

AWARD NUMBER: W81XWH-17-1-0691

TITLE: Factors Associated With Outcomes in Patients With Vestibular  
Symptoms Related to Traumatic Brain Injury

PRINCIPAL INVESTIGATOR: Faith W. Akin, PhD

CONTRACTING ORGANIZATION: Mountain Home Research & Education Corporation  
Mountain Home, TN

REPORT DATE: October 2021

TYPE OF REPORT: Annual

PREPARED FOR: U.S. Army Medical Research and Materiel Command  
Fort Detrick, Maryland 21702-5012

DISTRIBUTION STATEMENT: Approved for Public Release; Distribution Unlimited

The views, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision unless so designated by other documentation.

# REPORT DOCUMENTATION PAGE

*Form Approved*  
OMB No. 0704-0188

Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing this collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to Department of Defense, Washington Headquarters Services, Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. **PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.**

<b>1. REPORT DATE (DD-MM-YYYY)</b> October 2021		<b>2. REPORT TYPE</b> Annual Report		<b>3. DATES COVERED (From - To)</b> 1-29Sep2020-28Sep2021	
<b>4. TITLE AND SUBTITLE</b> Factors associated with outcomes in patients with vestibular symptoms related to traumatic brain injury				<b>5a. CONTRACT NUMBER</b> W81XWH-17-1-0691	
				<b>5b. GRANT NUMBER</b>	
				<b>5c. PROGRAM ELEMENT NUMBER</b>	
<b>6. AUTHOR(S)</b> Faith Akin, Ph.D. & Mary Jo Pugh, Ph.D.				<b>5d. PROJECT NUMBER</b>	
				<b>5e. TASK NUMBER</b>	
				<b>5f. WORK UNIT NUMBER</b>	
<b>7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)</b> Mountain Home Research & Education Corporation Sidney & Lamont St Mountain Home, TN 37684				<b>8. PERFORMING ORGANIZATION REPORT NUMBER</b>	
<b>9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)</b> U.S. Army Medical Research and Materiel Command Fort Detrick, Maryland 21702-5012				<b>10. SPONSOR/MONITOR'S ACRONYM(S)</b> USAMRMC	
				<b>11. SPONSOR/MONITOR'S REPORT NUMBER(S)</b>	
<b>12. DISTRIBUTION / AVAILABILITY STATEMENT</b> Approved for public release; distribution is unlimited.					
<b>13. SUPPLEMENTARY NOTES</b>					
<b>14. ABSTRACT</b> <i>Objective:</i> Dizziness and imbalance are common symptoms following head injury that can continue for months or years in some individuals. Chronic dizziness is a serious health concern that can lead to increased fall risk, emotional and psychological distress, as well as work disability. Multiple causes of post-concussive dizziness can present a challenge to diagnosis, and obstacle to treatment. The Departments of Veterans Affairs and Defense (VA/DoD) developed clinical practice guidelines that outline recommendations for managing individuals with post-concussive dizziness, but it is unclear how these recommendations impact treatment for post-concussion dizziness/imbalance. In addition, some Veterans may seek care outside the VA or use alternative approaches to manage their post-concussive dizziness. The purpose of this study is to determine factors that contribute to successful outcomes of patients with concussion/blast-related dizziness. <i>Methodology:</i> We will use VA and DoD health databases to identify and examine characteristics of Veterans with specific (for example, inner ear balance dysfunction) and non-specific diagnoses of post-concussion dizziness. Then, we will survey Veterans using questionnaires and access the VA electronic medical records to determine factors that impact long-term recovery of post-concussion dizziness. Specifically, we will examine the impact of factors such as type of treatment, the presence or absence of health conditions such as headache and anxiety, the severity of head injury, as well as age and gender. <i>Findings:</i> We have sent survey invitations to 4250 Veterans and received 1062 with at least 50% survey completion for a response rate of 25%. Chart abstraction has been completed on 995 subjects (93% completed). <i>Impact/Significance:</i> This study is the first step towards developing novel therapeutic approaches to reduce the negative impact of dizziness and imbalance on individuals with dizziness related to mTBI. This project will contribute to improved quality of life for active-duty service members and Veterans suffering from TBI, and blast-related mTBI.					
<b>15. SUBJECT TERMS</b> Vertigo, Dizziness, Vestibular, Otoliths, Traumatic Brain Injury, Patient Outcome					
<b>16. SECURITY CLASSIFICATION OF:</b>			<b>17. LIMITATION OF ABSTRACT</b>  Unclassified	<b>18. NUMBER OF PAGES</b>  17	<b>19a. NAME OF RESPONSIBLE PERSON</b> Faith Akin, Ph.D.
<b>a. REPORT</b> Unclassified	<b>b. ABSTRACT</b> Unclassified	<b>c. THIS PAGE</b> Unclassified			<b>19b. TELEPHONE NUMBER</b> (include area code) 423.926.1171 x.7376

