

# The Economic Impact of Traumatic Brain Injury (TBI)/PTSD Veterans in Kentucky



**Prepared for the Kentucky 2023/2024 Legislative Assembly**

**by**

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## Executive Summary

Hyperbaric Oxygen Therapy (HBOT) for TBI/PTSD Veterans is a standard of care for the Israeli military. We are asking for Kentucky to join the five funded states to help us help those who have defended our country and deserve the best healthcare our state and country can provide. The passage of House Concurrent Resolution (HCR) 40 in February 2022 supported by the Joint Executive Council of Veteran Organizations (JECVO) urged Kentucky's Congressional delegation to fund treatments through the VA medical centers. The funding has not developed. A network of private hospitals and a clinic is ready, qualified, authorized and trained to treat our TBI/PTSD Veterans immediately. With our TBI/PTSD Veteran suicide rate at 20 per day, alongside an opioid epidemic, time is of the essence. The cost savings alone are compelling.

The costs of the twenty-year wars in Afghanistan, Iraq, Syria, and Pakistan are staggering. They have cost American taxpayers \$6.4 trillion according to a recent study.<sup>1</sup> The report, from Watson Institute of International and Public Affairs at Brown University, also finds that more than 801,000 people have died as a direct result of fighting.<sup>2</sup> As of February 2, 2021, over 7,053 US personnel have died in Iraq and Afghanistan. Traumatic Brain Injuries, the “invisible wounds” and the “signature injuries” to US service members is over 877,450, in addition to the tens of thousands of visibly wounded combatants. It is fair to say that costs continue to escalate partly because of bad science brought about by medicine's unwillingness to accept worldwide science and evidence of new, non-standard treatments that are healing brain wounds. Our financial analysis did not include hospitalizations, suicide long-term care, caregiver healthcare (PTSD related to caregiving of TBI Veterans), routine medical doctor visits, outside VA healthcare covered costs or Medicaid costs. Approximately 19,394 Kentucky Veterans were Medicaid covered in 2015, and of this number, 54 percent were disabled, 11 percent had mental illness and 12 percent substance use disorder for a total of 76 percent or 14,739.<sup>3</sup> Our estimate of 12,050 TBI Kentucky Veterans is under stated in this analysis. Subsequently, our projected annual TBI/PTSD Veteran societal economic impact financial analysis is under reported herein.

***The current annual economic societal cost (Table 1) for Kentucky TBI/PTSD Veterans who live with an untreated, undiagnosed, or misdiagnosed TBI is estimated to be \$484,249,150. For the estimated 12,050 TBI/PTSD Veterans in our Commonwealth, an annual \$40,186 cost per TBI/PTSD Veteran (Table 2) or \$19.3 billion over 40-year lifespan (Table 3). With a Kentucky state reoccurring \$1.3 million treatment funding, the annual Return on Investment (ROI) is approximately \$2.7 million annual savings or 0.79 percent of the total lifetime \$19.3 billion cost (Table 3).*** The financial results on the Return on Investment (ROI) assessment should make this a straightforward business decision. There are an estimated 877,450 U.S. brain-wounded post 9/11 service members. **“The VA estimates that the 10-year cost of caring for post-9/11 veterans with Traumatic Brain Injury (TBI) alone will be \$2.4 billion from 2020 to 2029.”**<sup>4</sup> This is an inflation adjusted \$355.3 million in 2029 for

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<sup>1</sup> <https://abcnews.go.com/International/wireStory/counting-costs-americas-20-year-war-afghanistan-77414628>

<sup>2</sup> Watson Institute International & Public Affairs, Brown University Cost of War, Human Cost of Post 9/11 Wars: Lethality and Need for Transparency, November 2018, Neta C Crawford

<sup>3</sup> Kaiser Family Foundation, KFF.org, Medicaid's Role in Covering Veterans, June 29, 2017

<sup>4</sup> Department of Veterans Affairs. (2019). Volume II, *Medical Programs and Information Technology Programs*, p. VHA-150,

877,450 TBI Veterans across the country.<sup>5</sup> There are ten states (OK, AZ, TX, IN, KY, NC, FL, MD, VA, WY) which have legislated Hyperbaric Oxygen Therapy (HBOT) for TBI/PTSD Veterans. Five states (AZ, IN, NC, FL, MD) have funded treatments totaling approximately \$3 million to date.

## **Background**

In 2019, approximately 64.7 million citizens were enrolled in Medicaid, with persons with disabilities under the age of 64 in 2016 average Medicaid cost was \$19,753 per expenditure.<sup>6</sup> Overall, expenditures on Medicaid for FY2017, including federal funds, consumed 28.9 percent of state budgets.<sup>7</sup> We estimate a percentage of TBI Veterans qualify for Medicaid financial assistance. Our research did not conduct a financial assessment of TBI qualified Medicaid Veterans who qualified for compensation expenses across each state and are not included in the analysis.

Realistic estimates of TBI-related costs in the military are achieved through comprehensive long-term studies which to our knowledge have never been produced. Actual cost data at the level of individual patients, is required. Variables included specific TBI characteristics, treatments, comorbidities, health consequences, rehabilitation needs, and long-term disability. Such a study must follow injured Veterans over a long period to collect accurate cost data for all services they receive. A study must also account for the effects of improvements in technology and treatment on costs to ensure compatibility of cost estimates from different periods. Information about the economic consequences of TBI-related mortality must be obtained from families of those Veterans who died from TBIs. Costs in this document were conservatively understated scaled as to not overstate the economic impact. The total US TBI Veteran cost estimate for 877,450 brain wounded Veterans is \$118.1 billion annually, \$4.7 trillion over 40-year life span. We can treat Kentucky Veterans and heal for less than 0.80 of 1 percent of the lifetime cost.

Over 98 percent of the current pharmacologic treatment for TBI and PTSD are off label. Yet, treating TBI with off-label drugs, processes, devices, and protocols not approved by the FDA for TBI/PTSD is a continuing formula for failure to prevent, much less reverse, the TBI Veteran suicide and opioid epidemic. Failures of a growing number of psychological interventions have also proved ineffective in reversing the suicide epidemic. Costs and suicides continue to escalate.

Approximately 88 percent of the cost resides in caregiver, unemployment, and opioid use disorder related costs. This calculated loss of economic activity is spread across a complex of known impacts. It includes Veteran homelessness, loss of state and federal income taxes, loss of state sales taxes, loss of state vehicle taxes, drug and opioid induced costs including loss of state and federal income tax, loss of state and federal tax revenues from TBI suicides, non-taxable VA and Social Security disability payments, incarceration state costs, and pharmaceuticals. A

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<https://www.va.gov/budget/docs/summary/fy2020VAbudgetVolumeIImedicalProgramsAndInformationTechnology.pdf>

<sup>5</sup> Inflationdata.com, 114-year average inflation rate is 3.24%

<sup>6</sup> Medicaid & Children's Health Insurance Program (CHIP) Beneficiaries at a Glance, CMS Medicaid & CHIP Health Care Quality measures, December 2019

<sup>7</sup> Ibid.

conservative approach to the total economic impact for each of the cost elements described herein is used in the data that follows.

Treating and healing brain wounds, now possible, can tip the scales to reverse the suicide epidemic among service members and brake accelerating costs. The financial benefits to the VA and US Federal, State, County budgets is significant. KRS 217.930-.942 was enacted and became effective in July 2018 making HBOT chambers available to all Kentucky Veterans. We have a network of three hospitals and one private clinic currently serving the two largest Veteran demographic markets in Kentucky in Lexington (20,000) and Louisville (60,000) or approximately 28 percent of the total KY Veteran market. The treatment funding will help eliminate suicide ideation and make readily available life-saving treatment to TBI/PTSD Veterans across the Commonwealth.

Since 2007, over 20 clinical Institutional Review Board (IRB) medical studies involving over 750 Veterans/patients completed reflecting medical evidence of the safety and efficacy of HBOT for mild TBI Veterans. Dr. Paul G. Harch recently published paper on March 17, 2022 in the Frontiers of Neurology titled, [“Systematic Review and Dosage Analysis: Hyperbaric Oxygen Therapy Efficacy in Mild Traumatic Brain Injury Persistent Post-concussion Syndrome”](#) reveals the compelling medical evidence of how HBOT heals TBI Veterans. The medical research report was a systematic review of the evidence according to the Centre for Evidence-Based Medicine and practice recommendation according to the American Society of Plastic Surgeons.<sup>8</sup> Eleven studies were included: six randomized trials, one case-controlled study, once case series, and three case reports.<sup>9</sup> The conclusion summary indicates. “In multiple randomized and randomized controlled studies HBOT at 1.5 ATA oxygen demonstrated statistically significant symptomatic and cognitive or cognitive improvements alone in patient with mild traumatic brain injury Persistent Post-Concussion Syndrome.”<sup>10</sup>

The 20-year-old medical protocol for treating TBI Veterans is an individual symptom-based pharmacology approach which has resulted in national suicide and opioid epidemics, with no significant improvements in reducing the physical, cognitive, behavioral, neurological, psychological, and emotional/spiritual impact of TBIs. The take-away from this report is that we can treat KY TBI Veterans (and their families), a healthcare cost reduction, and an increase in the state revenue are all possible because of reintegration of Veterans back into society.

