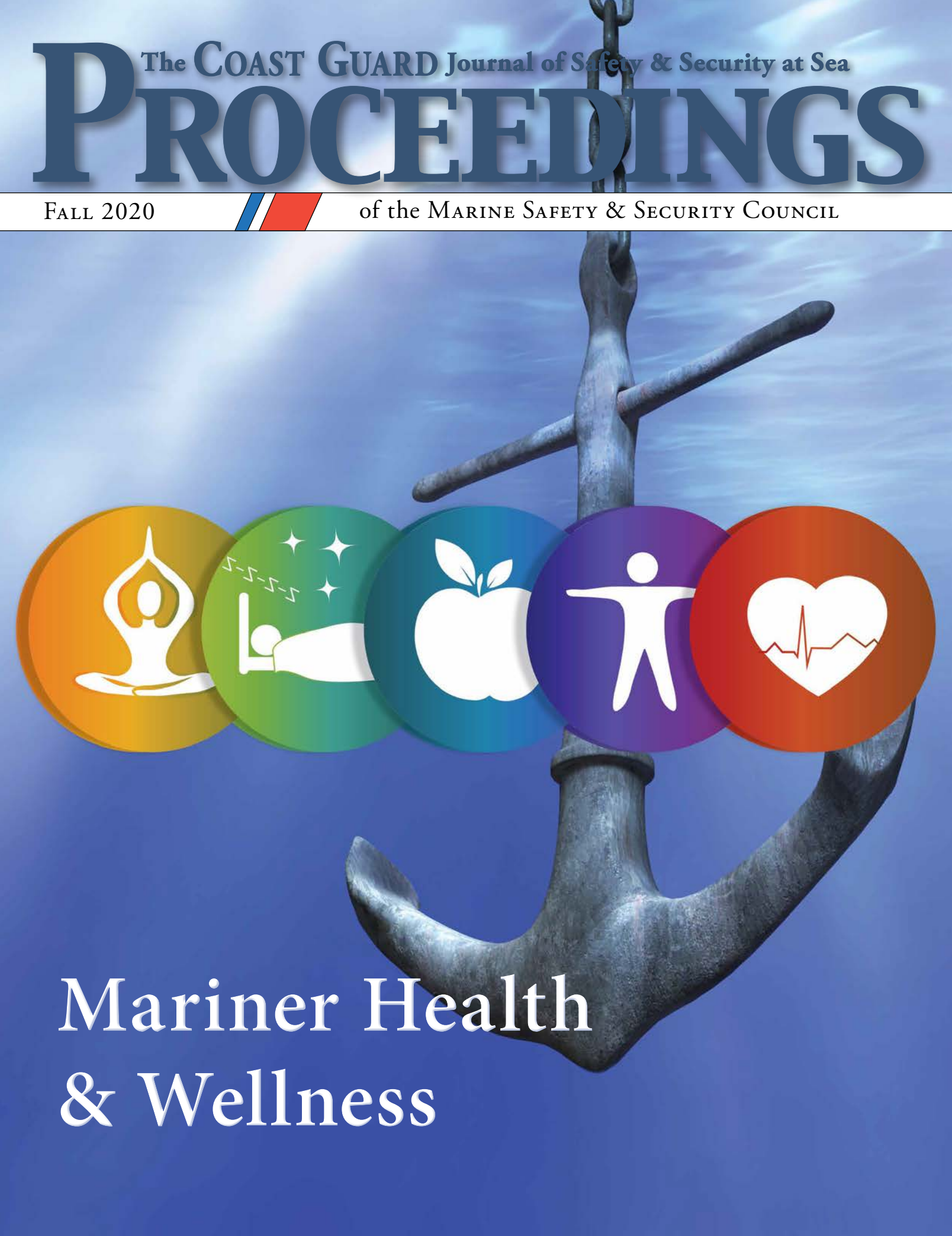
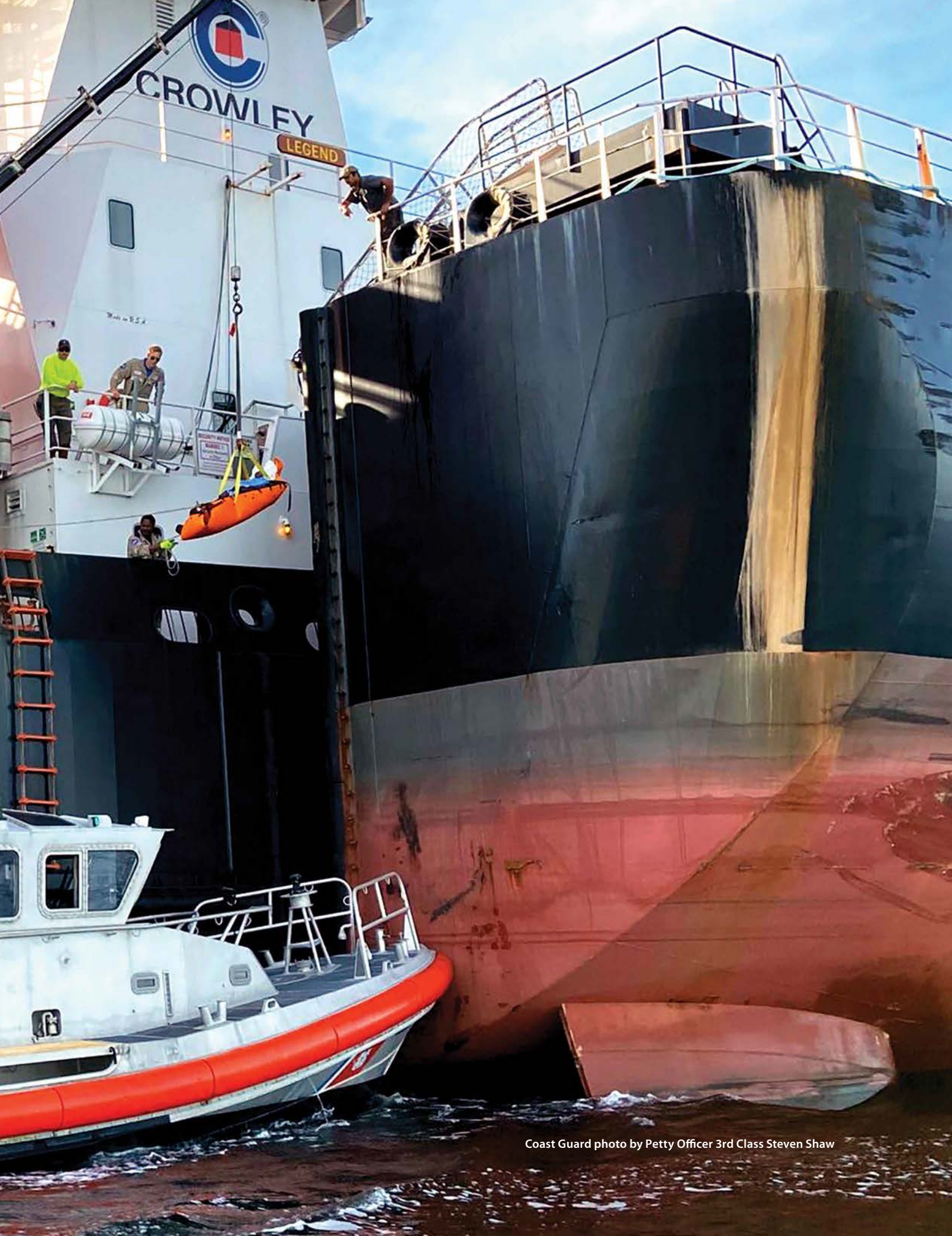
The Coast Guard Journal of Safety & Security at Sea
PROCEEDINGS
Fall 2020 of the Marine Safety & Security Council



Mariner Health & Wellness

"Maritime commerce is the lifeblood of the global economy and is responsible for 23 million U.S. jobs and $4.6 trillion in economic activity. Our Nation's seafarers are absolutely essential to our economic security."

—Admiral Karl Schultz
Commandant of the Coast Guard | U.S. Coast Guard



Coast Guard photo by Petty Officer 3rd Class Steven Shaw

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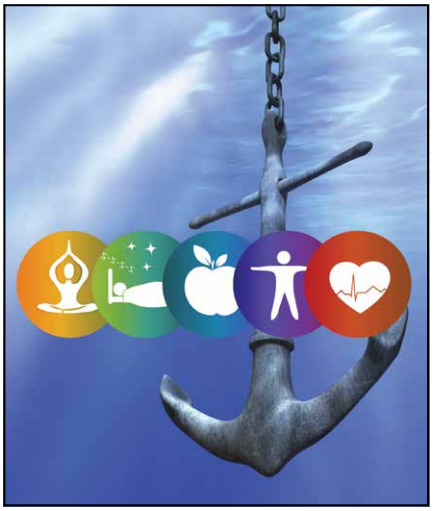
On the Cover: *Mariner health and access to care isn't just important to a long, healthy career at sea. It's vital to a safe voyage for both vessel and crew. Where and when a mariner sails, for how long, and proximity to medical services all play a part in the safe operation of a vessel underway. This makes the physical and mental health of everyone on board a top priority before the ship leaves port.*



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Assistant Commandant's Perspective

by Rear Admiral Richard V. Timme
Assistant Commandant for Prevention Policy
U.S. Coast Guard

I am pleased to present this issue of *Proceedings* examining a wide array of mariner health and wellness topics. These topics highlight the importance of health and wellness for our mariners because they are essential to the safety, security, and efficiency of the marine transportation system.

The Commandant of the Coast Guard identifies "the nation's complex maritime challenges" as one of the Coast Guard's 2018–2022 strategic priorities. To meet this strategic priority, the Assistant Commandant for Prevention Policy develops and maintains policies, standards, and alignment across

Champion's Point of View

by Mayte Medina
Chief, Merchant Mariner Credentialing
U.S. Coast Guard

I am pleased and honored to champion this edition of *Proceedings* highlighting mariner health and wellness.

The marine transportation system (MTS) is comprised of four vital elements: Mariners, vessels, waterways, and ports. As the human element of the MTS, mariners' medical, physical, and mental health status is as important as their professional qualifications for safe and efficient maritime operations. The Office of Merchant Mariner Credentialing (MMC) focuses on the human element of the MTS by developing the regulations and policies governing U.S. merchant mariner credentialing

prevention-related activities to achieve marine safety, security, and stewardship success. This includes having qualified and healthy mariners manning today's vessels.

Mariner health is particularly important because it can affect many areas, including vessel safety and worker productivity. Health status can also affect an individual mariner's ability to work and maintain their credentials. Since mariner health has such broad-reaching effects, it follows that actions and innovations promoting wellness may help prevent some of the illnesses that cause mariners to be removed from service, while contributing to increased retention and productivity.

The Coast Guard established regulations for mariner medical certification in Title 46 CFR Part 10 Subpart C, and published policies on mariner medical qualifications in the *Merchant Mariner Medical Manual,* COMDINST M16721.48. This issue of *Proceedings* builds on these regulations and policies by providing education to the maritime community and by encouraging partnership and coordination among mariners, employers, and medical professionals. The breadth of topics covered includes mariner medical concerns, medical challenges specific to the maritime environment, and strategies to promote mariner health and wellness. These topics are even more critical as we operate in the midst of the unprecedented global health crisis posed by COVID-19. We intend these articles to assist mariners with self-care so that they can build resiliency and withstand the rigors of life at sea, including public health related challenges. We also intend these articles to increase the public's knowledge of mariner health and wellness, and we urge interested stakeholders to apply this knowledge individually and in partnership to develop, maintain, and retain a healthy and qualified maritime workforce to meet today's maritime challenges.

Our nation's economic prosperity, national security, and global influence depend upon a successful marine transportation system, including its most valuable resource, the mariners. As you read this issue, we encourage you to join the discussion and consider how an investment in the health and wellness of our mariner workforce, promotes the safety and prosperity of the United States.

and maritime labor issues.

Over the past several years, MMC has worked closely with the Merchant Mariner Medical Advisory Committee (MEDMAC), the Merchant Marine Personnel Advisory Committee, and other maritime industry stakeholders to clarify, revise, and update policy pertaining to the medical and physical evaluation guidelines for mariner medical certification. During this work, MEDMAC members observed that regulation and policy have limited ability to improve mariner health. By their very nature, regulations and policies pertaining to mariner medical certification tend to highlight illness rather than wellness, particularly when applied to mariners who are already too ill to serve safely. Moreover, the current COVID-19 global pandemic underscores that regulation and policy alone, cannot address every individual health concern that may arise in the setting of novel maritime challenges.

The committee members noted that true improvements in mariner health requires action on the part of mariners, marine employers, maritime industry leaders, and medical professionals. By providing each of these stakeholders with information on how they can affect mariner health, it is possible to develop an environment where mariners have the knowledge and tools necessary to attain and maintain health and wellness, even during times of global crisis. Promoting a healthy maritime workforce can reduce the number of mariners lost from the workplace due to severe illness and can reduce the risk of medically related maritime accidents. A healthy workforce can also translate into increased productivity for marine employers and the maritime industry.

In the pages that follow, we have assembled a mariner health and wellness toolbox provided by an exceptional group of authors, including professional mariners, and mariner service providers, as well as maritime industry and medical professionals. We invite you to read on, explore these topics, and consider how you can contribute to the health and wellness of the maritime workforce.

A big thank you to everyone who contributed, including the members of MEDMAC who wrote the articles. A special thanks to Dr. Adrienne Buggs for her vision and tireless efforts to put this edition together.

A Word from the Chair of the Merchant Mariner Medical Advisory Committee

by Captain Margaret Reasoner
Director, Labor and Personnel
Patriot Contract Services

Established in 2011, the Merchant Mariner Medical Advisory Committee (MEDMAC) exists to advise the Mariner Credentialing Program of the United States Coast Guard. MEDMAC focuses on matters related to mariner medical evaluations and the issuance of medical certificates.

The committee comprises 14 members. Ten members are health-care professionals with subject matter expertise, knowledge, or experience regarding the medical examinations of merchant mariners or occupational medicine. Four members are professional mariners with knowledge and experience in mariner occupational requirements and how medical regulations impact activities aboard a vessel, or in maintaining fitness in a seagoing environment. The issues related to mariner medical certification require unique knowledge, expertise, mastery, and education, as well as an application of medicine and pharmaceuticals. This must all be combined with knowledge of the working environment and occupational impacts of going to sea, while maintaining safety for the crew, vessel, cargo, environment, and the public.

The Coast Guard appoints one member as the committee chairperson. MEDMAC appointments are based on an application process announced via the Federal Register. A Coast Guard employee serves as the Designated Federal Officer (DFO) for MEDMAC, and is responsible for approving or calling meetings, assigning committee tasks, and attending all committee meetings.

MEDMAC meetings are typically held twice a year at locations around the country. Although the committee membership is relatively small, MEDMAC public meetings are well attended by members of the maritime and medical community. The committee welcomes extensive input from all sources towards the accomplishment of designated tasks related to mariner medical issues. The committee meets formally, and then breaks into working groups to address Coast Guard-tasked assignments. Working groups are chaired by a committee member. This process allows for open dialog and additional expertise, input, and participation resulting in well-crafted recommendations that consider all areas and specialties within the maritime industry.

Previously, medical certification concerns were addressed through the Merchant Marine Personnel Advisory Committee (MERPAC), which produced the previous medical guidance in the form of Navigation and Vessel Inspection Circular (NVIC) 04-8, Medical and Physical Evaluation Guidelines for Merchant Mariner Credentials. As an exclusive committee, MEDMAC now partners with MERPAC in the areas where medical issues overlap qualification and credentialing.

Tasks and recommendations accomplished by MEDMAC since its inception include:

- revision of NVIC 04-08
- detailed inclusion of information pertaining to the top 10 medically disqualifying conditions
- analysis and review of medications and their impact to credentialing of mariners, and prohibited medications
- recommendations for reporting changes in medical condition or medications
- revision and recommendations to the medical exam and documentation forms
- development of recommendations for a Designated Medical Examiner Program, to include qualifications and training content
- mariner occupational health risk study analysis to further develop policy guidance on mariner fitness
- input to support regulatory reform of Coast Guard regulations
- content development and material for the *Merchant Mariner Medical Manual* released in September 2019

These accomplishments have improved the clarity of medical certification guidelines and reduced medical certification processing times. They have also provided

transparency for medical evaluations, requests for additional information, and waiver issuance. This, in turn, has led to a reduction in the number of medical appeals and, consequently, increased safety.

Working on board a ship is an arduous and sometimes dangerous profession. Therefore, mariner health is a very important aspect that must be considered when ensuring a safe and efficient maritime transportation system.

> The *Merchant Mariner Medical Manual* provides guidance for evaluating the medical and physical condition of all applicants for the medical certificate. It was designed to assist medical practitioners, the maritime industry, individual mariners, and the Coast Guard.

Medical certification is important because the risk of a subtle or sudden incapacitation can have grave impact on the mariner, other members of the crew, the vessel and operations, and the environment. To put it simply, working aboard a vessel is a tough job with a lot of risk! Therefore, it is mutually beneficial to all stakeholders that crew members are fit to perform the duties and responsibilities for the position they serve.

Medical certification, unfortunately, only provides a snapshot into a mariner's immediate fitness at the time of certification. Toward this end, MEDMAC also provides guidance, educational material, and recommendations on the distribution of educational material and content applicable to mariners and mariner health concerns specific to each mariner's unique work environment. These recommendations have covered topics such as:

- fatigue and its impact on mariners
- over-the-counter medications, energy drinks/pills, diet aids, and dietary supplements
- diet and healthy eating aboard vessels
- exercise and fitness in a "moving" environment
- effects of drugs/alcohol/smoking

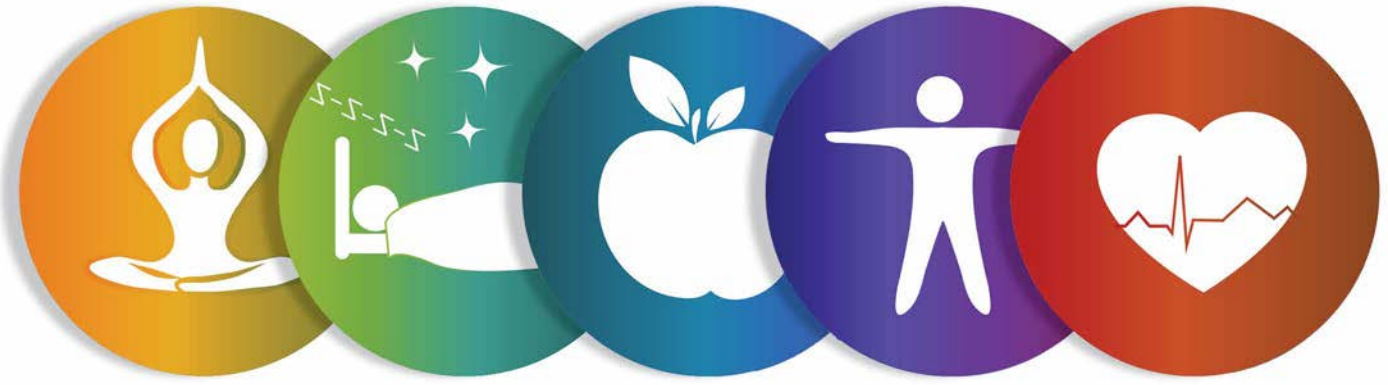
MEDMAC is currently working on mental health awareness education and recommendations for how to evaluate and ascertain certification when medical information identifies potential psychological concerns. Other current assignments include revision to the CG 719K, CG 719KE and CG 719P forms, and medical certifications for Military to Mariner applications.

Medical regulation provides one level of protection and safety, and through their own policies and procedures, maritime employers provide a second level. Mariners, however, are the most important level of safety. Within the safety management systems which govern our maritime industry, there is always room for continuous improvement and incorporation of best practices. Toward this, MEDMAC has a standing work group tasked with providing recommendations on mariner medical education, disease prevention, trends, research, and other interests that speak to medical compliance along with diet and wellness

The committee members are passionate and committed to mariner health and the work assigned. Their contributions to the maritime community, the committee, and the health of all mariners is demonstrated and promoted within the articles in this edition of *Proceedings* magazine. Their efforts lead to a healthy, certified, and safe maritime workforce.

About the author:

Captain Margaret Reasoner is a graduate of the California Maritime Academy. Currently the chair, she has been a member of the MEDMAC committee since 2012. She is also a former captain, port captain, and managing director of marine personnel for Crowley Maritime Corporation. Currently, she is the director of labor and personnel for Patriot Contract Services, LLC in Concord, California.



Working aboard a vessel is an arduous and sometimes dangerous profession. Developing a workforce that is up to the task requires attention to all dimensions of physical and mental health. Illustration by reineg | AdobeStock photo

Smooth Sailing Through the Medical Certificate Application Process

by Laura Torres-Reyes, M.D., MPH, FACOEM
Chief, Medical Evaluations Division, National Maritime Center
U.S. Coast Guard

Applying for the merchant mariner medical certificate may sometimes feel like heading out to sea without a compass. The good news is that there is a boatload of information and guidance available to ensure your journey through the process encounters fair winds and following seas.

Why the Medical Certificate is Important

The purpose of the medical evaluation and certification process is to determine whether an applicant meets the medical and physical standards for merchant mariners based upon the information available to the U.S. Coast Guard at the time of the certification decision. The Coast Guard recognizes that marine employers may establish more rigorous medical and/or physical ability guidelines based on factors that include, but are not limited to, specific duty requirements, austere work environments, lack of access to definitive medical care, and operational tempo.

Presently, the Coast Guard requires a valid medical certificate as authorization that a mariner:

- has the ability to fulfill all the physical requirements for merchant mariners as required by 46 CFR 10.304 (c)
- demonstrates adequate hearing and speech to communicate effectively and detect any audible alarms
- has no medical condition, disorder, or impairment that will prevent the effective and safe conduct of the mariner's routine and emergency duties
- is not suffering from any medical conditions likely to be aggravated by service at sea, which will render him or her unfit for service or endanger the health and safety of others on board
- is not taking medication that has side effects that will impair judgment, balance, or any other requirements for effective and safe performance of routine and emergency duties on board

Unfortunately, there are instances when an application must be denied. The top five reasons for denials are:

1. requested "amplifying information" is not submitted within 90 days
2. the mariner has a condition that poses a high risk of sudden incapacitation, including seizures, substance abuse, or unstable cardiovascular disease
3. provider marks certification recommendation as "Not Recommended" or "Needs Further Review" on the CG-719K
4. provider marks "Applicant does NOT have the physical strength, agility, and flexibility to perform all of the items listed in the physical ability table" on the CG-719K

How the Medical Certificate Application is Reviewed

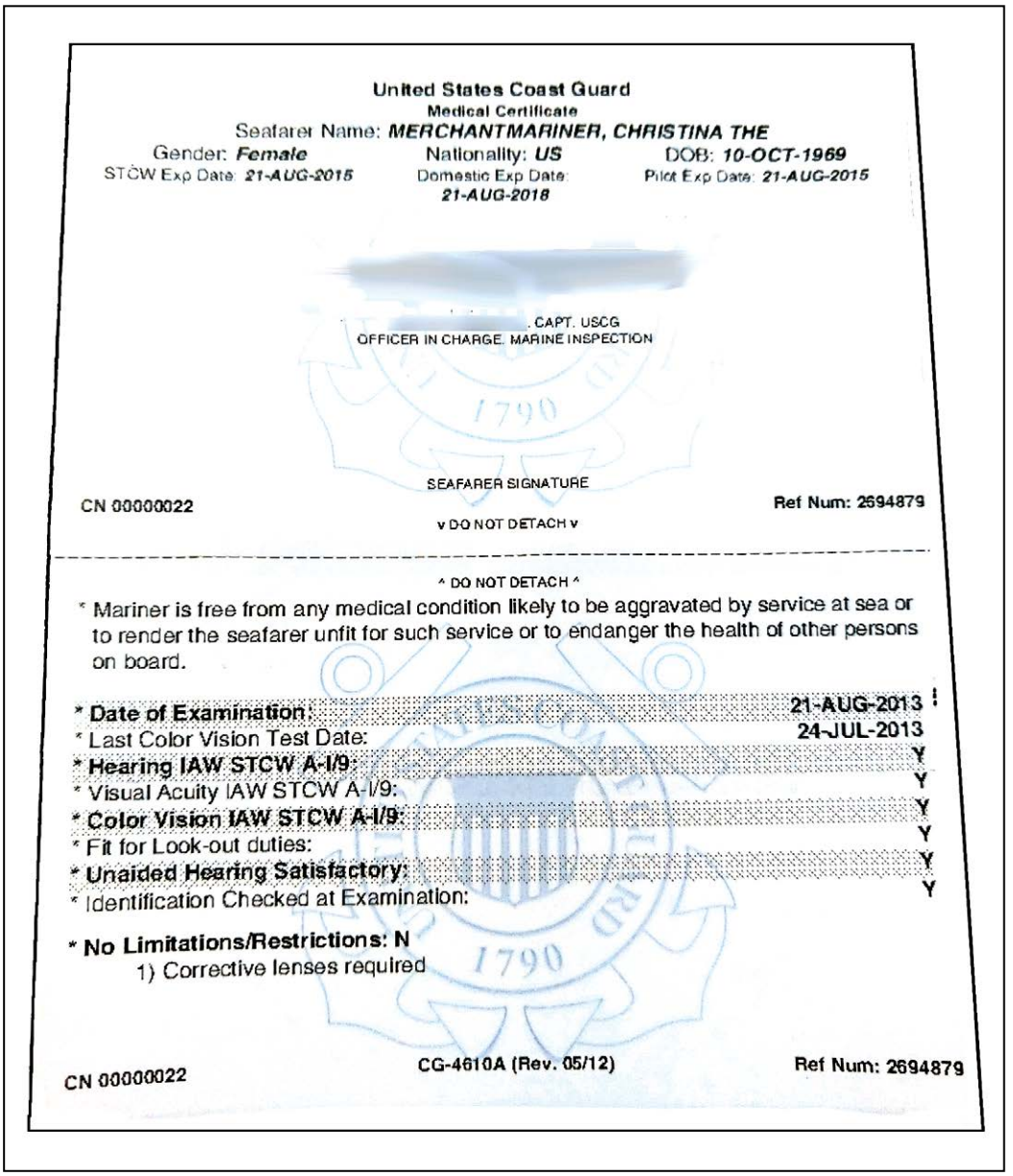
Once your application is received at the National Maritime Center's (NMC) Medical Evaluation Division, there is a dedicated staff of certified medical assistants, registered medical assistants, certified physician assistants, and occupational and environmental medicine physicians who review your documents for:

- conditions that may pose significant risk of impairment or sudden incapacitation
- medications
- exam findings
- physical abilities
- examining practitioner's recommendation
- supporting documentation with the treating provider's summary and analysis of test results as related to fitness for certification

Once the evaluators have completed their reviews, they make a determination of whether the applicant is fit to receive the medical certificate. Understandably, this is the area that has variability and is the most challenging for evaluators. NMC providers must use their knowledge of standards for vision, color vision, hearing, and physical ability as outlined in the Title 46, Code of Federal Regulations, Part 10. They also use their clinical expertise and guidance provided by the Merchant Mariner Medical

Manual, COMDTINST M16721.48, to evaluate documentation provided in the medical history and provider exam. No two mariners are exactly alike with regards to medical history, medical conditions, medications, documentation, or information provided on previously submitted applications.

The final printed product is the medical certificate that has three expiration dates based on the day it is printed at the NMC. The full medical certification period is 2 years for first class pilots and mariners with STCW endorsements, and 5 years for mariners with national endorsements. The medical information and recommendations supplied by the provider completing the CG-719K application are key factors in determining if a mariner is issued a medical certificate with a waiver, and whether a time-limitation is placed on the certificate. In most cases, mariners with well-controlled medical conditions can receive a medical certificate without a waiver.



United States Coast Guard
Medical Certificate
Seafarer Name: *MERCHANTMARINER, CHRISTINA THE*
Gender: *Female* Nationality: *US* DOB: *10-OCT-1969*
STCW Exp Date: *21-AUG-2015* Domestic Exp Date: *21-AUG-2018* Pilot Exp Date: *21-AUG-2015*

[redacted] CAPT, USCG
OFFICER IN CHARGE, MARINE INSPECTION

SEAFARER SIGNATURE

CN 00000022 Ref Num: 2694879

v DO NOT DETACH v

^ DO NOT DETACH ^

* Mariner is free from any medical condition likely to be aggravated by service at sea or to render the seafarer unfit for such service or to endanger the health of other persons on board.

* **Date of Examination:**	21-AUG-2013
* Last Color Vision Test Date:	24-JUL-2013
* **Hearing IAW STCW A-I/9:**	Y
* Visual Acuity IAW STCW A-I/9:	Y
* **Color Vision IAW STCW A-I/9:**	Y
* Fit for Look-out duties:	Y
* **Unaided Hearing Satisfactory:**	Y
* Identification Checked at Examination:	Y

* **No Limitations/Restrictions: N**
1) Corrective lenses required

CN 00000022 CG-4610A (Rev. 05/12) Ref Num: 2694879

Coast Guard medical certificate

If the NMC requires additional, amplifying information to make a decision, you will be sent a letter that explains exactly what is required. You will then have 90 days to submit the information. An extension can be requested if you require additional time to get the information from your provider or specialist. The top medical conditions that can delay an application for inadequate amplifying information are cardiovascular disorders, psychiatric disorders, alcohol/drug abuse, and chronic use of impairing medications

Where to Find Information

The informational links to tow you through the process are available on the Coast Guard's National Maritime Center website. Click on the "Medical Certificate" band on the left margin of the website to open a page with links to helpful information like:

- the correct Coast Guard 719 K or K/E application forms in a PDF fillable format
- common errors on the CG-719K form and medical certificate frequently asked questions
- the "Supporting Document (COMDTINST M16721.48)" that contains guidance on what medical information/tests are recommended for specific conditions
- the preferred method to submit your application and supporting documentation
- guidance for medical providers

All exams, tests, and demonstrations must be

The U.S. Coast Guard National Maritime Center staff assembled outside of its West Virginia main building. Coast Guard photo

performed, witnessed, or reviewed by a physician, physician assistant, or nurse practitioner, who is licensed by a state in the United States or a U.S. possession or territory. Medical examinations for U.S.-registered pilots must be conducted by a licensed medical doctor. Chart your course wisely since the examination on the application form must be completed and signed within 12 months of application submission. If you would like to have your medical certificate and merchant mariner credential printed with the same date, called harmonization, you must submit both applications together at a regional exam center. If you are only submitting a CG-719 K or K/E application, the quickest and preferred method is to e-mail it to MEDAIP@uscg.mil. Please include your full name in the subject line and ensure attachments are in PDF format. Cell phone pictures of applications are not accepted, and picture formats, like JPGs, GIFs, and others cannot be opened. You can also submit your application via fax or mail, but the processing time will be longer.

- Fax to (304) 433-3407, making sure to include your full name in the subject line.
- Send via United States Postal Service to: National Maritime Center, Medical Evaluation Division, 100 Forbes Drive, Martinsburg, WV 25404.

If you have all the documentation to support your application there is a high probability it will sail through the process without delay. The average net processing time for a complete application is less than 20 days. The most important thing to remember is that you are never alone in your voyage. Don't hesitate to ask for a lifeline by calling 1-888-427-5662, or send an email to iasknmc@uscg.mil. Online chat is also available through the website link at www.uscg.mil/nmc. We wish you a successful journey!

About the author:

Dr. Laura Torres-Reyes, a retired United States Air Force colonel, has served with the Coast Guard for the past three years. She is a graduate of Cornell University, Howard University College of Medicine, and completed a master's of public health and a residency in occupational medicine from the Johns Hopkins School of Public Health. She is a fellow of the American College of Occupational and Environmental Medicine.

Fitness-For-Duty Considerations for Entry-Level and Unlicensed Mariners

by Ann Jarris, M.D., MBA, FACEP
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Kathy Fletcher, J.D., and David Bratz, J.D.
Attorneys
LeGros Buchanan & Paul

One of the greatest challenges in maritime medicine is the fitness-for-duty medical screening process. While other industries, like aviation and commercial trucking, have federally regulated programs involving trained and certified medical examiners, clear benchmarks, and a relatively uniform work environment, medical screening assessments in the maritime industry lack this extensive, mandated structure.

Most U.S. Coast Guard-licensed mariners undergo a medical certification process consisting of a basic medical history and physical exam, as well as a demonstration of physical abilities.[1] However, an entry level-mariner subject to the International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers (STCW), 1978, undergoes just an assessment of physical abilities, without any medical evaluation. Mariners of this type who also handle food must provide certification that they are free of communicable diseases that pose a direct threat to the health or safety of other individuals in the work place. Moreover, as described in 46 CFR 10 subpart C, entry-level mariners who do not sail under an STCW endorsement or have food handler duties are not required to undergo any sort of medical or physical evaluation. Yet these mariners, who are not subject to any significant mandatory health or medical screening, comprise a significant portion of the maritime workforce.

The maritime work environment is remarkably disparate and varied. A mariner may work close to shore for limited hours each day and return home daily. Alternatively, he or she may be a week or more away from shore or medical resources, acting under the authority of his or her credential 24 hours a day. It is important to note that the Coast Guard medical certificate represents a minimum standard to sail away from a dock. The Coast Guard acknowledges the medical certificate represents a fitness for certification which does not imply or equate to fitness for duty. This is a critical distinction. The medical certificate does not represent an unrestricted fitness for duty to work in any specific environment, much less a remote and often harsh maritime environment. This makes it incumbent on the employer to assess the medical capabilities of a mariner to work in a specific, potentially remote, location according to his or her needs.[2]

In many cases, shipboard tasks performed by unlicensed mariners may significantly exceed the physical abilities required by the Coast Guard. This limitation is

For workers on a tug in a major harbor, fitness for duty is a very different consideration than it is for mariners on a near-coastal or oceangoing vessel. Photo courtesy of Ray Jarris estate and Foss Maritime

acknowledged in the *Merchant Mariner Medical Manual*, which outlines the medical and physical evaluation guidelines for merchant mariner credentials, stating these guidelines "do not preclude marine employers from establishing more rigorous medical or physical ability guidelines."[3]

Companies that provide both medical advisory services at sea and fitness-for-duty assessments have a unique opportunity to understand how appropriate medical evaluations can positively impact medical care at sea, as well as overall mariner health and safety. The fitness-for-duty assessment is part of a comprehensive opportunity to manage mariner health and safety at sea. Ensuring all mariners are physically and mentally qualified to perform their essential duties is a critical aspect of public safety and risk management. For the vessel owner, retaining good talent and ensuring the health and well-being of their crew is imperative. For the mariner, remaining healthy at sea and protecting the longevity of his or her career is a priority.

It may be beneficial, therefore, for certain marine employers to consider implementing medical assessments for unlicensed and entry-level mariners who currently have no medical evaluation requirements. Consideration of a supplemental medical screening for mariners holding a medical certificate might also be advantageous.

Under maritime law, marine employers have responsibilities relating to various medical conditions that manifest while in the service of the vessel. The employer's responsibility to provide medical treatment to injured or ill mariners is generally without regard to fault and continues until the seaman reaches maximum cure. The marine employer may also have legal obligations to crew members who become injured or fall ill because of another crew member's illness or other medical condition. A pre-deployment screening process may help mitigate some of these exposures. Notably however, federal, and sometimes state or local, statutes or regulations like the Americans with Disabilities Act or the Genetic Information Non-Discrimination Act may limit the scope and nature of a medical screening process. Therefore, consultation with counsel is advised when instituting a fitness-for-duty program.

The overall goal for any screening process is that every mariner goes to sea and returns safely. Medical evacuations are not always preventable, but a well-designed fitness-for-duty program can reduce the number of

The distance to shoreside medical care is a significant factor in a fitness-for-duty determination. Dutch Harbor in the Aleutian Islands is the main port for the Bering Sea fisheries, however, the medical facilities available are not sufficient to treat all medical conditions, and weather conditions can cause multi-day delays in transport to a higher level of care. It is important that the evaluating provider understands the medical resources available in nearby ports and limitations in stabilizing and treating complex medical conditions. Photo courtesy of Ray Jarris estate

Physical activity for entry-level and unlicensed mariners may often exceeds the U.S. Coast Guard's physical ability requirements. Since these mariners may have no medical or physical fitness assessment requirements, screening should be tailored to the specific job description and work environment. Photo courtesy of Ray Jarris estate

medevacs. Indeed, due to a commendable emphasis on vessel safety over the past decade, the majority of medevacs are now due to medical, rather than traumatic complaints.[4] A similar emphasis on illness prevention would further reduce medevac frequency.

Mariners are justifiably uncomfortable with the medical qualification and certification process. They are anxious to be cleared for work quickly. In completing health history questionnaires, mariners sometimes express reluctance to disclose known conditions for various reasons, including thinking the information is irrelevant, or private, or that full disclosure may preclude their employment. However, a non-disclosed condition may result in suboptimal treatment for a condition experienced on board, and may be a reason for an employer to terminate employment or deny benefits. Candor on the health questionnaire, or to a screening physician, is in the mariner's and the employer's best interests. It is important to note that submitting false information to the Coast Guard may be subject to criminal prosecution.[5]

Relatively speaking, few health problems are outright disqualifying. Many medical events at sea relate to poorly controlled health conditions, or limited screening for medical conditions that are difficult to detect. With appropriate disclosure and sound medical risk assessments, a screening program can help stabilize and manage health conditions that might worsen if undetected or untreated. Once such conditions are appropriately identified and addressed, the mariner's career may be safely extended, the employer retains a valued employee, and the risks and expense of a medical emergency at sea are mitigated. By necessity however, the medical screening process is often not instantaneous. When a chronic health condition is identified, it may take time to stabilize the condition. Still, this relative inconvenience is far outweighed by the mitigation or elimination of the risk of an undetected condition surfacing for the first time at sea.

Currently, many employers choose not to medically screen employees at hire. The reasons for this decision may be many, and can include everything from cost and difficulties crewing a vessel, to exposure to employment

discrimination claims, and responsibilities of maintaining and securing protected health information. The varying quality of medical examinations and lack of medical provider familiarity with maritime medicine, coupled with the fact that any medical issue that subsequently manifests in the service of the vessel would be the employer's responsibility, could also be contributing factors.

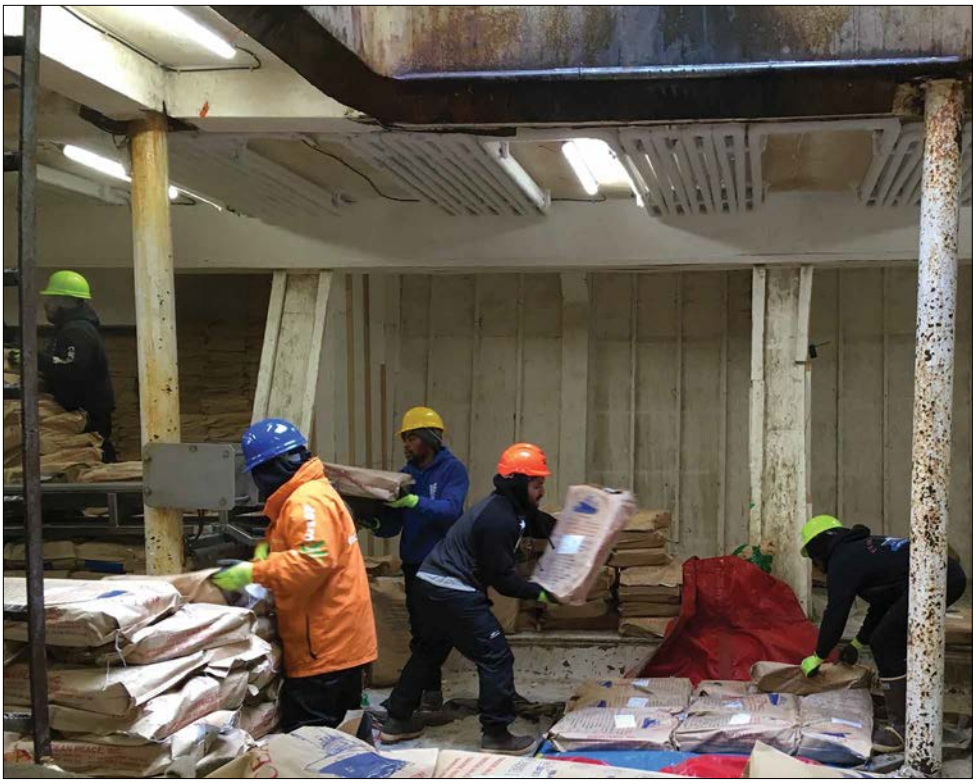
While these are all appreciable concerns, the risk of not medically screening crew members may be even greater. Generally, a cost-effective screening program that will demonstrate a positive return on investment at even the first avoided medevac or diversion can be designed and implemented.

An ideal program for assessing an entry-level or unlicensed mariner's fitness to work in a particular environment requires the following components:

- a comprehensive, meaningful job description
- an assessment of the work environment based on proximity to specific medical resources
- an assessment of the level of medical knowledge and resources that are immediately available in the work environment
- a medical and physical assessment by a qualified provider knowledgeable with the specific requirements of the maritime industry and the employer's operational limitations

Because of the wide range of work environments and distance to varying levels of shoreside medical care, it is impossible to create a single industry standard for fitness for duty for entry-level and unlicensed mariners. Even within the fishing industry, a small family-run seasonal fishing boat with a crew of less than five is a very different work environment than a large commercial processing or transport vessel with medical professionals on board. These risk assessments must be made on a case by case basis. The goal is to "right size" a fitness-for-duty program for each situation.

An effective medical review would be performed by a provider familiar with both the job description and maritime work environment. An optimal evaluator will be familiar with the specialized nature of maritime medicine which requires a thorough understanding of primary care, occupational, emergency, and remote medicine. Although 46 CFR §10.107 references a designated medical examiner as a licensed physician, licensed physician's assistant, or licensed nurse practitioner who has been trained and approved to conduct medical and physical examinations of merchant mariners on behalf of the Coast Guard, a specialized training program does not formally exist. Current requirements for a provider to perform the CG-719K, Application for Medical Certificate, or CG-719K/E, Application for Medical Certificate, Short Form are only that he or she be "a physician, physician assistant, or nurse practitioner licensed by a U.S. state, possession, or territory."[6] No specialized understanding of the maritime environment is currently required.



The need to climb ladders, move through hatches, and extract an injured or ill worker from below deck must be considered in making an assessment. In a medevac situation, a mariner who poses a danger to the rescue crew, or who cannot be physically extracted, may not be able to reach shoreside care in a timely manner. Photo by Mark Borden of Discovery Health MD

In order to make a fitness-for-duty assessment, the evaluator must be provided with an accurate job description including the essential functions of the job and a description of the work environment, available medical resources, and proximity to shore-based medical resources. Employers should be prepared to provide details regarding the physical nature of the offshore environment. This may include a number of factors, like vessel size, design, and where it will be operating; shift length and times; tour lengths, methods of

Many mariners work in remote and extreme environments. Heat and cold exposure, emergency response procedures, and the ability to don a survival suit quickly are some of the factors that must be considered when determining fitness for duty. Photo courtesy of Terry Lane

travel to and from the worksite; living accommodations; drug and alcohol policies; physical requirements; emergency duties; and other required training.

A description of the medical facilities and medical training available on board is also essential. The Coast Guard requires only "a complete first-aid manual and medicine chest of a size suitable for the number of individuals on board" and requirements for only CPR and first-aid training based on the number of crew.[7] Therefore, it is imperative for the medical evaluator to have an understanding of the medical response resources onboard. Some vessels have crew with paramedic or nursing training, and those holding an STCW endorsement have additional training requirements that may range from a one-day basic first-aid course up to a 7- to 10-day medical person-in-charge course.[8] Understanding the ability to provide interventions—from administering IV fluids to Advanced Cardiac Life Support—as well as knowledge of the contents of the medical chest, are critical to understanding whether a mariner can be deemed fit for duty for a particular work environment.

Additionally, the time and distance to shore-based medical facilities must be considered. Many medical conditions are not appropriate for placement greater than one hour from tertiary medical care. A mariner who could safely work on a harbor tug may not be appropriate for work on an ocean going, or even near coastal, vessel and an employer may or may not have the ability to accommodate recommended restrictions. Coast Guard guidance that "remote locations with minimal, if any, medical resources can be common and the loss of a functioning mariner on a vessel can significantly impact the rest of the crew, both in regards to routine and emergency duties"[9] underscores the importance of fitness-for-duty assessments to protect mariners and their co-workers.

An underlying medical condition should be evaluated "with respect to functional impairments, stability, need for surveillance, and the risk of incapacitation."[10] An illness could cause a sudden, incapacitating event, such as a hypoglycemic episode, an anticoagulant-aided bleeding episode, or a seizure. Conversely, the incapacitation could be gradual, like life-threatening sepsis in someone using immunosuppressant medication and unable to access specialty medical care within a reasonable period of time. Ideally, evaluators would reference expert consensus guidelines as to which conditions require additional investigation and which conditions

are suitable for placement in a work environment of variable remoteness. However, this formal guidance does not currently exist for entry-level and unlicensed mariners.

