



# **Veterans Recovery Pilot Program Evaluation Report**

---

**As Required by  
Texas Health and Safety Code**

**Section 49.008**

**Texas Health and Human Services  
October 2022**



**TEXAS**  
Health and Human  
Services

# Table of Contents

<b>Executive Summary .....</b>	<b>3</b>
<b>1. Background .....</b>	<b>4</b>
<b>2. Veterans Recovery Account.....</b>	<b>5</b>
<b>3. Summary of Research.....</b>	<b>6</b>
<b>4. Veterans Recovery Pilot Program .....</b>	<b>9</b>
<b>5. Conclusion.....</b>	<b>11</b>
<b>6. References .....</b>	<b>12</b>
<b>List of Acronyms .....</b>	<b>13</b>
<b>Appendix A. NASHIA Report.....</b>	<b>14</b>

# Executive Summary

The *Veterans Recovery Pilot Program Evaluation Report* is prepared in compliance with [Texas Health and Safety Code, Section 49.008](#), as added by House Bill (H.B.) 271, 85th Legislature, Regular Session, 2017. The biennial report is due to the governor, lieutenant governor, speaker of the House of Representatives, and appropriate standing committees of the Legislature no later than October 1 of each even-numbered year. Section 49.008 requires the report to include an evaluation of the effectiveness of the pilot program, as well as the number of veterans and facilities participating in the pilot program.

Pursuant to Texas Health and Safety Code Section 49.002, further implementation of the Veterans Recovery Pilot Program is on hold pending conclusive decisions by the medical community on the efficacy of hyperbaric oxygen treatment (HBOT) as a treatment intervention for traumatic brain injury (TBI) and post-traumatic stress disorder (PTSD), and the establishment of treatment protocols and best practices.

The Health and Human Services Commission (HHSC) continues to explore the best practices and treatment protocols that are being studied in the ongoing research for HHSC to provide the highest quality care and resources to the veteran community. This report includes information on the funds available in the Veterans Recovery Account and summarizes HHSC's efforts to gather more information for the pilot program implementation.

Since the last report in October 2020, HHSC has conducted the following activities:

- Developed a request for information report outlining the requirements and best practices for establishing a Veterans Recovery Program with the use of HBOT to treat TBI and PTSD focused on the Texas veteran population.
- Reviewed the report analyzing the current research and best practices on the existing HBOT programs for people with TBI and PTSD provided in different states and service organizations.
- Monitored the status of similar programs in other states through our work with the National Association of State Head Injury Administrators (NASHIA) as well as the emerging research to identify best practices and treatment protocols that would be necessary for establishing a Veterans Recovery Pilot Program.

# 1. Background

H.B. 271 amended Health and Safety Code, Chapter 49, to establish the Veterans Recovery Pilot Program. The program seeks to provide diagnostic services, HBOT, and support services to eligible veterans who have PTSD or a TBI, pending sufficient funds in the Veterans Recovery Account established pursuant to Health and Safety Code, Section 49.004. This chapter will expire on September 1, 2023.

Health and Safety Code, Section 49.008, requires HHSC to submit a report to the governor, lieutenant governor, speaker of the house of representatives, and appropriate standing committees of the Legislature on the pilot program no later than October 1 of each even-numbered year. The report must include:

- An evaluation of the effectiveness of the Veterans Recovery Pilot Program;
- The number of veterans; and
- The number of facilities participating in the pilot program.

## 2. Veterans Recovery Account

The Veterans Recovery Account is a dedicated account in the general revenue fund to support the Veterans Recovery Pilot Program. The account consists of:

- Gifts, grants, and other donations received for the account; and
- Interest earned on the investment of money in the fund prior to September 1, 2019.<sup>1</sup>

Funds from the account can only be used to pay for the following:

- Expenses of administering the pilot program;
- Diagnostic testing and treatment of a veteran with PTSD or a TBI under the pilot program; and
- Necessary travel and living expenses for a veteran required to travel to obtain treatment under the pilot program.

As of September 21, 2022, the account had a total of \$1,242.83 to be used toward the pilot program. This includes one \$1,200 donation received in December 2017 and \$42.83 from interest gained on the donation prior to September 1, 2019.