***Approximately half (49.3%) of the societal cost (Table 2) is related to caregivers' loss wages caring for TBI Veterans.*** Reintegration of 80 Veterans results in 104 caregivers returning to full time work (80 X 1.3 caregivers), an estimated \$2.06M in additional state taxable labor revenue in the first year. If 50 of the 100 treated Veterans returned to work, it is a \$604K (50 X \$12,091, Table 2) reduction in paid unemployment benefits. Based solely on caregivers returning to full time employment, and half of treated Veterans returning to work, this is an economic sound business case and ROI investment for Kentucky taxpayers investing in a proven treatment to reintegrate TBI Veterans into the work force.

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<sup>8</sup> Systematic Review and Dosage Analysis: Hyperbaric Oxygen Therapy Efficacy in Mild Traumatic Brain Injury Persistent Post concussion; frontiers in Neurology, D. Paul G. Harch, March 17, 2022

<sup>9</sup> Ibid.

<sup>10</sup> Ibid.

## 2023 KY TBI/PTSD Veteran Estimated Annual Societal Economic Impact

<b>Revenue Stream</b>	<b>Estimated Type Revenue</b>	<b>Total Estimated Costs</b>
TBI Veteran Caregiver Cost	TBI Veteran Caregiver Cost Impact Per Year	\$238,771,500
TBI Veteran Opioid Use Disorder	State Tax Revenue Loss	\$2,767,158
TBI Veteran Opioid Use Disorder	Federal Income Tax Revenue Loss	\$9,531,928
TBI Veteran Opioid Use Disorder	VA Disability Payments (Non-Taxable)	\$13,616,143
TBI Veteran Opioid Use Disorder	Social Security Disability (Non-Taxable)	\$14,688,000
TBI Veteran Pharmaceutical Cost	VA Pharmaceutical Cost Per Veteran Average \$1,035 Each Per Year x 12,050 TBI Veterans - 49% in VA	\$6,360,593
TBI Veteran Suicide	State Income Tax Revenue Loss	\$298,419
TBI Veteran Suicide	Federal Income Tax Revenue Loss	\$1,027,953
TBI Veteran Suicide	Social Security Disability	\$1,468,407
TBI Veteran Suicide	VA Disability	\$1,584,000
TBI Unemployed Veterans	Unemployed State income Tax Loss	\$32,779,970
TBI Unemployed Veterans	Unemployed Federal Income Tax Loss	\$112,915,997
TBI Homeless Veterans	State Income Tax Loss	\$1,627,740
TBI Homeless Veterans	Federal Income Tax Loss	\$5,607,018
TBI Veteran Incarcerations	Veteran Incarceration Annual Cost	\$20,883,565
TBI Veteran State and Local Sales Tax	State and Local Sales Tax Loss	\$11,785,503
TBI Veteran State Property Tax	State Property Tax Loss	\$7,223,011
TBI Veteran Vehicle Property Tax	Vehicle Property Tax Loss	\$1,312,245
<b>Total</b>		<b>\$484,249,150</b>

Table 1

## 2023 Kentucky TBI/PTSD Veteran Economic Impact Cost Summary

<b>Kentucky TBI Veteran Revenue Stream Economic Annual Impact</b>	<b>Total Estimated Economic Cost Impact</b>	<b>Percent of Total Cost</b>	<b>Average Cost Per Veteran Per Year Based on 12,050 TBI Veterans</b>
TBI Veteran Caregiver Economic Annual Impact	\$238,771,500.00	49.3%	\$19,815.00
TBI Veteran Unemployed Economic Annual Impact	\$145,695,967.00	30.1%	\$12,091.00
TBI Veteran Opioid Use Disorder Economic Annual Impact	\$40,603,229.00	8.4%	\$3,370.00
TBI Veteran Incarcerated Economic Annual Impact	\$20,883,565.00	4.3%	\$1,733.00
TBI Veteran Local, Property, and Vehicle Tax Economic Annual Impact	\$20,320,759.00	4.2%	\$1,686.00
TBI Veteran Homeless Economic Annual Impact	\$7,234,758.00	1.5%	\$600.00
TBI Veteran Pharmaceutical Economic Annual Impact	\$6,360,593.00	1.3%	\$528.00
TBI Veteran Suicide Economic Annual Impact	\$4,378,779.00	0.9%	\$363.00
Kentucky Estimated Untreated TBI Veteran Economic Annual Impact	\$484,249,150.00	100.0%	\$40,186.00

Table 2

## 2023 Kentucky TBI/PTSD Veteran Estimated Lifetime Economic Impact

<b>2023 Kentucky Estimated TBI Veteran Lifetime Economic Impact</b>	<b>Total Estimated Cost Impact</b>
Kentucky Annual Reoccurring Economic Impact X 10 Years (\$484,249,150 X 10)	<b>\$4.84 Billion</b>
Kentucky Lifetime Reoccurring Economic Impact X 40 Years (\$484,249,150 X 40)	<b>\$19.36 Billion</b>
Kentucky One-time Cost, 40 HBOT Treatments Per Veteran at Average \$322 per dive (\$12,880 Per Veteran X 12,050 Estimated TBI Veterans)	<b>\$155.2 million</b>
First Year Estimated Net Saving After HBOT Treatments: (100 Veterans X \$40,186=\$4,018,600) - \$1,288,000 Funding=(100 Vets X \$12,880 Cost Per Veteran)	<b>\$2.7 Million</b>
Estimated Cost to Treat Versus Lifetime Cost: \$155,204,000/\$19,369,966,000 X 100	<b>0.79%</b>

Table 3

## **Kentucky TBI Veteran Caregiver Economic Yearly Societal Cost**

“The RAND Report reflects 41,163 households contacted; 28,164 (68 percent) of caregivers responded to complete the screener for the survey. Of this group, 1,129 military caregivers and 1,828 civilian caregivers participated, making this study the largest and only nationally represented survey of military caregivers to this date in 2013. The report goes on to indicate there are 5.5 million caregivers in the US. Approximately 20 percent or 1.1 million who are caring for persons who served post 9/11.”<sup>11</sup> We used a conservative 1.1 million military caregivers as the basis for our analysis. We then used the Kentucky percentage of Veterans to the total US Veteran population of 1.5 percent (282,767/19,397,944). We applied that same percentage to the US caregivers to estimate the total number of Veteran Caregivers in Kentucky. **It equates to an estimated 16,500 Kentucky caregivers (1,100,000 x 1.5 %) for approximately 12,050 TBI/PTSD Veterans or 1.3 caregivers per Veteran.**

Key findings include that 33 percent of all post-9/11 military caregivers are spouses of the care recipient, 25 percent are the care recipients’ parents, for a total of 58 percent being either spouses or parents. In addition, the report identified 64 percent of post-9/11 military caregiver recipients have a mental health or substance use disorder, nearly 50 percent of all post 9/11 military care recipients have depression. Approximately 76 percent of post-9/11 military caregivers are in the labor force but, on average, miss one day of work per week or 52 days per calendar year. Recent 2022 data indicates one in five employees serve as unpaid caregivers for family members and miss on average 3.2 days of work a month.<sup>12</sup>

“RAND estimated and assigned an economic value to an hour of family caregiving of \$11.16 per hour, 18 hours per week on average, multiplied by 52 weeks in 2013 cost”.<sup>13</sup> **Using the US average inflation rate of 3.24 percent (infationdata.com), it equates to \$15.46 per hour in 2023, times 18 hours average per week and 52 weeks per year, or on average, \$14,471 per year, per caregiver. Using the estimated 16,500 Kentucky military caregivers’ times the \$14,471 estimated annual cost impact per caregiver equates to an estimated \$238,771,500 million per year of lost wage tax revenue from family TBI/PTSD Veteran caregivers.**

## **Kentucky TBI Veteran Suicide Epidemic and Cost**

In the last four years, the official government estimate on the number of veterans who die by suicide has gone from 22 a day to 17 a day in the latest Veterans Affairs report. But the rate of suicides among Veterans didn’t decrease over that span. Instead, the way the VA calculated the figures and how they are sorted and presented did! Instead, outside experts note that by many markers the problem has grown even worse, particularly in the time of COVID when suicides are up for all categories. The total number of suicides among Veterans has increased four of the last five years on record. From 2007 to 2017, the rate of suicide among Veterans jumped almost 50 percent. Veterans are 1.5 times more likely to

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<sup>11</sup> 2014 RAND Report, “Hidden Heroes, America’s Military Caregivers

<sup>12</sup> The Wall Street Journal, Struggling Caregivers Find New Support from Employee Groups, Tar Weiss, May 15, 2023

<sup>13</sup> The RAND Report, “Hidden Heroes, America’s Military Caregivers” dated 2014, page 155-156, Potential Benefits and Costs to Society

die by suicide than Americans who never served in the military. For female Veterans, the risk factor is 2.2 times more likely. ***“Our takeaway from all this is that what we are doing is not working,” “Everyone has been focused on this, but we’re not seeing results.”*** said Chanin Nuntavong, National Director of Veterans Affairs and Rehabilitation for the American Legion.<sup>14</sup>

A significant study was published in 2016 that throws a new light on the difficulty of differentiating between brain injuries caused by either PTSD or TBI. In what is being called a breakthrough study, Dr. Daniel P. Perl and his team at the Uniformed Services University of the Health Sciences in Bethesda, MD, USA [the medical school run by the Department of Defense], have found evidence of tissue damage caused by blasts alone, not by concussions or other injuries. The New York Times calls it the medical explanation for shellshock: preliminary proof of what medicine has been saying without proof for nearly 100 years -- blasts cause physical damage, and this physical damage leads to psychological problems, *i.e.*, TBI/PTSD.