Given this lack of expert guidance, evaluating providers would be wise to consistently apply equivalent benchmarks and guidelines in their assessments. Published guidelines pertaining to workers in remote and safety-sensitive positions may be referenced by the evaluating provider to help guide the assessment of facets of a particular medical condition. The American College of Occupational and Environmental Medicine has numerous resources available to assist with this assessment. Coast Guard practices with respect to the physical and medical evaluation process are continually evolving.[11] The recently released *Merchant Mariner Medical Manual*[12] reflects a shift in Coast Guard guidance from a conditions-based assessment to a more holistic approach, leaving the evaluating provider to apply benchmarks he or she finds most appropriate and that best approximate the specific job description and work environment.

It is important to understand that a fitness-for-duty assessment is not intended to be a comprehensive assessment of a candidate's overall health, and is limited to an assessment of a worker's ability to perform a specific job in a specific environment. The employer must bear this limitation in mind when designing a fitness assessment program and the mariner must assume the responsibility of maintaining an ongoing relationship with a primary care provider.

This medical employment determination must also be carefully balanced with various legal considerations including anti-discrimination laws, like the Americans with Disabilities Act and the Genetic Information Nondiscrimination Act, and privacy concerns. Federal anti-discrimination legislation, and the related missions of administrative bodies like the Equal Employment Opportunity Commission, dictate the timing and scope of pre-placement medical inquiries. There are also medical privacy considerations mandated by laws, like the Health Insurance Portability and Accountability Act of 1996 (HIPAA), which direct how employees' private health care information must be stored and limits how the information can be used and disseminated. As related to employees and prospective employees, consultation with maritime employment counsel regarding legal considerations and restrictions on the medical screening process is recommended.

Factors Determining a Candidate's Fitness

- current status and history of a condition
- frequency and severity of symptoms
- treatment plan, medications, and attendant side effects
- ability to perform the required physical tasks including safety sensitive duties

The specifics of a program will depend upon the particular work environments and job descriptions, and should be tailored to an employer's individual risk profile. For unlicensed or entry-level mariners, some components of a fitness-for-duty program may include biometric testing, medical history questionnaires, medical records reviews, physical exams, and functional capacity evaluations, in addition to drug screening, vision, and hearing testing where applicable. Employees with firefighting duties may be subject to Occupational Safety and Health Administration medical qualification evaluations for the use of self-contained breathing apparatus respirators.[13] Employers would be wise to work with their medical advisor to create a program that aligns with internal policies and procedures, is cost-effective, can be

Fishing vessel *Frosti* following the Canadian Coast Guard ship *Sir Wilfred Laurier* through ice north of Point Barrow, Alaska, in July 2017. Coast Guard photo by Petty Officer Nate Littlejohn

Coast Guard Station Port O'Connor boat crew members assist an Air Station Corpus Christi MH-65 Dolphin aircrew in transferring a mariner in need of medical attention during a medevac in Matagorda Bay near Port O'Connor, Texas, on February 23, 2020. The mariner was reported to be in stable condition. Coast Guard photo by Station Port O'Connor

launched efficiently, is appropriate for the job type and work environment, and is consistent across all employee classes. A risk assessment reviewing prior claims is a helpful place to start in designing a fitness-for-duty program.

While many employers are comfortable with the idea of pre-placement health screening, there is no consensus on the frequency of ongoing screening. Credentialed mariners will be re-evaluated every five years, or every two years for those holding an STCW endorsement. However, it is worth repeating that this medical certificate does not substitute for a fitness-for-duty evaluation. Some employers may institute annual condensed health history questionnaires asking only if there have been changes in a mariner's health history or medications in the past year. Others may repeat basic biometric screening, and still others may require annual physical exams. There may be additional considerations based on the employment status of the worker as to how often exams may be conducted.

In summary, employers would be wise to consider implementing a pre-placement fitness-for-duty screening program for new hires and examining the appropriate frequency to rescreen crew members. While this is especially important for entry-level and unlicensed mariners, additional screening appropriate to the position being evaluated, should be considered for licensed mariners holding a Coast Guard medical certificate.

For maritime physicians and providers, developing expert consensus guidelines on the medical evaluation for entry-level and unlicensed mariners in remote work environments would assist employers and candidates in understanding the goals for chronic disease management and improving overall health. It would also provide consistent guidance to medical providers tasked with these evaluations. Ideally, this will reduce illness and injury at sea, lessen the risk and expense of medical evacuations, and provide mariners with the tools to prolong their careers and continue meaningful contribution to the industry.

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Resources:

Merchant Mariner Medical Certification Title 46, Code of Federal Regulations (CFR), Part 10, Subpart C

The Merchant Mariner Medical Manual, COMDTINST M16721.48, effective Sept 9, 2019

Americans with Disabilities Act of 1990, As Amended. 42 USC Chapter 126 section 12101 et seq.

Genetic Information Nondiscrimination Act of 2008, 42 USC Chapter 21F section 2000ff et seq.

OSHA Respiratory Protection Standard 29 CFR §1910.134

STCW Code Section A-VI (STCW 2010)

Endnotes:

1. 46 CFR §10.304
2. *Federal Register* COMDTINST M16721.48 Public Comments on the *Draft Merchant Mariner Medical Manual.*
3. *Merchant Mariner Medical Manual* 4. Background (i)
4. Thibodaux et al, "Medical Evacuations From Oil Rigs off the Gulf Coast of the United States From 2008 to 2012, Reasons and Cost Implications," *Journal of Occupational and Environmental Medicine*, Vol 56, No 7, July 2014
5. *Merchant Mariner Medical Manual*–Chapter 1, c.
6. Ibid
7. 46 CFR §28.210
8. STCW Code Section A-VI/4 Chapter VI (STCW 2010 Resolution 2)
9. Information for Physicians and Other Licensed Healthcare Providers, USCG Form 719k (04/17), National Maritime Center
10. Ibid
11. Ibid
12. *The Merchant Mariner Medical Manual*, COMDTINST M16721.48, effective Sept 9, 2019
13. OSHA Respiratory Protection Standard 29 CFR §1910.134

When Pressure Builds

What is wellness?

by Captain Margaret Reasoner
Director, Labor and Operations
Patriot Contract Services

Wellness is the state of being in good health. Health is the state of being free from illness or injury. We, as a maritime industry, address things that can prevent harm to our crews, our vessels, our cargo, and our environment via safety management systems (SMS). This is a comprehensive program to manage elements in the workplace that include policy, procedures, guidelines, responsibilities, and goal measurements. SMS primarily focuses on preventing harm to our crews through the prevention of injury. But injury is only one half of the health equation and even less of the wellness equation. The few studies that incorporate statistics show that illness causes more loss of productivity than injuries. So, if we want to have a healthy, more productive workforce, then we must focus on what causes illness and how to maintain good health.

The medical community can diagnose and prescribe treatments to prevent and address illness. But health and, consequently, wellness are not just the absence of illness. Health is the presence of all the dimensions of wellness that allow an individual to cope positively with the demands of daily life. It's a state of balance, or rhythm, in equilibrium between an individual and his social, physical, and emotional existence. For a musician, health might be described as being in tune with his instrument and the orchestra. Overall good health is being well, or well-being.

Today, stress plays a big role in whether one is healthy. Stress can cause ailments such as insomnia, headaches, stomach upset, weight loss or gain, lowered immunity, higher blood pressure, or loss of libido. Stress and the health problems it causes all stem from emotions that are being ignored, denied, misunderstood, suppressed, or just poorly handled. Stress can come in a variety of emotions such as fear, anger, sadness, shame, disgust, and jealousy. While these are typically considered negative emotions, positive emotions, like happiness and love, can also create stress. In physical science, stress is the pressure or tension exerted on a material object causing movement in some other dimension. In people, when stress or pressure builds it usually results in a blow up of some sort. The blow up can manifest itself as overeating, relationship conflict, money mismanagement, substance abuse, quitting a job, dropping out of school, damage to self or material things, and, in many cases, poor physical health.

I prefer to describe wellness in eight dimensions:

- financial
- emotional
- career
- environmental
- social
- physical
- spiritual
- intellectual

Each dimension is unique but acts and interacts with the others in a way that contributes to our quality of life and well-being. The dimensions are holistic and require conscious choice and applied discipline. Each dimension may have a different priority, depending on circumstances and timing, but they all evolve and encompass one's entire lifestyle in a positive, abundant, and affirming way.

Financial

Financial well-being, or lack of it, is not necessarily dependent on income. Most people's finances are a very private matter and, while numbers can be very objective, one's feelings about finances are personal. Money, and being able to use it to pay for goods and services is how we live. Money represents the food we eat, the homes we live in, and the cars we drive. Financial management is a matter of income versus expenses and answers the question, "Is there enough?" Financial wellness applies to both necessities and luxuries. The financial dimension can affect us if we have worries about income level, job security, investment performance, retirement security, and day-to-day expenses. True financial freedom or well-being is the feeling of having financial security and financial freedom of choice, both today and in the future. One way to improve financial well-being is to spend less than you earn. Another way is to save, setting aside a part of all you earn for that rainy day, a grave need, or a future investment. Another way

is to give. Generosity makes us feel better about ourselves and causes us to see others with a more positive perspective.

Emotional

Emotional wellness is the ability to be aware of our feelings, positive or negative, accept them, and then process and/or act on them in a productive way. In the heat of the moment, it is very easy to act out in anger or love without thought to the impact of those actions. Others may process their emotions with denial or suppression and not feel or acknowledge what's going on inside. Emotional wellness is more than just stress management, it's understanding what's going on between thought and the stimulus of the world around you and the response generated. Emotional wellness is how you choose to respond to the things that happen to you, and what you internalize versus how you externalize it. Our emotions are dynamic with radical up, down—even sideways—swings. Emotional wellness involves an ability to feel and communicate. Feeling joy, even when you are not particularly happy; relationships built on independence, mutual trust, respect, love, and commitment; taking responsibility for your actions; recognizing and taking reasonable risks; and achieving fulfillment and success characterize emotional well-being. Tuning in to thoughts and feelings can help improve emotional wellness. In some cases, this may mean seeking outside psychological help. But maintaining and cultivating a positive attitude, setting priorities, and accepting mistakes and learning from them are important. Laughing is essential.

Career-Occupational/Vocational

Everyone is given their own unique gifts, skills, and talents. In a career sense, well-being comes from making use of personal attributes in order to gain purpose and enrichment in life. A wise man once said if you like and enjoy what you do, you will never work a day in your life. Work-related performance can be rated on a scale of motivational level and skill level. Employers most appreciate the individual who is highly motivated and highly skilled in their job. In the career dimension of wellness, since work takes so much of one's time, personal satisfaction is more related to your attitude about your work and its integration into a rewarding lifestyle. Some suggestions for improving occupational wellness are to explore a variety of employment options and choose one that suits your personality, interests, and talent. Be open and seek out opportunities to learn new skills. Envision your future. Suit up, show up, and do your best each day.

Environmental

To say environmental wellness is just about "saving the planet" would be to minimize how important it is to have an awareness of and protect limited resources. While this dimension of wellness relates to our earth—or even universe—and non-human inhabitants, like animals and plants, it is more than just recycling. Being in harmony with our surroundings and minimizing harm, creates peace within. Man-made influences such as climate change, pollution, soil and water degradation, deforestation, and overpopulation all disrupt our natural ecosystems. We each have a social responsibility to ourselves and future generations to protect the environment. Some suggestions to move toward improved environmental wellness include minimizing chemical use, reducing, recycling, and reusing products, taking a hike in a local or national park, going camping, going to the beach, and visiting the zoo with your children or grandchildren!

Social

Every vessel manager or owner understands the importance of their biggest ship: Relationship. We are social beings. The obsession with social media and platforms like Facebook, Twitter, Instagram, and Snapchat, is about people interacting with other people. While these platforms' influence on individuals and society can be debatable, their basis is about connection. Social wellness refers to an ability to effectively interact with others. This can be on a one to one basis or one to a million. Family, friends, coworkers, neighbors, and strangers all benefit from good communication skills. This is how intimacy and support are developed. Being well socially contributes to a sense of belonging. Social wellness is about respecting yourself and others, and thus contributing to community. Some means to socially connect are volunteering or getting involved in a hobby or sport. Listening more than you speak, asking for help, or starting conversations with a smile are good steps to social wellness.

Physical

Generally, the first thought towards physical wellness is diet and exercise. Physical wellness does encompass these aspects, but more important are the healthy behaviors contributing to a physically fit body. Nutrition, minimization of destructive habits, proper rest, health monitoring, and medical checkups are also included in this dimension. Developing healthy habits will enhance and extend life. To improve physical wellness, exercise, eat a colorful and proportional diet, quit smoking, use

protective equipment, get regular medical check-ups, and take a nap.

Spiritual

In nautical terms, spiritual wellness would be the internal compass, which provides direction and certainty in one's life with points of beliefs, principles, values, and morals. Ideals and personal characteristics of faith, hope, grace, forgiveness, and commitment are things to your spirit which provide meaning and purpose. This fills the hole and answers the question, "Why am I here?" For many, this is found in religion. Others may understand this dimension as their "mission." This defines that which is bigger than one's self and is always being pursued. Duty, honor, sacrifice, courage, obedience, service, integrity, patriotism, and commitment are terms understood in this dimension. Spiritual wellness is not having all the answers, but being comfortable with the questions. Meditation, prayer, and worship improve spiritual wellness. Try listening with your heart and not judging. Consider challenges as opportunities and not punishment. Express curiosity and not interrogation. Be yourself and give others the freedom to be themselves.

Intellectual

Exercising your mind is what intellectual wellness is all about. This is creativity, inspiration, scholarship, art, debate, and other things that stimulate thought. An active mind and a willingness to learn and expand skills, knowledge, and experience are also characteristics of intellectual wellness. IQ is not the measure of intellectual wellness. Ways to stimulate your mind could include taking a class or seminar on things you want to know more about, reading, engaging in activities around you, and hanging out with individuals you consider smarter than yourself. Take up an instrument, a paintbrush, or a new hobby.

These last three dimensions, physical, spiritual, and intellectual simplified to body, mind, and spirit, are integrally related. Our bodies respond to the way we think and feel. The three work together for optimum functioning and health. All holistic health practitioners and every recovering addict understands that you cannot treat or heal one aspect without addressing the others.

So why is it important to understand wellness and its dimensions? First, when one area of life is out of sync, it creates pressure or stress that affects other areas. For example, when a seaman on deck is worried about his daughter at college (social and financial), he is not paying attention to handling the bunker hose (intellectual and career). It slips, injuring him and spilling oil over the side (physical, environmental). He gets mad and curses

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out the other seaman on deck (spiritual and emotional). When incidents are investigated, how many root causes point to the human factor? Wellness is a component of the human factor corrective action.

Second, we want to define health and wellness in such a way as to address new topics as they come up; topics like gluten tolerance, the endocannabinoid system, mental health, or fatigue. Any type of health risk increases health care costs. So, we also need to create a platform to organize and deliver policies, services, and employee benefits that can reduce costs and increase productivity.

Finally, if we want to create management systems that improve wellness then they need to be designed to assist employees to choose to make voluntary changes that reduce their propensity to illness and improve health and our workplaces.

About the author:

Captain Margaret Reasoner earned her wellness program coordinator and manager certification at Chapman Institute. The author of A Sailor's Sunrise: 90 Days on Contract—Meditations for Mariners, *she is also a port chaplain, and serves on the board of directors for the International Maritime Center in Oakland, California. The California Maritime Academy graduate is a former captain, port captain, and managing director of marine personnel for Crowley Maritime Corporation, and is the current director of labor and personnel for Patriot Contract Services. She has been a member of the MEDMAC committee, which she currently chairs, since 2012.*

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Seafarers' Health and Wellness and the Maritime Labour Convention, 2006

by Douglas B. Stevenson
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The Seamen's Church Institute of New York and New Jersey

The Maritime Labour Convention, 2006, contains international standards for seafarers' medical care, many of which are codifications of ancient seafarers' rights.

Although the United States has not yet ratified the International Labour Organization's (ILO) Maritime Labour Convention, 2006 (MLC, 2006), it remains important for U.S. merchant ships that trade internationally. These ships, and others registered in countries that have not ratified the MLC, 2006, can be required to comply with the convention's standards when they call at a port in a country that has ratified it. For this reason, the U.S. Coast Guard has established a voluntary inspection program for American ships to certify that they conform to MLC, 2006.[1]

Providing medical care for seafarers is as ancient as shipping itself. Customary shipping practices that were well established in the pre-Christian era of shipping in the Mediterranean Sea included providing seafarers with free medical care. Written in the medieval era, the earliest maritime codes established the foundation for seafarers' rights to free medical care that continue to exist in today's maritime law. The first maritime medical manual was written by James Woodall in 1617 and included prescribing citrus fruit to treat scurvy, a disease that, according to the manual, was caused by sin. The first medical clinical study, conducted by ship's doctor James Lind in 1747, confirmed that citrus fruit did indeed cure scurvy.[2]

Today's international standards for seafarers' health and medical care are contained in the ILO's MLC, 2006. The ILO is a specialized agency of the United Nations that creates international labor standards for a variety of industries. From its beginning in 1919, the ILO has placed a high priority on creating labor standards for seafarers. Between 1920 and 2005, the organization adopted 68 maritime conventions and recommendations. In 2001, the agency began work on what would become the MLC, 2006. There was no intent to create new standards, rather it consolidated and updated existing ILO conventions and recommendations.

The MLC, 2006 is the most significant development in the long history of seafarers' rights law. It provides a comprehensive statement of seafarers' rights reflecting those that have withstood the test of time, as well as modern shipping realities. The MLC, 2006 includes standards for conditions of employment, hours of work and rest, accommodation, recreational facilities, food and catering, health protection, medical care, welfare and social security protection for seafarers, regulating recruitment and placement services, and enforcement. It has been ratified by 95 countries representing 91 percent of the world's tonnage of merchant ships.

MLC, 2006 Seafarers' Wellness Provisions

The MLC, 2006 has numerous provisions that affect seafarers' health, including hours of work and rest limitations, requirements for young seafarers, food standards, accommodations, recreational facilities, entitlement to

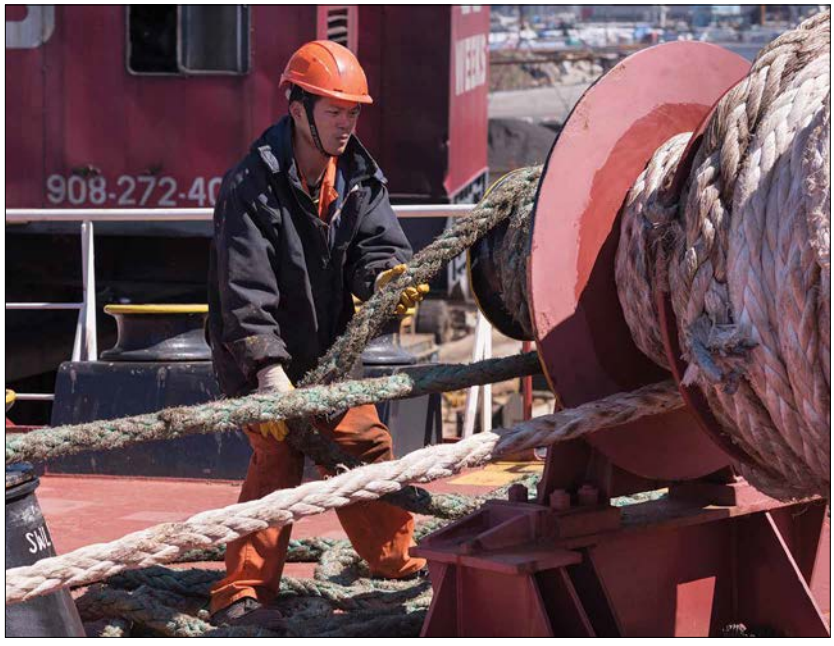
Doug Stevenson advises a seafarer about the Maritime Labour Convention, 2006. Photo courtesy of the Seamen's Church Institute of New York and New Jersey

leave, and occupational health and safety protection.

Regulation 1.2 Medical Certificates

Flag states must require all seafarers have a medical certificate attesting to their medical fitness to perform their duties at sea and prescribe a standard form for medical certificates, as well as medical examination requirements. A "duly qualified medical practitioner" must be given full professional independence in exercising medical judgment when conducting medical examinations and issuing medical certificates, which must indicate the seafarer's hearing, eyesight, and color vision are satisfactory for the seafarers' duties. The certificates must also state the seafarer is not suffering from any medical condition likely to be aggravated by working at sea or which will endanger the health of other persons on board the vessel. Medical certificates for seafarers working on ships in international trade must be in English and are valid for up to two years, except those for seafarers under the age of 18, which are valid for up to one year. Color vision certifications are valid for up to six years.

A medical certificate issued in accordance with the Standards of Training, Certification and Watchkeeping for Seafarers, 1978, as amended (STCW) must be accepted as meeting the requirements of the MLC, 2006. Flag states are given flexibility in determining medical fitness standards and requirements for medical certificates. The MLC, 2006 recommends the *Guidelines for Conducting Pre-sea and Periodic Fitness Examinations for Seafarers* published by the ILO and World Health Organization (WHO) for guidance on seafarers' medical fitness and conducting medical examinations. These guidelines were updated in 2013 by the ILO's *Guidelines on the Medical Examinations of Seafarer*s.



The Maritime Labour Convention, 2006 requires flag states to develop and promulgate guidelines on shipboard occupational health and safety. Photo courtesy of the Seamen's Church Institute of New York and New Jersey

Regulation 4.1 Medical Care On Board Ship and Ashore

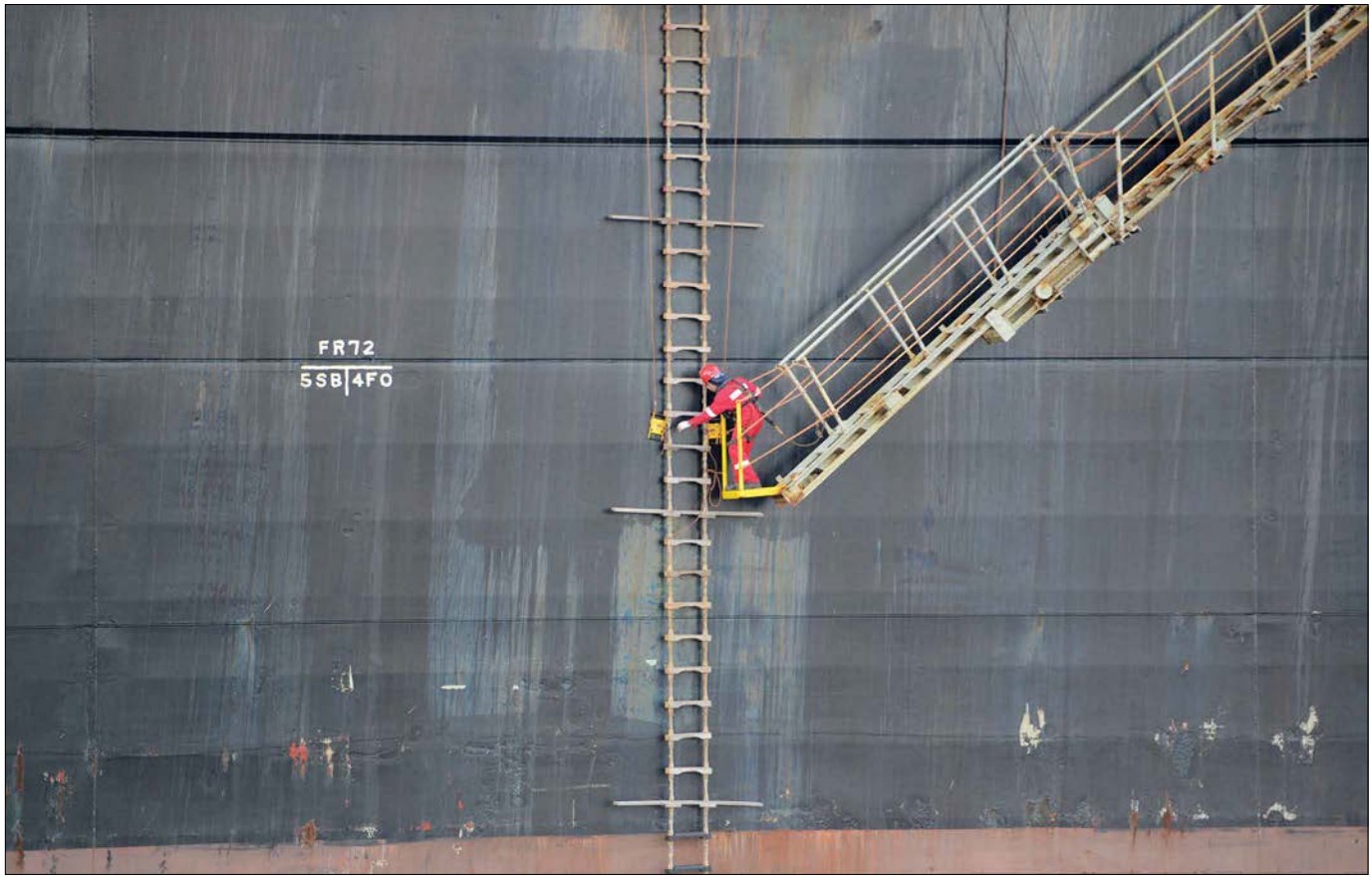
The MLC, 2006 establishes standards for flag states and port states to protect seafarers' health and to ensure they have prompt, no cost, access to medical care, including "essential dental care," when needed. Flag states also must establish requirements for their ships to ensure they provide adequate, onboard hospital and medical care facilities and equipment, as well as medical training for seafarers on board their vessels. Seafarers also must be allowed to go ashore when they need medical care in port. Medical care for seafarers on vessels must be as comparable as possible to medical care generally available to workers on land. Port states must provide access to medical facilities for seafarers on ships visiting their ports.

Flag states must adopt a standard medical report form to facilitate seafarers' medical treatment, but the contents must be kept confidential. It should be designed to facilitate exchanging medical and related information concerning seafarers between ship and shore in cases of injury or illness.

Ships must carry a medicine chest, medical equipment, and a medical guide appropriate to the vessel's operations and relevant recommended medical standards. The convention recommends the WHO's *International Medical Guide for Ships*, among other medical guides, for determining appropriate medicine chest contents and medical equipment, and that the medicine chest and equipment be properly maintained and inspected at least once a year.

Ships carrying 100 persons on voyages of more than three days must have a medical doctor on board. Ships that do not have a doctor on board must have at least one crew member who is in charge of medical care and administering medicine. There must also be at least one seafarer on board who has been trained to provide medical first aid in accordance with the STCW.

MLC, 2006 member nations must ensure there exists a prearranged system of providing medical advice, free of charge, to ships at sea 24 hours a day, irrespective of their flag. Ships on international voyages should have a copy of the *International Aeronautical and Maritime Search and Rescue Manual* on board, and seafarers should know how to use it.



Preventing accidents is a key element of the Maritime Labour Convention, 2006. Photo courtesy of the Seamen's Church Institute of New York and New Jersey

The convention recommends that each member country should consider participating in international cooperation for assisting seafarers in the following categories:

- obtaining medical care
- setting up health centers for training, research, medical treatment, and preventative health care for seafarers
- collecting and evaluating statistics on seafarers' occupational accidents and diseases

Regulation 4.2 Shipowners' Liability for Medical Care

The MLC, 2006 codifies shipowners' duties to provide seafarers' medical care, incorporating both the historic maritime law of rights to medical care and workers' compensation disability principles. MLC, 2006 member nations must ensure shipowners bear responsibility for financial costs for seafarers who become ill, injured, or deceased while employed on a ship. This financial responsibility includes medical care, room and board until the seafarer has fully recovered, the illness or injury is declared permanent, or maximum cure is reached. This responsibility extends to injuries or illnesses incurred during such service but do not manifest until later. The MLC, 2006 allows ratifying nations to limit by law or regulation a shipowner's liability for medical care and room and board to not less than 16 weeks from the day of the injury or the commencement of the sickness. Once a seafarers' sickness or incapacity has been declared permanent, the shipowner's liability ends. However, if the injury or illness was caused by employment, the shipowner can remain liable to pay for the seafarer's long-term disability benefits. The MLC, 2006 requires shipowners to provide financial security for seafarers' long-term disability caused by an occupational injury, illness, or hazard.

Shipowners are not liable for seafarers' injuries or illnesses that pre-existed employment and were intentionally concealed, that were caused by the seafarers' own willful misconduct, or were not incurred in service of the ship. The MLC, 2006 does not define "in the service of the ship," though the phrase has a specific meaning in maritime law. The MLC, 2006 provisions that codify general maritime law principles should be interpreted consistent with the general maritime law. The phrase, in ancient maritime law, is an element of seafarers' rights to medical care, not an exception or defense. It is understood as meaning "the whole period of service covering the seaman's articles." The phrase also includes illnesses or injuries incurred while a seafarer is on shore leave.

Regulation 4.3 Health and Safety Protection and Accident Prevention

The MLC, 2006 requires flag states to ensure seafarers on their ships are provided with occupational health protection and a safe and hygienic environment in which to live, work, and train. Measures to accomplish this include requiring ships to report occupational accidents, injuries, and diseases, as well as maintaining, analyzing, and publishing comprehensive statistics on occupational accidents, injuries, and diseases. Where appropriate, they must follow up with research on trends relating to identified hazards.

Yale University's Dr. Rafael Lefkowitz (far right) conducting occupational health research, accompanied by Seamen's Church Institute of New York and New Jersey chaplain and staff. Photo courtesy of the Seamen's Church Institute of New York and New Jersey

The Importance of Seafarer Occupational Medical Research

The MLC, 2006 sets minimum standards for member countries to collect data on seafarers' occupational illnesses and injuries and, where appropriate, to use the data for research. Seafarers have enjoyed the right to free medical care for centuries, and they have been provided medical care for centuries. Medical information on seafarers' diseases and injuries has also been collected for centuries. In modern times, maritime medical practitioners have amassed considerable experience and data.

Similarly, flag states have been collecting data on seafarers' occupational accidents, injuries, and diseases. Even though considerable medical data on seafarers exists, very little occupational health research on seafarers has been published. More research on seafarers' occupational health is needed for a number of reasons, including providing empirical bases for establishing standards for medical certificates, preventing occupational illnesses and injuries, and reducing expenses.

Each country establishes its own standards for issuing medical certificates that ideally confirm that seafarers are expected to be able to perform routine and emergency duties aboard ship, and that working on a ship will not endanger their health or that of their shipmates. A medical certificate does not certify a seafarers' general health or the absence of illness. The 2013 ILO guidelines on the medical examinations of seafarers are intended to assist flag states in establishing medical certification standards that are harmonized with other flag states and improve the quality and effectiveness of medical care for seafarers. The guidelines were created by a political process in an International Labour Organization and International Maritime Organization working group and not based on clinical studies or occupational health research on seafarers. Occupational health research on seafarers is needed to provide scientific bases for medical certificate standards.

Although there exists considerable data on seafarers' injuries and diseases, little is known about what causes those injuries and diseases. Seafarers' occupational health research could help provide answers to this and other seafarers' health issues. The results of such research would improve seafarers' health and well-being by providing guidance on preventing injuries and illnesses associated with seafaring occupations.

The medical care shipowners are liable for providing seafarers is a significant expense. Occupational health research on seafarers will reduce these expenses by identifying risk factors and recommending preventative measures. The research depends on analyzing all seafarers' health and wellness statistics.

Conclusion

The MLC, 2006 incorporates standards that reflect ancient seafarers' rights to free medical care. The greatest value of the convention is its potential for improving seafarers' health and well-being through prevention. Seafarers' have received medical care for centuries, but lessons learned from treating seafarers has not been adequately studied. The MLC, 2006 standards requiring collecting, analyzing, and researching data on seafarers' occupational illnesses and injuries, if properly implemented, will help prevent seafarers' illnesses and injuries and improve their health and well-being.

About the author:

Douglas B. Stevenson directs the Center for Seafarers' Rights at the Seamen's Church Institute of New York and New Jersey. He is a maritime lawyer and a retired U.S. Coast Guard officer, as well as a graduate of the U.S. Coast Guard Academy and the University of Miami School of Law.

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A Healthy Lifestyle Starts With a Healthy Menu

Watch portions, eat frequently, and don't be afraid to try something new and colorful

by Shannon Agor
Executive Chef, Culinary Operations
American Maritime Officers

Lesley Karentz
Manager of Medical Training
STAR Center

Alison Escalante
Registered Dietician and Certified Sports Nutritionist

American Maritime Officers (AMO) began offering health and wellness programs for members and their families more than a decade ago. As part of the wellness program, members have access to a registered dietician and fitness coach who provides individualized plans with continual follow up. Officers enrolled in courses at the Simulation, Training, Assessment & Research (STAR) Center are offered information on healthy dining, as well as opportunities to take fitness classes like cross-training and yoga. The health and wellness program also encourages mariners' wellness efforts through a monthly newsletter that provides wellness information, helpful tips, and recipes focused on a variety of topics like heart health, diabetes management, and mental health. Here, the chef and the registered dietician team up to provide readers with their views on nutritional wellness.

A Chef's Perspective

Fresh foods and fresh ingredients are the keys to healthy eating and a healthy lifestyle. Lean meats, healthy options, and portion control can help you feel satisfied while eating small portions every 3–5 hours. By maintaining a frequent meal and snack schedule, you can avoid being too hungry at the start of your next meal and overeating or being tempted by poor food choices.

We believe that we should offer "smart choices" in the galley, so we provide a lean alternative in all of our daily menus at every meal period. At breakfast we offer turkey-based meats and egg whites for lower fat, healthy alternatives. As chefs, we know that it is also important to offer favorite comfort foods, but we add more fresh herbs, vegetables, and natural purees instead of relying on fuller fat ingredients. We also offer healthy snacks 24/7, while striving to provide menus based on proper nutrition and

Centers for Disease Control illustration

Estimating Portion Sizes

1. 3 ounces of meat, fish, or poultry
   Palm of hand (no fingers)
2. 1 ounce of meat or cheese
   Thumb (tip to base)
3. 1 cup or 1 medium fruit
   Fist
4. 1–2 ounces of nuts or pretzels
   Cupped hand
5. 1 tablespoon
   Thumb tip (tip to 1st joint)
6. 1 teaspoon
   Fingertip (tip to 1st joint)

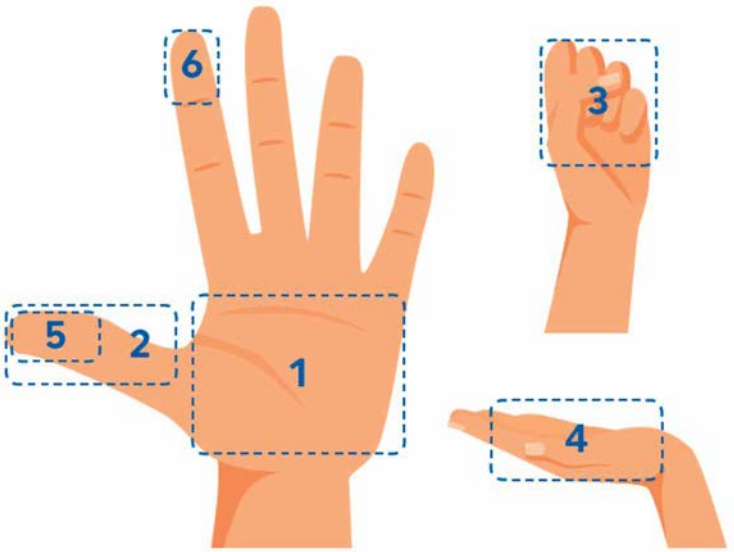


Image courtesy of the U.S. Centers for Disease Control and Prevention

approved by a registered dietitian. As an example, the galley chefs prepare pre-portioned entrée proteins, and we offer a wide variety of fresh vegetables and healthy starches like brown rice, quinoa, and sweet potatoes. As another tool to promote healthy eating, our entrée plate was decreased to 9.75 inches which means our members are not filling up on a large, overly full plate.

To prove that "Healthy Tastes Good!" our chefs continually come up with new and different ideas to keep the food interesting. Here are some tips to help you do the same at home or aboard a vessel.

Simple Tips for Getting Started on a Healthy Menu

Create a plan of short-term, healthy eating goals to avoid being overwhelmed.

- Steer clear of foods loaded with trans fats, extra sugars, high fructose corn syrup, and chemicals. Foods in this category may include junk foods, fast foods, and soda.
- Keep a list of your favorite healthy recipes for meals and snacks. Also keep your kitchen stocked with plenty of healthy ingredients.
- Buy foods that are in their most natural wholesome state and check out a local farmer's market.
- Learn to read food nutrition labels, which provide important information including serving size, calories, fat content, sugar content, and nutritional value.
- Make your plate a rainbow of color to ensure you are getting a wide variety of nutrients.
- To keep your food tasty and flavorful, experiment with new food flavors including herbs, spices, vinegars, and oils.
- Try not to eat anything containing ingredients you cannot pronounce or define.
- Limit ingredients on a food label to 4 or 5 items.
- Be careful to watch your portion sizes. If you don't have the time or means to measure your food, you can estimate using your plate and your hand (see graphics).

About the Authors:

Since 2008, Shannon Agor has been the executive chef of culinary operations at American Maritime Officers Plans in Dania Beach, Florida. Her professional career has been business management, menu, and sales since graduating Johnson and Wales University in 1994. She also spent more than a decade at a southern Florida catering company as a cook, sous chef, director of operations, vice president of catering operations, and owner.

As a registered dietitian and certified sports nutritionist, Alison Escalante has guided hundreds of individuals, including professional athletes, to reach their fitness, performance, wellness, and weight loss goals. In addition to clinical nutrition and the general population, she has developed customized meal plans for collegiate athletes, as well as NFL,

MLB, and NHL players; UFC fighters, NASCAR drivers, and national competition teams. She is currently involved in scientific research with some of the most well-known nutrition scientists in the field. Escalante is also certified as a licensed nutritionist, nationally qualified National Physique Committee competitor, and personal trainer.

Lesley Karentz has been a registered nurse for more than three decades, beginning her career as a nutrition support nurse at a large metropolitan hospital. Since 2004, she has been the manager of medical training at the STAR Center, in Dania Beach, Florida. Having been a live-aboard sailor, as well as having assisted with towing company operations and worked as crew on large motor yachts, she is able to bring a unique perspective to mariners' concerns and training. Her professional credentials include Department of Transportation drug and alcohol collection instructor and regional faculty for American Heart Association (2005-2018). She is a member of the Substance Abuse Professionals Administrators Association and National Drug and Alcohol Screening Association. She has served on the Merchant Mariner Medical Advisory Committee since its formation in 2011, and is an active member of the Fort Lauderdale Mariner's Club and the Women's International Shipping and Trading Association (WISTA).

About American Maritime Officers:
American Maritime Officers (AMO) is the largest union of U.S. merchant marine officers employed domestically and internationally aboard U.S. flagged vessels in a multitude of industry sectors. AMO Plans provide medical, vacation, and health and wellness benefits, safety and education, and retirement services.

Shrimp Fried Cauliflower "Rice"

Yield: 6 cups, 12-4 oz. servings

Ingredients

1 T coconut oil

1 t sesame oil

2–3 T chopped, pickled ginger OR **2 T** minced, fresh ginger

1 c white onion, finely chopped

⅛ c reduced sodium soy sauce

4 cloves garlic minced

8 scallions chopped

12 oz. shrimp peeled and deveined, marinated

1 medium carrot chopped

½ c peas

¼ c red bell pepper, finely chopped

4 c raw cauliflower rice (1 ½ whole cauliflower)

1 lemon or lime juiced, plus zest

2 eggs beaten (optional)

To Taste white or black pepper OR **¼** minced serrano chili

Directions

1. Heat a wok or large pan over medium-high heat.
2. Melt the coconut oil and add the sesame oil, ginger, onion and garlic to the pan. Cook for 3–4 minutes until the onion starts to soften.
3. Add the shrimp and cook for 1 minute.
4. Add the cauliflower, carrot, and bell peppers to the pan. Cook for 3–4 minutes.
5. Add soy sauce and toss well to coat. Add in peas and scallions. Add additional soy sauce for taste, if desired.
6. If using eggs, clear a circle in the center of the pan and pour in the beaten eggs.
7. Stir to scramble the eggs and then combine with the other ingredients and citrus zest.
8. Season rice with white or black pepper to taste.

*If using fresh, whole cauliflower, cut the cauliflower in half and remove the hard center, cutting it out with a knife, and grate on a box grater or pulse in a food processor until it is the size of rice.

*Marinated Shrimp—Dash sesame oil and low sodium soy sauce, olive oil to coat, minced fine garlic and fresh ginger. Let marinate 30 minutes before cooking.

Telemedicine Enhances Physical and Mental Health Resources Aboard Ship

by Lawrence Jacobson
General Counsel and Managing Director
Future Care Inc.

Ships float. They float on water and often far away from land, which is where, stubbornly, you find the overwhelming majority of medical professionals—physicians, nurses, psychiatrists, counselors, and others. This has presented seafarers with a serious and persistent problem for tens of thousands of years, perhaps as many as 130,000 years, according to a relatively recent discovery in Crete.[1] Echoing their sometime marriage vows, for better or worse, humans take the good and the bad, including their health, with them when embarking on a sea voyage of any duration or distance from land.

Other than occasionally planting a medical professional on board ship, the greatest advance in bringing health to the seafarer undoubtedly is telemedicine. The astounding combination of sophisticated, inexpensive electronic medical instrumentation and remote physician consultation provides the mariner with access to shipboard healthcare unparalleled in maritime history. Before telemedicine, the best that the seaborne mariner could expect when in need of medical attention was shoreside treatment when port was reached. U.S. Coast Guard and other helicopters have hastened the ability to reach shore in limited emergency situations, but have not fundamentally altered the response dynamic.

With the combination of immediate shipboard diagnosis, available through a handful of electronic instruments that can be attached to a smart phone or tablet, plus the physician's remote evaluation, telemedicine becomes a game-changer for the seafarer. Although limited by the ship's medicine chest, with professional guidance the medical officer can effect an immediate, and hopefully more efficient, response to emergency situations. Equally important, telemedicine often can alleviate the anxiety caused by wrong or self-diagnosis, reducing the catastrophic to the commonplace.

Shipboard telemedicine's role is not limited to emergency situations, however. Its greatest contribution to the mariner's medical welfare may well be its use in less dramatic circumstances, like the monitoring and treatment of chronic illness and practice of general preventative medicine, physical and mental. The pre-employment medical examination (PEME) likely has saved or prolonged the lives of numerous seafarers by identifying serious medical conditions before heading seaward, allowing for personal, shoreside treatment. However, the PEME may also identify the chronic illnesses that afflict many of us in some form or another—hypertension, diabetes, cardiovascular, and gastrointestinal problems—which the seafarer then takes on board ship with him for many months, frequently without any further organized medical support. A remote consultation with a medical professional can promote seafarer health in a variety of ways, including diagnosis and medication adjustment. Intangible benefits include the mariner's increased sense of well-being knowing that professional help is a computer screen away, even while in the middle of the ocean.