HHSC has posted information on its website regarding details of the pilot program, how to donate to the account, and distributed this information to stakeholders to increase awareness. This information can be found at the Veterans Recovery Pilot Program Webpage at <https://www.hhs.texas.gov/services/disability/acquired-brain-injury/veterans-recovery-pilot-program>.

---

<sup>1</sup> Effective September 1, 2019, House Bill 3317, 86th Legislature, reactivated Texas Government Code Section 403.0956 in which interest for any type of revenue is no longer kept by the program but goes to General Revenue.

### 3. Summary of Research

HHSC contracted with NASHIA to develop a comprehensive report outlining the requirements and best practices for establishing a Veterans Recovery Pilot Program with the use of HBOT as a treatment intervention for TBI and PTSD. NASHIA completed a literature review of the existing research on HBOT programs for people with TBI, PTSD, or both. They scheduled and conducted interviews with five national subject matter experts related to HBOT treatments and reviewed the HBOT programs that four other states Arizona, North Dakota, Indiana, and Oklahoma, have implemented with varied outcomes including a limited number of veterans specified as served. Their analysis of existing HBOT programs, research on HBOT programs for people with brain injury, and PTSD across the United States reveals that the establishment of an HBOT program will require more conclusive and definitive evidence of efficacy and reliability to establish consistent treatment protocols and best practice guidelines.

NASHIA's research was inconclusive as there is continued debate in the peer-reviewed literature. Those in support of HBOT treatment for brain injury and PTSD claim that the research results are interpreted incorrectly, while those that oppose the treatment raise concerns about the methodology of some of the research studies and consequently the validity of some of their outcomes. Importantly, the U.S. Department of Veterans Affairs and U.S. Department of Defense Clinical Practice Guideline for the Management and Rehabilitation of Post-acute Mild Traumatic Brain Injury gives a "strong against" recommendation for the use of HBOT services because a review of current research revealed "...no evidence of improved symptom severity and only a mixed effect on [quality of life]."

The U.S. Department of Veterans Affairs Veterans Health Administration and Office of Research and Development have also researched the effectiveness of HBOT for use in treating symptoms related with TBI among the veteran population. In June 2021, they updated their clinical guidelines recommending against the use of HBOT for mild TBI treatment. Those guidelines cited a potential risk of harmful impacts which included seizures. The U.S. Department of Veterans Affairs Center for Compassionate Care Innovation offers support to veterans who have been diagnosed with health conditions that have failed to respond to evidence-based treatments. HBOT will be provided as a treatment of last resort for those individuals for whom evidence-based therapies are not effective.

NASHIA completed several interviews of state and national experts, including Dr. Lisa Brenner, Dr. David Cifu, Dr. Flora Hammond, and Scott Pokorny, who

discussed several recommendations when considering establishing a pilot program. They recommended allowing veterans to receive care by the provider of their choice rather than contracting with one provider to ensure price sustainability and market-driven innovative practices. The interviewed experts further recommended research of consumer safety measures and professional credentialing systems for providers to ensure safe and healthy practices. Lastly, they recommended providing HBOT as part of a comprehensive well-being treatment that can include medication, meditation, nutrition counseling, exercise, and stress management tools to maximize the potential benefits.

Several states have enacted legislation regarding HBOT treatment for veterans with TBI and PTSD. Arizona provided \$25,000 to a non-profit and has served 15 veterans since 2018. North Dakota is providing approximately \$2.1 million towards a research study titled "HBOT and Post Concussive Symptoms Following Mild TBI." Oklahoma offers reimbursement to a medical facility providing HBOT services from the Veterans Traumatic Brain Injury Treatment and Recovery Revolving Fund. This fund relies on donations and other gifts, and it is unclear how many veterans have been served to date. Indiana appropriated \$1 million during the 2018-2019 biennium for the HBOT program for veterans. As of January 2021, less than a third of the funding has been spent and one veteran had received services. This was attributed to the global health pandemic and significant hesitation for veterans to travel. In May 2021, the Indiana Department of Health issued a new request for proposal to find a new provider to manage the Indiana HBOT Pilot Study Treatment Protocol, offering up to \$340,000 to provide HBOT services to veterans in the program.

