NAVAL SUBMARINE MEDICAL RESEARCH LABORATORY

The Naval Submarine Medical Research Laboratory (NSMRL) provides research solutions to aid warfighters aboard the most medically challenging platform in the US Navy, the submarine. NSMRL serves the submarine fleet by taking the lead in undersea human factors, sensory sciences, and operational medicine, delivering timely, evidence-based, healthcare solutions. Conveniently located at the Submarine Base New London, Groton, CT, NSMRL researchers have local access to two submarine squadrons, the Navy Submarine School, the Naval Submarine Support Facility, the Naval Undersea Medical Institute, and the US submarine builder, General Dynamics Electric Boat. The laboratory is staffed by a diverse group of psychologists, audiologists, physicians, physiologists, and electrical, biomedical, and nuclear engineers. Areas of research include: hearing conservation research, test, and evaluation; submariner psychological fitness; submariner health and performance; disabled submarine survival and escape; bioeffects of underwater sound and blast, diving physiology; and submariner human systems integration.

MISSION

Provide innovative human-centric research solutions aligned with the Submarine Force strategic direction, to sustain superiority in the undersea domain.

VISION

To be the Department of Defense Center of Excellence for Undersea Biomedical Research.

Join the Conversation:

@NavalMedicalRC

CAPT Kim Lefebvre
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Hearing Conservation Research, Test, and Evaluation:

NSMRL hearing conservation efforts span from basic to applied research. Current efforts include: evaluating field attenuation estimation systems performance in Navy hearing conservation programs (for both measuring individualized hearing protection performance and for improving training); evaluating head-worn devices for their impact on noise exposure, communication, sound localization, and blast exposure; evaluating a toolkit and an app to assist field audiologists and service members in hearing conservation education; and conducting field studies aboard Navy vessels. As a member of a multi service partnership of the Department of Defense Hearing Consortium, NSMRL is helping to develop American National Standards Institute standards for testing hearing protection devices and tactical communication and protection systems.

Submariner Psychological Fitness:

NSMRL is improving psychological screening of prospective submariners for submarine service suitability, prediction of unplanned losses from operational units, and individual and team resilience. NSMRL is also conducting studies to define the ideal psychological profile for successful service in the US nuclear-powered fleet.

Submariner Health and Performance:

NSMRL is studying new technologies for monitoring contaminants in the submarine atmosphere to ensure submariner health. Furthermore, NSMRL is investigating submariner circadian rhythms to maximize performance. This line of research includes evaluating watchstanding schedules, studying individualized light therapies to alter or entrain circadian rhythms, developing unobtrusive measures to predict decrements in performance, creating tools to account for the effects of fatigue when creating watchbills, and evaluating lighting to improve vigilance.

NSMRL initiated the first-ever study of Submariner Epidemiology monitoring the medical impacts of the unique submarine environment. This research is being expanded to include divers to assess the impact of the undersea environment on diver health.

Disabled Submarine Survival and Escape:

NSMRL is studying the environmental stresses encountered during disabled submarine escape and survival; evaluating genomic, as well as non-invasive biomarkers, of pulmonary oxygen toxicity; researching casualty estimates and triage requirements/capabilities for disabled submarine escape and rescue; and developing the Submarine Rescue Manual (Guard Book) for different classes of submarine.

Underwater Bioeffects:

NSMRL provides guidelines to the fleet on the exposure of divers and swimmers to underwater sounds, such as SONAR systems and blasts. NSMRL has long been, and continues to be, the Navy’s lead laboratory for underwater human factors research including high frequency underwater hearing and underwater sound localization, assessing nonlethal underwater bioeffects of sound and blast, and studying diving physiology and hearing under hyperbaric stress.

Submariner Human Systems Integration:

NSMRL is creating computational models of human auditory perception to understand how people process information and how that information impacts submariners’ operational performance. In addition, NSMRL applies Human Systems Integration techniques to redesign submarine operations to increase readiness.