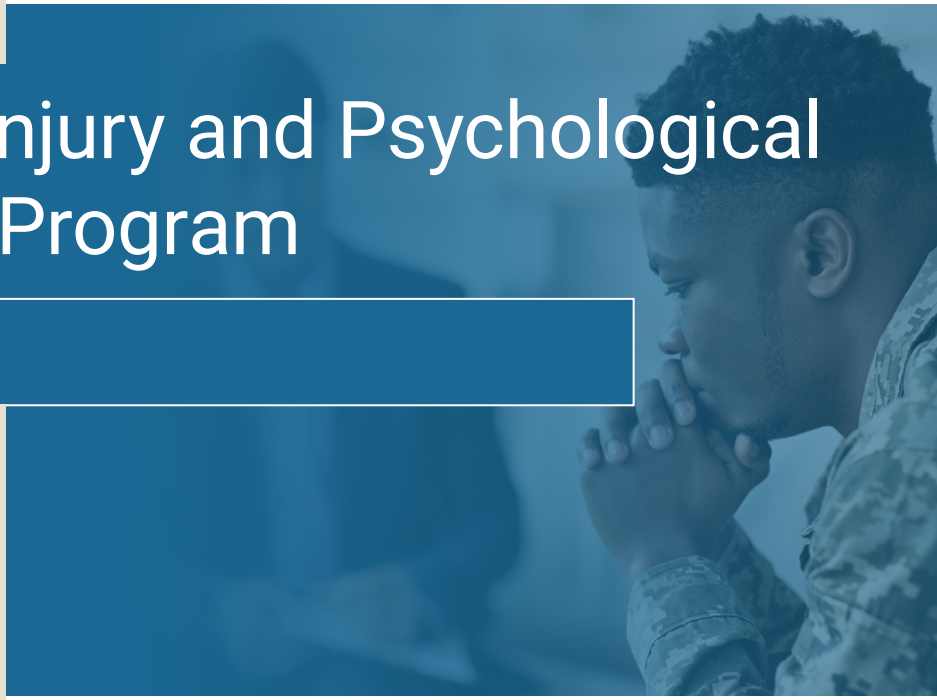
CDMRP
DEPARTMENT OF DEFENSE
CONGRESSIONALLY DIRECTED MEDICAL RESEARCH PROGRAMS

Traumatic Brain Injury and Psychological Health Research Program



Strategic Plan

INTRODUCTION

The Congressionally Directed Medical Research Programs (CDMRP) represents a unique partnership among the U.S. Congress, the military, and the public to fund innovative and impactful medical research in targeted program areas. Programs managed by the CDMRP have formalized strategic plans that identify program-specific research priorities; how to best address these urgencies; short- and long-term goals; investment strategies; and ways to identify and evaluate program successes with respect to the priorities.

This document presents the current strategy for the CDMRP's Traumatic Brain Injury and Psychological Health Research Program (TBIPHRP). The TBIPHRP Strategic Plan identifies the high-impact research goals most important to its stakeholders while providing a framework that is adaptable to changes in the medical research environment to address those goals. This plan has been formulated to provide greater clarity of the program's goals over time to the public and other stakeholders. Funding for the TBIPHRP is congressionally appropriated on an annual basis; therefore, there is no guarantee of future funding. The TBIPHRP Strategic Plan will be reviewed during the program's annual Vision Setting meetings and updated as necessary.

TBIPHRP BACKGROUND AND OVERVIEW

Based on recommendations from its Programmatic Panel, the TBIPHRP has developed the following vision and mission in response to congressional intent:

VISION: Optimize the prevention, assessment, and treatment of psychological health conditions and/or traumatic brain injuries

MISSION: Fund research to understand, prevent, assess, and treat psychological health conditions and/or traumatic brain injuries that accelerates solutions to improve the health, well-being, and healthcare of Service Members, their Families, Veterans, and the American public

BACKGROUND

The U.S. Congress appropriated funds for traumatic brain injury (TBI) and psychological health (PH) medical research in Fiscal Year (FY) 2007 in response to the PH issues and TBIs sustained by U.S. Service Members in Iraq and Afghanistan. From FY07 to FY20, the program was initially known as the Psychological Health and Traumatic Brain Injury Research Program (PH/TBIRP). The initial FY07 appropriation was assigned to the CDMRP for management. There was no appropriation in FY08. From FY09-FY20, a modified management model was employed. Programmatic oversight was provided by the U.S. Army Medical Research and Development Command-based research program areas aligned with the Defense Health Agency, Research and Engineering Joint Program Committees (JPCs) for Military Operational Medicine (JPC-5), Combat Causality Care (JPC-6), and Clinical and Rehabilitative Medicine (JPC-8).