Researching HBOT providers in Texas results in a diverse group, including major hospital systems, wound care programs, independent treatment centers, and advertisements to purchase a personal hyperbaric oxygen treatment system. None of the HBOT programs in hospital and wound care systems advertise for treatment of neurological disorders. Some of these providers may be participating in research activities that allow them to provide HBOT services to their veteran participants. Some independent providers in the community advertise that they will provide HBOT services for the treatment of neurological conditions and that they will only accept private pay options as reimbursement for services. HBOT programs are located primarily in large metropolitan areas, which may affect access for those who live in rural areas. Additionally, the diversity of providers may make it difficult for a consumer to determine a safe and effective provider without education and professional guidance.

A review of the Texas Administrative Code found HBOT is only regulated in Title 16, Part 4, Chapter 130, Subchapter D, Rule §130.47, instructing doctors of podiatric medicine that HBOT can only be administered in a hospital setting following the published recommendations of the Undersea and Hyperbaric Medical Society, Inc. The Undersea and Hyperbaric Medical Society, Inc. offers accreditation of hyperbaric chambers for providers as an independent accreditation organization.

## 4. Veterans Recovery Pilot Program

Health and Safety Code, Section 49.004(e), as established by H.B. 271, directs Health and Human Services to seek reimbursement for payments made under the pilot program from the TRICARE program of the United States Department of Defense, appropriate federal agencies, and any other responsible third-party payors. According to the TRICARE website, the program does cover the cost of HBOT for some United States Food and Drug Administration (FDA) approved uses such as decompression sickness, air or gas embolisms, carbon monoxide poisoning, and profound blood loss, when transfusion cannot be accomplished. TRICARE may cover HBOT as an addition to standard therapy for acute soft tissue injury, clostridial myositis and myonecrosis, compromised skin grafts and/or flaps, chronic, severe, and/or gangrenous diabetic foot wounds, osteoradionecrosis, and osteomyelitis refractor. However, TRICARE specifically states that it does not cover HBOT for TBI, stroke, cerebral palsy, autism, or as an additional therapy for the treatment of thermal burns. Other insurance providers will also typically only cover HBOT treatment for FDA-approved uses.

Therefore, reimbursement for costs associated with the pilot program from TRICARE, or other insurance providers, will not be possible unless there is a change in the status of HBOT treatment being approved for the use with TBI and PTSD. This would most likely require a change in both the FDA approving HBOT treatment and the U.S. Department of Veterans Affairs changing its treatment guidelines against their current recommendations. To date, there are no indications from subject matter experts or other governmental agencies that have indicated that the FDA-approved list will be altered in any way. One exemption might be if the HBOT treatment is for the purposes of research. Additionally, if a veteran utilizes Compassionate Care Innovation for HBOT treatment as a last resort, then the services would be provided and covered by that program and would not need to be outsourced to a program such as the Veterans Recovery Pilot Program.

HHSC has engaged with the veteran community to learn about the needs of the veteran community to include the family of service members. The Texas Coordinating Council for Veterans Services and the Texas Veterans Commission's Veterans Mental Health Department have been gracious in collaborating with HHSC to provide veterans and their families with information and resources to address concerns including medical care, mental health, housing, and education. HHSC will continue these collaborations.

HHSC will also continue to monitor the current research and discuss development of the pilot program by learning more about HBOT treatment programs across the United States. This includes exploring funding streams for implementation and collaborating with other Health and Human Services programs and state agencies. HHSC will work to collaborate with veteran's organizations or veteran's support programs both inside state programs and with independent providers. In addition, HBOT as a therapeutic treatment is being researched and implemented in other states as outlined in the NASHIA report. HHSC will utilize the NASHIA network to identify these states and learn about their best practices for program development and implementation. In addition to developing program goals and best practices for program operation, HHSC will also utilize these networks to determine the funding needed to implement a pilot program in Texas.

HHSC is committed to providing assistance and resource facilitation to the veteran community. HHSC staff in the Office of Acquired Brain Injury are actively involved in collaborating with the Texas Coordinating Council of Veterans Services to help identify and promote recommendations. These recommendations focus on improving the quality of services as well as the access to services for a wide range of veterans. HHSC will also continue to work with the Texas Veterans Commission to provide assistance to the veteran community and collaborate with veterans' advocacy organizations to identify the needs of veterans. These efforts will include HHSC reaching out to new organizations or programs to provide education and information to connect veterans with the appropriate resources. HHSC will continue to collaborate and partner with both internal and external stakeholders for veterans' services to provide education and resource facilitation to support veterans with TBI.

