

TICK-BORNE DISEASE RESEARCH PROGRAM



MISSION: Fund innovative research to understand and provide solutions to prevent, detect, and resolve Lyme disease and other tick-borne diseases and conditions for the benefit of Service Members and their Families, Veterans and the American public

**Congressional Appropriations
FY16-FY24:
\$55M total**



“What cohort of the American public is exposed to more global tick-borne illnesses than our

Service Members and military Families? After being medically retired from a career as a fighter pilot due to ‘chronic systemic tick-borne illness,’ I needed a new mission. As a TBDRP peer reviewer, I shared my lived experience to help advance the science. The unique patient-centered approach of the CDMRP ensures that the voice of patients are heard. This program gives me hope for bridging the gap between basic research and urgent patient needs.”

*Col. Nicole Malachowski
U.S. Air Force Retired
Former F-15E Fighter Pilot
FY17-FY20 Consumer Peer Reviewer*



SCOPE OF THE PROBLEM

About **195,000** cases of **tick-borne diseases** reported in the U.S. in a 4-year period



TBDs frequently go **undiagnosed or misdiagnosed;**



accurate rates of infection remain a significant challenge



Tick populations are **increasing and geographically expanding;** new TBDs are emerging and incidence is rising¹

RELEVANCE TO MILITARY HEALTH²



Nearly **7,000** Service Members and over **63,000** MHS beneficiaries received a TBD diagnosis

Lyme disease accounts for **80%** of these TBD diagnoses and for over **40%** of all vector-borne disease diagnoses

PROGRAM PRIORITIES

Tick-Borne Diseases

- **Bacterial:** Lyme disease, Ehrlichiosis, Anaplasmosis, Tularemia, Bartonellosis, Tick-borne Relapsing Fever, Rickettsioses, like Rocky Mountain Spotted Fever
- **Viral:** Powassan, Heartland, and Bourbon diseases, Crimean-Congo Hemorrhagic Fever, Tick-borne Encephalitis
- **Parasitic:** Babesiosis
- **Other:** Alpha-gal syndrome/red meat allergy

Program Goals

- Developing improved tick-borne disease detection methods and diagnostics
- Developing new and effective tick-borne disease treatments
- Understanding tick-borne disease pathogenesis at the cellular and molecular levels

¹ https://www.cdc.gov/ticks/resources/Reported-Tickborne-Disease-Cases-by-County-of-Residence_2016-2019.xlsx

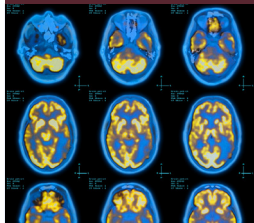
² Data from the Armed Forces Health Surveillance Branch for the years 2006-2022



For more information, visit: <https://cdmrp.health.mil/tbdrp>

PROGRAM IMPACT AND OUTCOMES

ADDRESSING GAPS IN TBD UNDERSTANDING, PREVENTION, TREATMENT AND DETECTION

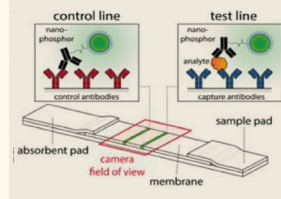


UNDERSTANDING CELLULAR AND MOLECULAR PATHOGENESIS

- Mechanisms and immune responses to tick-borne infections
- Tick-borne co-infections

IMPROVING DETECTION AND DIAGNOSIS

- Lateral flow diagnostic assay for Rickettsia
- Molecular biosignature assay for Lyme disease
- Host-based and pathogen-based diagnostics for Lyme disease in children



DEVELOPING NEW AND EFFECTIVE TREATMENTS

- Drug combination for persistent Lyme disease
- Chemical inhibitors of Crimean Congo Hemorrhagic Fever

DEVELOPING MEASURES OF PREVENTION

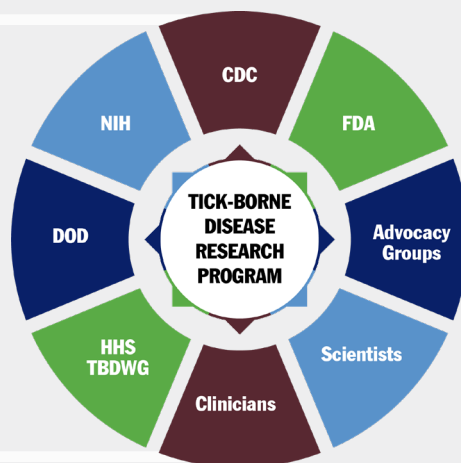
- Wearable device for controlled release of tick repellents
- PrEP for Lyme disease
- Vaccine candidates



STRATEGIC COORDINATION



The **TBDRP** coordinates with various **DOD** and other federal organizations, the **HHS-led Tick-Borne Disease Working Group**, and other subject matter experts from the private sector, including **scientists, clinicians and individuals with lived experience in tick-borne diseases.**



ONGOING HIGH-IMPACT RESEARCH

Pre-Exposure Prophylaxis for the Prevention of Lyme Disease

- Human antibody against *Borrelia burgdorferi* as a pre-exposure prophylaxis, or PrEP
- Demonstrated 80% protection from tick-bite transmitted infection in animal models
- Phase 3 clinical trial underway and intent to seek FDA approval by 2025

Wearable Device for Controlled Release of Tick Repellents

- Adaptive barrier controlled-release device worn as an ankle bracelet or incorporated in the uniform
- Includes remote wireless control and programming for receipt of device updates
- Advanced repellent formulations and device designs underway
- Intent to register with the EPA

Development and Validation of a Combined Pathogen-Host Genomic Assay for Diagnosis of Lyme Disease and Other Tick-Borne Infections

- Predictive model distinguishes between Lyme disease, sepsis, influenza and no infection with 87% accuracy
- “TickChip” assay detects nearly all tick-borne pathogens from blood samples, including bacteria, viruses and parasites



Point of Contact: CDMRP Public Affairs

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