

# Investment in research saves lives and money



facts about:

## Traumatic Brain Injury (TBI)

*"If you think research is expensive, try disease."*

- Mary Lasker 1901-1994

### Today:

- An estimated 3.2 to 5.3 million Americans are living with neurological symptoms caused by a traumatic brain injury (TBI).\*
- Every hour more than 155 Americans are admitted to hospital emergency departments for a TBI, more than 30 are hospitalized and nearly 6 die.\*
- Chronic traumatic encephalopathy (CTE) as result of repeated mild TBI is associated with an increased risk of suicide, violent behavior and dementia.†
- In 2013, over 13,000 older adults died from TBIs sustained in falls. In 2012, 325,000 youths were treated for sports and recreation-related TBI.\*
- Between 2000 and the first half of 2016, over 352,000 service members suffered a TBI. It is estimated that CTE affects nearly 20% of military veterans.†,‡

### The Cost:

- In 2010, direct and indirect costs of TBI were estimated to be over \$76 billion in the U.S.\*
- The cost of lifetime care for a person who suffers a TBI can be as high as \$3 million.‡
- Hospital inpatient care for TBI can cost nearly \$8,000 per day, and the cost of rehabilitative care can reach \$1,000 per day.‡
- TBI frequently leads to neurobehavioral disabilities that compromise patients' quality of life. Though there are a wide variety of individual differences, patients with TBIs are more likely to be unemployed than people who have not suffered a TBI.□

\* CENTERS FOR DISEASE CONTROL AND PREVENTION <WWW.CDC.GOV>  
 † GOLDSTEIN ET AL. SCI TRANSL MED, 2012. 4(134): 134.  
 ‡ DEFENSE AND VETERANS BRAIN INJURY CENTER <HTTP://DVVIC.DCOE.MIL/DOD-WORLDWIDE-NUMBERS-TBI>  
 § BRAIN INJURY ASSOCIATION OF AMERICA <HTTP://WWW.BIAUSA.ORG>  
 □ HUMPHREYS, ET AL. CLINICOECONOMICS AND OUTCOMES RESEARCH. 2013. 5:281-287

### perspective:



NAME: Patrick Mark Kinzle Risha  
 AGE: 32  
 CONDITION: Chronic Traumatic Encephalopathy (CTE)

Patrick is no longer with us. He tragically died from suicide, but science is telling us he actually died from CTE. Until that fateful night when he called his mother with his dog's leash around his neck, no one knew what was causing the rapid mental decline in such a young, gifted, and handsome Dartmouth graduate. When Patrick's brain was autopsied and CTE was discovered, his family made a commitment to inform other families of the dangers and symptoms of CTE through the Patrick Risha CTE Awareness Foundation.

CTE is caused by repeated mild TBI, the kind that occurs routinely when athletes head the ball in soccer, check each other in hockey, and hit and tackle in football. Many neurologists believe children may be the most vulnerable of all. Patrick started playing football when he was only 10 years old. CTE is becoming a prevalent problem for military veterans and domestic abuse victims as well.

CTE takes time to develop. It can take a decade, often presenting itself long after the repetitive brain trauma activity has ceased. Its symptoms include anger, memory loss, confusion, anxiety, impaired judgment, impulsivity, paranoia, aggression, depression, addictive behaviors and suicidal thinking. In Patrick's name his family seeks more research to find tools for the prevention, diagnosis, treatment and cure of CTE. Such research will lower crime, suicides, and drug addictions in our country, while saving families from the heartache of losing a loved one through such a tragic mental collapse.

"We need to recognize that the human brain is more fragile than we ever knew," says Karen Kinzle Zegel, Patrick's mom. "With this new awareness and continued research, lives will be spared."

For more information about the Patrick Risha CTE Awareness Foundation, visit StopCTE.org.

SAVING LIVES  
 SAVING MONEY

### HOW RESEARCH SAVES LIVES:

- Cyclosporine A (CsA) has shown promise in reducing the lasting brain damage that leads to most TBI-related impairment. While still being evaluated for use in humans, in preclinical trials CsA led to an 80% reduction in brain damage following a TBI.\*
- Decompressive surgery (partial removal of the skull) is being pioneered as a means of reducing the risk of death in severe TBI patients. In preliminary surgical trials, the rate of mortality fell from nearly 50% to less than 27%.^

### HOW RESEARCH SAVES MONEY:

- It is estimated that the development and adoption of in-hospital guidelines that encourage proper care following severe TBI would save over \$288 million dollars in direct medical costs and \$3.8 billion dollars in lifetime and societal costs.†
- The Centers for Disease Control and Prevention (CDC), in collaboration with public and private partners, has developed the Heads Up program. This program targets two high-risk populations-- adolescents and older adults - by developing training materials and interventions to help reduce the incidence of TBI. These two groups represent the largest share of TBI patients annually, and reducing the incidence of TBI in these groups can save hundreds of millions of dollars every year. †
- Compared to riders with helmets, unhelmeted motorcycle riders are 37% more likely to die and incur up to \$26,000 more in treatment costs following a motorcycle accident. New helmets being developed for recreational and professional athletics and for the military are increasingly more protective and should reduce treatment costs even more.‡

\* LOANE AND FADEN. TRENDS IN PHARMACOLOGICAL SCIENCE, 2010. 31(12): 596-604.  
 ^ HUTCHINSON ET AL. NEW ENGLAND JOURNAL OF MEDICINE, 2016. 375:1119-1130  
 † CENTERS FOR DISEASE CONTROL AND PREVENTION <WWW.CDC.GOV>  
 ‡ NATIONAL HIGHWAY TRAFFIC SAFETY ADMINISTRATION <WWW.NHTSA.GOV>