<b>Table of Contents:</b>	<b>Page Number:</b>
<b>Cover Sheet</b>	<b>1</b>
<b>SF-298</b>	<b>2</b>
<b>1. Introduction</b>	<b>4</b>
<b>2. Keywords</b>	<b>4</b>
<b>3. Accomplishments</b>	<b>4</b>
<b>4. Impact</b>	<b>11</b>
<b>5. Changes/Problems</b>	<b>11</b>
<b>6. Products</b>	<b>12</b>
<b>7. Participants &amp; Other Collaborating Organizations</b>	<b>13</b>
<b>8. Special Report Requirements</b>	<b>17</b>
<b>9. Appendices</b>	<b>17</b>

## 1. INTRODUCTION

Chronic dizziness or imbalance is a common symptom following head injury that can negatively impact quality of life. Injured Veterans of the recent wars typically enter the Veterans Health Administration through the Polytrauma clinics and undergo the Comprehensive TBI Evaluation (CTBIE) which includes the Neurobehavioral Symptom Inventory. Although there are several clinical practice guidelines for post-concussive symptoms, there are no data on the effectiveness of clinical management pathways for reducing symptoms of dizziness. We are examining long-term outcomes of post-concussive dizziness in Veterans with TBI to determine factors and clinical management strategies associated with successful outcomes. We are using a chart review and Veteran survey (see Appendix A) to examine clinical referral patterns, diagnostic testing, and types of VA and non-VA care used to treat Veterans with post-concussive dizziness. This research effort is part of a long-term goal to establish a unique treatment platform to diagnose, localize, and treat dizziness and imbalance related to mTBI.

## 2. KEYWORDS

Vertigo, Dizziness, Vestibular, Otoliths, Traumatic Brain Injury, Patient Outcomes

## 3. ACCOMPLISHMENTS

**What were the major goals of the project?**

<b>Major Task 1: Complete Regulatory Requirements for Study</b>	<b>Timeline (Months)</b>	<b>Percentage Completed</b>
Prepare Regulatory Documents and Research Protocol		
Finalize consent, human subjects protocol chart abstraction tool / Survey	1	100%
Coordinate with Sites for MOU/ DTA completion, nondisclosure agreements	1-5	100%
Secondary site IRB protocol submission (expedited)	1-4	100%
Submit amendments, adverse events and protocol deviations as needed	1-36	N/A
Coordinate with Sites for annual IRB report for continuing review	Annually	N/A
<i>Milestone Achieved: Local IRB and HRPO approval at Mountain Home Research and Education Corporation (MHREC) and Western Institute for Biomedical Research, Salt Lake City (WIBR)</i>	3-6	100%
<b>Major Task 2: Identify cohort who meet criteria for high NSI vestibular symptomology</b>	<b>Timeline (Months)</b>	<b>Percentage Completed</b>
Subtask 1: Obtain VA data for Post-9/11 Veterans		
Complete data request documentation for VA and DoD data sources	4-6	100%

