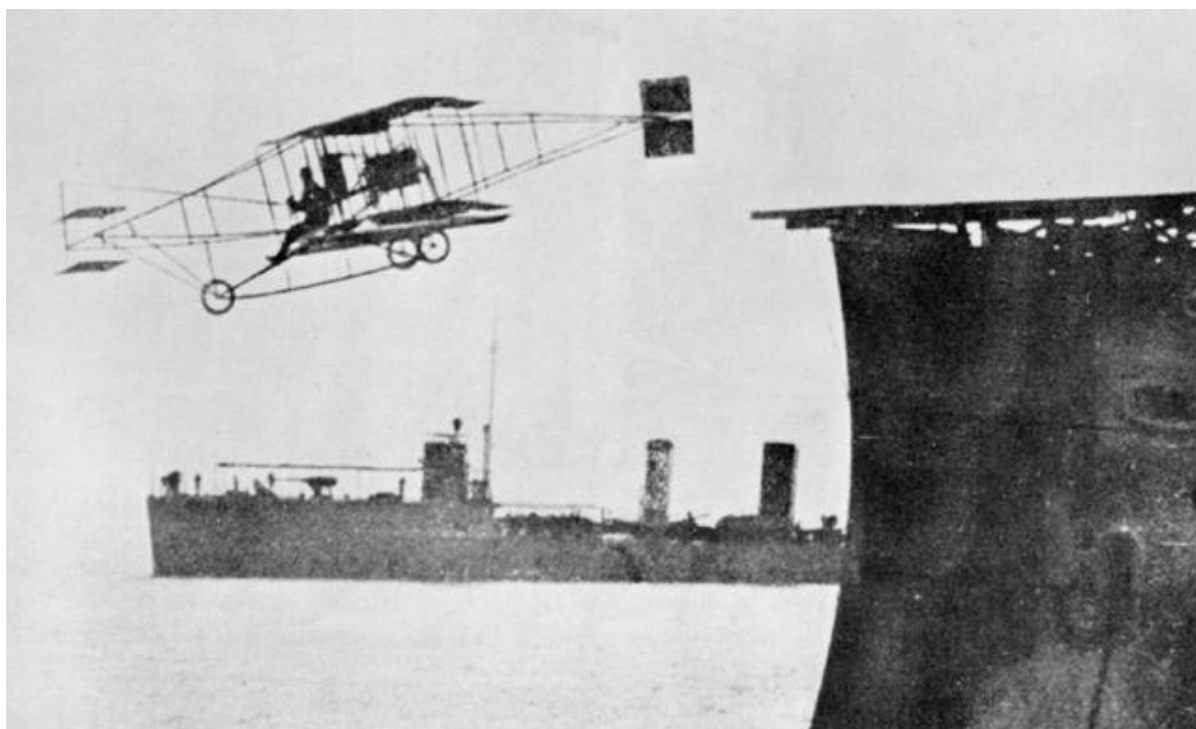




CONTACT

The Journal of the Society of United States Naval Flight Surgeons

**Volume XXVI, Number 1
January 2002**



Eugene Ely flying off the deck of the cruiser USS Birmingham



THE SOCIETY OF U.S. NAVAL FLIGHT SURGEONS
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CAPT Michael R. Valdez

The Society of U.S. Naval Flight Surgeons is a nonprofit organization. Its purpose is to advance the science, art, and practice of aerospace medicine and the mission of the U. S. Navy and the U. S. Marine Corps; to foster professional development of its members; and to enhance the practice of aerospace medicine within the Navy and the Marine Corps.

Membership is open to all Flight Surgeon graduates of the Naval Operational Medicine Institute. Subscription memberships are available. Dues are \$20.00 per year, or \$300.00 for a lifetime. Contact the Secretary or Treasurer for more information or a membership application form.

Cover Photo

On November 14, 1910 at Hampton Roads, Virginia, a civilian Curtiss exhibition pilot, Eugene Ely, took off from the modified cruiser USS Birmingham and flew to shore. A few months later on January 18, 1911, in San Francisco Bay, Ely landed on a wooden deck built over the stern of the USS Pennsylvania using ropes and sandbags as arresting gear. The birth of Naval Aviation had occurred.

On 3 November 1910, at an air show at Halethorpe Field near Baltimore, Ely met CAPT Washington Chambers, the first designated Director of Naval Aviation. During their conversation, Chambers mentioned he had just asked Wilbur Wright for a pilot and a plane to fly from a ship. Wright had flatly refused all help, saying it was too dangerous...

Eugene Ely was intrigued. CAPT Chambers did not have enough in his budget to pay Ely to try, but could provide a ship. Ely agreed and CAPT Chambers rushed the Birmingham, commanded by Captain W.B. Fletcher, to the Norfolk Navy Yard and told the yard commandant to help equip her with a ramp. An 83-foot ramp which sloped at five degrees from the bridge rail to the main deck at the bow was built. The forward edge was 37 feet above water.

The gloomy Monday morning 14 NOV saw an entourage of Navy official and onlookers awaiting the big show, but the weather was deteriorating. With about an hour of light left at 3 pm, the clouds lifted enough to see the target, Willoughby Spit. The plan was to have the Birmingham raise anchor and steam into the wind. However, impatient with the long anchor recovery time, Ely flew off the still anchored ship at 3:17. He briefly sank low enough to shatter his propeller tips on the waves, then flew to the spit with the entire plane vibrating badly. The observers were elated and Commodore John Ryan gave Eugene Ely \$500 to pay for his propeller.

At the Georgia State Fairgrounds 11 OCT 1911 Ely was flying his routine when he was seen fighting to maintain control while diving from several hundred feet, but the plane crashed near the grandstand. At 25, in a notable flying career lasting only 18 months, Ely died of a broken neck when he was thrown from his seat.

http://www.aerofiles.com/bio_e.html

President's Column

As I was running the other day at noon, the weather was beautiful, the sky blue and there was a pleasant, cool breeze over the track as I did a few training intervals. I heard the sound of jets overhead, looked up, and saw two A-4's that had just taken off from our nearby airfield. One was painted in "cami jungle" and one in "cami desert." I'm sure they were headed out as adversaries in a local training mission. What a beautiful sight on such a beautiful day in the tropics, and I said to myself, "It doesn't get much better than this!" But, I couldn't help remind myself at the time of how much things have changed for all of us since September 11.

The loss to our nation on that day was tremendous. Many lives were lost. The impact on families of those who died and on others affected directly was and remains incalculable. Our nation's sense of security and freedom has been shaken to its core. Despite the shock and horror of it all, U.S. civilian and military response was immediate and appropriate. Airports were shut down, and military installations worldwide went to Threat Condition Delta—our highest military threat condition. And, even now, three months later we continue to do business in a heightened security posture. In the immediate aftermath and despite deep shock, we began the healing process. Recovery continues.



With this in mind, please take a moment of silence in memory of those who died and lift up those most directly affected by the WTC Twin Towers and Pentagon disasters....

The NAMI staff has written an article in this issue in memory of those members of the Navy and Marine family who lost their lives. Please take time now and read their tribute on page 8. As a sign of respect for their ultimate sacrifice, the only color in this issue of *CONTACT* is found on the memoriam pages.

Speaking of change, I'm sure you've already noticed several on the front page of this issue of our quarterly publication—the change in name and change in description. First, the name has been changed to *CONTACT*, the name given to our first newsletter in the 1950's. It's especially appropriate to make this change in light of our renewed interest in Naval Aerospace Medicine history. Second, we have changed the description from a newsletter to a journal. Current article submissions include not only announcements of basic information and "news," but also critical analyses, original work, and historical accounts.

The Board of Governors (BOG) was considering these changes even before 11 September. However, the events of that day, plus our desire to cap-

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ture, report, and cherish Naval Aerospace Medicine history, prompted the BOG to do an informal survey of the membership on these ideas and to include the proposal in our October newsletter. No negative comments came. So, this issue, Volume XXVI, Number 1, January 2002, is the first of our new look and attitude—"CONTACT-The Journal of the Society of United States Naval Flight Surgeons." Kudos go to all those who had a part in our "new look." Special thanks go to our Secretary, LCDR Bill Padgett, for his pro-activeness in making this happen. Enjoy, and please let us know what you think.

A final note: Please plan on joining us in Montreal, Canada, in May 2002 for our annual Aerospace Medicine Strategic Planning Session sponsored by MED-23, our SUSNFS business meeting, the All-Navy Luncheon, and the AsMA scientific meeting. There were over 450 abstracts submitted for scientific program consideration. The program should be really outstanding this year.

Until our next *CONTACT*...Godspeed

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Awards

A reminder that nominations are due by 15 APR to CAPT Valdez at mrvaldez@nomi.med.navy.mil for the annual awards that will be given out at the Navy Luncheon at AsMA. For any questions please don't hesitate to contact him. Criteria for the awards were presented in the October issue.

Richard E. Luehrs Memorial Award for outstanding junior operational Flight Surgeon (note that this is routed via TYCOM not CAPT Valdez)

Ashton Graybiel Memorial Award for outstanding contributions to the medical literature.

Robert E. Mitchell Award for an emeritus Flight Surgeon in recognition of career contributions.

Sony Carter Memorial Award for MC/MSO officer promoting aeromedical community teamwork.

Bruce W. Jackson Memorial Award for outstanding contributions from a Flight Surgeon Reservist.

Nominations

It's that time of year again when we need to start thinking about whom you would like to have hold office in your Society starting May 2002. CAPT Fraser will fleet up to President and LCDR Rice will move in to the Treasurer position. CAPT Barker will move on to the Board of Governors as Immediate Past President.

Opening positions will be:

Vice-President

Secretary (needs to be in the Pensacola area in order to receive mail and work closely with the Treasurer)

Assistant Treasurer (needs to be in the Pensacola area in order to receive mail, run accounts and work closely with the Treasurer and Secretary)

Emeritus Board Member

Two Board Members (for the 2002-2004 term to replace the outgoing CAPT Scholl and LCDR Faulkner)

AsMA membership is required to be eligible for office as well as voting.

Please have your nominations in to CAPT Valdez at mrvaldez@nomi.med.navy.mil by 1 MAR so that the ballot can go out in the April issue. Winners will be announced on the website 1 MAY and at AsMA.



(Fire Fighting Drill on the Kitty Hawk)

From the Secretary

My sympathies go out to all those who have been affected by the tragic events of September. It is reassuring to hear reports of how well our troops are doing and how America is rebounding stronger and more united than ever. Despite the wonderful heroism emanating from so many sources, I would prefer to awake and find it was all a bad dream. As you all are keenly aware, we now live in a much different world.



Flight Surgeons are now on the front lines helping prosecute a new type of war. You are participating in experiences that no one else in our community has seen. SUSNFS will provide you any help that we can. Let us know the lessons you are learning and what issues our community needs to address. An incredible array of people are ready to do whatever it takes to make Naval Aerospace Medicine stronger and more responsive to the needs of the fighting forces. You contain the unique knowledge of what is happening at the unit level that needs to be heard by the rest of Aviation Medicine.

The response to my request for articles was outstanding. You will see articles from a wide range of contributors covering many different topics in this issue and promises for other interesting stories in the April issue. I urge the membership to continue providing the editor articles. Tell SUSNFS what you are thinking about or would like to see us publish. Impress friends, family, and the Graduate Medical Education Selection Board by getting your name in print. Sharing your knowledge and experiences with the rest of Aerospace Medicine strengthens us all. Articles can range from formal submissions to case reports to simple observations. What you are doing makes for interesting reading. So submit it.....