Expanding on the diagnosis element of a remote-wellness consultation, the mariner's ability to discuss his or her overall health in a non-emergency situation may reveal, or allow for a discussion of, the more difficult subject of mental health. To mariners and scholars alike, the factors of shipboard life contributing to mental disorders are well known and can include, but are not limited, to:

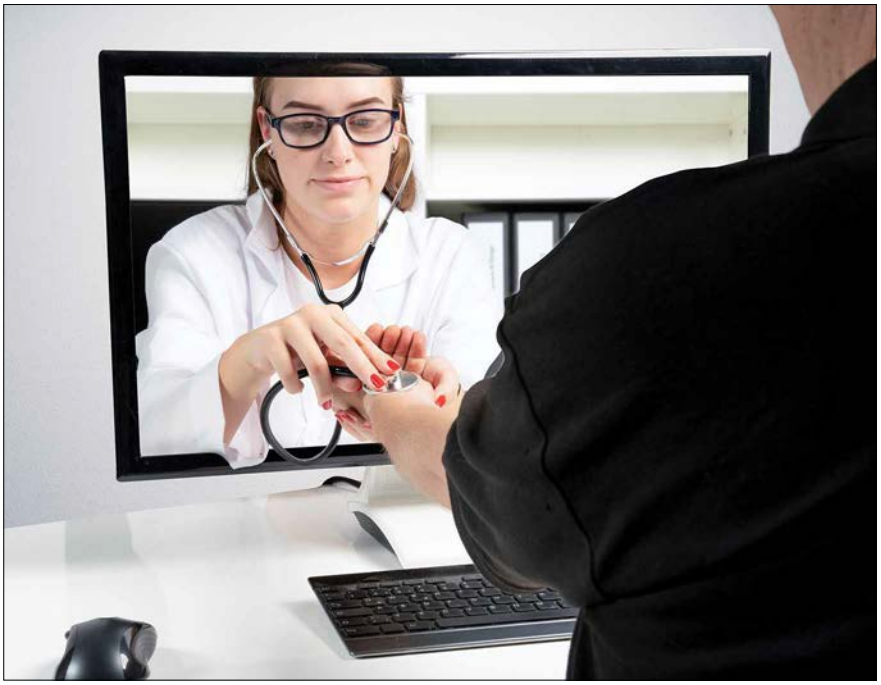
- missing family and friends
- social isolation
- lack of sleep
- multiculturalism and nationality—differences in language, culture, and diet
- work-related stress
- lack of exercise

Additionally, women may experience seafaring differently than men, in that they may have to deal with gender discrimination in addition to all the other strains of the job.[2]

However, there is an unwelcome element of serendipity in relying on the seafarer to spontaneously divulge mental problems during a remote-wellness consultation, although obviously the skilled physician can and should ask some basic questions. Ideally, the first element

of a shipboard mental health wellness program is to implement a screening process. Screening may be done orally, with the screener asking questions, with pencil and paper, or using a computer. Not only does mental-health screening raise awareness, it helps ensure that shoreside personnel and the ship's command are following a standardized, evidence-based protocol to identify individuals at risk. Screening also offers guidance for developing an action plan to manage risk. Repeated surveys may provide a measure of program effectiveness.[3]

The second component of mariner mental health wellness requires assembling appropriate resources to provide both prophylactic and responsive programs, accessible on board and ashore. One of the key elements of both types of programs is a dedicated 24/7 helpline available to the mariner at sea and at home. When properly staffed, the helpline serves a variety of functions, conveying psychological telemedicine, general counseling, and wellness coaching, as well as functioning as a gateway to other resources.



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The virtual presence of the health care professional can, by itself, greatly improve treatment benefits. Professionally conducted videoconference calls enhance psychotherapy or "talk therapy," that is, one-on-one discussions between the crewman and a therapist. Talk therapy is customarily used to treat many forms of non-psychotic mental health issues. If successful, it can postpone the need for unscheduled repatriation and/or shoreside treatment during the voyage. It can also prevent or postpone the need for medication.

Establishing positive health behaviors on board ship is an effective method of improving mental health generally. Included among the many measures are regular exercise, healthy eating habits, time management, adequate sleep, socialization with other seafarers, communication with family and loved ones, and limiting smoking and alcohol consumption. Additional processes include the creation of peer-to-peer support groups and morale activities like periodic gatherings, shipboard group meals, and recreational activities such as movies, as well as book and cultural clubs.[4]

Conclusion

Telemedicine can serve as the means of bringing vastly improved physical and mental health resources to mariners while on board ship. It can act as the pipeline for both immediate emergency professional medical response and the perhaps more difficult challenge of managing the chronic and sometimes hidden ailments affecting the modern seafarer. Other methods to maintain physical and mental wellness while on board a ship include developing a shipboard wellness program that includes not only medicine but diet, exercise, and increased shipboard socialization.

About the Author:

Lawrence Jacobson is a maritime and insurance attorney, and former Protection and Indemnity Club manager. He has extensive experience in handling and litigating a wide variety of maritime liability claims, including bodily injury. He acted as coverage counsel for several large domestic carriers, and litigated multiple first- and third-party yacht policy claims. Mr. Jacobson is currently managing director and general counsel for Future Care Inc., where he assists CEO Christina DeSimone and the team in bringing quality health care to mariners, shipowners, and their insurers worldwide, at sea and on land.

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Staying Healthy While on the Go

by Andrew Jenner
Global Account Manager
ATPI Group

Getting on a plane, can be like crawling into a petri dish. In fact, the last three times I flew internationally, I became sick soon after. Since mariners can live anywhere, and often not in a port area, traveling to the vessel's location by air is often unavoidable. Consequently, so is the possibility of becoming ill during the flight.

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This can be attributed to the unique environment on board the aircraft. For example, one of our bodies' natural defense mechanisms against airborne contaminants is the production of mucus, which dries up in the aircraft's low humidity. This combined with potentially sick fellow passengers transmitting their germs or viruses through the recirculated air places travelers at risk for countless maladies. With a little precaution, and the advice below, you can stay healthy while traveling by air.

Plan

Stress impacts our natural defenses, and flying can certainly be stressful. With a little planning, some stress can be greatly reduced, and that includes preventing a negative impact on sleep. Leaving things to the last-minute, not only increases stress, but may cause a lack of preemptive sleep. Additionally, when making airline reservations, consider a flight that arrives in the morning, especially when transiting time zones and losing several hours of sleep. Our body clocks are tuned to be awake during daylight hours, so a morning arrival will provide that visual daylight cue to help reset your internal clock.

When travelling expect travel delays. They are inevitable and beyond our control, so don't stress out over them. If your expectations are in line with reality, you will be much less frustrated and upset. Consider travel a good time to read that book that's been on your nightstand or tablet for the last few months.

Plan Not to Stress

- Pre-pack your luggage
- Exercise and eat right the days before your trip
- Conclude personal, work, or family related last minute affairs
- If you take prescription medication, always pack it in your carry-on. Checked bags are sometimes lost or delayed
- Confirm flight and hotel reservations
- Print your boarding pass or have it readily accessible on your cell phone
- Get to the airport early and allow time for traffic, baggage handling, check-in, and security

Keep it Clean

Remember, everything you touch at the airport and on the plane has already been touched by someone else. Your best defense against germ transfer is sanitizing wipes or gel with at least 60 percent alcohol. Use them frequently after touching surfaces in the airport and on the aircraft. After boarding the plane, wipe down your seating area, including armrests, the tray, and the seat

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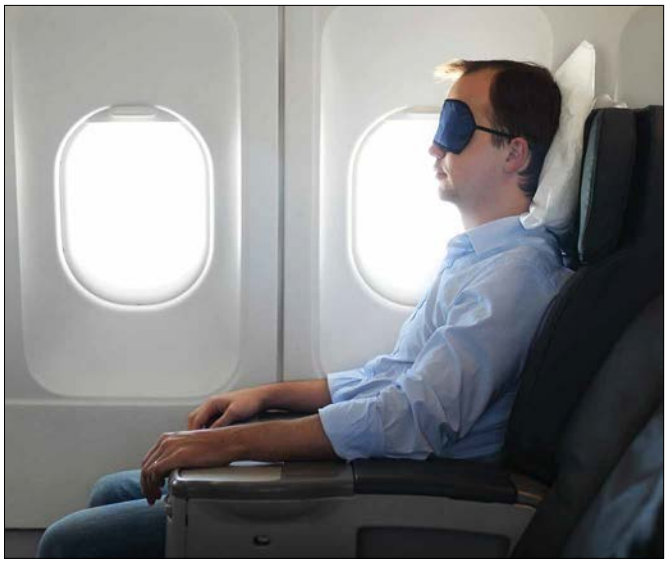
belt buckles. If you use the airplane toilet, wash your hands well and open the door using a paper towel.

Jet Lag

Traveling across time zones throws off your circadian rhythm by desynchronizing your internal clock and external time. The more time zones you cross, the more likely you are to be sleepy and sluggish. In general, it is more difficult to "lose" time than it is to "gain" time. When traveling east we lose time, and when traveling west we gain time. It takes about one day to adjust for each hour of time change. Downloading a highly rated app like Time Shifter or Uplift may be beneficial and help overcome the effects of jet lag. Travelers can receive personalized advice and jet lag plans from both.

While you may not be able to eliminate jet lag completely, you can lessen its effects with some simple strategies. Your circadian rhythm is internally generated and influenced by the environment, behavior, and medications. It is important to expose yourself to light during the waking hours, and conversely, minimize light when it's dark outside. Match this cycle by opening or closing the window covers on the plane at the appropriate time. Additionally, use eye covers to block the ambient glow from computers or reading lights. Ear plugs or noise canceling headphones will also help a great deal.

Think about taking a short nap on a short flight and a longer one on a longer flight. On longer flights consider resting during the latter portion, so you will feel refreshed as the flight approaches its destination. Don't snooze too long unless you have a long flight. Napping more than 30–45 minutes may put you into a deep sleep, making you feel more tired when you wake up.



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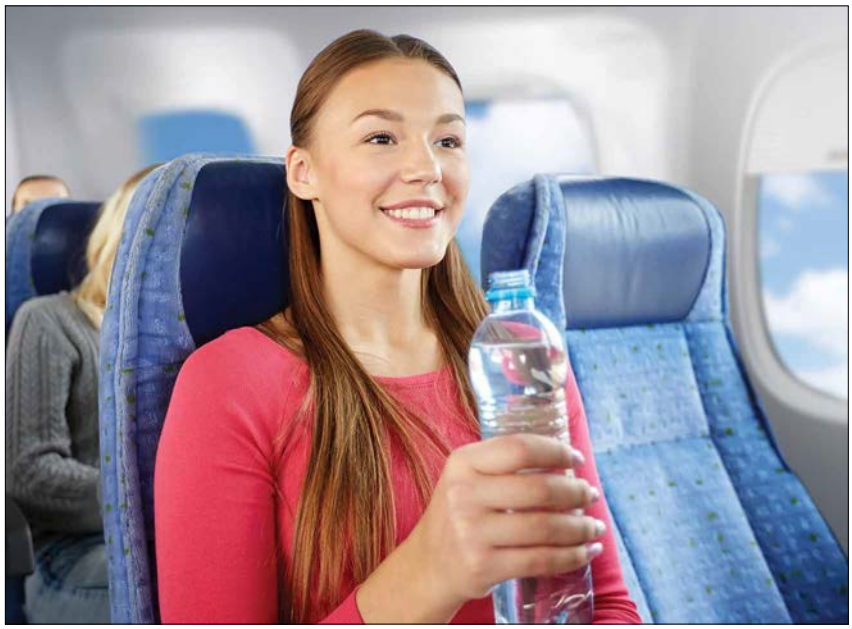

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Airline Travel Tip

If you normally wear contact lenses, consider wearing glasses instead. The low humidity on board the aircraft dries eyes.

Traveling with a "sleep kit" is a great idea, and highly recommended. In addition to the already mentioned ear plugs and eye covers, soothing music and perhaps a vial of lavender oil are just few suggestions. Think about your well-being and include items that enhance your comfort and reduce stress. It's worth it!

Get Comfortable

Wear something comfortable, loose-fitting, and layered. You never know if it will be too hot or too cold on the plane. Take off your shoes or at least loosen the laces to improve circulation, then get a pillow or two and a blanket.

A travel pillow that fits around your neck is also helpful. It will keep your head stable as you nap and may prevent a stiff neck. Your neck is not the only body part that may get stiff, so be sure to stretch regularly and get out of your seat when possible. Blood clots in the leg veins from traveler's thrombosis can occur during long flights and there are many risk factors, so having a check-up before you go is wise. For an otherwise healthy person, the best defense is prevention. Either way, don't underestimate the benefits of stretching your leg muscles and do it often.

Drink Water

As noted, air travel can be dehydrating, but drinking plenty of water will help counter the effects of the dry, recirculated air. It will also help with circulation and reduce jet lag. It's important to avoid alcohol and caffeine, as they are diuretics and cause you to go to the bathroom frequently, requiring more water to stay hydrated. Remember, one alcoholic drink in the air can have the same impact as two on the ground. Also, carbonated beverages may produce uncomfortable excess stomach gas.

Relieve Ear Pressure

Never fly with serious sinus/ear congestion, whether from a cold, allergy, or upper respiratory infection. If you do, you may experience severe pain and damage your eardrums. To avoid these issues, you must be able to "clear" your ears by gently but forcefully by exhaling against a closed mouth and nose. Antihistamines and decongestants may significantly help.

Pressure problems are generally worse on landing. So, make sure your ears feel clear before you descend. Chewing, yawning, and swallowing as the plane ascends or descends helps move air to the middle ear and sinuses.

With mariners, when arriving to work or to a vessel, taking a day off may not be the best option, but if you do get sick after traveling, it might be necessary to recoup.

AndreyPopov | BigStockPhoto

About the author:

Andrew Jenner is a senior global account manager with ATPI, a long-established travel management company, and one of the most experienced in the travel industry. Andrew possesses more than 20 years' industry experience specializing in the marine and energy sectors. The ATPI group delivers world-leading travel and event solutions to organizations operating in a variety of specialist sectors around the world.

Reflections on the International Maritime Organization's *Guidelines on Fatigue*

by Ira Douglas
Vice President of Labor Relations
Crowley Maritime Corporation

Perhaps the most malevolent impact of fatigue is the resulting drop in judgement. Conspiracy theories abound about casinos pumping in oxygen to keep gamblers awake on the theory that the longer a gambler remains awake, the less risk-averse they become. Whether to keep gamblers awake or to refresh smoky air, the mixture of long hours and loose judgement has helped build many a casino. As stakeholders in a 24/7 transportation operation, it is crucial that systems are put in place to avoid unnecessary gambles, whether we can pump in oxygen or not.

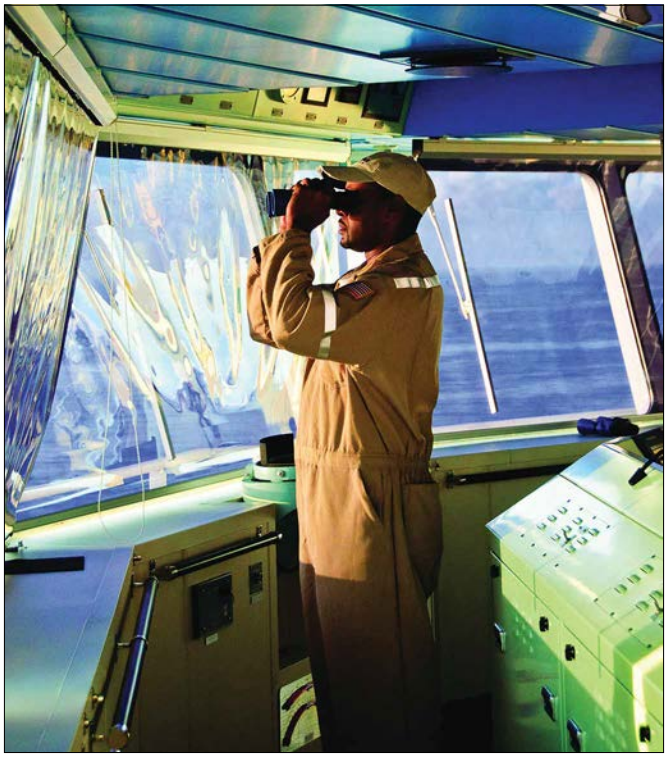
The consequences of fatigue can be devastating. On June 30, 2014, the workboat *Nora Victoria* was navigating in coastal waters off Norway when the captain activated the autopilot and sat down in the navigator's seat. While seated, he fell asleep. Ninety minutes after engaging the autopilot, he awoke as the vessel grounded. This would have been bad enough but, possibly due to sleep inertia and the continued impact of fatigue on judgement, the captain did a limited damage assessment and decided to back the vessel off and continue to make way for his destination. Shortly thereafter, he realized the vessel was taking on significant water. His next effort to intentionally ground was unsuccessful and *Nora Victoria* foundered.

Sleep Inertia

Sleep inertia is the feeling of grogginess and/or impairment felt just after waking up.

In every accident investigation by the National Transportation Safety Board (NTSB), or its counterpart in other countries, the aspect of fatigue is included as part of their investigation, and fatigue is found to be a contributing factor with fair regularity. In 2017 alone, the NTSB determined fatigue was a factor in the *Cerro Santiago/Tampa, Lydia & Maya, Nathan E Stewart/DBL 55*, and *Specialist* accidents. Determinations such as these have a tendency to gain attention of local and national regulators as well as the International Maritime Organization (IMO).

It is the IMO's mission to provide international standards about all aspects of shipping to be followed by national administrations like the Coast Guard, organizations like the American Bureau of Shipping, ship owners, and mariners. This includes, among others, safety and environmental standards, training requirements, and shipbuilding requirements. Over the past three years at



Effective watchkeeping and rounds require attentiveness and focus with all senses. Arming mariners with tools to mitigate fatigue and stay focused enhances safety and quality of operations. Photo courtesy of Crowley Maritime Corportation

IMO, the Human Elements, Training and Watchkeeping (HTW) Subcommittee of the Maritime Safety Committee has been developing revised *Guidelines on Fatigue*. These were published January 24, 2019.

I was fortunate to participate as a member of the U.S. delegation to the IMO for the HTW sessions the past several years. I worked on this topic at the meetings there, and as a member of the Merchant Marine Personnel Advisory Committee (MERPAC). As one can imagine, developing common sense, realistic guidelines to manage fatigue for administrations, operators, and mariners, and creating a framework in which to manage fatigue on board is no simple task. Coming up with these guidelines during a few of days' worth of meetings over the course of three years at an international body with well over 100 nations offering input adds further complexity. Even science can be up for debate.

For example, one delegation wanted to publish tools for measuring fatigue as part of the guidelines that were developed in a land transportation environment. Picture the Department of Transportation work hour limits for truck drivers in the United States. One specific tool would have deemed that an 8–12 watch seaman working the 8 a.m. to noon shift *and* the 8 p.m. to midnight shift each day, who worked only their watch with no extra overtime, maneuvering, etc., would present an unacceptable risk of being fatigued. Alleviating the risk using this tool would have required that mariners receive two days off for every seven days on board, essentially an artificial weekend. The science behind this conclusion may have been true for a truck driver who works eight straight hours, may have a commute, or need to check in/out of hotels, and deal with other shore-based distractions. It does not reflect the reality on board a ship. Those who have sailed in a traditional three-watch system know the 8–12 watch as typically the easiest of which to manage their rest and mitigate fatigue. The same unacceptable risk would exist for the 4–8 or 12–4 for those who have different circadian preferences.

Fortunately, the guidelines as published exhibit more common sense for the maritime industry, and it is understood that research specific to maritime fatigue should be the standard used for IMO instruments. This final work is not perfect, but is a significant improvement over the previous guidelines issued 20 years ago, and hopefully will be used throughout industry to help manage fatigue. It's unfortunate, but until I began working on the revisions to the guidelines, I didn't know of their existence.

Shipboard personnel engage in labor intensive and skilled work, such as piston pulls. Managing fatigue to remain at peak performance is a significant challenge. Photo courtesy of Crowley Maritime Corportation

Procedures and checklists are key parts of Safety Management Systems. The revised guidelines, hopefully, will help operators integrate fatigue into their SMS. Photo courtesy of Crowley Maritime Corportation

I'm positive I'm not alone. The new guidelines are written in simple, concise language with helpful information on diet, exercise, mental health, and sleep—all critical elements of managing fatigue.

The guidelines are a product of a long list of contributors from throughout the world, but perhaps none had more input than the U.S. delegation, which was a well-prepared group, largely due to work done at MERPAC. As an advisory committee, MERPAC demonstrates the best example of industry stakeholders—including owners, training institutions, and mariners—I have seen working with the Coast Guard to identify areas for improvement and working hand in hand to develop solutions. The Coast Guard, especially the Office of Merchant Mariner Credentialing (CG-MMC), deserve tremendous applause for their willingness to listen to industry concerns and partner to make things better. This partnership means representatives from industry including pilots, ship managers, maritime unions, training facilities, doctors, and mariners, volunteered their time over many days to review this material and find ways to improve it. They did this knowing the Coast Guard would advocate the best position for safe commerce on the waterways.

So, what next? The new guidelines have been published, but they are lacking the finished appendices that will contain tools to help identify, mitigate, and manage fatigue. MERPAC will continue working on these tools in preparation for the next HTW session. I would encourage those interested in this topic to provide feedback to members of MERPAC, MEDMAC, or the CG-MMC office, which leads the U.S. delegation to the IMO on this subject.

Managing fatigue is critical to a safe operation, but is very challenging in a 24/7 work environment with often difficult environmental conditions. Strides are being made to mitigate this hazard, including tracking work and rest; company management systems that encourage speaking out when a hazard has been identified; and knowledge about other factors, like diet and lighting, that can play a role. But all parties agree, we still have a way to go on this subject. It is the hope of this stakeholder that the new guidelines and the soon-to–be-developed appendices will further the progress in managing fatigue across the industry. I believe it has better odds to do so than pumped in oxygen.

About the author:

Ira Douglas is the vice president of labor relations for Crowley Maritime Corporation. He is also a member of MERPAC, and a former USCG licensed engineer.

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Editor's note: This article was written with assistance from Andrew McGovern, a retired Sandy Hook Pilot and former chair of MERPAC.

Addressing Mariner Fatigue

Knowledge is power, but action is change

by Jo Ann Salyers
Independent Consultant, Owner
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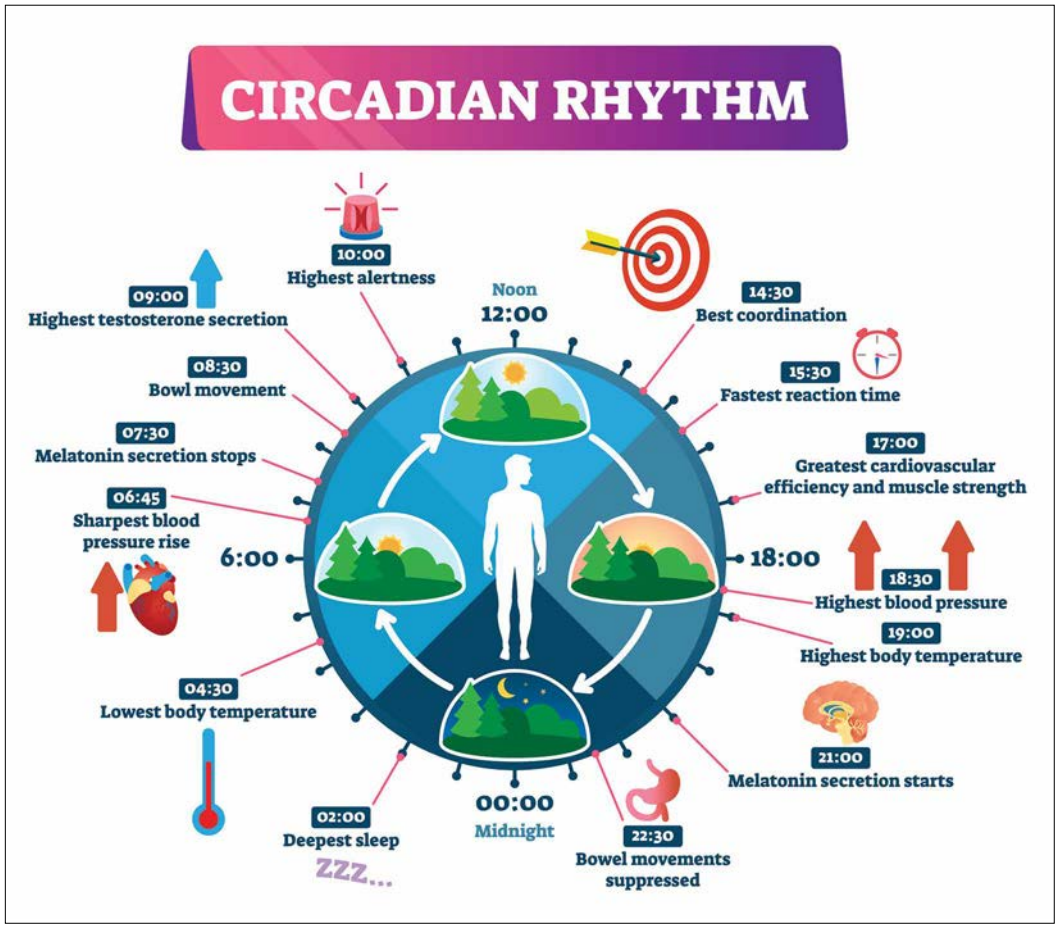
Humans are not designed for the lifestyle and 24/7 environment of the maritime industry. The natural circadian rhythm, or "biological clock," contributes to a crew member being sleepy or alert on their schedule and individual watch. Without proper management, not being able to follow your body's circadian rhythm can have a variety of negative effects including fatigue, health issues, reduced endurance, and poor cognitive skills.

Recognizing Fatigue in Yourself or Others

There are signs and symptoms that typically result from mental or physical fatigue. A crew member experiencing fatigue may appear to be exhausted or move slowly and exhibit reduced coordination. Fatigued shipmates may also be slow to respond to directions or warnings, or display poor decision making, including exhibiting risky or impulsive behaviors. If you frequently find yourself feeling exhausted, sluggish, lethargic, and tired, or if you are experiencing lack of energy or motivation, muscle aches or headaches, or difficulty concentrating, it is possible that you are experiencing fatigue.

The symptoms of fatigue are usually alleviated by a sufficient quantity of quality sleep, but it may take some time. As an example, during one of my U.S. Coast Guard Crew Endurance Management System (CEMS) coaches' classes, one crew member working 28-day hitches and a square six watch, or a repeating schedule of six hours on-duty followed by six hours off-duty for the duration of the voyage, told me that by the third week they were so fatigued that they considered week three "hate week." He said everyone was short tempered, tired, and less sociable by this point. When I asked about week four, he said that they saw the light at the end of the tunnel so everyone perked up.



VectorMine | BigStockPhoto

Most crew members report that when they get off the boat after a hitch it usually takes them, on average, two days at home to "decompress," recover from fatigue, and feel normal again. A CEMS

awareness level class was held with mariners' spouses and they supported this statement. After they learned about the effects of the reduction of sleep quality and quantity on the vessels, they understood why their spouses needed this decompression time when coming home, and why they needed to be well rested to return to work.

Wollwerth Imagery | BigStockPhoto

Consequences of Fatigue

The effects of fatigue can put individuals and vessels at risk for near misses and accidents. Accident investigations will often consider information such as sleep quality and quantity, work/rest history, time of watch, evidenced behaviors, self-reported condition, and circadian factors—what time of day the accident occurred—to determine whether fatigue may have been a contributing factor. It is important, therefore, for crew members to focus on proactively recognizing and managing fatigue before its effects become severe enough to affect performance and safety.

Managing Health to Manage Fatigue

Regarding fatigue, is your body a well-maintained machine or an accident waiting to happen? Understanding how your body works and the roles that sleep, nutrition, hydration, and other factors play in keeping you healthy and alert is important. Most people take better care of their vehicles than of their own bodies. We tend to have the oil changed, the engine tuned up, and maintenance performed "per manufacturer recommendations," but many individuals don't have regular checkups or pay attention to signs of trouble with their bodies. Keep in mind that a person doesn't develop high blood pressure, Type 2 diabetes, heart disease, or other medical conditions overnight. We put poor fuel in our bodies, don't take care of them, and still somehow expect optimal performance.

Your vessel wouldn't operate well on the wrong fuel and with little or no maintenance. Similarly, you are likely not operating at your optimal level. Risk factors like lack of sleep or poor sleep quality and common health issues, in addition to other factors, may be affecting your work performance. Over time these risk factors lead to fatigue, impaired performance, and a lower quality of life inside and outside of work.

Health Risk Factors

Common Risk Factors contributing to suboptimal health

- Poor sleep quality or not enough sleep

Common health issues

- Type 2 diabetes
- high blood pressure
- sleep apnea
- obesity

Environmental conditions

- noise
- temperature
- vibration

Other factors

- stress
- caffeine and nicotine abuse
- use of over-the-counter medications

Importance of Metrics to Assess Health

Standards of measurement are used in every aspect of the maritime industry including safety, operations,

maintenance, near misses, accidents, and fuel consumption. The results of these metrics are used to update processes and procedures to improve the same. Remember, you can't improve what you don't measure. It is important to understand that, just as metrics are important for your operation, they are also critical for making sure that crew members are healthy. For example, when we go for regular medical exams and checkups, medical providers are able to gauge our health using metrics. During the exam, medical providers may measure blood pressure, cholesterol, weight—including the dreaded BMI—and assess how we feel, overall. If the results are normal, the medical provider may advise on how to maintain wellness. If the results are abnormal or poor, the medical provider can often address problems early, in some cases before medication is needed, or before negative complications like heart attack, stroke, or death occur. For many licensed mariners, obtaining regular medical exams to assess their health metrics may help them manage their mental and physical health so that they can continue with their professions. Fortunately, more companies are putting additional money and time into their wellness programs to help along these lines as well.

Superman Complex

With or without these metrics, we often have misconceptions about our ability to perform our jobs. We think we are in good condition to handle our duties in the safest manner and make the best decisions. When we add up how much quality sleep we get, our physical condition, and the environment where we work and live while on the job, we may not realize that the more fatigued we are, and fatigue is cumulative, the harder it becomes for us to accurately gauge our abilities to perform tasks and make good decisions.

shmeljov|BigStockPhoto

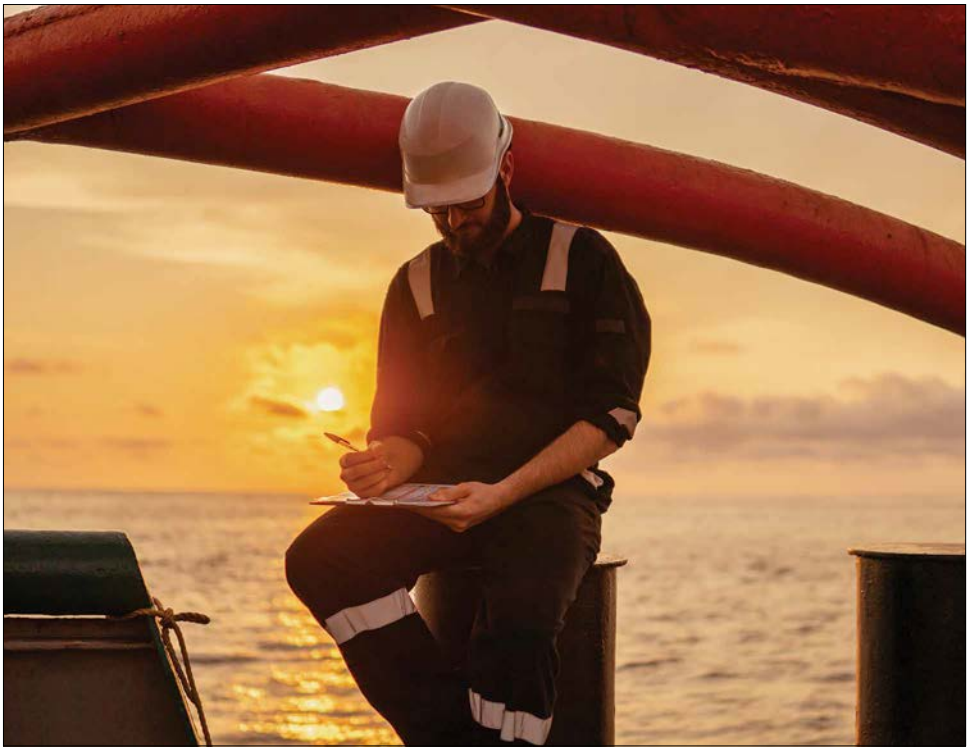
Many individuals are surprised to learn how small changes can greatly reduce fatigue and increase endurance. Oftentimes there are "quick win" solutions, including:

Nutrition: The key is moderation, timing, and paying attention to how certain foods, eaten at certain times, affect each individual. Foods that may not adversely affect you if eaten during the day may not be able to be eaten at night when changing shifts because of the way digestion works with the body clock. When beginning a watch, aim for foods high in fiber, protein, and good fats, for example eggs, oatmeal, lean meats, nuts, fruit, cottage cheese, yogurt, avocado, peanut butter, and whole-grain bread. Higher protein when coming on watch provides energy and the amino acids necessary to work, stay alert, and make good decisions. Eat lighter before bedtime because too much food, a heavy meal, or spicy or greasy foods can disturb sleep. Poultry, fish, vegetables, fruit, whole-grain breads, and cereals are good choices for evenings. Even ice cream is OK in moderation!

Quality sleep: Although you may not be waking up, noise, vibration, or other risk factors could be preventing you from getting quality sleep, so adjustments in your sleeping area can increase deep sleep and prevent fatigue. Try using eye covers or installing room darkening shades, turning off electronics, dampening sound with more insulation, and ensuring engine room doors are closed and courtesy policies are in place. Additionally, keeping sleeping areas between 65 and 68 degrees F allows for optimal sleep.

Over-the-counter and prescription medications: Certain medications may be better suited for a specific watch or may not be suitable to use while on the vessel. For example, if taking sleep aids on the vessel a crew member needs to dedicate 8 hours to sleep. Sleep aids may affect performance when having to wake up after less sleep for watch or in case of an emergency. Some medications labeled "daytime" or "p.m.," as well as antihistamines, may have the opposite effects on crew members. So, don't try a new medication while on the vessel and, if needed, discuss with your physician the best medications to take with your particular schedule. For example, if a crew member is going to take melatonin while on the vessel try it at home first to judge timing and see what dosage is most effective so as not to be groggy when waking up after a short sleep.

Light management: Certain intensities of light, used at certain times, affect your ability to stay awake or get quality sleep. Crew members coming on watch at night need to use as much light as possible to suppress the secretion of melatonin until three hours before getting off watch. From that point until going to bed in the morning, those crew members should be in light as dim as possible to allow the body to start producing melatonin and enable the crew member to get a better-quality sleep. At 0600 the crew members getting off watch and going to bed should have dim lighting in the galley, hallways, bunkrooms, and bathrooms. A dim hallway also helps with noise because individuals tend to be quieter when the lights are dim. For crew members coming on watch at 2400, lighting should be bright in the galley, bunkrooms, and bathrooms to suppress melatonin.



Heatray | BigStockPhoto

Caffeine: Used properly, caffeine is a very good countermeasure to fatigue, and studies show that it has health benefits. If used improperly, it can cause insomnia and contribute to health problems. It should not be consumed within four hours of bedtime, but is most appropriate halfway through the night watch and in the mid-afternoon when the afternoon dip in alertness hits. A cup of coffee when you wake up from sleep feeling groggy will help relieve that sleep inertia. However, high doses of caffeine lead to insomnia and addiction, resulting in caffeine losing its effectiveness as a stimulant.

Exercise: Exercise can increase your alertness, relieve stress, and improve mental and physical health. Although there may be some parts of your job that are physically demanding, exercise is still needed to improve your physical and mental health. This can include toe touches and stretching, which if done safely while on watch, will boost your energy. Brief bouts of exercise will also help maintain alertness, but all exercise should be completed one to three hours before trying to sleep.

Schedules: Many crews work a square six schedule, or 0600 – 1200 – 1800 – 2400. If staying with that schedule, depending on where a vessel operates, it may be useful to adjust that schedule to 0500 – 1100 – 1800 – 2300 to help keep the crew members getting off watch in the morning hours from being exposed to sunlight before going to bed.

Healthier Work and Life

After identifying the risk factors affecting your operation, vessels, or individual crew members, it is important to find a solution that will fit and is sustainable. There is no one-size-fits-all answer to reducing fatigue and increasing endurance. There are tools to assist with these efforts, including the CEMS and the American Waterways Operators *Fatigue Risk Management Guide*. In reality, it may not be possible to eliminate or reduce some of these risk factors in the industry, but once identified, awareness of key risks makes the work environment safer for everyone.

Happier and healthier crews are an important part of the long-term success of the maritime industry. Some companies have given me the opportunity to hold CEMS Awareness sessions with their wheelmen's spouses to give them the tools to help their mariners at home and on the vessel, because tying both lifestyles together is essential. Through education the goal is SIMPLE—Smart Ideas in Moderation and Planning for a Lifetime of Excellence!

About the author:

Jo Ann Salyers is an independent consultant and owner of Salyers Solutions, LLC, with more than 35 years in the safety, training, and risk management areas of the maritime industry. Regarding fatigue mitigation Jo Ann is a certified USCG CEMS expert, holds CEMS Coaches, and Awareness sessions and speaking engagements. She can be reached at joann@salyerssolutions.com

Fatigue Risk-Management Plans

Supporting mariners to promote safety

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Whether it is that post-lunch drowsy feeling or the inability to focus after a poor night's sleep, we all know what it feels like when fatigue impacts our performance in the workplace. Fatigue has been proven to lead to a decrease in attention, concentration, memory, accuracy, and reaction time.[1] When your office is a towing vessel working in the around-the-clock environment of the commercial maritime industry, you are regularly exposed to risk factors that may cause or exacerbate fatigue. Effectively managing these risks means more than preventing yourself from making typos in an email. It means reducing the likelihood of a fatigue-related accident that could harm people, the environment, or property on our nation's waterways.

This is why the American Waterways Operators (AWO) has long been committed to working with its member companies and government partners to promote a science-based and operationally practicable approach to managing fatigue and promoting alertness among towing vessel crew members. As one of its government partners, AWO has partnered with the U.S. Coast Guard for more than two decades to promote crew alertness. These efforts began with our collaboration on the development and implementation of the Crew Endurance Management System to manage fatigue risk factors and promote situational awareness. Ten years ago, AWO began drawing on scientific research in an effort to optimize crew endurance within existing industry watch schedules, specifically research demonstrating that obtaining sleep in two periods is as effective as an equivalent period of uninterrupted sleep. Scientists from Northwestern University's Center for Sleep and Circadian Biology produced a multi-phase study of the sleep habits of towing vessel crew members.[2] This study found that, while crew members averaged more than eight hours in bed per day, they only actually slept an average of about six-and-a-half hours. This suggested that the industry and the Coast Guard should focus, not on changing watch schedules, but on improving sleep efficiency. Sleep experts who peer-reviewed the study recommended the development of a model fatigue risk-management plan that towing vessel operators could adopt to promote crew member sleep, alertness, and wellness. In 2017, the National Transportation Safety Board's (NTSB) Most Wanted List of Safety Improvements included the maritime industry's establishment of fatigue risk management plans to prevent fatigue-related accidents.

An American Commercial Barge Lines crew member works atop an AEP barge. Photo courtesy of AEP River Transportation Division

What is a fatigue risk-management plan? As the NTSB describes them, "Fatigue risk management programs take a comprehensive, tailored approach to addressing the problem of fatigue within an industry or workplace. Such programs include policies or practices

A captain helms a tugboat operated by E.N. Bisso, based in New Orleans. Photo courtesy of E.N. Bisso & Son, Inc.

to address scheduling, attendance, education, medical screening and treatment, personal responsibility during non-work periods, task and workload issues, rest environments, commuting, and napping."[3] A significant appeal of fatigue risk management plans is that they can be incorporated into a company's safety management system to promote continuous implementation and improvement.

In 2018, AWO released *Developing a Fatigue Risk Management Plan: A Guide for Towing Vessel Operators*.[4] The guide's development was led by our Fatigue Risk Management Working Group, comprised of representatives of AWO member companies from all regions of the country and all sectors of the towing industry. These members brought their own expertise and experience to the table, but were also informed by academic experts, the Coast Guard, data from fatigue-related accidents in the towing industry, and other transportation industries' initiatives to manage fatigue. In particular, the working group drew on a report from the Transportation Research Board's National Cooperative Freight Research Program, *Enhancing Sleep Efficiency on Vessels in the Tug/Towboat/Barge Industry*, authored by Northwestern University scientists.[5] This report presents evidence-based best practices to improve sleep and reduce fatigue within existing industry watch schedules, and recommends these best practices be linked together by a fatigue risk management plan as part of a safety management system.

The resulting guide is tailored to the unique operational and environmental challenges of the towing industry. However, because towing vessel design and operations vary widely across the industry, the guide does not outline a "one-size-fits-all" approach. Instead, the guide encourages companies to evaluate their operating environment for fatigue-related risks and identify policies and procedures that are already in place to mitigate these risks. The guide can then help companies link their current policies and procedures into a comprehensive fatigue risk management plan. It also includes suggested practices that companies can consider to close gaps and build on existing fatigue risk management measures. The Fatigue Risk Management Working Group intends the guide to be a toolbox in which every towing vessel operator can find useful tools to address their specific fatigue challenges.

In the guide, the Fatigue Risk Management Working Group identified four core elements it considers to be most important in a fatigue risk management plan. Experts agree these elements have the greatest potential to positively impact the management of fatigue risks and improve industry safety, so a towing company looking to develop or enhance its fatigue mitigation program

should consider focusing on them. They are:

Education: A fatigue risk management plan should ensure fatigue information is included in a crew member's health and safety orientation. Companies should also incorporate continuing education into subsequent refresher training, and maintain awareness through routine, weekly, or monthly discussions of related topics.

Environment: A fatigue risk management plan should outline how a company plans to provide sleeping quarters and a work environment conducive to crew member sleep. The plan should also include regular assessments of the towing vessel and surveys of its crew members to identify potentially beneficial environmental adjustments.

Work Readiness and Fatigue Reporting: A key component of a fatigue risk management plan is providing policy and procedures for crew members to report inadequate rest and/or fatigue, and for captains and shoreside management to take action if a crew member makes a report.

Performance Measurement: As part of a fatigue risk management plan, companies should implement a process to regularly monitor and evaluate their fatigue management practices. This will allow them to assess whether and how these practices are being implemented, evaluate whether they are working, and determine whether modifications are needed.

Although the guide's intended audience is towing companies, there are many suggested practices that towing vessel crew members and other mariners can use to take action on their own. Here are just a few:

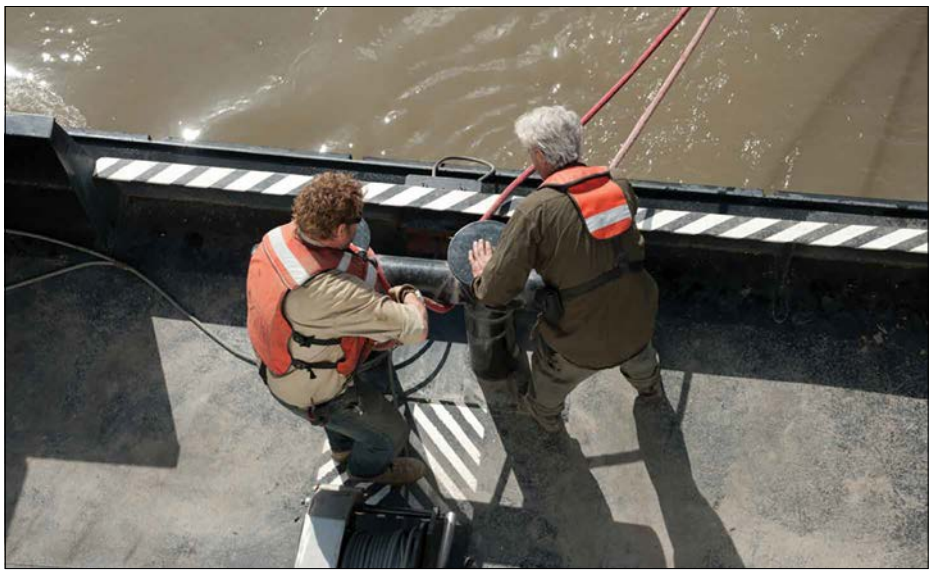
Educate yourself: Fatigue has detrimental effects on your ability to perform basic cognitive functions, which lead to a decline in job and safety performance. In addition, chronic fatigue puts you at higher risk of developing serious illnesses like cancer and heart disease.[6] Understanding the importance of sleep to your job and safety performance, as well as your overall health, will make you more likely to prioritize it.

It's also important for you to understand the specific risk factors you're exposed to working on board a vessel, such as heavy physical workloads, exposure to extreme environments, and separation from your family, all of which exacerbate stress and fatigue. "Once risk factors are identified, the next step is crew member education in relation to ways that they can eliminate, reduce, or work safely with these identified risks," Jo Ann Salyers of Salyers Solutions, an expert on fatigue mitigation and a member of the Fatigue Risk Management Working Group said. "Education is crucial since there are scientifically proven methods to address these risk factors and incorrect implementation may result in greater fatigue." Ask your captain or your employer whether they can direct you to available resources for identifying and managing fatigue risk factors.

Create an environment that's conducive to your sleep: Is your sleep environment on board the vessel comfortable? Has your vessel established "common courtesy" policies to minimize sleep disturbances for off-duty crew members? Consider the things that adversely impact your ability to get good sleep on board, whether it is light intrusion into your cabin, the quality of your mattress and bed linens, the volume of the television or conversations in the galley, or the scheduling of crew member meetings and drills during your rest period. Then talk to your captain or your employer about taking simple steps to address the issues you've identified.

Develop a sleep strategy: The total amount and quality of sleep you get during a 24-hour period is more important to mitigating fatigue and promoting alertness than whether that sleep occurs in an uninterrupted period. Therefore, the key to a good sleep strategy is to plan your activities within the on-duty and off-duty periods dictated by your watch schedule to obtain seven to eight hours of sleep per 24 hours. That may mean implementing an anchor sleep/nap sleep approach, in which you supplement a longer period of regularly scheduled anchor sleep with a shorter period of regularly scheduled nap sleep.