Obtain VA and DOD data, calculate NSI severity, identify comorbidities, including TBI and TBI characteristics, and other clinical characteristics	6-7	100%
<i>Milestone Achieved: Raw Data obtained</i>	7	100%
<b>Subtask 2: Identify vestibular and non-specific dizziness diagnoses in FY02-FY15 cohort</b>		
Compile data from VA and DoD data sources and identify vestibular and non-specific dizziness diagnoses	7	100%
<i>Milestone Achieved: Cohort of Veterans with Dizziness identified</i>	7-8	100%
Conduct/interpretation of logistic regression analyses on Post-9/11 VA cohort and complete manuscripts	8-12	100%
<i>Milestone Achieved: Aim 1 completed</i>	12	100%
<b>Major Task 3: Conduct survey of Veteran with high vestibular symptomology</b>	<b>Timeline (Months)</b>	<b>Percentage Completed</b>
Obtain survey supplies, develop REDCap and paper survey administration forms, and develop logistics for survey process. (WIBR)	1-7	100%
Identify sample with high vestibular symptomology (NSI vestibular scale score of $\geq 3$ ) AND who received care in a vestibular relevant clinic AND who received a diagnosis vestibular-specific or non-specific dizziness. (WIBR)	7-8	100%
Verify contact information and prepare survey mailings for administration. (WIBR)	7-26	100%
Conduct survey administration via online, mail (and telephone if preferred by respondents) modalities. (WIBR)	7-26	100%
Treatment responders will be identified: improvement in an individual's vestibular symptom score of $\geq 2$ points or 20% improvement in the NSI vestibular subscale score. (WIBR)	7-27	100%
<i>Milestone Achieved: Study sample frame for Aim 2 identified and characterized; Survey data for Aim 2 collected</i>	27	100%
<b>Major Task 4: Identify Sample for Aim 2 and conduct chart abstraction</b>	<b>Timeline (Months)</b>	<b>Percentage Completed</b>
Develop and finalize chart abstraction data elements. (MHREC)	1-6	100%
Develop chart abstraction form in REDCap. (MHREC)	7-8	100%
Conduct preliminary training for chart abstraction on test cases identified from administrative data with high vestibular symptomology (NSI vestibular scale score of $\geq 3$ ) AND who received care in a vestibular relevant clinic AND who received a diagnosis vestibular-specific or non-specific dizziness. (MHREC)	8-10	100%

Perform chart abstraction from electronic medical record via VISTA web system to describe type of care received and sample characteristics, including TBI, comorbidities, demographics. (MHREC)	11-30	93%
<i>Milestone Achieved: Study sample frame for Aim 2 identified and characterized</i>	30	95%
<b>Major Task 5: Conduct analyses comparing Veterans with and without vestibular specific diagnoses who Responded vs. Non-responders</b>	<b>Timeline (Months)</b>	<b>Percentage Completed</b>
Conduct interim and final analyses/ interpretation for Aim 2. (WIBR + MHREC)	30-34	10%
Complete manuscripts for publication. (WIBR + MHREC)	30-36	30%
<i>Milestone Achieved: Report findings comparing Veterans who Responded vs. Non-responders (Aim 2)</i>	36	10%

### What was accomplished under these goals?

#### 1. Major Activities:

- a. Determined the proportion of Veterans evaluated in the CTBIE who reported high NSI vestibular symptomology, the extent to which individuals with high NSI vestibular scores have a vestibular specific diagnosis based on ICD-9 codes, and the relationship between vestibular symptomology, vestibular specific diagnosis codes and TBI characteristics (Aim 1; Swan et al., 2021, *J Head Trauma Rehabil*).
- b. Survey Status. In FY21 Q2, the WIBR team completed mailing all survey packets to all 4,250 potential participants (Aim 2). In FY21 Q3, our team mailed the third follow up letter to survey non-responders from Batches 3 and 4. The third follow up letter includes a notice that Veterans may be emailed to participate. In Q3, we emailed 142 potential participants who did not respond to the third follow up letter, and in Q4 we emailed an additional 289 potential participants. By July 25, 2021 we received 1094 surveys, of which 32 were less than 50% complete and had to be removed. We exclude these partial completers and include only those who completed 50% or more of the survey in the total response rate count. A total of 1,062 responders completed more than 50% of the survey (25% response rate) by July 25, 2019 and the survey was closed July 29, 2021. With these 1,062 surveys, we have reached 101% of our goal toward 1050 completed surveys. Our response rate by mailing batch is provided in Table 1, and our response rate by Study Group is provided in Table 2.