CONTACT is now available in Adobe Acrobat PDF format as well as printed version. For those of you away from home at the beginning of the month when the journal is sent out, contact me by e-mail and I will get you the electronic version to tide you over until you return home. These are large 3-5MB files so you will need a fast connection to receive them. I have not had any problems sending them to mil ac-

counts. A few of the recent past issues are also available at our website. The electronic files will eventually be for sale on a CD-ROM that will allow word searching across all issues. At some point, we will blatantly copy CAPT Davenport's wonderful SUSNFS index from 1996 and update it to make use of the compendium much easier. Approximately half of the past issues are now in electronic format including the very first issue. I will apply the pressure and tell you I expect to have all of them available by the AsMA meeting.

I want to express my gratitude to CAPT Dully, CAPT Calcagni, and CAPT Mitchell who are helping to bring Naval Aerospace Medicine history to the forefront. There are others I have failed to mention by name, but just as important in efforts to preserve our history. CAPT Dully is the head of SUSNF's History Committee and will gladly accept help on this endeavor. His e-mail is frankdully@att.net. Check out the History Committee section on the web page. CAPT Dully was the source of the Senior Medical Officer list that can be found on the Society's website which led to the extensive listing of Flight Surgeons and Duty Stations. CAPT Calcagni has provided the Society with 1922 BUMED Newsletters that described the state of the art of Aviation Medicine at that time. We will aim to get all of this information into an electronic format accessible from the website so those not in Pensacola can benefit from it as well.

Continue to play around on the website and let us know what needs to be added. The "Died on Duty" listing has been updated with some links to poems and inspirational stories about these men. Interesting reading. Did you know that Victor Prather was a Flight Surgeon that set the manned balloon altitude record that stands to this day while working on the Mercury Project? Also on the website is the ONLINE STORE under "Merchandise" or "Membership" that allows you to securely pay by credit card. Just in time to start thinking about those 2002-2003 dues.

Check you mailing label and verify I have your expiration and member status correct. Remember that you must be in good standing with AsMA in order to be classified a MEMBER with voting privileges. Without AsMA, we classify you as a SUBSCRIBER.

LCDR William S. Padgett, MC, USN
wspadgett@nomi.med.navy.mil

From the Treasurer

Greetings from the Treasurer.

I hope you all have been enjoying your tour and the wonderful autumn weather. Pensacola is still rather warm, but getting cooler in the evenings, which is so good for sleeping. Pensacola is such a beautiful place in the fall. The pine needles cover my lawn and turn it a bright brown color. If any of you would like some Loblolly pine needles for your garden, just come by and rake up all you want for free!



There are some new developments in our community and we have some new products to offer. The first of these is the new Flight Surgeon belt buckle. We put a picture of it in the last newsletter, but unfortunately it showed the one specific for the NAMI command. The buckle available for all Flight Surgeons only has the wings of the Flight Surgeon on it and no lettering. It is a nice belt buckle and sells for \$24.00.

We also have some beautiful naval aviation art done by one of our own. LT Will Patton has done some wonderful drawings of naval aircraft and these are being offered to members of the Flight Surgeon community through the Society. Will is an exceptionally gifted artist and some of you may have seen the picture of the F-14 he did several years ago. We have pictures of the F/A 18 (one in color and one in black and white) and the CH-53. I will try to have thumbnails available on the website soon.

The Mishap Guide should be ready soon. This edition will be a little different, but it should be more damage resistant.

Dues continue to trickle in. I wouldn't be the treasurer without mentioning dues, but if you want to pay with your credit card just give us a call and we'll get it done that way. With the problems the country is facing in the postal service, I would actually prefer use of our ONLINE STORE at www.aerospacemed.org under "Membership" or the phone to complete our transactions. If you have received notice that your dues are expired and you know you paid them, just send me an email and we can fix it. If not, why not take a moment and send us

that \$20?

We have a big challenge this year. The tariff laws in Canada are to some extent prohibitive and we will probably not be able to sell our wares at this conference. This will put a big dent in our treasury so we will have to devise another way to raise funds to support the Society. We definitely will be selling our goods at the AsMA conference in 2003 when it is again in the United States.

We will be trying to sell the fabulous wares of our Society at the Problems Course and hopefully, you will be able to come and buy your GEDUNK then.

I am pleased to inform you that LT G. Merrill Rice has agreed to become the assistant treasurer. He will then take the reins of the office of treasurer at the AsMA meeting this spring and a new assistant will be elected. I am off to be the "Ships Doctor" of the USS Naussau, LHA-4. It has been a great pleasure to serve the Society of US Naval Flight Surgeons for the past 3 years and I am certain that the Society will continue to thrive and represent the professionals of aviation medicine in the greatest Navy in the world.

At this time in our history, we all need to remember those who are actively doing the job of defending our freedom against the forces of terrorism that plague our earth. Keep your thoughts and prayers with them so that they believe what they are doing is supported by all their shipmates and countrymen. There is an old Eskimo legend, which is symbolized by a panther on one side of a paddle and a rabbit smoking a pipe on the other. The rabbit is smoking his pipe because he is relaxed. He is relaxed because he does not fear his enemy. He does not fear his enemy because he knows he is smarter than his enemy.

Keep your heads on a swivel, and your aviators on the flight station. Remember who we are, Volanti Subvenimus...we support the flyer.

Make sure it is "done right, first time, on time!"

LCDR David C. Kleinberg, MC, USN

Physical Standards (Code 42)

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Specialty Leader (MED-23)

For all the 22 years that I have been in Navy Medicine and I suspect for many years prior to my entering the Navy, there has always been an underlying culture in the career development of a Navy medical officer that centered on a pipeline in either operational medicine or hospital medicine. To advance to leadership positions in a particular pipeline, the medical officer had to develop skills that were often unique to operational medicine or to hospital medicine.



As such, senior career Flight Surgeons and Specialists in Aerospace Medicine (RAMS) historically have chosen to hone their skills in operational medicine. As a result, Flight Surgeons have had a tremendous impact on Navy Medicine as leaders in the Operational Arena and have performed admirably in operational leadership jobs.

But, take a look at the leadership in all of Navy Medicine today and in the past and reflect on the low number of senior "Wing Wearers" that have served in hospital CO or Flag positions where their operational backgrounds could have had a major impact on decisions made at the MTF level or the Flag level. These low numbers are largely due to the fact that most senior Flight Surgeons and RAMS have failed to develop those skills that are unique to the hospital setting. Therefore, they cannot compete on selection and screening boards with those medical officers who did develop the necessary skills to command a hospital or advance to Flag. To be competitive for these positions, a Flight Surgeon must spend time in the hospital setting where these skills can be developed.

This is why the Aerospace Medicine community must undergo a change in culture. A culture is a set of community attitudes, values, goals, and practices that influence decisions made by individuals within that community. For years, the attitudes, values, goals, and practices of the Aerospace Medicine community have focused on career development centered around an operational pipeline. It is necessary to broaden that sphere of community influence and instigate a culture in the Aerospace Medicine commu-

nity that supports and encourages Flight Surgeons and RAMS to move into and within both the operational and the hospital pipelines.

Ultimately, this will benefit Navy Medicine, the Aerospace Medicine community, and the individual. Navy Medicine and Aerospace Medicine will be strengthened by the presence of senior leaders in the Medical Treatment Facilities and the Flag positions that have a solid background in operational medicine. And Flight Surgeons and RAMS will see an enhancement of their career potential by providing them with a career pathway that allows for mobility and advancement to senior leadership positions within both the operational and hospital pipelines.

In future issues of *CONTACT*, there will be offshoots of this change in culture. The career pipeline for a Navy Flight Surgeon and RAM will be redesigned to determine a structure that allows for movement of the Flight Surgeon between the operational and hospital settings. Guidance will be provided on how to mentor those medical officers who select Flight Surgery as a career choice. The precept for selecting the residents for the Aerospace Medicine program will be changing. And, new marketing schemes for Flight Surgeons and Residents in Aerospace Medicine will be developed.

Speaking of the residency, the GMESB results were released on 12 December. With increased interest in aerospace and operational medicine and active recruiting, we had an outstanding applicant pool to the Aerospace Medicine Residency this year. Unfortunately, due to training billet reallocation between specialties, the RAM program was only allowed to select four new residents from this highly qualified field of applicants. Congratulations to those who were successful - we welcome you to our specialty! For those selected as alternates or who were not accepted to the residency program this year, we're as disappointed as you are, and hope you'll persevere and reapply next year. Please contact me to discuss your career plans, and we'll do all we can to keep you with us.

I encourage you all to contact me with any questions related to this change in culture and look forward to your thoughts and comments.

CAPT Dwight C. Fulton, MC, USN

Director, Aerospace Medicine

dcfulton@us.med.navy.mil

In Memoriam

Along with the rest of the world, those of us at NAMI were riveted to the televisions the week of 11 September 2001, as we watched in horror and dismay at the events unfolding at the World Trade Center, the Pentagon, and in rural Pennsylvania. We stood around in somber groups, watching the TV monitors in the patient waiting areas of the Robert E. Mitchell Center building, stunned at the carnage that was taking place as the WTC buildings collapsed, one after another. Our hearts went out to the firefighters and police as they tried to rescue thousands of victims, only to become victims themselves. We had a profound sense that the world had changed that Tuesday morning, and that life in America would never be quite the same again.

Reprinted in this issue are the names of dozens of victims who are part of our Navy and Marine Corps family. There are doubtless more we have not yet identified, particularly among those in the World Trade Center. From junior enlisted, to decorated veterans of prior wars, to retired flag officers, they found themselves on the front line of a new war that September morning, and gave the ultimate sacrifice. The Society joins the rest of the nation and the globe in honoring their memory, expressing our sympathy to their families and loved ones, and committing ourselves to end the injustice and evil that brought about their deaths.

NAMI Staff

AMERICAN AIRLINES FLIGHT 11

Kenneth Waldie, 46, Methuen, Mass. Senior quality control engineer for Raytheon. Naval Academy graduate.

AMERICAN AIRLINES FLIGHT 77

Charles F. Burlingame, III of Herndon, Virginia, was the plane's captain. He was a former U.S. Navy pilot.

Wilson "Buddy" Flagg of Millwood, Virginia, was a retired Navy Admiral and retired American Airlines pilot.

Richard Gabriel 54, a Marine lieutenant in Viet Nam who received the Purple Heart

John D. Yamnicky SR A former Navy test pilot.

PENTAGON

Melissa Rose Barnes, Yeoman 2nd Class , 27, Redlands, California

Kris Romeo Bishundat, Information Systems Technician 2nd Class , 23, Waldorf, Maryland

Christopher Lee Burford, Electronics Technician 3rd Class 23 Hubert, North Carolina

Daniel Martin Caballero, Electronics Technician 3rd Class , 21, Houston, Texas

Eric Allen Cranford, LT, 32, Drexel, North Carolina

Gerald Francis Deonto, CAPT, 44, Sandwich, Massachusetts



Johnnie Doctor Jr., Information Systems Technician 1st Class , 32, Jacskonville, Florida

Robert Edward Dolan, CDR, 43, Florham Park, New Jersey

William Howard Donovan Jr., CDR, 37, Nunda, New York

Patrick Dunn, CDR, 39, Fords, New Jersey

Edward Thomas Earhart, Aerographer's Mate 1st Class 26, Salt Lick, Kentucky

Robert Randolph Elseth, LCDR, 37, Vestal, New York

Jamie Lynn Fallon, Storekeeper 3rd Class 23, Woodbridge, Virginia

Matthew Michael Flocco, Aerographer's Mate 2nd Class 21, Newark, Delaware

Lawrence Daniel Getzfred, CAPT, 57, Elgin, Nebraska

Ronald John Hemenway, Electronics Technician 1st Class 37, Kansas City, Kansas

Michael Scott Lamana, LT, 31, Baton Rouge, Louisiana

Class Nehamon Lyons IV, Operations Specialist 2nd, 30, Mobile, Alabama

Brian Anthony Moss, Electronics Technician 2nd Class, 34, Sperry, Oklahoma

Patrick Jude Murphy, LCDR, 38, Flossmoor, Illinois

Michael Allen Noeth, Illustrator/draftsman 2nd Class Jackson Heights, New York

Jonas Martin Panik, LT, 26, Mingoville, Pennsylvania

Darin Howard Pontell, LTJG, 26, Columbia, Maryland

Joseph John Pycior Jr., Aviation Warfare Systems Operator First Class, 39, Carlstadt, New Jersey

Marsha Dianah Ratchford, Information Systems Technician First Class, 34, Prichard, Alabama

Robert Allan Schlegel, CDR, 38, Gray, Maine

Dan Frederic Shanower, CDR, 40, Naperville, Illinois

Gregg Harold Smallwood, Chief Information Systems Technician, 44, Overland Park, Kansas

Otis Vincent Tolbert, LCDR, 38, Lemoore, California

Ronald James Vauk, LCDR, 37, Nampa, Idaho former submarine officer standing reserve duty time.

