The Cost and Human Toll of Neurological Conditions

White Paper Series

Improved Quality and Cost for Payers and the Members They Serve

Utilize®

Volume #1
Traumatic Brain Injury

Traumatic Brain Injury • Stroke • Multiple Sclerosis • Spinal Cord Injury/Disorder
Cerebral Palsy • Muscular Dystrophy • Other Neurological Conditions
Neurological Conditions Drive $800 Billion in Annual U.S. Costs

According to a report in *Neurology Today*, neurological conditions drive a staggering $800 billion in annual U.S. costs.¹ A subset of six neurological conditions—including traumatic brain injury (TBI), stroke, spinal cord injury/disorder, multiple sclerosis, muscular dystrophy, and cerebral palsy—drive nearly a third of these neurological related claims costs, or $240 billion annually,¹ and costs continue to grow at an alarming rate.

This white paper is the first in a series from Utilize Health exploring the cost and human toll of neurological conditions. In this paper, we lay the foundation for the series by examining the lifelong effects of neurological conditions and their significant impact on unnecessary utilization and cost in the United States. We then provide a deep dive into one key neurological condition, TBI, which has been a significant focus for recent public policy discussions and the media.
Experts now recognize there are hidden costs for patients with neurological conditions—costs that are not captured by traditional health plan algorithms or analytics. Like the costs themselves, the drivers of these costs have remained invisible and therefore not addressable by many health plans and treating providers. The evolution of neuro-analytics has not only driven a quantum shift in the ability to identify and pre-empt risk and cost, it also has yielded algorithms to achieve dramatically improved levels of recovery for individuals with neurological conditions.

In 2018, a multiple health plan claims analysis using proprietary neurological algorithms revealed post-acute neurological episodes are far more common, and more costly, than previously understood by payers. Although prevalence and cost varied by plan type and lines of business, the analysis revealed that between 12 and 24 percent of total annual medical spend was driven by members with one or more of the following six neurological conditions, including TBI, stroke, spinal cord injury/disorder, multiple sclerosis, muscular dystrophy, and cerebral palsy.

For this same subset of conditions, the analysis further found that annual medical expenditures grew by more than 25 percent, significantly surpassing traditional health plan estimates.

A 2018 analysis for a half million-member health plan revealed a savings opportunity of more than $40 million across all lines of business, driven by just 3 percent of the plan’s population.

Although average annual costs per member across all risk levels (low, rising and high) were $20,000, these costs more than doubled to $42,700 per member per year (PMPY) for the rising to high-risk member segment. For the high-risk segment only, costs averaged $90,000 PMPY. Savings opportunities fell into three main categories, including:

1. Improved identification and management of risk related to Ambulatory Care Sensitive Conditions (ACSC) and Associated Neurological Sensitive Conditions (ANSC)

2. Optimized place of service (POS)

3. Optimized medication management
Identified Cost Savings Opportunity: >$40MM

(ALL RISK LEVELS)

- Improved identification and management of ACSC + ANSC drives a majority of the Total Savings Opportunity

- Optimized POS drives next greatest segment of the Total Savings Opportunity
  - Reduced unnecessary ED visits and inpatient hospitalizations
  - Reduced unnecessary emergency transportation

- Optimized Rx
  - Represented a smaller but still significant share of the Total Savings Opportunity

Summary Savings Projections & Opportunity

Ambulatory Care Sensitive Conditions (ACSC)

+ Associated Neurological Sensitive Conditions (ANSC)

Rx
How Much of Neurologically Driven Risk and Cost is Preventable?

Perhaps even more staggering than the expenditures themselves is the fact that such costs are driven largely by preventable complications. How much of the cost is truly addressable? In 2018, a visionary health plan partnered with an innovative neurological care solutions company to implement a targeted program focused solely on a subset of six neurological conditions (TBI, stroke, spinal cord injury/disorder, multiple sclerosis, muscular dystrophy, and cerebral palsy).

Within six months, the program achieved a 14 percent delta in care costs for participating members. At nine months into the program, projections remained on track for a 20-25 percent reduction in total annual medical expenditures for participating members. Designed and implemented by Utilize Health, a targeted neurological care solutions company, the program not only achieved significant reductions in healthcare expenditures, it also delivered unprecedented levels of maintained clinical recovery for individuals participating in the program in addition to a 4:1 return on investment for the health plan.

What Can We Learn from TBI?

