Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army												Date: March 2023
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 2: *Applied Research*					R-1 Program Element (Number/Name) PE 0602787A *I Medical Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	124.002	80.656	66.266	-	66.266	73.066	20.851	20.867	21.099	0.000	406.807
BS7: *Medical Technology (CA)*	-	34.467	46.680	-	-	-	-	-	-	-	0.000	81.147
MK4: *Warfigher Health Applied Rsch Technology*	-	28.480	31.916	64.326	-	64.326	70.422	18.155	18.171	18.373	0.000	249.843
MM4: *Cbt Casualty Care Applied Rsch Technology*	-	22.794	1.935	1.815	-	1.815	2.525	2.576	2.577	2.606	0.000	36.828
MM6: *Medical Technologies to Support Dispersed Ops Tech*	-	10.297	0.125	0.125	-	0.125	0.119	0.120	0.119	0.120	0.000	11.025
MM8: *Infectious Diseases and Applied Rsch Technology*	-	27.964	-	-	-	-	-	-	-	-	0.000	27.964

A. Mission Description and Budget Item Justification

This Program Element (PE) supports application of knowledge gained through basic research to refine drugs, vaccines, medical devices, diagnostics, medical practices/ procedures, and other preventive measures essential to the protection and sustainment of Warfighter health. Research is conducted in five principal areas: Combat Casualty Care, Military Operational Medicine, Military Relevant Infectious Diseases, Clinical and Rehabilitative Medicine, Medical Capabilities to Support Dispersed Operations, and Systems Biology/Network Sciences. Projects are coordinated with the Defense Health Agency.

The cited research is consistent with the Under Secretary of Defense for Research and Engineering science and technology focus areas and the Army Modernization Strategy.

Work in this Program element (PE) is performed by the United States Army Medical Research and Development Command (USAMRDC), Fort Detrick, MD.

All medical applied research is conducted in compliance with Food and Drug Administration (FDA) or Environmental Protection Agency (EPA) regulations. The FDA requires thorough testing in animals (preclinical testing) to ensure safety and, where possible, effectiveness prior to evaluation in controlled human clinical trials (upon transition to Advanced Technology Development). This PE focuses on research and refinement of technologies such as product formulation and purification and laboratory test refinement with the aim of identifying candidate solutions. This work often involves testing in animal models. The EPA also requires thorough testing of products, such as sterilants, disinfectants, repellents, and insecticides to ensure the environment is adequately protected before these products are licensed for use. Program refinement and execution is externally peer-reviewed and fully coordinated with all Services as well as other agencies through the Joint Technology Coordinating Groups of the Biomedical Community of Interest. The Biomedical Community of Interest, formed under the authority of the Assistant Secretary of Defense for Research and Engineering, serves to facilitate coordination and prevent unnecessary duplication of effort within the Department of Defenses (DoD) biomedical research community, as well as their associated enabling research areas.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army	Date: March 2023
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602787A *I Medical Technology*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	120.747	33.976	17.584	-	17.584
Current President's Budget	124.002	80.656	66.266	-	66.266
Total Adjustments	3.255	46.680	48.682	-	48.682
• Congressional General Reductions	-	-			
• Congressional Directed Reductions	-	-			
• Congressional Rescissions	-	-			
• Congressional Adds	-	46.680			
• Congressional Directed Transfers	-	-			
• Reprogrammings	3.255	-			
• SBIR/STTR Transfer	-	-			
• Adjustments to Budget Years	-	-	48.682	-	48.682

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: BS7: *Medical Technology (CA)*		
Congressional Add: *Program Increase - Military Force Vector Borne Health Protection*	5.000	-
Congressional Add: *Biological Performance Technology*	5.000	-
Congressional Add: *Program Increase - Center for Excellence in Military Health and Performance Enhancement*	3.567	5.000
Congressional Add: *Program Increase - Holistic Health and Fitness*	1.500	5.680
Congressional Add: *National Trauma Research Repository Data Population Project*	1.900	-
Congressional Add: *Physiological Study of Female Warfighters to Improve Training*	5.000	-
Congressional Add: *Program Increase - RNA Therapeutics for Infectious Disease Threats*	7.500	8.000
Congressional Add: *Program Increase - BIOMATERIALS FOR COMBAT WOUND CARE*	-	3.000
Congressional Add: *Program Increase - ENGINEERED ANTIBODIES FOR SKIN AND SOFT-TISSUE INFECTIONS*	-	5.000
Congressional Add: *Program Increase - PHOTONIC INTEGRATED CIRCUIT PLATFORM*	-	5.000
Congressional Add: *Program Increase - SURGICAL INSTRUMENT STERILIZATION*	-	5.000
Congressional Add: *Program Increase - TRAMA IMMUNOLOGY*	-	10.000
Congressional Add: *Human Optimitzation*	5.000	-
Congressional Add Subtotals for Project: BS7	34.467	46.680
Congressional Add Totals for all Projects	34.467	46.680