David Lucian Williams, LCDR, 32, Newport, Oregon

Roger Woods, 57 chief technical manager for the CNO, retired Navy radioman chief

Kevin Wayne Yokum, Information Systems Technician Second Class 27, Lake Charles, Louisiana

Donald McArthur Young, Chief Information Systems Technician 41, Roanoke, Virginia.

UNITED AIRLINES FLIGHT 175

Capt. Victor Saracini, 51, of Lower Makefield Township, Pennsylvania, was a Navy veteran.

Brian D. Sweeney, 38, of Barnstable, MA. Business Consultant and prior Naval Aviator and member of the Tailhook Association.

WORLD TRADE CENTERS

Calixto Anya, Jr., 35, of Suffern, NY. New York City firefighter. Former Marine who re-enlisted when the Persian Gulf War broke out.

Marcia Cecil-Carter, of Carr Futures. Former Navy Chef.

Mark Charette, of Morristown, NJ. Insurance broker for Marsh & McLennan. Five years as a nuclear submariner.

John Chipura, New York City firefighter. Former Marine in Beirut in 1981.

Benjamin Keefe Clark, of Sodexho. Former Marine chef.

Denease Conley, New York City firefighter. Served in the Navy for four years.

Matthew Garvey, New York City firefighter. Former squad leader of the elite Marine scout team 2nd Anglico. Remained in the Marine Reserves.

Ken G. Grouzalis, 56, property manager for the Port Authority. Drafted into the Marines and served a tour in Viet Nam.

Michael P. Laforte, 39, of Holmdel, NJ. Senior vice president of high yield securities at Cantor Fitzgerald. Five years as a Marine Corps Artillery Officer.

William J. Martin, Jr., 35, of Cantor Fitzgerald. Former Navy.

Edward J. Martinez, of Elmhurst, Queens. Operations manager at Cantor Fitzgerald. Former Navy.

Charles Mathers, 61, of Sea Girt, NJ. Managing director at Marsh & McLellan. Six years on a nuclear submarine.

Pablo Ortiz, 49, of Staten Island. Superintendent of construction for the Port Authority. Former Navy Seal.

John G. Scharf, 29, of Manorville, NY. Former Marine Corps Sergeant.



**NASA
News**



With just a couple of months to go before launch, Navy Flight Surgeon and astronaut CAPT Lee Morin was kind enough to give me an early-December update.

Lee and the other six crew members of STS-110 are scheduled to begin their flight to the International Space Station aboard *Atlantis* on March 21, 2002, with lift-off at about 1:00 AM from Pad 39-B. The mission will last nearly eleven days, and the primary objectives are to deliver and install the S-0 truss and the Mobile Transporter (MT) cart, described in detail in the July issue of the *Newsletter*. The effort will require four EVAs, with Lee going outside for two of them. With extensive training in the Sonny Carter Neutral Buoyancy Laboratory, the crew have achieved certification for those two, and the other two are coming along well.

In addition to those objectives, the crew will deliver and install five major payload items. One is a module that uses hydroponics to grow two types of plants, illuminated by a fluorescent lamp and "fed" by a CO2 cylinder. Three others are devoted to protein crystal growth in microgravity, for later analysis by X-ray crystallography, in support of designer pharmaceutical technology development. The fifth payload item is a laboratory refrigerator for blood and body fluid sample storage.

Lee's duties on the mission are many and varied. Besides the two EVAs and his role in the installation and turnover of the scientific payloads, he wrote much of the 5000-plus pages of software the mission will employ. And yes, the good doctor will be administering the first-day prophylactic injections of promethazine to those crewmembers who want one. Who will give him his? The "other" crew medical officer, in this case, the mission commander, that's who. He is Air Force Lt. Col. Michael Bloomfield, not a physician, but an F-15 pilot. Remember, most crews do not have even one doctor among them, and two members have to be trained to serve as crew medical officers.

Always a Navy Flight Surgeon, Lee asked the leadership of our community if he could carry a me-



(CAPT Lee Morin: Official NASA Photo)

mento into space with him and return it to us as a keepsake. The item chosen is NAMI's Fox Flag. The international signal flown aboard ships during flight operations, it is also displayed at the ceremony at which each of us received our wings as Flight Surgeons. The process for getting approval to take an item into space is not trivial, and we are deeply indebted to Lee for taking this important symbol for our community, and adding that much more meaning to it. From all of us, thanks, Captain Morin, and God-speed.

In the meantime, the earthbound among us will have to settle for following the progress of STS-110 at the website, <http://science.ksc.nasa.gov/shuttle/missions/sts-110/mission-sts-110.html>.

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Physical Qualifications (Code 342)

Holiday greetings from NAMI Code 342. Much is happening here, although transparent to the fleet. Our biggest project thus far is the pending upgrade to TRIMEP. The new version will be a stand-alone client-server program (able to run as a stand-alone program for local use) AND web enabled, to communicate with the NAMI aeromedical database. You will be able to access the database in real-time. This will permit the user to up-load demographic data to facilitate forms completion, status of waivers searches, or if research is desired, perform queries for diseases and dispositions within the naval aviation community. The entire look and feel will be improved with fewer windows needed to complete a flight physical and better graphic user interface. Of course, the new DD 2801/2802 will be generated as replacements for the SF 88/93. The down side of all of this is time. It takes considerable time and computer programming resources to produce such a great product.

Even more improvements are coming your way if you're shipboard deployed! The programming architecture for the above TRIMEP upgrade will be the backbone of the new Electronic Physical Exams (EPE) module for SAMS. We are working with BUMED/NMIMC and SPAWAR to provide a medical program capable of generating a physical examination for any purpose (flight/diving/rad health/occ health/etc.) to the fleet. Best of all, it will fully communicate with existing SAMS data, and as SAMS is upgraded it will become web-enabled, and allow internet communication while underway with the NAMI database. Look for the initial TRIMEP upgrade this spring and an EPE module for SAMS in the summer of 2003.

NAMI has a new full-time Webmaster, and as you have probably noticed, the Aeromedical Waiver Guide has a new look! As new developments become available through the Aeromedical Advisory Council(AAC), subject to BUMED approval, I will continue to post updates on the web. I hope to have formal decisions made for some upcoming issues in FY 02 include:

- 1) Zyban-recommended use for aviation personnel,
- 2) Leukotriene use,
- 3) Nutritional food supplements,
- 4) Diabetes Type II update.

I am hoping many others will follow. I encourage all of you to feel free to contact my staff or me by phone or e-mail if any questions arise. A quick phone call or e-mail can save a mountain of inconvenience when a problem is solved in this manner.

Let's face it, a major part of the Flight Surgeon's duties is administrative: Aeromedical Summaries, Flight Physicals, etc. Not the most exciting, but VERY important nonetheless. I applaud the vast majority of you who practice good medicine and take the time to "do it right" when it comes to the paperwork. Code 342 wants to be your strongest supporter and advocate. Help us by paying attention to the details. Check the waiver guide for the latest changes in disqualifying conditions. Take thorough histories to maximize the opportunity for waivers for your shipmates. Our Navy has a huge investment in their training and experience. We need to keep them on the flight deck and at their flight station.

Best Wishes for the Holiday season. Take time to remember your shipmates committed to operations and combat at this time of year. Take time to warm the hearts of your families with your presence and love. Remember that a loving atmosphere in your home is the foundation of your life. Share your knowledge. Once a year, go someplace you've never been before. Judge your success (and your freedom) by what you had to give up in order to get it.

Do it right, first time, on time.

Volanti Subvenimus (We support the flyer)

The Code 342 Staff



Anthrax Anxiety

ANTHRAX... Just the word conjures up the horrors of biological warfare. Given the current climate, many Americans are afraid to open their mail or fear for their lives when they see any powdery substance. Although caution is warranted, many people are living in a heightened state of anxiety. In order to relieve anxiety, it is important to know about the biohazard that is causing such a scare.

Anthrax is an acute infectious disease brought about by the spore producing bacterium *Bacillus anthracis*. In spore form, the bacterium can live in the soil for many years. Anthrax can be found around the world. It is more often a risk in countries with less standardized and effective public health programs. Areas currently at risk from naturally occurring anthrax include South and Central America, Southern and Eastern Europe, Asia, Africa, the Caribbean and the Middle East. The bacterium that causes anthrax is very commonly found in soil where you find grazing animals. With the advent of modern immunization of humans and livestock, cases of anthrax are very rare. Anthrax in animals has been reported in Texas, Louisiana, Mississippi, Oklahoma and South Dakota. Most cases of anthrax involving humans are treatable with antibiotics. The symptoms of anthrax are dependent on how the disease enters the body. Symptoms normally occur within seven days of exposure. The most common treatment for anthrax is an aggressive regimen of antibiotics such as Ciprofloxacin, Tetracyclines and Penicillins.

The most common form of anthrax (95% of reported cases) occur when the bacteria enters the body through a cut or an abrasion. It is very common among workers who handle wool hides, leather or hair products of infected animals. Typically, the skin infection begins as a raised itchy bump (resembling an insect bite) but over 24-48 hours develops into a painless blister that is red around the edges. Eventually it forms into an open sore and then a black-scabbed area. Additional symptoms include a low-grade fever and swollen lymph nodes. Most people will get better spontaneously and may not even realize what they had. However, if left untreated, it could lead to an infection in the blood stream that could become fatal. If left untreated,

cutaneous anthrax has a 20% mortality rate. When treated with antibiotics, chances of death are greatly minimized (1%).

Intestinal anthrax occurs when contaminated meat is consumed. It can be transmitted by improper slaughtering techniques and by consuming meat that has not been thoroughly cooked. This form of anthrax is characterized by a sudden inflammation of the intestinal tract. The initial symptoms range from nausea, vomiting, loss of appetite and fever and progress to abdominal pains, vomiting of blood and severe diarrhea. This type of anthrax has a mortality rate of between 25-60%. It is important to note that according to the Department of Defense, this form of anthrax is not considered to be a threat to US forces.

The form that is most hazardous is inhalation anthrax. This form of the disease occurs when an individual inhales 8,000 to 10,000 anthrax spores. These spores are small (only 1x3 microns). As the spores enter the lungs, they enter the alveoli. Some of the spores are destroyed by the immune system. If enough spores are inhaled, some of the spores migrate to the lymph nodes where they change into the bacterial form. This bacterium then multiplies and produces toxins that cause bleeding and ultimately destroy structures in the middle chest (hemorrhagic necrotizing mediastinitis). The symptoms of this type of anthrax include viral-like aches and pains, fever, fatigue, cough and mild chest discomfort. As this disease progresses, breathing becomes increasingly more difficult and shock may set in. Death almost invariably occurs in untreated cases of inhalation anthrax. In treated cases where high doses of antibiotics are given after the symptoms arise, there is an 80% mortality rate. However, antibiotics will suppress the infection only if it is administered early (24-48 hours) after exposure to the spores.