“From 2008 to 2020, the VA mental health budget surpassed \$86.1 billion (\$6.6 billion annually on average) and \$7.7 billion (\$592 million annually on average) for medical research.”<sup>15</sup> Over \$93.8 billion was spent on research, treatments and interventions that may or may not have contributed to the small number of TBI Veterans being healed. Yet the suicide and opioid epidemics and hundreds of thousands of veterans and active duty suffering from brain injuries, coupled with a suicide rate of 20 per day, for a total estimated at over 877,450 TBI Veterans (nearly 35-combat divisions) has caused no sense of urgency and immediate use of alternative proven therapies such as HBOT.

Evidence that the VA is aiming at symptom identification and resolution on a symptom-by-symptom basis – as opposed to wholistic, integrated, patient-centered, precision medicine can be found in the latest update to VA and DoD Clinical Practice Guideline for the Management of Concussion-Mild Traumatic Brain Injury. Evolving treatment protocols are turning toward isolating individual symptoms and treating those symptoms of brain injury as opposed to a focus on the cause – the underlying the physical brain wound.

## Gaining Perspective on the Suicide Epidemic

There should be a call for action and change in a very meaningful way. A study of 273,591 veterans (16% with TBI history or 43,775) receiving care from the Department of Veterans Affairs reported a connection between TBI, PTSD, and suicide attempts. The authors found an increase of suicide attempts among those with deployment-related TBI compared to those without TBI (hazard ratio 3.76, 95% CI 3.15 to 4.49).<sup>16</sup> A further analysis showed that psychiatric conditions mediated 83% of the association between TBI and attempted suicide, with PTSD having the largest impact hazard. The November 2018 Defense and Veterans Brain Injury Center Research concluded population-level investigations have consistently found elevated

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<sup>14</sup> Militarytimes.com, New Veteran Suicide Numbers Raise Concerns Among Experts Hoping for Positive News, Leo Shane III, October 9, 2019

<sup>15</sup> The National Brain-Wounded Veteran Brain Drain, Googlebooks.com, October 2021, Page 90

<sup>16</sup> Jennifer R. Fonda et al., A Methodology for Assessing Deployment Trauma and Its Consequences in OEF/OIF/OND veterans: The TRACTS longitudinal prospective cohort study, 2016.

rates of death by suicide, as well as suicide attempts and suicide ideation in individuals with a positive history of TBI. A systematic review conducted by Bahraini supported an increased risk of suicide among persons with TBI history compared to those with no TBI history.<sup>17</sup> Some non-military studies have reported that the risk of death by suicide may be three to four times higher for individuals with TBI than for the general population.<sup>18</sup> A surveillance study of 20 years of data from Canadian health and vital statistics databases found that persons with mTBI were three times more likely to die of suicide compared to the general population.<sup>19</sup> Swedish researchers conducted a large longitudinal study and found that TBI patients are three times more likely to die by suicide when compared to matched controls from the general population without a history of TBI,<sup>20</sup> and the same rate of increase in suicide death one-year post-TBI was found in a study by Harrison-Felix et al.<sup>21</sup> “The DoD is reimbursing for off-label use of FDA Black Box labeled drugs that have been implicated in the marked suicide rate in our injured veterans. **These drugs mask symptoms or act as chemical restraint, leaving untouched the underlying brain injury that is repaired by HBOT 1.5.**”<sup>22</sup> There currently is “NOT” any of the approximately 100 medications routinely prescribed to TBI Veterans that are FDA approved, they are all “off-label” and experimental. How is it that oxygen, which when used in the medical capacity, is an FDA approved drug, is not widely used for TBI?

The VA 2005 to 2017 historical suicide report is a revelation. ***We have lost more than 78,000 veterans to suicide over the 13-year period by the VA accounting.*** That is by all normal CDC standards a national epidemic. Approximately 7,300 Veterans commit suicide per year over the past ten years (73,000) while the number of Veterans in America has dropped by about 15 percent. The VA/DoD may not account for veteran suicides if they are not active duty or enrolled in the DoD/VA so there is a variance in the VA accounting and actual suicides reported. As recently as four years ago, VA leaders were still referencing the “22 a day” statistic in-regards to Veteran’s suicide based on partial state death records data and internal estimates. “Between March and August 31<sup>st</sup>, 2020, 144 active-duty Army soldiers killed themselves up from 88 in the period of 184 days.”<sup>23</sup> “When Army reservists and national guardsmen are added the figure, it jumped to 200, compared with 166 for last year’s period. The rate of suicide among active-duty Army soldiers is currently 36 per 100,000 defense officials said, up from 25.9 deaths per 100,000 last year”.<sup>24</sup> Military leaders are attributing the increase to Covid 19 induced isolation from families suffering from and dying of Covid 19 that has created additional stress along with inability to travel.

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<sup>17</sup> Psycnet.apa.org, Suicidal ideation behaviors after traumatic brain injury: A systematic review. Bahraini, Simpson, Brenner, Hoffberg, & Schneider, 2013

<sup>18</sup> Pubmed.ncbi.nlm.nih.gov, Suicidality in people surviving a traumatic brain injury: prevalence, risk factors and implications for clinical management. Simpson & Tate, 2007

<sup>19</sup> Pubmed.ncbi.nlm.nih.gov Fralick, Thiruchelvam, Tien, & Redelmeier, 2016

<sup>20</sup> Fazel, Wolf, Pillas, Lichtenstein, & Langstrom, 2014

<sup>21</sup> Pubmed.ncbi.nlm.nih.gov, Harrison-Felix et al., 2009

<sup>22</sup> Dr. Paul Harch, Suicides in the U.S. Military Personnel, Veterans of War in Iraq and Afghanistan, and the Core Medical treatment for Mild-Moderate Traumatic Brain Injury & PTSD, June 22, 2010 report to Senate Armed Services Committee

<sup>23</sup> WSJ.com, U.S. Army Saw Rise in Suicides as Covid-19 Pandemic Locked Down Nation, Nancy Youssef, October 1, 2020

<sup>24</sup> Ibid.

Actual Veteran suicide numbers remain elusive. The VA.vetdata.gov reported from 2005 through 2017, 78,875 veterans have committed suicide, a thirteen-year average of 6,067 per year. Males accounted for 75,975 of those deaths or 96% of the total. Although the suicide rate in the U.S. Army has traditionally been below the demographically matched civilian rates, it has climbed steadily since the beginning of the conflicts in Iraq and Afghanistan. During these tours, suicide rates among service members rose from 9.9 to 22.7 per 100,000.<sup>25</sup> The Army (53%) and Marines (18%) account for 71 percent of all TBI's incurred by service members since the Iraq and Afghanistan conflicts.

“The number of Veteran suicides has exceeded 6,000 every single year between 2008 and 2017, and in 2017, the suicide rate for veterans was 1.5 times the rate for non-veteran adults.”<sup>26</sup> The daily suicide rates continue to climb to over 30.5% over the 2005 rates. We can point towards ineffective treatments, program assessments, or the deluge of “more research”, or perhaps the symptom-based non-FDA approved drug treatment protocol for causes. What is not being addressed is the true root cause, *that mTBI is a physical brain wound, and protocols prescribing black box off labeled, non-FDA approved drugs by the VA adds to the suicide rate.*

### Understanding the Total Impact of Combat Wounding

“Since late 2001, U.S. military forces have been engaged in conflicts around the globe, most notably in Iraq and Afghanistan. These conflicts have exacted a substantial toll on soldiers, marines, sailors, and airmen, and this toll goes beyond the well-publicized casualty figures. It extends to the stress that repetitive deployments can have on the individual service member and his or her family. This stress can manifest itself in different ways—increased divorce rates, spouse and child abuse, mental distress, substance abuse—but one of the most troubling manifestations is suicides, which are increasing across the Department of Defense (DoD).”<sup>27</sup> Oddly, this is the same period we deployed over 4 million troops, including second through fourth tours for our veterans, to Iraq and Afghanistan to combat terrorism. Reported mTBIs escalated.

“VHA patients with mental health condition or Substance-Use-Disorder (SUD) diagnoses accessed mental health treatment services have higher rates of suicide than other VHA patients.”<sup>28</sup> The main finding reflected, “rates of suicide among users of VHA services have remained relatively stable in recent years.”<sup>29</sup> With no change in the suicide rates over fourteen years how can the report reflect that conditions are stable? The suicide rate for VHA users in 2001 was 39.9, in 2014 it was 39.2. *Fourteen years of NO change or improvement in the VA treatment protocol reflected in the data tracked but they are relatively stable.* Year over year, despite the carnage, there is homeostasis. And recall the majority of Veterans do not use VHA services.