## 5. Conclusion

HHSC contracted with NASHIA to explore and understand the current research and best practices that the medical community has learned for utilizing HBOT in treating TBI and PTSD. The report highlighted that the research has been inconclusive and is being debated in the peer review literature to determine HBOT treatment efficacy and reliability to address the concerns associated with a diagnosis of TBI and PTSD. The U.S. Department of Veterans Affairs does offer HBOT treatment as a last resort option for those whose conditions are not responding to other medical interventions. The subject matter experts recommended that a program like the Veterans Recovery Pilot Program should work with the participants of the program to choose their preferred provider, identify what consumer protections are in place, and how providers are credentialed since these are the primary issues that need to be considered when developing the Veterans Recovery Pilot Program. Other states including Arizona, North Dakota, Indiana, and Oklahoma have implemented HBOT programs with varying outcomes and have served a limited number of veterans.

HHSC will continue to collaborate with programs and organizations focused on veterans' health needs, research and share best practices for a Veteran Recovery Pilot Program development, explore appropriate program goals, and develop a strategy for determining funding needs. Texas Health and Safety Code Section 49.009 details that this chapter related to the Veterans Recovery Pilot Program will expire on September 1, 2023. If the chapter expires, this report will be the final report submitted in accordance with H.B. 271.

## 6. References

Veterans Recovery Pilot Program Webpage

<https://www.hhs.texas.gov/services/disability/acquired-brain-injury/veterans-recovery-pilot-program>

Texas Administrative Code Title 16, Part 4, Chapter 130, Subchapter D, Rule §130.47

[https://texreg.sos.state.tx.us/public/readtac\\$ext.TacPage?sl=T&app=9&p\\_dir=P&p\\_rloc=192690&p\\_tloc=&p\\_ploc=1&pg=3&p\\_tac=&ti=16&pt=4&ch=130&rl=47](https://texreg.sos.state.tx.us/public/readtac$ext.TacPage?sl=T&app=9&p_dir=P&p_rloc=192690&p_tloc=&p_ploc=1&pg=3&p_tac=&ti=16&pt=4&ch=130&rl=47)

VA/DoD Clinical Practice Guideline for the Management and Rehabilitation of Post-Acute Mild Traumatic Brain Injury. (2021). The Management and Rehabilitation of Post-Acute Mild Traumatic Brain Injury Work Group, The Office of Quality and Patient Safety, VA, & Office of Evidence Based Practice, Defense Health Agency. <https://www.healthquality.va.gov/guidelines/Rehab/mtbi/VADoDmTBICPGFinal508.pdf>

News article from WRTV in Indianapolis: "Program meant to heal brains of Indiana veterans fails to get fully off the ground years later"

<https://www.wrtv.com/news/wrtv-investigates/program-meant-to-heal-brains-of-indiana-veterans-fails-to-get-fully-off-the-ground-years-later>

TRICARE Covered Services Website

<https://tricare.mil/CoveredServices/IsItCovered/HyperbaricOxygenTherapy>

Undersea and Hyperbaric Medical Society

<https://www.uhms.org/>

# List of Acronyms

<b>Acronym</b>	<b>Full Name</b>
H.B.	House Bill
HBOT	Hyperbaric Oxygen Treatment
HHSC	Health and Human Services Commission
FDA	United States Food and Drug Administration
NASHIA	National Association of State Head Injury Administrators
PTSD	Post-Traumatic Stress Disorder
TBI	Traumatic Brain Injury

# **Appendix A. NASHIA Report**

## **HBOT for Texas Veterans Living with TBI**

An environmental scan off current research and practices related to use of HBOT for treatment of TBI

Report by Rebeccah Wolfkiel

National Association of State Head Injury Administrators

### **Introductions**

In 2017, Texas legislation went into effect creating the Veterans Recovery Pilot Program. This program provides veterans living with Traumatic Brain Injury (TBI) and Post Traumatic Stress Disorder (PTSD) with diagnostic services, hyperbaric oxygen therapy (HBOT) and related support services. Additionally, this law created the Veterans Recovery Account, which accepts donations and earns interest on all gifts received. Funds available through the Veterans Recovery Account may be used by veterans who have experienced TBI or PTSD to receive HBOT, as well as pay for services associated like transportation.