**Table 1.** Response rate by Batch

Batch	Received	Sample	Percent
Pilot	59	225	26%
Batch 2	518	2001	26%
Batch 3	140	498	28%
Batch 4	345	1526	23%
Total	1062	4250	25%

**Table 2.** Response rate by Study Group

Group	Sample Mailed	Received	Goal	%
Group 1	1220	364	350	104%
Group 2	1515	354	350	101%
Group 3	1515	344	350	98%
Total	4250	1062	1050	101%

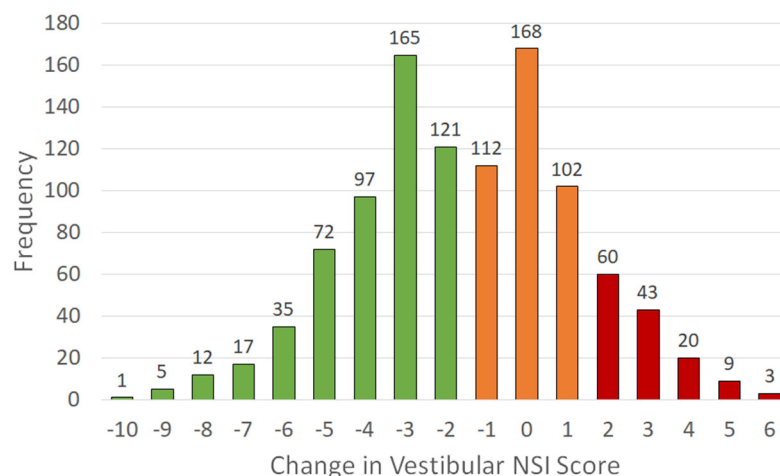
- c. The WIBR team has cleaned the survey data and begun initial analyses (Major Task 5).
- d. MHREC continued chart abstraction of participants who completed the survey (target sample size = 1070). A total of 995 charts have been reviewed by one reviewer, and 38% of the charts (375) have been cross-checked by a second reviewer. Chart abstractions will be completed on all 1062 participants who completed at least 50% of the survey. Eight additional participant charts were reviewed but excluded due to <50% survey completion, and their data will not be used for analyses. Because the mean interrater agreement was 85%, we reduced the number of chart abstractions that were cross-checked by a second reviewer from 100% to 10%.
- e. Continued twice monthly conference calls with key personnel at all study sites.

**2. Specific Objectives:**

- a. Completed survey administration (Major Task 3, 100% completed).
- b. Performed chart abstractions on 995 participants (Major Task 4, 93% completed).

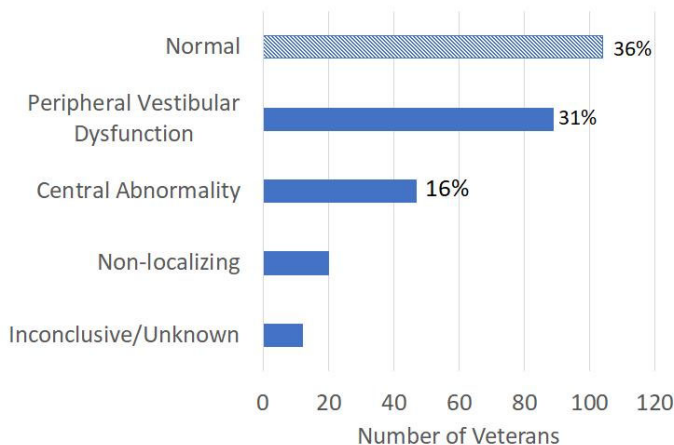
**3. Significant Results:**

- a. Examined disruptive dizziness among Post-9/11 Veterans with deployment-related traumatic brain injury (TBI) and factors associated with receiving diagnoses for these symptoms. 15% of post-9/11 veterans (21,984) reported disruptive dizziness following deployment-related TBI. Access to specialty care was the single best predictor of dizziness and vestibular dysfunction diagnoses, underscoring the importance of facilitating referrals to and utilization of specialized, comprehensive clinical facilities or experts for veterans who report disruptive dizziness following deployment-related TBI. In addition, Veterans who identified as Black non-Hispanic and those with substance use disorder diagnoses or care were substantially less likely to receive dizziness and vestibular dysfunction diagnoses. See Appendix B for the published manuscript (Swan et al., 2021).
- b. Preliminary analysis of survey data to examine long-term outcomes of post-concussion dizziness. Figure 1 shows the frequency of change in the vestibular subscale of Neurobehavioral Symptom Inventory (NSI) administered at the VA Comprehensive TBI Evaluation (baseline) and on the study survey for 1062 post 9/11 Veterans with TBI and disruptive dizziness who completed the survey. Using a criterion of >1 for significant change, 49% demonstrated a decrease in disruptive dizziness (shown in green bars), 36% had no change (shown in orange bars), and 15% demonstrated increased dizziness (shown in red bars).