In FY21, the TBIPHRP was assigned to the CDMRP for management. The CDMRP will execute the program and provide full program cycle support, including the development of program announcements, solicitation and review of applications, management of awards, and

program evaluation/planning. The TBIPHRP employs the Health and Medicine Division of the National Academies of Sciences, Engineering, and Medicine's recommended two-tiered model of peer and programmatic review. The two-tiered model results in a high-quality, programmatically relevant research portfolio that spans the TBI and PH research spectrum. Program scope includes the prevention, diagnosis, treatment, and rehabilitation of TBI and PH and spans the spectrum of basic, applied, and clinical research. The TBIPHRP funds TBI research alone, PH research alone, or both.

FUNDING HISTORY

The TBIPHRP has received over $2.3 billion (B) in congressional appropriations from FY07 to FY23 and averaged $140.9 million (M) per year. **Figure 1** below shows the funding profile for the last six fiscal years. Award data and abstracts of funded research proposals can be viewed on the CDMRP website (http://cdmrp.health.mil).

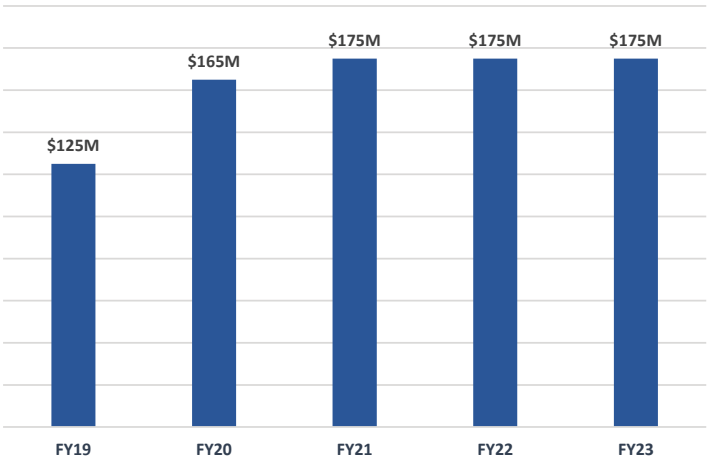
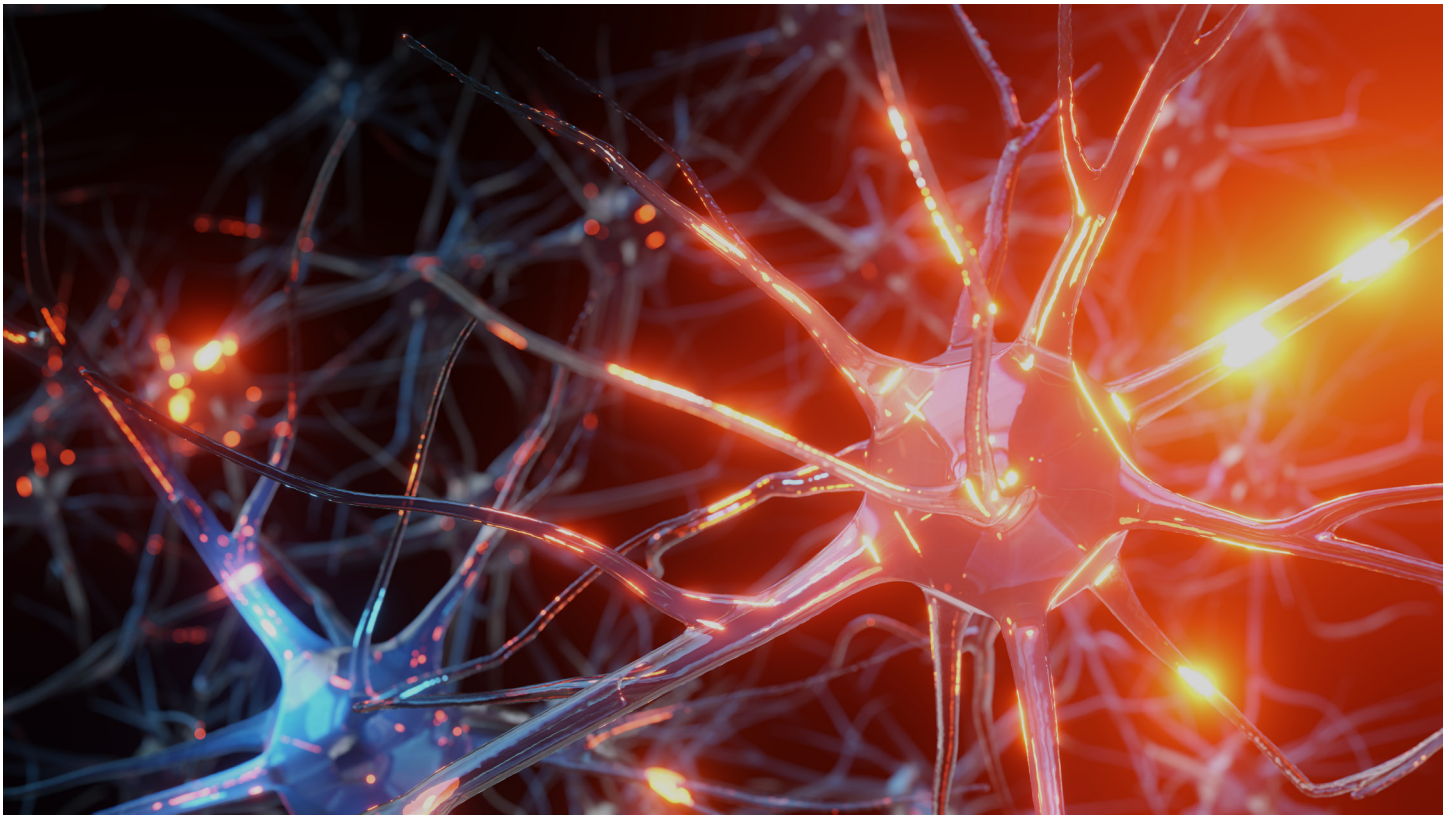
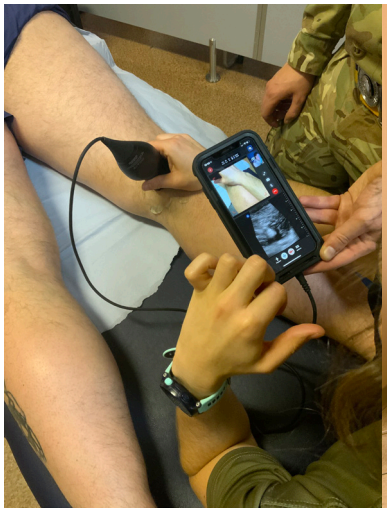


Figure 1. Funding Profile 2019-2023





TBIPHRP Accomplishments

As the PH/TBIRP and TBIPHRP, the CDMRP has managed 735 awards totaling over $1.3B. These awards have generated 1,409 publications and 122 patents. Research accomplishments from the program include:

- Neural Analytics, Inc., was granted U.S. Food and Drug Administration (FDA) 510(k) clearance and CE Mark for the Lucid M1 Transcranial Doppler (TCD) Ultrasound System. The system features 92% accuracy classifying elevated intracranial pressure and 83% accuracy in diagnosis of mild TBI, as well as 99.2% accuracy diagnosing large vessel occlusion in proximal middle and internal carotid artery.
- The OsiriX CDE is a software tool that can be used as a biomarker test for TBI. The tool provides a standardized way to identify and analyze injured brain tissue using common criteria and label abnormalities on MRI images. The tool can be used to enrich populations in clinical trials intended to improve outcomes of patients with mild TBI. The OsiriX CDE Software Module is recognized by the FDA under the Medical Device Development Tool program as a tool that can be used by other medical device companies/sponsors in the development and evaluation of devices as part of the FDA clearance process.
- Multiple collaborative consortia to address post-traumatic stress, TBI, suicide, concussion, and other related areas:
    - o Conducted targeted research and clinical studies coordinated among academic, U.S. Department of Veterans Affairs (VA), and U.S. Department of Defense (DOD) investigators.
    - o Collected and generated significant amount of research/clinical/medical data available for sharing and informing research and clinical decision-making.
    - o Conducted outcomes advanced research and development of improved treatments and informed VA/DOD Clinical Practice Guidelines.
- Contributed to the development of the Banyan Brain Trauma Indicator, which detects brain-specific protein markers that appear rapidly following traumatic brain injury.
- Swoop™ Imaging Device – portable, low-field MRI device developed by Hyperfine, Inc., and cleared by the FDA for brain scanning in neonatal through adult patients. Expands use of MRIs outside of controlled hospital imaging facilities to the bedside and field-based applications.
- Generated data suggesting that Written Exposure Therapy (WET) is effective as cognitive processing therapy (a gold-standard therapy for post-traumatic stress disorder [PTSD]) in alleviating symptoms and helping patients recover from PTSD. WET was selected by the Practice-Based Implementation Network as pilot therapy within the Military Health System.
- Provided data suggesting that video teleconference-based delivery of PTSD treatment interventions is comparable to in-person cognitive processing therapy.

Current TBIPHRP Portfolio

Given that the vision of the TBIPHRP is to optimize the prevention, assessment, and treatment of psychological health conditions and/or traumatic brain injuries, an assessment of the portfolio's maturation and by analogy potential for improving health and health outcomes is needed and performed on a yearly basis. Technology and Knowledge Readiness Levels, TRLs and KRLs,[1] respectively, are used to categorize the maturity of biomedical tangible and knowledge products. TRLs and KRLs are represented on a 9-point scale, where 1 represents early research and 9 represents mature, fielded products.

The table below represents a recent assessment of the TBIPHRP portfolio according to TBI and PH research areas and TRL/KRL. TRL/KRL analysis shows that the current TBIPHRP portfolio is relatively mature, and the majority of the funded research is TRL/KRL 4 or above. TRL/KRL 4 research is performing the critical final assessments prior to transition to clinical trials. This type of research is typically high-risk, high-reward. The TBIPHRP believes that, by operating in this space, the program is best positioned to rapidly develop candidates that can improve health outcomes.

System/Problem	Basic and Applied Science/Technology				Phase 1/2 Studies		Phase 2/3 Studies			Total Projects	Total Investment
	1	2	3	4	5	6	7	8	9		
Acute TBI Management	1	1	5	4	3					14	$15.4 M
Biopsychosocial Wellness and Resilience				2	2					4	$7.1 M
Blast, Trauma, and Injury Modeling			1	1						2	$1.5 M
Brain Structure, Function, and Health	1	10	7	3	4	1	3			29	$65.2 M
Clinical Disorders		2	2	4	2	2	1			13	$48.0 M
Interpersonal Violence	1			3						4	$2.4 M
Locomotion/Movement				1						1	$0.6 M
Other studies							1			1	$0.3 M
Sensory		1	1	1	2		1			6	$9.9 M
Substance Misuse and Abuse				1						1	$1.5 M
Suicide Prevention				1	1		1			3	$7.4 M
Total Projects	3	14	16	21	14	3	7			78	
Total Investment	$2.1 M	$15.5 M	$33.1 M	$46.3 M	$26.9 M	$14.0 M	$21.4 M				$159.3 M

Table 1: TBIPHRP Awards by System/Problem

[1] Additional information can be found at https://apps.dtic.mil/docs/citations/ADA524200 and https://www.rand.org/pubs/research_reports/RR2127.html.

TBIPHRP STRATEGIC GOALS

The overall goal of the TBIPHRP Strategic Plan is to provide a framework to develop medical capabilities to improve PH and reduce or eliminate the effects of TBI and traumatic stress. It is expected that the outcomes of this research program will benefit Service Members, Veterans, and the American public, all of whom are affected by and/or at risk for TBIs and PH burdens.

GUIDING PRINCIPLES

Congressional intent is the foundation

Each fiscal year, Congress publishes language that defines the intent, scope, and research areas for consideration for the TBIPHRP. The TBIPHRP reviews the congressional language associated with each appropriation to ensure that the program's vision, mission, Focus Areas, and funding announcements remain aligned with congressional intent.

