

# NHRC UPDATE

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*This update is published quarterly to highlight NHRC contributions to the Navy and Marine Corps as well as the scientific community.*

## NHRC Scientists Discover Positive Personality Changes During Basic Training

**M**ilitary basic training is a major transition period for most recruits, and it occurs at a time when the typical 17-to-20 year old recruit is in an important personality development phase. Therefore, attitudes and behaviors instilled during this transition from civilian to sailor or marine may influence the individual's behavior during his or her military service and in civilian society after leaving the service. Given that more than 100,000 young people go through military basic training every year



Recruit Training Command, Great Lakes graduation ceremony

(even with recent downsizing trends for the military services), any effect of basic training on personality development has substantial implications for both the military and society.

In a study supported by the Office of Naval Research, Dr. Vickers, Ms. Hervig, and Ms. Paxton of the Naval Health Research Center, in collaboration with researchers at the University of Minnesota, assessed the impact of basic training on personality. In general, these researchers found that basic training changes personality in a positive direction. Compared to entering Navy recruits, graduating recruits are less

prone to negative emotions, such as depression and anger, and less susceptible to stress. Graduating recruits are more conscientious, more likely to set high standards, and more likely to strive for high achievement levels. In addition, graduating recruits are more organized when attacking tasks and have greater persistence in the face of difficulties. While the authors conclude that such changes are a normal part of development in late adolescence and early adulthood, development during basic training is much more rapid than would be expected. Other research linking personality to job performance and citizenship in military and civilian populations indicates that the personality attributes that change the most during basic training are precisely those which will contribute most to improving job performance and lowering the risk of delinquent behaviors (e.g., drug use, absenteeism, etc.). During military service, the personality effects of basic training will make the recruits more effective sailors who perform better and are less prone to being administrative nuisances. After military service, the personality effects of basic training should make the service members better, more productive citizens.

## NHRC Researchers Track Suicide Risk in the Navy and Marine Corps

**S**uicide is the third leading cause of death among 17- to 24-year-olds in the United States, and in the military only accidents and homicide surpass it. Suicide is also the third leading cause of death among sailors and second among marines. Across services from 1980 - 1992, the Navy had the lowest annual rates for both men and women (11.74 and 4.82

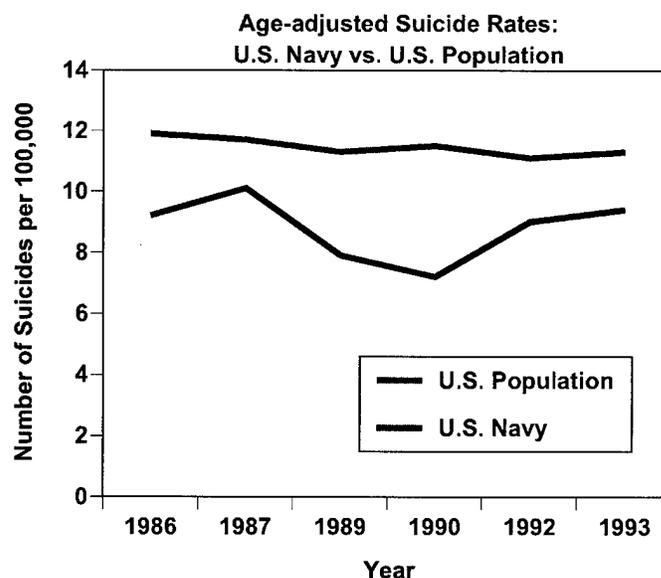
per 100,00, respectively) while the Marine Corps had the highest (13.93 and 11.48 per 100,000, respectively). Among suicides that occur in the workplace, men in military service appear at highest risk. Military occupations with access to firearms also have a significant risk of suicide when compared to other military occupations.

Suicide is a statistically rare event that is exceedingly difficult to predict or prevent. Although studies of suicide among active-duty military personnel of all branches have generally shown that suicide rates in the military are lower than rates for the U.S. population, suicide remains an important issue because of its devastating consequences for families and shipmates alike. Recent interest in Navy suicides has stemmed in part from media attention surrounding the suicide of Admiral Boorda in May of 1996; "clustered" events (e.g., three suicides on one ship within one 6-month deployment); an imitative pattern of suicidal behavior in a naval school, and from preliminary reports of increasing rates within the Navy that may not be experienced by the other services.