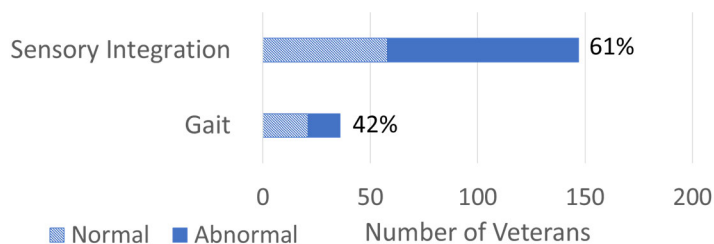


**Figure 1.** Long-term change in NSI Vestibular subscale for 1062 post-9/11 Veterans with TBI and dizziness

- c. Preliminary analysis of chart abstraction data to examine clinical vestibular and balance test findings in 980 post-9/11 Veterans with TBI and dizziness who completed the survey. Twenty-nine percent of Veterans had vestibular assessment in the VA electronic medical record system (Figure 2), and 19% of Veterans had balance and/or gait assessment (Figure 3). The most common abnormal findings (shown in dark blue in the figures below) were peripheral vestibular dysfunction (31%) and abnormal sensory integration (61%).

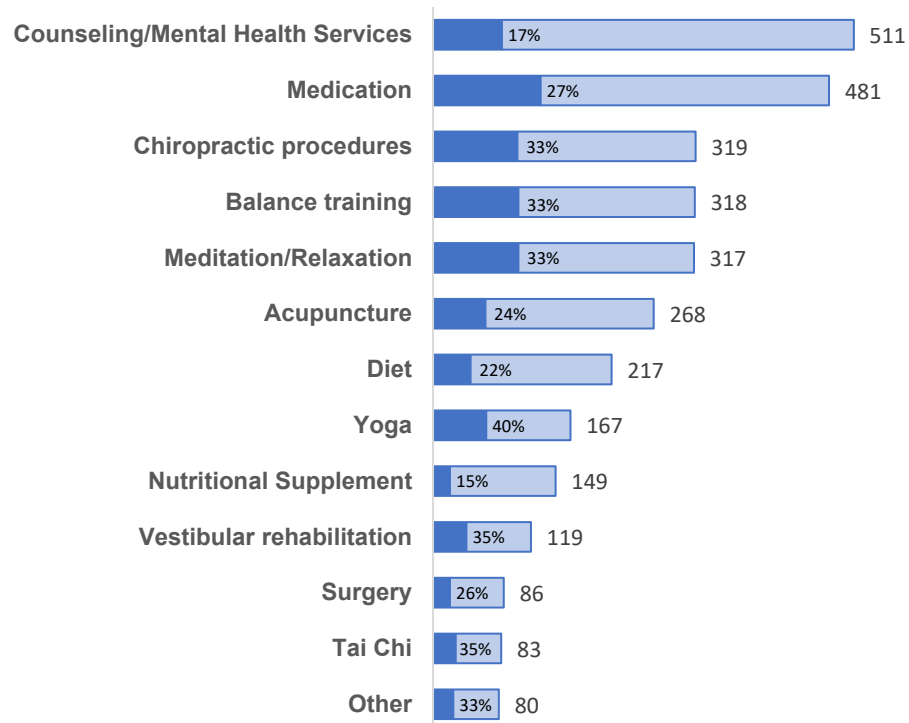


**Figure 2.** Clinical vestibular test findings in 286 post-9/11 Veterans with TBI and dizziness



**Figure 3.** Balance and gait testing in 189 post-9/11 Veterans with TBI and disruptive dizziness

d. Preliminary analysis of survey data to examine self-reported therapeutic interventions for dizziness and imbalance in 1062 post-9/11 Veterans with TBI and dizziness. Fifty-seven percent of Veterans reported that they had received treatment for dizziness or imbalance. The histogram in Figure 4 below shows the type of treatments that the Veterans reported they had received (shown in light blue) and the percentage of Veterans who reported the treatment improved their dizziness or balance problem (shown in dark blue). There was no single treatment in which a majority of participants reported perceived benefit, and the treatment strategies used most frequently (counseling/mental health services and medication) had low self-perceived benefit for dizziness/imbalance.