To maximize your time to sleep during your off-duty period, take care of routine tasks—eating,



Crew members of Ruby Marine, based in Nenana, Alaska, work aboard a vessel. Photo courtesy of Ruby Marine, Inc.

showering, or exercising—while on duty, if permissible. Ask your captain or employer to schedule crew member meetings and drills near the beginning or end of shifts to create blocks of time for sleep. Following a routine can be helpful, too. For example, if you read a book or exercise before bed at home, you should follow this routine before bed on board the vessel to signal to your body that it's time to wind down and help you fall asleep faster. And, as tempting as it may be, try not to spend time on personal electronic devices such as mobile phones and tablets while in bed.

Crew members of Turn Services, based in Baton Rouge, Louisiana, prepare to dock a vessel. Photo courtesy of Turn Services, LLC

Focus on your wellness: Poor health can impair sleep, and poor sleep can negatively impact health. Maintaining a nutritious diet and regular exercise regimen can improve both your health and your sleep.

Report when you're fatigued: The Fatigue Risk Management Working Group believes it is the shared responsibility of a crew member to report ready for duty, and a company to allow adequate opportunities for crew members to rest and provide a process for crew members to report when they have not been able to obtain enough rest. If you feel fatigued, it is important for you to let your captain and your employer know so that they can take appropriate action. Incorporate fatigue assessments into your job-safety or job-hazard analyses, and if necessary, use your stop-work authority when you believe fatigue has the potential to jeopardize safety. The most important thing is to prevent a fatigue-related accident.

These are just a few of the things mariners can do to ensure they are well-rested and ready for duty. There is no single solution to prevent or mitigate fatigue, but AWO will continue to encourage its member companies to implement fatigue risk management plans. We believe a safety management system that takes a proactive approach to fatigue prevention through a plan tailored to a company's unique operations is the best way to support towing vessel crew members in obtaining the sleep they need and promote the safety of our shared waterways.

About the Authors:

Jennifer Carpenter serves as president and chief executive officer of The American Waterways Operators, the national trade association for the tugboat, towboat, and barge industry. She has been with AWO for 29 years, and is a former member of the Towing Safety Advisory Committee. Caitlyn Stewart serves as AWO's senior director of regulatory affairs and has been with AWO for nine years. Justin Lampert is manager of AWO's Midcontinent Office and has been with AWO for three years.

About American Waterways Operators:

We are the national trade association for the tugboat, towboat, and barge industry, which operates more than 5,500 towing vessels and over 31,000 dry and liquid cargo barges on the commercially navigable waterways that run through America's heartland. These towing vessels provide family-wage jobs and ladders of career opportunity for the nearly 39,000 men and women who work on board. Supporting our member companies in ensuring the safety of their crew members, members of the public, their vessels, and the waters on which they operate is our organization's highest priority.

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Mariners' Mental Health and Suicide Prevention

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Promoting mariner wellness has been a core mission of the Seamen's Church Institute of New York and New Jersey (SCI) throughout its 184-year history. As a key part of this mission, SCI strives to raise awareness of mariners' mental health issues and eliminate stigma associated with mental illnesses and treatment. The authors gave presentations on mariners' mental health at the U.S. Coast Guard's September 2018 Merchant Mariner Medical Advisory Committee (MEDMAC) meeting in Dania Beach, Florida. This article summarizes those presentations.

At the 2018 meeting, SCI convened a roundtable discussion on mariners' mental health issues bringing together a small group of experts from various maritime sectors, including representatives from flag states, shipowners, protection and indemnity clubs, medical professionals, academia, and mariners' welfare agencies. There was no attempt to draw any conclusions or agreements. Rather, SCI offered a neutral forum for experts to share their experience with mariners' mental health issues, to gain a better understanding of the subject, and to identify areas where further work was needed.

The roundtable discussion provided an insightful starting point for further research and action. It opened by reviewing World Health Organization data stating that 1 in 4 people worldwide will be affected by mental or neurological disorders at some point in their lives. Around 450 million people currently suffer from such conditions, placing mental disorders among the leading cause of ill-health and disability worldwide.

With such data, it is unrealistic to assume that mariners are immune to mental health problems. But are they more susceptible to them than other workers due to stressful working conditions? Or, given requirements for periodic medical screening, are mariners in fact less susceptible to mental health issues than other workers?

There is no research showing that mariners suffer mental health problems at different rates than the general population or other occupations. However, mariners are exposed to a relatively high degree of traumatic events and other stressors compared to people in more sedate careers. Photo courtesy of the Seamen's Church Institute of New York and New Jersey

There is no research showing that mariners suffer mental health problems at different rates than the general population or other occupations. However, mariners are exposed to a relatively high degree of traumatic events and other stressors compared to people in more sedate careers. The roundtable discussed stressors that could make mariners vulnerable to mental health issues. Topics included loneliness, isolation, environmental pressures like constant noise or vibration, bullying and harassment, cultural conflicts, generational conflicts, extreme weather, dangerous work, and job insecurity.

Most people experience some mental health problems after traumatic events, but most people also recover without long-term consequences. Mental health therapies have been shown to be very effective in treating post-traumatic

Promoting mariner wellness has been one of the Seamen's Church Institute of New York and New Jersey's core missions throughout its 184-year history. Photo courtesy of the Seamen's Church Institute of New York and New Jersey

symptoms in other populations, and there is no reason to believe that mariners are any different. Short-term mental health issues are not predictive of long-term impairments. Post-traumatic stress disorder (PTSD) cannot be diagnosed in the short term, and the degree of trauma is not predictive of future challenges. Some mariners suffer significant mental health problems following what appear to be minor traumatic incidents, while other mariners are only slightly affected by severe trauma. No data exists that identifies mental illness as a contributing factor to maritime casualties.

The Maritime Labour Convention, 2006, which is in force on 91 percent of the world's merchant fleet, requires mariners to have medical certificates that are valid for two years. Roundtable discussions during the MEDMAC meeting included whether mental illnesses and mental health medications are disqualifying, and whether medical certificates can be viewed as assurances of mariners' good mental health.

Standards for medical certificates are defined by regulation. They do not certify that mariners are healthy. The criteria for medical certificates are that the mariner is not suffering from any medical condition likely to be aggravated by service at sea, to render the mariner unfit for service, or to endanger the health and safety of other personnel on board. It also certifies the mariner is not taking medication that has side effects which could impair judgment, balance, or any other requirements for effective and safe performance of routine and emergency duties on board.

In the United States, the Coast Guard regulates medical qualifications for mariners on U.S. vessels. Several other flag states maintain similar programs. Mariners with psychiatric disorders including clinical depression and psychotic disorders, as well as those taking medications that cause drowsiness, or impair cognitive ability, judgement, or reaction time, like anti-depressants and anti-psychotic medications, are subject to review by the Coast Guard. Potentially disqualifying conditions and medications are reviewed by the Coast Guard on a case-by-case basis for possible waivers and limitations on an individual's medical certificate.

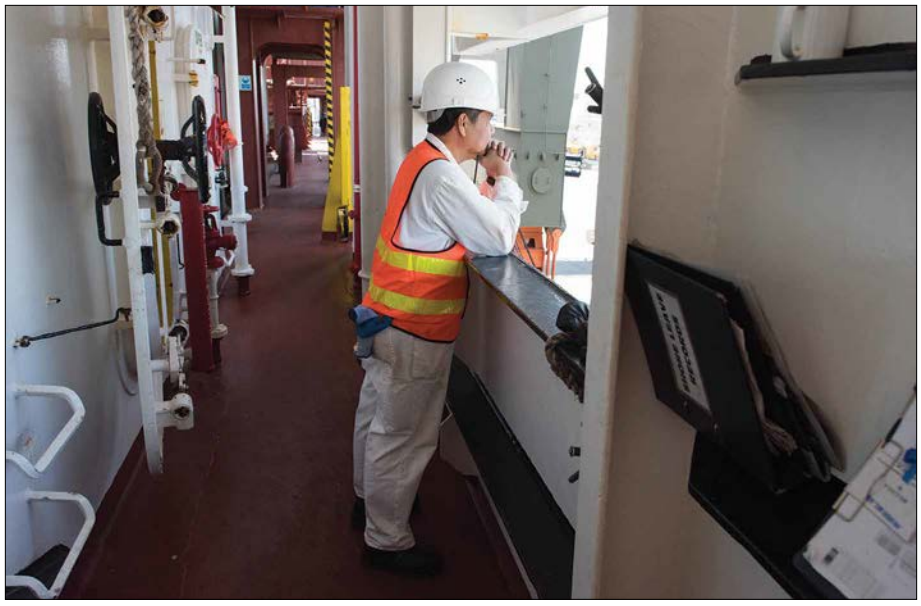
Medical certificates rely on mariners disclosing any medical conditions they have or medications they may be taking. Because disclosing a potentially disqualifying condition or medication could jeopardize their career, mariners have an incentive to conceal these. Additionally, U.S. mariners select their own medical professionals to examine them for medical certificates. Medical doctors have an ethical obligation to protect patient confidentiality, which can prevent them from disclosing their patients' potentially disqualifying conditions or medications. Because medical certificates rely on self-reporting, they may not be reliable indicators of mariners' mental health. Furthermore, medical certificates only certify a mariner's medical condition at the time they are issued.

They are not valid predictors of a mariner's future health or vulnerability to mental illness.

Stigma associated with mental illness and therapies persists, even in countries where mental health care is widely accepted. Stigma surrounding the topic of mental health can deter mariners from disclosing problems and seeking help for them.

The roundtable participants offered recommendations for future action, including:

- conducting more research on mariners' mental health, including the incidence of mental illness among mariners, screening for mental illness, long term effects of traumatic events, factors in the work environment and home communities that affect mental health, the costs associated with poor mental health among mariners, the effects of contract duration on mental health, identifying mariners who are at risk for suicide, the effectiveness of short-term and long-term mental health therapies, and the value of psychological first aid and suicide-prevention training for mariners
- developing mental health standards for medical certification that do not depend so heavily on mariners' self-reporting
- creating an environment that encourages mariners to accurately self-disclose conditions and medications, which could be accomplished by building a culture where disclosures are dealt with compassionately, with a view towards granting waivers or limitations, and where failures to disclose are not forgiven
- while some conditions must remain disqualifying, flag states and employers can encourage disclosure by compassionately reviewing individual circumstances when mariners disclose potentially disqualifying conditions and strictly react to mariners' failures to disclose known conditions
- recommending to the International Maritime Organization that the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers, 1978 training requirements include psychological first aid and suicide-prevention training
- initiating a dedicated advocacy campaign to remove stigma associated with mental health care and encourage mariners to disclose mental health issues
- viewing mental health problems as a general health issue



Among other things, improvements in shore-leave for international mariners, can promote well-being. Photo courtesy of the Seamen's Church Institute of New York and New Jersey

Normal Human Response to Experiencing Events Involving Death or Serious Injury

Aboard ship, the potential for traumatic events is significant, and depending upon pre-existing vulnerabilities, human responses to trauma can be immediate, delayed, or chronic. Whether the trauma affects a group, such as mariners witnessing a fatal man-overboard event, or is highly personal, as in the case of a sexual assault, competent evaluation and prompt treatment reduce human suffering and promote a return to health. An immediate medical evaluation assesses the mariner's condition while providing practical advice to manage potential symptoms. Ideally, a follow-up evaluation after three and six months explores residual suffering and offers counseling support. When a crew has experienced a common trauma, such as a piracy attack, team bonding after leaving harm's way can yield assurance and mutual support.

Practical maritime challenges should be addressed to promote healing and continued fitness-for-duty. Many mariners may return home to parts of the world that are medically underserved. If a mariner is repatriated or simply concludes a contract, he or she may lose the continuity of care needed for successful recovery. Although the shipowner must render care, the mariner may fall through the cracks. Health providers must navigate the mariners' self-reliance or culture that stigmatizes mental health issues and leads to under-treatment. Follow-up

evaluation respects the reality that traumatic symptoms may be delayed.

Although a life at sea yields limited medical confidentiality at best, the shipowner should support and underwrite treatment upon repatriation or contract termination. Honoring doctor-patient confidentiality promotes trust, healing, and a confident return to work. The ship's owner should remember that a mariner who discloses symptoms and receives treatment becomes a safer employee than one who suppresses concerns for fear of lost income. Competent treatment and resiliency training return a highly skilled worker while reducing the risk of future medical problems and repatriation.

Mariners, like all employees, bring their humanity to work with them, including psychological vulnerabilities, family stressors, and economic challenges, among others. Photo courtesy of the Seamen's Church Institute of New York and New Jersey

Stress, distinguished from trauma, is how the brain and body respond to any demand or stressor. Everyone feels stress from time to time, whether it be the routine stress of work, family, and other daily responsibilities or sudden life changes like moving, divorce, or changing jobs. While stress can produce positive responses, such as motivating people to perform or respond to emergencies, stress can also affect a person's health. Chronic stress can lead to diminished focus or medical complications, but simple fixes normally solve the problem. The bigger issue comes when an acute external stressor becomes more pronounced or an internal condition goes untreated. Symptoms of chronic stress include, but are not limited to, sleep or dietary disturbances; irritability or social isolation, decreased situational awareness and concentration, and outbursts of anger or tears.

Simple forms of psychoeducation may reduce anticipated or actual stress. These may include exercise, conflict resolution, appropriate confiding and conversation, meditation/breathing exercises, and careful diet. Group cohesion and social activity can increase morale while reducing isolation aboard ship. In personal forms of stress, such as continued anxiety or distress about home issues, contact with family or telemedicine psychology consultation might lead to successful resolution. In some cases that are consistent with safety protocols, psychotropic medicine may be prescribed.

Suicidal thoughts and behaviors represent the extreme end of human suffering and can have catastrophic results for the mariner and those who work around him or her. While suicidal thoughts and behaviors happen in all cultures and settings, life at sea with extended deployment and limited professional resources creates a special challenge.

Increased attention has been given to mariner suicides in recent years, including some poignant articles in the press. The World Health Organization (WHO) estimates that more than 800,000 people worldwide die each year from suicide, and there are many more who attempt suicide. WHO acknowledges the availability and quality of data on suicide and suicide attempts is poor. Cultural taboos and inconsistent documentation may

Aboard ship, potentially traumatic events at sea may include:

- thwarted or successful piracy attacks and crimes at sea
- ship fire or other threats to the vessel's integrity
- discovering death aboard ship through injury, natural cause, suicide, or homicide
- witnessing the death of a crewmate
- severe weather and the threat of sinking
- acts of abuse, bullying, and harassment
- hidden, pre-existing trauma that the mariner brings aboard ship
- extreme stresses of a cadet or first-contract mariner away from home

lead to under-reporting and misclassification in many countries.

Whatever the actual numbers might be, any mariner suicide is one too many. SCI has given significant attention to suicide prevention, intervention, and caring for shipmates and families after a suicide. We know that suicides are preventable with timely, evidence-based, and low-cost interventions. In the context of working with mariners, it is important to understand the larger human condition of suicide risk and its prevention, and then adapt it to mariners' unique workplace and work/life conditions.

Mariners, like all employees, bring their humanity to work with them, including psychological vulnerabilities, family stressors, and economic challenges. These pre-existing stressors play out in a different way in the maritime world because of deployments that take mariners away from their families and communities for long durations. Long deployments at sea, where shore-based community resources are unavailable, may exacerbate other vulnerabilities, especially if crew cohesion is lacking and the mariner becomes isolated in his or her suffering. The 24/7 reality of work/life balance also can deepen psychological impairment of any kind, especially when mariners keep problems to themselves in fear that disclosure will create fitness-for-duty concerns.

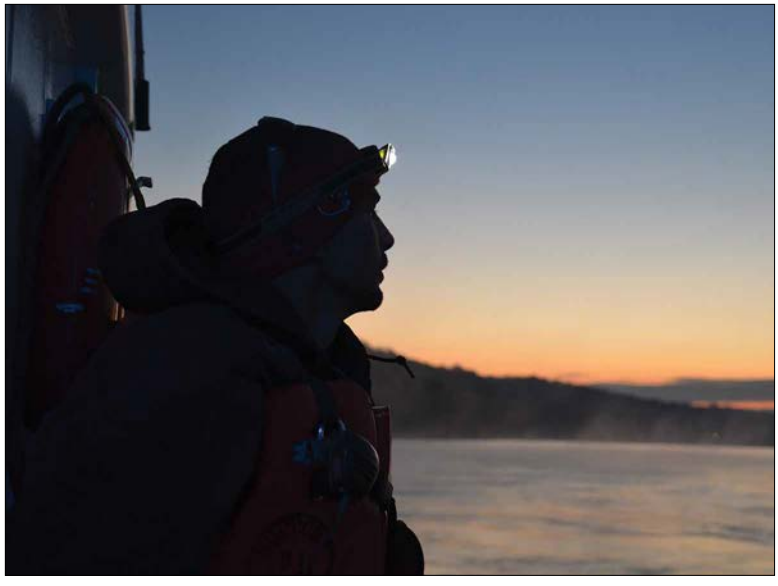
One of the warning signs that a person may be thinking about suicide is looking for lethal means to kill oneself, like seeking access to firearms or medications. For mariners, the side of the vessel itself becomes a constantly available access to lethal means.

SCI provides chaplain first-responder services for international mariners in Port Newark and for American mariners along the 2,200 miles of the U.S. inland river system. We witness strikingly different suicide patterns between "blue water" and "brown water" mariners.

International "blue water" mariners represent a richly cross-cultural ethnic mix with long-duration contracts. There are typically 20–25 crew members per ship, and fewer annual deployments from home—meaning they can settle into life aboard ship—with increasing daily access to home via phone and social media, which can be both a blessing and curse. SCI's experience with international mariners suggests a higher risk for cadets and first-voyage mariners who tend to be young and perhaps away from home for the first time. Acute, transitional stressors may make young mariners feel overwhelmed, akin to what military personnel might experience in boot camp or their first deployment.

Suicide patterns for brown water mariners, in our experience, are quite different. SCI has been involved with more than 20 suicides on the inland river system, usually supporting surviving crews or leading funerals. Counterintuitively, life on the vessel may be somewhat protective for mariners thinking about suicide. Of the more than 20 brown water suicide cases previously mentioned, only two took place on the vessel. The vast majority took place at home during the first 48 hours post-deployment, or the final 48 hours pre-deployment.

The victims fit the United States Centers for Disease Control profile of heightened risk for white males 35–50 years of age. They also come from largely rural areas, where there are fewer mental health resources, they are avid hunters and so have access to lethal means, and they almost always suffer from self-inflicted gunshot wounds. Strangulation by hanging and ambiguous man-overboard incidents also have been means of self-harm.



Mariner suicide risk must be treated with competency, compassion, and without stigma, like any other public health challenge. Photo courtesy of the Seamen's Church Institute of New York and New Jersey

Our unscientific hypothesis argues these mariners go from a highly-structured two-watch system where they know their roles and would never disappoint their crewmates to a highly unstructured 14 or 28 days at home, with family stressors, reintegration problems, and access to alcohol and firearms. As such, this is both a homelife and a workplace challenge.

We do not know how many blue water seafarers resort to suicide at home, because we don't have much information about them once they leave the vessel. Our chaplains typically interact with them only when they are at work aboard ship. Protection and indemnity clubs would not usually see claims for home injuries or deaths. More research on mariners' mental health and suicides is needed, including examining factors that affect their mental health in their home communities. In addition to requesting more

research, we recommend measures to increase mariner resilience, intervene more effectively with those at risk, and strengthen a maritime culture of zero self-harm.

Most importantly, we can promote mariners' well-being and suicide prevention through:

- improvements in shore leave for international mariners
- group cohesion aboard the vessel, including at meal times
- recreation and physical activity for stress reduction
- reducing and eliminating bullying and harassment
- removing the stigma of psychological self-reporting
- giving attention to signs of impairment such as behavioral changes
- providing access to telemedicine for mental health consultations

Ships' crews and ship managers should be prepared to promote mariners' mental health through training on stress reduction, psychological first aid, and suicide prevention. They should also be prepared to move proactively to mitigate the effects of traumatic events on mariners' mental health.

SCI recommends a suicide-prevention training and intervention curriculum created by LivingWorks called Applied Suicide Intervention Skills Training (ASIST). This curriculum approaches suicide risk like any other public health problem, attempting to destigmatize and normalize conversation about suicide. The ASIST method develops skills to ask a vulnerable person about suicidal thoughts and, when acknowledged, to develop a joint plan to keep that person "safe for now." It recognizes that thoughts of suicide may or may not lead to behaviors, while creating a safety plan to minimize the risk until additional resources are brought to the case. ASIST also provides a framework to recognize that thoughts of suicide often abate with supportive care and the resolution of underlying stressors. Encouraging disclosure and treatment often resolves the isolation and rumination that can lead to fatal choices. ASIST training takes place globally, and SCI recommends the ship's medical officer receive the two-day ASIST training as part of the ship's first-aid plan.

In conclusion, mariner suicide risk must be treated like any other public health challenge: with competency and compassion, and without stigma.

Whether trauma affects a group or an individual, competent evaluation and prompt treatment reduce human suffering and promote a return to health. Photo courtesy of the Seamen's Church Institute of New York and New Jersey

First Steps to Addressing Mariner Suicide

- Gaining skill in assessing acute versus chronic risks in a given mariner and referring for treatment before or after a non-fatal behavior.
- Gaining skill in prevention and intervention, creating a workplace culture that respects suicide reality while treating it in the same spirit we do man overboard or back injury prevention.
- Acknowledging dilemmas regarding fitness for duty and return to work while creating safety plans that may allow someone thinking about suicide at work to continue without need for diversion.
- Promote more shoreside training with models like ASIST to identify and connect with mariners at risk, removing the drama and stigma that can drive symptoms underground until it is too late.
- Promote campaigns for Zero Self Harm, and "having each other's back," encouraging mariners to be proactive in seeking and offering help to fellow crew members.

About the authors:

Rev. David Rider, a graduate of Carleton College and Union Theological Seminary, has served as The Seamen's Church Institute of New York and New Jersey President and Executive Director since 2007. Prior to this, he managed mental health and disability benefits for the Episcopal Church Pension Group for more than 20 years. DMR contact information: drider@seamenschurch.org.

Douglas B. Stevenson, a graduate of the U.S. Coast Guard Academy and the University of Miami School of Law, directs the Center for Seafarers' Rights at the Seamen's Church Institute of New York and New Jersey. He is a maritime lawyer and a retired U.S. Coast Guard officer. DBS contact information: dstevenson@seamenschurch.org (alternatively, dbs5218@gmail.com after 30 June 2019).

Mental Health Claims, the Jones Act, and General Maritime Law

by Boriana Farrar
Vice President
Shipowners Claims Bureau, Inc.

Mental health-related claims are difficult to understand and quantify. They present invisible symptoms that often have devastating consequences, are highly subjective, volatile, and very hard to verify.

This article discusses the general statutory framework of the Jones Act and general maritime law within the context of mental health-related claims. This article further explains the protection and indemnity (P&I) implications of such incidents and the proactive claims handling approach which is essential for the well-being of the seaman, ship owner, and the entire crew.

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An injured seaman is entitled to sue his/her employer for negligence under a federal law called the Jones Act. The Jones Act gives seamen who are injured in the course of their employment, the right to sue their employer for negligence. Under the Jones Act, a maritime employer must:

- provide the seaman with a reasonably safe place to work, and
- use ordinary care under the circumstances to maintain and keep the vessel on which the seaman works in a reasonably safe condition

These are very strict requirements and any negligence, however small, can lead to liability and result in a Jones Act claim. If a claim is substantiated, regardless of who was at fault, an injured seaman is entitled to receive what is called maintenance and cure. In this case, maintenance is defined as daily expenses comparable to the cost of living on board the ship, while cure is the cost of all medical expenses until the seaman reaches maximum medical improvement (MMI). This does not mean the seaman has recovered 100 percent, or that he can go back to work, but that he cannot get better by any medically reputable means. In the mental health context, MMI is extremely hard to pinpoint, as often mental health issues manifest randomly without any predictable timeline or pattern.

Jones Act personal injury, maintenance and cure, as well as illness claims are covered under our P&I policy. Often, we see post-traumatic stress disorder, depression,

Mental Health Resources

National Suicide Prevention Lifeline
1-800-273-TALK (8255)

SAMHSA Treatment Referral Helpline
1-877-SAMHSA7 (1-877-726-4727)

American P&I Club
www.american-club.com/files/files/mental_wellness_resources_October_2018.pdf

Chinnapong | BigStockPhoto

or other mental health issues developing in conjunction with, or as a result of, a physical injury. This is especially true if the seaman is in a long recovery process with temporary or permanent disability. In such cases, a proactive and personal approach is key to a successful outcome. This means working closely with the member, local correspondent, or legal counsel.

Appointing the right case manager to oversee and assist with the appropriate medical care is also essential for a quick resolution of the claim. The case manager will recommend appropriate medical professionals to treat any mental issues in a prompt, effective, and efficient manner. Location, national origin, language, and cultural environment are also key factors that we asses when handling such claims.

There are cases that are not amenable to quick resolution, and mental health issues persist even after the claimant has reached physical MMI. Under this scenario, we generally authorize continued medical care until the seaman gets better, which is our overriding goal.

There are also cases where we have seen more than one medical opinion as to the condition of the claimant. For example, one opinion states the seaman is fully recovered, but another states he needs continued treatment. Under such scenario, we generally continue to authorize treatment to ensure the seaman becomes stable.

In addition to this proactive claims-handling approach, the American P&I Club, managed by Shipowners Claims Bureau in New York, has several loss prevention initiatives. Together with Seamen's Church Institute, our loss prevention department developed the related guidance, *What's on Your Mind*. This guidance reviews some of the common risk factors for developing mental health conditions and recommends measures to prevent or treat an occurrence on board. Together with Seamen's Church Institute, American P&I Club also conducts training for members and industry professionals to better spot and address mental health issues on board.

What's On Your Mind

https://www.american-club.com/files/files/whats_on_your_mind.pdf

About the author:

A native of Bulgaria, Boriana Farrar performs several functions at Shipowners Claims Bureau, Inc., including serving as vice president. She holds two master's degrees, one in admiralty and maritime law from Tulane Law School and another in international and comparative law from the University of San Diego School of Law. Ms. Farrar also serves on several boards, including Women International Shipping and Trading Association, Seamen's Church Institute, and Marine Insurance Claim Association. She also served on the board of the Maritime Law Association of the United States from 2013–16.

Worse Things Happen at Sea

Trauma and resilience in seafaring

by D. Conor Seyle, Ph.D.
Director, OEF Research
One Earth Future Foundation

Most people who know anything about maritime professions know they're dangerous jobs. Maritime work, particularly commercial fishing, regularly posts among the highest rates of injury or death of any profession in developed countries. What might not be appreciated, within and outside the profession, is what that means in human terms for the men and women who work in the maritime sector.

A recent study I was a part of surveyed more than 400 seafarers from India, Ukraine, and the Philippines. Although the primary focus of the study was on the impact of piracy, as a part of that work we surveyed participants about their experiences with accidents or other severe threats aboard ships. We found that 64 percent of our sample had experienced a major life-threatening or traumatizing event aboard ship—a fire, grounding, serious accident or injury, serious fight, falling overboard, or witnessing suicide. More than a third, 35 percent, reported having experienced more than one event. Seafarers may pride themselves on facing these challenges, but the truth is that they are human beings, and research in psychology strongly suggests that exposure to these kinds of events, particularly when repeated, can impact human behavior. In psychology jargon, severe threats such as those reported by our participants constitute "traumatic" events.

A growing body of research, including some specifically within the seafaring community, suggests that while most people recover from traumatic events without lasting issues, they can nevertheless cause some significant impacts. At the same time, the research suggests that traumatic stress responds well to therapy and treatment, and there are some fairly simple programs that seafarers and companies could implement to reduce the risk of lasting issues.

Technically, a traumatic event is an event that causes someone to fear for their life or the risk of serious injury to themselves or a loved one. This can come from direct exposure—an actual or perceived threat—or it can come from indirect exposure, such as hearing about an experience that threatened an individual or one of their loved ones. Trauma affects human behavior through several pathways, to include triggering the "fight or flight" response and challenging optimistic beliefs.

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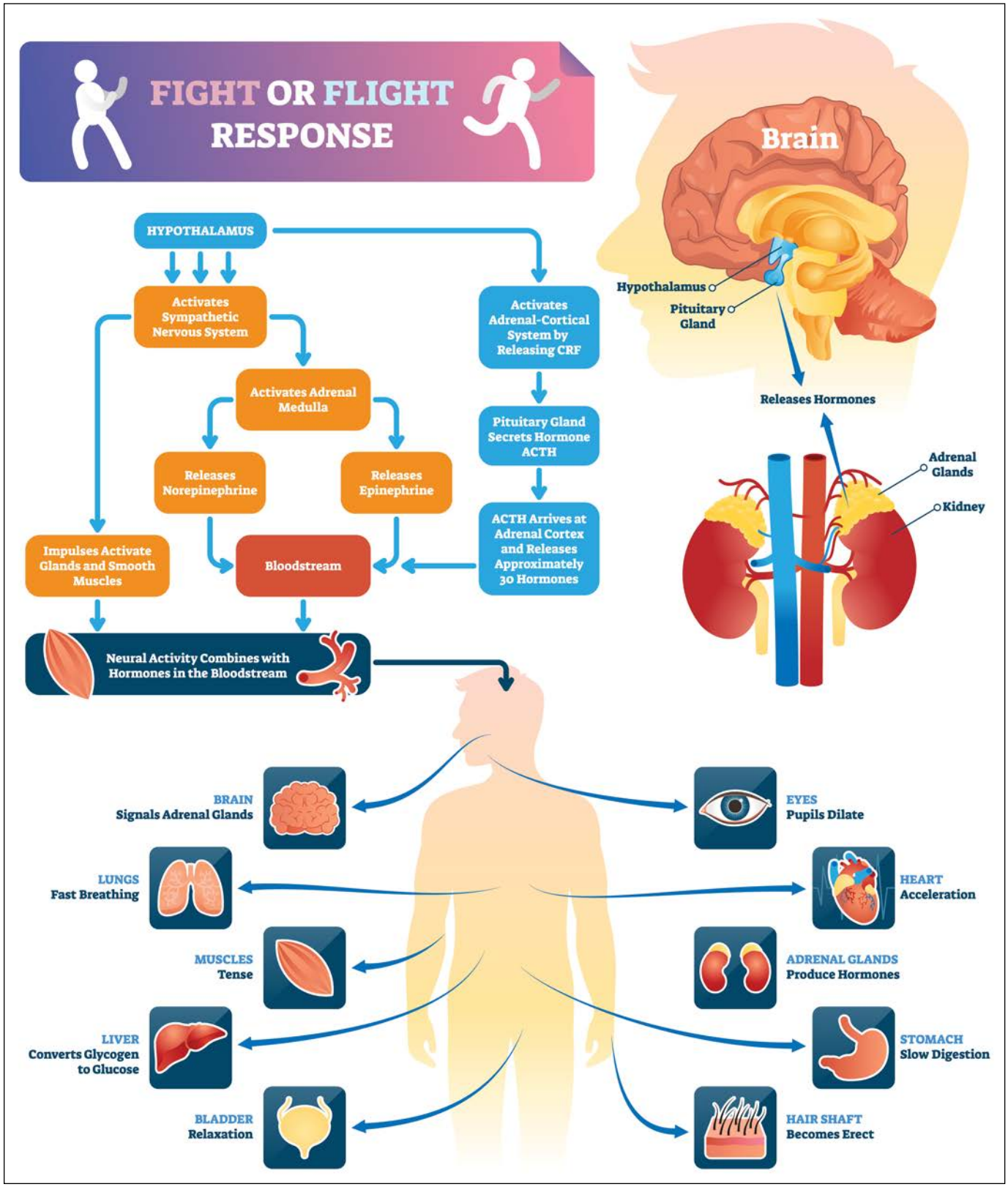
The fight or flight response pathway is activated when the fear associated with a traumatic event triggers neurological and physiological stress systems that enable us to fight a threat or flee from it. Our physical and mental systems have developed this response to protect us when we feel our lives are under threat. Once the threat resolves, the neurological and physiological stress systems gradually return to normal. In some cases however, individuals experience lasting changes in these systems which seem to be associated with higher reactivity and reduced



VectorMine|BigStockPhoto

ability to control emotional responses or memories of the event.

In a separate pathway, traumatic events affect behavior by challenging optimistic beliefs. For instance, although many people are abstractly aware of the risks of things like car crashes, or working in the maritime sector, people generally tend to believe they are likely to be safe. This "optimism bias" is useful in that it allows us to willingly engage in risky behavior that needs to be done. People who have experienced traumatic events

have their optimistic beliefs punctured, and find themselves coping with a direct experience of how risky the world can be.

Research in post-traumatic stress suggests that both of these pathways operate following traumatic events. Heightened physiological reactivity from the fight or flight response can lead to stronger emotional responses or more vivid memories of the event and reduced emotional coping skills. Additionally, with challenged optimistic beliefs, the survivor must develop a new understanding of the world that creates a bridge between their previous belief of safety and their new understanding of how bad things can be. These processes can result in a number of different impacts including changes in thinking, emotional response, and behavior. In the aftermath of a traumatic event, almost everyone will show some short-term disturbances such as emotional instability, sleep disturbances—sleeping more or less—sudden and unwanted memories of the traumatic event, and/or a tendency to avoid any reminders of what happened. For most people, in most cases, these symptoms fade over time, but for others they may lead to more lasting problems.

Post-traumatic stress disorder (PTSD) is the most well-known impact of trauma and is characterized by lasting symptoms like those described above—intrusive memories of the event, avoidance of reminders of the event, changes in mood, and increased emotional reactivity. In addition to PTSD, other issues such as depression, substance abuse, and anger management problems are also relatively common. Interestingly, the physiology of trauma appears to be very similar internationally but how this experience is understood and expressed as symptoms is highly variable by culture. Culture influences how people interpret traumatic events, the tools they have for support and coping, and it appears to even affect how the symptoms of trauma are experienced with some cultures showing more physical symptoms and others more emotional ones.

What this all means is that many people who experience traumatic events will have at least some form of impact, with lasting and significant distress in a significant minority of people. Research on trauma in workplace environments has shown that this kind of distress has impacts on employees' work. Separate from challenges of emotional regulation that can lead to angry outbursts or interpersonal problems with coworkers, people who experienced traumatic events must cope with the reminders of their trauma and other distress. This can lead to absenteeism, people leaving their careers, and distraction. A RAND study of American combat veterans returning to civilian life estimated that the aggregate economic impact of untreated combat-related PTSD was significantly higher than the cost of providing therapy, meaning that it actually cost less to provide therapy to veterans than to not provide them with support.

There is reason to believe that this research is relevant to the maritime industry. An old adage states, "worse things happen at sea." The challenges of the maritime space compound the normal workplace risks of any industrial workplace. The result is what appears to be a strikingly high rate of traumatic events in the seafaring community. In our sample of seafarers, the most common experience was fire. About 30 percent of the seafarers we talked to had been aboard vessels where there was a fire. Other traumatic events were also concerningly high. More than a quarter of seafarers in our sample had been injured aboard ships, 20 percent had experienced a medical emergency, 14 percent had witnessed death from an accident, 11 percent had been involved in a serious fight, and 4.8 percent had witnessed a suicide aboard ship.

These are all prototypical traumatic events, and it's likely that these seafarers will have some lasting impact. In fact, our study found that exposure to multiple traumatic events was associated with post-traumatic stress symptoms, increased depression, and reduced mental well-being. The high rates of exposure suggest that this means a fairly large number of seafarers may be dealing with the lasting impact of trauma at sea. The positive news about this is that trauma responds quite well to treatment. Because it has impacts through multiple pathways, there are a number of things that can be done to help people exposed, starting with prevention. Along both the cognitive and physiological pathways to impact, preparatory training can reduce the likelihood of lasting problems. One of the major risk factors for longer-term PTSD is the experience during the traumatic event, in that people who have stronger responses in the moment are more likely to have lasting distress. Training on concrete responses to mitigate the emergency, information about typical responses to trauma, and basic emotion regulation tools can all help reduce this in-the-moment distress and prevent the development of more serious issues. In the first place, well-drilled plans for responding to crises can help avert the negative event itself and, at the same time, can increase participants' sense of control and give them something to focus on during crisis events. These together can reduce the experience of emotional distress in the moment of crisis.

For more information

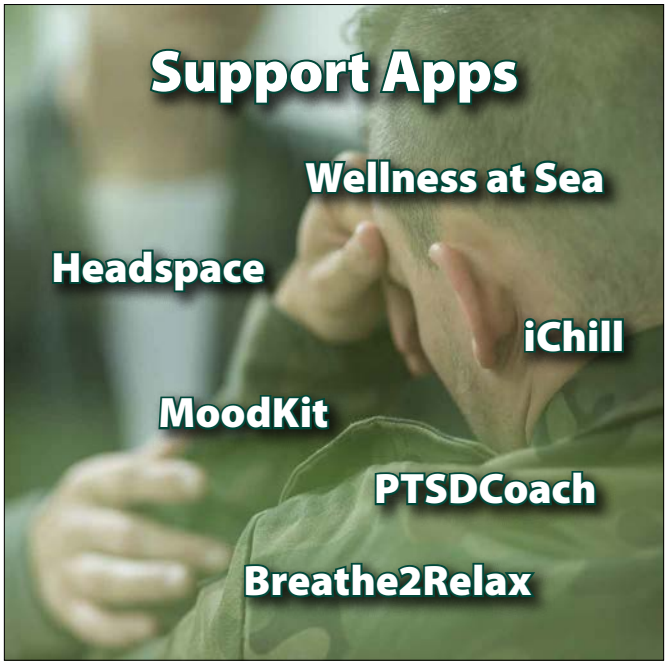
International Seafarers' Welfare and Assistance Network's SeafarerHelp

direct dial +44 20 7323 2737
email help@seafarerhelp.org

"Psychoeducation" is a term for providing people more concrete information about typical responses to trauma, which appears to work to help people identify typical and atypical responses. There is, however, developing research that suggests that too much information about symptoms can backfire. Emotion regulation tools provide people with evidence-based approaches to manage both acute and chronic distress, and can help improve coping so that the experience of distress in the moment is reduced. After an event, PTSD and many other trauma-related issues respond well to therapy. There are several therapeutic approaches that meet the criteria necessary to be considered "evidence-based" for treating lasting issues including Trauma-Focused Cognitive Behavioral Therapy and Eye Movement Desensitization and Reprocessing.

The relatively strong impact of both prevention and response to trauma means that there is a lot of room for positive interventions. The seafaring community is particularly exposed to traumatic events, but it is also unusually well-positioned to develop positive responses. This is particularly true in the case of prevention training. Seafarers already are expected to regularly train on new skills and emergency responses, and the addition of basic psychological assistance and support tools to this training would be a relatively minor change to the existing system. The addition of even a half day of training on trauma or behavioral health, more broadly, to basic medical training provided to officers could be a relatively easy extension of existing systems that could provide significant value. For seafarers experiencing significant distress because of existing trauma, the research suggests that therapy funded by the maritime industry may actually result in a net gain to the industry compared to leaving this untreated.

At the more individual level, there are a developing set of resources for seafarers to help focus on well-being. Many of these come in the form of apps. Smartphones have become extremely powerful at helping people develop better coping tools, in general, and apps such as the Sailor's Society's "Wellness at Sea" provide information and guidance directly targeting seafarers. This is a subset of a much larger ecosystem of apps designed to promote resilience and emotional health, ranging from mindfulness apps, like "Headspace," designed for a general community, to issue-specific support apps such as "iChill," "Breathe2Relax," "MoodKit," or "PTSDCoach" which provide different tools for emotion regulation or trauma management. People today have many more tools for self-support than ever before, so the primary issue is one of awareness and making the decision to access support resources. For more acute responses, seafarers can access help through the International Seafarers' Welfare and Assistance Network's Seafarer Help line or many other programs available to provide seafarer welfare and support. The truth is that there are many programs in place that want to provide assistance to seafarers, but not yet a culture that includes sophisticated understanding of behavioral health challenges or encourages seafarers to access resources for this kind of help.



Traumatic events affect everyone. For some, these experiences cause short-term disturbances, while for others the effects are lasting. Kasia Bialasiewicz | BigStockPhoto

The maritime environment is tough and unforgiving. As we learn more about human psychology, we appreciate more about what exactly that means for seafarers and their well-being, and we can develop better and better tools for supporting them. In the case of trauma, at this point we know fairly well how bad things might be and also how much support is available. The main challenge is translating the research and the resources into an at-sea culture that acknowledges these issues and provides the support that people need.

About the author:
Conor Seyle is the director of OEF Research, the research program of the One Earth Future Foundation, an operating foundation focused on advancing iterative, empirical approaches to peacebuilding and solving complex problems at the root of conflict. OEF has a particular focus on maritime security and, through its former Oceans Beyond Piracy project and current Stable Seas project, has been developing research on the causes and impacts of maritime security challenges. A research psychologist by training, Seyle has worked on the impact of maritime trauma and insecurity on seafarers with organizations including Sailor's Society, the Seamen's Church Institute, and International Seafarers' Welfare and Assistance Network. Before OEF, he worked with Psychology Beyond Borders and the U.S. Crisis Counseling and Assistance Program on behavioral health interventions following disasters and mass casualty events. He holds a Ph.D. in social psychology from the University of Texas.

Prevention is Key

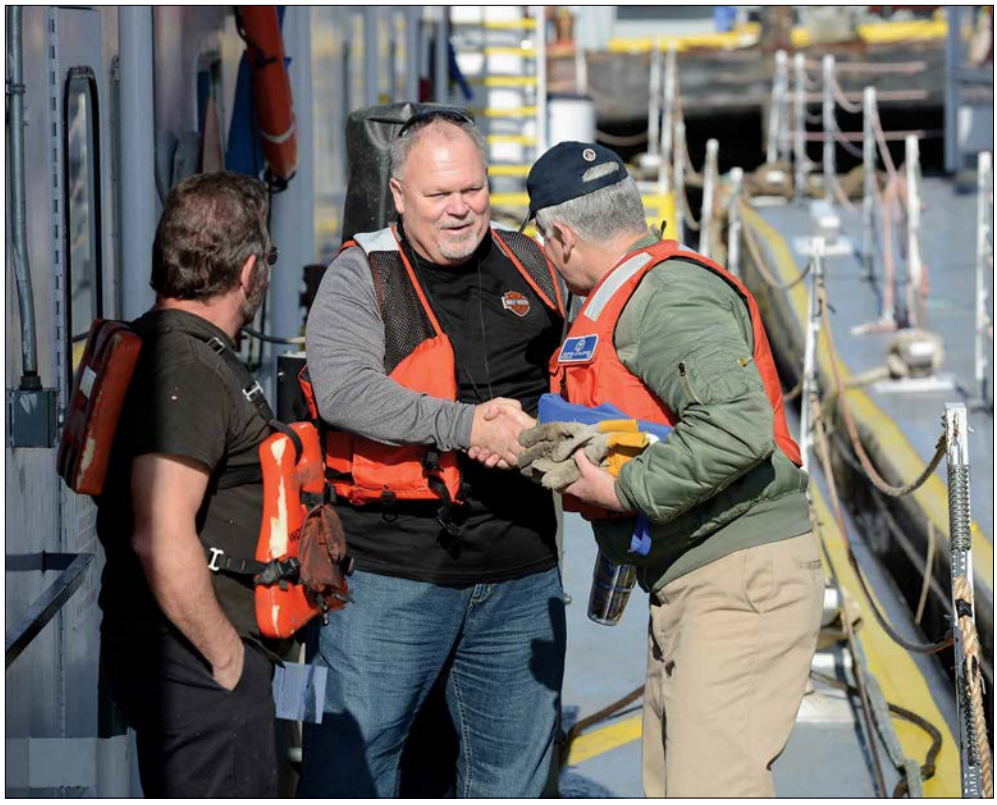
Ingram takes proactive approach to reducing mariner suicides

by Kelly Clapp
Human Resources Manager
Ingram Barge Company

For Ingram, it started with one bad phone call. Over the next 12 months, we received several of those calls, each one as heartbreaking as the last. After researching the topic, we learned that suicide among mariners typically happens within a few days of getting off the boat or within a few days of their scheduled return to the boat. With each loss, one of our first calls was to a Seamen's Church Institute (SCI) chaplain. They always knew what to say and what to do and with such grace. They were there to support the family and the crew members impacted by each loss. These tragedies not only affected each mariner at Ingram, but also made a huge impact on our shoreside team. Our human resources team, operations managers, and crew dispatchers felt the impact as well.

In the beginning, we were not sure what to do, but knew we had to do something. At Ingram, we are very fortunate to have an owner and a senior leadership team that wanted to be proactive. While there is no evidence that shows mariners are at a higher risk for suicide, it is important to look at some of the factors involved in the lifestyle of a mariner that may increase their risk. While on the vessel, there is a more structured environment free of drugs and alcohol, free of firearms, and a set schedule each day. When a mariner leaves the vessel and goes home, that may not be the case.

