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FY 2006/2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET
Exhibit R-2

DATE: Feb 2005

BUDGET ACTIVITY: 03
PROGRAM ELEMENT: 0603729N
PROGRAM ELEMENT TITLE: WARFIGHTER PROTECTION ADVANCED TECHNOLOGY

COST: (Dollars in Thousands)

Project Number & Title	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
Total PE	29,183	66,868	16,068	16,835	19,101	19,492	19,796	20,276
R2334 NATIONAL BONE MARROW PROGRAM	0	29,715	0	0	0	0	0	0
R2914 WARFIGHTER PROTECTION ADVANCED TECHNOLOGY	12,579	16,548	16,068	16,835	19,101	19,492	19,796	20,276
R9030 ORGAN TRANSPLANT TECHNOLOGY	2,437	1,981	0	0	0	0	0	0
R9031 DAMAGE CONTROL OPERATIONS CONCEPTS (DCOC)	1,640	0	0	0	0	0	0	0
R9130 NURSING TELEHEALTH RESEARCH	0	2,576	0	0	0	0	0	0
R9162 NAVY MEDICAL SYSTEM CONFIGURATION AND TEST BED (NMSCTB)	8,201	5,052	0	0	0	0	0	0
R9163 PORTABLE DEVICE FOR REMOTE PRODUCTION OF IV FLUIDS AND PATIENT SPECIFIC IV THERAPIES	2,884	0	0	0	0	0	0	0
R9335 CENTER FOR COLLABORATION IN MEDICAL MODELING AND SIMULATION	1,442	0	0	0	0	0	0	0
R9490 ANTI-OXIDANT MICRONUTRIENTS PROGRAM	0	595	0	0	0	0	0	0
R9491 BATTLEFIELD PHARMACEUTICAL TEST	0	991	0	0	0	0	0	0
R9492 BLOOD AND FLUID INFUSION/TRANSFUSION TECHNOLOGY	0	1,485	0	0	0	0	0	0

R1 Line Item 25
Page 1 of 12

UNCLASSIFIED

UNCLASSIFIED

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R9493	HEMOSTATIC RESEARCH							
	0	991	0	0	0	0	0	0
R9494	IMPLANTABLE MIDDLE-EAR HEARING SYSTEM							
	0	1,485	0	0	0	0	0	0
R9495	INDIVIDUAL WATER PURIFICATION (IWP) PROGRAM							
	0	2,972	0	0	0	0	0	0
R9496	TISSUE AND LIMB TRANSPLANTATION MEDICAL TECHNOLOGY DEVELOPMENT							
	0	2,477	0	0	0	0	0	0

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program supports the development and demonstration of field medical equipment, diagnostic capabilities and treatments; technologies to improve warfighter safety and to enhance personnel performance under adverse conditions; and systems to prevent occupational injury and disease in hazardous, deployment environments. Navy investment in these areas is essential because Navy/USMC mission needs are not adequately addressed by the civilian sector or other Federal agencies. For example, civilian emergency medicine does not address casualty stabilization during long transit times to definitive care, or the logistics of providing self/buddy-carried, life saving technologies for massive battlefield wounds. The National Institutes of Health (NIH) focuses on disease processes, not product demonstration. Programs are complementary with those of the Army and are coordinated through the Armed Services Biomedical Research Evaluation and Management (ASBREM) Committee to prevent duplication of effort.

Due to the number of efforts in this PE, the programs described herein are representative of the work included in this PE.

UNCLASSIFIED

UNCLASSIFIED

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PROGRAM CHANGE SUMMARY:

	<u>FY 2004</u>	<u>FY 2005</u>	<u>FY 2006</u>	<u>FY 2007</u>
FY 2005 President's Budget Submission	28,318	16,719	18,637	19,812
Cong Rescissions/Adjustments/Undist. Reductions	0	-638	0	0
Congressional Action	0	50,800	0	0
Execution Adjustments	1,541	0	0	0
Non-Pay Inflation Adjustments	-16	0	8	11
Program Adjustments	0	-13	-2,603	-3,060
Rate Adjustments	0	0	26	72
SBIR Assessment	-660	0	0	0
FY 2006/2007 President's Budget Submission	29,183	66,868	16,068	16,835

PROGRAM CHANGE SUMMARY EXPLANATION:

Technical: Not applicable.

Schedule: Not applicable.