**Figure 4.** Self-reported therapeutic interventions for dizziness/imbalance and perceived benefit in Veterans with TBI and dizziness.

#### 4. Other Achievements:

- a. Akin, F. (2021, September 29 – October 1). Head Trauma and Imbalance [Conference Presentation]. 2021 NCRAR 10th Biennial Conference, Portland, OR.
- b. Swan, A. A., Akin, F. W., Amuan, M. E., Riska, K. M., Hall, C. D., Kalvesmaki, A., Padilla, S., Crowsey, E., & Pugh, M. J. (2021). Disruptive Dizziness Among Post-9/11 Veterans With Deployment-Related Traumatic Brain Injury. *Journal of Head Trauma Rehabilitation*, Publish Ahead of Print. <https://doi.org/10.1097/HTR.0000000000000714>

**What opportunities for training and professional development has the project provided?**

The WIBR team has provided survey administration and data cleaning training to junior staff. Mentoring junior research assistant to conduct national survey processes and research staff participating in VA cyberseminars related to TBI, mental health and sensory dysfunction. Drs. Pugh and Kalvesmaki are mentoring one of the graduate research assistants, John Doyle, who is also a Veteran, to prepare a master's thesis manuscript using data analyses of dizziness on Veteran employment outcomes. Dr. Kalvesmaki is serving on his thesis committee.

Three audiology clinical doctoral students have contributed to the chart abstraction at MHREC and a Ph.D. student contributed to processing of the chart review data for the preliminary analysis.

**How were the results disseminated to communities of interest?**

In addition to a peer-reviewed publication, we completed a manuscript (Swan et al., 2021) described above which identifies and characterizes disruption due to dizziness symptoms following deployment-related TBI and factors associated with receiving diagnoses or care for these symptoms. We are working on development of lay content for distribution through the TBI Warrior Foundation and other TBI stakeholder groups.

Dr. Pugh also presented findings from this paper as a guest lecturer for Clinical Epidemiology to doctoral students in Population Health Sciences program at the University of Utah.

Dr. Akin presented preliminary findings in her presentation entitled "Head Trauma and Imbalance" presented at the 10<sup>th</sup> biennial National Center for Rehabilitative Auditory Research (NCRAR) conference. The NCRAR is a Veterans Affairs Rehabilitation Research & Development-funded research center with the mission of improving the quality of life of Veterans and others with hearing and balance problems through clinical research, technology development, and education that leads to better patient care.

**What do you plan to do during the next reporting period to accomplish the goals?**

- 1) Complete chart abstraction (n = 75 remaining).
- 2) Complete analyses of survey and chart abstraction data to examine factors associated with responders vs. non-responders.
- 3) Submit manuscripts on the following topics:
  - a. Survey methodology and outcomes
  - b. Factors associated with dizziness symptom improvement
  - c. Validation of the Dizziness Impact Inventory (DII)
  - d. Prevalence of vestibular abnormalities
  - e. Vestibular physical therapy prescription patterns

**4. IMPACT**

**What was the impact on the development of the principal discipline(s) of the project?**

Nothing to report.

**What was the impact on other disciplines?**

Nothing to report.

**What was the impact on technology transfer?**

Nothing to report.

**What was the impact on society beyond science and technology?**

Nothing to report.

**5. CHANGES/PROBLEMS**

**Changes in approach and reasons for change**

Nothing to report.

**Actual or anticipated problems or delays and actions or plans to resolve them**

This project was delayed for several reasons. Co-PI, Dr. Pugh, transferred to the VA Salt Lake City Health Care System (SLC) at the time of the project funding, which resulted in some delays in start-up. Specifically, there were hiring and contracting delays at WIBR which led to reduced expenditures. In addition, there was a delay in completing the regulatory process at the Mountain Home site (MHREC) because the local IRB for MHREC requires approval of regulatory documents from all other study sites prior to granting local approval for MHREC. Due to COVID-19, our mailing schedule was delayed, and additional surveys and follow-up letters were mailed in FY21 to achieve our goal of 1050 completed surveys. Finally, MHREC was short-staffed May-August 2021 due to maternity and sick leave.

We requested and were approved for a 1-year no cost extension (NCE). During this NCE year, chart abstractions, final analyses, and manuscripts will be completed.