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Army	Date: March 2023
Appropriation/Budget Activity 2040: *Research, Development, Test & Evaluation, Army I* BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 0602787A *I Medical Technology*

Change Summary Explanation

Increased funding in FY24 supports research in emerging directed energy mechanisms and biological effects.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army										Date: March 2023		
Appropriation/Budget Activity 2040 / 2					R-1 Program Element (Number/Name) PE 0602787A / *Medical Technology*				Project (Number/Name) BS7 / *Medical Technology (CA)*			
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
BS7: *Medical Technology (CA)*	-	34.467	46.680	-	-	-	-	-	-	-	0.000	81.147

Note

Congressional Interest Item funding provided for Medical Technology.

A. Mission Description and Budget Item Justification

Congressional Interest Item funding provided for Medical Technology.

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023
Congressional Add: Program Increase - Military Force Vector Borne Health Protection ***FY 2022 Accomplishments:*** Congressional Interest Item funding provided for Military Force Vector Borne Health Protection	5.000	-
Congressional Add: Biological Performance Technology ***FY 2022 Accomplishments:*** Congressional Interest Item funding provided for Biological Performance Technology	5.000	-
Congressional Add: Program Increase - Center for Excellence in Military Health and Performance Enhancement ***FY 2022 Accomplishments:*** Congressional Interest Item funding provided for Center for Excellence in Military Health and Performance Enhancement ***FY 2023 Plans:*** Congressional Interest Item funding provided for Center for Excellence in Military Health and Performance Enhancement	3.567	5.000
Congressional Add: Program Increase - Holistic Health and Fitness ***FY 2022 Accomplishments:*** Congressional Interest Item funding provided for Holistic Health and Fitness ***FY 2023 Plans:*** Congressional Interest Item funding provided for Holistic Health and Fitness	1.500	5.680
Congressional Add: National Trauma Research Repository Data Population Project	1.900	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602787A / *Medical Technology*	**Project (Number/Name)** BS7 / *Medical Technology (CA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023
FY 2022 Accomplishments: Congressional Interest Item funding provided for National Trauma Research Repository Data Population Project		
Congressional Add: Physiological Study of Female Warfighters to Improve Training	5.000	-
FY 2022 Accomplishments: Congressional Interest Item funding provided for Physiological Study of Female Warfighters to Improve Training		
Congressional Add: Program Increase - RNA Therapeutics for Infectious Disease Threats	7.500	8.000
FY 2022 Accomplishments: Congressional Interest Item funding provided for RNA Therapeutics for Infectious Disease Threats		
FY 2023 Plans: Congressional Interest Item funding provided for RNA Therapeutics for Infectious Disease Threats		
Congressional Add: Program Increase - BIOMATERIALS FOR COMBAT WOUND CARE	-	3.000
FY 2023 Plans: Congressional Interest Item funding provided for BIOMATERIALS FOR COMBAT WOUND CARE		
Congressional Add: Program Increase - ENGINEERED ANTIBODIES FOR SKIN AND SOFT-TISSUE INFECTIONS	-	5.000
FY 2023 Plans: Congressional Interest Item funding provided for ENGINEERED ANTIBODIES FOR SKIN AND SOFT-TISSUE INFECTIONS		
Congressional Add: Program Increase - PHOTONIC INTEGRATED CIRCUIT PLATFORM	-	5.000
FY 2023 Plans: Congressional Interest Item funding provided for PHOTONIC INTEGRATED CIRCUIT PLATFORM		
Congressional Add: Program Increase - SURGICAL INSTRUMENT STERILIZATION	-	5.000
FY 2023 Plans: Congressional Interest Item funding provided for SURGICAL INSTRUMENT STERILIZATION		
Congressional Add: Program Increase - TRAMA IMMUNOLOGY	-	10.000
FY 2023 Plans: Congressional Interest Item funding provided for Trama Immunology		
Congressional Add: Human Optimitzation	5.000	-
FY 2022 Accomplishments: Congressional Interest Item funding provided for Human Optimization.		
Congressional Adds Subtotals	34.467	46.680