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<sup>25</sup> DoD, 2011; ncbi.nlm.nih.gov, Logan, Bohnert, Spies, Jannausch 2013

<sup>26</sup> The January 23, 2020, article, “Veteran Suicide Rates Remain High Despite Year of Reform” on the [www.foxnews.com](http://www.foxnews.com) website

<sup>27</sup> Ramchand et al., The War Within: Preventing Suicide in the US Military

<sup>28</sup> The August 3, 2016 VA Suicide Among Veterans and Other Americans 2001-2014 Report, Page 9

<sup>29</sup> The August 3, 2016 VA Suicide Among Veterans and Other Americans 2001-2014 Report, Page 15

Veterans *who died by suicide were more likely to have sleep disorders, traumatic brain injury, or a pain diagnosis, or all.* “A study done by the Department of Veterans Affairs discovered that veterans are more likely to develop symptoms of PTSD for several reasons such as:

- Longer times at war
- Lower level of education
- More severe combat conditions
- Other soldier around them killed
- **Brain/head trauma**
- Female gender
- Life lasting physical injuries
- Military structure”

Brain/head trauma are the same as Traumatic Brain Injury (TBI) or concussions although there could be actual penetrating head injuries from explosions, hostile fire, etc.”<sup>30</sup>

## What is the Relationship Between TBI and Suicides?

Our country is currently experiencing a **20-year epidemic** of monumental proportions in the form of **military suicides**. At 20 suicides per day, we have experienced an estimated 124,100 (17 years x 7,300) military suicides since 2003 and the number continues to grow.

“Veterans with multiple brain injuries are twice as likely to consider suicide, compared with those with one or none”.<sup>31</sup> A VA site comments: “A new study finds that post 9-11 Veterans with a history of repeated traumatic brain injuries-versus none-are at much greater risk for considering suicide.”<sup>32</sup> The study stemmed from interviews with more than 800 Veterans who held combat roles in Iraq and Afghanistan. About half of the Veterans in the study experienced at least one TBI. Of those, almost 20 percent had history of multiple TBIs reported suicidal ideation, compared with 11 percent with one TBI and 9 percent with no history of TBI. The report also points out that 18 percent met the criteria for major depression disorder (MDD), a significant related suicide ideation symptom. Roughly 40% reported some level of suicide ideation.

The “Relationship between traumatic brain injury history and recent suicidal ideation in Iraq and Afghanistan era Veterans reports of 838 Iraq and Afghanistan war-era Veterans, approximately 50% reported a lifetime history of at least one TBI, and 17.9 percent met criteria for current major depressive disorder (MDD).”<sup>33</sup> “The report further states that current depression and poor

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<sup>30</sup> The “United States Military Veteran Suicide,” article on Wikipedia edited May 5, 2020

<sup>31</sup> Mike Richard, The VA Research News from the U.S. Department of Veterans Affairs reported on November 20, 2018, Study

<sup>32</sup> The VA Research News from the U.S. Department of Veterans Affairs reported on November 20, 2018, Study, the study was funded by the VA’s Mid-Atlantic Mental Illness Research, Education and Clinical Center (MIRECC), and appeared online in the journal Psychological Services in November 2018. The study was funded by the VA’s Mid-Atlantic Mental Illness Research, Education and Clinical Center (MIRECC).

<sup>33</sup> Posted on pubmed.ncbi.nlm.nih.gov on May 16, 2019

sleep quality were consistently associated with recent suicide ideation.”<sup>34</sup> Increasingly across multiple studies since 2004 TBI has been directly linked to increased suicide ideation amongst Veterans. The current VA treatment protocol for TBI is a symptom driven non-FDA approved prescription drugs that continues to produce the same suicide rates for the past 14-years.

“The systematic review and meta-analysis found a 2-fold higher risk of subsequent suicide among more than 700,000 patients diagnosed with concussion and or mild TBI, compared with more than 6.2 million individuals who had not been so diagnosed.”<sup>35</sup> One of the most important findings from the very large study review of 17 different studies indicated, “There are several possible mechanisms that may explain the association between concussion and or mild TBI and suicide. Recent meta-analysis of neuroimaging studies of patients with mild TBI reported abnormal activity on functional magnetic resonance imaging and abnormal structural connectivity in brain regions critical for cognitive and emotional processing.”<sup>36</sup> We know from our research the VA does not currently recommend imaging in their guidelines for the first 30-90 days of diagnosis. The veterans mTBI is simply not being diagnosed early or at all through the use of imaging technology (fMRI, SPECT). The report goes on to report, “Our results suggest that compared with people with no history of concussion and or mild TBI, there is evidence of a heightened risk of suicide, suicide attempts and suicide ideation among individuals diagnosed with these conditions.”<sup>37</sup>

TBI Veteran suicides has not subsided in any meaningful way since 2005; in fact, they have continued to climb. Beginning in 2018 the VA data reflects an average of 6,067 veterans committing suicide per year at a rate of 27.7 per 100,000; that is on average of 352 more per year than 2005 (5,787 to 6,139) and the rate per 100,000 has escalated 7.1 basis points (23.9 to 31.0) (Table 5) from 2005 to 2017. Over 13 years the number of Veteran suicides per year has escalated 6.1 percent with no signs of improvement. The veteran population has decreased by over 5 million during this time period. What is not accounted for in the statistics are Veterans not enrolled in the VA committing suicide. The 20 Veteran suicides estimated per day, 7,300 per year represents Veterans inside the VHA but not National Guard or Reserves outside the VHA.

Our research could not identify how many Veteran suicides were actually PTSD mis-diagnosed or actual TBI Veterans. However, previous industry research has identified a correlation between TBI/PTSD diagnosis and suicides. **In our economic analysis, we used 20 Veteran suicides per day, or 7,300 per year as the basis for identifying the overall state financial impact.** The 20 per day number has been widely used and reported throughout the history of the VA.gov until just recently in 2020. The VA excluded reporting Guard and Reserve suicides along with active-duty numbers, essentially lowering the reporting numbers but not lowering the actual number of suicides occurring across the entire military spectrum.<sup>38</sup>

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<sup>34</sup> Posted on pubmed.ncbi.nlm.nih.gov on May 16, 2019

<sup>35</sup> The American Medical Association 2018 article in the JAMA Neurology, “Association of Concussion with the Risk of Suicide, A Systematic Review and Meta-Analysis

<sup>36</sup> Ibid.

<sup>37</sup> Ibid.

<sup>38</sup> This was a concern in our research as close to 50 percent of the Guard and Reserves were deployed to Iraq and Afghanistan from 2001 through 2018. Reporting this data by states has been dubious and under reported. Consequently, we choose the conservative “20 per day number” as it more accurately reflects the number of military suicides occurring across America in all the active duty, Veteran Reserves, and guard military services.

The toll suicides are having on our Veterans and their families impose an economic toll that can be calibrated with a higher degree of fidelity than the humanistic toll. The average Kentucky economic impact of TBI Veteran suicides per year on lost state and federal taxes is estimated at **\$1,326,372 million per year** (\$298,419+\$1,027,953, Table 1). The VA and Social Security disability annual impact is estimated to be **\$3,052,407 million** (\$1,468,407+\$1,584,000) (Table 4). The total estimated annual financial impact is estimated to at **\$4,378,779 million per year** (Table 2). This does not include prescription medications, hospitalizations, hospital or doctor medical visits, illegal drugs, community services charges, or the failed suicide attempts medical cost each Veteran undertakes each year. Consequently, the economic impact we have identified for suicides is a very conservative estimation.

### Estimated Kentucky TBI Veteran Suicide Epidemic Economic Impact

(A) States	(B) Estimated State Veteran Population See Note 1	(C) Percent of Total US Veteran Population Note 2	(D) Estimated Veteran Suicides Per Year (C X 7300) Note 3	(E) 2017 Median Household Income See Note 4	(F) 2018 State Tax Rate Note 5	(G) State Tax (EXF) See Note 5	(H) Income over \$38,701 Note 6	(I) Federal Tax Rate/ 22% over \$38,701+\$4453 See Note 6	(J) Social Security Tax/ 6.2% per employee See Note 7	(K) Medicare Tax/1.45 % per employee See Note 8	(L) Total Federal Income Tax Collected (I+J+K) Note 9	(M) Total Veterans VSE State Income Tax Impact (D X G) Note 9	(N) Total Veterans Federal Income Tax Impact (D X L) Note 9	(O) Total Veteran VSE Disability Impact (\$13,349.16) Note 9	(P) Social Security Disability Payments (D X \$14,400) Note 10
Kentucky	282,767	1.5%	110	\$45,215.00	6.0%	\$2,712.90	\$6,514.00	\$5,886.08	\$2,803.33	\$655.62	\$9,345.03	\$298,419.00	\$1,027,953.30	\$1,468,407.60	\$1,584,000.00

Table 4

Note 1: 2020 Veteran populations from [va.gov/vetdata/veteran\\_population.asp](http://va.gov/vetdata/veteran_population.asp).

Note 2: Individual state percent determined by taking the total veteran population of each state and dividing by total US population of 19,397,944 (2020) times 100.