Driving innovative and impactful research by targeting relevant research gaps and consumer involvement

For the TBIPHRP, a relevant research gap is defined as missing or incomplete knowledge, or information that is grounded from the clinical, research, or lived experience perspective. Through soliciting gap-driven research, the TBIPHRP intends to fund research that results in new knowledge or products for the benefit of the stakeholder community. On a yearly basis, the TBIPHRP maps current and proposed Focus Areas with gaps identified in congressional language, guidance documents, or stakeholder input. This analysis was performed most recently for FY23.

In order to maximize relevance, consumers are included in all levels of our process. This includes stakeholder meeting participation, and Programmatic Panel membership. The TBIPHRP's funding opportunities also encourage or require community-based participatory research in the design and execution of the research. The TBIPHRP recognizes that, through the establishment and utilization of effective and equitable collaborations and partnerships between scientists, clinicians, and community remembers, the translational and impact potential of the proposed research can be maximized.

Rigorous Review Processes

The two-tiered review process, which is composed of a scientific peer review and a separate programmatic review, is a hallmark of the CDMRP. The scientific peer review is conducted by an external panel that is recruited specifically for each peer review session. Peer review involves the expertise of scientists, clinicians, military members, and consumers (patient advocates). Each application is judged on its own scientific and technical merit, with respect to the described criteria in the funding opportunity solicitation. The second tier of review is conducted by a Programmatic Panel and includes discussions by experts in the field. These experts, which include scientists, clinicians, consumers, and members of the military, assess the applications based on the scientific peer review ratings and summaries, a balanced portfolio, programmatic intent, and scientific merit. Scientifically sound applications that best meet the program's interests and goals are recommended for funding by the Programmatic Panel.

STRATEGIC GOALS

Despite the considerable investments to date, significant research gaps remain in TBI and PH. Based on responses to the FY21 TBIPHRP Request for Information, input received at the stakeholders meeting and analysis of existing research portfolios, congressional language, and various DOD gap analysis documents, the TBIPHRP Strategic Goals were identified to make a unique and meaningful impact on TBI and PH research and care. The Strategic Goals and their descriptions are below:

1. **Understand:** Research will address knowledge gaps in, epidemiology, and etiology of psychological health conditions and/or TBI.
2. **Prevent and Assess:** Research will address the prevention or progression of PH conditions and/or TBI conditions through population, selective, and indicated prevention approaches. Efforts that focus on primary prevention (including protection), screening, diagnosis, and prognosis are within scope.
3. **Treat:** Research will address immediate and long-term treatments and improvements in systems of care, including access to and delivery of healthcare services. Treatment topics may include novel treatments and interventions, personalized medicine approaches, length and durability of treatment, rehabilitation, relapse, and relapse prevention.

In order to categorize TBIPHRP-funded research and group the Strategic Goals, the program adopted the National Research Action Plan (NRAP) research continuum. Developed by the DOD, VA, and Departments of Education and Health and Human Services, the NRAP research continuum serves as a common framework to organize and track research progress within and between federal agencies. Figure 2 below shows how the TBIPHRP Strategic Goals map across the research continuum.