The purpose of this report is to provide the Texas Office of Acquired Brain Injury (OABI) with the most current information related to research and government-funded services regarding delivery of HBOT services for individuals living with symptoms associated with a TBI. Included in this report are a review of research practices which speak to the efficacy of HBOT for use by individuals with TBI, an overview of related activities by the United States Veterans' Administration, summaries of state programs that aim to provide HBOT to veterans for treatment of TBI symptoms, and recommendations for Texas OABIHBOT program creation based on multiple interviews and literature reviews by experts in the field of brain injury.

### **Research and Scientific Overview**

During hyperbaric oxygen therapy, patients sit in a special chamber and breathe in pure oxygen at an elevated ambient pressure. This allows the oxygen to permeate injured organs and tissue. The therapy is covered by the Medicare program, approved by the Food and Drug Administration (FDA), and used widely for several medical conditions, including some types of skin wounds and internal injuries. Bu tits use in treating brain injury continues to be controversial and has not been approved by the FDA.

Numerous studies by independent researchers, university-affiliated parties and federal government entities have focused on the efficacy of the use HBOT for treatment of TBI and PTSD. To date, the research results remain inconclusive.

Opponents of HBOT claim that studies that have found HBOT to be impactful for TBI do not use adequate controls, are funded by entities with a vested interest in the therapy and data produced only measures immediate outcomes, rather than long-term effects. Proponents of HBOT for TBI claim that the main confusion lies within the interpretation of the findings of the studies. Specifically, proponents of HBOT contend that among randomized control trials the control groups that received oxygen levels lower than standard HBO therapy levels have been mischaracterized as sham, misleading the results.

A recent literature review conducted at Virginia Commonwealth University, assessing all Veterans Affairs (VA), Department of Defense (DOD) and civilian research conducted on this topic found that, "...clinical support for using Hyperbaric Oxygen Therapy (HBO) for neurological conditions is primarily based on anecdotal case data...". More nuanced is the impact of HBOT based on the severity of the TBI. Specifically, some evidence may exist to support that HBOT improves survival in acute and severe TBI cases, however there is no evidence related to functional outcomes. Additionally, the research conducted to date does not support improvements to symptoms from chronic TBI, most commonly from a mild concussive injury.

Further, HBOT for TBI has been found to pose a significant risk to populations with severe brain injury, with almost 15 percent experiencing incidence of injury from the HBOT treatment itself.

## **Department of Veterans Affairs**

For the last decade, the Veterans Health Administration, Office of Research and Development, has researched the effectiveness of HBOT for use in treating symptoms related with TBI among the veteran population.

While research remains inconclusive, the VA has addressed the ongoing desire to use HBOT by veterans with TBI in the following ways:

- In June 2021, the Veterans Health Administration and the Department of Defense updated their clinical guidelines for mild TBI, VA/DoD Clinical Practice Guideline for the Management and Rehabilitation of Post-Acute Mild Traumatic Brain Injury. After a review of all research and clinical evidence since 2000, for the first time, the Guidelines explicitly recommends against the use of HBOT for

the treatment of mild TBI. Specifically, "...the Work Group ... found no evidence of improved symptom severity and only a mixed effect on Quality of Life." Further, the Guidelines state, "In addition to lack of patient improvement, the use of HBOT after mild TBI may have harmful impacts, including seizures." Finally, the Guidelines reference their convenience often associated due to the limited availability of HBOT providers and necessity to undergo multiple treatments, as well as the expense associated and lack of both public and private insurance coverage. It concludes, "Given the evidence of harm in the literature and the FDA findings, currently, HBOT is not an effective or safe treatment after mild TBI."

- Since 2018, the VA's Center for Compassionate Care Innovation (CCI) has also provided HBOT to small groups of veterans among four VA Medical Centers. CCI serves veterans who have been diagnosed with health conditions that have not responded to evidence-based treatments. CCI is most focused on providing access to new approaches or novel treatments that support suicide prevention, and reduce symptoms associated with PTSD, TBI and chronic pain. This program supports a relatively small number of veterans each year and is only available after all evidence-based options have been exhausted.