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602787A / *Medical Technology*	**Project (Number/Name)** BS7 / *Medical Technology (CA)*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 2	R-1 Program Element (Number/Name) PE 0602787A / *Medical Technology*	Project (Number/Name) MK4 / *Warfigher Health Applied Rsch Technology*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
MK4: *Warfigher Health Applied Rsch Technology*	-	28.480	31.916	64.326	-	64.326	70.422	18.155	18.171	18.373	0.000	249.843

A. Mission Description and Budget Item Justification

This Project conducts research to prevent and protect Warfighters from training and operational injuries; refine mechanisms for detection of physiological (human physical and biochemical function) and psychological (mental) health problems; reduce the effects of trauma and promote rapid recovery from acute stress in far forward operational environments; evaluate hazards to head, neck, spine, eyes, and ears; set the standards for rapid return to duty; and determine new methods to sustain and enhance performance and readiness across the operational spectrum. This research provides medical information important to the design and operational use of military systems, and this work forms the basis for behavioral, training, and nutritional interventions.

The four main areas of study are:
(1) Physiological Health and Performance
(2) Environmental Health and Protection
(3) Injury Prevention and Reduction
(4) Psychological Health and Resilience

Research in this Project is coordinated with and complimentary to work done in Program Element (PE) 0602143A (Soldier Lethality Technology) and PE 0603118A (Soldier Lethality Advanced Technology).

The cited research is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy.

Research in this Project is performed by the United States Army Medical Research and Development Command (USAMRDC), Fort Detrick, MD.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Operational Risk Planning Tools for Battlefield Environmental Threats	2.268	1.349	1.277
Description: This effort investigates and incorporates mechanisms for health risks of heat, cold, and altitude injuries to develop guidelines and advise countermeasure development for operations in extreme environments. Investigates health risks from industrial chemicals and pollutants found in dense urban and subterranean (SubT) environments in which Soldiers operate. ***FY 2023 Plans:*** Will continue to develop risk profiles for exposures to cold water and expand effort to include subzero/artic conditions; advise on functional clothing to prevent freezing injury during military free fall; validate heat injury biomarkers to inform return to duty guidance; determine the influence of female sex hormones on physiological responses and adaptations during heat acclimation;			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602787A / *Medical Technology*	**Project (Number/Name)** MK4 / *Warfigher Health Applied Rsch Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
develop gene expression profile signatures to predict individual susceptibility to acute mountain sickness and acclimatization status prior to high altitude ascent. ***FY 2024 Plans:*** Will develop risk profiles for exposures in extreme environments including sub zero/artic conditions; will identify individual factors that make an individual more susceptible to environmental injury (including age, sex, etc); mature "smart" fabrics that detect temperature & moisture in real-time to prevent frostbite injury. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding change reflects planned life cycle of this effort.			
Title: Prevention of Soldier Performance Degradation in Extreme Environments ***Description:*** This effort develops and matures non-invasive technologies, decision-aid tools, and other countermeasure to prevent and enhance Soldier performance in extreme environments of heat, cold, altitude, dense urban and SubT environments. This effort includes validation of approved pharmaceuticals as well as provides improved sensors and predictive algorithms models. ***FY 2023 Plans:*** Will validate performance of pharmaceuticals and nutrition-based pharmacologic interventions to reduce acute mountain sickness, heat injuries and other environmental exposures; design physiological modes to predict human state during complex military scenarios; evaluate cold acclimatization as an intervention to augment peripheral blood flow in cold exposure; study the effects of vascular preconditioning to reduce cold-induced blood vessel constriction to maintain core body heat and improve manual dexterity. ***FY 2024 Plans:*** Design physiological modes to predict the state of men and women during complex military scenarios; evaluate cold habituation as an intervention to augment peripheral blood flow in cold exposure; study the effects of vascular preconditioning to reduce cold-induced peripheral vasoconstriction and improve manual dexterity. Will develop risk profiles for exposures in extreme environments including sub zero/artic conditions; determine the influence of female sex hormones on physiological responses and adaptations during heat acclimation; Investigate and validate physiological mechanisms for design and development of rapid heat acclimation protocols; validate transcriptomic signatures to predict individual susceptibility to acute mountain sickness and acclimatization status prior to high altitude ascent ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding change reflects planned life cycle of this effort.	4.171	4.005	3.331
Title: Leader Decision Aid to Manage Blast Head Injury in All Settings	0.253	0.853	1.135

