



## **PUBLIC POLICY BRIEF #2**

### *The Public Health Consequence of Brain Injury in Indiana*

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# ***Brain Injury is a lifelong chronic condition***

**Brain injury is a chronic lifelong condition.** Survivors are at risk for: unemployment, addiction, homelessness, depression, criminal conduct, alienation from family and friends, and co-occurring health conditions. Further, brain injury is commonly not reported and frequently misdiagnosed. Since 2009, the Rehabilitation Hospital of Indiana (RHI), in partnership with Indiana Vocational Rehabilitation (VR), has offered a new service called Resource Facilitation – which has improved brain injury survivor return to work from 18% to 70%.

This paper provides a high level picture of Indiana’s public health challenges resulting from brain injury. It is our intention to continue deepening our understanding of the public health challenges resulting from brain injury, and seeking partners in our search for solutions.

#### ***Public Health – Brain Injury is a Chronic Lifelong Condition***

While lifelong, brain injury is not static.<sup>1</sup> Research has demonstrated that compared to year one after injury, 20% of people at two years after traumatic brain injury (TBI) are more disabled and 31.5% are less disabled. Further, by 15 years post-injury, the level of disability improved for 28.9% of people with TBI as compared with their status at 10 years post-injury, but for 28.9%, their level of disability got worse. The Institute of Medicine has concluded that moderate to severe TBI is associated with dementia of the Alzheimer type and with Parkinsonism.<sup>2</sup> The CDC<sup>3</sup> has concluded that TBI should be managed as a chronic condition. ***Brain injury is a chronic condition that can most often be managed, but is subject to substantial change over time.***

***Scope – After 8 years of service, our census averages 10 years post-injury, and we still don’t have a complete picture of the problem.***

As brain injury is not well documented, a comprehensive assessment of the challenge is impossible.<sup>4</sup> A recent study conducted by Ball State University estimates that there are at least 66,410 Hoosiers living with Traumatic Brain Injuries.<sup>5</sup> Up to 20% (13,282) are moderate to severe.<sup>6</sup> While RHI has offered RF since 2009, those we serve are on average 10 years post-injury. ***The scope of brain injury in Indiana is not well defined, but it is clear that we have just scratched the surface in terms of meeting needs.***

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***Cost – Indiana’s 2017 cost for newly injured survivors is estimated conservatively at \$23,966,154.***

The Ball State study finds that, without RF services, 266 newly brain injured Hoosiers would not return to work, costing Hoosiers \$23,966,154 in 2017.<sup>7</sup> Adding a measure of hope, the full cost of RF for this group is roughly 7% of the costs associated with their unemployment. ***Brain injury related costs are high, solutions known to us today cost a fraction of the problem.***

***Criminality – 95%+ in the Veterans Court, and 60%+ in Drug Treatment Court.***

Brain injury is a recognized risk factor for criminal conduct.<sup>8</sup> RHI recently screened defendants in Marion County, finding 95% in the Veterans Court, and over 60% in the Drug Treatment Court screened positive for brain injury. Over the past 20 months, 185 ex-offenders (over 12%) returning to Marion County from the Indiana Department of Corrections were found to have moderate to severe brain injuries.<sup>9</sup> Many had no idea that they had a brain injury. ***Proper diagnosis and training offers these people a chance to understand the challenges they face, take responsibility for themselves, and avoid future criminal conduct.***

***Addiction – You can’t treat what you can’t see.***

People with brain injury are at significant risk for substance abuse.<sup>10</sup> Experts in the rehabilitation community generally agree that people with brain injury are in greater than average risk for heroin addiction.<sup>11</sup> Many of the 60% in Marion County’s Drug Treatment Court who screened positive didn’t know they had a brain injury. With an undiagnosed brain injury contributing to alcohol or drug use, a defendant who can’t stay clean could appear irresponsible or worse. ***A necessary step to overcoming an addiction with brain injury is accurate diagnosis and appropriate treatment.***

***Missed Diagnosis or Misdiagnosis – “Does being shot in the head count as a brain injury?”***

This question was posed to RHI staff while working with ex-offenders returning home from the Indiana Department of Corrections. While an extreme example, this question highlights a serious problem. Brain injury is frequently misdiagnosed as bipolar disorder as they share similar symptoms, or “psychosis NOS”. Some medications commonly

prescribed for bipolar disorder can worsen negative behavior in people with brain injury. Medical professionals can’t help patients address brain injury related problems if that injury is not reported to them. ***Psychiatrists and Psychologists acknowledge this problem, but there are currently no known data on how many people are affected.***

***Solutions – Awareness, Diagnosis, Action.***

RHI staff regularly train providers and social services agencies about brain injury basics and screening. Further, in cooperation with Indiana Vocational Rehabilitation and the Indiana Department of Corrections, state employees have been trained to screen for and respond appropriately to brain injury.