## **United States Congress**

In the United States Congress there has been growing support to require VA coverage of HBOT for veterans with TBI. Legislation (S. 2189, the Access to HBOT Act) introduced in June 2021 by Senator Tommy Tuberville (R-AL) would require the VA to refer veterans with TBI or PTSD, who are at high risk for suicide, and have already tried two complementary and alternative medicine (CAM) treatments, to a participating HBOT clinic. The bill would build upon the Right to Try Act, which was signed into law in 2018. That law, according to the FDA, enables patients with life-threatening diseases or conditions to access some unapproved treatments once they have exhausted all other treatment options. This legislation has not yet been considered by the Senate Veterans Affairs Committee, nor the full Senate at large.

Additionally, Congressman Greg Murphy (R-NC) has introduced legislation in the House of Representatives (H.R. 1014, the Veterans National TBI Treatment Act) to scale the Compassionate Care Innovation program at the VA to provide HBOT to additional veterans with TBI and PTSD. This legislation has not yet been considered by the House Veterans Affairs Committee, nor the full House of Representatives.

## State Approaches

### Arizona

In May 2018, Governor Doug Ducey signed legislation into law providing seed funds for a non-profit that raises money for HBOT treatments for veterans with TBI. Specifically, the State of Arizona provided \$25,000 to Healing Arizona Veterans, to expand its private-public partnership and help it reach its goal of raising \$600,000 to treat 50 veterans. To date the non-profit has paid for HBOT for 15 veterans.

### Indiana

In 2018, Governor Eric Holcomb signed into law an effort to provide veterans with TBI an PTSD with hyperbaric oxygen therapy through a state program. The state legislature appropriated \$1 million during the fiscal year 2018-19 biennium for the hyperbaric oxygen therapy program for veterans. To date, less than a third of the funding has been spent and no veterans have received treatment. Speculation is that providers were hesitant to participate due to the fact that the reimbursement structure was based on patient improvement and outcomes rather than services provided.

On April 8, 2021, the state legislature extended the program to 2025 and in May 2021 the Indiana Department of Health issued new Request for Proposals to find a new provider to manage the Indiana HBOT Pilot Study Treatment Protocol, offering up to \$340,000.

### North Dakota

In 2019, North Dakota's state legislature passed the following language as part of an annual budget bill:

"SECTION 20. HYPERBARIC OXYGEN THERAPY PILOT PROGRAM GRANT. Subdivision 2 of subsection 1 of this Act includes the sum of \$335,000 from the general fund for the purpose of providing a grant to an entity to develop a hyperbaric oxygen therapy pilot program."

Due to advocacy by North Dakota brain injury stakeholders, the funding is currently being used by the University of North Dakota to create a study protocol titled "HBO and Post Concussive Symptoms Following mild TBI" to study this issue further.

In 2021, North Dakota's state legislature allocated an additional \$2.1 million from the state's American Rescue Plan distribution, to the HBO and Post Concussive

Symptoms Following mild TBI. The funds are slated to go towards the addition of participants to the study.

## Oklahoma

In 2014, Governor Mary Fall in signed into law the Oklahoma Veterans Traumatic Brain Injury Treatment and Recovery Act, to make hyperbaric oxygen therapy available for free to Oklahoma veterans with TBI. The law is intended to allow veterans to receive the treatment at any licensed and equipped medical facility in the state and created a revolving fund to pay for the service. The law includes no state appropriation for the program and relies on donations from the International Hyperbaric Medical Foundation, or other gifts, to support the revolving fund.

The Oklahoma State University Center for Aerospace and Hyperbaric Medicine (OSUCAHM) was selected to provide full statewide management of all medical treatments provided and costs allowed to providers who request reimbursement from the Veterans Traumatic Brain Injury Treatment and Recovery Revolving Fund. According to the statute, "Prior to the treatment of any veteran for TBI the OSUCAHM shall develop and publish a standard approved treatment plan for veterans being treated using HBOT. ...OSUCAHM shall have the authority to approve or disapprove the treatment plan for reimbursement under this act."

Participating facilities must provide treatment at no cost to the veteran and remit an invoice to the state of Oklahoma. The bill is to be paid from the Veterans Traumatic Brain Injury Treatment and Recovery Revolving Fund to the extent funds are available.

If the cost of the treatment exceeds the availability of funds, the veteran is held harmless from any costs of treatment by the facility and the state is under no obligation to make payments beyond the approved amount in the fund.

