

# Peer Reviewed Medical 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.

In 2015, an ad hoc committee of the National Academies of Sciences, Engineering, and Medicine was assembled to evaluate the CDMRP's two-tiered review process and its coordination of research priorities with the National Institutes of Health (NIH) and the Department of Veterans Affairs (VA). As part of their final report,<sup>1</sup> the committee recommended that each CDMRP program "...develop a strategic plan that identifies and evaluates research foci, benchmarks for success, and investment opportunities for 3–5 years into the future," and that these strategic plans "should specify the mission of the program, coordination activities with other organizations, research priorities, how those priorities will be addressed by future award mechanisms, how research outcomes will be tracked, and how outcomes will inform future research initiatives."

The Peer Reviewed Medical Research Program (PRMRP) Strategic Plan identifies the high-impact research goals that are most important to its patient, clinician, and research community stakeholders pertaining to the diseases and conditions specified by Congress while providing an adaptable framework to address them. The Strategic Plan was developed to accelerate progress within the Congressionally directed PRMRP Topic Areas and will be reviewed during the program's annual Vision Setting meeting and updated as needed.

### PRMRP BACKGROUND AND OVERVIEW

The Department of Defense (DoD) Peer Reviewed Medical Research Program (PRMRP) was established in 1999 to provide support for military health-related research of exceptional scientific merit toward the goal of improving the health and well-being of military Service members, Veterans, and their beneficiaries.

Throughout its 20-year history, the Vision, Mission, and annual Investment Strategy of the PRMRP have been shaped by recommendations from a Programmatic Panel of leading scientists, clinicians, and policy makers from the DoD, Office of the Assistant Secretary of Defense for Health Affairs, Department of Veterans Affairs, Department of Health and Human Services (HHS), and academia. Based on recommendations from the Programmatic Panel, the PRMRP has developed the following Mission and Vision in response to Congressional intent:

**VISION:** Improve the health, care, and well-being of all military Service members, Veterans, and beneficiaries

**MISSION:** Encourage, identify, select, and manage medical research projects of clear scientific merit and direct relevance to military health

The PRMRP uses a two-tier review process for proposal evaluation that was recommended by the Institute of Medicine (now the Health and Management Division of the National Academies of Sciences, Engineering, and Medicine) in 1993. The first tier, scientific peer review, evaluates the scientific merit of an application against published review criteria. The second tier, programmatic review, is conducted by the Programmatic Panel, which compares applications to each other and makes funding recommendations based on scientific merit, relevance to military health, relative impact, and portfolio balance. This two-tier review ensures that the PRMRP funds scientifically excellent research with relevance to military health in accordance with the directives from Congress.

**FUNDING HISTORY**

From fiscal years 1999 through 2019 (FY99-FY19), the PRMRP received \$2.35 billion (B) in Congressional appropriations. Each year's Congressional language directs the appropriations toward the different Topic Areas to be funded by the program. The program has solicited and reviewed pre-applications and received, reviewed, and awarded full applications for the PRMRP Topic Areas. Through FY18, the PRMRP funded 1,385 research awards in 161 unique diseases and conditions, resulting in over 2,700 peer-reviewed publications and 243 patent applications/issued. Award data, abstracts, and associated publications of funded research can be found at <https://cdmrp.army.mil/search.aspx>.

PRMRP awards and Topic Areas can be grouped into seven research portfolios. Table 1 shows the Congressionally specified Topic Areas included in the program in FY14 through FY19 appropriations.

**Table 1. PRMRP Topic Areas****Cardiovascular Portfolio**

Topic Area	FY19	FY18	FY17	FY16	FY15	FY14
Cardiomyopathy	X	X				
Cardiovascular Health					X	
Congenital Heart Disease	X	X	X	X	X	X
Diabetes	X	X	X	X	X	
Metabolic Disease						X
Vascular Malformations	X	X	X	X	X	
Women's Heart Disease	X	X	X	X	X	

**Autoimmune Diseases & Immunology**

Topic Area	FY19	FY18	FY17	FY16	FY15	FY14
Arthritis	X	X	X		X	X
Food Allergies					X	X
Guillain-Barre Syndrome	X	X	X			
Hereditary Angioedema	X	X	X	X	X	X
Immunomonitoring of Intestinal Transplants	X	X	X			
Inflammatory Bowel Diseases	X	X	X	X	X	X
Lupus				X	X	X
Rheumatoid Arthritis	X	X	X	X	X	X
Scleroderma	X	X	X	X	X	

Table 1. PRMRP Topic Areas (cont.)