Note 3: 20 suicides per day x 365 equates to 7,300 per year (August 28,2019 VA Secretary Wilkie announcement at American Legion National Conference). 2019 VA National Veteran Suicide Prevention Annual Report, Page 3, 16.8 suicides per day in 2017, 2.5 suicides per day for Guard and Reserves equates to 19.3 per day, US Dept of VA, "Suicide Among Veteran and Other Americans 2001-2014" [Mentalhealth.va.gov](http://Mentalhealth.va.gov), June 1, 2019

Note 4: 2017 median incomes from [en.wikipedia.org](http://en.wikipedia.org)

Note 5: Individual state income taxes account for 37% of state tax collections on average. Individual state tax rates from [taxfoundation.org](http://taxfoundation.org), top state marginal individual income tax rates for 2018

Note 6: Federal income tax rate based on 2018 tables and include the following: 22%=\$38,701 to \$82,500, \$4453 plus 22% of the amount over \$38,701

Note 7: 2019 Social Security tax based on 6.2% for employee and employer or 12.4% total

Note 8:2019 Medicare tax rate based on 1.45% for employee and employer or 2.9% total

Note 9: For disability payments, we assumed 50% disability rating based on the presumption for service connection for all Veterans and states as the average stated by Hill & Ponton Disability Attorneys, 50% disability rating being married, with one child and one parent equates to 2020 VA.gov monthly payment of \$1,112.43 per month x 12=\$13,349.16 per year per Veteran.

Note 10: Military benefits information reported in 2016 the Social Security Administration (SSA) official site indicated more than 600,000 Veterans received daily payments at a range of \$800-\$1800 or an average of \$1200 per month per Veteran x 12 = \$14,400

The lost state income tax, federal income tax, VA, and social security disability payments from managing depression and suicidal ideation is taking its toll on our economy. In 2019, 45,390 Americans committed suicide of which 6,139 were United States military Veterans – about 13.5 percent. Between 2005 and 2016, the suicide rate for Veterans had risen by 80 percent.

Suicide statistics for the U.S. Veteran population indicate an average of 20 veterans per day committed suicide. Although Veterans account for only 8.5% of the U.S. adult population, they disproportionately represent 17.9% of all deaths by suicide in U.S. adults in 2016.<sup>39</sup> It has been determined that Veterans receiving high doses of opioid painkillers are more than twice as likely to die by suicide than those receiving low doses.<sup>40</sup>

Researchers with the University of Michigan and with the Serious Mental Illness Treatment, Resource and Evaluation Center and the Center for Clinical Management Research at the VA Ann Arbor Healthcare System found in 2016 that Veterans receiving the highest doses of opioid painkillers were more than twice as likely to die by suicide, compared with those receiving the lowest doses. The research team looked at nearly 124,000 Veterans who received VA care in 2004 and 2005. All had non-cancer chronic pain and received prescriptions for opioids. Using the National Death Index, the researchers identified 2,601 patients among this group who died by suicide before the end of 2009. Approximately 67.2 percent of the 78,875 Veteran suicides occurred with Veterans who were outside the VHA care.<sup>41</sup>

### VA. Gov 2005-2017 Veteran Suicide Deaths

<b>Year</b>	<b>Veteran Suicides</b>	<b>US Veteran Population</b>	<b>Veteran Rate Per 100,000</b>
2005	5,787	24,240,000	23.9
2006	5,688	23,731,000	24.0
2007	5,893	23,291,000	25.3
2008	6,216	22,996,000	27.0
2009	6,172	22,603,000	27.3
2010	6,158	22,411,000	27.5
2011	6,116	22,061,000	27.7
2012	6,065	21,767,000	27.9
2013	6,132	21,415,000	28.6
2014	6,272	21,029,000	29.8
2015	6,227	20,560,000	30.3
2016	6,010	20,170,000	29.8
2017	6,139	19,803,000	31.0
<b>13-Yr Total Suicides</b>	<b>78,875</b>		
<b>Avg Per Year</b>	<b>6,067</b>	<b>22,005,769</b>	<b>27.7</b>

Table 5

<sup>39</sup> U.S. Department of Veterans Affairs, 2016

<sup>40</sup> The National Brain Wounded Brain Drain, October 2021

<sup>41</sup> VA.gov, See Table 5 Note 1 and Note 2

Note 1: The data was extracted from files prepared by the Department of Veteran Affairs Office of Mental Health and Suicide Prevention [Mentalhealth.va.gov](http://Mentalhealth.va.gov), National Veteran Suicide Date and Reporting Data Appendix

Note 2: The VA suicides recorded in Table 5 represent 32.8% of veterans enrolled in the VA health care system plus 67.2% of estimated Veteran suicides outside the VHA. Approximately 10.2 million or 51 percent of Veterans are not enrolled in the VA and suicides related to non-VA enrolled veterans were not accounted for in this chart. If you factor in the National Guard and Reserves components, it's another 3.3 suicides per day and hence the VA estimate of 20 suicides per day or 7,300 per year were used in the cost analysis throughout this report

The U.S military has lost more troops to suicide than to combat over the last two decades. Veterans Affairs Secretary Robert Wilkie informed the American Legion's national conference in Indianapolis on August 28<sup>th</sup>, 2019, "20 Veterans a day kill themselves, about double the rate of the rest of the population". "From 2006 through 2014, the DEA.gov website that tracks all opioid drugs distributed across the entire U.S., the VA distributed over 847,000,000 million opioid pills. This accounting was from just 4 of 8 VA Consolidated Mail Outpatient Pharmacies (CMOPs) that account for approximately 80 percent of the prescription medications distributed yearly in the VA system."<sup>42</sup> In Q42012, **the VA indicated there were over 679,000 Opioid Use Disorder (OUD) Veterans in the VA system (Figure 2)**. If 679,000 were prescribed opioids, that equates to approximately **155 opioid pills for every OUD Veteran**. It was not just the number of opioid pills distributed; the dosage of the pills ranged from 50 to 400 mg per tablet. These high dosage opioid pills were noted as a contributing factor in the 679,000 OUD Veterans and number of suicides.

Secretary Wilkie warned, "the VA can't do it alone, because 70 percent of those Veteran suicides never come to the VA in the first place". Presidential Executive Order on a National Roadmap to Empower Veterans and End Suicide states, "answering this call to action requires an aspirational, innovative, all-hands-on-deck approach to public health- not government as usual. To reduce the Veteran suicide rate, the Federal Government must work side-by-side with partners from State, local, territorial, and tribal governments, as well as private and non-profit entities." Twenty veterans per day is 7,300 veterans per year and if 51% are not enrolled the VA, that is 3,723 veteran suicides outside the VA medical arena. The number may be under reported. Many have underlying mental health conditions or substance use disorders, in some cases aggravated by their military TBIs, which increases their risk. "Research Review on September 2018 Traumatic Brain Injury and Suicide deployment related TBI, 14.0% to 23.0% screened positive for TBI during their deployment, and almost all TBIs were mild."<sup>43</sup> It's estimated 51 percent of service members deployed to Iraq and Afghanistan were National Guard and Reserves.

## **The Kentucky TBI Veteran Opioid Epidemic**

Chronic pain is more common in Veterans than in the non-Veteran US population, more often severe and in the context of comorbidities. Pain severity with mental health comorbidities result in high impact pain with a corresponding substantial restriction of participation in work, social and self-care activities. The VHA has found 1 in 5 Veterans report persistent pain, 1 in 10

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<sup>42</sup> The National Brain-Wounded Veteran Brain Drain, Googlebooks.com, October 2021, page 37

<sup>43</sup> Terrio, H., Brenner, L.A., Ivins, B.J., Cho, J.M, Helmick, K., Schwab, K., Scally, K., Bretthauer, R. & Warden, D. (2009). Traumatic brain injury screening: Preliminary findings in a US Army Brigade combat team. *Journal of Head Trauma Rehabilitation*, 24, 14-23

Veterans report severe persistent pain, and 1 in 3 diagnosed with chronic pain.<sup>44</sup> “The most frequently identified risk factor among Veterans who died by suicide was pain.”<sup>45</sup> This pain migration leaves the vast majority of combat Veterans at high risk of opioid medication addiction. The VA/DoD approach for pain management from 2006 through 2017 of prescribing opioid pills to veterans has been devastating. Data points towards the VA self-inflicting its own Opioid Use Disorder (OUD) over this period by prescribing with low and high dosage opioid pills for pain.<sup>46</sup> The long-term economic impact on TBI Veterans is profound. An estimated 25-41% of patients on prescription opioids meet the criteria for Opioid Use Disorder. Although the VA began to make strides in late 2013 through 2017 to reduce the number of veterans being prescribed opioids, the epidemic had already gained a foothold and veterans were dying at an epidemic rate. The number of veterans on long term opioid therapy Q4 FY 2012 had surpassed 438,000. There is a strong correlation between this regimented prescription protocol and the instances of TBI veterans succumbing to overdose and or committed suicide during this time period. The VA approach to long-term pain management for the symptoms of TBI/PTSD Veterans has escalated into a national opioid and suicide epidemic that to this day, seemingly with no end in sight.