A growing body of research and policy decisions on TBI have brought awareness to the considerable opportunity for recovery and cost improvement to be achieved through targeted neurological care solutions. In 2008, Congress passed the Traumatic Brain Injury Act, which required the Centers for Disease Control (CDC) and the National Institutes of Health, in collaboration with the Department of Defense and Veterans Affairs, to improve methods for determining incidence and prevalence of TBI among former military personnel. Since then, a groundbreaking 2015 TBI Report to Congress and the Journal of the American Medical Association (JAMA) 2018 TRACK TBI study have championed awareness of both the challenges and opportunities to better manage TBI in America. Their findings have laid the groundwork for targeted neurological care solutions as an effective strategy for improving care quality, cost, and recovery not only for TBI, but also for neurological conditions overall.

What is the Cost and Human Toll?

In 2010, TBI accounted for $21 billion in medical costs; emergency room costs for TBI represented 38 percent of that total. In 2017, TBI medical costs reached $86 billion annually, placing ER costs at nearly $33 billion. The estimated lifetime cost for an individual with a severe TBI can range upwards of $5 million. Based on a growing body of evidence supporting its lifelong adverse health effects, TBI can no longer be viewed as a discrete event and instead must be understood and managed as a disease process.

As with other chronic conditions, managing TBI as a disease process has its challenges. The tremendous variation in intensity and duration of TBI across individuals greatly complicates the construction of evidence-based guidelines and best practice treatment options. Further, TBI symptoms include cognitive as well as physical impairments.
While cognitive symptoms of TBI impact memory, learning, and behavior, the physical symptoms of TBI can range from headaches, fatigue, and sleep disturbances to functional limitation, lack of coordination, sensory loss, and disability. Following a TBI, secondary neurological disorders including mood disorders and epilepsy can also occur. In addition, scientific literature now supports a connection between TBI and increased risk of dementia as well as other neurodegenerative disorders.

<table>
<thead>
<tr>
<th>Physical Symptoms</th>
<th>Cognitive Symptoms</th>
<th>Social &amp; Emotional Symptoms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Loss of hearing, smell, taste, or vision</td>
<td>Decreased attention and concentration</td>
<td>Irritability</td>
</tr>
<tr>
<td>Physical paralysis</td>
<td>Confusion</td>
<td>Aggression</td>
</tr>
<tr>
<td>Chronic pain</td>
<td>Slurred speech</td>
<td>Depression</td>
</tr>
<tr>
<td>Sleep disorders</td>
<td>Agitation</td>
<td>Lack of awareness</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Impulsiveness</td>
</tr>
</tbody>
</table>
TBI is now also recognized as a major contributing factor in domestic violence and physical abuse, extending far beyond the initial diagnosis and treatment period to effect a lifelong cost and human toll on patients, caregivers, families, and society.\textsuperscript{4,17–20} Numerous studies now support the ongoing and far-reaching impact of TBI. These studies reveal the shocking connection between TBI, domestic violence, and child abuse due to unaddressed TBI-related effects on the brain.\textsuperscript{19, 20}

Expanded access to appropriate treatment and recovery resources could prevent perpetuation and proliferation of countless cycles of violence and victimization within our current society and for future generations.

Further, targeted neurological care programs to identify, address, and prevent TBI symptoms from escalating could have immediate and significant impact on overall healthcare expenditures for families, communities, and our nation as a whole. Especially for vulnerable populations, which are already subject to increased rates of violence and abuse, there is a profound socioeconomic impact to be considered. Collaboration with government and public plans such as Medicare and Medicaid to implement programs for vulnerable populations could yield significant improvements in quality, recovery, and medical cost reductions.
TBI is one of the most prevalent neurological conditions in the U.S. As with other neurological conditions, TBI incidence, prevalence, and mortality are all increasing year-over-year at alarming rates. Statistics reveal that TBI incidence and prevalence spans all age bands and impacts all payer lines of business from commercial to Medicare and Medicaid. Extrapolations from state data estimate that between 1999 and 2008, 3.2 to 5.3 million Americans were living with a TBI-related disability.\textsuperscript{21–23}

In 2010, the CDC estimated that TBIs accounted for approximately 2.5 million ED visits; 300,000 hospitalizations; and nearly 53,000 deaths.\textsuperscript{4} Despite these concerning statistics, the CDC estimates occurrence of TBI remains significantly underreported, since it does not account for individuals who did not seek medical care, had outpatient or general practitioner office visits, were U.S. military personnel, or were veterans who sought care at a VA hospital.\textsuperscript{4}