# facts about: } TBI

## Hope for the Future:

- ❑ Axons are the “wires” that transmit messages between neurons and are frequently damaged or destroyed in TBI. Ongoing clinical research at the University of California Irvine has shown promise in regrowing these axons.\*
- ❑ Currently, it is very difficult to diagnose CTE in living patients. However, researchers supported by an NIH grant are making great strides toward being able to diagnose CTE by using positron emission tomography (PET) scans to tag and visualize tau protein clumps, a primary indicator of CTE. ^
- ❑ The Brain Research through Advancing Innovative Neurotechnologies (BRAIN) Initiative provides over \$300 million in public and private sector investments committed to understanding and mapping the brain. This basic research is crucial to the development of measures to prevent, diagnose and treat injuries and diseases of the brain, including TBI.+

\* PAWAR, ET AL. BIOMATERIALS. 2015. 65:1-12

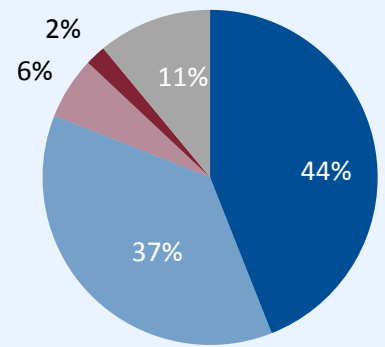
^ BARRIO ET AL. PROC NATL ACAD SCI U S A. 2015. 112(16):E2039-47.

+ THE WHITE HOUSE <HTTPS://WWW.WHITEHOUSE.GOV/BRAIN>

### National Poll: TBI Research is Important

*How important is it for our nation to support traumatic brain injury (TBI) research?*

A RESEARCH!AMERICA SURVEY OF U.S. ADULTS CONDUCTED IN PARTNERSHIP WITH ZOGBY ANALYTICS IN JANUARY 2016.



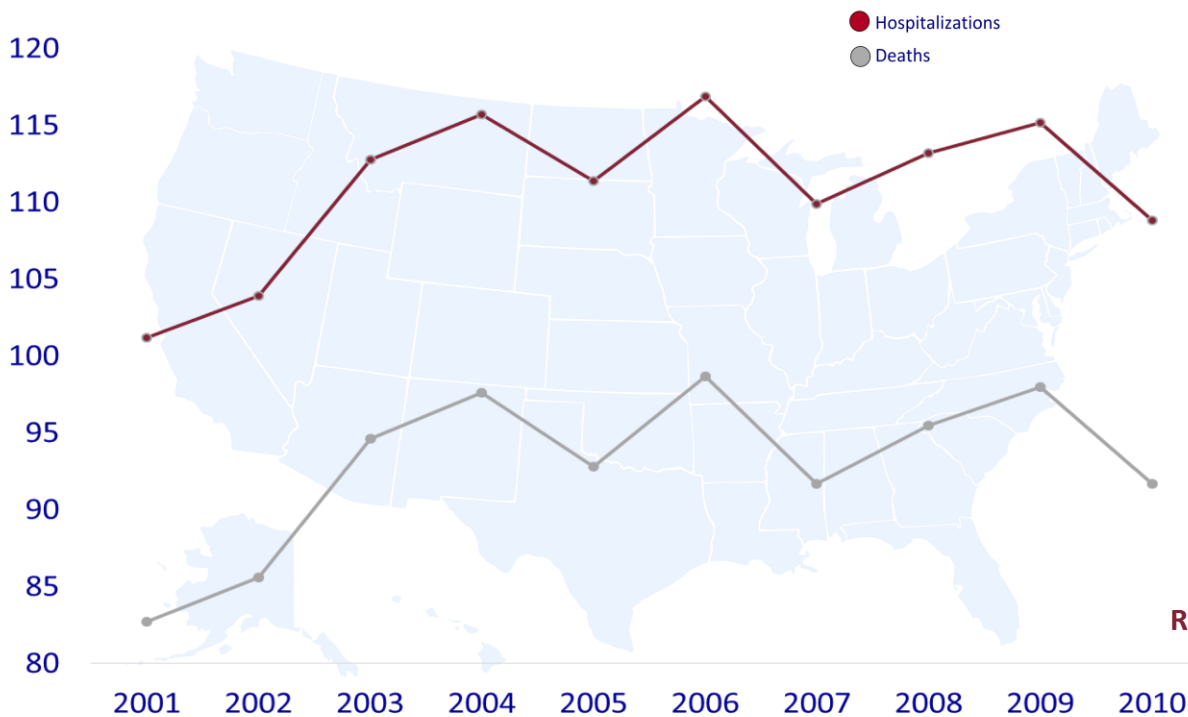
- Very Important
- Somewhat Important
- Not too Important
- Not at all Important
- Not Sure

## The Bottom Line:

*Traumatic brain injury (TBI) is a complex condition that affects many Americans, disproportionately impacting our troops and most vulnerable populations. TBI damages the brain not only from the initial injury, but degrades brain function over time as secondary injury mechanisms continue to take their toll. Robust investments are needed to research the impact of this injury – and its potential cures.*

## Hospitalizations and Deaths from TBIs in the U.S., 2000-2010

(per 100,000)



SOURCE: CENTERS FOR DISEASE CONTROL AND PREVENTION

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*The Albert and Mary Lasker Foundation is a founding partner in this series of fact sheets. [www.laskerfoundation.org](http://www.laskerfoundation.org)*

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