**Changes that had a significant impact on expenditures**

Nothing to report.

**Significant changes in use or care of human subjects, vertebrate animals, biohazards, and/or select agents**

**Significant changes in use or care of human subjects**

Nothing to report.

**Significant changes in use or care of vertebrate animals**

Nothing to report.

**Significant changes in use of biohazards and/or select agents**

Nothing to report.

**6. PRODUCTS**

**Publications, conference papers, and presentations**

Akin, F. (2021, September 29 – October 1). *Head Trauma and Imbalance* [Conference Presentation]. 2021 NCRAR 10<sup>th</sup> Biennial Conference, Portland, OR.

Pugh, M. J., Swan, A. A. (2020, January 7). *The Big Picture: The Scope of Sensory Deficits Associated with Traumatic Brain Injury* [Webinar]. VA TBI Cyberseminar. [https://www.hsrp.research.va.gov/for\\_researchers/cyber\\_seminars/archives/video\\_archive.cfm?SessionID=3752](https://www.hsrp.research.va.gov/for_researchers/cyber_seminars/archives/video_archive.cfm?SessionID=3752)

Swan, A. A., Akin, F. W., Amuan, M. E., Riska, K. M., Hall, C. D., Kalvesmaki, A., Padilla, S., Crowsey, E., & Pugh, M. J. (2021). Disruptive Dizziness Among Post-9/11 Veterans With Deployment-Related Traumatic Brain Injury. *Journal of Head Trauma Rehabilitation, Publish Ahead of Print*. <https://doi.org/10.1097/HTR.0000000000000714>

Swan, A. A., Nelson, J. T., Pogoda, T. K., Akin, F. W., Riska, K. M., Hall, C. D., Amuan, M. E., Yaffe, K., Pugh, M. J., & the Chronic Effects of Neurotrauma Consortium. (2019). Association of Traumatic Brain Injury With Vestibular Dysfunction and Dizziness in Post-9/11 Veterans. *Journal of Head Trauma Rehabilitation, 35*(3), E253–E265. <https://doi.org/10.1097/HTR.0000000000000513>

**Books or other non-periodical, one-time publications.**

Nothing to report.

**Other publications, conference papers and presentations.**

Nothing to report.

**Website(s) or other Internet site(s)**

Nothing to report.

**Technologies or techniques**

Nothing to report.

**Inventions, patent applications, and/or licenses**

Nothing to report.

**Other Products**

Nothing to report.

**7. PARTICIPANTS & OTHER COLLABORATING ORGANIZATIONS**

**What individuals have worked on the project?**

Name:	<i>Faith Akin</i>
Project Role:	<i>Co-Principal Investigator</i>
Researcher Identifier (e.g. ORCID ID):	<i>0000-0001-9739-738X</i>
Nearest person month worked:	<i>3</i>
Contribution to Project:	<i>Dr. Akin has overseen project startup planning and chart abstraction at MHREC.</i>
Funding Support:	

Name:	<i>Mary Jo Pugh</i>
Project Role:	<i>Co-Principal Investigator</i>
Researcher Identifier (e.g. ORCID ID):	<i>0000-0003-4196-7763</i>
Nearest person month worked:	<i>2</i>
Contribution to Project:	<i>Dr. Pugh has overseen project startup planning, survey development, health system data analyses, and survey administration at WIBR.</i>
Funding Support:	

Name:	<i>Courtney Hall</i>
Project Role:	<i>Co-Investigator</i>
Researcher Identifier (e.g. ORCID ID):	<i>0000-0001-9403-1980</i>
Nearest person month worked:	<i>3</i>
Contribution to Project:	<i>Dr. Hall has assisted with survey and chart abstraction development, as well as startup planning and training at MHREC.</i>
Funding Support:	

Name:	<i>Alicia Swan</i>
Project Role:	<i>Co-Investigator</i>
Researcher Identifier (e.g. ORCID ID):	<i>0000-0003-2412-0499</i>
Nearest person month worked:	<i>2</i>
Contribution to Project:	<i>Dr. Swan has assisted with regulatory requirements, survey and chart abstraction development.</i>
Funding Support:	

Name:	<i>Kristal Riska</i>
Project Role:	<i>Co-Investigator</i>
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	<i>0.6</i>
Contribution to Project:	<i>Dr. Riska has assisted with survey and chart abstraction development.</i>
Funding Support:	