In our research, we learned that females are more likely than males to attempt suicide, but males are almost three times more likely to die by suicide. We also learned the highest rates of death by suicide are among people ages 45 to 64 years old, which describes a large group of our mariners. Because of this, it was very important to us to make sure we implemented a preventative approach that would be easily accessible to all associates.



Ingram Barge has partnered with Seamen's Church Institute (SCI) on measures to help prevent mariner suicides. One measure is having people like SCI's Chaplain Kempton Baldridge, right, come aboard ship to talk with mariners and give them a chance to share their concerns. Photo courtesy of Seamen's Church Institute

We have had a partnership with SCI for many years and decided to start there. Members of our senior leadership teams met with the organization to discuss ideas and opportunities. We learned that about 5 percent of the American population has thoughts of suicide each year, but that most suicidal behaviors do not end with death if the person at risk receives the care and support they need. From that, we decided on two approaches

Seamen's Church Institute's Rev. Kempton Baldridge talks with Ingram Barge Company mariners at Ingram's Paducah landing. Photo courtesy of Ingram Barge Company

For more information

For more information on SCI Online training or ASIST, please visit SCI's website at seamenschurch.org or seamenschurch.org/ASIST

that would have the greatest impact on our associate base—an online training module, and a two-day interactive workshop.

The online training module is hosted through SCI online. It's a 60-minute training focused on suicide awareness. It is available to all of our vessel associates and can be completed on the boat, giving us the opportunity to reach our mariner associates that are not able to attend the two-day workshop.

The second preventative approach we implemented is a two-day interactive workshop in suicide first-aid known as ASIST, or Applied Suicide Intervention Skills Training. ASIST was developed by LivingWorks, a Canadian company. Focused on intervention, the training teaches how to recognize when someone may be having thoughts of suicide and provides guidance on how to ask directly about suicide. We wanted something to help our shore and marine associates feel confident and prepared to have conversations when they see a concern. ASIST also offers guidance on how to keep someone safe until help is available by creating a plan that will support his or her immediate safety. If the person is not thinking about suicide, it lets them know someone cares.

During the two-day workshop participants practice this new set of skills through role play to make asking questions of someone thought to be in danger more comfortable. It also allows for real-time feedback on how the situation could have been handled differently. We started by enrolling shoreside associates, our first line of support to our mariners, in ASIST. We wanted those associates to feel prepared and be able to recognize signs when having conversations with mariners. The entire human resources team, all operations managers, and crew dispatchers went through the two-day interactive training. A few marine associates have participated in the training so far and, as we move forward, we are hoping to get

Ingram Barge Company's M/V *Todd Brown* is at work in Columbus, Kentucky. Photo courtesy of Ingram Barge Company

more mariners in leadership roles involved.

At Ingram, we have created a culture of Zero Harm, which means reducing risk to the lowest reasonable levels. Some of the components of our culture include felt leadership, risk assessments, and a caring environment. Felt leadership is action-based leadership developed by trust and dedicated to putting the well-being of associates first. Our Zero Harm philosophy ties in with suicide awareness and prevention, and directly affects our mariner's health and wellness. We want all of our associates to be safe, injury free, and mentally and physically healthy.

Ingram has adopted some additional best practices beyond the two training options, including working with our operations managers as they make vessel visits. Mental health is a safety topic and we want associates to feel comfortable talking about it. We also want to make sure everyone is aware of the resources the company provides. These include:

- providing an employee assistance program that offers confidential help through a counselor
- keeping posters on each vessel with the contact information for these programs
- sending emails throughout the year as a reminder of resources available, especially around the holidays

We currently have an online medical questionnaire in place that each marine associate completes prior to traveling for crew change. It is hosted and reviewed by a third-party occupational medical provider. The questions focus on the associates' ability to return to work and safely perform the essential functions of the job. It reviews whether any illnesses or injuries occurred while they were off work that would prevent them from returning. We are currently exploring adding mental health questions to the questionnaire regarding associates' mental health while they are off the boat. The goal would be to make sure the mariner gets connected to help if they need it, so answers would not be punitive.

As we move forward, we will continue working to make the biggest impact with continued proactive education and awareness, because the need is still there.

About the author:

Kelly Clapp is approaching her eighth year with Ingram Barge Company where she is a human resources manager. She has also held roles in barge maintenance and repair, claims, and human resources at Ingram. She received her bachelor's degree in business administration, and an MBA from Murray State University. She serves on the boards for Paducah Propeller Club and Paducah Day Nursery. Outside of work, Clapp is a barre instructor and enjoys playing tennis competitively.

Top Medical Conditions

How to stay fit at home, at work, and with the United States Coast Guard National Maritime Center

by Eric Schaub, M.D., MPH, FACOEM
Medical Director
Seafarers Health and Benefits Plan

Maritime work is physically and mentally demanding. The maritime environment itself is challenging, and maritime work commonly involves being far from medical care. Therefore, ensuring you can safely perform the work is vital to protecting you, other members of your crew, your vessel, and the public. This article reviews some general guidelines to stay healthy and, if you develop medical issues, what actions you should take to remain credentialed and working. Additionally, this article will discuss the information that may be useful to the U.S. Coast Guard National Maritime Center (NMC) when reviewing your medical certificate application, as well as information that employers' medical consultants may use to determine your fitness for duty.

No matter your age or medical problems, there are things that you can do to stay healthy at home and at work, including:

- Have regular visits with a healthcare provider. How often you need to see your provider depends on your health. If you have health conditions, make sure that you see your provider more frequently. If you are not sure how often you need to be seen, ask your provider.
- Be aware that a family history of some conditions such as high blood pressure, diabetes, and certain cancers can increase your risk so you may need to be seen more frequently and require additional testing.
- You should see your dentist regularly. Since dental pain and infections can be serious, prevention or repair of dental problems should occur before more serious problems can develop. Many dentists recommend you be seen every six months, although it depends on your dental health.
- If you wear glasses, have noticed a change in your vision, or have diabetes, you can benefit from regular eye care. You want to have the best vision possible before going for your Coast Guard medical certificate examination so you are more likely to pass.
- When completing your Coast Guard medical certificate examination, list all your medications including those that you only take occasionally or as needed. Be sure to include medications that you have "in case." Other medications that should be listed include inhalers, eye or nose drops, and skin patch medications.
- If you use, or are supposed to use, a Continuous Positive Airway Pressure (CPAP) device for sleep apnea, make sure that you include that in your medical history.
- When you see your healthcare provider, it is helpful to provide some information about what you do since most physicians have limited knowledge about maritime work. It helps your provider understand that most maritime jobs are safety sensitive and that health conditions that may cause gradual or sudden impairment or

Physical activity is one part of holistic health. Photo courtesy of Crowley Maritime Corporation

incapacitation may be a safety issue. If your vessel is not docked or close to shore, it is important for the provider to know that you will not be able to get immediate medical attention beyond first aid on the job until the vessel returns to port. Likewise, some vessels are in port daily or more often, while other vessels may be at sea for days, weeks, or months. If your vessel will be gone for long periods of time, your provider will want to know because this may affect what medications are used and how often you need to be seen for follow-up visits. If you will not be near medical care, certain medications are not appropriate in case of a reaction or side effect.

If you will be working on board the vessel for a period without returning home, ensure that you have adequate medications for the duration of your job.

There are common conditions that require closer review by the NMC. The Coast Guard may ask for more information when you apply for your medical certificate if you have these conditions. If you require closer monitoring, the NMC may issue a medical certificate with a shorter approval period and/or may issue a waiver. Waivers are issued if your vision, hearing, or general condition do not meet the USCG standards or if closer observation with shorter approval period is indicated. A waiver is issued if the NMC feels your condition does not pose a significant risk to maritime safety. They include a separate letter and waiver issuance will be noted on your Coast Guard medical certificate. In most cases the expiration date of the waiver will be the same as the expiration date of your medical certificate. If you are issued a waiver, the requirements for updated information to be provided at the time of your waiver renewal are spelled out on your Coast Guard waiver letter. Therefore, it helps to read this letter when you receive it, and again before starting your medical certificate renewal process. It may also help to take your waiver letter to your provider, so your provider is aware of what information is required.

The Coast Guard determines fitness for certification when issuing the medical certificate and any associated waiver. The physical abilities the Coast Guard focuses on relate largely to the ability of each mariner to assist with emergency response if required and the minimum physical abilities for a mariner. In addition to physical abilities, the NMC is concerned with conditions that may result in gradual or sudden impairment or incapacitation. If your job requires a Coast Guard medical certificate to work, this represents a minimum standard to take a job on board a vessel.

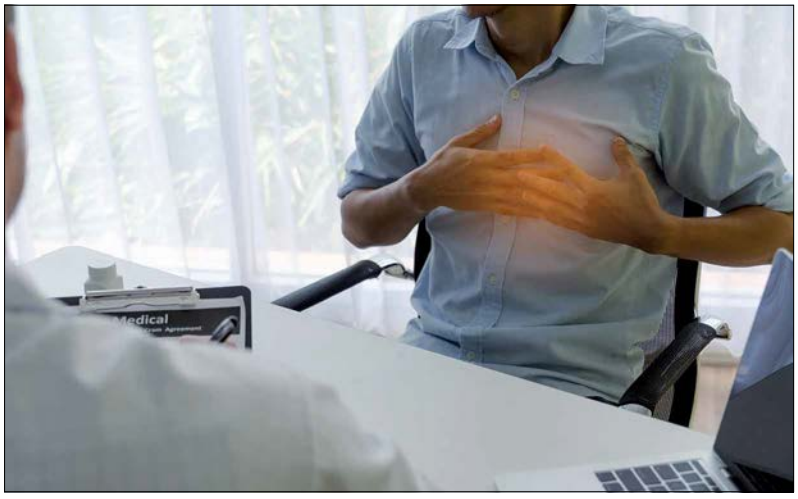
The Coast Guard does not determine fitness for duty or the ability for you to take a certain job with your employer. The Coast Guard does not have different fitness standards for different job titles or for those who work deep sea and remote locations versus nearshore and inland. For that reason, many employers have consultants who review your medical conditions to determine if you are fit for duty based on the job requirements. Your employer's medical consultant may ask for additional information beyond the information provided to the Coast Guard to ensure you are fit for duty for the specific job.

While the NMC and the employer's consultant use the information from your providers, some providers are not familiar with the maritime environment including the limited medical treatment available and the physical and psychological demands of the job. The NMC and the employer's consultant must make their own determination taking into account all available medical information and the job requirements.

The factors that are considered by the NMC and the employer's medical consultant when determining your fitness for certification or fitness for duty include:

- any functional limitations related to your condition
- stability versus the chance that your condition worsens over time
- need for, and frequency of, your follow-up visits or testing
- risk of gradual or sudden impairment or incapacitation due to the condition
- risk of gradual or sudden impairment or incapacitation from medications used to treat your condition, including missed doses or sudden discontinuation of the medication

Below are some common examples of conditions and the type of information that may be requested about



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your condition.

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Heart Disease

Heart disease can cause difficulty with the physical portions of your job, like climbing stairs or walking a long distance, and can place you at risk for sudden incapacitation. If you have heart disease—angina or chest pain, myocardial infarction or heart attack, stents, or heart surgery—you should see your provider regularly, but at least yearly and more often, if necessary. As time goes on after a stent or heart surgery, blockage can return or appear in a new area of the heart. Therefore, you need to report new symptoms. You may require additional testing such as a stress test to detect these changes. Medications are important, as are lifestyle changes like weight loss, smoking cessation, blood pressure control, exercise, and diet.

Heart rhythm irregularities, like atrial fibrillation, may be treated by medications that control your heart rate or keep your heart in regular rhythm. You may be placed on aspirin or an anticoagulant to prevent blood clots from forming in the heart which can then travel to the brain causing a stroke. You will require regular checkups to evaluate your heart rhythm. In addition, if you are placed on an anticoagulant, you will require regular visits with your provider, and you may require blood tests periodically. There is increased risk of external and internal bleeding with anticoagulation. These risks, in relation to your work which may be in remote environments without access to medical care should be discussed with your provider.

If you have a pacemaker implanted in your chest, you will need to have regular checkups to evaluate how the pacemaker is working and to determine the battery strength. There are different devices called implantable cardioverter defibrillators (ICD), with or without a pacemaker, that are surgically implanted in the chest and are used to deliver an electric shock if there is a dangerous heart rhythm. If you have an ICD, more extensive records will be required to evaluate you, and it is best to contact the NMC to determine what information is needed. Not all employers allow mariners with an ICD to work on board their vessels.

Diabetes Mellitus

Diabetes can cause sudden incapacitation from low blood sugar or place you at risk for dehydration, temporary vision changes due to swelling of the lens of the eye, and even more serious complications if your blood sugar is too high. A common problem in American adults, diabetes is caused by the body being unable to control blood glucose, or sugar. Treatment may include weight loss, diet, exercise, and medications. If blood sugars are not controlled, diabetes can cause damage to eyes, heart, kidneys, blood vessels, and nerves. The blood vessel damage is worse with smoking, high blood pressure, and high cholesterol.

A common measure of how well blood sugars are controlled over time—the three months prior to the test—is a blood test called hemoglobin A1C. This test is often measured every three to six months. The NMC and medical consultant reviewing you for fitness for duty may ask to see your recent hemoglobin A1C test results, since it shows your level of blood sugar control over time.

In certain persons, insulin is prescribed. It is administered through either daily, or more frequent injections; an insulin pump that provides regular small doses of insulin; or by a new medication that is breathed into the lungs. In persons taking insulin, blood sugars are

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measured regularly using a test meter. The NMC and your employer's medical consultant may ask to see the log of your blood sugars. In many cases, the blood glucose test meter keeps track of your blood sugars which can be downloaded and reviewed.

Mental Health Conditions

It is important to realize that mental health conditions can affect your work and how you relate to those around you. With the smaller crews on modern vessels, every mariner becomes more important to the functioning and safety of the vessel. An additional area of concern for everyone, including the Coast Guard, is suicide prevention and keeping mariners safe and mentally healthy. Work on a vessel may increase stress due to long hours, loss of regular contact with your family or significant other, and interpersonal challenges when working with other crew members.

If you are seeing a mental health professional, you should talk with them about your work and any concerns or challenges you may have. It is important to identify support systems on the vessel and maintain healthy habits as you are able. If you are taking medications, it is important not to make medication changes shortly before boarding, or while on, the vessel since the medication changes will affect you at a time where additional treatment changes are difficult to make. Additionally, some antidepressant or anti-anxiety medications should not be suddenly stopped due to possible side effects. If you, or someone you are working with, develop problems on board, including thoughts of suicide, you should alert a responsible person on board to help with the situation.

Sleep Disorders

Sleep is very important to your health and function at home and at work. If your sleep is poor, you cannot function properly, and the risk of gradual impairment may affect you while standing navigational watch or working in the engine department. Slower reaction times and slowed thinking increase the safety risk.

There are various methods of testing for sleep disorders including home tests that are cheaper and easier to do than in the past. Continuous positive airway pressure, or CPAP, remains the gold standard of sleep treatment although there are other options available, both surgical and non-surgical. All modern CPAP machines can store data on how effective the CPAP is, which helps the NMC and your employer's medical consultants determine fitness for duty by revealing whether your sleep disorder is being adequately treated. However, CPAP is only fully effective if used regularly.

While less common, narcolepsy requires further evaluation by the NMC to determine your fitness for obtaining a medical certificate. Narcolepsy is a sleep disorder that causes affected individuals to fall asleep at unexpected times with little or no warning. Providers consulting with employers will also want to review your fitness if you have narcolepsy.

Insomnia is another problem that may affect your work. If you are living on the vessel for a period, be aware that medications that may help you sleep pose a risk of causing you to not be aware in case of emergency on the vessel. Certain medications taken to help with sleep can cause you to do things while not being fully awake or aware, which can be a serious problem on board a vessel.

Seizures and Epilepsy

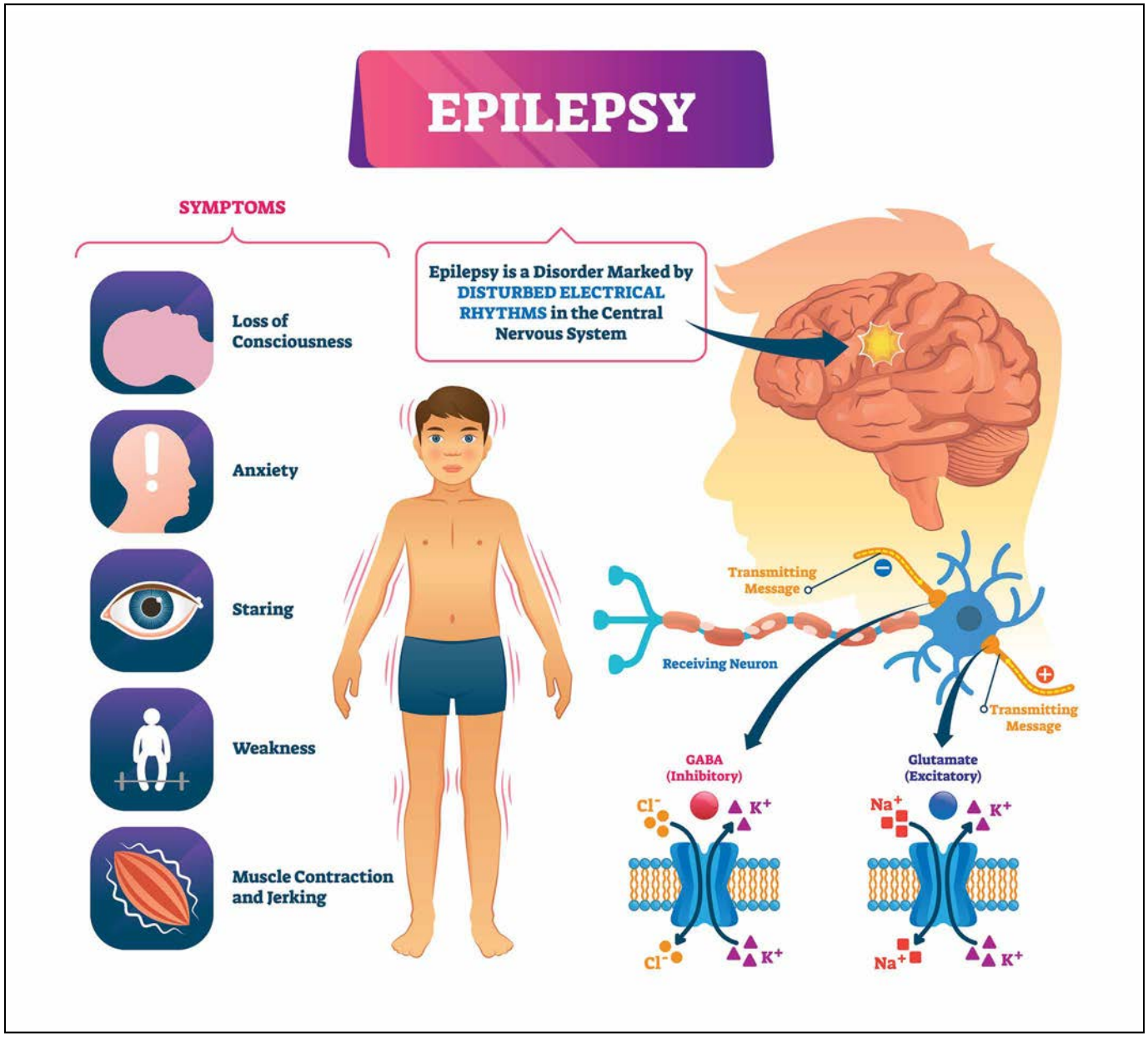
Seizures are nervous system disorders that can result in loss of consciousness, often with uncontrolled movements. If seizures occur repeatedly, the condition is termed epilepsy. Seizures can cause sudden incapacitation, and there is additional risk if your job involves work at heights, on an exposed deck, or around dangerous machinery. You should be aware that seizures or epilepsy are conditions that need to be reviewed by the NMC, and additional information from your provider will be required. Because of that, it may help to contact the NMC so your provider is aware of what information is required. Employer's medical consultants will also request information for review. It is important that if you are taking medication to prevent seizures that you do not change or discontinue the medication without talking to your provider.

Summary

This article is not intended to be a complete review of all the conditions that may affect you or all of the information that goes into reviewing you for fitness for certification or fitness for duty. The review must incorporate what is known about the condition and what is known about your unique situation. Each person is reviewed as an individual, as no two cases are the same.

In summary, you need to take responsibility for your overall health. Be aware that providing complete information to the NMC will assist with the process and may reduce delays. If information is not provided, this may result in the NMC delaying final determination while additional information is collected and forwarded to the NMC from your providers.

While the Coast Guard medical certificate is a minimum requirement for most maritime jobs, many



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employers have medical consultants who look at fitness for duty for the particular job. The consultants may use the information provided to the NMC, but also may ask for additional information. Working with all parties is the best way to ensure you will be able to continue to work for years into the future while keeping your crew, vessel, and the public safe.

About the author:

Dr. Eric Schaub has been a member of the Coast Guard Merchant Mariner Medical Advisory Committee since 2014. He is medical director of Seafarers Health and Benefits Plan, a joint union-management trust representing the Seafarers International Union (SIU) and affiliated employers. He is focused on medical fitness for duty and wellness of SIU mariners who work in the United States and around the globe. He is board certified in occupational and internal medicine, and has been working in maritime medicine since the early 1990s.

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Lifestyle Choices and Chronic Disease

by Emily Reiblein
Director of HSSE
Crowley Logistics

Chronic conditions like heart disease, Alzheimer's disease, and diabetes are the leading causes of death in our modern world. They creep into our lives, often unseen, and start pulling us apart. Their largest impact may not be death itself, but may lie in the slow decrease in quality of life that accompanies them until they ultimately take it from us. The exact causes of these chronic diseases are hotly debated among researchers, scientists, and doctors. However, most agree that for those conditions that include metabolic elements like heart disease, stroke, Alzheimer's, and Type 2 diabetes, it is important for individuals to reduce their risk factors for the disease, which can include changes to lifestyle. These changes can help slow disease progression, dampen symptoms, even reversing them in certain conditions.

Links Between Chronic Killers and Lifestyle Alterations

Diseases like Alzheimer's and other forms of dementia are on the rise, as are heart disease, stroke, and Type 2 diabetes. Researchers are now exploring the connections among these chronic diseases and finding links. For example, those with diabetes are two times more likely to get heart disease, and have a 60 percent increased risk of developing any type of dementia. Those with heart disease, where plaque builds up on the inside of artery walls, find themselves at higher risk of stroke, where plaque builds up inside blood vessels in the brain. The good news for those looking to attack these chronic conditions is that one or two lifestyle alterations may ultimately aid multiple conditions. Decrease your symptoms of Type 2 diabetes and you may ultimately help save your mental marbles. Not surprisingly, two lifestyle changes that have large impacts across the board are reducing the amount of sugar by lowering carbohydrates in the diet and exercising daily.

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Reduce Sugar and Carbohydrate Intake

Grandma used to say "sugar will rot your teeth." As it turns out, teeth are the least of the worries when it comes to chronically high sugars in the body. High sugar intake, or high glycemic load, sparks insulin to pump from the pancreas. Insulin prevents unused sugar from circulating in the blood by assigning it to be stored in fat cells, building our body mass. Chronic high sugar intake means insulin pumps work overtime. They eventually wear down and out, leading to pre-diabetes, presently affecting some 80 million Americans, and Type 2 diabetes. The easiest way to reduce strain on the system is to reduce the amount of sugars and higher carbohydrate foods—those that turn into sugar—that we take in to our bodies.

Our waist line and insulin pumps are not the only costs of sugar highs. Studies show that excess stored fat has a relationship to declining brain health. A correlation between the two was published[1] identifying those with a body mass index of 30 or higher had a decline in executive function over a 10-year period. People who were obese in middle age were also more likely to be in the top 25 percent of those with the fastest rate of decline in cognitive test scores. Excess sugars shrink brains and expand waist lines. They keep us "well marbled," while deteriorating our mental marbles. To ensure that you are not eating too much sugar, read the labels on packaged food to see how many grams of sugar are contained in each serving. Where you see sugars in grams, divide the number by 4 to determine how many teaspoons of

sugar are in a serving. The World Health Organization Guidelines recommend that daily added sugar intake should not exceed 9 teaspoons for men, 6 teaspoons for women, or 4 teaspoons for children. This would be somewhere around 5 percent to 10 percent of daily caloric intake.

Graphic by Stephanie Eisele/Corporate Synergies

Daily Exercise

Exercise and movement practices have long been linked to good health. The heart is a muscle and just like every other muscle in your body, it gets stronger when it is worked the right amount. The right amount seems to vary, but researchers have shown a reduction in cardiovascular events by 31 percent and a reduction in risk of death by 32 percent in those who walk around 5 miles per week at a casual pace of 2 mph. Additionally, muscles can use sugar for fuel. Exercising your muscles uses up the sugar in your body and can help reduce the amount that insulin pumps need to operate.

Exercise may also help the brain. University of British Columbia, researchers showed that aerobic exercise boosted the size of the area of the brain that controls learning and memory. Runners can expand this area by double and triple. Slower endeavors prove good for the brain as well. In 2010, the University of Pittsburgh showed that those who walked an average of 72 blocks or more per week increased areas of signaling and processing in the brain. They also reduced episodes of cognitive decline after 13 years. Whether you are a runner or walker, brain function and heart health generally improve with exercise.

One of the ways that exercise contributes to a healthy heart and brain is through the production of brain-derived neurotropic factor (BDNF). This protein's production gets ramped up during exercise and leads to the development of new neurons in the brain, improved survival of neurons already there and promotes faster cognitive function. BDNF levels may also play a role in other chronic conditions. Low levels of BDNF have been noted in heart disease patients and patients with Alzheimer's and other forms of dementia. If you have not exercised in some time, or are looking to change your routine, get help. It never hurts to talk to a professional to determine how to set up a routine that is sustainable, fun, and does not leave you hurting. The Physical Activity Guidelines for Americans recommends 20–25 minutes of moderate exercise per day. Including a few sessions of weightlifting in your weekly exercise routine can help sustain mobility and build muscle.

The Newest Lifestyle Change in the Tool Kit

Food and exercise may not be the only way to change health outcomes. The latest research in circadian science is starting to reveal another avenue for good health and disease prevention. Circadian science is most widely associated with our sleep and wake cycle. Advances in this research are now identifying how these rhythmic movements can impact our health beyond sleep. Using these newly understood patterns may ultimately change the way our shift-working mariners, and more than

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20 percent of the rest of the population, including nurses soldiers, doctors, fire fighters, and new parents, improve their health, and decrease symptoms of chronic disease even in the face of minimal sleep and poor nutritional intake.

The body's circadian rhythms cycle over a 24-hour period and daily exposure to light regulates the timing mechanism. Circadian rhythms propel many aspects of our behavior, psychology, and physiology. Disrupting or misaligning the body's cycles, creates the potential for deadly consequences, some of which are linked to metabolic diseases such as cardiovascular disease and diabetes. Research in circadian clock disruption also shows possible associations with cancer, gastrointestinal illness, and neurological decline.

Recently, circadian relationships have been identified across the whole body with various "clocks" embedded in organs, muscles, and the bacteria in the gut. These clocks operate somewhat independently, but in conjunction with the "major clock" in the brain which regulates the sleep and wake cycle. The good news is that even though we may not be able to sleep and wake at normal hours, we may still be able to glean other beneficial circadian cycles such as the rhythmic movements of the gut.

In his book The *Circadian Code*, Satchidananda (Satchin) Panda examines the science and research on how not eating, or restricting when we eat, can affect our circadian cycle to better health. In studies at the Panda Lab, animal models are showing that time restricted feeding can decrease body weight by one-third and help regulate blood lipid numbers like cholesterol and triglycerides, even for those with nutritional challenges. Study subjects only ate during a 9- to 12-hour time period each day, and refrained from ingesting anything other than water outside of that time frame. Body weights in this group were reduced, without restricting calories, and weight loss continued even through there were disruptions to the time restricted eating cycles, like wild weekend feasting for example. Shockingly, even subjects who ate a combined high-sugar and high-fat diet, also known as a Standard Western Diet, while restricting their eating to a 9-hour time window still experienced weight loss and enhanced metabolic regulation. Cells became healthier and produced more energy. Symptoms of diseases like diabetes and cardiovascular disease were reduced. Panda points out that resting time for the gut and other organs helps drive healthy circadian cycles and is one of the reasons for the positive, "Just like you cannot repair a highway when the traffic is still flowing, you can not completely repair the gut if you keep on eating." Aligning gut "down-time" with our bodies sleep timing; not eating two hours prior to bed and an hour after waking appears effective at setting the gut up for success and also promoting better sleep.

The chronic diseases that affect our brain, heart, and blood can be affected by what we put in our mouths and how much we move. Further promise of using time restricted feeding/eating may turn out to be a great complement to these other lifestyle changes to help our mind and body function optimally for as long as possible. Like any promise or plan though, it's only as good as the execution of actions that take it through to fruition.

Author's note: Nothing in this article constitutes medical advice. All medical advice should be sought from a medical professional.

About the author:
Emily Reiblein is the director of Health, Safety, Security, and Environmental Protection at Crowley Logistics. She came to the industry after graduating from the Massachusetts Maritime Academy with a degree in marine safety and environmental protection and has spent the last 20 years in vessel operations, security, and management system integration. She has served on the United States Coast Guard's Navigation Safety Advisory Council, Towing Safety Advisory Council, and American Waterways Operators Accreditation Board. Ms. Reiblein is also a nutritionist and presently serves as a member of the USCG Medical Advisory Council.

Endnote:

1. *Neurology* (77 (5):461-8

Obstructive Sleep Apnea in the Marine Industry

Identifying, addressing, and mitigating its impacts

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Associate Professor of Neurology
Medical Director of Sleep Disorders Center
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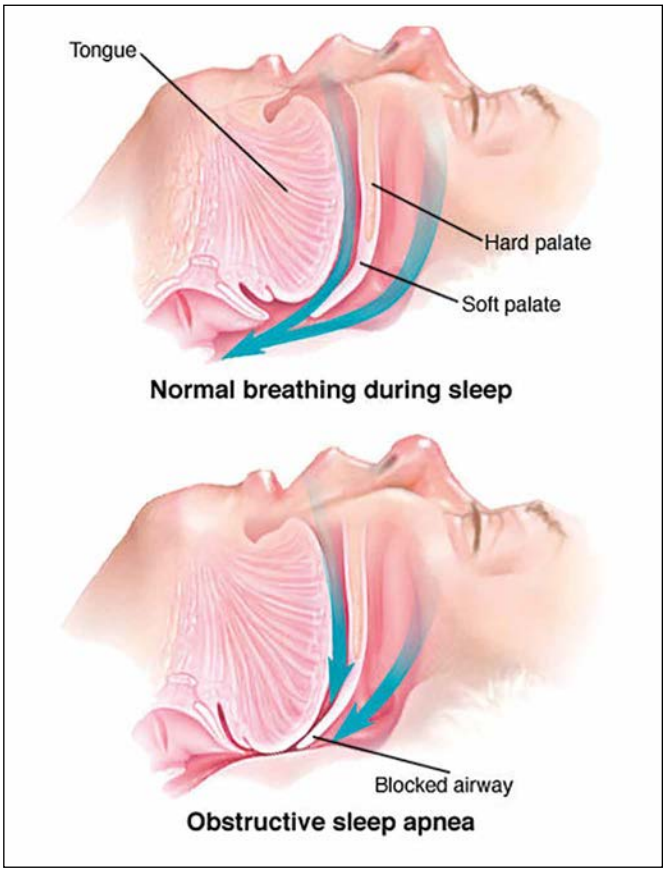
I have been working with merchant mariners for the last seven years and have come to appreciate the demanding nature of their work. They work away from home for extended periods of time in environments that can often be unpredictable and, at times, dangerous. Threats to safety are ever present and maintaining a constant high level of vigilance is critical to avoiding injury, property damage, and environmental catastrophe. Like everyone else, a mariner's ability to maintain vigilance is directly related to the quality and quantity of his/her cumulative sleep over the preceding days and nights. Getting "good" sleep consistently is a luxury that is rarely afforded to a mariner who must work and sleep in shifts around-the-clock in a moving vessel that is noisy and exposed to inclement weather. Despite operational and environmental constraints to optimal sleep practices, there are a number of practical strategies to improve sleep in the marine environment as outlined in the U.S. Coast Guard's publication *Crew Endurance Management Practices.*[1] The reader is strongly encouraged to review this document. Not covered in the document, however, and probably just as important, is the impact of sleep disorders on sleep quality and daytime vigilance. In this article, I will describe obstructive sleep apnea, one of the most common sleep disorders, which can have a big impact on sleep quality, daytime vigilance, and the long-term health of mariners.

What is Sleep Apnea?

Sleep apnea is a condition characterized by periodic pauses or reductions in breathing that occur during sleep. There are two types of sleep apnea, central and obstructive, the latter being much more common. In obstructive sleep apnea (OSA), upper airway muscles relax and allow the surrounding structures such as the tongue and the soft palate to partially or completely block the upper airway in the region between the nasal cavity and the trachea, or windpipe, especially when a person is sleeping on his/her back. Additionally, the suction force of breathing itself can narrow and collapse the airway, which leads to reduced airflow to the lungs and low oxygenation of the blood. Breathing effort continues and, in fact, increases to compensate for the increased resistance in the airway. Eventually the increased work of breathing and the reduction in blood oxygen levels cause the brain to arouse. Once aroused, the brain activates the airway muscles and reopens the airway. The arousals are very brief, and most sufferers of sleep apnea aren't aware of them.



Why is Sleep Apnea Important to Mariners?

Obstructive sleep apnea is a very common condition that is estimated to occur in 24 percent of adult males. The risk of apnea increases with age and body weight, and is a very serious medical condition if left untreated. Not breathing adequately and not getting enough oxygen can damage blood vessels and strain vital organs such as the heart, brain, and kidneys. Clinical studies have linked untreated sleep apnea with chronic medical conditions such as high blood pressure, heart disease, stroke, kidney failure, and Alzheimer's disease. Additionally, the frequent arousals associated with OSA result in poor quality of sleep, daytime sleepiness, low mood, and increased risk of fatigue-related errors and accidents. These complications can be prevented by early identification and treatment of sleep apnea. Treatment of sleep apnea improves sleep quality, mood, and daytime alertness in the short-term while reducing the risk of cardiovascular disease in the long-term. Additionally, accumulating evidence suggests treatment of OSA improves operational safety and reduces work related injury and economic losses.

What are the Symptoms of Sleep Apnea?

Most people with sleep apnea are unaware of their condition. OSA symptoms such as snoring and fatigue are so common that they are taken for granted, especially because the symptoms come on gradually over a long period of time. Most people seek help for sleep apnea due to the urging of their bed partners who are either troubled by the snoring and/or concerned about the breathing pauses that may be observed.

How is Sleep Apnea Diagnosed?

Sleep apnea is not particularly difficult to diagnose. There are a number of screening tools that can help identify those at-risk. We commonly use the STOP-BANG screening tool in our clinic which consists of eight common risk factors for sleep apnea. Each letter of the acronym represents a risk: S for snoring; T for tired; O for observed apnea; P for high blood pressure; B for body mass index greater than 30; A for age greater than 50; N for neck circumference, greater than 16 inches for women and greater than 17 inches for men; and G for male gender. The presence of three or more risk factors suggests the possibility of sleep apnea while a score >5 strongly suggests high risk of sleep apnea. The diagnosis is then confirmed with a sleep study. Although sleep studies were traditionally done in a sleep lab with multiple sensors, more and more patients are being evaluated in their own home with portable home sleep testing devices. Home sleep testing is more convenient and less costly for patients. Facility-based sleep study is required for individuals with certain medical conditions, like congestive heart failure and chronic lung disease. A sleep medicine specialist should be consulted to determine the best test. Additionally, negative home sleep study results should always be followed by facility-based sleep study in patients at high risk of sleep apnea.

Obstructive Sleep Apnea Symptoms

In addition to snoring and fatigue, other obstructive sleep apnea symptoms include:

- dry mouth
- sore throat
- night sweats
- awakenings frequently during the night to urinate
- morning headaches
- acid reflux
- sexual dysfunction
- decreased concentration
- irritability
- low mood
- anxiety
- daytime sleepiness

What are the Treatments for Sleep Apnea?

Treatment of OSA depends on the severity of the condition as measured by the apnea-hypopnea index (AHI), which is calculated by adding up the number of breathing pauses and shallow breathing episodes, and then dividing that number by the number of hours of sleep. Individuals with AHI of less than 5 are considered to have normal breathing. AHIs of 5–15, 15–30, and more than 30 events/hour define mild, moderate, and severe sleep apnea, respectively. Mild sleep apnea can often be treated with weight loss alone. Another option is an oral appliance, a device that holds the lower jaw in a forward position and in doing so creates a wider and more stable airway in the back of the throat. These devices are convenient to use and can be effective for those with mild to moderate sleep apnea. Custom made adjustable devices tend to perform better. The most effective treatment is continuous positive airway pressure (CPAP) therapy. CPAP devices generate airflow and, when applied via a nasal or facial mask, create pressure in the upper airway and prevent airway obstruction during sleep. Although clinically proven to be effective, most people need time to adjust to therapy. Despite concerted effort and adequate troubleshooting, a small but significant percentage of individuals with obstructive sleep will not adjust to the therapy. Lastly, there are a number of surgical options, including an emerging treatment involving electrical stimulation of the upper airway, for those who can't tolerate the other modalities. Further discussion of these surgeries is beyond the scope of this article.

My Experience Treating Mariners with Sleep Apnea

When I first started working with mariners in 2011, there was a great deal of apprehension in the transportation industry regarding potential regulations surrounding

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sleep apnea. At that time, the National Transport Safety Administration listed "addressing human fatigue" as their No. 1 priority. Recognizing the potential impact of untreated sleep apnea on operational safety, some industry leaders incorporated sleep apnea and fatigue management education into their safety training. However, this training had little impact on convincing mariners to get treatment.

Below are some of the reasons why mariners do not seek sleep apnea care.

I don't have sleep apnea. It is estimated that 80 percent of individuals with OSA are undiagnosed. This is because most people with sleep apnea don't know that they have a problem and rarely seek a remedy on their own account. It is usually a spouse, a bed partner, or a friend with successfully treated sleep apnea who encourages the patient to seek help. Another common symptom of OSA is fatigue which is often underestimated and/or accepted by mariners as something that is inherent to their line of work. I have seen many mariners who realize how tired they are only after their sleep apnea is treated. I have had many patients tell me that the treatment made them feel 20 years younger.

I will lose my job if I have sleep apnea. Obstructive sleep apnea is so common that employers can't afford to fire mariners on the account of sleep apnea, especially given the looming shortage of merchant mariners predicted by the U.S. Naval Institute.[2] Rather employers have a vested interest in holding onto their employees.

I will lose my merchant mariner credential. One of the biggest fears that mariners have is that the diagnosis of sleep apnea will lead to loss of their medical certificate and, in turn, their merchant mariner credential. This misunderstanding stems from the designation of OSA as a "medical condition that requires further review" by the Coast Guard. The truth is that the Coast Guard, through its National Maritime Center, makes every effort to keep mariners working, especially given projected workforce shortages. Individuals with sleep apnea are required to submit paperwork that includes their sleep study and a note from their treating physician. Individuals treated with CPAP are also required to submit a "CPAP adherence report" showing adequate use of a CPAP device. Individuals not on a CPAP device will need to demonstrate control of apnea with alternative treatments, like an oral appliance.

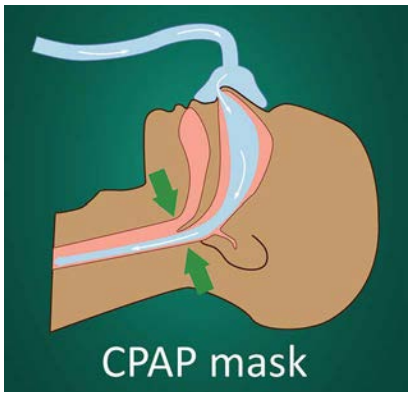
It is too difficult to get tested. This may have been true 20 years ago, when there were far fewer sleep labs and sleep specialists. However, it has never been easier to get a sleep study than it is today. With the tremendous growth in sleep medicine over the past few decades, there are more than 3,000 sleep labs in the United States. In addition, advances in technology have led to the development of reliable home sleep-testing devices that are less expensive and more convenient. The growing use of telemedicine, medical care provided remotely by audio/video, has lowered the barrier to accessing care.

I will not be able to use CPAP. Most people are understandably ambivalent about CPAP when they first encounter it. People worry they may experience claustrophobia, discomfort from the straps, or intolerance of the pressure. They also worry the machine will make too much noise and the tubing will keep them tethered. Some worry the facial mask will make them unappealing to their bed partner. These concerns are valid. No one will deny the fact that wearing a CPAP is unnatural and often quite uncomfortable. At the end of this article, I provide solutions to the top 10 problems with CPAP in the hopes that it will allay concerns about this therapy for those new to it and encourage those who gave up on CPAP therapy to give it another try.

Telemedicine Sleep Apnea Program for Mariners

To help overcome many of the barriers that prevent mariners from getting treatment for sleep apnea, we have developed a unique remote sleep apnea treatment program for those living in the South and the Midwest. The program incorporates sleep apnea education into mariner safety training presentations. Mariners are encouraged to seek help if they have any of the symptoms of sleep apnea. Additionally, mariners who score 5 or higher on the STOP-BANG survey during their medical evaluations for credentialing are offered a sleep medicine consultation. The consultation is done in real time with a sleep physician via audio-video conferencing tools. A home

Troubleshooting CPAP Therapy



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1. *Claustrophobia:* New users to CPAP sometimes have a hard time breathing with a mask over their face and often feeling like they are suffocating, even though the airflow and the positive pressure actually helps them breathe easier. To avoid this problem, I recommend CPAP desensitization techniques which gradually expose the individuals to the CPAP for incremental periods of time. This is done outside the bedroom, early in the evening, and while the individual is awake, relaxed, and distracted by a passive activity such as viewing a favorite TV program. Once they are accustomed to the CPAP, they will wear the device during their sleep period. The key to success is daily use.

2. *Skin irritation, rash, pressure sores:* Skin irritation over the nasal bridge is quite common with some masks, but can be reduced by applying moisturizers to reduce friction between the skin and the mask. Additionally, a soft cotton cloth placed between the mask and the skin can help. A number of new "hybrid" masks, a cross between nasal and full-face mask, avoid the nasal bridge.

3. *Mask leaks:* This can be solved by changing to different mask size and/or style. Tightening the straps can also help, provided it doesn't create pressure sores on the skin. There are more than 50 different types of masks on the market and new types are being rolled out regularly. They have become lighter, softer, smaller, and more comfortable.

4. *Nasal congestion:* This is often due to narrow nasal passages; deviated nasal septum; large nasal turbinates, or structures in the nose; or a combination of these factors. Environmental allergies can also cause congestion through inflammation of the inner lining of the nose and sinuses. Allergies can be improved by nasal saline rinses, non-sedating antihistamine medications, and nasal steroids that reduce inflammation. Very infrequently, patients may require nasal surgery to treat a deviated septum and/or reduce the size of the nasal turbinates.

5. *Dryness of the nose and mouth:* This can be solved by increasing the humidity setting on the CPAP machine to increase the moisture content of the air that is breathed. Mask leaks can also lead to dryness, especially in habitual mouth breathers. This can be prevented by switching to a mask that covers nose and mouth or wearing a chin strap to keep the mouth closed. Some people who have dry mouth, despite the above interventions, will benefit from a mouth rinse or spray.

6. *Too much pressure:* This can be remedied by using a ramp feature that allows the CPAP machine to start at a low pressure when it is first applied at the beginning of the night. As the user falls asleep, the pressure rises gradually to the setting needed to keep the airway open. In some people, pressure requirements vary across the night depending on sleep stage and body position. These individuals can benefit from auto titrating CPAP machines which have sensors that detect airway obstruction and automatically adjust the pressure up or down to keep the airway open throughout the night.

7. *Too little pressure:* This can be remedied by increasing the pressure setting. This will require an order from the treating physician or healthcare provider.

8. *Air in the stomach:* This is an infrequent problem where CPAP causes individuals to swallow air. This leads to bloating, burping, and flatulence. This can be remedied by lowering the pressure and sometimes switching to bi-level positive airway pressure (BPAP) therapy. BPAP devices allow for a lower pressure setting during exhalation so it is easier to breathe out against the blowing air. Sometimes changing the mask type may help.

9. *Forgetting to put on the CPAP:* Far too often, despite best intentions, people with obstructive sleep apnea forget to put on their CPAP. The solution to this problem requires understanding the root cause. If the CPAP is uncomfortable, for any of the reasons described above, people will not be motivated to wear it. Troubleshooting the specific cause of the discomfort usually improves the use of CPAP. Poor sleep habits often get in the way of CPAP use. If the individual has a habit of watching TV and falling asleep in the living room, the CPAP in the bedroom will go unused. This can be remedied by creating bedtime ritual that is followed nightly.