The key to combating the anthrax scare is being aware. As you can see, early treatment of anthrax is your best defense (besides an anthrax vaccine). With the recent rash of mailings of "infected" letters, the FBI has issued an advisory regarding suspicious mail. For a list of indications that a package may be of a suspicious, please see www.fbi.gov. If you do receive a suspicious parcel, handle it with care. Do not shake or bump it. Isolate the package from people. Handle it as little as possible. If you have

handled the package, wash your hands immediately with soap and warm water. Do not open it. If you did, try to not inhale any of the contents. Call 911 and wait for authorities to arrive. While it is highly unlikely that you will ever receive an anthrax laced letter, vigilance and preparation are the keys to combating this threat.

Resources:

Chin J, ed. Control of Communicable Diseases Manual, 17th ed. Washington, DC: American Public Health Association, 2000

Inglesby TV, Henderson DA, Bartlett JG, Ascher MS, Eitzen E, Friedlander AM, Hauer J, McDade J, Osterholm MT, O'Toole T, Parker G, Perl TM, PK, Tonat K, "Working Group on Civilian Biodefense. Anthrax as a biological weapon: Medical and public health management." Journal of the American Medical Association 1999;281:1735-45

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Anthrax Differential

Inhalational Anthrax vs Influenza

The first 10 cases of bioterrorism-related inhalational anthrax highlight the difficulties in differentiating the life-threatening pneumonia caused by *Bacillus anthracis* from influenza and other self-limited viral respiratory infections [1]. These cases also demonstrate that early recognition by a high clinical suspicion with prompt initiation of antimicrobial therapy and supportive therapy can reduce the mortality from a historical rate of >85% to 40% [1].

The classical description of inhalational anthrax is a biphasic illness [2]. The initial phase of 2-4 days is characterized as a nonspecific illness with fever or chills, headache, myalgia, and nonproductive cough. The second fulminant phase is characterized by severe respiratory symptoms with dyspnea, hypoxia, and diaphoresis followed by death within

1-2 days. During the current outbreak, the victims developed the nonspecific symptoms a median of 3.5 days (range 1-7 days) before they sought medical care suggesting an initial phase prior to the onset of the fulminant phase [1]. There was no interval of improvement between the initial phase and fulminant phase as described previously [1].

Findings that can be used to differentiate between influenza and anthrax are the presence or absence of rhinorrhea, eye pain, precordial oppression, drenching sweats, nausea and vomiting, and mediastinal widening, pleural effusions, and parenchymal involvement on chest X-ray [1-3].

Rhinorrhea is a common finding in influenza as the influenza virus infects the epithelial cells of the upper respiratory tracts [3]. Inhalational anthrax is an infection of the lower respiratory tract and only 10% of the recent victims complained of rhinorrhea [1].

Eye pain, especially on lateral gaze, is one form of myalgia seen in influenza but not in anthrax.

Precordial oppression is a complaint of patients in the initial phase of inhalational anthrax. 70% of the recent victims complained of chest discomfort or pleuritic chest pain [1].

Drenching sweats were seen in 70% of the current victims [1]. Patients with influenza have warm, moist skin early in the course of their illness but typically do not have drenching sweats, a characteristic of bacterial infections.

Nausea and vomiting were reported in 90% of the current victims, a finding not reported previously [1]. Nausea and vomiting are not common findings in influenza. The majority of fatal victims of the Sverdlovsk inhalational anthrax outbreak had gastrointestinal lesions felt to be due to hematogenous spread [4].

Abnormal chest X-rays were seen in all 10 victims of the recent outbreak of anthrax even when the victims presented early in the course [1]. Chest radiography detected mediastinal widening in 70%, infiltrates/consolidation in 70%, and pleural effusions in 80% [1]. Primary viral influenza may present with bilateral infiltrates but no consolidation [3]. Infiltrates will develop in influenza patients who develop a secondary bacterial pneumonia.

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In summary, the presence of rhinorrhea and eye pain suggests influenza and not anthrax. The presence of precordial oppression, drenching sweats, nausea and vomiting, and mediastinal widening, pleural effusions, and infiltrates/consolidation on chest X-ray suggest the presence of inhalational anthrax.

References

1. Jernigan JA, Stephens DS, Ashford DA, et al. Bioterrorism-related anthrax: the first 10 cases reported in the United States. *Emerg Infect Dis* 2001;7:933-44.
2. Lew D. *Bacillus anthracis* (anthrax). In *Principles and Practice of Infectious Diseases*. 4th ed. Mandell, Bennett, and Dolin (eds). 1995; 1885-9.

3. Betts RF. Influenza virus. In *Principles and Practice of Infectious Diseases*. 4th ed. Mandell, Bennett, and Dolin (eds). 1995; 1546-67.
4. Abramova F, Grinberg L, Yampolskaya O, Walker D. Pathology of inhalational anthrax in forty-two cases from the Sverdlovsk outbreak of 1979. *Proc Natl Acad Sci USA* 1993;90:2291-4.

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Table 1. Clinical findings in Influenza and Anthrax

	Anthrax- Initial Phase [1,2]	Anthrax- Second Phase [1,2]	Influenza [3]
Systemic Symptoms	Mild	Drenching sweats	Predominate
Respiratory Symptoms		Predominate Dyspnea 80%	
Fever or Chills	Mild	100%	100-104 F
Nausea and Vomiting		90%	
Headaches		50%	Severe
Myalgia	Present	60%	Extremities, back
Eye pain		0%	Lateral gaze
Cough	Non-productive	Minimally or non-productive	Non-productive; overshadowed by systemic
Precordial Oppression	Present		
Chest Discomfort or Pleuritic Pain		70%	
Rhinorrhea	Absent	10%	Present
Auscultation	Rhonchi	Moist rales; pleural effusion	Scattered rhonchi/rales in 20%
Radiography		Mediastinal widening; Pleural effusion	Bilateral infiltrates without consolidation

BUMED Anthrax Management Message

R 261910Z OCT 01 ZYB PSN 560299J31

SUBJ: Updated Guidance for Evaluation and Management of Persons Possibly Exposed to Anthrax

REF A is initial BUMED MSG on Evaluation and Management of Persons Possibly Exposed to Anthrax.

REF B is 26 OCT MMWR article on Anthrax Exposure Management and Antimicrobial Therapy, available at www.cdc.gov/mmwr/pdf/wk/mm5042.pdf.

REF C is 24 OCT CDC Interim Recommendations for Protecting Mail Handlers, at www.bt.cdc.gov/agent/anthrax/anthrax.asp.

REF D is 19 OCT MMWR article on Anthrax Exposure, available at www.cdc.gov/mmwr/preview/mmwrhtml/mm5041a1.htm.

REF E is MMWR article on Recognition of Illness Associated with Intentional Release of a Biologic Agent, at www.cdc.gov/mmwr/preview/mmwrhtml/mm5041a2.htm.

REF F is CDC Guidelines for State Health Departments, available at www.hopkins-biodefense.org/cdc_anthrax.pdf.

REF G is CDC Health Advisory: How to Handle Anthrax and Other Biological Agent Threats, available at www.bt.cdc.gov.

REF H is USA Medical Research Institute for Infectious Diseases Handbook: Medical Management of Biological Casualties, 4th edition.

REF I is Medical Event Reporting Instruction.

REF J is ASD(Health Affairs) policy memo on Prophylaxis for Anthrax Exposures.

1. This message has been coordinated with the Commandant of the Marine corps. The Commandant has authorized transmission to Marine Corps activities.

2. This message is a major revision of REF A. Read in entirety, and no longer use REF A. Request widest dissemination to health care providers and preventive medicine personnel.

3. With the proliferation of anthrax scares and actual anthrax exposures, health care providers should be prepared to evaluate and manage persons presenting with concerns about possible anthrax exposure. References B through I provide valuable guidance.

4. Asymptomatic persons stating they may have been exposed to Anthrax:

A. Consider these factors in assessing likelihood of exposure to Anthrax-infectious material:

- (1) suspected or confirmed local cases of anthrax.
- (2) direct or ventilation system exposure to a material - such as a powder - known, suspected, or threatened to contained anthrax spores.
- (3) history/physical (e.g., suspicious skin lesion)
- (4) other factors raising suspicion of a biological terrorism event.

B. Persons considered unlikely to have been exposed to Anthrax-infectious material based on the above factors:

- (1) diagnostic testing is not necessary.
- (2) chemoprophylactic treatment is not necessary.
- (3) reassurance.

C. Persons considered to have a possible or likely exposure to Anthrax-infectious material based on the above factors:

- (1) start prophylactic antibiotics.
- (2) Ciprofloxacin and Doxycycline are FDA approved for Anthrax exposure prophylaxis. Per REF D, interim CDC guidelines are to start Cipro or Doxy for adults and children.
 - (A) change to Amoxicillin in children if Penicillin sensitivity can be determined. Information on organism sensitivity can be derived from testing of other exposed persons, and does not require specific testing of each individual.
 - (B) for adults, including pregnant women, start Ciprofloxacin 500mg PO BID or Doxycycline 100mg PO BID. For continued treatment of pregnant women, and for treatment of children, see REF F.
- (3) initially provide five to ten days of prophylaxis, pending results of environmental or suspicious substance testing. Consider stopping prophylaxis if confirmatory laboratory analysis of substance or environmental sampling is negative. Do not use a negative nasal culture alone to stop antibiotics.
 - (A) Amoxicillin is an alternative, if clinical judgement indicates that use of Cipro and Doxy is unwise.

D. Nasal swab for gram stain, culture and sensitivity testing is not needed for every person with a possible exposure, because nasal swab testing can not rule out Anthrax exposure. Obtain a nasal swab for culture and sensitivity if:

- (1) person being evaluated is considered likely to have been exposed, or
- (2) public health personnel request such testing for epidemiologic purposes.

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E. With confirmed Anthrax exposure:

- (1) if person is unimmunized and vaccine is not available, continue antibiotics for a full 60 days.
- (2) if person is unimmunized and vaccine is available, start vaccine series. Anticipate additional guidance regarding duration of antimicrobial prophylaxis in this situation.
- (3) if person is up to date with Anthrax immunizations, including annual booster, continue antibiotics for at least 30 days. Anticipate further guidance on duration of prophylaxis.
- (4) if person has had two or more doses of vaccine and vaccine is available, give the next dose in the series and continue antibiotics for at least 30 days. Expect further guidance on duration of prophylaxis.
- (5) if person has had only one dose of vaccine and vaccine is available:
 - (A) restart series if first dose was two years or more in the past.
 - (B) continue series with next dose if first dose was less than two years in the past.
 - (C) in either case, expect further guidance on duration of prophylaxis.

F. For all persons given chemoprophylaxis for a confirmed Anthrax exposure, follow closely after discontinuing antibiotics for clinical signs of Anthrax.

5. Symptomatic persons. Details of presenting symptoms, laboratory evaluation, diagnosis, and treatment of anthrax are available in REFS B, E, and H. If clinical Anthrax is suspected, an infectious disease specialist should be consulted immediately.

6. Suspected cases of Anthrax disease must be reported immediately to the local and state health departments and within 24 hours to the cognizant NEPMU by Medical Event Report, per REF I. Also per REF I, suspected or confirmed exposure to a biologic warfare agent also requires reporting to the NEPMU. As a guide, starting prophylactic antibiotics indicates that a medical event report is required. Facilities must be able to track all persons given prophylactic antibiotics; Medical Event Reports will facilitate this tracking.