## Infectious Diseases

Topic Area	FY19	FY18	FY17	FY16	FY15	FY14
Antimicrobial Resistance	X	X	X	X		
Dengue					X	
DNA Vaccine Technology for Post-Exposure Prophylaxis					X	X
Diarrheal Diseases			X			
Emerging Infectious Diseases	X	X	X	X		
Healthcare-Acquired Infection Reduction					X	
Hepatitis B and C	X	X	X	X	X	
Influenza			X	X		
Malaria		X	X	X	X	X
Pathogen-Inactivated Blood Products/Dried Cryoprecipitate/ Dried Plasma	X	X	X	X	X	
Tuberculosis	X	X	X	X		
Vaccine Development for Infectious Diseases		X	X	X		

## Internal Medicine

Topic Area	FY19	FY18	FY17	FY16	FY15	FY14
Early Trauma Thermal Regulation			X			
Eating Disorders	X	X	X			
Endometriosis		X				
Epidermolysis Bullosa	X	X	X			
Focal Segmental Glomerulosclerosis	X	X	X	X	X	
Integrative Medicine			X	X	X	
Interstitial Cystitis	X	X	X	X	X	X
Mitochondrial Disease	X	X	X	X	X	
Nutrition Optimization	X	X				
Pancreatitis	X	X	X	X	X	X
Polycystic Kidney Disease	X		X	X	X	X

Table 1. PRMRP Topic Areas (cont.)

## Neurological &amp; Psychological Health

Topic Area	FY19	FY18	FY17	FY16	FY15	FY14
Acupuncture					X	X
Cerebellar Ataxia	X	X				
Chronic Migraine and Post-Traumatic Headache	X	X	X	X	X	X
Chronic Pain Management		X				
Dystonia	X	X	X	X	X	X
Epilepsy						X
Fragile X		X	X	X	X	X
Frontotemporal Degeneration	X	X				
Hydrocephalus	X	X	X	X	X	
Myotonic Dystrophy	X	X	X			
Neuroprosthetics						X
Non-Opioid Pain Management		X	X	X		
Psychotropic Medications				X	X	X
Resilience Training	X					
Rett Syndrome	X	X	X	X		
Sleep Disorders	X	X	X	X	X	
Spinal Muscular Atrophy	X	X	X			
Tinnitus	X	X	X	X	X	X

## Orthopedic &amp; Regenerative Medicine

Topic Area	FY19	FY18	FY17	FY16	FY15	FY14
Advanced Prosthetics					X	
Musculoskeletal Disorders	X	X	X			
Nanomaterials for Bone Regeneration	X		X	X	X	
Osteoarthritis					X	
Post-Traumatic Osteoarthritis	X	X	X	X	X	X
Pressure Ulcers	X	X				
Segmental Bone Defects						X
Sustained-Release Drug Delivery		X	X			
Tissue Regeneration	X	X				



Table 1. PRMRP Topic Areas (cont.)

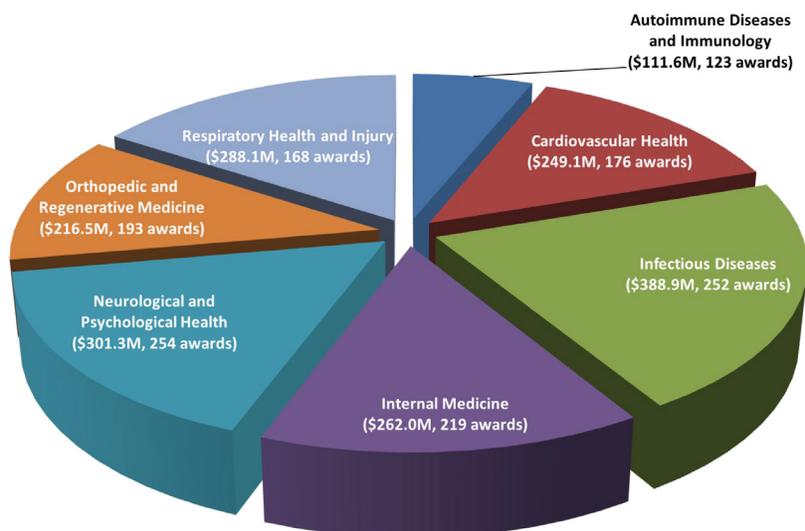
Respiratory Health & Injury						
Topic Area	FY19	FY18	FY17	FY16	FY15	FY14
Acute Lung Injury	X	X	X	X	X	
Burn Pit Exposure	X	X	X		X	
Constrictive Bronchiolitis	X	X	X	X		
Hemorrhage Control	X					
Illnesses Related to Radiation Exposure						X
Lung Injury	X	X				
Metals Toxicology	X	X	X	X	X	
Pulmonary Fibrosis	X	X	X	X	X	
Respiratory Health	X	X	X	X	X	X