Laurel Hourani, Ph.D., M.P.H and her colleagues at the Naval Health Research Center have recently compared active-duty suicide rates to employed civilian rates. In her research, Dr. Hourani reasoned that since unemployed men have higher suicide rates than employed men, a more appropriate comparison group for active-duty personnel should be drawn from employed U.S. civilians. When properly compared to employed civilian rates, Navy and Marine Corps suicide rates may be higher, thus identifying a potential problem. Further, not all previous studies considered that suicide rates vary greatly according to demographic variables such as age, gender, and race, and that the percentage distribution of the U.S. Navy across these groupings is very different from that of the population in general. In a series of recent studies, Dr. Hourani, Ms. Coben, and Dr. Giles Warrack of North Carolina A&T State University examined adjusted standardized mortality rates, demographic distributions, trends, and potential clustering of suicides in the Navy and Marine Corps from 1990 to the present. Over the period from 1990 to 1996, there were 213 suicides in the Marine Corps. In the period from 1990 to 1995, there were 360 suicides in the Navy. Expected numbers if the services had the same suicide rate as the U.S. population, (adjusting for age, sex, race, and

employment) were 225 for the Marine Corps and 537 for the Navy, both higher than observed rates. However, important differences within demographic groups were found. As might be expected, males predominantly committed the suicides in each service, but the number of female suicides exceeded the expected number. Fewer than expected suicides were committed by Caucasians and African Americans but more than expected by Hispanics and other ethnic group males. The Marines showed a higher rate of handgun use in suicide than the general population, and the Navy a lower rate. The suicide rate in the Navy had increased in recent years but not in the Marine Corps.

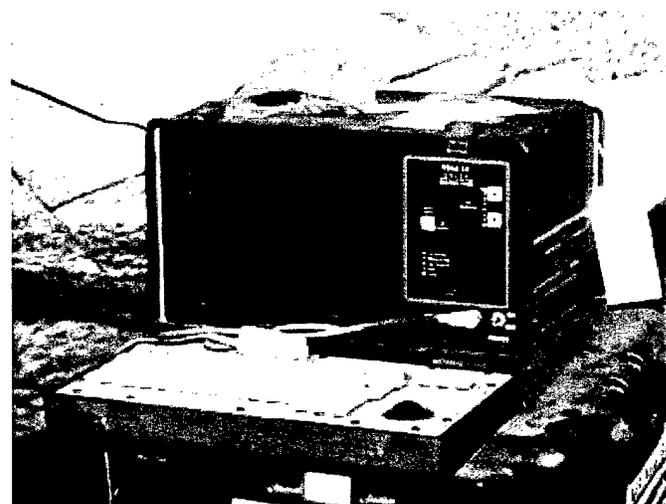
Continuing studies at NHRC are focusing on risk factors for suicide. Although most studies have found that risk factors for suicide in the military mirror those of the general population, i.e., interpersonal



loss, depression, substance abuse, and work problems, at least one study has noted that interpersonal separation was more often the precipitating event of the suicide among young military personnel than among civilian suicides. NHRC will begin a new study to corroborate high risk groups identified from its current studies and examine a wide range of risk factors among suicide attemptors (personnel hospitalized with a suicide attempt diagnosis) and among contemplators (personnel who self-report contemplating suicide within the last 2 years). These studies will be conducted with existing databases also resident at NHRC - the automated hospitalization records of all Navy and Marine Corps personnel and population-based

survey data from approximately 10,000 Navy and Marine Corps personnel worldwide. These new data will help develop a profile of Navy and Marine Corps personnel at suicide risk and enhance detection capability. Future research plans include intervention studies based on these data to improve prevention strategies.

prototype units utilized a standard U.S. Military battlefield personal computer and featured a flexible architecture with data capture and display capability that could be expanded to incorporate new devices and interface with existing military communications systems.



M3 system in the field

NHRC, in coordination with SAIC, worked with medical personnel from the 1st Medical Battalion and 1st Force Service Support Group to develop the functionality for the next generation prototype of the Mobile Medical Monitor (M3), the M3 (B). In addition, NHRC researcher, LT William Deniston, evaluated the M3 (A) at Kernel Blitz '97, Camp Pendleton. Those results now form the basis for M3 (B) currently under development by SAIC and their subcontractor, Litton Data Systems. The M3 (B) will consist of additional clinical capabilities, ultrasound with doppler and nasopharyngeal scope. Along with clinical and clinical support functions, the M3 (B) will host the SPAWAR Theater Medical Core Services software and forward data within the framework of Theater Medical Information Program-Maritime (TMIP-M). These M3 (B) units will be configured and field-tested during calendar year 1998. Data will be collected during field exercises and will be used to identify the optimal suite of tools that maximizes clinical assessment capability and minimizes weight and footprint.