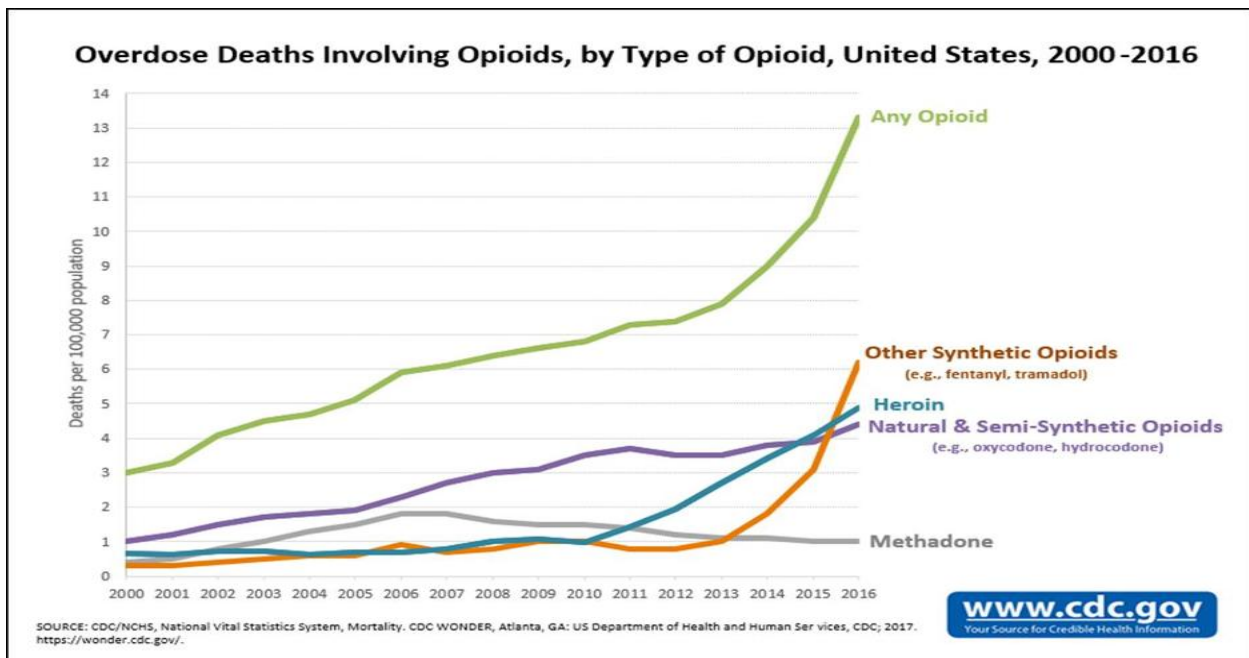


Figure 1

Note: Chart taken from Department of Veteran Affairs, The VA Opioid Safety Initiative-How Did We Get here and What is Ahead? By Friedhelm Sandbrink, MD and Von Moore, Pharm D, HSRD.research.va.gov

<sup>44</sup> Hsrd.research.va.gov, Trends in Veterans Reporting Chronic Pain from 2008 to 2016: A National VA Study, Evan Carey

<sup>45</sup> The Behavioral Health Autopsy Report. 2015

<sup>46</sup> See for example: Art Levine, “How the VA Fueled the National Opioid Crisis and is Killing Thousands of Veterans,” NEWSWEEK, October 12, 2017

The TBI symptom-based approach by the VA and DoD resulted in many Veterans being either over opioid prescribed for their symptoms or abusing the system in getting the VA and outside medical doctors to prescribe simultaneously. The economic impact has migrated beyond simply the lost tax wage incentive when over 3.5 veterans were dying daily from OUD.

Our conservative estimate is 1,020 Opioid Use Disorder TBI Veterans in KY or 1.5 percent of the state 2020 Veteran population <sup>47</sup> (282,767/19,397,944=1.5% x 68K OUD Veterans in US=1,020). **The economic impact on state tax revenue is estimated at \$2,767,158 and the federal income tax at \$9,531,928 or \$12,299,086 per year (Table 1). When we couple disability payments of \$13,616,143 and Social Security payments of \$14,688,000 together, it equates to \$28,304,143 (Table 1). All tolled an estimated \$40,603,229 yearly impact (\$12,299,086 + \$28,304,143). (Table 2)**

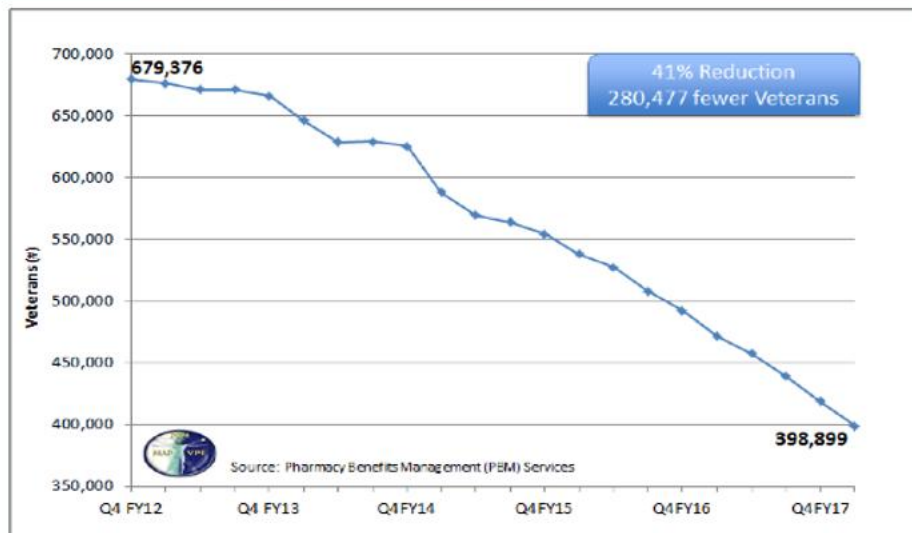


Figure 2

Note: Chart taken from Department of Veteran Affairs, The VA Opioid Safety Initiative-How Did We Get here and What is Ahead? By Friedhelm Sandbrink, MD and Von Moore, Pharm D, HSRD.research.va.gov.

### Kentucky TBI Veteran Pharmaceutical Costs

Pricing for Drugs are covered under Section 603 of Public Law 102-585. “VA requests that GAO include its average cost per unique user of outpatient pharmacy from fiscal years 1999 to 2012,

<sup>47</sup> VA.gov, 1L\_vetpop2020\_national\_NCVAS.XLSX

which has only risen from \$599 to \$723.”<sup>48</sup> We assessed this to mean the average cost per Veteran per year for pharmaceutical services offered through the VA CMOP and Veteran Hospital networks. **If we escalate the 2012 cost of \$723 at the 3.24% per year based on the historical annual U.S. inflation rates (infationdata.com), the conservative estimate in 2023 cost of \$1,035 per Veteran per year cost for pharmacy services. With an estimated 12,050 TBI veterans, that is an annual pharmaceutical total estimated cost of \$12,471,750 for TBI Veterans (\$1,035 x 12,050).** Approximately 49% of Veterans are enrolled in the VA having their pharmacology paid for. Fifty one percent of \$12,471,750 equates to \$6,360, 593 impact to state budgets (Table 1). **The 2020 VA Budget reflects a pharmacy outpatient prescription budget of \$300,663,191 and the overall reliance on prescription drugs for enrolled Veteran population is 65 percent.** <sup>49</sup> **Sixty-five percent of 107,339 VA TBI Veterans is 69,770 prescription Veterans which equates to \$4,309 per Veteran (\$300,663,191/69,770) prescription cost per year. We have significantly underestimated the prescription cost per year at \$1,035 per Veteran.**

### Kentucky TBI Veteran Estimated Opioid Use Disorder Economic Impact

(A) States	(B) Estimated State Veteran Population	(C) Percent of Total US Veteran Population	(D) Estimated Veteran Opioid Use Disorder (C X 68K)	(E) 2017 Median Household Income	(F) 2018 State Tax Rate	(G) State Tax (EXF) See Note 5	(H) Income over \$38,701	(I) Federal Tax Rate/ 22% over \$38,701+\$453 See Note 6	(J) Social Security Tax/ 6.2% per employee See Note 7	(K) Medicare Tax/ 1.45% per employee See Note 8	(L) Total Federal Income Tax Collected (I+J+K)	(M) Total Veterans OUD State Income Tax Impact (D X G)	(N) Total Veterans OUD Federal Income Tax Impact (D X L)	(O) Total Veteran OUD Disability Impact (D X \$13,349.16) NOTE 9	(P) Veteran Social Security Disability Payments (D X \$14,400) Note 10
Kentucky	282,767	1.5%	1020	\$45,215	\$0	\$2,713	\$6,514	\$5,886	\$2,803	\$656	\$9,345	\$2,767,158	\$9,531,928	\$13,616,143	\$14,688,000

Table 6

Note 1: 2020 Veteran populations from [va.gov/vetdata/veteran\\_population.asp](http://va.gov/vetdata/veteran_population.asp).

Note 2: Individual state percent determined by taking the total veteran population of each state and dividing by total US 2020 population of 19,397,944 times 100.

Note 3: 20 suicides per day x 365 equates to 7,300 per year (August 28, 2019, VA Secretary Wilkie announcement at American Legion National Conference). 2019 VA National Veteran Suicide Prevention Annual Report, Page 3, 16.8 suicides per day in 2017, 2.5 suicides per day for Guard and Reserves equates to 19.3 per day, US Dept of VA, “Suicide Among Veteran and Other Americans 2001-2014” Mentalhealth.va.gov, June 1, 2019

Note 4: 2017 median incomes from [en.wikipedia.org](http://en.wikipedia.org)

Note 5: Individual state income taxes account for 37% of state tax collections on average. Individual state tax rates from [taxfoundation.org](http://taxfoundation.org), top state marginal individual income tax rates for 2018

Note 6: Federal income tax rate based on 2018 tables and include the following: 22%=\$38,701 to \$82,500, \$4453 plus 22% of the amount over \$38,701

Note 7: 2019 Social Security tax based on 6.2% for employee and employer or 12.4% total

Note 8: 2019 Medicare tax rate based on 1.45% for employee and employer or 2.9% total.