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602787A / *Medical Technology*	**Project (Number/Name)** MK4 / *Warfigher Health Applied Rsch Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Description: Develop injury risk assessment/guidance/criteria that will inform the development of technologies (i.e., personal protection equipment, vehicles) and strategies (i.e., health hazard assessments) to protect the Soldier against current and emerging operational threats (i.e., blast, blunt, ballistic, and accelerative). Improve the prevention of and reduce the severity of spinal injuries experienced by military vehicle occupants and dismounted Warfighters during non-underbody blast operational exposures (aircrew crash, vibration, head-supported mass) through the development of improved, biomedically valid spinal injury criteria and health hazard assessments. ***FY 2023 Plans:*** Will continue to develop injury risk criteria for head supported technologies in multiple military operational environments (mounted and dismounted). ***FY 2024 Plans:*** Will continue to develop and refine cervical spine injury risk criteria for head supported technologies and protective equipment in multiple military operational environments (mounted and dismounted). ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding change reflects planned life cycle of this effort.			
Title: Physical Fitness Standards to Prevent Musculoskeletal Injuries ***Description:*** Develops validated standards and strategies to optimize Soldier readiness and performance related to musculoskeletal injury (MSKI) in order to provide military leadership with strategies and standards to mitigate musculoskeletal injuries, facilitate quick return to combat effectiveness after MSKI, and decrease risk of re-injury once been cleared to return after injury to increase the probability of mission success. ***FY 2023 Plans:*** Will continue to support the United States Army Training and Doctrine Command (TRADOC) Center for Initial Military Training (CIMT) and the United States Army Forces Command (FORSCOM) in development of accurate and reliable physical assessment strategies after musculoskeletal injury to promote more effective and timely return-to-duty with reduced probability for re-injury. ***FY 2024 Plans:*** Will continue to support TRADOC CIMT and FORSCOM in development of accurate and reliable physical assessment strategies after musculoskeletal injury. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding change reflects planned life cycle of this effort.	1.614	0.869	1.258
Title: Leader Tools to Reduce Musculoskeletal Injury In All Settings	3.603	2.383	2.088

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602787A / *Medical Technology*	**Project (Number/Name)** MK4 / *Warfigher Health Applied Rsch Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Description: Enhances the Army's understanding of the physiological mechanisms underlying musculoskeletal injuries and identifies countermeasures to mitigate injury risk in order to reduce musculoskeletal injuries in new recruits, thereby directly impacting force readiness and improving lethality. ***FY 2023 Plans:*** Will develop and refine models of musculoskeletal injury risk during basic training, specifically bone health optimization strategies that will transition to TRADOC-CIMT. ***FY 2024 Plans:*** Will complete model development of musculoskeletal injury (stress fracture risk) for validation. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding change reflects planned life cycle of this effort.			
Title: Forward Neuro-Muscular Skeletal Injury Assessment ***Description:*** Focus on developing portable imaging technologies to identify soft tissue musculoskeletal injury severity in the field and generate capabilities to guide musculoskeletal injury management to inform appropriate evacuation vs. return to duty (RTD) decisions. ***FY 2023 Plans:*** Will develop and refine ultrasound techniques and algorithm development to detect foot and ankle musculoskeletal injuries using machine learning techniques. ***FY 2024 Plans:*** Will develop recommendations for evidence-based guidance detailing the predictive metrics of those physical/ physiological, cognitive/psychological, and behavioral contributions that optimize Soldiers' MSKI tolerance and risk. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding change reflects planned life cycle of this effort.	0.389	0.311	0.297
Title: Biomedical Performance Enhancement ***Description:*** This effort evaluates strategies and technologies that enhance Soldier physical and mental performance in Multi-Domain operations. Additional efforts concentrate on characterization of physiological and genetic factors that contribute to physiological resilience to military stressors. ***FY 2023 Plans:***	6.469	4.725	5.013