In 2016, RHI formed a Research and Training Center (RTC) to train healthcare and community services providers how to recognize and treat brain injury consistent with their disciplines. We have begun to build relationship and partnerships from these interactions. This will be critical for next steps.

Currently, RHI is engaged with partners in the following actions:

1. Providing RF services through Indiana VR.
2. Providing brain injury services to ex-offenders returning to Marion County from the Indiana Department of Corrections, with the intent of getting those interested RF services through Indiana VR.
3. Providing Brain Injury Coping Skills training to offenders in the Veterans Unit at the Edinburg Correctional Facility, again with the hope of getting them into RF services upon release.

We welcome you to join us in improving lives and reducing the costs of brain injury.

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End Notes:

<sup>1</sup> Dijkers MP, Harrison-Felix C, Marwitz JH. The traumatic brain injury model systems: history and contributions to clinical service and research. *J Head Trauma Rehabilitation* 2010; 25:81-91.

<sup>2</sup> Institute of Medicine. *Gulf War and health: volume 7: long-term consequences of traumatic brain injury.* Washington (DC): National Academy Press, 2009.

<sup>3</sup> Moderate to severe traumatic brain injury is a lifelong condition. Center for Disease Control and Prevention. [https://www.cdc.gov/traumaticbraininjury/pdf/moderate\\_to\\_severe\\_tbi\\_lifelong-a.pdf](https://www.cdc.gov/traumaticbraininjury/pdf/moderate_to_severe_tbi_lifelong-a.pdf)

<sup>4</sup> We want to recognize recent changes in law which are driving improved recognition and treatment of sports related brain injuries.

This will improve recognition and help many people live much better lives than would otherwise have been the case. Yet, many brain injuries are never reported, their subsequent symptoms are frequently misdiagnosed, and many survivors lived isolated lives never meeting their potential as productive members of their communities.

<sup>5</sup> Economic Impact of Resource Facilitation: Workforce Re-entry Following Traumatic Brain Injury, Srikant Devaraj, PhD, Michael Hicks, PhD, Brandon Patterson Graduate Research Assistant, Center for Business and Economic Research, Miller College of Business, Ball State University, February 21, 2017.

<sup>6</sup> Clinical Trials in Head Injury, Raj K. Narayan, MD, NIH Public Access, May 17, 2006.

<sup>7</sup> Economic Impact of Resource Facilitation: Workforce Re-entry Following Traumatic Brain Injury, Srikant Devaraj, PhD, Michael Hicks, PhD, Brandon Patterson Graduate Research Assistant, Center for Business and Economic Research, Miller College of Business, Ball State University, February 21, 2017.

<sup>8</sup> Sarapata, M, Herrmann, D, Johnson, T, & Aycocock, R. The role of head injury in cognitive functioning, emotional adjustment and criminal behavior *Brain Injury 1998: 12* (10), 821–842.

<sup>9</sup> Under the auspices of a federal grant from the Health Resources Services Administration (HRSA), RHI, the Indiana Department of Corrections and Re-entry providers PACE and Duval have been working to help ex-offenders with moderate to severe brain injuries re-acclimate to society. The screenings conducted in the Marion County Problem Solving Courts were also part of this grant. Both screening efforts used the same instrument, and in both cases the screeners were trained by RHI. The above-referenced number was the result of screening under this grant.

<sup>10</sup> Miller SC, Baktash SH, Webb TS et al. Addiction-related disorders following mild traumatic brain injury in a large cohort of active-duty US Airmen. *Amer J Psychiatry* 2013; 170:383-390.

<sup>11</sup> This widely held opinion is as yet unproven. However, the general agreement has been sufficiently strong that research is underway.