Unfortunately, it is unclear to date how many veterans have been able to take advantage of this treatment through the Revolving Fund.

## Consideration

Based on the various interviews conducted with state and national experts, as Texas continues to move forward with creation of an HBOT program for veterans, the following suggestions are recommended for consideration:

- At times state legislative advocacy for HBOT provision is driven by the HBOT providers themselves. Allowing veterans to receive care at the provider of their

choice, rather than contracting with one HBOT provider to offer all state-covered services, would help to ensure price sustainability and market-driven innovative practices as well as decrease real/perceived conflict of interest.

- Hyperbaric oxygen chambers are expensive machinery, and the treatments are often costly for the recipient. “Military grade” chambers can also be purchased online by anyone who can afford them. If HBOT chambers are to be used for medical use, consumer safety measures such as health and safety licensure for operators, as well as the machines themselves, should be established.
- A professional credentialing system, such is given to other therapy providers (AT, OT, PT etc.) may be worth pursuing to ensure providers are maintaining safe and healthy practices.
- To maximize benefits, HBOT may be provided as part of a comprehensive wellbeing treatment battery, that includes: meditation, nutrition counseling, exercise and other stress management tools.
- Utilization of HBOT for TBI as “compassionate care,” as is utilized by the VA’s program, provides HBOT as a treatment of last resort for those individuals for whom evidence-based therapies are not working. Introducing HBOT as an option to provide some relief, even temporary, maybe worth the expense and additional obstacles to treatment for individuals who are experiencing severe chronic symptoms and for whom traditional evidence-based treatments such as cognitive therapy, are not relieving symptoms.
- To continue to support research related to HBOT, Texas may want to consider tracking long-term outcomes and collecting outcomes data for an extended period of time after treatment has occurred.

## Conclusion

Above all, it is commendable to that Texas is dedicated to serving veterans who have been injured in combat. While the efficacy of hyperbaric oxygen therapy for TBI remains a hotly debated topic, there are state and federal programs that have integrated its use into treatment protocols. Creation of a dedicated account that receives interest on allocations, such as the fund created by the Texas legislature, is the approach that Oklahoma has taken, while Arizona contributed to a non-profit organization to manage fundraising and service delivery all together. Both Oklahoma and Indiana’s programs contract with an entity to manage the service delivery, with Oklahoma’s experience seemingly more productive than Indiana’s to date. Finally, the United States Veterans’ Administration takes a “treatment of last resort” approach, ensuring that the individual has tried all evidence-based therapies

before funding the more expensive and controversial therapy. Ultimately, though Texas is still among the early adopters of this type of program, it may be best to integrate pieces of each approach that appears to have worked well in the programs that have been created before this one.

## References

1. Boussi-Gross R, Golan H, Fishlev G, Bechor Y, Volkov O, et al. (2013) Hyperbaric Oxygen Therapy Can Improve Post-Concussion Syndrome Years after Mild Traumatic Brain Injury-Randomized Prospective Trial. *PLoS ONE* 2013;8(11): e79995. doi:10.1371/journal.pone.007999
2. Brenner, Lisa. Zoom Interview. October 19, 2021.
3. Churchill S, Weaver LK, Deru K, Russo AA, Handrahan D, Orrison WW, Foley JF, Elwell HA; A prospective study of hyperbaric oxygen for chronic sequelae after brain injury (HYBOBI). *Undersea Hyperb Med* 2013;40(2):165-93.
4. Cifu DX. Zoom Interview. September 8, 2021.
5. Cifu DX, Hart BB, West SL, Walker W, Carne W.: The effect of hyperbaric oxygen on persistent post concussion symptoms. *J Head Trauma Rehabil.* 2014 Jan-Feb;29(1):11-20.
6. Cifu DX, Hoke KW, Wetzel PA, Wares JR, Gitchel G: Effects of hyperbaric oxygen after mild traumatic brain injury on eye tracking abnormalities. *J Rehabil Res Develop* 2014;51(7):1047-1056.
7. Cifu DX, Walker WC, West SL, Hart BB, Franke LM, Sima A, Graham CW, Carne W.: Hyperbaric oxygen for blast-related post-concussion syndrome: 3-month outcomes. *AnnNeurol.* 2014;75:277-286.
8. Collins-Fadell, Carrie. Zoom Interview. September 3, 2021.
9. Crawford Cindy, Teo Lynn, Yang EunMee, Isbister Caitlin, Berry Kevin: Is Hyperbaric Oxygen Therapy Effective for Traumatic Brain Injury? A Rapid Evidence Assessment of the Literature and Recommendations for the Field. *J Head Trauma Rehabil.* 2017.May/Jun;32(3):E27-E37
10. Hammond, Flora. Zoom Interview. December 14, 2021.
11. Harch PG, Andrews SR, Fogarty EF, Amen D, Pezzullo JC, Lucarini J, et al: A Phase I Study of Low-Pressure Hyperbaric Oxygen Therapy for Blast-Induced Post-Concussion Syndrome and Post-Traumatic Stress Disorder. *J Neurotraum* 2012;29:168-185.