UNCLASSIFIED

UNCLASSIFIED

FY 2006/2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET
Exhibit R-2a

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PROGRAM ELEMENT: 0603729N

PROGRAM ELEMENT TITLE: WARFIGHTER PROTECTION ADVANCED TECHNOLOGY

PROJECT NUMBER: R2914

PROJECT TITLE: WARFIGHTER PROTECTION ADVANCED TECHNOLOGY

COST: (Dollars in Thousands)

Project Number & Title	FY 2004 Actual	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate	FY 2008 Estimate	FY 2009 Estimate	FY 2010 Estimate	FY 2011 Estimate
R2914 WARFIGHTER PROTECTION ADVANCED TECHNOLOGY	12,579	16,548	16,068	16,835	19,101	19,492	19,796	20,276

A. MISSION DESCRIPTION AND BUDGET ITEM JUSTIFICATION: This program supports the development and demonstration of field medical equipment, diagnostic capabilities and treatments; technologies to improve warfighter safety and to enhance personnel performance under adverse conditions; and systems to prevent occupational injury and disease in hazardous, deployment environments. Navy investment in these areas is essential because Navy/USMC mission needs are not adequately addressed by the civilian sector or other Federal agencies. For example, civilian emergency medicine does not address casualty stabilization during long transit times to definitive care, or the logistics of providing self/buddy-carried, life saving technologies for massive battlefield wounds. The National Institutes of Health (NIH) focuses on disease processes, not product demonstration. The Army fights linearly, with echeloned health support in trace, and has dedicated medevac platforms. Naval forces fight up to 200 nautical miles from their support bases and evacuate casualties using multi-role platforms (not pre-configured or supplied for medical use). Programs are complementary with those of the Army and are coordinated through the Armed Services Biomedical Research Evaluation Management (ASBREM) Committee to prevent duplication of effort. This project funds the Force Health Protection Future Capability (FHPFC) Program (formerly titled Warfighter Protection Future Naval Capability) and supports the "Sea Warrior" component of the Naval Transformation Roadmap, medical logistics aspects of "Sea Basing" and expeditionary force medical support associated with "Sea Strike".

B. ACCOMPLISHMENTS/PLANNED PROGRAM:

	FY 2004	FY 2005	FY 2006	FY 2007
CASUALTY CARE AND MANAGEMENT	5,423	7,446	7,811	8,213

The goal of Casualty Care and Management is to maximize the continuum of care with lifesaving interventions as far forward as possible, in an increasingly lethal battlespace, with reduced infrastructure and logistics. FY2004 to FY2005 increase due to initiation of new efforts and continuation/expansion of ongoing efforts.

UNCLASSIFIED

UNCLASSIFIED

FY 2006/2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET
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FY 2004 Accomplishments:

- Continued development of drugs and devices for treatment of uncontrolled hemorrhage in the far forward battlefield. Blood loss is the leading cause of preventable death in combat.
- Continued development of resuscitation fluids that enhance cardiovascular function, tissue perfusion and oxygen delivery. Improved resuscitation fluids are needed to prevent casualty deaths from shock and associated tissue/organ damage.
- Continued development of medical devices to monitor patient status and identify casualties in danger of progressing into hemorrhagic shock. This will improve triage decisions and allocation of medical evacuation resources.
- Continued identification of Food and Drug Administration (FDA) approved or novel therapeutics that protect against the induction of hemorrhagic shock. A reduced need for resuscitative fluids would significantly reduce the medical logistical burden for Naval forces.
- Continued development of casualty management tools and data. These tools and data are required by combat, material development, and medical planners to evaluate the effectiveness of personal protection systems and healthcare support services, and to project future material and training requirements.
- Initiated development of an effective analgesic for controlling severe pain that does not have the adverse effects of morphine (cardiorespiratory depression, sedation) or the addiction potential. Naval casualties are expected to "stay in the fight" as long as possible and the use of morphine removes that capability.

FY 2005 Plans:

- Continue all efforts of FY2004 less those noted as completed above.
- Initiate development of therapeutic interventions in wound management. Focus is to reduce morbidity resulting in a quicker return to duty and to reduce requirement for medical resources.

FY 2006 Plans:

- Continue all efforts of FY2005 less those noted as completed above.

UNCLASSIFIED

FY 2006/2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET
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FY 2007 Plans:

- Continue all efforts of FY2006 less those noted as completed above.

	FY 2004	FY 2005	FY 2006	FY 2007
CASUALTY PREVENTION	6,149	7,778	7,082	7,071

Casualty Prevention includes enhancing warfighter situation awareness and countering threats from disease, battle and non-battle injuries.

FY2004 to FY2005 increase due to initiation of new efforts and continuation/expansion of ongoing efforts.