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602787A / *Medical Technology*	**Project (Number/Name)** MK4 / *Warfigher Health Applied Rsch Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Will continue to investigate pharmacological strategies for improving Soldier vigilance & endurance. Will continue to investigate pharmacological strategies for improving Soldier vigilance & endurance. Will also continue to refine electrical stimulation technologies. ***FY 2024 Plans:*** Will complete investigation of pharmacological strategies for improving Soldier vigilance & endurance; Will finalize identification of the physiological responses of elite female and male soldiers to continuous prolonged military operations. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding change reflects planned life cycle of this effort.			
Title: Expeditionary Force Nutrition to Improve Performance ***Description:*** Characterizes and refines field fueling and garrison practices to sustain Medical readiness, military performance and recovery from military operations. Evaluates combat ration components to sustain Medical Readiness and performance in deployed, disaggregated and dispersed operations. ***FY 2023 Plans:*** Will continue experiments to improve understanding of environmental influences (heat, cold, altitude) on eating behavior; investigate the effects of protein source on muscle mass growth, strength and maintenance; evaluate nutritional requirements for maintenance of cognitive, physical and immune function during arduous military training. ***FY 2024 Plans:*** Will finalize experiments to; investigate the effects of protein source on muscle mass growth, strength and maintenance; evaluate nutritional requirements for maintenance of cognitive, physical and immune function during arduous military training. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding change reflects planned life cycle of this effort.	1.781	1.462	1.727
Title: Medical Interventions to Reduce Impact of Fatigue on Performance ***Description:*** Investigates and determines strategies and technologies that prevent or mitigate fatigue-related performance decrements and injuries during training and operations. Refines interventions that prevent or mitigate clinical sleep disorders in Soldiers. Evaluates technologies to non-intrusively & non-invasively monitor vigilance and performance in real-time.	2.334	-	-
Title: Optimal Delivery of Far Forward Behavioral Health Care ***Description:*** This effort will develop a Far Forward Behavioral Health (BH) delivery system of care for rapid recovery in austere	2.735	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602787A / *Medical Technology*	**Project (Number/Name)** MK4 / *Warfigher Health Applied Rsch Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
environments, and guidelines for use of pharmacologic and non-pharmacologic solutions for BH issues in MDO without dedicated BH assets, tailored to needs and training of medics, that will reduce the development of deployment-related psychological health issues.			
Title: Unit-Level Psychological Interventions to Enhance Performance ***Description:*** This effort will deliver evidence-based strategies and inform policies to optimize, enhance and sustain Service member and Unit psychological health, well-being, resilience and readiness.	2.863	-	-
Title: Energy Field Biological Effects and Mechanisms ***Description:*** Investigate the area of emerging directed energy threat mechanisms and biological effects. Conduct research to support the Department of Defense and US Government's threat mitigation strategy. ***FY 2023 Plans:*** Design and develop threat-relevant directed energy source technologies for laboratory investigation; investigate directed energy coupling, penetration, and absorption in biological structures; design and develop directed energy biological effect modeling and simulation tools; explore and characterize the biological effects of directed energy exposure; research to identify mechanisms by which effects are produced. ***FY 2024 Plans:*** Will continue to develop and validate threat-relevant directed energy source technologies for laboratory investigation; investigate fundamental biophysical and physiological mechanisms; identify relevant biological mechanisms for accelerated study; mature cross-cutting / multi-disciplinary research processes to allow rapid advances; investigate component technologies necessary to complete laboratory research; complete infrastructure improvements for unclassified and classified laboratory space and equipment; investigate fundamental limitations on directed energy coupling, penetration, and absorption in surrogate structures and at relevant protocol levels; investigate low frequency electromagnetic bioeffects; validate the design of directed energy biological effect modeling and simulation tools; conduct experiments on previous investigation of biological effects of directed energy exposure; conduct research to compare biological effects theories and models against real world data; transition data on biological mechanisms and effects to DoD medical community to support research and development efforts for directed energy induced injury prevention and treatment. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding increase supports research in emerging directed energy threat mechanisms and biological effects in support of the Department of Defense and US Government's threat mitigation strategy.	-	15.209	48.200
Title: SBIR/STTR Transfer	-	0.750	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602787A / *Medical Technology*	**Project (Number/Name)** MK4 / *Warfigher Health Applied Rsch Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Description: Funding transferred in accordance with Title 15 USC §638. ***FY 2023 Plans:*** Funding transferred in accordance with Title 15 USC §638. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC §638.			
Accomplishments/Planned Programs Subtotals	28.480	31.916	64.326