12. HBOT Access Act, S. 2189. (2021). United States Library of Congress. [www.congress.gov](https://www.congress.gov/bill/117th-congress/senate-bill/2189/text). (December 2021) <https://www.congress.gov/bill/117th-congress/senate-bill/2189/text>.
13. Hoge CW, Jonas WB: Commentary: Hyperbaric Oxygen, Lesson for Post concussion Symptoms Treatment. *JAMA Intern Med* 2014 (Doi:10.1001/jamainternmed.2014.3375)
14. Miller RS, Weaver LK, Bahraini N, et al: Effects of Hyperbaric Oxygen on Symptoms and Quality of Life Among Service Members with Persistent Post concussion Symptoms: a Randomized Controlled Trial. *JAMA Intern Med* 2014 (Doi:10.1001/jamainternmed.2014.5479).
15. Peterson Kim, Bourne Donald, Anderson Johanna, Boundy Erin, Helfand Mark: Evidence Brief: Hyperbaric Oxygen Therapy (HBOT) for Traumatic Brain Injury and/or Post-traumatic Stress Disorder
16. VA Evidence-Based Synthesis Project. 2018.
17. Pokorney, Scott. Zoom Interview. September 15, 2021.
18. VA/DoD Clinical Practice Guideline for the Management and Rehabilitation of Post-Acute Mild Traumatic Brain Injury. (2021).
19. The Management and Rehabilitation of Post-Acute Mild Traumatic Brain Injury Work Group, The Office of Quality and Patient Safety, VA & Office of Evidence Based Practice, Defense Health Agency.
20. Veterans National Traumatic Brain Injury Treatment Act, H.R. 1014. (2021). United States Library of Congress. [www.congress.gov](https://www.congress.gov/bill/117th-congress/house-bill/1014?s=1&r=97). (December 2021) <https://www.congress.gov/bill/117th-congress/house-bill/1014?s=1&r=97>.
21. Veterans Traumatic Brain Injury Treatment and Recovery Revolving Fund. Title 63 Public Health and Safety. 63-1-291.3
22. (2014). <https://www.ok.gov/health2/documents/Title%2063%2011-1-19.pdf>
23. United States Veterans Administration. National Center for Healthcare Advancement and Partnerships.
24. Center for Compassionate Care Innovation. (December 2021) <https://www.va.gov/healthpartnerships/updates/cci/08092019.asp>
25. Walker WC, Franke LM, Cifu DX, Hart BB.: Randomized, Sham-Controlled, Feasibility Trial of Hyperbaric Oxygen for Service Members With Post concussion Syndrome: Cognitive and Psychomotor Outcomes 1 Week Postintervention. *Neurorehabil Neural Repair* 2013;28(5):420-32.

26. Weaver LK, Cifu D, Hart B, Wolf G, Miller S.: Hyperbaric oxygen for post-concussion syndrome: design of Department of Defense clinical trials. *Undersea Hyperb Med.* 2012 Jul-Aug;39(4):807-14.
27. Wolf G, Cifu D, Baugh L, Carne W, Profenna L.: The effect of hyperbaric oxygen on symptoms after mild traumatic brain injury. *J Neurotrauma.* 2012 Nov 20;29(17):2606-12. Doi:10.1089/neu.2012.2549. Epub 2012 Nov 9.

National Association of State Head Injury Administrators

This report was prepared by:

Rebeccah Wolfkiel  
Executive Director  
National Association of State Head Injury Administrators  
December 2021