10. Despite diligent efforts by the individual and the treating physician, about 10–15 percent of individuals with sleep apnea will not tolerate CPAP or BPAP. For these individuals, alternative remedies such as oral appliance therapy and surgery are recommended.

sleep-testing device is mailed to mariners suspected of having sleep apnea based on the interview with the sleep physician. The results of the study are reviewed with the mariner and an individualized treatment plan is developed. Those needing CPAP are provided with the equipment. Sleep technologists are available to provide support for CPAP therapy via telephone, and the efficacy of the therapy is monitored remotely via periodic telephone calls, video chats, and review of therapy data from CPAP machines. This program has been well-received by the mariners because of the convenience it provides—no need to take time off from work and no need to travel. Additionally, therapy outcomes have been well above the national averages, due in part to upfront education about sleep apnea, ongoing CPAP therapy support, and efficacy monitoring.

In summary, sleep apnea is very common problem in the marine industry. Diagnosis and treatment of sleep apnea has become increasingly more accessible. Mariners should set aside their reservations regarding sleep apnea and its treatment and consult with their physician, especially if they have any symptoms. Treating sleep apnea could make a big difference in sleep quality and daytime vigilance, while promoting better long-term health.

About the author:

Dr. Raghu Upender is an associate professor of neurology and medical director of Vanderbilt Sleep Disorders Center. He has been in practice for 20 years in the fields of clinical neurology, electrodiagnostic medicine, sleep medicine, and clinical research. His current research focuses on understanding the role of sleep in human performance, fatigue, and public safety. He has been invited to speak on topics related to sleep medicine and fatigue management in a number of professional conferences.

Endnotes:

1. www.dco.uscg.mil/CG-ENG-1/cems/ Accessed last on December 11, 2019
2. news.usni.org/2016/03/22/u-s-facing-looming-shortage-of-merchant-mariners. Accessed December 11, 2019

They're Alive!

The story of teeth

by Emily Reiblein
Director, HSSE
Crowley Logistics

In 1958, a dentist named Dr. Ralph Steinman determined that our teeth are alive. He saw fluid moving through each tooth, orienting from the intestines, and regulated by a hormone system in the brain. He examined its flow upward in the body, and finally outward through the teeth. This fluid is responsible for bringing nutrients to the teeth, and also leaches out beads of "sweat" from each tooth, which helps clean the teeth by flushing out harmful bacteria and toxins. A film from this fluid ultimately forms on the teeth and helps repel cavities, and prevent gum/periodontal disease. When the flow of this fluid is compromised, it reverses and becomes centripetal, pumping fluid inward bringing bacteria and a trail of damage with it. Enamel gets eaten away and nutrients get pulled from the teeth. Gums bleed, and rotting can ultimately banish the tooth from your mouth. This is how living teeth end up dead.

The death of a tooth from poor dental hygiene and a lousy diet may be far more telling as an indicator of overall health. One study from Sweden, found a much more sinister, and hidden, relationship between some types of gum disease—tooth loss or bleeding gums—and an increased likelihood of heart attack, stroke, or heart failure.

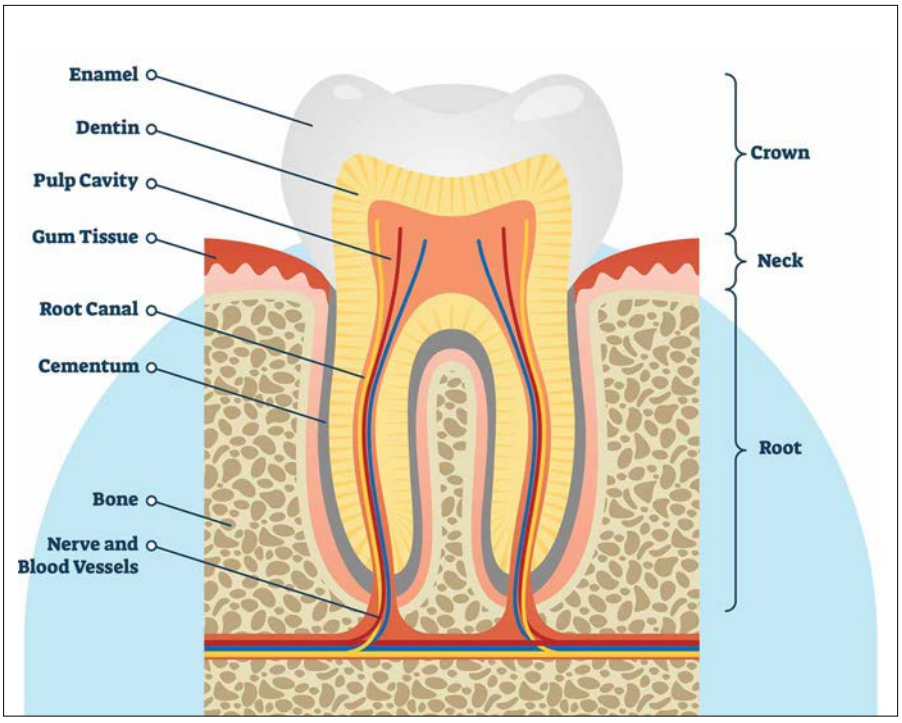
This study of 8,000 men and women 20 to 85 years old found that:

- Adults with fewer than 21 teeth had a 69 percent increased risk of heart attack compared with adults who retained most of their teeth
- People with periodontal pockets, had a 53 percent greater risk of a heart attack than those with the fewest pockets. These pockets form when the gums pull away from the teeth and form "pockets" where bacteria can get caught
- Adults with the least teeth had twice the risk of developing congestive heart failure.
- Those who had bleeding gums were at twice the risk of stroke compared with those whose gums were healthy

"Why these different markers of periodontal disease predict different cardiovascular diseases remains unknown. … But we hope that future research will answer that question," Anders Holmlund, a study leader and periodontist said.

Factors that Weaken Teeth

Poor nutrition is a front runner in the process of tooth decay. Our villains in this story of deterioration are sugar and citric acid. But our hero is fat. According to the Weston A. Price Foundation, there are three fat soluble vitamins that act upon our teeth with a great force of protection. Vitamins D, A, and K2 help to shuttle calcium into the teeth and bones and boost its absorption rates for



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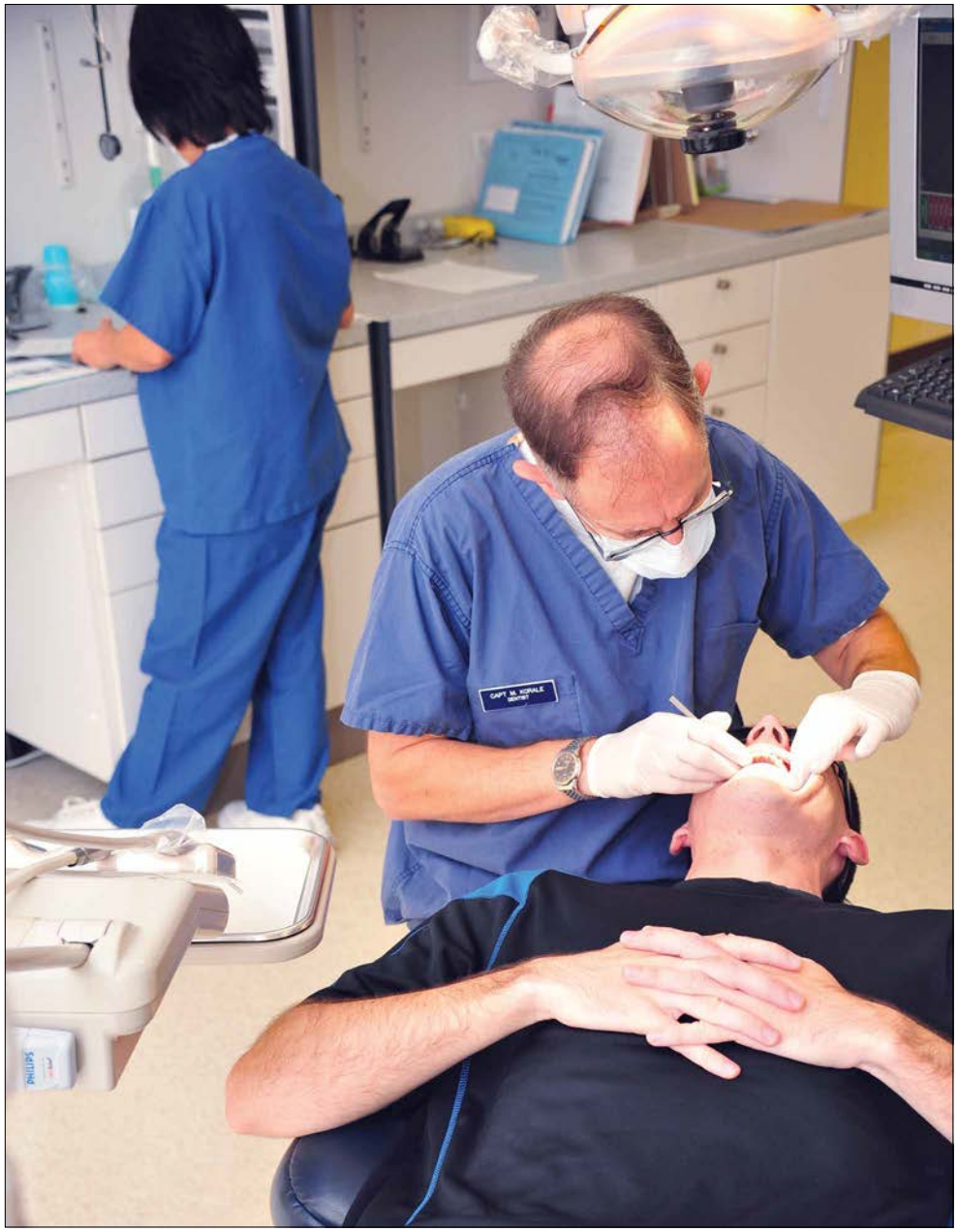


Coast Guard Captain Michael Korale, senior dental executive at the Coast Guard wing Tripler Army Medical Base, performs a dental exam on a Coast Guard member in February 2011. The clinic provides physical examinations, immunizations and clinical laboratory, pharmacy and referral services to other treatment facilities for specialty care. Coast Guard photo by Petty Officer 3rd Class Michael De Nyse

stronger, healthier teeth.

Fluoride also affects teeth for the better, and sometimes for the worse. The World Health Organization identifies that over fluorination can be as damaging to teeth as under fluorination. This phenomenon is based on their scientific research of fluoride sources that we ingest including water, food, and toothpaste.

Fluoride is a desirable substance: It can prevent or reduce dental decay and strengthen bones, thus preventing bone fractures in older people…. Because of its positive effect, fluoride is added to water during treatment in some areas with low levels. But you can have too much of a good thing.

Studies demonstrate that water with fluoride levels above 1.5mg/liter may have long-term toxic effects. Instead of strengthening bones and teeth, it makes them more likely to break and cause a state called dental fluorosis. According to the Centers for Disease Control, the prevalence of dental fluorosis in the United States ranged from 41 percent of the population among adolescents ages 12–15, to 9 percent among adults ages 40–49. Meaning, 41 percent of adolescents in the United States have enough fluoride in their system to break their teeth and bones.

How to Care for Teeth

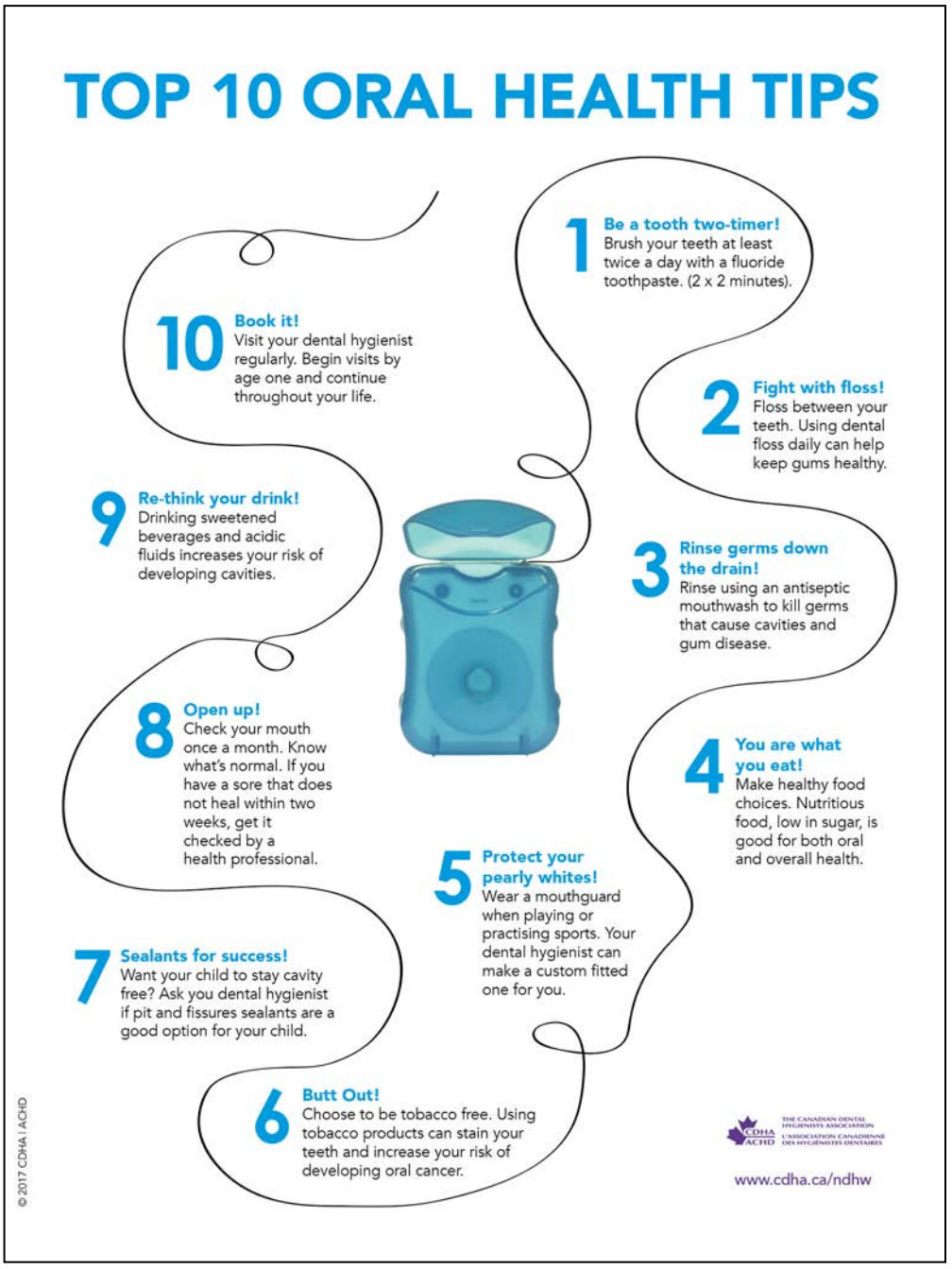
The most common form of disease in the mouth, and about 50 percent of the population has it, is gum or periodontal disease. This disease is an infection of the tissues that hold your teeth in place. It is typically caused by poor brushing and flossing habits that allow a film of bacteria to build up on the teeth and harden into plaque. In advanced stages, periodontal disease can lead to sore, bleeding gums; painful chewing problems; and even tooth loss. Beyond the "brush and floss," there are a few other considerations that may be warranted:

Professional Teeth Cleanings: Not getting proper cleanings of the teeth has proven to be detrimental. In a study by Dr. Emily Zu-Yin Chen, M.D., researchers followed 100,000 people for seven years. Those who had their teeth cleaned professionally had a 24 percent lower risk of heart attack and 13 percent lower risk of stroke overall compared with those who never had a dental cleaning. Those who had their teeth cleaned at least once a year had the fewest heart attacks and strokes.

- Take advantage of dental cleanings if you have

insurance. If you do not have insurance, find a dental college that provides cleanings by students at low or no cost. Both options can help you stay on track with tooth maintenance and care at a low cost.

Nutritional Assets: Vitamins D, A, and K2 are critical to strong teeth and bones. Vitamin D is easy to get from unfiltered sunlight and in many foods where we find vitamin K2. Vitamin K2 is far less known and comes from fats like butter from pastured cows, brie cheese, many hard cheeses, egg yolks, organ meats, and fermented foods, although the latter may be hard on the teeth. Lastly, Vitamin A can be found in tuna, leafy greens, sweet potatoes, carrots, and many other raw vegetables. Stay away from sugar and things that produce sugar in high quantities in the body. Additionally, if you eat acidic foods, like citrus, and do not brush immediately following their consumption, enamel can be damaged easily. If you absolutely need to brush right then, gargle with a baking soda/water mix to neutralize the acid in the mouth, then brush.



Graphic courtesy of the Canadian Dental Hygienists Association

Understanding Your Fluoride Levels: If you are in an age group that tends toward over fluorination, your water is fluorinated, you use fluorinated toothpaste, and/or you start to see cavities crop-up, testing may help determine if over fluorination is an issue. Your medical doctor can order the testing.

Ditch the Tobacco: Tobacco use is one of the major risk factors for periodontal disease. This just adds to the growing list of things tobacco is not good for.

Teeth are alive. Our exposures, what we put in our body, and how well we maintain our mouths all provide critical pieces of the puzzle that keep our teeth and our bodies from an early grave.

About the author:

Emily Reiblein is the director of Health, Safety, Security, and Environmental Protection at Crowley Logistics. She came to the industry after graduating from the Massachusetts Maritime Academy with a degree in marine safety and environmental protection and has spent the last 20 years in vessel operations, security, and management system integration. She has served on the United States Coast Guard's Navigation Safety Advisory Council, Towing Safety Advisory Council, and American Waterways Operators Accreditation Board. Ms. Reiblein is also a nutritionist and presently serves as a member of the USCG Medical Advisory Council.

Drugs and the Merchant Mariner

Stormy weather ahead

by Eric Schaub, M.D., MPH, FACOEM
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Seafarers Health and Benefits Plan

Joseph Mignogna, M.D., MPH, CIME, FACOEM
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"The person who takes medicine must recover twice, once from the disease and once from the medicine."

—Sir William Osler, M.D. (1849–1919)

Medicine is changing with more medications available to treat more conditions than ever before. While medications have improved care, you need to be aware that some medications can affect your job performance which can impact your safety as well as that of your vessel, other crew members, and the public. Awareness and discussion with your healthcare provider or pharmacist, the U.S. Coast Guard's National Maritime Center (NMC), and your employer may be warranted. The medications may cause impairment directly, or as a side effect. In addition, it is important to realize that the opioid epidemic that has affected the United States has also affected the maritime industry and our merchant mariners. Finally, it is important to be aware of the issues with the use of medical marijuana and cannabidiol (CBD) products, from both a medical and a legal perspective.

Medication Usage

The numbers and types of medications on the market have increased over the years and will continue to increase at an even faster rate in the future. This is a benefit to patients with a variety of conditions, offering treatments that were not previously available. Providers try to weigh the benefits and risks of a treatment, choosing the best possible treatment for each patient.

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It is important to realize that many commonly used medications have the potential to adversely affect you. Asking how the medication will help you and what side effects are most common or severe is one important action you can take. Many providers are not familiar with the demands of maritime work so it may help to briefly explain what is required to perform your job, including the ability to stay alert for periods of time, rotating work shifts, and limited medical treatment. It is also important to realize that a medication may affect you differently than other people, so you can help by letting your provider know if a medication is causing a side effect.

Just because a medication is available without a prescription does not mean it is free of side effects or harmless when used with other medications. Over-the-counter

Examples of Controlled Substances

- narcotics used for pain control include opioids like codeine, morphine, hydrocodone, and oxycodone, as well as non-opioids, like tramadol, or Ultram/Ultracet
- narcotics used for addiction treatment include methadone and buprenorphine, or Suboxone
- medications called benzodiazepines—like diazepam, or Valium; alprazolam, or Xanax; and clonazepam, or Klonopin, among others—are used for anxiety, sleep, or muscle spasms
- medication used for nerve pain like pregabalin, or Lyrica
- muscle relaxers like carisoprodol, or Soma

*This is not an exhaustive list of medications or brand names.

(OTC) medications like the antihistamine diphenhydramine found in Benadryl, Tylenol PM and others, and the motion sickness medication meclizine, found in Bonine and other anti-motion sickness medications, can cause drowsiness, blurred vision, and problems with extreme heat or cold. Other OTC medications like pseudoephedrine and phenylephrine, among others, can aggravate high blood pressure. Your pharmacist can answer questions about your OTC medications and their side effects.

Uros Poteko | BigStockPhoto

Prescription medications identified as controlled substances are closely regulated by the Drug Enforcement Administration (DEA) and also can affect you. Your pharmacist can tell you if your medication is a controlled substance.

Other prescription medications that can cause drowsiness, clumsiness, or slow reaction time include:

- muscle relaxers like cyclobenzaprine or Flexeril
- antiseizure medications that are used for other conditions such as nerve pain including gabapentin, or Neurontin, and others like pregabalin, or Lyrica
- Anti-depressants like amitriptyline or Elavil, mirtazapine or Remeron, and other medications used for mental health conditions, like quetiapine or Seroquel

Some medications have the opposite effect, increasing alertness and preventing sleep. Amphetamines and other stimulants, like Ritalin, Vyvanse, and modafinil or Provigil, are drugs which can cause poor sleep as a side effect. In fact, modafinil is used to help stay awake. However, these medications can interfere with the ability to sleep during times when you are supposed to sleep and can cause you to be more tired as the medications wear off. Stimulants also can cause dizziness, nervousness, abdominal pain, and fainting.

Remember that prescription and OTC medications are prescribed or recommended for a purpose. It is also important to consider how the underlying problem may be affecting your job performance. For example, if medications are being taken for pain or muscle spasm, is the condition that is causing the pain or spasm affecting your ability to safely perform tasks on board the vessel or to respond in an emergency?

It is important that you do not start or stop medications before talking with your treating healthcare provider. Certain medications such as narcotics, tramadol, and benzodiazepines can cause serious side effects including withdrawal or seizures if suddenly stopped. With certain medications, the withdrawal effects can occur days after stopping the medication. Be sure to always discuss your job duties and work environment with your healthcare provider. Do not make sudden medication changes shortly before going to work, and if you are stopping a medication, ask your provider about how to do so safely.

Depending on your job schedule, it may be possible to use the medication while at home but not on the vessel. This depends on the amount of time off between work shifts or assignments. This should be discussed with your provider since suddenly starting or stopping a medicine can be problematic. Trying to use a medication on board the vessel during off-times can also be a problem since time off is limited, and even during the off-shift time you may be called upon to respond to an emergency.

Opioids and the Maritime Industry

Use of opioids should be reported to the NMC for review to determine if a waiver can be granted by the Coast Guard. Even with a waiver, it is up to the marine employer to determine if opioid use is permitted at any time on board the vessel. If you require pain control, you should discuss any alternative treatments with your doctor.

Until recently, routine drug tests have detected only a limited number of opioids. With the opioid crisis, the Department of Transportation expanded the types

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of opioids tested for starting in 2018. This resulted in identification of additional mariners who were using opioids, either prescribed or illicit, on board the vessel. There are ongoing discussions of further increases in the opioid test panel in the future. Use of this type of drug can result in impairment including cognitive and motor impairment that can place the mariner, crew, and vessels at risk, and can last well after use, depending on the specific drug.

Marijuana and CBD

An increasing number of states are approving the use of marijuana for medical conditions, recreational purposes, or both. The governmental approval is at the state level, while the federal government continues to prohibit use of marijuana, which is still a DEA Schedule I drug, or a prohibited substance. This has led to the situation where some mariners mistakenly believe that the state approval means that mariners are able to use marijuana while on or off duty. Use of marijuana remains prohibited and use of medical marijuana, even if acceptable under state regulations, is not enough reason to overturn a positive urine drug test result. Since tetrahydrocannabinol (THC), the major psychoactive ingredient in marijuana, can often be detected for an extended period of time after use, mariners who use while off duty may be at risk of a positive drug test upon return to work.

Cannabidiol, or CBD, one of the active ingredients in marijuana, has been marketed for a variety of ailments and has been labeled as "THC free." Studies have shown that a significant percentage of CBD products are contaminated with THC or have THC levels exceeding regulatory limits. Therefore, a positive drug test for THC is possible after use of CDB products, and use of CBD products is not an acceptable explanation for a positive drug test result for marijuana. The same situation may apply to hemp products currently on the market.

In summary, it is ultimately your responsibility to ensure you are fully capable to safely perform assigned duties and not put yourself, your coworkers, your vessel, or the public at undue risk.

Jonathan Weiss | BigStockPhoto

About the Authors:

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Ensuring the Welfare of Seafarers Visiting U.S. Ports

by Jason Zuidema, Ph.D.
Executive Director
North American Maritime Ministry Association

In 2017, then-Chaplain of the Coast Guard, CAPT Gregory Todd, kindly accepted our invitation to speak at the North American Maritime Ministry Association's annual conference in New Orleans. He, and a delegation of Coast Guard chaplains, spoke to our association of chaplains and other seafarers' welfare professionals. His visit was, from my perspective, the beginning of a working partnership that is only natural. Although we may not work alongside Coast Guard chaplains all the time, we do frequently meet those whom they serve because of our service to merchant mariners in ports around the United States.

Despite shipping being essential to our global economy, mariners have not always merited much thought or honor in the public mind. An ancient Greek philosopher is credited with saying that there are three types of people—the living, the dead, and mariners. Yet the specific challenges faced by seafarers gained widespread recognition only in the 18th and 19th centuries, when religious and other charitable organizations began acting on the reality that ports were becoming rather unpleasant places. In many ports, criminals, thugs, prostitutes, and other objectionable individuals waited to separate sailors from their money as quickly as possible. From this context emerged the first of the Christian missions to seafarers. Seamen's Bethels, Seamen's Christian Friend Societies, various European national seamen's missions, the Seamen's Church Institute, and other independent chaplaincies sprung up in major ports.

In the earliest mission period, these organizations focused on religious services and the fight against social ills, like alcohol abuse and the curse of the criminal elements who preyed on sailors in port areas. In the middle of the 19th Century and stretching past World War II, the priority shifted to developing safe, clean housing and a more comprehensive system of advocacy for seafarers' needs and rights. In this era, it was not uncommon to see organizations offer boarding houses, chapels, schools, libraries, and related services under the same ministry.

However, the massive shifts of the 1960s and 1970s—increases in crew diversity, modern communications technology, port redevelopment, and containerization—meant that such large institutions generally became obsolete. This was the era of seafarers' centers with a focus on recreation and communication. In many ways these centers are similar to USO lounges in airports for active military personnel, but in this case, based in ports for both foreign and domestic seafarers. Many of these centers still operate in our own network. Yet the needs of seafarers continue to evolve, and these substantial physical locations might be too far from the port, or seafarers may have little time to visit. Today, more important are transportation services or the provision of communication equipment like SIM cards or Wi-Fi so mariners from around the world can stay in touch with their families.

The North American Maritime Ministry Association

Then-Chaplain of the Coast Guard, CAPT Gregory Todd, speaks at the NAMMA Conference 2017 in New Orleans. Photo courtesy of North American Maritime Ministry Association

(NAMMA) formed in 1932 from these ministries' recognition of the benefits of banding together for a common voice and desire to learn from one another. It has grown over time, and today NAMMA is an ecumenical network dedicated to the service of seafarers' ministries in the United States, Canada, Mexico, and the Caribbean. Our annual meeting gathers more than 100 delegates representing about 50 different ports in North America. There are 400–500 centers around the world and some of them are further organized according to religious denomination and capitalize on their time together at NAMMA's conference to hold meetings of their own. All of these denominations work together in practical ways for the benefit of seafarers from around the world.

It is worthwhile to consider some of the joys and challenges of the work. The most obvious joy is working directly with seafarers, bringing happiness into a life that can be stressful and that, by its very nature, is lived apart from family and other loved ones ashore. A surprisingly large number of seafarers still do not have anything like high speed internet on board their ships, so they are often very happy with the communications services that NAMMA members provide.[1] Most crew members can be on board for nine to 10 months. If a seafarer wants to begin a family, it is a challenge for him to be home for the birth of his child. It happens very regularly that a seafarer will see his baby for the first time using the Wi-Fi provided by one of our centers.

Providing Wi-Fi speaks to a major need of seafarers, but it is only one of many. What other issues do seafarers face today? For one, it is clear the amazing efficiency of shipping has effects that must be monitored carefully. Quicker turn-around times, increased paperwork, and smaller crews to carry out port operations all mean that seafarers might have a few hours in port today, instead of the days or weeks they enjoyed in generations past. Furthermore, while crews are generally smaller, they are also more diverse. Even small crews might include as many as 10 different nationalities, 10 different cultures, and 10 different languages. The demands of modern shipping, combined with the smaller crews, also mean that seafarers are often fatigued; not just tired, but a deeper exhaustion that adds stress to daily responsibilities and hangs over them all day. This tends to be true despite the introduction of new technology and more automation, which can save time, but also eliminates certain positions, leaving more work for fewer workers.

And what is the upshot of all these issues? Social isolation. This goes beyond a perceived feeling of loneliness, becoming an objective reality of being isolated from others. Researchers have begun exploring the implications of social isolation and, while the field is still in its early stages, it is increasingly apparent that isolation from one another has powerful, detrimental effects on many aspects of health.[2]

The internet has transformed shipping, the work of seafarers, and our work in ministering to them. Despite becoming slowly available to seafarers for recreational purposes, more widespread and faster connections are quickly approaching. Perhaps even in the next decade all seafarers will have internet access at all times and in all places.[3] But ubiquitous internet access has other effects. Increased access to high-speed internet can draw seafarers to spend more of their time off-watch in their cabins with no in-person socialization. Importantly, these trends are not seafarer-specific issues. The social effects of having our internet-enabled gadgets on hand at all times is something our society needs to debate and study in general.

Seamen's Church Institute Port Newark Center in New Jersey, serves mariners in the largest port complex on the East Coast of the United States. Wi-Fi and computer stations are available to all seafarers. Photo courtesy of Seamen's Church Institute

On the other side of the coin, these issues also affect our ministries as seafarers' welfare professionals. Chaplains, ship visitors, volunteers, and staff simply cannot do things the way they have always been done. We are, no doubt, entering a new phase of maritime ministry. Complicating present realities is the fact that seafarers' ministry is, to be blunt, a messy profession. There are no one-size-fits-all solutions, very few guides to how to do this work, an enormous variety of port environments, and increasingly sparse funding. Even when best practices are determined, it is difficult to apply them across the board. Churches or other social groups that once supported seafarers' centers often do not

have the wherewithal to continue doing so, while the few volunteers available prefer to share their talents on specific projects rather than being physically present on a regular basis.

How are chaplains and ship visitors engaging this new era in seafarers' welfare? We hear from our members the eagerness and the anxiety surrounding the nature of shipping today. Chaplains and ship visitors want to know how to do their work in the midst of an ongoing, and rapid, technological revolution. They also are unsure of how their call to ministerial service fits with crucial, practical tasks like selling SIM cards, transporting seafarers to shopping, fundraising, and recruiting and managing volunteers. It's not uncommon to hear, "They didn't teach me this in seminary!"

A Seamen's Church Institute chaplain laughs with mariner on board the M/V *Louisiana Purchase*. Photo courtesy of Seamen's Church Institute

To be sure, we can be confident that the intricacies of port security, finding a particular SIM card that will fit a phone purchased in a different country, or navigating the complex safety requirements of moving about a ship are not on most schools' curriculums. However, this type of service is not in competition with other forms of assistance. Despite its banality, selling phone cards is not a distraction from the "real" work of advocacy. It connects seafarers with their friends and families. This kind of work is, very often, the perfect opportunity to exercise a "ministry of presence," a term often evoked but rarely explained. Yet our faith principles provide clear examples, when those with faith are commended for serving other humans in feeding, clothing, comforting, and visiting those in distress. In the Christian faith tradition, visiting ranks as highly as more tangible works, like providing food and clothing. Simply being there is essential in ministry.

But ship visiting is not a straight-forward thing. It takes practice and time. We want to do this visiting as well as possible. This past year, NAMMA was privileged to team up with the UK's Merchant Navy Welfare Board to produce an online version of the Ship Welfare Visitor Course, which to that point had been a two-day, in-class course. Many could no longer do the two-day version because of distance and cost. This course is set up to give staff and ship visitors up-to-date, general information on the maritime industry, security, and safety, but also training on how to make ship visiting as effective as possible. This is important, for it is central to our work. Spending time with seafarers and serving their needs is one element of the maritime ministry that has remained constant from its earliest days.

Author's note: *A previous version of this text was first presented at the U.S. Coast Guard chaplains training at Coast Guard headquarters in Washington on April 10, 2018. Thank you to Chaplain Gregory T. Todd for the invitation.*

About the author:
Jason Zuidema (Ph.D., McGill) is executive director of the North American Maritime Ministry Association. He began his work with NAMMA in 2013 after serving on the staff of the Montreal Seafarers' Centre in Quebec. NAMMA is an association representing seafarers' welfare professionals in more than 50 ports around North America. Among the organizations' goals is providing a common voice for seafarers' welfare to increase collaboration with port, government, labor, and the wider maritime industry. He was also a producer of the Ship Welfare Visitor Course online for the UK's Merchant Navy Welfare Board (shipwelfarevisitor.com) and is publisher of The MARE Report, *a print and online journal for seafarers' welfare professionals.*

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Employee Assistance Programs

An employer-provided benefit to promote well-being in life and in the workplace

by Captain Joy Manthey
Captain
Mississippi River

Paid for by employers, employee assistance programs are confidential employee benefits programs that assist employees with personal and work-related problems that impact health, job performance, and mental and emotional well-being. An employee assistance program (EAP) helps employees deal with work-life stressors, family issues, financial concerns, relationship issues, drug problems, or legal concerns. They may be valuable in helping employees set and reach goals, face life challenges, or simply make life easier, and are often available to both employees and their family members.

How Do Employee Assistance Programs Work?

Most EAPs provide outside counselors, resources, and referrals to assist employees and their family members. Any employee assistance benefits received by either the employee or the family members remain confidential, so while the employer pays for the benefit, it has no insight into an employee's use of the program or services provided.

Most EAPs provide a certain number of counseling sessions at no cost to the employee or the family member. An EAP representative will listen to an employee's needs and then help identify resources near the employee's home. As a long-time chaplain to seafarers and mariners, I have helped many merchant mariners and their family members use their employer's EAP, and I often remind crew members that they work for a big company because of the benefits. Why not use the benefits provided? It is an extra bonus at no cost to them!

History of Employee Assistance Programs

Under the Comprehensive Alcohol Abuse and Alcoholism Prevention, Treatment and Rehabilitation Act of 1970, EAPs were originally only occupational alcoholism programs, but expanded into the EAPs available now under the Drug Free Workplace Act; Public Law 99-570, 1986. These employer-provided programs emerged from two sources, occupational social work and occupational alcoholism programs. The latter first came about in the early 1940s to deal with alcohol issues in the workplace. In the early 1960s, these programs began addressing drug abuse in the workplace, as well as attendance and productivity problems. Founded in 1975, the first EAP was called human affairs. The programs later expanded to include a host of other offerings to address the needs of employees and their family members as a preventative model to encourage use of an EAP before an adverse action occurred. The Coast Guard requires that all employers provide an EAP for crew members under 46 CFR 16.401.

- *Mental Health Issues* including anxiety, depression, the effects of traumatic events, anger management, or similar issues an employee or family member may be experiencing.
- *Grief Work and Assistance, Bereavement, and Stress Management* for employees, or their family members, who are experiencing grief related to any significant loss in their life, including the death of a loved one, colleague, loss of a job, relationship, or pet.
- *Workplace Conflicts*, or interpersonal communication issues, including those concerning working with others where advice, suggestions, and role playing can be used to discuss how to handle relationship challenges or a difficult co-worker or crew member.
- *Health and Caregiving Issues* including how to take better care of yourself, mental health concerns, weight management, and managing a disability or medical issue at work. Assistance is also available to help employees find child care or obtain assistance for ill family members, aging parents, or loved ones.
- *Substance Abuse Issues* including help dealing with co-workers or other crew members' addictions, how to deal with a family member's addictions, and finding help with nicotine addiction.
- *Legal and Family Advice* including marriage counseling, divorce, child custody issues, adoption help or issues, or problems with a landlord.
- *Financial Counseling* to pay off credit card debt,

create a budget for paying off student or other loans, avoid bankruptcy, plan for long term financial goals, or address financial challenges that could arise.

Problems left untreated—anxiety, family problems, and relationship issues—can translate into problems in the workplace. This includes poor performance, unsafe work practices, missed work, bad customer service, and workplace mishaps and injuries that may cost you a term of disability and loss of work and income. An EAP is designed to give employees the resources and help they need to resolve all kinds of issues so they can be their best and remain productive and safe in the workplace.

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Why Employers Provide an Employee Assistance Program

Employers realize that personnel issues can creep into, and negatively impact, a person's productivity at work. The Employee Assistance Trade Association, the trade association for EAPs in North America, reports that 1 in 4 adults have an untreated mental disorder, while 1 in 8 adults may have an addiction problem. Employers who offer an EAP can proactively prevent issues from affecting employee productivity and reduce turnover, which costs businesses thousands of dollars a year.

Many employers add an EAP to their benefits package simply because it is the right thing to do. These companies believe in providing their employees and family members with a problem-solving tool and resources whenever the need arises. The federal government requires its agencies to provide these services. Companies that care and show loyalty to their employees are more likely to see the same type of effort in return. Studies have shown a direct correlation between the degree of concern a company shows for its employees and employee productivity, morale, and job satisfaction. Years of research and outcome studies have shown evidence that EAPs will tend to improve overall employee morale and lead to a more energetic, positive, and productive workplace, while reducing employee turnover and overall health care costs.

In 2003, 364 United States companies participated in the American Management Survey on health and wellness programs. The survey showed that 71 percent of corporations believed they had a responsibility to promote wellness among the employees, 22 percent thought the corporations did not have the responsibility, and 7 percent were undecided. Tides have turned since then, and more and more employers are realizing the need for, and the benefits of offering EAPs.

In 2012, EAP services were provided by 74 percent of all employers, up from 46 percent in 2005. In 2016, the number of companies offering employee assistance programs was reported to be 77 percent by the Society of Human Resource Management. In the United States, reports show that in 2018, more than 97 percent of companies with more than 5,000 employees had EAPs. Of companies with 1,000 to 5,000 employees, 80 percent offered employee assistance programs, and companies with 251 to 1,000 employees offered EAPs 75 percent of the time.

Sometimes it is difficult to measure the cost of what doesn't happen because a company has invested in an EAP. What is known is that companies that offer them will reduce health care costs, increase productivity, and see a return of anywhere from $1 to more than $20 for every dollar invested. The overall purpose of any EAP is to ensure that employees are able to manage their daily lives and remain safe and productive even when they are faced with difficult life experiences, trials, and tribulations.

The next time you are experiencing difficulties, need financial or legal advice, or you or someone in your family is having a relationship issue, give your EAP a chance to help.

About the author:

Captain Joy Manthey has been a riverboat captain, tow boat captain, and first class pilot for more than 40 years. She became the first woman to hold a first class pilot's license from mile 88 to mile 235 on the Lower Mississippi River. She later earned her license as master of unlimited tonnage upon inland waters. Captain Manthey thoroughly enjoys working in the brown water industry.

Health Challenges at Sea

An interactive, case-based discussion

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Three decades ago, emergency physicians at The George Washington University were approached by a maritime shipping company with a unique proposal. The company wanted to provide their vessels the ability to consult with a physician when the crew had medical questions at sea. While passage of the Merchant Marine and Death on the High Seas acts in 1920 sought to improve the welfare and safety of U.S. mariners, it did not provide guidance on how to best accomplish that task. The company hoped to leverage the expertise of an emergency physician to aid the crew in discerning the severity of medical complaints, support the crew in providing the most appropriate care on board, and assist them in determining whether the mariner needed further care ashore.

Emergency medicine, a specialty with a broad base of medical knowledge is, at its core, a specialty designed to identify life-threatening conditions while separating them from the more mundane. Its practitioners, who work in resource-constrained environments, were the ideal group to provide medical support to ships at sea. And while the practice of medicine has become more advanced and subspecialized, the need for providing prompt, broad-based care for patients in resource-constrained environments is just as important today as it was 30 years ago.

In this three-part article, we present topics and concepts highly relevant to the maritime community including providing medical care at sea, preventative and occupational healthcare, and identification of serious medical problems at sea. Each topic includes clinical vignettes based on real cases providing context to each theme. The information contained in this article is meant to provide general information on complex topics and is pertinent to the organizations and individuals who rely on the sea for their livelihood, whether they operate four weeks, four days, or four hours from the next port. There is this delicate balance between the desires of ships' crews to work and achieve the mission with that of the responsibility of ships' captains and their respective organizations to oversee their crews' health and well-being.

Part I—Medical Supplies, Medications, and Tidbits

Medical issues can arise minutes or days after leaving port. Many of these issues never make it to the attention of the ship's leadership because of their benign nature—think simple bumps, bruises, cuts, and muscle aches and pains related to the performance of day-to-day work. There are, however, medical problems that require more intensive intervention, often requiring the use of the medicines or supplies contained within the ship's medical chest. Some of these items can be found in any pharmacy and are readily available over-the-counter, making their use straightforward. However, a substantial number of people are not aware of the untoward effects or precise indications of over-the-counter medications, much less those obtained by prescription. Understanding the importance of what is available in your medical chest and the benefits and risks associated with the use of these medicines and supplies is essential to providing prompt, safe, and effective care.

Case 1

A 32-year-old able-bodied seaman aboard a container

ship contacted the ship's medical officer after sustaining a wound to his lower lip. After ducking down in a tight space, he stood up, struck his head and bit down on his lower lip leaving an open wound that began bleeding immediately. He washed the wound out and when the bleeding subsided, he and his supervisor visited the medical officer.

What are the best ways to manage an open wound? What are the factors we should consider when assessing the wound? What supplies are best to address the wound? How do I maintain supplies aboard the ship?

Our skin is an integral defense against man-made and natural elements and illness, including viruses and bacteria that inhabit our world. A wound is any break in the skin which disrupts that defensive barrier. Open wounds depending on their size, location, and mechanism will need some level of care because broken skin exposes the interior tissue and fat, and sometimes tendon, muscle, and bone, which is sterile, to the exterior environment. This increases the chance for infection and subsequent complications with wound healing. The goal of wound care is to create an environment where wounds can heal as quickly as possible and regain the protective barrier skin affords. Wounds should be washed out with copious amounts of clean water—a strong flow of potable water from a sink is typically sufficient, though extremely dirty or contaminated wounds may require the use of soap. Regions of the body that have a large blood supply, like the face, mouth, scalp, or genitals, will heal faster and are often less likely to become infected. Extremities, especially hands and feet, which have a large concentration of bacteria, have a greater likelihood of infection. Large or deep wounds may require stitches or the use of plastic strips to bring wound edges together to aid in better, faster healing. Other wounds require only cleaning and application of a clean dressing. Most wounds should undergo bandage or dressing changes daily to ensure it is healing and not infected. Topical antibiotic ointment can be applied to the wound for the first few days to inhibit bacterial growth and aid in wound closure. Wounds that are initially healing normally, may develop infections so long as the skin is not fully healed.

Maintenance of supplies is essential to providing safe and effective care on the ship. Ships with larger inventories of medications and supplies use an inventory list, and often centralize the list across their fleet to simplify ordering and standardize supplies. Other companies rely on vendors to outfit their ships or fleets, ensuring medications and supplies are readily available. In either case, keeping inventory is essential as supplies and medications are often used during the course of a trip, especially those vessels operating beyond territorial seas or engaged in work that keeps them out to sea for days at a time. The topic of medication and supply expiration often arises, especially for larger inventories. We recommend using non-expired medications and supplies. Consultation with a medical professional prior to using any expired supplies or medication is recommended as their safety or effectiveness are not guaranteed beyond the expiration date.

Case 1: Lip laceration. Photo courtesy of George Washington University

Case 2

A 25-year-old day worker returns from a brief hospitalization while the catcher-processor he worked on was moored. The mariner had undergone a minor procedure which required him to be anesthetized and included placement of a urinary catheter into his bladder during the procedure. After awakening and being observed overnight, the mariner was deemed fit for full duty and capable of sailing with the ship. The ship left port later in the day, but about 20 hours after leaving port, the mariner reported increasing abdominal pain and inability to pass urine.

What are the issues with allowing a post-operative patient to sail soon after their procedure? What is the possible problem with this mariner and how is it best addressed? What supplies and medicines should be maintained on a ship?