Name:	<i>Kara McGregor</i>
Project Role:	<i>Study Coordinator</i>
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	<i>12</i>
Contribution to Project:	<i>Dr. McGregor has assisted with chart abstraction at MHREC.</i>
Funding Support:	

Name:	<i>Erin Dula</i>
Project Role:	<i>Research Assistant</i>
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	2
Contribution to Project:	<i>Dr. Dula has assisted with chart abstraction at MHREC.</i>
Funding Support:	

Name:	<i>Silvia Padilla</i>
Project Role:	<i>Research Specialist</i>
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	2
Contribution to Project:	<i>Ms. Padilla is responsible for survey administration at WIBR.</i>
Funding Support:	

Name:	<i>Andrea Kalvesmaki, PhD</i>
Project Role:	<i>Research Associate</i>
Researcher Identifier (e.g. ORCID ID):	0000-0002-4282-0619
Nearest person month worked:	2
Contribution to Project:	<i>Dr. Kalvesmaki is responsible for overall project management, staff training, and survey administration at WIBR.</i>
Funding Support:	

Name:	<i>Megan Amuan</i>
Project Role:	<i>Data Scientist</i>
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	1
Contribution to Project:	<i>Ms. Amuan prepares and analyzes Health System data.</i>
Funding Support:	

Name:	<i>Sarah Leonhart</i>
Project Role:	<i>Research Analyst</i>
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	6
Contribution to Project:	<i>Ms. Leonhart assists with survey administration and data processing at WIBR.</i>
Funding Support:	

Name:	<i>Eleanor Gonzales</i>
Project Role:	<i>Senior Research Analyst</i>
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	<i>1</i>
Contribution to Project:	<i>Ms. Gonzales assists with survey administration and data processing at WIBR.</i>
Funding Support:	

Name:	<i>Robert George</i>
Project Role:	<i>Research Analyst</i>
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	<i>3</i>
Contribution to Project:	<i>Mr. George assists with survey administration and data processing at WIBR.</i>
Funding Support:	

Name:	<i>John Doyle</i>
Project Role:	<i>Graduate Research Assistant</i>
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	<i>3</i>
Contribution to Project:	<i>Mr. Doyle assists with survey administration at WIBR.</i>
Funding Support:	

Name:	<i>Lindsey Gavin</i>
Project Role:	<i>Graduate Research Assistant</i>
Researcher Identifier (e.g. ORCID ID):	
Nearest person month worked:	<i>1</i>
Contribution to Project:	<i>Ms. Gavin assists with survey administration at WIBR.</i>
Funding Support:	

**Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?**

**Marv Jo Pugh**

**Has there been a change in the active other support of the PD/PI(s) or senior/key personnel since the last reporting period?**

The following grant application received a notification of funding for September 30, 2021.

*Military Injuries--Understanding Post-Traumatic Epilepsy (MINUTE): Bioinformatics with Big Data to Examine Multimodal PTE Biomarkers*

**Pugh Total funded effort for FY21: 85%**

**Faith Akin**

New Funding:

C3616-P (PI: Akin) 10/1/20 – 9/30/22 3.0 calendar  
 RR&D SPiRE  
*Development of a mobile medical app for diagnosis and treatment of benign paroxysmal positional vertigo (BPPV)*

Changes to Funding (6-month NCE):

C1986-R (co-PI: Akin/Holt) 4/1/16 – 10/31/21 3.0 calendar  
 RR&D Merit Review  
*The Effect of Noise on the Vestibular System*

**What other organizations were involved as partners?**

<b>Organization Name:</b>	<b>Location of Organization:</b>	<b>Organization Contributions:</b>
Duke University	Durham, North Carolina	Collaboration
University of Texas San Antonio	San Antonio, Texas	Collaboration

**8. SPECIAL REPORTING REQUIREMENTS**

**Collaborative Awards:** WIBR cannot submit a separate report as all reports are now submitted through eBRAP.

**Quad Charts:** Please see Appendix D for Quad Chart.

**9. APPENDICES**

**Appendix A:** Surveys

**Appendix B:** Swan et al., 2019

**Appendix C:** Swan et al., 2021

**Appendix D:** FY21 Quad Chart