FY 2004 Accomplishments:

- Continued development of the capability to provide protection of aircrews from laser attacks. No laser protection capability exists for daytime/nighttime protection of aircrew from tunable frequency lasers.
- Continued development of protective personal gear and physiologic monitoring ensembles to reduce injury risk and enhance personnel safety in operational settings that include: shipboard firefighting and damage control operations, warm and cold water operations for Navy divers, and extreme aircraft operations (g-force, altitude and heat protection).
- Continued effort to develop noninvasive diagnostic tests for diseases. Goal is to create noninvasive tests that produce results in minutes, not hours or days.
- Continued development of improved hearing protection systems, compounds, and techniques for personnel supporting aircraft operations. Completed animal research on cochlear microdialysis for treatment of hearing loss. This effort was previously accounted for in the Healthy and Fit Force activity.
- Completed development of standards for personal armor systems for blunt trauma (BABT).
- Completed laser event detector effort.
- Initiated development of tools to predict injury related to thermobaric and conventional blast. Understanding the mechanisms involved with organ and neurological damage due to blast is crucial to developing effective protective equipment.

FY 2005 Plans:

- Continue all efforts of FY2004 less those noted as completed above.

R1 Line Item 25

Page 6 of 12

UNCLASSIFIED

UNCLASSIFIED

FY 2006/2007 RDT&E,N BUDGET ITEM JUSTIFICATION SHEET
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- Initiate research into understanding neurological and cognitive effects of blast injuries. There is an increasing amount of information related to the correlation of closed-head blast injury with cognitive and motor deficits as well as long term emotional problems such as Post-Traumatic Stress Disorder (PTSD).
- Initiate development of decision support tools for controlling disease and non-battle injuries on Navy vessels. Current tools are not targeted at the General Medical Officer and do not focus on human behavioral models.

FY 2006 Plans:

- Continue all efforts of FY2005 less those noted as completed above.
- Complete development of tools to predict injury related to thermobaric and conventional blast.

FY 2007 Plans:

- Continue all efforts of FY2006 less those noted as completed above.

	FY 2004	FY 2005	FY 2006	FY 2007
HEALTHY AND FIT FORCE	1,007	1,324	1,175	1,551

Healthy and Fit Force efforts preserve health and enhance fitness of ready forces against physical and psychological threats through the continuum of peace and war.

FY2004 to FY2005 increase due to initiation of new efforts and continuation/expansion of ongoing efforts.

FY 2004 Accomplishments:

- Continued identification of factors and causes of injury in shipboard and aviation scenarios, and development of exposure guidelines and engineering specifications for preventing mechanical shock-related injury. Musculoskeletal injury has a major impact on force readiness and warfighter health. Completed initial estimates of factors and solutions for mitigating shock-related injury in Mark V boats.
- Note - Previous effort "Continue development of improved hearing protection systems, compounds, and techniques for personnel supporting aircraft operations" is now accounted for in the Casualty Prevention activity.

UNCLASSIFIED

UNCLASSIFIED

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FY 2005 Plans:

- Continue all efforts of FY2004 less those noted as completed above.
- Initiate development of treatments for warfighter mental health injury. Combat related psychological trauma has been shown to be a major detriment to retention and force readiness.

FY 2006 Plans:

- Continue all efforts of FY2005 less those noted as completed above.

FY 2007 Plans:

- Continue all efforts of FY2006 less those noted as completed above.

C. OTHER PROGRAM FUNDING SUMMARY:

NAVY RELATED RDT&E:

PE 0601153N Defense Research Sciences
PE 0602235N Common Picture Applied Research
PE 0602236N Warfighter Sustainment Applied Research
PE 0603236N Warfighter Sustainment Advanced Technology
PE 0604771N Medical Development

NON-NAVY RELATED RDT&E:

PE 0602716A Human Factors Engineering Technology
PE 0602785A Manpower/Personnel/Training Technology
PE 0602787A Medical Technology
PE 0603002A Medical Advanced Technology
PE 0602202F Human Effectiveness Applied Research
PE 0603231F Crew Systems and Personnel Protection Technology

D. ACQUISITION STRATEGY:

Not applicable.

UNCLASSIFIED

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PROGRAM ELEMENT TITLE: WARFIGHTER PROTECTION ADVANCED TECHNOLOGY

PROJECT TITLE: Congressional Plus-Ups

CONGRESSIONAL PLUS-UPS:

R2334	FY 2004	FY 2005
NATIONAL BONE MARROW PROGRAM	0	29,715

Effort supports the National Marrow Program/Registry, funding research associated with transplantation.

R9030	FY 2004	FY 2005
ORGAN TRANSPLANT TECHNOLOGY	2,437	1,981

Performed trials of newly developed immune therapies designed to achieve tolerance to transplanted tissues without the need for continuous immunosuppression. FY05 will continue advanced animal studies to meet necessary requirements in preparation for clinical trials.