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### MOBILE MEDICAL MONITOR (M3): A Workstation for Clinical And Medical Information Support

**M**ilitary personnel perform in a broad range of operations that require medical support in remote and austere environments where proper diagnosis, treatment, and triage decisions increase returns to duty and can mean the difference between life and death. New miniaturized, lightweight, compact, rugged medical technologies allow more advanced medical care to be delivered in deployed settings. Under an FY97 congressionally sponsored conference committee addition, named the Mobile Medical Monitor (M3), the U.S. Navy has initiated a program for assembling, deploying, and implementing microelectronic monitoring devices and medical information technology capabilities into a modular mobile medical unit for field use.

The M3 team, headed by NHRC's Bill Pugh, consists of personnel from Navy Medical Information Management Center, Science Applications International Corporation (SAIC), MTS Technologies, Inc., and SPAWAR. NHRC, along with NMIMC, are responsible for program management, SAIC for system development and integration, MTS for management support and independent M3 test and evaluation, and SPAWAR for development of theater medical information software.

The M3 program uses existing technologies to the greatest degree possible, while leaving room for the integration of emerging technologies to meet the user requirements. Science Applications International Corporation (SAIC) developed the prototype system, M3 (A), which included clinical applications such as automatic blood pressure, pulse oximetry, ECG monitoring, and imaging capability. These pro-

## NHRC's Relationships With Universities And Academic Institutions Enhance Navy Biomedical Research

Researchers at the Naval Health Research Center (NHRC) maintain close collaborative research relationships with leading universities to further our mission of service to the fleet through biomedical research, development, test and evaluation. With support from the **Office of Naval Research**, this practice of leveraging the best national talent available ensures the application and transition of cutting edge science and technology to biomedical requirements for Navy and Marine Corps personnel in operational settings. Some of our current collaborations include:

- **Naval Postgraduate School:** Identify the primary causes of injury during Special Ops small boat unit operations and develop countermeasures.
- **University of California, Los Angeles, School of Public Health:** Evaluate the effectiveness and potential contraindications of photorefractive keratectomy (PRK). Postoperative changes in visual acuity, contrast sensitivity, light scatter, and marksmanship are being monitored to determine the appropriateness of this procedure for operational forces.
- **Yale University, School of Medicine:** Assist in the use of magnetic resonance imaging (MRI) as a noninvasive procedure to document muscle damage via soft tissue markers.
- **NASA Ames Research Center:** Assist in analyzing and evaluating electrophysiological eye movement data and electrocortical activity data collected from Marine Force Reconnaissance personnel. These measures are combined with performance and survey data to assess alertness in near- real time and to determine the possible development of sleep countermeasures training modules for special operations personnel.
- **Northern Illinois University:** Provide additional expertise in family violence and sexual assault research to determine the effect of maltreatment histories on Naval personnel and to determine the effect of a recently developed sexual assault intervention on subsequent attitude, beliefs, and behaviors concerning sexual assault.
- **Salk Institute for Biological Sciences:** Assist in the development of algorithms and methods to analyze complex EEG and functional magnetic resonance imaging (fMRI) signals in order to detect fatigue and drowsiness in real-time.
- **University of Washington; University of California, San Diego, School of Medicine; Department of Veterans Affairs Medical Center, San Diego; and San Diego State University:** Assist in the development of an intervention to reduce heavy alcohol use among Marine Corps personnel.
- **University of California, San Diego, School of Medicine, Department of Family and Preventive Medicine:** Provide additional epidemiologic expertise for Gulf War Illness Studies, Shipboard Health Studies, and other epidemiologic research projects.
- **Johns Hopkins University (Applied Physics Laboratory):** Assistance with bone densitometry and anthropometry studies and a stress fracture assessment in Navy women in training. Objectives include: (1) determine the impact of musculoskeletal injury in operational forces, (2) establish risk factors for injury susceptibility, and (3) develop interventions to reduce the impact of injuries.
- **University of Alabama:** Support of research on identification of risk factors for chorioamnion infection and adverse pregnancy outcome among active-duty military women and dependents. Additional collaborations include protein serotyping of pathogens and immunoblot assays of the capsular polysaccharide of *Streptococcus pneumoniae* isolates to determine the serotype in association with Emerging Infectious Diseases Studies.
- **San Diego State Foundation:** Provides student assistance for data collection and analysis support to all NHRC departments.

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