## RESEARCH AND FUNDING ENVIRONMENT

The PRMRP has impacted the landscape of many diseases and conditions to the benefit of military Service members, Veterans, and the general public by funding high-impact research in prevention, screening, diagnosis, and treatment, as well as survivorship and quality of life issues pertaining to the diseases and conditions specified by Congress. The PRMRP portfolios in the figure below show the percentages of dollars invested in each of the seven research portfolios; percentages of research dollars allocated by Scientific Classification System Code are shown in the figure that follows.

### PRMRP FY2013-FY2018 Awards by Portfolio\*

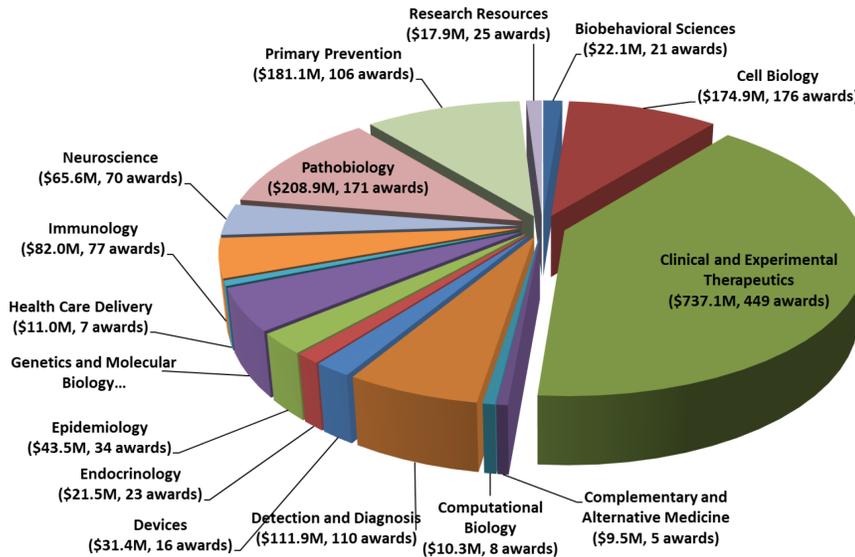
% Research Dollars  
(892 awards totaling \$1.31B)



\*Final FY18 budgets are pending award negotiations.



**PRMRP FY99-FY18 Awards by Scientific Classification System Code**  
(% Research Dollars)



The PRMRP designed an Investment Strategy that emphasizes supporting research along the bench to bedside continuum, from early discovery through the development of ideas and onto product development and clinical applications. The **Discovery Award** fosters new ideas by supporting innovative, non-incremental, high-risk/potentially high-reward research. The **Investigator-Initiated Research Award (IIRA)** supports more mature ideas that have the potential to yield highly impactful data leading to critical discoveries or major advancements, while the **Focused Program Award** supports multiple distinct but complementary projects that address a central critical problem or question. Two other award mechanisms focus on translational research; these are the **Technology/Therapeutic Development Award (TTDA)**, a product-driven award mechanism intended to support the translation of promising preclinical findings into products for clinical applications, and the **Clinical Trial Award**, which supports rapid implementation of clinical trials that have a potential to have a significant impact.

The PRMRP has placed emphasis on high-impact translational research that has near-term benefits for the Warfighter, Veteran, and beneficiaries. The figure to the right shows the award mechanisms offered since the inception of the PRMRP. The charts depict the percentages of funds invested for FY99-FY13, FY14-FY16, and FY17-FY18 in discovery-like, high-risk, potentially high-gain research, more mature research through the IIRA and Focused Program Awards, translational research through Translational Partnership and TTDA mechanisms, and pilot, phase 1 and 2 clinical trials through the Clinical Trial Award mechanism.