Between 2007 and 2010, TBI-related ED visits, hospitalizations, and deaths increased by 45 percent; this increase is believed primarily to be driven by a concomitant 56 percent growth rate in TBI-related ED visits for the same period.\textsuperscript{4}

Although reasons for the increase are not fully clear, increased awareness of TBI stemming from heightened media coverage, CDC awareness campaigns such as HEADS UP, and state legislation requiring better recognition and management of sports-related concussions may be contributing factors.\textsuperscript{4}

Major causes of TBI include falls, which drive the majority of TBIs (35 percent), followed by motor vehicle-related injuries (17 percent), and blows to the head (17 percent) such as in acts of violence and sports injuries.\textsuperscript{24} In 2011, the CDC reported a 62 percent increase in the number of “sports and recreation–related ED visits for TBI” between 2001 and 2009 for individuals at or over age 19.\textsuperscript{25} Another CDC report found >300,000 U.S. children and young adults are treated annually in the ED with a sports or recreation-related diagnosis of concussion or TBI.\textsuperscript{26} In 2017, a JAMA study revealed that nearly all young adults assessed in the ED for TBI showed signs of chronic traumatic encephalopathy,\textsuperscript{27} a neurodegenerative disease caused by repeated head trauma.\textsuperscript{28} Among veterans and the military, a key population impacted by TBI, the Department of Defense estimated that 4.2 percent of the nearly 6 million individuals who served in the U.S. armed forces between 2000 and 2011 were diagnosed with a TBI.\textsuperscript{3}
The post-acute recovery trajectory for individuals with a TBI is extended, uncertain, and can last a lifetime. Too often following stabilization of the initial, acute event, individuals can become “lost” in the system. JAMA’s 2018 TRACK-TBI study revealed that:

Only 44 percent of patients reported seeing a physician within 3 months post injury, and even among patients with 3 or more moderate to severe post-concussive symptoms, only 52 percent reported having seen a practitioner within 3 months following the injury.5

Another study revealed that more than half of patients hospitalized for a TBI still had unrecognized needs for services one year post-injury.29

Significant barriers to recovery remain not only for TBI but also for neurological conditions as a whole. Providing solutions to address each of these barriers is key to delivering a credible solution.4, 5

What are the Main Barriers to Recovery?

© 2019 Utilize Health | utilizehealth.com
Key Barriers to TBI Recovery:

• In 2015, the CDC reported that the current body of evidence does not support the presence of a true post-acute standard of care including recommendations for the “optimal dose or intensity of therapy, the ideal timing of therapy in the recovery process, or the necessary modifications for subpopulations.”

Lack of Evidence-Based Guidelines:

• In 2011, the Institute of Medicine (IOM) acknowledged the difficulty in establishing evidence-based guidelines for TBI due to the complexity of such injuries and the inability to translate available rehabilitative options into standardized clinical recommendations.

Need for Personalized Approaches:

• The CDC also found that “No single TBI rehabilitation program will work for all patients…goals and methods of rehabilitation must be individualized.”

Unaddressed Neurological Risk Factors:

• Post-discharge follow-up is critical to prevent exacerbation of Associated Neurological Sensitive Conditions (ANSC) and Ambulatory Care Sensitive Conditions (ACSC), as established by CMS and AHRQ guidelines.

Limited Access to Quality Facilities:

• A recurring theme throughout TBI research is lack of access to quality, specialized rehabilitative facilities, resulting in high utilization of inappropriate care settings. There is a great need for technology and digital health approaches to empower outreach and engagement, empower personalized facility matching, and address other key access barriers.
Approaches to neurological rehabilitation have advanced greatly over the past two decades. Although it once was dogma that the brain is a “static” organ and brain development ceases early in life, it is now well understood that neuroplasticity and neurogenesis is ongoing and allows the neurons in the brain to compensate for injury and disease. “A growing body of research on TBI and recovery has demonstrated benefits of high-intensity intervention, even during later stages of recovery.”4,31 Greater focus is required to evaluate alternative rehabilitation models and long-term medical care for TBI, including “use of tele-health and web-based technologies that provide access to expert consultation…to overcome barriers to rehabilitation access, such as geographic residence and lack of transportation.”4

Evidence now points to the need for specialized and highly personalized approaches for neurological conditions. Utilize Health is pioneering targeted neurological care solutions by working with recognized health plan innovators to help members with complex neurological conditions navigate their course of care. The program combines digital tools and “personal touch” services to help members effectively coordinate their medical care. Results are achieved through specialized and highly individualized monitoring, education, and preventive action plans that empower members to achieve their maximum potential for recovery while significantly reducing the cost of care.
How Do We Achieve Unmatched Results?