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 2	R-1 Program Element (Number/Name) PE 0602787A / *Medical Technology*	Project (Number/Name) MM4 / *Cbt Casualty Care Applied Rsch Technology*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
MM4: *Cbt Casualty Care Applied Rsch Technology*	-	22.794	1.935	1.815	-	1.815	2.525	2.576	2.577	2.606	0.000	36.828

A. Mission Description and Budget Item Justification

This Project refines and assesses concepts, techniques, and materiel that improve survivability and treatment outcomes for Warfighters wounded during combat operations and treated under austere field conditions, including prolonged field care, and during medical evacuation, and maintains laboratory capability to perform these functions. Combat casualty care research addresses control of severe bleeding; resuscitation and stabilization; advanced automated life support systems suitable for use in forward areas, treatment of severe orthopedic injuries, treatment of severe burns, and combat-related brain injury.

Promising efforts identified in this Project are further matured under Program Element (PE) 0603002A (Medical Advanced Technology).

The cited research is consistent with the Under Secretary of Defense (Research and Engineering) science and technology focus areas and the Army Modernization Strategy.

Research in this Project is performed by the United States Army Medical Research and Development Command (USAMRDC), Fort Detrick, MD.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Modular and Automated Battlefield Sustainment of Critical Organ Function Cap Set 2 ***Description:*** This effort performs applied research to support development of novel, disruptive technologies to improve survival of the most severely injured casualties when medical evacuation is delayed and access to definitive surgical care is limited.	1.222	-	-
Title: Battlefield Pain Control without Physiological Impairment ***Description:*** This effort performs applied research in laboratory and animal studies to determine novel, non-opioid drugs to treat pain in the austere battlefield environment with minimal side effects.	2.287	-	-
Title: Candidate Capabilities for Rapid Burn Treatment ***Description:*** This effort conducts research to enhance the ability to treat acute severe burns at or near the point of injury, protect burn wounds from further injury, infection and inflammation, especially when definitive surgical burn wound care is delayed or unavailable, and accelerate wound healing and return to combat duty.	1.649	-	-
Title: Autonomous Cardiopulmonary Resuscitation	0.513	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602787A / *Medical Technology*	**Project (Number/Name)** MM4 / *Cbt Casualty Care Applied Rsch Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Description: This effort investigates new technologies addressing major causes of battlefield mortality, including non-compressible hemorrhage, safe mitigation of hemorrhagic shock, and airway obstruction and ventilation.			
Title: Unconventionally-acquired Brain Injury (UBI) ***Description:*** This effort performs applied research aimed at determining the physiological effects of unconventionally-acquired threat technologies to support development of future diagnostic and treatment tools.	8.659	-	-
Title: Automated Management of Traumatic Brain Injury (TBI) and Concussion in Prolonged MDO ***Description:*** This effort performs applied research to support development of therapies to treat and clinically manage brain injury under prolonged care conditions.	1.231	-	-
Title: Prevention and Treatment of Brain Injury ***Description:*** This effort supports refinement of drug (includes mature drug technologies and those that are United States Food and Drug Administration (FDA) approved for other indications) and therapeutic strategies to manage brain injury resulting from battlefield trauma.	1.456	-	-
Title: Next Generation Rapid Burn Injury Treatment and Return to Duty Cap Set 2 ***Description:*** This effort conducts research to support development of novel, disruptive technologies that will significantly enhance the ability to treat acute severe burns at or near the point of injury, protect burn wounds from further injury, infection and inflammation, especially when definitive surgical burn wound care is delayed or unavailable, and accelerate wound healing and return to combat duty.	0.706	-	-
Title: Bioengineered Blood Surrogate ***Description:*** This effort performs applied research focused on development of modified whole blood or blood products, and synthetic blood products that will stop life threatening bleeding, stabilize tissue metabolism, mitigate shock and restore normal blood clotting, and will improve prompt hemorrhage control and minimize sustainment requirements.	0.349	-	-
Title: Next Generation Human-Derived Blood Replacement ***Description:*** This effort performs applied research focused on development of improved blood products and biopharmaceutical technologies that stop life threatening bleeding, stabilize tissue metabolism, mitigate shock and restore normal blood clotting, and will improve prompt hemorrhage control and minimize sustainment requirements.	0.749	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602787A / *Medical Technology*	**Project (Number/Name)** MM4 / *Cbt Casualty Care Applied Rsch Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Future En Route Casualty Care Sustainment System Cap Set ***Description:*** This effort performs applied research to support development of technologies that will increase capability and capacity to provide combat casualty care from point of injury to final point of care. ***FY 2023 Plans:*** Will perform studies to determine test conditions and development standards for aeromedical patient movement systems. Will perform studies to determine impact of en route care environment and patient number on medical care provider performance. ***FY 2024 Plans:*** Will evaluate use of patient-specific medical device alarms during multi-patient medical evacuation scenarios. Will determine effect of vehicle vibration and jolt on medical provider performance in a simulated en route care environment. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.	1.793	1.885	1.815
Title: Candidate Capabilities for Field Stabilization of Bone in Preparation for Evacuation ***Description:*** This effort focuses on multiple disruptive technologies for early treatment of extremity fractures to accelerate healing and mitigate complications, while maintaining soldier mobility.	0.527	-	-
Title: Candidate Capabilities for Limb Function Repair and Return to Combat Duty ***Description:*** This effort focuses on multiple disruptive technologies directed toward early treatment of extremity fractures to accelerate healing and mitigate complications and includes compartment syndrome (Increased pressure within a closed body space, especially of the leg or forearm. May require surgery and loss tissue or extremity).	0.579	-	-
Title: Candidate Capabilities for Battlefield Sustainment of Critical Organ Function ***Description:*** This effort performs applied research to study the physiological implications of delayed medical evacuation and limited access to definitive surgical care in severely injured casualties.	1.074	-	-
Title: SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC §638. ***FY 2023 Plans:*** Funding transferred in accordance with Title 15 USC §638. ***FY 2023 to FY 2024 Increase/Decrease Statement:***	-	0.050	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602787A / *Medical Technology*	**Project (Number/Name)** MM4 / *Cbt Casualty Care Applied Rsch Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Funding transferred in accordance with Title 15 USC §638.			
Accomplishments/Planned Programs Subtotals	22.794	1.935	1.815