<sup>48</sup> <http://www.gao.gov>, GAO-13-358 Report, Letter to Mr. John E. Dicken, Director Health Care, US GAO from Mr. Jose D. Riojas, VA Interim Chief of Staff on April 2, 2013, Mr. Riojas statement on Page 1

<sup>49</sup> 2020 VA Budget, FY2020 Funding and FY2021 Advance Appropriations, Volume II, Page VHA 181

Note 9: For disability payments, we assumed 50% disability rating based on the presumption for service connection for all Veterans and states as the average stated by Hill & Ponton Disability Attorneys, 50% disability rating being married, with one child and one parent equates to 2020 VA.gov monthly payment of \$1,112.43 per month x 12=\$13,349.16 per year per Veteran.

Note 10: Militarybenefits.info reported in 2016 the Social Security Administration (SSA) official site indicated more than 600,000 Veterans received payments at a range of \$800-\$1800 or an average of \$1200 per month per Veteran x 12 = \$14,400

## Kentucky TBI Veteran State and Local Sales Tax Economic Impact

State	(A) 2023 Sales Tax Rate	(B) 2023 Avg Local Sales Tax Rate	(C) 2023 State Combined Sales Tax Rate	(D) 2017 State Median Household Income	(E) State Tax	(F) Total Federal Taxes (Federal, Social Security, Medicare)	(G) Total Net Income (D-E+F)	(H) 50% Net Income X Combined Sales Tax Rate (C)	(I) State Veteran TBI Estimate	(J) Lost TBI Veteran Sales Tax (H X I)
Kentucky	6.00%	0.00%	6.00%	\$45,215	\$2,406	\$10,207	\$32,602	\$978	\$12,050	\$11,785,503

Table 7

Note 1: Sales tax sources were Sales Tax Clearinghouse, Tax Foundations calculations, State Revenue Department website.

Note 2: Non-table income includes child support, certain Veteran benefits such as disability payments, welfare payments, insurance reimbursements, healthcare benefits, alimony payments

Note 3: State and locals sales taxes apply with some exemptions to all goods and certain services to include tobacco, alcohol, certain foods, and motor fuels

Note 4: 282,767 KY 2020 Veterans x 4.261429% = estimated 12,050 TBI Veterans. State veteran TBI estimate of 4.26% is based on national estimate of 23% TBI of 2.7 million=631K who served in Iraq and Afghanistan. Veterans who served at least twice is 1.5 million x 77%=1,115,000 x 23%=256,450 + 621K=877,450/20,590,510 total US veterans=4.26% of total veteran population by state

State sales tax is based on Veterans being gainfully employed and paying taxes on goods and services. **Our estimate is \$11,785,503 yearly Kentucky lost sales tax revenue from TBI Veterans unemployed.**

If you calculate the estimate TBI Veterans homeless (328)), TBI Veterans total (12,050) and total Veterans unemployed (11,311) it equates to 23,689 or approximately 8.3 percent of the total state Veteran population (282,767). **KY homeless TBI Veterans state tax revenue loss is estimated to be \$1,627,740 annually. The federal homeless Veteran income tax loss is estimated to be \$5, 607,018 or total of \$7,234,758(Table 2). KY TBI Veterans state unemployed income tax loss is estimated to be \$32,779,970 and federal unemployed income tax loss of \$112,915,997. The total KY state income tax loss is estimated to be \$34,407,710 (\$1,627,740 + \$32,779, 970).**

## Kentucky TBI Veteran Homeless and Unemployed

(A) State	(B) 2017 Median Household Income (See Note 3)	(C) 2018 State Tax Rate (See Note 1)	(D) State Tax (C X B) (See Note 1)	(E) Income over \$38,701	(F) Federal Tax Rate/ 22% over \$4453 (See Note 5)	(G) Social Security Tax/ 6.2% per employee (See Note 6)	(H) Medicare Tax/ 1.45% per employee (See Note 7)	(I) Total Federal Income Tax Collected (F+G+H)	(J) 2020 Veteran Population (See Note 2)	(K) Estimated 2022 Number of Homeless Vets (See Note 4)	(L) State Veteran TBI Estimate 4.261429% (See Note 8, 9A)	(M) 2019 State Veteran Unemployment Rate (See Note 8B)	(N) Unemployed Veterans Per State (J X M)	(O) Homeless Vets Lost State Revenue (D X K)	(P) Homeless Veterans Lost Federal Revenue (I X K)	(Q) Unemployed Vets Lost State Revenue (D x N)	(R) Unemployed Vets Lost Federal Revenue (I X N)
KY	\$45,215.00	6.0%	\$2,712.90	\$6,514.00	\$5,886.08	\$2,803.33	\$655.62	\$9,345.03	282,767	328	12050	4.0%	11311	\$889,831	\$3,065,170	\$32,779,971	\$112,915,997

Table 8

Note 1: Individual state income taxes account for 37% of state tax collections, individual state tax rates from [taxfoundation.org](http://taxfoundation.org) top state marginal individual income tax rates for 2018

Note 2: Veteran 2020 populations from [va.gov/vetdata/veteran\\_populations.asp](http://va.gov/vetdata/veteran_populations.asp).

Note 3: 2017 household median incomes from [en.wikipedia.org](http://en.wikipedia.org)

Note 4: 2022 Veteran homeless data from [Huduser.gov](http://Huduser.gov), The 2022 Annual Homeless Assessment Report (AHAR) to Congress, 2022 total US Veterans homeless 33,129, 328 in KY represents 1% of total US homeless Veterans.

Note 5: Federal income tax rate based on 2018 tables and include the following: 22%=\$38,701 to \$82,500, \$4453 plus 22% of the amount over \$38,700

Note 6: 2019 Social Security tax rate based on 6.2% for employee and employer or 12.4% total

Note 7: 2019 Medicare tax rate based on 1.45% for employee and employer or 2.9% total

Note 8: State Veteran TBI estimate of 4.261429% based on national estimate of 23% TBI of 2.7M=621K who served in Iraq/Afghanistan, 2<sup>nd</sup> tour Veterans 1.5M x 77%=1,115,000 x 23%

TBI=256,450+621K=877,450/20,590,510=4.261429%

Note 8A: Estimated 19.5% TBI returning OEF/OIF Veterans + 3.5% (1/2 of 7% with mental health or TBI)=23%, RAND.org, Invisible Wounds, Mental Health and Cognitive needs of Americas Returning Veteran, 2008, Page 2

Note 9: Mild TBI is considered one of the signature wounds of the wars in Iraq and Afghanistan, with as many as 23% of US Veterans who served in these conflicts reporting at least one mTBI during the military service) American Journal of Epidemiology, TBI and Attempted Suicide Among Veterans of War in Iraq and Afghanistan, Volume 186, Issue 2, 15 July 2017, Pages 220-226.

## Kentucky TBI Veteran Vehicle Property Tax Economic Impact

(A) States	(B) Vehicle Tax Rate	(C) Annual Taxes on \$25K Car	(D) State Veterans with TBI Estimate	(E) Estimated TBI Veterans Non-Car Owners (30%) (D X 30%)	(F) Estimated Annual Loss of Vehicle Taxes TBI Vet Non-Car Owner (C x E)
Kentucky	1.45%	\$363	12050	3615	\$1,312,245.00

Table 9

Note 1: Walletbub.com list \$24,970 is the value of a Toyota Camry LE four-door sedan as of 2/1/20, the highest selling automobile in 2019.

Note 2: Estimated TBI Veteran non-car owners calculated by taking estimated KY TBI Veterans 12,050 x 30% and multiplying by estimated tax per vehicle of \$363 to arrive at \$1.3 million.

Vehicle ownership is at the core of American employment. Transportation is an essential element for veterans being able to attain and sustain employment. Dependency on public transportation in many cases may limit the type and location of employment, work hours, and location of domicile. Of the 877,450 estimated TBI Veterans in America, 30 percent equated to an estimated 263,235 Veterans who do not own vehicles. In 2020 the Veteran population in the US was 19,397,944. Veteran total population in America used in our analysis, Veterans not owning vehicles equated to a mere 1.28 percent of the total population, a very conservative estimation for this cost analysis.

In summary, TBI Veterans not owning vehicles can be attributed to a combination of issues ranging from disability, need, type and amount of prescription drugs taken daily, drug and or alcohol related offenses, medical conditions that effect the ability to seek and attain a driver's license, unemployment, homelessness, and suicidal ideation, to name a few. This analysis did not investigate the reasons or number of Veterans not owning vehicles as the focus is conservatively estimating the economic tax impact of non-ownership by TBI Veterans. **Our conservative estimate is \$1,312,245 of lost KY tax revenue from vehicle ownership.**

### Kentucky TBI Veterans Property Tax Loss

(A) State	(B) Real Estate Tax Rate	(C) Annual Taxes on \$205K Home	(D) State Veteran TBI Estimate	(E) Estimated OEF/OIF Veterans Home Ownership (D X 34%)	(F) Estimated Annual Loss of Property Taxes TBI Vet Non-Homeowner (C x E)
Kentucky	0.86%	\$1,763	12050	4097	\$7,223,011

Table 10

Note 1: Wallenthub.com depicts \$204,900 is the median home value in the US as of 2018

Note 2: Column E, 2017 average Veteran home ownership, 18–34-year-olds is 34% as reported in the 2017 American Community Survey

Note 3: Data was not available at the time of this report on exact number of TBI Veterans who actually own homes

Note 4: The estimated real estate tax impact of KY TBI Veterans was calculated by estimating the number of TBI Veterans owning homes x the average annual taxes paid on \$205K residence

We assumed that most Veterans once they leave the service, are at the state median income levels especially if they are disabled. Based on the data, we elected to be conservative in our cost assessment and use the US national median home value of \$205,000 versus using the individual state median home values. The actual 2018 actual home median value was \$204,900.