Utilize Health’s innovative solutions focus on neurological conditions that drive some of the highest care costs (TBI, stroke, spinal cord injury/disorder, multiple sclerosis, muscular dystrophy, and cerebral palsy). The program helps health plans achieve quality-driven medical cost savings while supporting members to achieve optimized levels of recovery. The program uses a targeted approach that identifies and addresses risk of concomitant conditions and social determinants of health, optimizes place of service, and improves medication management for members with neurological conditions. Utilize Health’s unique program addresses all key opportunities identified by current published evidence.

Neurological Claims Analysis and Ongoing Clinical Assessment:

Utilize Health’s program begins with a specialized claims analysis using a proprietary neurological analytics model that leverages 300+ relevant data points not included in a traditional health plan claims analysis. Members with ongoing neurological conditions are identified and risk stratified. A secondary analysis identifies predictive patterns to pinpoint cost savings opportunities correlating to member acuity, including existence of comorbidities and/or complications, increased utilization, and place of service.

Analysis and stratification are further supported by comprehensive, ongoing member assessments and interventions provided as part of the program. These assessments are based upon National Committee on Quality Assurance (NCQA) standards for complex patients and include neurological functional assessments, identification of Associated Neurological Sensitive Conditions and Ambulatory Care Sensitive Conditions, medication reconciliation and therapy adherence, and assessment of social determinants of health impacting ability and willingness to adhere to a plan of care.

Tailored Engagement and Specialized Clinical Support:

Utilize Health’s targeted neurological care solutions program leverages expert, multichannel engagement and care navigation solutions tailored to each member’s specific condition and needs. With a comprehensive suite of digital support tools, Utilize Health’s specialized Patient Advocates (PAs) and field-based community health workers provide the critical element of human interaction required to optimize program success. Each member is assigned a dedicated PA to contact when questions or needs arise.
The PA team includes registered nurses and other clinicians, each with a minimum of 8+ years of neurological care experience in two or more discrete care settings (Physical Therapy, Occupational Therapy, and/or Speech and Language Therapy). Complementing the program’s digital and telephonic support are specially trained, field-based community health workers for member in-home support.

**Neuro Specific Platform and Cloud-Based Application:**

The Patient Advocate (PA) platform is the backbone of the program, empowering the ability to drive effective care outcomes, reduce costs, and achieve high member satisfaction. The PA platform securely collects member assessment and claims data to inform care goals and empower timely intervention by Utilize Health’s clinicians. Ongoing member assessment and engagement is facilitated through a secure, cloud-based application. Via this application, the patient portal supports convenient, real time communication with the patient’s dedicated PA.

**Referral Management & Navigation to Appropriate Care Setting:**

In addition to convenient member messaging and a Medical Equipment and Therapy Library, the cloud-based application features a neuro rehabilitation center Facility Optimizer™, which empowers highly specialized facility matching tailored to member needs. The Facility Optimizer is wholly unique to Utilize Health. Leveraging data curated over 14 years, the application can complement and expand a health plan’s existing quality network and educational resources.
At Utilize Health, no one walks alone.

Contact Utilize Health today.

Although significant gaps in care exist for individuals with neurological conditions, evidence supports that focused and highly personalized approaches are indicated for the benefit of patients, payers, and providers. Utilize Health’s unique program addresses all key challenges and opportunities identified by current published evidence, providing highly targeted and tailored neurological care solutions not only for TBI, but also for other costly neurological conditions, including stroke, spinal cord injury/disorder, multiple sclerosis, muscular dystrophy, and cerebral palsy. Utilize Health’s programs deliver proven results, including optimized care navigation, high rates of patient engagement and satisfaction, and a 4:1 ROI. **Programs are easily launched and deliver savings within 6 months of program start.** Utilize Health offers flexible funding models and financially guarantees results.

---

To learn more about improved outcomes, recovery, and cost of care for your members with neurological conditions, please contact us at:

812.449.7843 or
jessica.harthcock@myutilizehealth.com

---

Jessica Harthcock, Chief Executive Officer  |  Tel: 812.449.7843  |  jessica.harthcock@myutilizehealth.com
Resources


3 The CDC, NIH, DoD, and VA Leadership Panel. Report to Congress on Traumatic Brain Injury in the United States: Understanding the Public Health Problem among Current and Former Military Personnel. Centers for Disease Control and Prevention (CDC), the National Institutes of Health (NIH), the Department of Defense (DoD), and the Department of Veterans Affairs (VA) (2013).