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It may take hours to days for someone to regain their full mental faculties after undergoing general anesthesia. AntonioDiaz | BigStockPhoto

Patients who undergo surgery, even minor procedures, are subjected to medications and procedures that can create unexpected changes in the body's physiology. For example, it may take hours to days for someone to regain their full mental faculties after undergoing general anesthesia. Additionally, the anesthesia or pain medications can cause the inability to pass urine and/or constipation. Some anesthetic medications are deposited in the fat tissues making the metabolism of the medication unpredictable and lengthy. Also, patients who undergo the placement of a urinary catheter, common for several types of surgeries, can develop bladder infections or serious bladder spasm, both of which can cause an inability to pass urine. In the case of the mariner who recently underwent surgery, there was a high probability this young man was retaining urine and unable to empty his bladder.

The question of what supplies a ship should maintain is one that depends on several factors. The first is the proximity and speed with which the ship can reach habitable land with reasonable medical facilities. The second is the nature of work in which the ship engages. The composition and age of crew members, as well as the ability of the ship to divert or speed up to reach a port, are other factors to consider. Ships that operate far from land for long stretches should be carrying a robust compliment of supplies for both routine and emergent circumstances as there are likely few options for diversion or medevac. Ships that have smaller, healthier crews that operate near coastal cities or towns can often maintain smaller medical chests. And while most advanced countries/economies do have the ability to effect medevacs, sole reliance on those resources is not recommended as those resources are constrained by weather, distance, and each agency's perception or definition of an emergency.

Case 3

A 55-year-old container ships' electrician notified the chief mate that he had increased swelling and pain around his finger nail. His symptoms started about two days prior and he hoped they would resolve on their own, as they had when he experienced a similar episode two years ago. There is no report of trauma to the finger. The swelling, redness, and pain became increasingly more intense making it difficult for him to perform his day-to-day duties.

What are the signs and symptoms of a skin infection? Do all skin infections require antibiotics? What else is there to know about antibiotics?

Skin infections are best recognized from a combination of symptoms and signs. Symptoms are the subjective experience of the patient and signs are the findings obtained when evaluating a patient. Most symptoms of skin infections are the combination of pain, warmth, and swelling over a particular area of the skin. The signs of a skin infection are redness, pain on palpation of the area, swelling with the presence of firmness or squishiness. Some patients will develop a fever and/or a fast heart rate. A substantial number of people have had one or more skin infections, which may also aid in recognizing a subsequent infection.

While antibiotics are often the mainstay of treatment for most skin infections, there are certain types of skin infections that do not require oral antibiotics, instead requiring only a topical antibiotic cream or ointment. Other skin infections require extracting pus. These types of infections are termed abscesses and the act of draining the pus allows the immune system to access and fight that area of infection more effectively.

Occasionally the immune system needs a hand and antibiotics are required. Antibiotics are a complex group of medications with different classes. Even amongst classes of antibiotics there are differences in how the medications target bacteria, how they are metabolized by the body, and their side effect profiles. Most people know that an allergic reaction, stomach upset, and/or diarrhea, are common side effects of antibiotics. However, most people are unaware that certain antibiotics are linked to tendon/ligament injury, the increased likelihood of fungal infections, severe bacterial diarrhea, and life-threatening rashes and allergic reactions. Additionally, each antibiotic targets specific bacterial species, so for example while penicillin may be good for a tooth infection, it is not a recommended antibiotic for urinary tract infections or malaria.

Case 3: Paronychia. ThamKC | BigStockPhoto

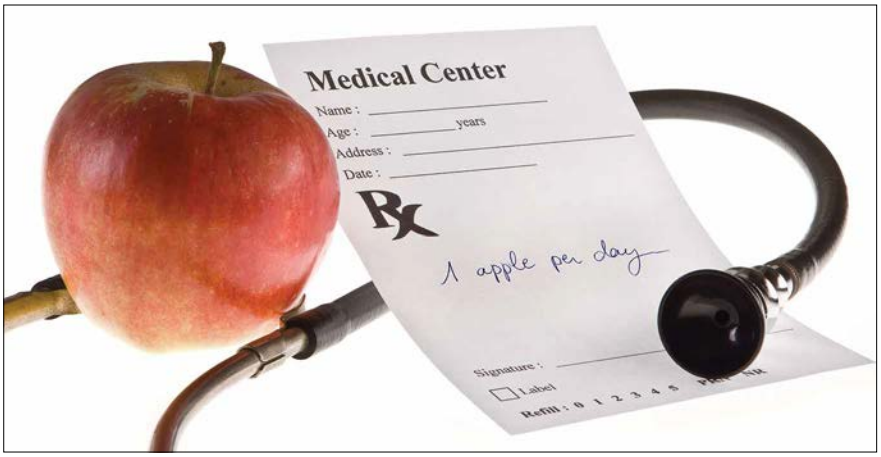
Part I—Case Follow Up

- **Case 1:** The mariner's wound was deemed to be contained within the lower lip, which often heals on its own without any intervention. The mainstays of therapy are to avoid foods that have crumbs and require heavy chewing, as those will prevent the wound from healing. Frequent salt water rinses, especially after eating will keep the wound clean. Typically, oral wounds heal fast. In this case, the wound healed in a matter of days allowing the mariner to return to his normal eating routine.
- **Case 2:** After consulting with a shore-based medical advisory service, the medical officer determined that the day worker's abdominal pain was due to the inability to pass urine. Fortunately, the ships' medical chest was equipped with a urinary catheter. The advisory service provided the medical officer with detailed instructions on the placement of a urinary catheter. Once the catheter was placed, a liter of urine was drained, relieving the pain. The catheter was left in place for 48 hours until re-evaluation at the next scheduled port.
- **Case 3:** Images of the finger were forwarded to a medical advisory service. A diagnosis of paronychia, or nail cuticle infection, with a small collection of pus along the nail line was made. The chief mate was directed on the procedures for draining the pus. The electrician was advised to do frequent warm soaks afterwards and provided with medication to help with pain and inflammation. After 48 hours, the symptoms and level of infection were significantly improved.

Part II—Preventative and Occupational Health

Much of medical care delivery in the United States is focused on urgent and emergent care. There are well-established and integrated trauma, stroke, and heart attack transport and treatment systems in place. While these robust emergency networks serve as a cornerstone of health care delivery, there is another essential, and often undervalued, component in our system. Preventative health care is defined as behaviors and strategies meant to reduce the prevalence of disease and enable people to live longer, more productive, lives.

On a micro level, preventative care allows each individual to lead a more fulfilled life with improved longevity and energy, as well as less pain, injury, and dependence upon medications. On a large scale, preventative health care improves our societal and economic systems through reduction in disease, injuries, missed work days, and health care expenditures. Many organizations, both governmental and nongovernmental, dedicate a great deal of resources in promoting preventative health. The United States Preventative Services Task Force (USPSTF), a division of the United States Department of Health and Human Services, provides recommendations and evidence to health professionals and consumers regarding health screening tests and exams as well as preventative health guidelines and behaviors. While the Occupational Safety and Health Administration, a division of the United States Department of Labor, spends much of its time ensuring adoption and adherence to regulations, it also provides and promotes strategies and guidelines related to workplace safety and injury prevention. Organizations within the medical community like the American Medical Association, American Heart Association, and American Academy of Pediatrics, provide specific recommendations and guidelines to improve health and reduce disease. Ultimately, adoption of preventative health care measures within the



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maritime community provides support for an aging workforce, reduction of workplace injuries, and subsequent lost work days while improving longevity and job satisfaction.

Case 1

A 64-year-old crew member aboard a research vessel presents to the medical officer feeling run down, dehydrated, urinating frequently, and experiencing blurry vision and headaches. Because he is a diabetic, he has been keeping tabs on his blood sugar levels using his glucometer and noted that they have been slowly rising for the last week. Overall the crew member eats well, stays active, and notes good control of his blood sugar prior to sailing. He recently switched primary care doctors and, during his last visit, did not discuss his occupation or the need for an additional refill of his medication ahead of his scheduled trip. The ship does not carry his specific diabetes medication in the medical chest.

What are some important facts about diabetes? What are the dangers of poorly controlled diabetes? Why is it important to take and adhere to your prescribed medications?

Diabetes, shortened from diabetes mellitus, is a medical condition which causes a person's blood sugar, or glucose, to be high. This can be caused by an inadequate amount of insulin in your body—Type 1 diabetes—or an inability for the body to use insulin—Type 2 diabetes. Some of the most common symptoms of uncontrolled or newly diagnosed diabetes include frequent urination, blurred vision, and feeling dehydrated. Often the symptoms, like fatigue and frequent urination, are more subtle. Doctors are able to screen for diabetes with several different blood tests, and early diagnosis and good management of the disease is important for preventing long term problems of the skin, eyes, kidneys, and nerves. Poorly managed diabetes leads to an increased risk for heart attack, stroke, infections, kidney, and eye problems. Because diabetes is most often a lifelong disease, it is important to take prescribed medications consistently.

Case 1: A glucometer with test strip inserted, lancet device, and bottle of test strips. Photo courtesy of George Washington University

Taking daily medications for a chronic, or long-term, illness is essential in preventing progression of disease and development of other problems. Though patients may not feel the obvious signs of certain conditions like elevated blood pressure, poor adherence to medication regimens progressively increases the risk of serious illness. In the case of hypertension, there is an increased potential for stroke and heart attack. Additionally, stopping some medications abruptly may cause worsening of an existing condition, as well as rebound or withdrawal-type effects. For instance, suddenly stopping certain antidepressant medications may put you at risk for seizures. Stopping or changing medications should be done under the direction and supervision of your primary care provider.

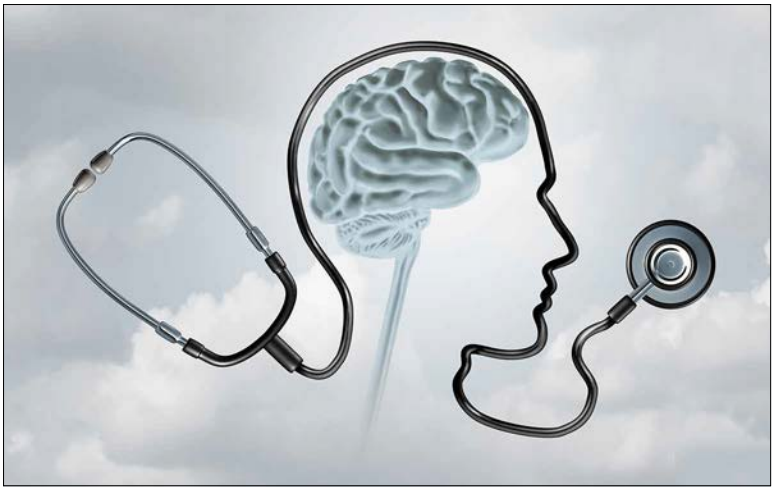
Case 2

A 33-year-old steward presents to the medical officer with anxiety, insomnia, and thoughts of hurting himself after being on deck when the ship had a near collision with another ship. He reports he is unable to work or sleep and, during his last port call, he described feeling like people were watching him. Additionally, he hears voices that tell him that he is worthless.

What are some basics about mental health problems and how prevalent are they? What are some of the common causes, features, and potentially serious outcomes of a mental health emergency? How does that differ from a mental health crisis? What happened in this situation and what is the right amount of medication to bring on a trip?

Mental health disorders have been and remain prevalent in the United States. As of 2017, 1 in 5 Americans suffer from a mental health disorder.[1] Mental health disorders comprise all of the recognized mental, behavioral, or emotional disorders described and classified in the *Diagnostic and Statistical Manual of Mental Health Disorders: Fifth Edition*, the accepted medical reference for psychiatric disorders published by the American Psychiatric Association. Approximately 1 in 20 Americans suffer from serious mental illness, defined by the National Institute of Mental Health as a subset of mental health disorders resulting in serious functional impairment, which substantially interferes with or limits one or

more major life activities.[2] Of the people with a broader range of mental health disorders, only 42.7 percent received some form of mental health services and of those with serious mental illness, 66.7 percent received treatment in the last year.[3] It is important to understand that these disorders are distributed throughout the general population of the United States. Despite the availability of information and prevalence of mental health disorders, there continues to be misinformation about them and their management. What has become clearer in the last several decades is that mental health issues are common, affect the broader population of the United States, and may be under recognized and untreated.



digitalista | BigStockPhoto

While the majority of people with a mental health diagnosis manage their conditions well, when in crisis and left unmanaged or untreated, individuals can pose a danger to themselves or others, and can jeopardize the ship's safety or mission. Therefore, recognition and treatment of acute mental health issues is very important. Individuals with acute decompensation of their mental health are often distraught or experiencing emotional distress, may become disoriented or lose connection to reality, and are unable to function normally. The threat or action of self-harm or harming others, highly erratic or unpredictable behavior, or inability to care for one's self are emergent issues that need to be addressed immediately. Signs of early decompensation may include changes in behavior, the inability to cope with daily activities, feeling overly worried or fearful, sleeping problems, or labile emotions, including intense sadness and anger, poor concentration, paranoia, and hallucinations—typically hearing voices or sounds that are not real. Often these problems are brought on by life stressors, stopping or running out of medications, or substance abuse. Because acute mental health issues are typically unpredictable, having a shipboard plan and/or way to communicate with a medical professional are instrumental in minimizing harm to the mariner, crew, and general well-being of the ship.

In this particular case, the mariner disclosed that he stopped taking his medications several days prior to sailing with the ship. Mental health medications can take days to weeks to be completely metabolized and symptoms of an acute mental health issue may not manifest until several days after leaving port. Patients with mental health disorders will often feel well when taking their medications and may inappropriately theorize that it is not necessary to continue taking them. A similar situation occurs when patients taking blood pressure or cholesterol medications abruptly stop taking them. The effects of not taking the medication are not immediately apparent.

For more information

For more information about mental health visit: www.nimh.nih.gov/health/topics/index.shtml

Being on a consistent drug regimen before leaving for your trip is important for several reasons. Consistently taking medications for 90 days without a change allows clinicians to monitor for drug effectiveness and safety during the first months of treatment. Some medications can take weeks to months to be effective. Similarly, the development of an allergic reaction or other side effects like headaches, drowsiness, gastrointestinal upset, or rashes can, and often do, occur within the first few weeks of starting a medication. While most of these reactions are not worrisome, some medications can cause devastating, life-threatening side effects that require discontinuation of the medication and secondary treatment. Developing an established routine of taking your medications also increases the chances of adhering to the treatment plan. When departing for a trip, it is recommended to bring enough medication for the entire trip, though some providers recommend bringing 1.5 to 2 times the number of days you are traveling. This ensures avoiding any potential lapses in medication should your return be delayed.

Case 3

A 44-year-old second engineer felt something in her eye after grinding metal in the shop. She wore safety goggles while grinding, but while removing the goggles some of the metal fragments fell into her face and in her eye. She blinked several times in an attempt to get the particulate material out and also used the eyewash station, but

despite her best efforts continued to have pain and a foreign body sensation in the left eye. The second engineer presented to the chief mate soon after to tell him about the situation.

What are the best ways to prevent eye injuries and injuries in general at sea? Are there specific preventative behaviors or strategies that you could be using to improve your overall health? What benefit do they confer? What are the benefits of routine medical visits and screening tests?

For more information

The Occupational Safety and Health Administration website has additional resources and details for maritime safety: www.osha.gov/dts/maritime/

Because the maritime industry in the United States includes several different workforces, shipping, fishing, transportation, towing, cable laying, environmental response, research, and tourism, among them, it is difficult to know the precise statistics on injuries and deaths in the industry. The Bureau of Labor and Statistics (BLS) has reported occupational fatality statistics in commercial fishing, marine transportation, installation, and repair and maintenance occupations. When combined, these statistics best approximate the risks and hazards most mariners face. A British study looking at the marine shipping industry concluded that, while fatality rates have declined over the decades, the rate of fatal accidents was 21 times greater than that of the general workforce.[4] BLS also reports annual injury rates in shipping and marine transportation industries at a rate equivalent to approximately 2 in 100 full-time workers annually.[5] Though BLS does not specifically report injury rates for other maritime fields, injuries at sea can be more complex since timely, comprehensive medical care is not readily available. As a result, injuries may affect the ship's operational capabilities, either because of diversion or decreased crew readiness.

Prevention strategies are instrumental in maintaining crew health and readiness, while reducing injuries, lost work days for mariners, and operational days for the ship. Prevention is not only the adherence to policies and deployment of personal protective equipment (PPE) to minimize workplace injuries, though that is an integral part, but the adoption of a broader strategy and culture to promote health. While each workplace is different, the tenants for promoting health, safety, and injury prevention are the same. Organizations and employees share the responsibility for promoting health and safety at all levels within the maritime industry. Signage and standardized orientation/training with frequent reminders are often some of the easiest ways to promote safety and cannot be overlooked as part of a safety program. Some examples of these commonly used practices are promoting the use of PPE, training personnel about the common workplace hazards, and the use of signage and other visual aids to make others aware of hazards. Other injury prevention strategies that often get overlooked and add dimensionality to a safety program at the organizational and personal level include:

- staying hydrated
- getting adequate sleep
- eating balanced meals focused on vegetables
- reducing intake of processed foods
- maintaining a healthy weight
- keeping the mind and body active
- taking prescribed medications as directed
- reducing or quitting smoking
- reducing alcohol intake

Undergoing a routine health screening exam before starting a new job or departing on a remote or extended trip is critical. The maritime environment is a unique setting making it important to find a health care provider who understands the industry, its respective occupations, and risks. In these cases, it is helpful to share your specific job description, as well as your anticipated work schedule and itinerary with your provider. Providers should take these factors into account during your evaluation when making specific recommendations and changes. These exams also present an opportunity to address lingering medical concerns, refill medications, and ensure you receive counseling and recommended screening tests based on your age and risk profile prior to your departure.

There are some specific evidence-based recommendations for medical screening tests. Screening tests are tests or procedures used to detect early disease or prevent disease prior to the development of signs and symptoms of that particular illness. These screening tests have been reviewed by medical societies and government agencies and are based on the best available, current medical information. One of the best places to get credible information about preventive health is from the USPSTF. The task force is an independent volunteer panel of national experts in prevention and evidenced-based medicine, according to its website.

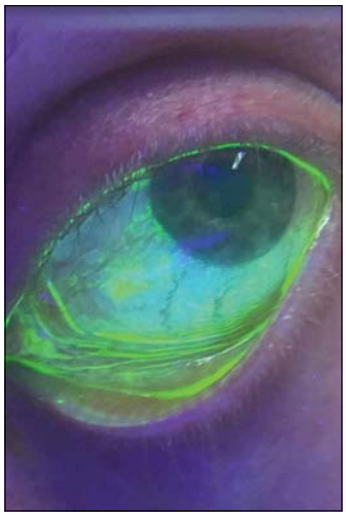
For more information

Learn more about U.S. Preventative Services Task Force at www.uspreventiveservicestaskforce.org/

Part II—Case Follow Up

- **Case 1:** The ship conferred with a medical advisory service and they recommended the following:
  - check the crew member's current blood sugar with the ship's glucometer
  - continue rehydration with water by mouth
  - switch the mariner to a low sugar diet
  - explore medication substitutions for the patient

  The mariner's blood sugar was high but, with modification of diet, rehydration, and use of an alternative medication the crew member's symptoms and blood sugar improved. The ship fortunately did not need to divert, though, at the next opportunity, the mariner was sent ashore where he saw a local doctor and was able to get a refill of his medication.
- **Case 2:** The captain and crew were very concerned for the safety of the steward. He was given an oral sedative, his cabin was searched and made safe, including the removal of objects that could be used for self-harm, and he was put on one-to-one, around-the-clock observation. At the ship's next port, he was evaluated at a local emergency room and stabilized in a psychiatric ward. For his safety, the steward was repatriated with a medical escort and completed his treatment with his primary psychiatrist, primary care doctor, and an outpatient counselor.
- **Case 3:** The second engineer was sent back to the eye wash station for a longer period of irrigation to ensure removal of any remaining debris. Afterward, she still had a persistent sensation of material in her eye. Using a medical advisory service, the medical officer applied a topical eye anesthetic which allowed for more irrigation. The medical officer also used fluorescein, a special dye, with a black light to identify scratches to the surface of the eye. The images of the eye were reviewed with the on-call doctor and antibiotic eye drops were prescribed. The symptoms completely resolved in four days. At their next port, the second engineer was sent ashore for a formal eye exam.



Case 3: Eye stained with fluorescein, a solution that fluoresces under a black light. Photo courtesy of George Washington University

Part III— Identifying Medical Emergencies at Sea

Recognizing and treating an emergent condition is challenging and essential where access to medical care is limited or nonexistent, and identifying a sick patient is not always an easy task. In emergency departments across the United States patients with severe illnesses sometimes go undiagnosed despite the use of triage systems, lab testing, and advanced imaging. Even experienced clinicians are regularly challenged by the subtle and unusual presentations of diseases. Additionally, there may be variability in the evaluation and treatment of diseases, even with what seem to be straightforward diagnoses. The practice of medicine is complex, especially in the maritime environment, where one action or decision may alleviate or exacerbate an already tenuous situation.

Case 1

A 32-year-old crew member aboard a motor yacht was found unconscious but breathing at the bottom of a ladder. It was noted there was blood coming from the back of his scalp. One of the other crew members found him and notified the medical officer. After applying pressure and bandaging his bleeding scalp, they placed the crew member on a backboard, carried him to the ship's medical bay, and called the medical advisory service for further guidance.

What are the immediate actions that should occur when happening upon an unconscious crew member or a person in medical distress? What are the next steps? In this case, what are important things to identify that may not be immediately apparent? What are the benefits and problems with a medical advisory service and/or action plan?

When attempting to provide aid to another person in distress, there are a host of factors to consider. The first and most immediate action is to ensure the scene is safe. A responder who gets injured while providing assistance

is not only unable to provide aid, but risks becoming another casualty. The classic example is responders who become incapacitated by a lack of oxygen or noxious gas when attempting to rescue a crew member in a confined space. The next step is making others aware of the situation, which should allow for a more robust and effective response.

Case 1: Scalp laceration. CHEN WEI SENG | BigStockPhoto

With these two actions complete, determine whether the patient is conscious and breathing. Patients who are unconscious and not breathing should be checked for a pulse as that will alter the level and type of response. As an aside, unless the scene is deemed unsafe or poses an immediate threat to the victim through fire, flooding, or other imminent danger, trauma patients should be moved in an organized and systematic way to prevent further injury.

For significant injuries where a fall, high impact force, or other significant trauma is suspected, specific actions should be taken before the patient is moved to another area, if possible. Responders should immobilize or protect the neck with a cervical collar before transferring the patient to a rigid backboard, if these two items are available. For events where trauma is not suspected, patients can be escorted to an open space with ready access to medical supplies.

Once the patient is situated in an open space or the ship's medical bay, obtaining vital signs and a full head-to-toe exam are essential to assessing the patient's condition and injuries. This information will allow the ship to plan immediate interventions as well as the next steps for care. Circumstances where a person falls and/or becomes unresponsive warrant gathering as much data as possible to determine if the patient fainted, sustained an injury, or was exposed to a substance that rendered them unconscious. If they are conscious, this can be done by directly asking the patient to recount, in detail, the moments leading up to their loss consciousness. A survey of the area where the patient was found and any bystanders may also help piece together a history.

Cases where trauma and concurrent medical issues are present are extremely challenging as there are many factors and interventions to consider, especially where the closest medical care may be days away. Medical advisory services assist mariners in deciphering information obtained during the initial response to a casualty and can range from general medical advice to tailored services. Consultants can provide tailored instructions on how to conduct detailed medical exams/surveys, administer medications by injection or intravenously, manage pain, and provide guidance on how best to use shipboard resources. They often know when and how best to access resources beyond the ship.

Case 2

The ship's captain called his shipping company to report that two of his crew members had developed fevers and headaches over the last 12 hours. Both are young, healthy, and in their normal state of health before the symptoms developed. The ship's last port of call was Mombasa, Kenya. Neither individual went ashore during this particular port call nor ate anything prepared locally. They do not have a rash, cough, abdominal pain, diarrhea, or problems passing urine. There are no other crew members with similar symptoms. The crew members do not share a cabin or know each other than through their day-to-day interactions on the ship.

What are the potential causes for fevers? What are the concerning symptoms in this case? What are the issues in this particular case and how emergent are these circumstances? Are there ways to prevent certain types of illnesses when traveling abroad?

The human body maintains a basal temperature around 98.6 degrees Fahrenheit, with fluctuations of plus or minus 0.5 degrees during the course of a day, and there is some variation in each person's basal temperature. A fever, defined as greater than 98.9 degrees Fahrenheit in the morning or greater than 99.9 degrees Fahrenheit in the afternoon/evening is the brain's response to the release of chemicals from one or more processes.[6] These chemicals are most often released when the body encounters infections, but fevers can also be caused by drugs—prescribed and illicit—vaccines, presence of cancer, formation of blood clots, or problems with the immune, nervous, or endocrine systems. Adult fevers are often equated to pediatric fevers, most of which are viral in origin and not worrisome, but that is a misnomer. The presence of an adult fever, subjective fever, or shaking chills should be taken seriously.

Generally speaking, fevers are accompanied by other symptoms including chills, a productive cough, headache, urinary burning, diarrhea, rash, muscle aches and pains, and/or abdominal pain. Several of the symptoms—body aches, chills, and occasionally headaches—are

often related to the presence of a fever. Giving medications to treat the fever will not only improve symptoms, but may aid in more clearly discerning the cause of the illness. In the case of the two crew members, the fever and presence of headache are concerning symptoms. Because both crew members developed similar symptoms at roughly the same time and do not share the same cabin, there is some concern that both were exposed to something during their voyage. When traveling in a tropical environment it is important to consider insect-borne infections. As the climate is becoming warmer, there is a wider distribution of insects throughout the world making rates of insect-borne disease transmission more prevalent. Because some of these illnesses can be life-threatening or spread quickly, like norovirus or measles, isolating patients and getting them ashore for definitive testing and treatment is essential. Generally speaking, isolating a crew member with a fever and/or other infectious symptoms until additional information and consultation can be obtained is good practice.

There are many ways to prevent injury and illness when traveling abroad. The first is to become knowledgeable about the ships' route, including the areas and regions it will visit. The U.S. Department of State provides regional and country-specific assessments and trip advisories on crime and personal safety, while the Centers for Disease Control provides recommendations for countries and regions of the world related to health, vaccines, preventative medications and strategies to prevent the transmission of diseases. Discussing your travel with your doctor, using a travel clinic or medical advisory service can aid in preparation of your personal supplies as well as ensuring the ships' medical provisions and medications are adequate for the specific itinerary, length of journey, and crew size.

Case 3

A 52-year-old ordinary seaman reports to the bosun that he has a lump in his groin after lifting some heavy equipment on deck. He mentions that he has had the lump before, but it typically goes away on its own, however, this time it will not go away and is becoming painful. They report to the chief mate who notes that the patient indeed has a lump in his groin area that is tender to the touch.

What are the benefits of a routine physical exam prior to an extended voyage or deployment to a remote location? What are the types of medical issues that should be addressed prior to going to sea? What are the issues in this particular case and how are they best managed?

Seeing a physician routinely and in advance of going to sea is not only an essential component to preventative care, but also allows a patient and their medical provider the opportunity to discuss general health concerns and address lingering issues. Some matters may not be problematic on a daily basis, but it is important to discuss and address persistent medical issues, even if they seem minor, with a medical provider who understands your needs and the limitations of at-sea medical care.

In this case, an occasional, or chronic lump in the groin may be suggestive of an abdominal hernia, the protrusion of fat or intestines from inside the abdomen through an internal hole in the abdominal wall. Abdominal hernias occur for a variety of reasons, some are related to birth defects, others are the result of stress on the abdominal wall, including heavy lifting, trauma, or prior surgery. Others causes are associated with genetics, excessive weight gain, or progressive changes with age. While not every hernia requires surgery, each hernia should be evaluated by a surgeon to determine the need for further

For more information

For more information about global crime and personal-safety issues and trip advisories, please see www.state.gov

For global heath and health-safety, including strategies to prevent the transmission of disease, see www.cdc.gov

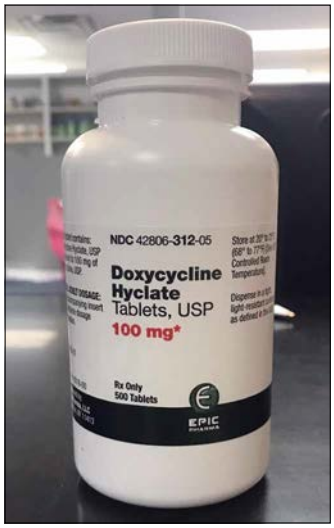
Routine Matters to Discuss With a Health Care Provider

This list may seem exhaustive, but it represents a broader list of conditions that may signal a potential life-threatening problem if not addressed.

- Unexplained progressive weight loss or weight gain
- Excessive sweating, chronic headaches
- Unexplained fatigue
- Intermittent shortness of breath or chest pain
- Changes in mood or sleep habits
- Painless and/or unexplained rashes
- Growths or lumps
- Blood tinged stool or urine
- Problems with bowel movements or passing urine

Part III—Case Follow Up

- **Case 1:** The crew member awoke soon after arriving at the medical bay. He was able to recall working on a high voltage electrical outlet, but unable to recall any other details. After advice from the medical advisory service, the medical officer conducted a head–to-toe exam which revealed a 5-inch scalp wound and second degree burn marks on the palms of both hands. After making sure there was no neck or spine injury, the medical officer was able to get the crew member off the backboard and out of the neck brace. The patient was directly observed, encouraged to stay hydrated, while the ship was diverted to a nearby port where he was transferred to a hospital for further evaluation and treatment.
- **Case 2:** After much discussion about the recent ports of call, determining the level of exposure to mosquitoes in Mombasa, and learning that the crew was not taking preventative antimalarial medications, it was decided there was a high likelihood both mariners were infected with malaria. They were started on medications to treat the malaria soon after. While the crew members' symptoms improved with medications, certain malarial infections can be life-threatening, so the ship was diverted to a nearby port where the patients were transferred to a hospital, where the malaria diagnosis was confirmed.
- **Case 3:** Based on photos sent from the ship, a medical advisory service determined the ordinary seaman (OS) had an inguinal, or groin, hernia. He was provided with pain medication and the medical officer, with some coaching by the on-call doctor, was able to place the hernia back into the abdomen. The OS was observed for 12 hours and during this time did not develop any pain, was started back on food and fluids, and had a bowel movement. He was placed on light duty until the ship arrived at the next port where he was determined fit to travel and returned home to see a surgeon.



Case 2: The antibiotic doxycycline is commonly found in most ships' medical chests. Photo courtesy of George Washington University

intervention. It is important to discuss your occupation and work environment, daily routine, and how the hernia impacts your quality of life with the surgeon as that will inform his or her recommendations. A hernia that has not been evaluated and/or repaired poses a risk of becoming stuck in place, or an incarcerated hernia, with a loss of blood flow to the intestines, known as a strangulated hernia. The latter is a surgical emergency. Incarcerated and strangulated hernias are extremely painful and can lead to serious infection, disability, and potentially death if not addressed promptly.

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About George Washington Maritime Medical Access

George Washington Maritime Medical Access is a network of board-certified emergency medicine physicians dedicated in the practice of maritime, aviation, and remote medicine. Using a combination of telemedicine solutions including phone, email, video, and text messaging, Maritime Medical Access provides care to patients around the globe. The practice supports a variety of maritime clients from the commercial shipping industry, specialized deep-water and coastal ships, research vessels, commercial fishing vessels, yachts, and sailing ships.

Endnote:

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Drug and Alcohol Testing is Key to Safety at Sea

by Patrick J. Mannion
Drug and Alcohol Prevention and Investigation Program Manager
U.S. Coast Guard

For more than 160 years, the U.S. Coast Guard, in its many variants, has served as a regulatory oversight agency for the maritime industry. Credentialing of mariners, vessel inspections, and navigation safety have been, and continue to be, core Coast Guard missions to promote maritime safety. Supporting these larger missions, a smaller but no less critical mission exists. It is the mission of the U.S. Coast Guard Drug and Alcohol Prevention and Investigation Division (DAPI) to ensure vessel operators are free from the dangerous effects of drugs or alcohol while serving in safety-sensitive positions aboard a vessel.

The DAPI program exists to deter, detect, and remove users of illicit drugs from serving in safety-sensitive duties aboard a vessel. Dangerous drug or alcohol use by crew members presents an unacceptable safety-risk to life, property, and the environment. In order to reduce this risk, the Coast Guard, mariners, marine employers, and sponsoring organizations participate in a structured and cooperative drug testing effort to balance the need for maritime safety with the individual privacy rights of mariners.

Since 1989, the Coast Guard has required drug testing of all mariners serving in a safety-sensitive position. During that time, drug test failure rates have fallen from a high of 9 percent in 1990 to less than 2 percent in 2019. The dramatic reduction in failed drug test rates is a credit to the professionalism of the modern maritime workforce. It is also an exemplary achievement of partnership between mariners, industry, and the Coast Guard working toward a common goal. By taking part in strategies to deter the use of dangerous drugs by merchant marine personnel, the Coast Guard, marine employers, and sponsoring organizations seek to reduce the potential for drugs as a factor in causing marine casualties.

Coast Guard regulations Title 33 Code of Federal Regulations (CFR) Part 95, and Title 46 CFR Part 4 and Part 16 establish clear and uniform standards for drug and alcohol testing. It serves to provide clear requirements to mariners, marine employers, and sponsoring organizations on how and when drug and alcohol testing must occur. These regulations are the application of the Coast Guard strategy of deterring,

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detecting, and removing dangerous drug users from safety-sensitive positions aboard a vessel in order to reduce maritime casualties.

- The first component of the Coast Guard strategy is to deter illicit drug users from entering the maritime workforce. This is achieved via the periodic drug test for credentialed mariners and the pre-employment drug test administered by marine employers and sponsoring organizations. Title 46 CFR § 16.220 requires a mariner to demonstrate that they are not a dangerous drug user by passing a periodic drug test in order to be issued a credential. To further deter users of illegal or illicit drugs from entering the maritime workforce, 46 CFR §16.210 requires marine employers and sponsoring organizations to conduct pre-employment drug testing on individuals prior to employing them to serve as a crew member aboard a vessel. Testing is required for both credentialed and non-credentialed crew members.
- A second component of the Coast Guard strategy is to maintain deterrence and to detect illegal drug use. This is accomplished in the random drug testing program, as required in 46 CFR § 16.230. Marine employers and sponsoring organizations are responsible for ensuring that a credible and transparent process is in place whereby a mariner may be tested for dangerous drugs at any time.
- A third component in identifying dangerous drug users is the reasonable-cause drug test. Title 46 CFR §16.250 requires a reasonable-cause drug test when a mariner appears to be under the influence of a dangerous drug.
- A fourth component of this strategy is to remove users of dangerous drugs or alcohol from safety-sensitive positions. Credentialed individuals who fail a chemical test for dangerous drugs must be denied employment as a crew member or must be removed from duties which directly affect the safe operation of the vessel as soon as practicable. Additionally, these individuals are subject to proceedings of suspension and revocation against their credential under 46 CFR part 5 (See 46 CFR 16.201). Finally, individuals who have failed a required chemical test for dangerous drugs may not be reemployed aboard a vessel and may not return to work until specific requirements are met, in accordance with 46 CFR 16.201(e)–(f).
- Education and training comprise the strategy's fifth component. Title 46 CFR 16.401 requires marine employers to provide an Employee Assistance Program (EAP) for all crew members. The EAP must include education and training on drug use for crew members and the employer's supervisory personnel.

Today, our nation faces many challenges as a result of increasing rates of drug abuse and misuse by the larger population. As the maritime workforce derives from the larger population, it too will naturally be challenged. However, the reliability and integrity of the American maritime transportation industry is vital to our economic security and standard of living. It is for this reason that the many achievements to reduce drugs and alcohol as a contributing factor in marine casualties cannot be taken for granted.

As our national workforce suffers from growing rates of drug abuse and misuse, the Coast Guard, mariners, marine employers, and sponsoring organizations must reaffirm our commitment to the shared goal of a drug-free workplace and continuously strive to strengthen our partnership to detect, deter, and eliminate the risks of drug and alcohol use endangering our nation's waterways.

About the author:

Patrick J. Mannion, a licensed master mariner in the United States Merchant Marine with more than 20 years of experience in commercial maritime operations, logistics and safety, currently serves as the U.S. Coast Guard Drug and Alcohol Prevention and Inspection Program Manager. He has served as director of the United States Coast Guard Vessel Traffic Service for the Port of New York and New Jersey, as a regulatory project manager, for the Subchapter M and commercial diving rulemaking. Mr. Mannion has also served as alternate designated federal officer to the National Offshore Safety Advisory Committee and the Towing Safety Advisory Committee, and executive chair of the Coast Guard's Offshore Marine Services Association Partnership and Association of Diving Contractors International Partnership.

What Happens After a Positive Drug or Alcohol Test?

The path for returning to safety-sensitive duty

by John M. Gallagher Ed.D., LCADC, LCADAS, MAC, SAP
Director
Seafarers Addictions Rehabilitation Center

When a U.S. merchant mariner tests positive for a controlled substance, or an alcohol breathalyzer test shows them to be inebriated, it sets into motion a comprehensive safety program designed to remove them, sanction them, or promote their return to safety-sensitive duty. Ideally, a U.S. Coast Guard proof of cure settlement agreement is coupled with the Department of Transportation's (DOT) return to safety-sensitive duty process for the individual. These two items satisfy the safety program requirements, and involve professionals from military, medical, alcohol, drug, and legal fields to help the mariner resolve the identified issue.

The Proof of Cure Settlement Agreement

In accordance with 46 Code of Federal Regulations (CFR) 16.201(c), U.S. merchant mariners who test positive for a dangerous drug, or alcohol, must be denied employment as a crew member or be removed from duties that directly affect the safe operation of the vessel. In addition, they are subject to suspension and revocation proceedings against their credential under the rules delineated in Title 33 CFR Part 20 and 46 CFR Part 5. In some cases, the Coast Guard may allow the mariner to enter into an agreement that provides them the opportunity to regain their credential and return to safety-sensitive duties, once they fulfill the requirements of the agreement. This agreement, known as a proof of cure settlement agreement, requires the involved mariner to go through a series of actions to demonstrate they are drug-free and at low-risk for subsequent use of dangerous drugs.

Among other items, the proof of cure agreement requires the mariner to demonstrate "non-association" with the drug of choice by undergoing 12 successful, unobserved urinalysis drug screens over a 12-month period. This component is unique to the maritime industry and was developed because of the difficulty encountered in obtaining consistent, on-demand *observed* urinalysis in the medically remote shipboard environment. The settlement agreement also requires the mariner to undergo a series of evaluations by a substance abuse professional (SAP), who will determine the mariner's treatment and education requirements, assess the mariner's compliance with the settlement agreement requirements, and determine the follow-up drug-testing schedule, if and when the mariner is allowed to return to maritime service. Although the settlement agreement process is quite involved and comprehensive, it has allowed thousands of U.S. mariners to regain their credential and return to safety-sensitive work in the maritime industry.

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The Substance Abuse Professional Evaluation

In addition to being part of a proof of cure settlement agreement, a SAP evaluation is also required under 49 CFR Part 40 Subpart O Section 40.285 when an employee has a verified positive DOT drug test result or DOT alcohol test indicating blood alcohol concentration of .04 or greater. This is also true if the employee refuses to test, including specimen adulteration or substitution, or any other violation of the prohibition on use of alcohol and drugs under DOT regulations. The employer is required to furnish the violating employee, including new employees and applicants, a listing of nearby acceptable SAP's with names, addresses, and telephone numbers. The employer is not required to provide SAP evaluations, recommended treatment, or education. However, if the employer offers the violating employee the opportunity to return to safety-sensitive duty subsequent to the violation, then the employer must ensure the employee receives a SAP evaluation and complies with the recommendations and testing prior to, and after return to safety-sensitive duty.

During the initial evaluation, the SAP meets face-to-face with the mariner to conduct a clinical assessment, obtain a psychosocial, alcohol and drug history, and perform a mental status evaluation. Using this information, the SAP will then determine the appropriate treatment or education services needed to resolve the mariner's alcohol and drug issues. At the follow-up face-to-face evaluation, the SAP will assess whether the applicant has been compliant with initial recommendations and develop a follow-up drug-testing plan for the mariner.

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The Substance Abuse Professional

A Substance Abuse Professional (SAP) is an independent clinician who evaluates credentialed professionals who have violated the Department of Transportation's drug and alcohol regulations. Under federal guidelines specified in 49 CFR Part 40 Subpart O, the SAP must be a licensed physician or state licensed certified psychologist, social worker, therapist, employee assistance professional, or specifically board certified alcohol and other drug counselor. SAPs are required to undergo initial education, training, and qualification through the Department of Transportation and must periodically renew their education and training to maintain their certification. The SAP that evaluates members of the U.S. Merchant Marine must also be well versed in the Coast Guard regulations that pertain to mariners seeking to return to duty after a positive drug or alcohol test.

The Follow-up Drug Testing Plan

Federal law requires a minimum of six observed, follow-up drug screens in the first year after return to safety-sensitive duty. The mariner may also be subject to follow-up, observed urinalysis testing for a period of up to 60 months total, after return to safety-sensitive duty. The actual timeframe and frequency schedule for testing an affected mariner is determined by the SAP during the second evaluation. The SAP may order more than the DOT minimum of six tests in the first year, however, it is not always feasible to conduct an onboard, observed urinalysis in the maritime industry's medically-remote environment. An overly burdensome testing schedule could effectively interfere with the mariner's return to safety-sensitive duty process. The SAP will aim to develop a realistic, attainable, follow-up drug testing schedule by balancing the limitations of the shipboard environment with public safety concerns and the requirements for returning to safety-sensitive duty. The follow-up drug testing plan is then shared with the medical review officer, or MRO, who will facilitate the testing plan, and the designated employer representative, who is responsible for carrying out the drug testing plan.

Subsequent SAP Evaluations

The SAP may recommend that the mariner undergo additional evaluations to assess compliance and determine requirements for additional services. He or she may also modify or terminate the follow-up drug-testing, with the exception of the mandatory minimum six tests in the first 12 months of return to safety-sensitive duty. As an

example, the SAP may recommend extended timeframe testing where the mariner is subject to an additional 48 months of drug-testing after returning to safety-sensitive employment. This can be an effective component of the return-to-duty process, particularly in consideration of the limitations inherent to the maritime industry. The SAP testing requirements follow the employee through breaks in service and changes in employers. No other tests, such as random tests, may be substituted for the recommended testing. Written reports are generated on the letterhead of the SAP and provided to the designated employer representative. The reports may be provided to the mariner if they have no current employer, as well as to subsequent DOT-regulated employers in the event the mariner obtains another safety-sensitive position.

Important Considerations

- The SAP is not an advocate for the employer or the employee, but is charged with protecting public interests by conducting a professional evaluation, making appropriate recommendations for treatment, education, aftercare, and developing a follow-up testing plan that is appropriate for the involved mariner.
- Neither the mariner nor the employer is permitted to seek another SAP evaluation, or "SAP shop," for purposes of changing the initial SAP's evaluation. Only the original SAP has the authority to modify the initial evaluation and recommendations based on new or additional information.
- The SAP provides referral for the best recommended assistance without conflict of interest or financial association, per the guidelines and exceptions delineated in the regulation.
- A verified positive test is a violation of the DOT drug and alcohol regulations. In the evaluation process, the SAP assumes that a verified positive test result conclusively demonstrates the employee committed a DOT drug and alcohol regulation violation. There is no consideration or mitigation action based on employee claims of unjustified or inaccurate testing, employee statements referencing use of hemp oil, contact highs, medical marijuana, job stress, poppy seed ingestion, or personal opinion.

Conclusion

Conditions of maritime employment present unique challenges that often translate as dysfunctional commonalities in the industry. Social isolation aboard the vessel, loneliness, separation from home and family, overseas cultural differences, and the availability of illicit substances may increase susceptibility to the use of alcohol and other drugs. Mariners working overseas may have access to illicit drugs that are of much higher potency and purity than those commonly available in the United States. Additionally, mariners may have access to the prescription drugs fueling the opioid epidemic, as well as high THC-content cannabis that is now readily available in some states.

While aboard the vessel, the mariner is in a highly structured and relatively restrictive environment for specific lengths of time that usually extend between 4 and 6 months. During that time, the conditions of employment mandate a heightened awareness of shipboard protocols and regulations to promote productivity, safety, and compliance with the rules of the government-mandated drug-free workplace. However, once discharged from the vessel the mariner is now "on vacation" and often relaxes the standards required during employment. Nonetheless, the mariner is required to be as responsible at home as at sea.

The substance abuse professional that evaluates individuals employed in the maritime industry should be cognizant of the above-mentioned risk factors and prevalent characteristics of the industry. This knowledge helps promote accurate evaluations, avoid misinformation, and provide services that include accurately informed recommendations necessary for the DOT return to safety-sensitive duty process designed to protect the public interest and safety.