In column E of Table 10, the 2017 average Veteran home ownership for 18-34-year-olds is 34 percent based on the 2017 American Community Survey. This is the lowest Veteran age group that reflects home ownership on the survey. This is on the low end of Veteran age groups who own homes and is used as a conservative approach to not overstate the property tax cost estimate impact on TBI veterans. Second, the 18–34-year-old veteran groups are most likely to be deployed into Iraq and Afghanistan from 2001-2018, the group most at risk for experiencing TBIs during their combat deployments. **Out estimate of KY TBI Veteran property tax revenue loss is \$7,223, 011 annually.**

### Kentucky TBI Veteran Incarceration Cost Impact

While the prevalence and impact of TBI in the prison population has not been well recognized, its influence is unmistakable.<sup>50</sup> According to a report by the Department of Justice (DOJ), approximately 2.3 million people are currently being held in U.S. prisons and jails. Of that number, the rate of TBI is high and ranges from 25% to 87% of incarcerated individuals.<sup>51</sup> In contrast, the rate of TBI in non-incarcerated adults is estimated to be lower than 8.5%.

According to the CDC, “prisoners who have had head injuries may also experience mental health problems such as severe depression and anxiety, substance use disorders, difficulty controlling anger, or suicidal thoughts and or attempts.”<sup>52</sup> At the end of 2019, there were a total of 1,435,500 incarcerated inmates in the US. Using 8 percent as Veterans, that is 114,840 total Veterans incarcerated. The CDC indicated 25% to 87% inmates in prison experienced a TBI, the average equates to 56 percent. Fifty six percent of 114,840 is 64,310 veteran inmates estimated with TBI. 64,310 incarcerated TBI Veterans x 1.5% equates to estimated 965 Kentucky TBI Veterans. **Our conservative estimate of Kentucky incarcerated TBI Veterans cost is \$20,883, 565 per year.**

### 2015 Kentucky State Prison Cost Per Inmate Per Year

(A) States	(B) Prison Population	(C) Prison 2015 Reported Expenditures	(D) 2015 Avg Cost Per Inmate (C /B)	(E) 2023 Estimated Avg Cost Per Inmate (D x 3.24% x 8 yr)
Kentucky	21,062	\$351,336,792	\$16,681	\$21,641

Table 11

Note1: Statistics provided by Vera.org website.

Note 2: US historic 114-year inflation rate is 3.24% as reflected in inflationdata.com.

<sup>50</sup> Slaughter, B., Fann, J.R., & Ehde, D. (2003). Traumatic brain injury in a county jail population: Prevalence, neuropsychological functioning and psychiatric disorders. *Brain Injury*; Wald, Helgeson & Langlois, n.d.

<sup>51</sup> CDC Traumatic Brain Injury in Prisons and Jails, n.d.; Wald et al., n.d.

<sup>52</sup> CDC Traumatic Brain Injury in Prisons and Jails, n.d

## Kentucky Estimated TBI Veteran Incarceration Cost

(A) State	(B) Estimated State Veteran Population Note 2	(C) Percent of Total US Veteran Population	(D) Total Estimated Incarcerated TBI Veterans Per State (C X 64,310)	(E) 2023 Average Cost to Incarcerate Veterans Per Year (D X \$21,641)
Kentucky	282,767	1.5%	965	\$20,883,565

Table 12

Note 1: 2020 Veteran population from [va.gov/vetdata/veteranpopulation.asp](http://va.gov/vetdata/veteranpopulation.asp).

Note 2: The cost estimates are based on state and local inmate costs, federal inmate costs not included

Note 3: Average incarceration cost per year extracted from [vera.org](http://vera.org) prison spending in 2015 by state equated to \$39,888 per inmate at national average across all 50 states. The more conservative \$21,641 rate per inmate was used to determine Kentucky incarceration cost.

## Conclusion

***The current annual economic societal cost (Table 1) for Kentucky TBI/PTSD Veterans who live with an untreated, undiagnosed, or misdiagnosed TBI is estimated to be \$484,249,150. For the estimated 12,050 TBI/PTSD Veterans in our Commonwealth, an annual \$40,186 cost per TBI/PTSD Veteran (Table 2) or \$19.3 billion over 40-year lifespan fix (Table 3). With a Kentucky state reoccurring \$1.3 million treatment funding, the annual Return on Investment (ROI) is approximately \$2.7 million savings or 0.79 percent of the total lifetime cost (Table 3).***

The data in this report tells a story about the economic impact of TBI veterans on Kentucky taxpayers. The economic impact and the humanistic toll it is having on our TBI Veterans, their families, caregivers, and our Commonwealth is enormous. Calculating these full costs is outside the scope of this document. We did not consider the ripple effect costs in this review and did not capture social security costs of families needing to enter mental health programs, secondary TBI given to wives and children, mental health services in the private sector, family out of pockets costs to cover accidents, legal fees for divorce, child protection, civil and criminal defense, property dissolution, spouses working as caregivers, etc. Nevertheless, what data that is available allow our trusted public officials and the public to better understand the costs of failing to adequately confront the physical damage caused by untreated Traumatic Brain Injuries. The fiscal cost is only a segment of the total impact on our Commonwealth. Historically, TBI Veterans are more prone than their peers to suffer drug and alcohol dependencies, require caregiver support, or succumb to homelessness or incarceration.

This is not to say all TBI Veterans suffer in the same way. The point is that untreated physical brain injuries, whether diagnosed or not, can cause incalculable financial damage. TBI Veteran costs are continuing to escalate substantially each year. The VA 2021 and 2022 submitted budget proposals were reflective of just how the cost is escalating every year. The VA mental health, suicide, homeless program, suicide, and opioid treatment program budgets alone are escalating at

a combined 107.2 percent per year or a 2021 cost of \$14.1 billion annually. In any normal business environment, the cost escalation is simply not sustainable or acceptable. There is an old tested and tried business approach that states, *“what gets measured gets fixed”*. The cost analysis is designed to bring transparency and allow business discussions on how best to mitigate these enormous state cost escalations.

Kentucky was prescient enough to pass The Colonel Ronald D. Ray Traumatic Brain Injury and Treatment Act in 2018 (HB 64/KRS 217.930-942) calling for the use of HBOT to treat Veteran TBI/PTSD. It is time to fund treatments to realize the human and cost savings possible with a new standard of care occurring across the country for invisible brain wounded Veterans.

The highly decorated TBI Veterans herein below tell their own stories on what path we should follow. The life cycle incurred by too many TBI/PTSD veterans is lamentable. As one veteran put it: “The cycle is **Deny, Delay, Deceive, Drugs, Depression, and Death, the 6 D’s.**” A large fraction of our combat veterans sustains invisible injuries; they return home to the DoD and then turn to the VA for help. The testimonials speak for themselves, we just need to follow their leads.

[US Army BG <http://tinyurl.com/m97x4jp>]; A VA disability rating is assigned.

[USMC GYSGT <https://bit.ly/2RYqJ4D>], a round of pharmacology, cognitive, physical, and mental health interventions commence;

[US Army Major, <http://tinyurl.com/jts2jv3>]; drugs are prescribed.

[USMC and US Army Lt., <https://bit.ly/3foowHU>]; caregiver family support ensues

[MOH recipient <https://tinyurl.com/s67ryzfu>]; changing doctors and doses of drugs, including opioids continue.

[Navy SEAL, <https://youtu.be/kZ3TFGjbptA>], the veteran is unemployable

[Mother of Army Sgt, <https://tinyurl.com/y6jaxzbx>]; prescriptions and talk therapy continue

[SGT US Army, <https://youtu.be/DBm3k63Qhkc>]; medication problems ensure

[USAF PhD, <https://tinyurl.com/4kp9d9ux>]; hospital and ER visits occur

[SGM USMC, <https://tinyurl.com/wybes8k8>]; marriages disintegrate

[Army Ranger, <http://tinyurl.com/hf3czmw>]; veterans become homeless

[USAF SGT, <https://tinyurl.com/a3f9up73>]; followed, too often by either incarceration or death

[US Army Ranger wife, <https://tinyurl.com/26ayccmy>];

<https://fox56news.com/news/kentucky/healing-hidden-wounds-kentucky-veterans-find-hope-in-hyperbaric-oxygen-therapy/> **Kentucky HBOT Treatment Program Fox 56 Lexington 4-15-25**

**Here is the link to our story: Free treatment for veterans with PTSD now available after \$1.5 million in Kentucky funding 9-23-24**

[https://www.wdrb.com/in-depth/free-treatment-for-veterans-with-ptsd-now-available-after-1-5-million-in-kentucky-funding/article\\_e658164c-781d-11ef-ab5d-f7a8f037df60.html](https://www.wdrb.com/in-depth/free-treatment-for-veterans-with-ptsd-now-available-after-1-5-million-in-kentucky-funding/article_e658164c-781d-11ef-ab5d-f7a8f037df60.html)