A.NEPMU-2: Plad NAVENPVNTMEDU TWO NORFOLK VA, DSN 564-7671, Comm. Tel.(757)444-7671, nepmu2@nepmu2.med.navy.mil.

B.NEPMU-5: Plad NAVENPVNTMEDU FIVE SAN DIEGO CA, DSN 526-7070, Comm. Tel. (619)556-7070, nepmu5@nepmu5.med.navy.mil.

C.NEPMU-6: Plad NAVENPVNTMEDU SIX PEARL HARBOR HI, DSN 473-0555, Comm. Tel. (808)473-0555, nepmu6@nepmu6.med.navy.mil.

D.NEPMU-7: Plad NAVENPVNTMEDU SEVEN SIGONELLA IT, DSN 624-4101, Comm. Tel. 39-095-56-4101, nepmu7@nepmu7.sicily.navy.mil.

7. REF C provides CDC interim recommendations for protecting mail handlers.

8. The BUMED Homeland Defense working group web page provides other useful resources for responding to bioterrorism issues at <https://bumed.med.navy.mil/med03/womd/default.asp>.

9. REF J emphasizes these important points:

- A. Adherence to CDC guidelines.
- B. Use of prophylactic antibiotics only when:
 - (1) there is a clinical suspicion of exposure.
 - (2) local public health experts so advise.
- C. Reporting of all suspected exposures to biologic agents to local preventive medicine, public health, and law enforcement officials.
- D. Tracking of suspected exposures to enable appropriate care and follow-up.

Effectiveness of Head and Neck Support Devices in Racing Crashes

Could they be modified for Aviation Use?

It is a rare American who doesn't know that race driver Dale Earnhardt was killed in a last-lap accident at last February's Daytona 500. Many also know that the fatal injury was a basal skull fracture, specifically a ring fracture with associated subarachnoid and epidural bleeding (Coroner's Draft Autopsy Report, Office of the Medical Examiner, Volusia & Seminole Counties Florida, February 19, 2001).

Almost immediately there was speculation in the press and among race medics that Earnhardt would probably still be alive if he had been wearing a HANS® (Head and Neck Support) device. NASCAR, the sanctioning body for the racing series in which Earnhardt was driving, had never mandated such a device, although they soon made it clear that they had never discouraged its use either.

Even before Earnhardt died, two major open-wheel, open-cockpit racing series, Formula One and Championship Auto Racing Teams, made use of the HANS a requirement for racing in 2001. However, some NASCAR drivers felt that wearing a HANS in their sedan-like "stock cars" could hinder their egress in case of fire, since there are no working doors and they must exit by climbing out a window. There were also arguments that it might make them claustrophobic, and could even limit their head motions and therefore their field of vision. So NASCAR had not intended to come up with a head and neck restraint policy, at least not for the 2001 season.

But NASCAR had a problem. Dale Earnhardt was not the only driver to die of a basal skull fracture. Three others had also died in the recent past of similar injuries, including Richard Petty's grandson Adam in May of 2000 and Kenny Irwin in July, so NASCAR now felt considerable pressure to do something. They began looking at energy attenuating systems for the cars and for the walls surrounding the track, but they also began to look seriously at devices that, like the HANS, would tether the head and neck and prevent violent hyperflexion and distrac-

tion in frontal and angled impacts.

On October 17th, 2001, NASCAR announced that it had approved two head and neck restraint systems, the HANS and the Hutchens Device, and that use of one or the other would be mandatory as of that date. Although many drivers voluntarily began using the HANS immediately after Earnhardt's death, it had now become official, and all but one driver indicated that they would comply. After some gentle arm twisting and the threat of a soon-to-be-determined penalty, the final holdout, Tony Stewart, eventually came aboard. But when it was all sorted out, most, if not all NASCAR drivers opted for the Hutchens Device rather than the HANS, possibly for the reasons cited above, and possibly because the Hutchens was born and bred on the stock car circuit.

Descriptions and photos of both devices will follow, but first a little history.



Figure 1.
Original HANS®

Jim Downing, a long-time race car driver and builder, was concerned about the number of drivers who suffered serious head and neck injuries in the late 1970s and early 1980s. He discussed his concerns with his brother-in-law, Dr. Robert Hubbard, a biomechanical engineering professor at Michigan State University. Hubbard went to work on a solution, and in the mid-1980s came up with the first HANS (fig.1). It was a device that was held to the driver's shoulders and upper chest by the car's existing shoulder harness. It had an integrated posterior "collar" with two heavy nylon straps that attached to each side of the driver's helmet. The device was based on the principle that in the first few milliseconds of a frontal crash, the driver would stretch the shoulder belts, and the HANS would move with the driver. When the harness reached its limit, the torso would stop moving, but the helmeted head would continue moving forward. Almost immediately the device's nylon straps would stop the head's forward motion, preventing hyperextension and distraction. And it would do so with tolerable deceleration forces because the straps (and the device itself) would give slightly, allowing the head and neck to "ride down" the deceleration rather than stop instantaneously.

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Impact sled tests were run at Wayne State University, and validated the effectiveness of the HANS in keeping deceleration forces below the threshold of serious injury. Armed with this data, Hubbard and Downing started a company to make and sell the device. They attended national and international motor sports safety meetings, always bringing a HANS with them. Unfortunately, this original HANS found only limited acceptance, chiefly in the realm of closed-wheel sports car racing where the seating position is more upright and the cockpits are relatively spacious. The device was just too large and unwieldy to be used in the tight confines of, say, a Formula One car's narrow and steeply reclined cockpit. And it was also "one-size-fits-all", so some drivers found it uncomfortable.

Yet the potential of the device wasn't lost on drivers and officials of the major racing bodies, and in 1997 the HANS made a giant leap forward. DaimlerChrysler decided to adapt the device for use in F-1 cars, and in conjunction with Hubbard and Downing began a comprehensive series of tests, designs, and redesigns. (fig. 2) At the 2000 Society of



Figure 2. HANS version 3.0 prototype made of composite, before fitting of helmet

Automotive Engineers Motorsports Engineering Conference, Hubbard and DaimlerChrysler engineer Hubert Gramling presented their impact data, demonstrating that the HANS would consistently protect drivers against serious injury (such as basal skull fracture) in frontal, angled frontal, and even in some rearward impacts (fig. 3)

Formula One soon embraced DaimlerChrysler's revision of the original HANS, and strongly encour-



Figure 3. Angled impact at 30° without HANS (left) and with HANS (right)

aged its use for the year 2001. CART followed by making it mandatory on oval tracks, and strongly encouraged its use on street and road courses (it will be mandatory at all races in 2002). Driver acceptance was not a problem, as the new device was smaller, lighter, and had more effective padding where it contacted the shoulders and upper chest. And it could be customized for each driver.

The HANS device as used in CART have a simple collar shape, with two over-the-shoulder extensions. The load-bearing structure is carbon fiber, and the extensions are padded with a dense gel. Unlike with the original HANS, the current HANS shoulder extensions don't have flanges to contain the belts, but rather rely on harness tightness plus a rubber covering to keep the belts from slipping off. To be effective, the HANS must be held in place by the shoulder belts at all times, so any slippage must be avoided. The straps that secure the device to the helmet are designed with some slack to allow for a limited amount of head movement in all directions (fig. 4). The drivers only



Figure 4. HANS device in place, anchored to helmet

have to be able to see their mirrors and the instrument panel, and don't need to "check six" like a tactical aviator.

The Hutchens Device (fig. 5), so popular in



Figure 5. Hutchens Device

NASCAR, is essentially a harness of interconnected nylon straps that encircle the torso, with loops that go under the arms and between the legs. Two vertical straps go from the upper torso strap to two attachment points on the rear of the helmet. The harness must be worn very tightly, as it would have far too much slack to prevent neck hyperflexion in a crash if it were the least bit loose. Whereas the HANS will protect the driver in rearward impacts and angled frontal crashes, the Hutchens does not offer any protection in rearward impacts and its effectiveness in other types of crashes has not been thoroughly tested. There have been no engineering studies on the Hutchens published to date.

Have these devices been tested in the field? Most definitely. The HANS has been used in professional and amateur sports car racing for several years, and has also been adopted by some National Hot Rod Association drag racers. Even some boat racers utilize it, as they occasionally become airborne, go inverted (known as a "blowover"), and hit the water at very high speed. Now that drivers in the Big Leagues are wearing it, it is being tested with some regularity.

On March 18th, as if on cue, Mike Skinner answered NASCAR drivers concerns about exiting a burning car while wearing the HANS when he crashed hard at Darlington, severing a fuel line. His car was immediately surrounded by flames, yet in spite of

wearing a HANS he made a quick departure through the driver's side window and was not injured.

On April 28th, Mauricio Gugelmin crashed his CART Indy car at Texas Motor Speedway while practicing for a race (which was eventually canceled because the extremely high speeds were causing intolerable G forces in the turns, making the drivers ill). His car initially impacted the inner retaining wall nose-first with a force of 66 Gs. The car continued sliding down the track and the rear end struck the outer wall with an even higher force of 113 Gs. Afterwards Mauricio said, "I didn't plan on being the test driver for HANS, but I'm definitely glad I had it. I can't say enough about the device because I truly believe it saved me from a much more serious injury because I basically had two major crashes at once". The stress on the HANS was enough to crack it, but it did not fail.

Why were Gugelmin's G forces known with such accuracy? Accelerometers have been in CART's race cars for several years, and all post crash data are electronically downloaded and analyzed by a team from Ford Motor Co. To put these numbers in perspective, CART's Director of Medical Affairs, Stephen Olvey, notes, "in the past (before the HANS) a frontal crash of 66 Gs was always associated with loss of consciousness and significant head injury, often fatal".

Gugelmin had another severe rearward crash practicing for the Chicago race in July, this time

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Gidley's car after crash at Elkhart Lake. Wearing the HANS, he had a mild concussion and no neck injury (not discussed in text)

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being subjected to 123 Gs over .03 seconds without significant injury. The cockpit's rear headrest was partially crushed by the force of his head hitting it! Again, the HANS suffered superficial cracking, but it held (fig.6). He was cleared to continue driving



Figure 6. Gugelmin's cracked HANS after Chicago crash

that weekend, and the next day, after qualifying for the race, he said, "I'm still pretty sore from my accident, but it doesn't really affect me when I'm in the car". Again he gave credit to the device he was wearing, saying, "I'm very fortunate to have been wearing the HANS...I'll be alright".

Several years ago, before any open-wheel drivers were wearing the HANS, CART driver Emerson Fittipaldi suffered a near-catastrophic cervical spine fracture in a rearward crash at the ultra-fast Michigan International Speedway. Dr. Olvey feels that Fittipaldi's injury would likely have been prevented with the HANS.

Now for the question of most interest to Flight Surgeons: Is there a place for such an obviously effective device in aviation? Probably not in tactical ejection-seat aircraft, because the device, by intent, limits head mobility. And it is not practical if the wearer must have upper body mobility, because any movement or slack in the shoulder straps could allow the belts to slip off the HANS' shoulder/chest extensions, rendering it useless. One way it could be made to work would be to restore the channel design of the original HANS. Those channels were meant to keep the shoulder straps centered on the shoulder/chest extensions, but they also made it harder for the driver to throw off the belts, which could hinder egress. The newest design makes it easy to cast off

the straps, allowing the driver to exit the car rapidly while still wearing the HANS and the attached helmet. It also depends on the shoulder straps being tight 100% of the time. Escape these days is more likely to be slowed by the need to disconnect the communication cord than by the presence of the HANS!