Federal Regulations Take Precedent

Both the Department of Transportation and the Coast Guard have issued public statements referencing medical and recreational marijuana legalization on the state level and incompatibility with the superseding federal regulations. U.S. merchant mariners are subject to federal regulation regardless of their state of residence or medical status.

About the author:

Dr. John M. Gallagher Ed.D., LCADC, LCADAS, MAC, SAP is the program director at the Seafarers Addictions Rehabilitation Center in Valley Lee, Maryland. He also serves as adjunct faculty at several higher educational institutions and is a clinical preceptor for U.S. Navy substance use disorder counselors at the SARP unit at Patuxent Naval Air Station. He received his doctorate in counseling psychology at Argosy University and his master's degree in clinical counseling psychology from LaSalle University. A licensed clinician, he specializes in chemical dependency rehabilitation and is a nationally certified master addictions counselor and federally credentialed substance abuse professional.

Next Steps

The Way Forward

by Adrienne Buggs, MD, MPH, FACEP
Office of Merchant Mariner Credentialing
U.S. Coast Guard

Mariner medical and mental health have profound consequences for the maritime industry. A healthy mariner population can improve productivity, reduce the risk of medically related maritime accidents, and curtail the number of maritime professionals forced to leave the workforce because of serious illness. For these reasons, the Merchant Mariner Medical Advisory Committee (MEDMAC) dedicates a significant portion of its efforts toward improving mariner health and wellness. While striving to provide quality recommendations on policy and best practices for mariner medical certification, MEDMAC has repeatedly identified that its ability to provide sound recommendations is often hindered by limited data on mariner medical concerns.

In this issue, MEDMAC members and others have discussed many of the challenges affecting mariner medical and mental health, and have offered guidance to mariners, employers, and providers on managing these challenges to promote mariner health and wellness. Much of the work needed to make further improvements in the overall health of merchant mariners requires better data and further research on mariners' health concerns. Some of the data needed likely exists but is not amassed into one data set, nor is it readily available to advisory committees, policy makers, and researchers. Research in this field is critically important to generate additional data and develop evidence-based recommendations to help prevent the illnesses and injuries that lead to repatriation, maritime accidents, or loss of medical certification. Despite the importance of this type of information for the maritime industry, few researchers study the topic.

The following section examines where we need to go from here. The first article provides a call to action and lays out next steps for gathering the information needed to promote a fit and healthy maritime workforce, while the second article shares information about current research in mariner mental health. Please, read on and consider how you or your organization will answer the call to action and promote mariner health and wellness.

About the author:
Dr. Adrienne Buggs has served as the medical technical advisor for the Office of Merchant Mariner Credentialing, U.S. Coast Guard Headquarters since 2010. She is a U.S. Army veteran and a graduate of the Massachusetts Institute of Technology, the University of Virginia School of Medicine, and the George Washington University School of Public Health. She is a fellow of the American College of Emergency Physicians and her areas of past practice include emergency medicine, community medicine and occupational medicine. If you have questions or comments regarding merchant mariner regulations and policy, please contact Dr. Buggs at mmcpolicy@uscg.mil. Parties interested in learning more about mariner health, wellness and medical certification are invited to attend public meetings of the Merchant Mariner Medical Advisory Committee.

Envisioning an Ideal Maritime Health Research Database

by Rafael Y. Lefkowitz, M.D., MPH
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Director of Research
Yale Occupational and Environmental Medicine Program

So much time and effort is spent ensuring a product is moved safely and efficiently from point A to point B. You do the best you can to reduce risks to cargo, vessel, and mariner. Many of you may say, "With all the risks associated with tugging and towing, one thing I won't ever be able to figure out is reducing health risks. That's just too unpredictable." But what if the answer to reducing mariner health risks was hiding in plain sight?

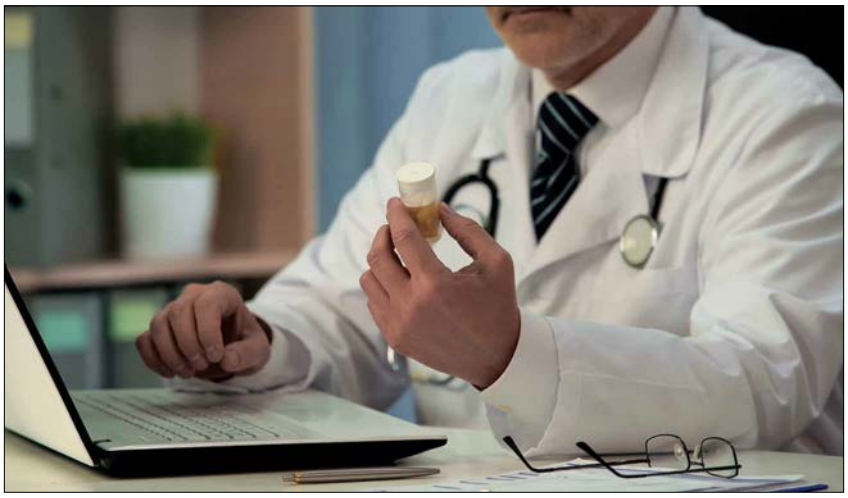
Much of the information needed to reduce health risks may already be collected by industry stakeholders. It lives in human resources files, industrial hygiene reports, inspection files, and medical clearance forms. If this data could be properly harnessed, we could see major improvements in mariner occupational health, translating to happier, longer, and more productive working lives for mariners and a reduction in medical costs for shipping companies.

This article describes characteristics of a mariner injury and illness database that would be ideal for research purposes. Such a database would be important in order to appropriately describe and prevent occupational injuries and illness among seafarers, inland mariners, and coastal mariners. The ideal research database may differ from existing databases in many ways, because existing databases serve different purposes. For example, databases of seafarer injuries and illness exist in insurance claims management companies and within the U.S. Coast Guard. However, the purposes of these databases are for claims management or law enforcement, and so the contents and design of the databases differ. In describing the ideal research database as follows, we recognize that while all aspects may be difficult to achieve in a single database, these principles can serve to also enlighten the development of existing databases.

An ideal database would fuel *preventive* occupational and environmental medicine research. This type of research seeks to prevent injuries and illnesses in working people by carefully examining the characteristics of individual events to establish similarities and differences between events. Armed with this type of information, researchers are able to identify underlying risk factors that can be modified or reduced. Modifying and reducing risk factors translates to fewer injuries and illnesses on vessels, with reduced risk of incapacity and less need for expensive, logistically challenging medical management.

Characteristics of an Ideal Seafarer Injury and Illness Database

The ideal seafarer injury and illness database would possess several characteristics to make it useful as an effective research tool. Such a database would include all pertinent information needed for preventive occupational epidemiology research, or research that focuses on incidence, distribution, and causes of disease, illness, or injury in the workplace. This database would be in an electronic format for easy input, data management, and analytical applications, and easily accessible from multiple research stations. Similarly, it should be easy to input data from various data collection sites. The database itself



motortion | AdobeStock photo

would have a flexible structure, allowing for changes as circumstances and settings develop. These characteristics are not necessarily unique to a mariner injury and illness prevention database, but rather may be desirable attributes of any research database.

Types of Data in the Ideal Database

The information included in the database should anticipate the goals of preventative epidemiologic occupational and environmental medicine research. Such research tends to focus on two general areas. The first area is calculation of injury and illness rates, to allow for comparison to other industries and for descriptive studies. The second area is analysis of risk factors for injuries and illness, to enable preventive efforts and statistical analysis. Consequently, the levels of data to be included in an effective research database would include, in general, categories of individual level data and occupational/work environmental data. Individual level data would include pertinent seafarer demographic characteristics such as age, gender, socioeconomic information, as well as background medical history, including pre-existing medical conditions, medications used, prior hospitalizations, and biometric information. Occupational data on the seafarer's level would include degree of training, rank and position on board, job category, years working as a seafarer, and any other pertinent information regarding an individual seafarer's occupational abilities. Pertinent data relating to the vessel environment would include the type and age of vessel, registry, route traveled, specific cargo, days at sea, vessel casualty history, and history of other human injuries or illnesses occurring on this vessel.

The ideal database would also need to include pertinent event-related data, specific to the injuries and acute medical events occurring on board. After all, prevention of such events is an anticipated goal of using the database. Data related to illness events should include the type of illness, amount of work time lost, treatments rendered, and other measures of severity which may include the need for evacuation or repatriation. The same would apply for injuries. A description of how the mariner was injured and the injured body part would also be highly pertinent. Similar data on near misses for an injury, as well as less severe illnesses, would also be very helpful because identifying factors related to near misses can help prevent actual injury and illness cases from occurring. Other information which may assist in determining the level of severity would include associated costs, direct and indirect, as well as any environmentally adverse outcome, like chemical spills or other environmental damage, and damage to other vessels or port facilities.

Why is all this information necessary, or even helpful? In order to prevent injuries and illness on board, we must understand the modifiable risk factors associated with events. Describing mariner medical events in terms of demographics, job tasks, and vessel-related factors allows for determination of high-risk features. Knowing these high-risk features, enables interested parties to develop appropriate interventions that are targeted to the individual mariners or mariner groups that are at highest risk. For example, if younger deck hands taking blood pressure medications are at higher risk for head injuries, it may be useful to target them for head-injury preventive education. Or, if injury risk is higher at certain times of a voyage, then an intervention could be provided at crew safety meetings during those higher-risk time periods. Fundamentally, having the most complete information available regarding seafarer or mariner demographics, job, and vessel characteristics, allows interested parties to allocate resources appropriately, prepare for, and manage medical problems that arise, and apply targeted preventive interventions.

Whose Data is Needed?

So whose data is needed for the database? The answer is simple. Data is needed on all seafarers and mariners in order to develop a picture of the full spectrum of seafarers and vessels actively working. With such background information available, it would then be possible to establish determinants of injuries and illness. In other words, it would be possible to discover what makes injured and ill seafarers different from those who do not get sick or injured, and what is different about the vessels on which injuries or illnesses occur from those vessels on which such events do not occur. This is essentially the key to prevention of injuries and illness at sea. By identifying modifiable risk factors for injuries and illness, risk for injuries and illness could be reduced to the mutual benefit of mariners, seafarers, and shipping companies alike.

What Type of Data is Not Needed?

It is extremely important to emphasize that the population-level research that would ensue from establishment of an ideal seafarer research database does not require any information that can put individuals at risk of identity theft or compromised employment status, including names of individuals, ships, or vessels. Leaving identifying information out of the database will help ensure information security and minimize risk to participants. If there is a need to follow individuals over time, for example in a longitudinal study, there are ways to design specific databases for such purposes without including identifying information.

Challenges

Anticipated challenges to the development of an ideal

research database revolve around achieving high levels of participation, aiming to include all seafarers, mariners, and vessels, with all their pertinent information and characteristics. While universal participation does seem to be a monumental, and perhaps insurmountable challenge, there are two important points to emphasize. First, achievement of this goal would allow for success in determining occupational risk factors in the seafarer and mariner population. This would be well worth the effort. It may also be fully achievable with engagement from all stakeholders, at least for the segment of the seafarer and mariner population requiring licensing. Second, it should also be noted that even if achievement of 100 percent description of the mariner/seafarer and vessel population is unrealistic, any work in this direction would significantly enhance researchers' abilities to advise regarding preventive interventions.

Dr. Lefkowitz (left) working with inland river mariners on the lower Mississippi. Photo courtesy of Seamen's Church Institute

There are several additional considerations and challenges common to designing and using any large research database. Many such considerations revolve around the logistical aspects of hosting and maintaining the database. As an industry-wide collaborative, would a government agency, academic institution, or other third-party be an appropriate data-holding site? What would be the mechanics of data submission and extraction? How could results of studies using this data be appropriately disseminated back to the working mariners and shipping companies who contributed the data and stand to gain most from the work? In the early design stages, potential solutions could be discussed openly among data contributors and industry stakeholders through trade conferences, mariner forums, social media, and other appropriate venues with input from experienced researchers to provide guidance.

Conclusions

An ideal mariner research database would include information on all working seafarers and mariners to the extent possible, as well as all active vessels. The research database would allow for easy access and flexibility for changing times and needs. Personal identifying information for seafarers or vessels would not be necessary. Building an enduring and effective research database may seem like a utopian ideal, but any step toward building perhaps smaller, more limited databases with pertinent information on a defined population of seafarers and vessels would be a step in the right direction. Achieving these goals may not be an easy task, and would require full cooperation of seafarer unions, advocacy groups, training facilities, maritime institutions, medical centers providing licensing examinations, regulatory bodies including the Coast Guard, shipping companies, and port authorities, among others.

Next Steps and Call to Action

Meaningful progress toward preventing injuries and illness and improving mariner health requires meaningful data. Finding, organizing, and harnessing that data into an ideal database will require collaboration between researchers, mariners, and the maritime industry. We would like to assist the maritime community in building an ideal maritime health research database, and call on others to do the same. We welcome any input, ideas, or suggestions from mariners, seafarers, and the shipping industry towards achieving this ideal and would encourage anyone with thoughts on building this database contact us via email at Rafael.Lefkowitz@yale.edu or Martin.Slade@yale.edu.

About the Authors

Dr. Rafael Lefkowitz and Martin Slade, both of the Yale Occupational and Environmental Medicine Program, have been conducting occupational medicine research on seafarers and mariners since 2012, both collecting new data and analyzing existing data provided by industry stakeholders. They founded and co-direct the Yale University Maritime Research Center, which is committed to improving the evidence-base for mariner and seafarer injury and illness prevention, management guidelines, and health policy. Dr. Lefkowitz also serves as a member of the Merchant Mariner Medical Advisory Committee.

Mariner Mental Health Research

Study aiming to characterize mental health risks and reduce suicides

by Rafael Y. Lefkowitz, M.D. MPH
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Mariner suicides. Almost everyone would agree that one mariner suicide is one too many. Determining ways to prevent mariner suicides can be very challenging because of the nature of suicide and mental illness, and because very little is known about mariner suicide. For instance, we do not know exactly how many suicides there are among mariners, or whether mariners suffer from more suicides than other groups of people. If mariners do have a higher suicide rate than non-mariners, is there something inherent to the work environment that increases suicide risk? If so, could that environmental risk be reduced, or even eliminated? Or, if found, perhaps an increase in risk could be attributed to the workers being from a primarily male population, as men have higher likelihood of suicide completion than women. What are the underlying rates of depression and anxiety among working mariners, and which mariners are most at risk? These are important questions which can best be explored through appropriate research methods and researchers at Yale are currently trying to find answers to these very questions by actively investigating mariner mental health.

If we want to prevent suicides, we have to start at the beginning. Suicides are a tragic consequence of mental illness or mental instability. But suicide may be part of a larger continuum starting when a mariner at risk for mental illness develops depression or anxiety. The mental health condition may go untreated or inadequately treated. Then, at some point, the mariner reaches a crisis moment—perhaps brought on by work-related factors or problems at home—and takes the unfortunate and irreversible step of taking his or her own life. It's possible that suicides can be prevented if risk factors are identified earlier and appropriate preventive interventions initiated.

Current Research

Researchers from Yale University School of Medicine's Occupational and Environmental Medicine Program first started investigating injury and illness risk among water transportation workers in 2012. At that time, they found it quite challenging to gain access to seafarers and mariners who often work far from routine medical care, in locations scattered throughout the country or the world. In the years since, these researchers were able to address this challenge by partnering with seafarer welfare agencies including Seaman's Church Institute (SCI) in the United States and Sailors' Society in England. Through these partnerships, researchers have been able to board ships with port chaplains to speak directly with working seafarers and collect data while observing them in the work environment.

The researchers expanded their scope to include mariner mental health research following an alarming number of suicides in the inland mariner population in 2016. Seafarer welfare agencies, maritime employers, researchers, and other interested parties came together to discuss the problem and develop action plans to prevent additional suicides. Although they were able to enact some steps to curb the outbreak of suicides, they concluded that more information was needed to understand suicide rates and risk factors among working mariners and to understand, on a population level, how mariners compare to other workers.

In order to address this information gap and better characterize the extent and severity of maritime suicide risk, Yale researchers are currently conducting a survey of mariner mental health. The study uses a short questionnaire that includes elements from validated screening tools for depression and anxiety in clinical settings. The questionnaire also asks about demographic and occupational characteristics, and will provide a fuller picture of the state of mental health in working mariners. Working in continued collaboration with SCI, Yale researchers have distributed the surveys at SCI training centers in Paducah, Kentucky, and Houston, with a plan to extend it to additional areas including active vessels on rivers. As of this writing, more than 200 mariners from a range of ages and demographic backgrounds have participated in the study allowing for a

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formal description of the mental illness prevalence and risk factors among them. This research is just one step toward understanding the full scope of mental health and suicide risks in the mariner population. Of course, describing the underlying mental illness burden is an important part of preventing mariner suicides. However, more information is needed, and so again we turn to the maritime community.

Additional Mental Health Research Needs

To understand the true rate of suicides among working mariners, researchers will need data from maritime shipping companies—no identifying information regarding individual seafarers is necessary—including at least the number of suicides and the number of mariners in the company. Bringing all the data together would then allow calculation of the overall suicide rate in the industry and comparison to other industries. The more companies that participate, the better. Demographic information, including mariner age, sex, years of work experience, job, and other information, like race and income, would allow for further stratification by risk groups enabling targeted preventive interventions. Some limitations to this approach include the way suspected suicides on the rivers are documented. For example, it is possible that a suicide might occur but not be documented as a suicide for a variety of reasons including stigma, sensitivity toward family, or other reasons. Also, mariners who commit suicide may do so at home, and the circumstances of death may not be fully disclosed to the company. Recognizing these limitations, it may be helpful to include suspected suicides and missing mariners in the study population. An estimated suicide rate, using suspected suicide cases, which can be formally defined with industry input, would be a good place to start.

Understanding the conditions under which suicides occur can enable preventive efforts to be maximally

For more information

Veteran's Affairs
Suicide Prevention program
www.mentalhealth.va.gov/suicide_prevention/

University of Washington,
Safer Homes Coalition
https://depts.washington.edu/saferwa/about-us/

Dr. Rafael Lefkowitz (second from right) with Seamen's Church Institute river chaplain Kempton Baldridge (far right) talk with mariners on the Mississippi River. Photo courtesy of Seamen's Church Institute

successful. Additionally, researchers can use information regarding mechanisms of suicides to develop actionable recommendations to prevent future mariner suicides. For example, if it is discovered that mariners used firearms to complete suicide, most common with males, then appropriate interventions to reduce risk of firearm-related suicides could be pursued. In this direction, the University of Washington recently partnered with the National Rifle Association, firearm retailers, and others in the Safer Homes initiative, which promotes safe gun storage in an effort to minimize risk of self-harm throughout Washington state. As another example, when the United States Department of Veteran's Affairs recognized the burden of military veteran suicides, they increased suicide-prevention education for veteran communities with the goal of reducing suicide risk in this population. Describing the prevalence and distribution of depression, anxiety, and suicides in our inland mariners could reduce the stigma of mental illness on our rivers, Great Lakes, and coasts. Mariners may be more willing to open up and seek appropriate treatment and work in a healthier state of mind without fear of repercussions on the job.

We hope that through research and partnership with the maritime community, mariner mental health risks can be identified and reduced. Mariner advocacy organizations and industry leaders may develop and publicize policies optimizing mariner mental health at work and at home to the extent possible, and the maritime community can lead other industries by way of example.

If you would like to consider partnering with us in this endeavor, please do not hesitate to contact us.

Dawn Null (left) and colleague, Lynn Gill (right), take a break from a cook's training which included sessions on nutrition and chronic disease, healthy menu development, and mindful eating. Photo courtesy of Seamen's Church Institute

About the Authors:

Dr. Rafael Lefkowitz is a physician in the Yale Occupational and Environmental Medicine Program and serves as a member of the Merchant Mariner Medical Advisory Committee. He has conducted occupational medicine research on seafarers and mariners since 2012, both collecting new data and analyzing existing data provided by industry stakeholders. He co-founded and co-directs the Yale University Maritime Research Center, which is committed to improving the evidence-base for mariner and seafarer injury and illness prevention, management guidelines, and health policy. Feel free to contact him at Rafael.Lefkowitz@yale.edu.

Dawn Null, Ph.D., is an assistant professor in human nutrition and dietetics at Southern Illinois University Carbondale where she is a part-time teacher of all things nutrition, and part-time researcher in the areas of health and nutrition on the tow, college health, and environmental nutrition. A registered dietitian, she has worked in the college setting molding young minds for 20 years, and has also consulted for the river barge industry since 2009. She is also on a mission to figure out how to make healthy habits easy for mariners while on the tow. She can be reached at dawnnull@siu.edu.

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Veteran's Affairs Suicide Prevention program: www.mentalhealth.va.gov/suicide_prevention/

University of Washington, Safer Homes Coalition. https://depts.washington.edu/saferwa/about-us/

Historical Snapshot

Robert Goldman and the Kamikaze Crash on *LST-66*

by William H. Thiesen, Ph.D.
Atlantic Area Historian
U.S. Coast Guard

I was a passenger naval officer aboard the ship at the time of the attack and was in a good position to observe the courage displayed by the Pharmacists Mate [Robert] Goldman. His back was badly burned and he refused to even sit down until every one of the other casualties had been treated. … In my opinion such courage was far beyond the call of duty.

—Lieutenant junior grade Collum J. deGruy, U.S. Navy Reserve

During World War II, the United States Coast Guard played an important role on the high seas. The service used more than half of its personnel to man 802 Coast Guard, 351 U.S. Navy, and 288 U.S. Army vessels that supported land, sea, and air forces in all combat theaters. Coast Guard troop ships, attack transports, cargo vessels, fuel ships, and auxiliary vessels provided for Allied amphibious operations, fighting fleets, and land forces throughout the world, ensuring a steady stream of troops, equipment, and supplies to Allied offensives. Robert Goldman was one of countless Coast Guardsmen who served in this armada of military vessels.

Early photo of Robert Goldman. Courtesy of the Goldman family

Born and raised in Connecticut, he received a degree from the University of Connecticut and taught at the National Farm School in Pennsylvania. He was never a Boy Scout, but his adherence to rules led his family to describe him as such. In October 1942, he enlisted in the Coast Guard and chose to become a pharmacist's mate with duties similar to those of a medic or corpsman. Over the next year, he received medical training at Columbia University's Pharmacy School, got married, and served as a third-class pharmacist's mate in the Coast Guard's New York District. In June 1944, the 24-year-old Coast Guardsman left behind his bride of less than a year and travelled to the service's Alameda, California, processing center. Within a month, he shipped out on a voyage that would lead to the killing fields of the Western Pacific.

Just a month after his cross-country journey, Goldman reported for duty on board the Coast Guard-manned *LST-66*. At 328 feet in length, the LST, short for "landing ship, tank," was a product of British and American engineering genius, and the Allies' desperate need for amphibious landing ships in the European and Pacific theaters. The largest of the Allies' purpose-built landing ships, the LST carried 2,100 tons of troops, tanks, trucks, supplies, and ammunition. Along with 110 Coast Guard officers and enlisted men, Goldman would now call *LST-66* home.

When he arrived on board *LST-66*, she was busy landing troops and supplies for the Army's campaign in Western New Guinea. That autumn, the Allies launched one of the most strategically important amphibious operations of the war—a campaign to retake the Philippines from the Japanese. In so doing, Army General Douglas MacArthur would fulfill the pledge he had made in 1942 before the surrender of the islands, to return and liberate them. More importantly, Allied control would cut off the Japanese homeland from vital raw materials, such as the oil reserves located in the Dutch East Indies and Malaya, and far-flung units of the Japanese Army holding out as far south as Borneo.

Japanese military leaders knew all too well the strategic importance of the Philippines. Its loss would initiate the final chapter of a retreat to the home islands that had begun in mid-1942 with the Allied "island-hopping"

A British protectorate in 1944, Malaya is now part of Maylasia.

campaign. To hold onto the Philippines, the Japanese military resorted to desperate measures. These included sending the last major units of the Imperial Japanese Navy on a deadly mission to destroy the Allied invasion forces, and a new aviation tactic termed "Kamikaze," or "Divine Wind." Japanese kamikaze pilots would fly suicide missions by crash-diving their fighters and fighter-bombers into Allied ships.

American military leaders decided on Leyte Island as the target of their first landings in the Philippines. One of the largest amphibious operations of the war, the Leyte invasion included nearly 430 amphibious vessels supported by aircraft carriers and capital ships of the U.S. Navy's 3rd and 7th fleets. On Friday, October 20, 1944, Goldman witnessed this massive operation from the deck of *LST-66* while she helped land the invasion's nearly 200,000 troops. In the ensuing naval battle, considered the largest in history, Allied warships repelled the Japanese naval forces leaving most of the enemy warships damaged or destroyed.

On Sunday, November 12, *LST-66* returned to the shores of Leyte Island. It would be a day of days for Robert Goldman. At 8:30 a.m., *LST-66* ran ashore on the grey sandy beaches near the town of Dulag, opened her protective bow doors, and dropped her landing ramp. The shoreline had been cleared of enemy defenses, so the LST's doors would remain open for the day to deposit cargo and embark exhausted American troops from the invasion's first wave.

By late afternoon, the *LST-66* embarked men of the 75th Joint Assault Signal Company. Prior to the initial October landings, this joint Army-Navy reconnaissance unit had been inserted on the Leyte coast to identify Japanese defenses and communicate their location back to the invasion's planners. After weeks of living in the jungle on C-rations, the recon men were happy to board a friendly vessel equipped with bunks and hot chow. The weary troops made their way to the relative safety of the LST's stern, out of range of enemy snipers. A lieutenant with the unit even boarded with a cockatoo perched on his shoulder, which drew a crowd of curious crew members. By now advanced to a second-class pharmacist's mate, Robert Goldman struck up a conversation with the lieutenant and admired the majestic bird.

Throughout the day, Japanese "Zero" fighters had made suicide attacks against the landing ships, so the Army Air Corps sent up P-38 fighters to protect the vessels. At about 5 p.m., a Zero zoomed toward *LST-66* from behind the mountains on Leyte Island with two P-38s hot on its tail. The Lightnings hit the Zero with machine gun fire, suddenly broke off their pursuit, and rocketed skyward.

What happened next was a gruesome shock to everyone. The wounded Zero flew straight for the Army and Coast Guard men gathered on the starboard side of the LST's stern. In milliseconds, Goldman witnessed the enemy fighter impact the LST's deck, careen across the ship's aft quarterdeck, explode, and obliterate men and machines before crashing into the water. The Zero had spread death and destruction across the LST's stern leaving a swath of carnage and wreckage in its wake. The lieutenant with the parrot and one of his men were killed instantly with another seven soldiers severely wounded. The toll on Goldman's shipmates was greater—four killed and seven wounded. All that remained of the parrot was white feathers sprinkled over the twisted metal and mangled bodies strewn about the quarterdeck.

Miraculously, the crashing fighter spared Goldman's life, but though he survived he was still a victim. When the Zero scoured the LST's aft deck, it sprayed aviation fuel over everything including Goldman. His back on fire, he tried rolling on deck to smother the flames, but the deck was coated with aviation fuel and only added to the problem. To make matters worse, Goldman's right leg had been hit with shrapnel from the crashing fighter, and he suffered severe shock from the sudden crash and resulting carnage.

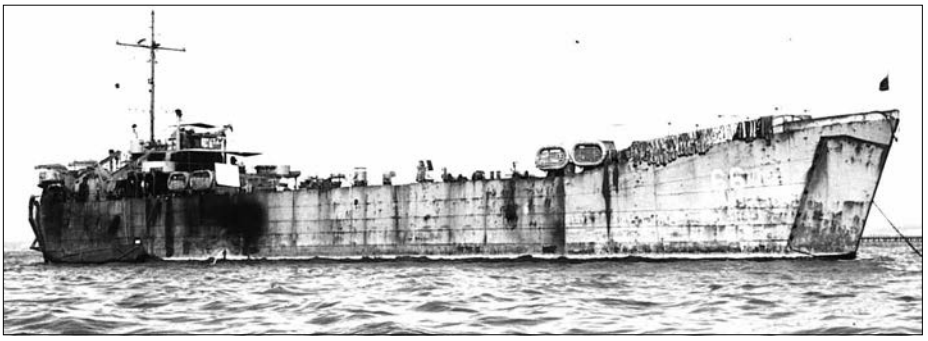


Photo of *LST-66* anchored in the San Francisco Bay after her return from the war. The black and white image shows the effects of the kamikaze attack on her aft starboard side. Coast Guard Collection photo

The instinctive response to such an experience would be to run, hide, or escape from the scene. But Goldman did what he was trained to do despite his wounds and trauma. When the Zero careened across the deck, it had flown straight into the aft 40 mm and 20 mm gun mounts, crushing equipment and men. The 40 mm gun tub smoldered with exposed ammunition cooking to critical temperatures while the gunner

writhed in agony from having his legs crushed by the gun's mangled splinter shield. Disregarding the hot ammo, his wounds and burning back, Goldman jumped into the tub and administered morphine to ease the man's pain and suffering. When the 40 mm gunner asked about his legs, Goldman told him they would be okay. Reassured, the man responded, "As long as I can get home to Mom." The splinter shield was later removed and the wounded gunner evacuated, but he expired that evening.

U.S. Army Air Corps employed the P-38 "Lightning" pursuit fighters in the Pacific theater of operations. Air Force photo

Goldman focused his efforts on separating the dead and dying from the wounded and treating them quickly with the medical supplies in his first aid bag. In combat situations such as these, good training can overcome fear, shock and trauma, but Goldman's stubborn devotion to duty pushed him beyond normal limits. His shipmates implored him to seek medical attention, but he refused saying, "Others are hurt worse than I am." Goldman allowed a shipmate to put out the flames on his back and cut away the charred skin and clothing adhered to his burns, but he continued treating the wounded and dying until all had received care. Only after the casualties had been moved below for treatment did he allow his own wounds to be examined. At that point, his shipmates realized he had sustained shrapnel wounds to his leg in addition to his burns and charred back. The U.S. Navy medical doctor attached to *LST-66,* Lieutenant junior grade Paul Irvine, wrote in his after-action report:

> *It is my opinion that by his actions, namely by jumping into the burning gun tub, giving treatment to the trapped seaman and assisting in his removal; by administering plasma and morphine to wounded men topside; and by the caring for wounded in the ship's wardroom in the face of painful burns he had sustained the moment of the plane's crash, Pharmacist's Mate Goldman rendered service beyond the call of duty, permitting care of himself only after all the wounded had been treated.*

LST-66's dead were tagged for identification and sent ashore for burial at Leyte's military cemetery. Meanwhile, Goldman was evacuated with the wounded to another LST serving as a makeshift hospital ship. The lack of medical staff on board the LST required him to treat his own wounds. Over the next several weeks, his body healed, but the effects of the trauma lingered on. He was shipped back to the West Coast, rode a special train for war wounded to the East Coast, and convalesced at the naval hospital located near Norfolk, Virginia. While recovering, he received a diagnosis of "psychoneurosis," "war neurosis," or simple "combat fatigue," an emotional shock termed post-traumatic stress syndrome, or PTSD, by modern psychiatric professionals.

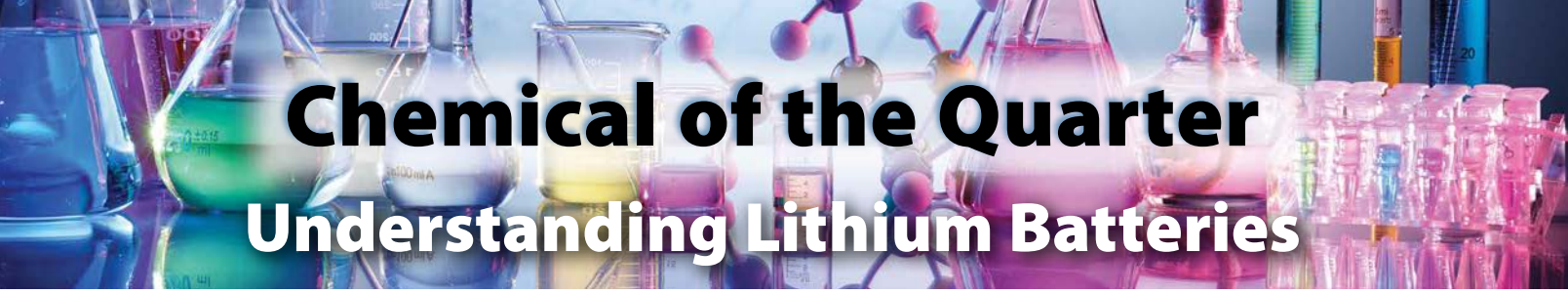
For his heroic deeds, Goldman received the Purple Heart and Bronze Star medals. His Bronze Star citation reads:

> *He persistently refused care for his own wounds until all others had been treated and additional medical assistance arrived. His conduct throughout distinguished him among those performing duties of the same character.*

Goldman also received the Navy Unit Commendation as a member of battle-tested *LST-66,* one of the most decorated LSTs in the Leyte campaign. His trauma eased over time, but he would never return to the front. The naval hospital doctors believed it best for him to spend the rest of his service in the States. Meanwhile, General MacArthur secured Leyte Island on December 25. It was a fitting Christmas gift, and MacArthur's forces would pursue the enemy back to Manila. The recapture of the Philippines marked the beginning of the end for the Japanese military.

Robert Goldman was an ordinary man who performed extraordinary feats that fateful day in November 1944.

About the author:
William H. Thiesen, Ph.D., is the United States Coast Guard's Atlantic Area historian. He earned an M.A. from East Carolina University in maritime history, and a Ph.D. from the University of Delaware's Hagley Program in the history of technology. He is the author of two books and a frequent contributor to the online history series, The Long Blue Line, *featured on the* Coast Guard Compass *web site.*



Chemical of the Quarter

Understanding Lithium Batteries

by Hillary Sadoff
Hazardous Materials Division
U.S. Coast Guard Office of Design and Engineering Standards

What is it?

Lithium batteries are the type of batteries that keep your electronics and life going. This may sound odd as a topic for Chemical of the Quarter, but these types of batteries are regulated the same way as other Class 9 chemicals within 49 CFR, the hazardous materials transportation regulations. Lithium batteries, which hold an electronic charge used to power electronics, are valuable because they are lightweight, have a high-energy density, and are rechargeable. A typical battery consists of two electrodes, an electrolyte solution, and a containment case. Lithium batteries all contain lithium, but the specific chemistry can be different.

How is it shipped?

Lithium batteries are shipped under four different United Nation (U.N.) numbers. All four numbers are categorized as Class 9, or a miscellaneous hazard, and each number corresponds to a different configuration/arrangement as illustrated in the below table.

UN #	Proper Shipping Name
UN3480	Lithium ion batteries *including lithium ion polymer batteries*
UN3481	Lithium ion batteries contained in equipment *including lithium ion polymer batteries*
UN3481	Lithium ion batteries packed with equipment *including lithium ion polymer batteries*
UN3090	Lithium metal batteries *including lithium alloy batteries*
UN3091	Lithium metal batteries contained in equipment *including lithium alloy batteries*
UN3091	Lithium metal batteries packed with equipment *including lithium alloy batteries*

The hazardous materials regulations (HMR) dictate very specific requirements for transporting lithium batteries for each mode of transport. Air is the most restrictive transport mode, and therefore vessel transport is the most commonly used mode for international shipments.

Why should I care?

The major concern during transport is the risk of fire. When lithium batteries become overheated or damaged they can produce an exothermic reaction that causes more heat to be generated. If multiple batteries are transported next to one another, the heat from one damaged battery can propagate and spread to another battery. This propagation can increase failure of all surrounding batteries within a package, equipment, or cargo transport unit. The problem will persist and will continue to get worse before it resolves. Additionally, a secondary concern is that the battery can release explosive gas. A reaction between lithium and water can produce highly flammable hydrogen gas.

Due to these risks, the hazardous materials transportation community requires significant testing of lithium batteries to ensure that they are safe for transport. Furthermore, the HMR has specific, special provisions and requirements for additional labels and markings on all lithium battery packages. Some of the requirements are intended to reduce the risk of fire, which includes protecting the battery from short circuits, limiting movement within the package, and preventing accidental activation of the equipment in which the battery is installed. Packaging of lithium batteries is unique in that each battery is required to be packed in an inner and outer package, each of which must meet specific requirements such as being leak-proof and made of nonmetallic materials. Each package is required to have the lithium battery mark and may have signal words such as "LITHIUM BATTERIES—FORBIDDEN FOR TRANSPORT ABOARD AIRCRAFT AND VESSEL."

As consumers are more reliant on electronics, more incidents have occurred with the increase of transporting lithium batteries and equipment containing them. French authorities have reported frequent container fires onboard ships related to shipments of recycled batteries. The Norwegian Maritime Authority has published an alert concerning a small fire that erupted in the battery room onboard the MF *Ytterøyningen* passenger ferry after a fire and subsequent gas explosion onboard a diesel-electric ferry in Norway. U.S. authorities' investigation of the September 2, 2019, fire onboard the M/V *Conception*, which may have been caused by the charging of lithium ion batteries in equipment onboard the vessel, is ongoing.

What is being done?

As a result of these and other incidents, the Department of Transportation has formed a Lithium Battery Advisory Committee. The committee will be responsible for providing the department with information regarding new technologies and transportation safety practices, as well as developing policy positions for international forums and guiding activities to increase awareness of safety requirements. The U.N. Subcommittee of Experts on the Transport of Dangerous Goods is also discussing the problems related to transport of lithium batteries. This organization is working to provide a clear guidance on the testing methodology and acceptable flexibility in conducting the tests to classify lithium batteries. These tests will eventually will be incorporated in both international and domestic regulations.

About the author:
Hillary Sadoff is a chemical engineer in the Hazardous Materials Division in the Office of Design and Engineering Standards. Her primary responsibilities revolve around areas of packaged hazardous materials shipments by water. She serves as the USCG subject matter expert for rulemaking projects harmonizing international and domestic packaged hazardous materials regulations. She earned her bachelor and master of engineering degrees in chemical engineering from the University of Maryland, College Park, and has a graduate certificate in project management from Boston University.

Nautical Engineering Queries

Questions

Prepared by NMC Engineering Examination Team

1. A vertical shaft having a rudder attached to its lower end and having a yoke, quadrant, or tiller fitted to its upper portion by which it may be turned, is the _____ .

A. Rudder frame
B. Rudder post
C. Rudder stock
D. Stern post

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2. In the operating cycle of a four-stroke/cycle diesel engine, blowdown to exhaust manifold pressure must occur before the piston begins the exhaust stroke to minimize _____ .

A. Pressure losses
B. Exhaust pulsations
C. Excessive scavenging
D. Pumping losses

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3. The explosive range of a mixture of flammable vapors and air lies between the lower and upper explosive limits. These limits are specified as a percentage of _____ .

A. Flammable vapor by volume in air
B. The lower limit of explosibility of the mixture
C. Oxygen present to support combustion
D. The temperature of the flash point

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4. Compared to the return flow oil burner system, an internally mixed steam atomizer requires _____ .

A. Higher fuel oil viscosity
B. Less excess air
C. Higher air velocity
D. Greater turbulence in the air/oil stream

1. A. Rudder frame — Incorrect
B. Rudder post — Incorrect
C. Rudder stock — **Correct answer.** The lower section of the shaft to which the blade is attached is called the main piece; the upper section, which extends upward into the hull, is called the rudder stock.
D. Stern post — Incorrect

Reference: Introduction to Steel Shipbuilding, *2nd Ed, Baker, Page 145*

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2. A. Pressure losses — Incorrect
B. Exhaust pulsations — Incorrect
C. Excessive scavenging — Incorrect
D. Pumping losses — **Correct answer.** In the case of the four-stroke engine, the area enclosed by the p-V diagram for the gas exchange process is known as the pumping loop which may contribute positive or negative loop work to the work associated with the power loop. One should always strive to minimize pumping losses as they subtract from the power generated.

Reference: Diesel Engines, *Lilly, Pages 1/6 and 1/17*

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3. A. Flammable vapor by volume in air — **Correct answer.** The flammable (explosive) range of a fuel is reported using a percent by volume of gas or vapor in air for the lower flammable limit (LFL) and for the upper flammable limit (UFL).
B. The lower limit of explosibility of the mixture — Incorrect
C. Oxygen present to support combustion — Incorrect
D. The temperature of the flash point — Incorrect

Reference: Marine Firefighting, *1st Ed, IFSTA, Page 12*

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4. A. Higher fuel oil viscosity — Incorrect
B. Less excess air — **Correct answer.** The internal–mix steam atomizer and the vented-plunger atomizer have the highest turndown ratio and provide for the smallest and most uniform particle size over their range of operation. Finely atomized fuel droplets provide more surface area for combustion and permit less excess air to be used.
C. Higher air velocity — Incorrect
D. Greater turbulence in the air/oil stream — Incorrect

Reference: Marine Engineering, *Harrington, Page 206*

Nautical Deck Queries

Questions

Prepared by NMC Engineering Examination Team

1. INTERNATIONAL ONLY: Your vessel is backing out of a slip in a harbor and you can see that other vessels are approaching. You should sound which of the following signals?

A. Three short blasts when leaving the slip
B. One prolonged blast followed by three short blasts when the last line is taken aboard
C. One prolonged blast only
D. Five short and rapid blasts

---

2. Your vessel is being towed and back-up wires have been installed. Back-up wires carry the towing load in which situation?

A. The bridle legs part
B. The towing bitt or pad eye fails
C. The bight ring fails
D. The main towing hawser parts

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3. What is the spoken emergency signal for a "man overboard" on the VHF radio?

A. Man overboard
B. Securite
C. Mayday
D. Pan-Pan

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4. How long would a steady wind need to blow in order to create a wind driven current?

A. 2 hours
B. 6 hours
C. 12 hours
D. 18 hours

1. A. Three short blasts when leaving the slip — **Correct answer.** When vessels are in sight of one another, a power-driven vessel underway, when maneuvering as authorized or required by these rules, shall indicate that maneuver by the following signals on her whistle:
- one short blast to mean, I am altering my course to starboard
- two short blasts to mean, I am altering my course to port
- three short blasts to mean, I am operating astern propulsion

B. One prolonged blast followed by three short blasts when the last line is taken aboard — Incorrect

C. One prolonged blast only — Incorrect

D. Five short and rapid blasts — Incorrect

Reference: International Rule 34(a)

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2. A. The bridle legs part — Incorrect

B. The towing bitt or pad eye fails — **Correct answer.** Back-up wires are installed to hold a towing bridle in the event of failure of the towing pad eye.

C. The bight ring fails — Incorrect

D. The main towing hawser parts — Incorrect

Reference: Tugs Towboats and Towing, *Brady, 1st Ed 6th Printing, Page 152*

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3. A. Man overboard — Incorrect

B. Securite — Incorrect

C. Mayday — Incorrect

D. Pan-Pan — **Correct answer.** Pan indicates that the calling station has a very urgent message to transmit concerning the safety of a ship, aircraft, or other vehicle, or the safety of a person.

Reference: PUB 102 International Code of Signals, 2005 Ed, Page 147

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4. A. 2 hours — Incorrect

B. 6 hours — Incorrect

C. 12 hours — **Correct answer.** In general the wind drift current is about 2 percent of the wind speed in deep water when the wind has been blowing steady for at least 12 hours.

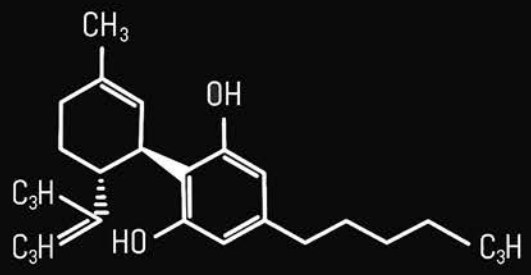
D. 18 hours — Incorrect

Reference: Bowditch, *2002 Ed, Page 434*

Cannibidiol a Can't for Mariners

Cannibidiol, or CBD, claims to be the newest cure for everything from knee aches to anxiety, but STOP! Claims that a product is free of tetrahydrocannabinol, or THC, the psychotropic compound in marijuana, is no guarantee and it could cost you your career.

Some commercially available CBD and hemp products may contain drugs prohibited by Department of Transportation regulations, and enough THC to result in a positive drug test. This includes items ingested, inhaled, smoked or applied to the skin, like lotions, oils, creams, and shampoo.



CBD

Remember these Points and Protect Your Career

- A mariner is "presumed to be a user of dangerous drugs" if he/she fails a chemical test for drugs under 46 CFR 16.201(b).
- Failing a chemical test for drugs under 46 CFR 16.201(b) may result in enforcement action, up to and including suspension and revocation action against the merchant mariner credential.

For these reasons, use of medications or topical preparations containing THC, CBD, or hemp **WILL NOT** be waived under any circumstances.

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An MH-60 Jayhawk helicopter from U.S. Coast Guard Air Station Clearwater, Florida, approaches the 550-foot tanker *Gaschem Stade*, southwest of St. Petersburg in August 2017. The air crew medevaced a 55-year-old man who had suffered heart attack-like symptoms from the tanker. Coast Guard photo by Petty Officer 3rd Class Gage Hunt