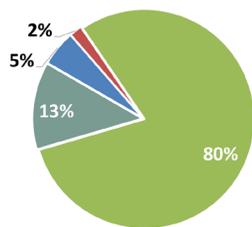
**PRMRP FY99-FY18 Awards by Research Stage**  
(FY13-FY18: 892 awards totaling \$1.31B)

**PRMRP Investment Strategy FY99-FY18**

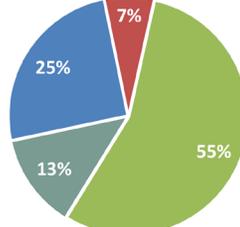
FY99-FY02	FY03-FY06	FY08	FY09	FY10	FY11-FY13	FY14-FY18
Investigator Initiated Research (IIRA)	IIRA Program Projects Advanced Technology (TTDA)	IIRA TTDA Translational Research Clinical Trial	IIRA TTDA Clinical Trial	Concept IIRA TTDA Clinical Trial	Discovery IIRA TTDA Clinical Trial	Discovery IIRA Focused Program TTDA Clinical Trial



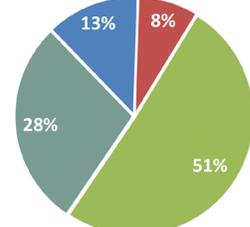
**FY99-FY13 (\$550M)\***



**FY14-FY16 (\$683M)**



**FY17-FY18 (\$585M)**



\* M = million  
Final FY18 budgets are pending award negotiations.  
Pie charts are % research dollars.



## NOTABLE ADVANCES SUPPORTED BY THE PRMRP

### • Research Tools

- Culture conditions for expansion of nephron progenitor cells – Active patent and widely used method
- Mouse model of noise-induced tinnitus
- Transgenic animal model (MYC-tTA-IT SN Mouse) to study cardioprotection and disease progression

### • Prevention/Risk Assessment

- Gait retraining – Clinical trials evaluating active feedback gait retraining after anterior cruciate ligament reconstruction to prevent or delay post-traumatic osteoarthritis
- Etanercept – Clinical trial evaluating TNF-alpha blocker as a treatment of blast-induced tinnitus
- RAVEN™ – Field-deployable surgical robot for combat casualty care; subsequent development (RAVEN II) continued with funding from another source
- Amicidin-Alpha Surgical Gel – Developing and testing of a surgical hydrogel to protect against microbial contamination in surgical and trauma settings to reduce the risk of post-operative infection
- LAMP-Vax Technology – Clinical trial to evaluate the safety, tolerability, and immune response of a vaccine in adults allergic to peanuts
- Everolimus – Phase 3 clinical trial to test the first immunosuppression regimen for pediatric heart transplant patients
- Statin Therapy – Clinical trial testing the efficacy of pravastatin to improve renal structural disease and blood flow, and preserve kidney function in polycystic kidney disease
- Cogmed Working Memory Intervention – Phase 2 clinical trial to test impact of Cogmed Working Memory on improvements in neurocognitive and behavioral outcomes in children with congenital heart disease

### • Detection and Diagnosis

- CareGuide™ – Portable sensor system to continuously and noninvasively monitor muscle pH, oxygen, and hematocrit
- Banyan Brain Trauma Indicator – First Food and Drug Administration-approved blood test to evaluate mTBI
- Ceeable Visual Field Analyzer – Non-invasive visual field test and diagnosis system for early detection and assessment of eye disease
- ImmunoPoC – Developing a POC platform to differentiate between bacterial and viral infections

### • Treatment and Quality Of Life

- KeraGenetics™ Bone – Novel bone morphogenetic protein carrier shown to facilitate bone healing in preclinical models
- Percutaneous Osseointegrated Prosthesis – Clinical testing of a prosthesis that allows direct skeletal attachment of the prostheses; two active patents
- Percutaneous Peripheral Nerve Stimulation (PNS) – Phase 2 clinical trial testing if percutaneous PNS, a non-opioid, minimally invasive therapy, can reduce pain, pain medication use, and disability in individuals with chronic low back pain compared to standard of care
- Potentiator Compounds – Identifying and testing compounds that improve the potency and effectiveness of co-administered antibiotics against multi-drug resistant gram-negative pathogens
- Vascular Graft – Constructing and pre-clinical testing of a tissue-engineered vascular graft for use in congenital heart surgery; graft will have the capacity to grow as the child matures
- nStrada™ – Novel device that is implantable under the skin for long-term (> 6 months) drug delivery of multiple drugs (buprenorphine-*nStrada*)
- MEDI8852 – Phase 1/2a clinical trial evaluating the efficacy of MEDI8852 in treating all Type A strains of influenza compared to standard of care
- Cryoanalgesia – Double-masked, placebo-controlled, definitive clinical trial of a non-opioid pain management to treat post-amputation phantom limb pain
- Doxycycline and Tacrolimus – Phase 3 clinical trial testing the efficacy for treatment of nasal hemorrhage in hereditary hemorrhagic telangiectasia patients
- Pelvic Floor Muscle Therapy – Clinical trial assessing the effectiveness of pelvic floor muscle physical therapy compared to standard bladder-directed therapy to relieve pelvic pain and voiding dysfunction in interstitial cystitis



## STRATEGIC DIRECTION

A hallmark of the DoD PRMRP is the partnership of advocates with scientists and clinicians from all branches of the military, VA, HHS, NIH, and academia, all working together to design award mechanisms/funding opportunities, evaluate research applications, and identify high-impact research relevant to military health.