Since the HANS must be attached to a helmet, it wouldn't be used in transports and trainers such as the T-39. So that leaves helicopters, and if one could assure that the HANS and the shoulder harness straps would remain in contact and centered over the shoulder/chest extension at the moment of impact, it might be workable. There would still be a problem with restricted head mobility, but this could well be solved during the necessary re-designs. As more race cars crash and more drivers are spared serious head and neck injury, the military's interest in a restraining device such as the HANS, especially for helicopter crews, should be piqued.

Although this discussion was mainly about the HANS, could the Hutchens be more appropriate for aviation, since it does not depend on being held in place by the safety belts, and would allow for more head and torso mobility? Possibly, but its design seems to allow the head and neck more slack than does the HANS, and one reliable source has stated that it was only "40% as effective" as the HANS in a frontal sled impact test. And it has no effect in angled and rear impacts. As the Hutchens is now being used by virtually all NASCAR drivers, it is certain to be put to the test during the 2002 season, and meaningful statistics will eventually be gathered. In the meantime, we should consider the pros and cons of using any type of head and neck restraint in military aviation.

If the military does pursue this, the racers and biomechanical engineers will already have done a lot of the difficult work for us, and for that they deserve our thanks.

Disclaimer: The author has participated for over 25 years in the field of motorsports medicine. He has no financial interest in the HANS® or Hutchens devices, but has followed their development and increasing use with keen interest.

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Cases from the I-Philes

Traumatic Polycoria

One of the most startling findings on physical examination of the eye is polycoria—literally many pupils or openings in the iris. This condition is functionally significant because exposed multiple defects in the iris may be visually disabling. Similar to light leaks in a camera, stray light rays from outside the primary visual axis striking the retina cause glare and/or multiple image formation (multiplopia), and hence visual confusion and distraction. In addition, maximum visual acuity is dependent on light passing through the normal pupillary location as described by the Stiles-Crawford phenomenon: outer segments of rods and cones have a morphology similar to fiber optic waveguides to enhance sensitivity and are oriented within the eye so that their long axes point toward the pupil. Occasionally deliberate surgical or laser peripheral iridectomy extra openings may be created in the iris, for example to equalize pressure across the iris base in angle closure glaucoma, but these are placed in such a location to be covered by the normal upper lid position and therefore are asymptomatic.

One form of polycoria occurring after blunt trauma is that due to iridodialysis, or separation of the iris from its thin root insertion at the ciliary body (Fig. 1). These tears usually extend over less than a third of the circumference and appear lens or D-shaped. The



Fig. 1. Nasal iridodialysis of right eye resulting in polycoria. Note slightly D-shaped pupil is displaced temporally. (1)

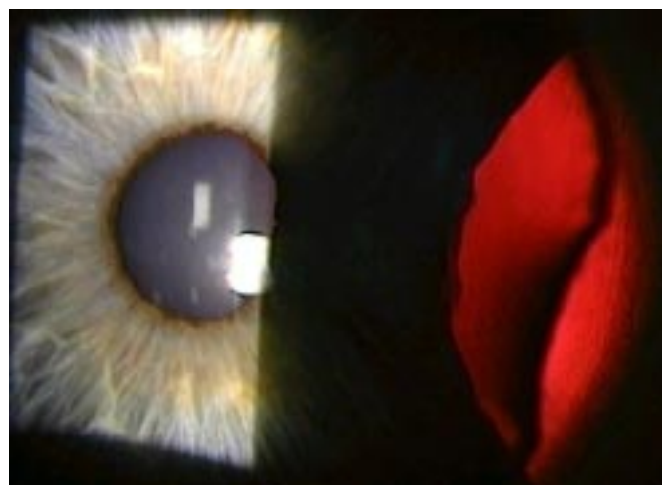


Fig. 2. Retroillumination of iridodialysis defect revealing crystalline lens marginal malformation and absent zonules; single slit lamp image with direct illumination of pupil on left, back-lighting of defect with red light reflected from retina on right. (1)

pupil is typically slightly displaced laterally as the entire iris sags from its peripheral support. Visible behind the iridodialysis defect is the margin of the crystalline lens (Fig. 2). The zonules supporting the lens may be seen, or if these are disrupted, anterior vitreous humor may prolapse into the anterior chamber. The iridodialysis defect is best examined at the slit lamp using retroillumination technique in which the light beam is directed into the pupil illuminating the retina, but the observer's view is focused on the defect which is now lit from behind by red reflected light. This technique is also ideal for discovering other iris defects or areas of thinning such as the radial slits seen in pseudoexfoliation and pigmentary dispersion syndromes and is most sensitive when the room is otherwise completely darkened.

Symptomatic iridodialysis may be surgically repaired with 10-0 polypropylene mattress sutures which are tied externally under a scleral flap (Fig. 3). The iris stroma is non-proliferative and will not scar in reattachment, so permanent sutures are required. Even with a sound initial repair, the stiff suture ends may eventually erode through the scleral flap causing discomfort and melting of the eye wall.

Any patient with a hyphema should receive a comprehensive eye exam including gonioscopy and dilated peripheral retinal exam approximately six weeks after the injury to detect other damage to the eye.

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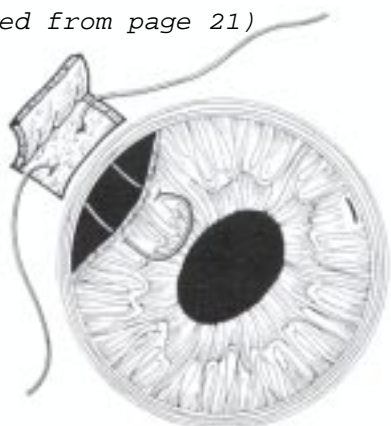


Fig. 3. Surgical repair of iridodialysis with 10-0 polypropylene mattress suture. (2)



Fig. 4. Mechanism of globe injury with blunt trauma resulting in hyphema. (2)

The mechanism of iridodialysis in blunt trauma is that the anterior-posterior dimension of the globe is compressed which increases the equatorial diameter and stretches all the anterior segment structures that are attached at their circumferential periphery (Fig. 4). A blood vessel is often torn in the very vascular uveal tissue causing a micro- or macroscopic hyphema. Any patient with an apparently “benign” hyphema should receive a comprehensive eye evaluation including gonioscopy and dilated peripheral retinal exam approximately six weeks after the injury to detect other occult damage to the globe. The “seven anterior rings” of ocular tissue vulnerable to expansion and tearing are, in order from anterior/central to posterior/peripheral (Fig. 5):

1. iris sphincter pupillae (rupture with radial tears, keyhole iris)
2. iris base (iridodialysis); iris stroma (iridoschisis-splitting of layers)
3. anterior ciliary body (angle recession)
4. attachment of the ciliary body to the scleral spur (cyclodialysis cleft)
5. trabecular meshwork (tears, scrolls and separations)
6. lens zonules (subluxation and dislocation of the lens)
7. anterior retinal attachment to the ora serrata (retinal dialysis and detachment); avulsion of the vitreous base in a bucket handle tear fashion.

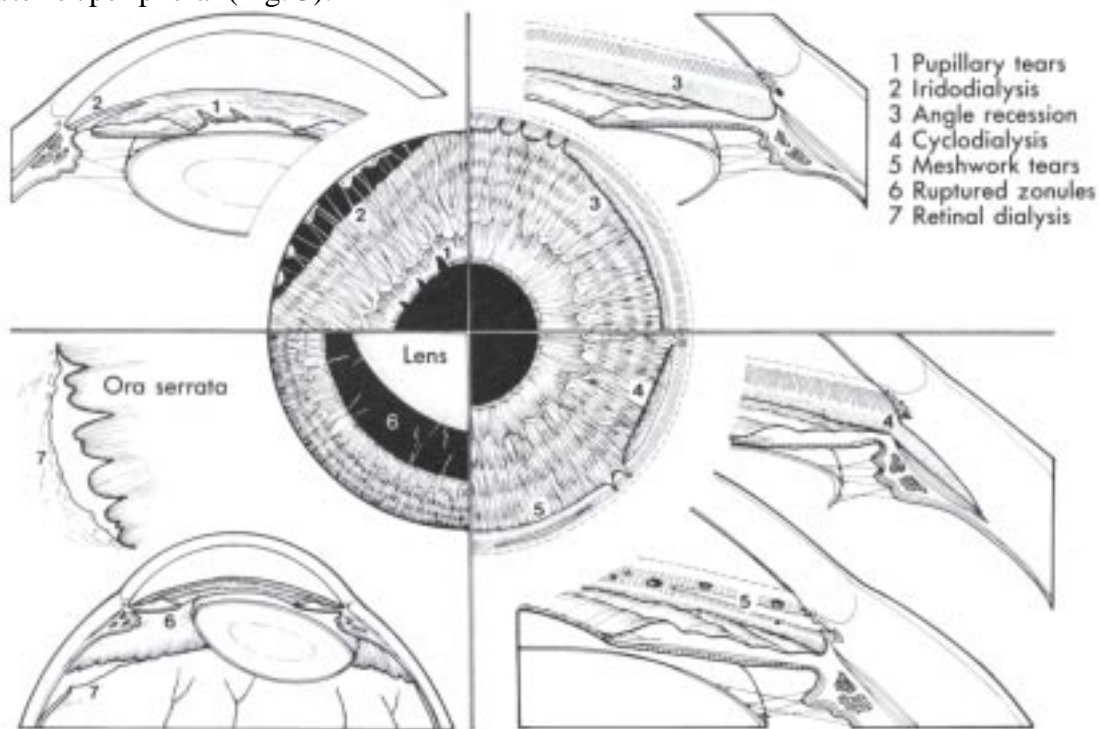


Fig. 5. Seven rings of tissue typically damaged by tearing in blunt globe trauma. (2)

Polycoria, pseudocoria, corectopia and iridoschisis as well as iridocorneal adhesions may also be seen in non-traumatic ocular disease conditions such as Axenfeld-Reiger syndrome, Peters anomaly, irido-corneal endothelial (ICE) syndrome, posterior polymorphous dystrophy, and chronic angle closure and neovascular glaucoma.

The immediate aeromedical significance of polycoria due to iridodialysis is the hazard of impaired perception, distraction and visual confusion from reduced acuity, glare and multiplopia leading to degraded performance or mishap. In addition, other structures in the eye are also likely to be injured with significant trauma. The late sequelae of such trauma include glaucoma or hypotony, cataract and retinal detachment among other concerns which could result in premature loss of service to the aviation community, jeopardize mission accomplishment or safety due to acute or progressive incapacitation, or require medical resources unavailable in the austere aviation duty environment. For these reasons, we at NAMI Ophthalmology and Physical Qualifications Departments are unlikely to recommend a waiver for DIF as SNA or SNFO for history of significant eye trauma including iridodialysis. Waivers may be considered on a case-by-case basis for designated aviation personnel in whom significant training resources have already been invested and who have demonstrated aeronautical proficiency and contributed aviation service.



Eugene Ely

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Lessons from The Tip of the Spear

What follows is my account of the March 12, 2001 bombing mishap at the Udari range in Kuwait that killed 6 people and taught me a few lessons for any Flight Surgeon or GMO forward deployed.

1925 – March 12, 2001. I was working out at the gym that night, getting ready to leave, shower and eat when I got a page. “Hey doc. There’s been some kind of explosion at Udari. They need you to jump in a helo and go.”

I had arrived at Ahmed Al Jaber airbase in Kuwait just 4 days ago with no idea what the clinic here was like, who was assigned, or what its capabilities were. Not 5 minutes after unstrapping from the back of one of our F/A-18D’s, I was introduced to the Air Force Colonel who runs the 332d AEG and was told I would be in charge of the clinic.