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 2	R-1 Program Element (Number/Name) PE 0602787A / *Medical Technology*	Project (Number/Name) MM6 / *Medical Technologies to Support Dispersed Ops Tech*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
MM6: *Medical Technologies to Support Dispersed Ops Tech*	-	10.297	0.125	0.125	-	0.125	0.119	0.120	0.119	0.120	0.000	11.025

A. Mission Description and Budget Item Justification

This Project supports applied research in two task areas: 1) Medical Robotic and Autonomous Systems (Med-RAS) - will a) leverage emerging technologies in biomedical engineering, robotics, autonomy, unmanned systems, and assured position navigation and timing, to improve capabilities and expand capacity to deliver prolonged care, perform evacuation, delivery emergency resupply of medical material supplies (Class VIII), such as blood products, by ground or air, in dispersed and Multi-Domain Operations and b) establish medical performance criteria to ensure Soldiers are able to effectively perform manned-unmanned teaming tasks; and, 2) Virtual Health - will leverage emerging technologies in information science, artificial intelligence, telecommunications network engineering, and cyber security to enable prolonged care, remote telemonitoring, automated decision support, and telementoring between providers in Role of Care 3 and 4 to patients in Role of Care 1 and 2. Promising work in this Project will be further matured in PE 0603002A (Medical Advanced Technology) / Project MM7 (Enabling Med Cap to Support Dispersed OPS Adv Tech).