R9031	FY 2004	FY 2005
DAMAGE CONTROL OPERATIONS CONCEPTS (DCOC)	1,640	0

Effort developed and demonstrated a brass board prototype of the Prognostics Framework (PF) approach to supplement, enhance and improve the Automated Hull Damage and Stability Monitoring System (AHDSMS). The enhanced AHDSMS provides visibility of real-time assessment of ship hull damage and compartment flooding which allows for optimization and prioritization of flooding control and stability response strategies.

R9162	FY 2004	FY 2005
NAVY MEDICAL SYSTEM CONFIGURATION AND TEST BED (NMSCTB)	5,751	5,052

Effort established a capability for expediting the delivery of emerging technologies from Navy Medical (R&D) efforts to DoD healthcare. Force health protection technologies developed by the Naval Health Research Center (NHRC) are undergoing further development and systems integration prior to actual field-testing. FY05 effort involves integration into NHRC Integrated Suite of Technologies, development of the capability to import data from other models, and model validation in exercises.

UNCLASSIFIED

UNCLASSIFIED

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PROJECT NUMBER: Various

PROJECT TITLE: Congressional Plus-Ups

R9162	FY 2004	FY 2005
NURSING TELEHEALTH RESEARCH PROGRAM	2,450	2,576

Effort established an international consortium of military medical technicians, educators, researchers, and domestic rural health care providers to design and deliver a nurse training curriculum to remote international locations with special emphasis on emergency medical training and humanitarian relief. FY05 efforts will establish a beta test of the Virtual Clinical Practicum between Walter Reed Army Medical Center and Mount Aloysius College, implement and evaluate a "Smart Classroom" initiative, and conduct a telehealth-based research study for high cost diabetic patients.

R9163	FY 2004	FY 2005
PORTABLE DEVICE FOR REMOTE PRODUCTION OF IV FLUIDS AND PATIENT SPECIFIC IV THERAPIES	2,884	0

Effort focused on advanced testing of a lightweight, man-portable, disposable device for producing water suitable for injection from potable water in the field.

R9335	FY 2004	FY 2005
CENTER FOR COLLABORATION IN MEDICAL MODELING AND SIMULATION	1,442	0

Effort focused on establishing a National Center for Medical Modeling and Simulation to integrate military, government, and industrial modeling and simulation technologies for use in medical and surgical training and in the delivery of medical services. Efforts included: integrating simulations into medical and surgical training; developing medical preparedness and response simulations; developing methods for on-site and distributed continuing education for medical and health professionals; determining paths for more rapid transition of medical modeling and simulation research into commercial products and programs; developing pro-operative and operative assistance for surgeons performing tissue and organ reconstruction; and facilitating civilian and military cooperation in the application of medical simulations to improve both routine and emergency response capabilities.

UNCLASSIFIED

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R9490	FY 2004	FY 2005
ANTI-OXIDANT MICRONUTRIENTS PROGRAM	0	595

Effort evaluates protective effects of a series of antioxidant micronutrient against the adverse effects of blast injuries, ionizing radiation, and hyperbaric oxygen exposures.

R9491	FY 2004	FY 2005
BATTLEFIELD PHARMACEUTICAL TEST	0	991

Effort supports continued development of a pharmaceutical to be used for the resuscitation of combat casualties.

R9492	FY 2004	FY 2005
BLOOD AND FLUID INFUSION/TRANSFUSION TECHNOLOGY	0	1,485

Effort supports blood and fluid infusion/transfusion technology.

R9493	FY 2004	FY 2005
HEMOSTATIC RESEARCH	0	991

Effort develops a hemostatic agent to rapidly control moderate to severe hemorrhage thereby preventing excessive blood loss in combat casualties. The Navy and Marine Corps will benefit from an inexpensive, easy to use, agent to prevent excessive blood loss in combat casualties.

R9494	FY 2004	FY 2005
IMPLANTABLE MIDDLE-EAR HEARING SYSTEM	0	1,485

Effort develops a fully-implantable middle-ear transducer technology for use in treatment of noise-induced hearing loss (NIHL).

UNCLASSIFIED

UNCLASSIFIED

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R9495	FY 2004	FY 2005
INDIVIDUAL WATER PURIFICATION (IWP) PROGRAM	0	2,972

Effort delivers a device that will produce Ringer's lactate resuscitation fluid for injection utilizing any water source (pond, puddle, well, etc).

R9496	FY 2004	FY 2005
TISSUE AND LIMB TRANSPLANTATION MEDICAL TECHNOLOGY DEVELOPMENT	0	2,477

Effort supports tissue and limb transplantation medical technology development.

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