1934 – I sprinted to my room, grabbed a flight suit and boots, grabbed the ATLS bag at the clinic, and I was sped to the flight line, changing in the back of a pickup, and pushed onboard a turning Air Force Special Ops. MH-53.

1936 – We are enroute. Someone tossed me a strange looking sort of torso harness and a helmet. I have no idea how to strap in and am struggling to figure out the night vision goggles on the helmet – the NVG’s are totally different from the Marine variety. Once I get them on, I find that the best I can do is focus about arms length away from me. I plug into the ICS, but can’t adjust the volume. Mass confusion on the radio. I don’t dare interrupt the pilots to ask what they know since they are flying on NVG’s at night, in formation, and trying to pick out an unfamiliar landing zone at the accident site.

1950 – I find a flashlight in the ATLS bag and try once to inventory and sort out the gear, but a flashlight beam, even a small one, does not make me popular with the crew on NVGs and it is quickly slapped off. I hear first that all 8 are dead, then that

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they are all critically wounded. It's my worst nightmare – about to triage and try to save wounded soldiers in pitch-black conditions not even knowing what materials I have to work with. I settle for just trying to figure out what is going on and waiting until we land somewhere.

2010 – Still have no idea how many dead or wounded, but we are re-routed to a Kuwaiti military hospital.

2020 – I run out at a strange hospital, the helo takes off. A Kuwaiti soldier takes me to the ER. Mass confusion, 40-50 Americans all trying to figure out what's going on. I speak to one soldier with an apparent Le Fort 3 facial fracture who tells me they were hit by a stray 600 lb bomb.

2030 – Kuwait Military Hospital is a modern facility and I discover that the American Forward Surgical Team is already prepping the other 2 wounded patients for OR. I am allowed to scrub in and assist an Army General Surgeon and a well-trained Kuwaiti vascular surgeon in an above knee amputation of a soldier who had most of his calf blown off.

2100 – The worst part of the night is when another American says he heard on CNN that an F-18 dropped this bomb. For the next 3 hours I am in low spirits thinking one of my squadron buddies did this. I remind myself to put the pilot and WSO on a suicide watch when I get back and remove my squadron patch before I put my flight suit back on – no telling if the wounded soldiers comrades at the hospital will take it personally.

2330 – CNN states it was an F-18 off the USS Truman – good news for my squadron in an absurd way.

March 13, 0030 – Finishing the amputation, we roll the patient to inspect the shrapnel wounds on his back. To our shock, although the X-rays showed no retained metal, an entry wound only 3 cm in diameter has managed to obliterate most of his right scapula and the attaching muscles.



0130, 13 Mar.– Extremely thirsty, hungry and tired, (no water for last 5 hours) I finally scrub out. The third wounded sustained a comminuted tib-fib fracture with about a dozen separate breaks. Despite this injury, this man managed to drag himself around by his hands to his wounded comrades. With no formal medical training, he triaged the expectant and dead from the other wounded, called for an immediate medevac by an H-60, and put an effective tourniquet on his buddy's shattered stump, thus saving his life.

0230 – I call base and arrange a ride home.

My nightmare scenario of trying to triage and treat critically wounded in the dark did not occur that night. But the possibility of it happening and other events taught me a few valuable lessons I'd like to pass on:

1- Update your mishap plan as soon as you arrive and keep it simple so anyone on base knows how to contact you.

2- Know your facilities and the contents of your emergency bags cold.

3- Make room in your trauma kits for a water bottle and a flashlight– preferably with a red or green filter.

4- Find out what units might be tasked with mass casualty response and know their aircraft. After the mishap the special ops guys were happy to show my entire clinic the MH-53 Paveleo setup and how to strap on its gear. We also trained together and made a few practice SAR flights with them.

5- Review your trauma and Emergency War Surgery guidelines.

6- BUDDY AID SAVES LIVES! The chance of your being the first to arrive at an accident site is slim. Buddy aid saved lives at the Khobar Towers, on the USS Cole, in Beirut and at Udari. I gave my Marines a 'buddy aid' lecture before we left Miramar. I'm going to do it again.

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The Flea Bag (NAMI Internal Medicine)

The Flea Bag continues. Despite a suspicious absence from the last issue of the SUSNFS newsletter, the Flea Bag is still here. Ready to bite you when you least expect it. Sort of like the case I am going to share with all of you.

It was a peaceful day in April when our unsuspecting aviator (we'll call him TM) was enjoying lunch with his significant other. Little did he know that the greasy fried chicken he was ingesting would leave a lasting impression on him. With lunch gone and his son waiting for a ride home from school, TM strolled around the town shops waiting for the school bell to ring. He happened upon a coffee shop and while he was no stranger to caffeine, being a six cup a day man, he was a little surprised when his DOUBLE espresso arrived. With profound apologies, the clerk offered the high octane beverage free of charge. Like any other respectable aviator, TM happily accepted the "free" beverage and proceeded to his car where he sat waiting for junior to get out of class.

That is when the day's events began to catch up to TM. While sitting in his parked car on a secluded side street minding his own business, he began to note a discomfort in his chest. Having never experienced any significant reflux symptoms before, he reasoned that the greasy chicken and double espresso were simply talking back to him. Just a minor annoyance. Nothing more than reflux. Some rest at home before dinner would probably take care of it. But wait, TM thinks, I am 41 and this discomfort is in my chest. Could this be from my heart? Am I having a heart attack? These thoughts last only microseconds as TM quickly realizes that heart attacks only happen to people with poor health habits. Despite the aforementioned lunch and espresso, TM actually did lead a pretty clean lifestyle from a cardiac perspective. He did not use tobacco, he had good BP, he had no family history of premature CAD and his last lipid profile only a few months ago at the time of his annual physical was quite good with an LDL <130 and a normal HDL (50 something he thought). At any rate, how could I be having a heart attack, TM continued to think, since I am just sitting here? Heart

attacks don't occur at rest. Especially in runners like myself. After all he was in the midst of training for a marathon (this would be his seventh in as many years with multiple 10K, 10 mile and 15K races mixed in for fun.) I even ran 10 miles just yesterday, thought TM, and did not have any problem so no this can't be my heart, just indigestion from my dietary indiscretions today. And with that self re-assurance, TM put the worries to rest as junior arrived at the door for his ride home.

With renewed vigor TM continued on with his afternoon "honey do" list and arrived home a few hours later. This indigestion thing is really a bummer, TM thinks, as it enters its 4th hour. Over the counter H-2 blockers taken earlier in the afternoon did nothing to relieve his discomfort, so while junior and his sister helped mom with dinner, TM decides to lie down and rest. He notes he is a little sweaty and lightheaded but figures it will pass after dinner. His spouse, being accustomed to taking care of TM, becomes concerned and orders (as the CINC of the house, TM's spouse could do that sort of thing) TM to get in the car because she is taking him to the ER.

TM obeys the direct order and arrives for evaluation 4.5 hours after the onset of his pain. Now the ER doctor's shuttle him promptly into the chest pain unit of the ER and draw all the appropriate labs. He is given an aspirin and an ECG is also checked. The pain is mild and TM is feeling a little better, as well as a little embarrassed. A GI cocktail is ordered but does not help. CXR is normal and the ECG only shows sinus brady without acute ST changes or q waves. TM is kept as comfortable as possible while waiting for his labs. He and his wife still think this is a little overkill, but comply with the doctor's order to stay in bed on the monitor while they await the labs.

Good thing that CINCHOUSE was home tonight. When the doctor next visits TM it is with a nitro drip, heparin and tirofiban (a glycoprotein IIb/IIIa inhibitor) in hand. TM's troponin I was elevated, as was his CKMB. The nitro relieved his chest pain and TM was admitted to the CCU for MI protocol. A single recurrence of chest pain shortly after arriving in the CCU was quickly relieved by more nitro but not until an ECG showing dynamic T wave changes was recorded. TM ruled in for MI by enzymes with

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continued elevation of his Troponin I and CK/CKMB. His CK and CKMB peaked at 928 and 99 respectively approximately 30 hours after admission. TM did not meet criteria for thrombolytic therapy but underwent diagnostic cardiac catheterization on hospital day two. He was continued on heparin and tirofiban until his cath. So where was the lesion?

Good question. On diagnostic cardiac catheterization, TM had no evidence of coronary atherosclerosis. He indeed had been telling the truth. He was living a healthy lifestyle. He had every reason to believe he had no coronary atherosclerotic disease, because he didn't. Why then did he have an MI? With a history of chest pain and consistent enzyme levels he met the criteria for MI. You only need two of the three findings, the third being compatible ECG findings. TM didn't have those, though he did have transient T wave changes.

So again I ask, why did TM have an MI and why am I bothering to tell you about it? To answer these questions you need to look at the differential for MI in patients **without** atherosclerotic CAD. The list can be rather long so I will limit it to the more common causes of this uncommon phenomenon. The list includes paradoxical embolus via an intracardiac shunt, hypercoagulable state, mismatch between oxygen supply and demand (ultimately the cause of all MI's I suppose), sympathetic hyperstimulation, coronary trauma, drug induced (stimulants, cocaine), and variant angina with coronary vasospasm usually associated with endothelial dysfunction.

Which one caused TM's MI? Well from the placement and the lengthy descriptors you can probably guess it was the variant angina with vasospasm. How do we know? Well again we can't be 100%

sure, but by process of elimination we have a pretty good idea that that was the culprit in this case. We can eliminate the others by history or from his physical and lab data. He had multiple urine drug screens and denied any stimulant or cocaine use so that didn't cause TM's MI. However, that should be one of your first thoughts in young patients with MI so don't forget to do the drug screen. While I didn't tell you this yet, TM's doctor ordered a hypercoagulable evaluation (protein S and C, antithrombin III, factor

V Leiden, Homocysteine, prothrombin gene mutation, anticardiolipin antibody, lupus anticoagulant) which was completely normal. He also performed an ECHO with bubble study to r/o intracardiac shunt. Certainly the double espresso may make you think of sympathetic stimulation, but his heart rate remained bradycardic throughout his evaluation, even in the ER with chest pain. While we can't absolutely rule out an oxygen supply/demand mismatch it is also unlikely given the lack of underlying pulmonary disease, the bradycardia, and normal O2 sats while in the ER. There was no trauma, so that cause is eliminated.

And with that, we are already

down to the coronary vasospasm as our culprit.

Variant angina only accounts for about 2-3% of patients evaluated for chest pain in referral centers and vasospasm, a subset of variant angina, only 10% of those. Given about 1.5 million cases of acute coronary syndromes in the US annually there are only about 3000-4500 cases of MI from vasospasm each year. There are, of course, more cases that do not cause MI but only angina. Why do we care? Because vasospasm is more common among young people who present with chest pain than is premature CAD and we must keep it in our differential when



evaluating patients, especially our active duty population, with acute chest pain.

Treatment is typically calcium channel blockers and though the literature is relatively sparse, most patients do relatively well. Fortunately for TM, he fit into this category. He survived the MI as typically is the case for patients with vasospasm and has had no recurrence since starting his calcium channel blocker. What about his flying you wonder? Well, also fortunately for TM, he is lucky enough to fly in a platform that does not necessarily preclude the use of calcium channel blockers. While returning to flight status was no easy feat (he came to Pensacola and was evaluated by a Special Board of Flight Surgeons) he is indeed flying again.

Keep your differential broad and don't ignore chest pain, even in patients with no cardiac risk factors. That's the take home message from all of this. The other is that you never know if your aviator can ever fly again after being diagnosed with a seemingly aviation incompatible condition until you ask. While there are clearly reasons to keep patients with significant CAD out of the cockpit this case demonstrates that not all things are as simple as that.

Until next time...