The cited work is consistent with the Under Secretary of Defense for Research and Engineering priority focus areas and the Army Modernization Strategy. Work in this Project is performed by the United States Army Medical Research and Development Command (USAMRDC), Fort Detrick, MD.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Medical Robotic and Autonomous Systems	7.083	0.120	0.125
Description: Research, design, and validate autonomous and unmanned capabilities to deliver high quality combat casualty care in dispersed operations with limited or absent medical care personnel, and future medical robotic systems capable of providing autonomous combat casualty care while optimizing the medical logistic footprint in far-forward and dispersed geographic environments in support of the Army Multi-Domain Operations (MDO) concept and the Army Force 2025 and Beyond vision documents.			
FY 2023 Plans: Will expand research platforms for the Semi-Autonomous Casualty Management Module (SACM2) and integration for technologies for in-flight interventions; provide communication infrastructure and cyber security solutions for remote patient monitoring, remote supervision and control of semi-autonomous patient management systems			
FY 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602787A / *Medical Technology*	**Project (Number/Name)** MM6 / *Medical Technologies to Support Dispersed Ops Tech*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Utilizing the identified candidate for emerging semi-autonomous en route care technologies for providing patient management during UAS missions, will validate designs for integrating autonomous critical casualty care and management systems with common user, multi-purpose, unmanned aerial system platforms. Will also advance the interoperable data systems. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding change reflects planned lifecycle of this effort.			
Title: Virtual Health Applications for Multi Domain Operational Environments ***Description:*** Investigate future Virtual Health enterprise process architectures and integrated physical solutions capable of supporting prolonged field care in conditions with limited or lacking traditional field communications. Deliver sustainable high quality medical care using advanced technology approaches to export medical expertise to ill/injured soldiers where and when it is needed regardless of geographic location of medical providers, enabling the MDO tenet of maximizing human potential.	3.214	-	-
Title: SBIR/STTR Transfer ***Description:*** Funding transferred in accordance with Title 15 USC §638. ***FY 2023 Plans:*** Funding transferred in accordance with Title 15 USC §638. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding transferred in accordance with Title 15 USC §638.	-	0.005	-
Accomplishments/Planned Programs Subtotals	10.297	0.125	0.125

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army			Date: March 2023
Appropriation/Budget Activity 2040 / 2	R-1 Program Element (Number/Name) PE 0602787A / *Medical Technology*	Project (Number/Name) MM8 / *Infectious Diseases and Applied Rsch Technology*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
MM8: *Infectious Diseases and Applied Rsch Technology*	-	27.964	-	-	-	-	-	-	-	-	0.000	27.964

A. Mission Description and Budget Item Justification

This Project conducts applied (pre-clinical) research for medical countermeasures to prevent naturally occurring infectious diseases that impact operational readiness and maintains laboratory capability to perform these functions. The Project builds on basic research to optimize lead countermeasures and determines their safety and efficacy in animal models of infection. Effective preventive countermeasures protect the Warfighter from disease and sustain readiness and operations. Infectious disease threats from parasitic diseases, bacterial diseases, and viral diseases are high priorities for military operations.

Research conducted in this project focuses on the following three areas:

(1) Parasitic Diseases
(2) Bacterial Diseases
(3) Viral Diseases

The cited research is consistent with the Under Secretary of Defense (Research and Engineering) science and technology focus areas and the Army Modernization Strategy.

Work is managed by the United States Army Medical Research and Development Command (USAMRDC) in coordination with the Naval Medical Research Center (NMRC). The Army is responsible for programming and funding all Department of Defense (DoD) naturally occurring infectious disease research requirements, thereby precluding duplication of effort within the Military Departments.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Prevention & Treatment of Combat Wound Infections during Prolonged Care ***Description:*** Determine and validate combat wound infection preclinical animal models. Investigate and validate prophylactic and treatment safety and effectiveness in validated combat wound infection preclinical animal models. Fund research to down-select lead combat wound infection prophylactic and treatment candidates for use in human clinical trials.	11.327	-	-
Title: Prevention and Treatment of Endemic Diseases ***Description:*** Determine and validate endemic bacterial and viral disease preclinical animal models. Investigate and validate prophylactic and treatment safety and effectiveness in validated bacterial and viral disease preclinical animal models. Down-select lead bacterial and viral infection prophylactic and treatment candidates for use in human clinical trials.	16.637	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Army		Date: March 2023
Appropriation/Budget Activity 2040 / 2	**R-1 Program Element (Number/Name)** PE 0602787A / *Medical Technology*	**Project (Number/Name)** MM8 / *Infectious Diseases and Applied Rsch Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Accomplishments/Planned Programs Subtotals	27.964	-	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A