The strategic direction is based on the scopes of the problems affecting the military Service and Veteran population and general public who are suffering from the Congressionally specified diseases and conditions being studied through PRMRP awards, and the pressing gaps faced by each of those affected communities. The driving factors behind the PRMRP Strategic Plan include the following:

- Congressional language for the PRMRP
  - Support research of “clear scientific merit” and “direct relevance to military health”
  - Research areas considered under this PRMRP funding are restricted to the diseases and conditions specified in the Congressional language
- Senate Explanatory Statement for the DoD Appropriations Bill
- Joint Requirements Oversight Council Initial Capabilities Documents
- Defense Health Program Guidance for Research and Development Planning Activities
- Deputy Assistant Secretary of Defense, Health Readiness Policy and Oversight Initial Capabilities Documents
- Guidance from stakeholders

Areas of Encouragement related to each PRMRP Congressionally specified Topic Area are identified by the DoD, VA, HHS, and other relevant stakeholders and are included as an Appendix in all of the PRMRP Program Announcements. The Areas of Encouragement provide investigators with information about research priorities and unmet needs for each disease and condition. The Areas of Encouragement are not exhaustive; investigators are not restricted to submitting research that addresses an Area of Encouragement, and any aspect of research that is relevant to any Topic Areas designated within an FY is considered for funding.

## STRATEGIC GOALS

The PRMRP’s 5-Year Investment Strategy includes investing in basic research, translational research, product development, clinical research, and clinical trials. Strategic goals include the following:

- Support research of high scientific merit and high impact
- Support research with relevance to the health of the military Service member, Veteran, and beneficiary
- Support research that meets the first two goals in as many Topic Areas as possible

The importance of these strategic goals signifies the direction of the PRMRP as directed by Congress. By reducing the burden of disease on military families, not only is the Service member retained for mission readiness, but the support system (families of Service members) are kept healthy and able to provide the emotional, psychological, and physical support needed by the Service member. In addition, addressing research priorities for each disease and condition is critical to the mission of the PRMRP in relation to Service members, their families, Veterans, and the American public.

## INVESTMENT STRATEGY

The PRMRP’s Investment Strategy and associated award mechanisms provide the framework and direction necessary to most effectively invest each Congressional appropriation pertaining to the diseases and conditions specified each year by Congress. The PRMRP seeks to fund research that will have a significant impact on the Warfighter, Veteran, and beneficiary that need advancements now, as well as support new avenues of research that have a strong potential for making a significant impact in the long term. Through the combination of both basic and patient-based research, the program hopes to achieve its ultimate goals of understanding, preventing, detecting, treating, and providing a better quality of life for those suffering from each of the diseases and conditions specified in the Congressional language.

To achieve strategic plan success, the PRMRP’s 5-Year Investment Strategy is to fund 10% in early discovery research awards, 50% in more mature research, 20% in product-driven awards, and 20% in clinical trials.



## MEASURING PROGRESS

### NEAR-TERM

The PRMRP recommends the following research outcomes to determine the success of the program's near-term direction and goals:

- Number of applications received in each Topic Area, Area of Encouragement, Portfolio, Scientific Classification System group, and award mechanism
- Number of applications funded in each research classification and award mechanism
- Quantity of publications, patents, and products produced by funded research applications

### MEDIUM- TO LONG-TERM

The success of the program's long-term goals will be determined by the following research outcomes: follow-on grants; publications; number of ongoing and completed technology/product-driven awards; number of products brought into clinical trials or fielded; and the number of ongoing and completed clinical trials and their success rates.

These research outcomes will be used for the evaluation and continuous improvement of award mechanisms and Areas of Encouragement/research priorities for each Topic Area.

## REFERENCES

1. *Evaluation of the Congressionally Directed Medical Research Programs Review Process*. 2016., National Academies of Sciences, Engineering, and Medicine. The National Academies Press, Washington, DC.