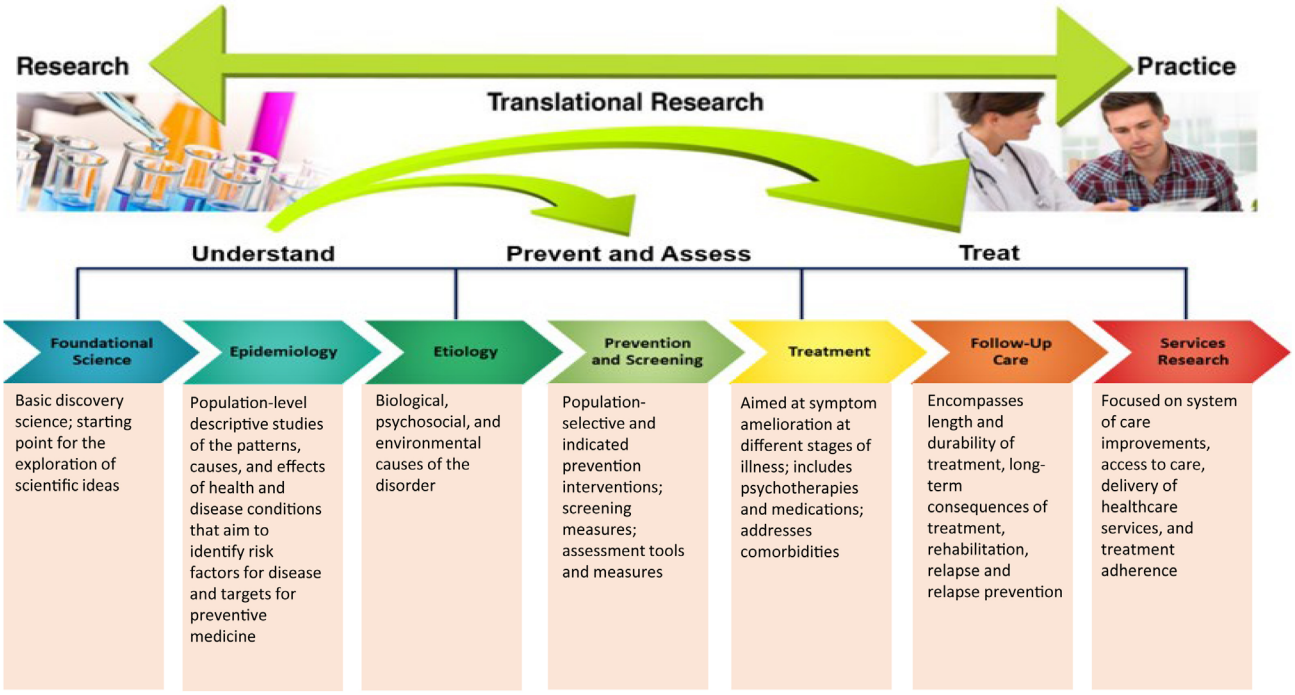


Figure 2: TBIPHRP Strategic Goals' Alignment with TBIPHRP Research Continuum

STRATEGIC GOALS TO FOCUS AREAS

The TBIPHRP Focus Areas directly map to the Strategic Goals. The Focus Areas are revisited each year by the TBIPHRP. Applicants to the TBIPHRP are required to address at least one of the current fiscal year Focus Areas as part of their hypothesis-driven research proposal. The FY22 Focus Areas and their alignment to the Strategic Goals are provided below:

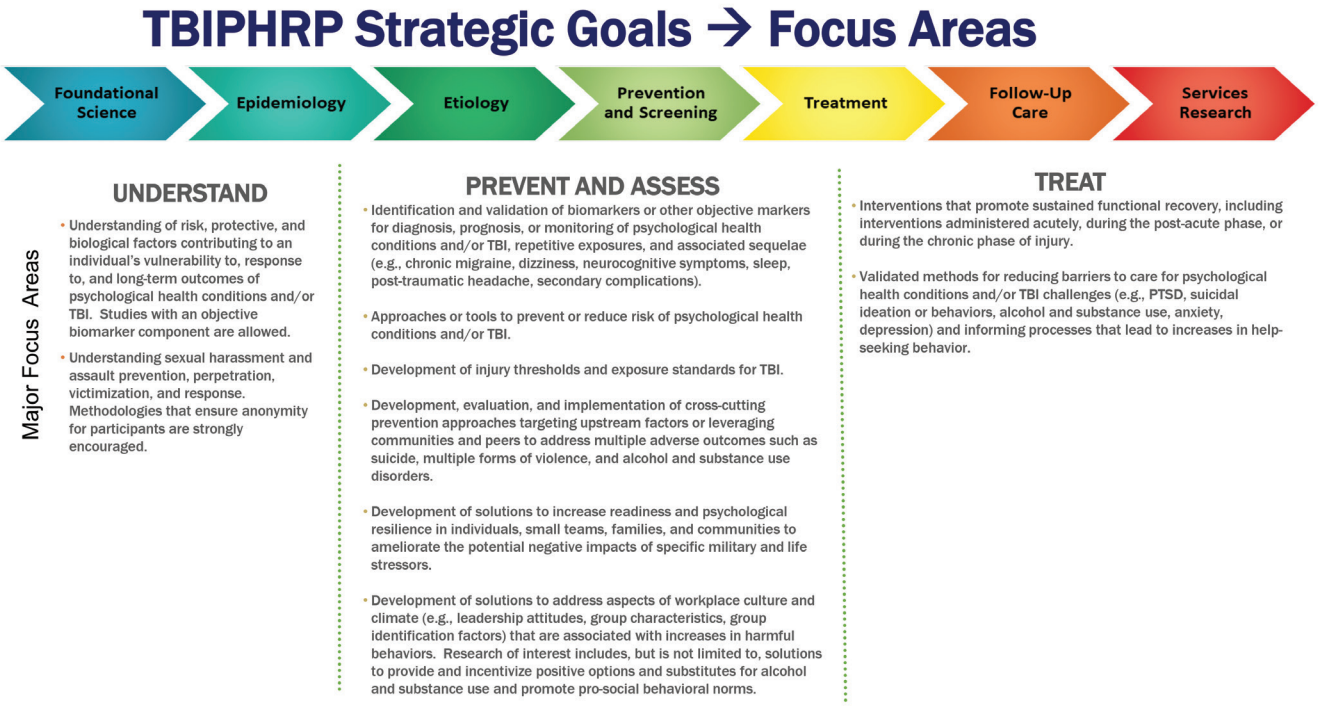


Figure 3: FY23 TBIPHRP Focus Areas

INVESTMENT STRATEGY

The TBIPHRP's 5-year investment strategy (FY22-FY26) outlines the program's approach to soliciting the type of research that will facilitate accomplishment of its strategic goals. After each fiscal year, the CDMRP and the TBIPHRP Programmatic Panel will review research outcomes and determine whether the award mechanisms and their funding allocations are supporting the TBIPHRP strategic goals and guiding principles. TBIPHRP award mechanisms fall under the following categories:

- **Maturing Ideas**
  - o Investigator-Initiated Research Award: Supports studies with the potential to yield highly impactful discoveries or major advancements toward the understanding, preventing and assessing, and treating of TBI and/or PH conditions
- **Translational Research**
  - o Translational Research Award: Supports research that will accelerate the movement of promising ideas in PH conditions and/or TBI research into clinical applications, including healthcare products, technologies, and/or clinical practice guidelines
  - o Health Services Research Award: Bridges the gap between research, practice, and policy by building a knowledge base on how interventions, clinical practices/guidelines, tools, and policies can be deployed to targeted populations at the appropriate time at the point of need
- **Clinical Trials**
  - o Clinical Trial Award: Supports the rapid implementation of clinical trials with the potential to have a significant impact on PH conditions and/or TBI through clinical applications, including healthcare products, technologies, and/or practice guidelines
- **Team Science**
  - o Focused Program Award: Supports the development of a synergistic, multidisciplinary research program with the potential to have a significant impact on PH conditions and/or TBI through clinical applications, including healthcare products, technologies, and/or practice guidelines

RESEARCH OUTCOMES – TRACKING AND INFORMING FUTURE INITIATIVES

Regular portfolio evaluation is critical to achieving the TBIPHRP mission and vision. The outcomes below represent some of the parameters to be tracked over the short- and long-term.

NEAR-TERM OUTCOMES (3-5 YEARS)

- Portfolio composition
  - o Investment across the strategic goals and associated focus areas
  - o Investment in clinical trials and implementation science/health services research
  - o Quantity and scientific merit of applications received and funded
- Intellectual diversity and community-based participatory research
  - o Investment in new organizations and investigators
  - o Quantity and quality of community-based participatory research
- Research Output
  - o Publications
  - o Patents (applications and actual patents)
  - o Knowledge or tangible products identified and evaluated

MEDIUM- TO LONG-TERM OUTCOMES (6+ YEARS)

- Maturation of research
  - o Research that is developed and matured within the TBIPHRP or externally
  - o Information or product handoffs between the TBIPHRP and advanced development organizations
- Clinical impact
  - o FDA-approved or -cleared products
  - o Implementation of TBIPHRP products within the military or civilian health system
  - o Clinical practice guidelines developed or revised