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Refractive Surgery: AMS Submissions to NAMI

The retention study for naval aviation personnel has been ongoing now for close to a year. Hundreds of Naval Flight Officers, Aviators, and Aircrew have undergone PRK, and had successful outcomes. Each case requires a waiver as any refractive surgery is still considered NPQ, with a waiver recommended

in cases when the personnel are enrolled in the retention study.

The AMS Template for refractive surgery is in the works to be updated to reduce some common errors that we have seen over the past year. The PRK AMS form and template can be downloaded at www.nomi.navy.mil then going to headline NAMI, then proceeding to department of Ophthalmology where it will be listed, or going directly to the link www.nomi.med.navy.mil/directorates/23page.htm and then directly to the AMS template.

A quick review of the process for submission of

the AMS to get your aircrewman up for flying in a timely manner follows:

- Aviators must meet MANMED/NAMI published standards for appropriate Class or Service Group post PRK.

- Refractive stability must be proven or demonstrated: no greater than 0.50 D change in sphere or cylinder over 2 exams at least 2 weeks apart. First exam must be at least 2 weeks post-op. This means a minimum of 4 weeks before you can submit an AMS on behalf of your aviation personnel.

- Preferably off of steroid drops... If still on drops, must be indicated on AMS with dosage. (ex-



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ample: 2 week taper left, currently at FML bid OU, tapering weekly by one drop)

- No symptoms related to procedure such as hazing, excessive dryness, or subjective symptoms such as significant glare, reduced visual acuity or noticeable night vision decrease.

- Ensure that all-necessary and pertinent information is enclosed when completing an AMS. The new template highlights the information that needs to be included.

Once the PRK recipient has been seen, it is the members' Flight Surgeons responsibility to submit the AMS to NAMI Ophthalmology. The local eye doctor's name should be included on the form and the AMS should be reviewed by both parties, the Flight Surgeon and the eye doctor, before submission to NAMI. The members commanding officers name should also be included.

The completed AMS form should be submitted to either of the following addresses at NAMI Ophthalmology:

wanderson@nomi.med.navy.mil
Anderson, Warren CAPT, MC, USN
rmkuharich@nomi.med.navy.mil
Kuharich, Richard CDR, MC, USN

(Both addresses on outlook global address list for navy medicine)

Please do not fax in the AMS as too many times, this is never received on our end, and mostly illegible even when received. Some folks have complained that they have no access to email, and if this is the case, please contact any of the staff below and see what can be worked out with us.

A copy is retained in NAMI Ophthalmology before being sent to Code 42, ensuring that if any question arises on the status of an individual, we can check the database and pull up the AMS. Any request found to be in error or incomplete will be returned back electronically to the Flight Surgeon before being forwarded to Code 42 for processing. When a waiver has been received and is properly filed, an electronic notice is sent within 24-48 hours, confirming receipt of the AMS and allowing for a temporary up-chit to be given. Simultaneously, NAMI Ophthalmology sends a copy to Code 42, thus elimi-

nating the need for you to resubmit or send a copy to Code 42. The returned AMS from NAMI Ophthalmology is equivalent to a Local Board of Flight Surgeons, and all you have to do is to issue the upchit at this time.

We thank all of you in advance for your continued support and vigilance in keeping naval aviation safe and our aircrew flying. Keep up the good work and if there are any questions, please contact any of the following at NAMI.

NAMI DSN 922-2257 or 850-452-2257

CAPT Warren Anderson	x 1020
CDR Richard Kuharich	x 1019
LCDR Anna Stalcup	x 1018
LCDR Ken Uyesugi	x 1030

The Aviation Retention study has so far treated over 600 flight personnel. 420+ NFO's and 65+ Aviators, and 90+ others. The majority of the outcomes have been extremely positive, with only a handful of complications secondary to refractive surgery reported. The most common complication has been the need for glasses to correct to 20/20 standards after surgery, followed by several cases of corneal haze that have caused some temporary visual problems. Further information will be published in time by the San Diego research team.

CDR Mitch Brown, OD, has left the San Diego PRK program recently and we all wish him "fair winds and following seas" on his new venture starting flight training for the dual designator program. CDR Brown has led the way with the San Diego team of surgeons for the refractive surgery program and we all owe him a huge debt of gratitude for his service. His replacement is CDR Andrew Engle, formerly XO of NAMRL, who brings with him years of knowledge and experience as an aerospace optometrist and we welcome him to the program as CDR Brown successor.

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SAR/MEDEVAC Lessons

The schoolhouse does a good job of preparation for the Fleet, but there isn't much emphasis on SAR/MEDEVAC issues. I recently participated in a helicopter MEDEVAC involving the USAF and Icelandic Coast Guard (ICG). We were tasked with transporting a MVA victim with head trauma from the scene to the medical center. Although an "N of 1", I hope that my observations and lessons learned will be helpful.

- Training and coordination are invaluable. It was a relief to recognize the on-scene ICG physician from a previous SAR exercise. Familiarity with all mission factors will decrease the pucker factor. Flying on training missions with the PJs, USAF pararescuemen, previously was also helpful. If you don't feel comfortable with the abilities of your team, it's your fault. Their abilities are only as good as the training you provide.

- The flight environment presents unique challenges and stresses. A calm patient may become combative when exposed to the noise and motion generated by a helicopter.

- Monitoring a patient in flight is challenging. Level of consciousness, pulse, and respiratory rate are relatively easy to obtain. However, manual blood pressure and lung sounds are impossible to determine. A pulse oximeter, automatic blood pressure monitor and external heart monitor are extremely helpful, but don't depend upon their reliability.

- Procedures are technically difficult. Confined cabin spaces and noise make intubations technically challenging and confirmation of tube placement problematic. A CO2 detector may be the only immediately available information. For these reasons, consider performing intubations and other anticipated invasive procedures before entering the aircraft. Keep an eye out for ob-

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Eugene Ely after succesful ship landing. Note innertubes used as life vest.

Pregnancy At Sea

Pregnancy is a concern for the medical department while at sea. It may occur when an undetected (or pre-detectable) pregnancy occurs prior to deployment, a poorly planned pregnancy, irresponsible sexual activity and/or the occasional strategic attempt to avoid deployment. Occasionally, a crewmember may become pregnant and deny, not disclose or hope it will go away during the deployment. Although uncommon, they do occur and the operational medical department must be prepared.

Prior to deployment, prepare for the unexpected. Know your available resources/facilities en route, especially surgical and evacuation options. If the nearest facility is foreign, be aware that cultural differences may exist that affect your patient's options. By instruction, a pregnant woman shall remain onboard ship ONLY if a facility capable of handling

obstetric emergencies is within 3 hours by MEDEVAC. Knowing these will pay off not only for obstetrical emergencies, but also for other surgical emergencies.

Prevention, Prevention, Prevention

Male and female members must be educated on appropriate contraception prior to deployment. Males must be aware of proper condoms use and availability. Females must have contraception and pregnancy tests available. Abstinence is only an option if member(s) can adhere during times of physical/mental stress, close quarters, and/or new found partners while deployed. *Sex drive is a real phenomenon.*

Condoms are readily available and effective if used properly. They also confer some protection against sexually transmitted diseases (STDs). These should be recommended even in cases where other forms of contraception are used.

Hormonal contraception for females is more effective if used properly. They may confer some minimal defense against ascending STDs, but should not be relied on for this purpose.

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Combination oral contraceptives pills (OCPs) in tri-cyclic or monophasic forms are very effective when used properly. If a daily tablet is skipped, then two should be taken the next day followed by resumption of single daily use. If two days are skipped, then two tablets daily for two days should be used. If three days are missed, then that pack should be discontinued, employ alternate barrier contraception and resume single daily dosing after menstrual flow.

Depo-Provera is another effective hormonal contraception that is administered IM every three months. It may be associated with irregular spotting for up to one year after starting, but is generally associated with amenorrhea well before one year. Amenorrhea is often concerning for women for the fear of cancer or other permanent uterine derangement or infertility, but these do not occur. In fact, the use of progesterone is often used to treat precancerous changes in the endometrium. Stopping its use results in the resumption of normal menses and fertility within a few months and rarely up to one year. Amenorrhea may also occur with OCPs since their progesterone effects usually dominate the estrogen effects resulting in the generally observed shorter and smaller menstrual flow. Norplant (norethindrone) 5 year dermal implants are much less common, but act in the same fashion as the Depo-Provera.

The hormonal contraception methods have other benefits for a woman at sea. Stress, illness, and mood disorders can have significant effects on menstrual flow. These factors can cause derangements in the hormonal milieu controlling the menstrual cycle. Hormonal contraception supersedes the in-situ hormonal control independent (or at least minimizing the effects) of the aforementioned deranging factors.

Other benefits of hormonal contraception are often overlooked. Endometriosis in its mild or early forms can be controlled or minimized by hormonal contraception. Depo-Provera may even control more severe forms. They also decrease the risk of ovarian/endometrial cancer by causing a relative quiescent state within these organs. Hormonal contraception also reduces painful ovarian cysts, menorrhagia and often premenstrual syndrome.

These comments are certainly not presented in an attempt to recommend that all female shipmates use

hormonal contraception, but rather to minimize their avoidance due to common misperceptions.

Diagnose Pregnancy

A high index of suspicion helps to avoid surprises! Signs of pregnancy include (especially when unexplained): pelvic pain, irregular bleeding, amenorrhea, weight gain, nausea/vomiting, a mass in the vagina, and/or exercise intolerance. Diagnosis of pregnancy using a first-morning urine HCG is effective and nearly as accurate as serum tests. An enlarged uterus may also be a sign, especially if a smaller uterine size was documented previously. Ultrasound may be available to identify intrauterine pregnancies. Recall that an ovarian corpus luteum cyst is present up to 10-12 weeks of gestation and may cause confusion in interpretation. Also, a tubal pregnancy may be associated with a pseudogestational sac, which is merely a collection of intrauterine blood. A true gestational sac will have a "double ring" appearance (a thin, external hyper-echoic ring adjacent to an inner less echoic ring around the sonolucent center). Cardiac activity may also be present.

Doptone instruments for fetal heart tones may be available. The best placement of this instrument would be suprapubic and midline. Aiming the instrument toward the patient's iliac vessels while palpating a pulse, will aid in differentiate the patient's pulse from a midline fetal pulse.

Common Pregnancy Complications

Ectopic pregnancy is the leading cause of first trimester maternal mortality. Although it is the least common, it is the most likely to kill your patient. More common are spontaneous abortions. Over 30% of conceptions result in spontaneous abortion. They usually result in bleeding but may occur with minimal or unrecognized signs/symptoms. In all cases of bleeding, be prepared for the uncommon, urgent blood transfusion.

Threatened abortion is a 1st trimester pregnancy with bleeding and a closed cervix. The majority of these result in a normal pregnancy. Once more serious conditions are ruled out, reassurance and observation are the treatment.

Inevitable abortions are those with bleeding and a dilated cervix, while incomplete abortions show

tissue in the os. These may be treated expectantly, but curettage is necessary in the presence of active bleeding.

When tissue is obtained by any means, pathology specimens must be considered for confirmation. Organized blood clots may often appear to be gestational tissue. Also, placing the obtained tissue in water may aid identification of gestational tissue since it floats. Ultrasound may be used during curettage to confirm a safe evacuation. Consider postoperative treatment with ibuprofen and doxycycline for 7 days. Always remember that Rhogam is indicated within 72 hours for Rh negative women with any bleeding in pregnancy to prevent Rh isoimmunization. If uncertainty exists, administer it. Potential complications from its administration are negligible.

Missed abortion is an intrauterine pregnancy that is not growing and without cervical dilation or bleeding. Consideration and preparations must be entertained for performing curettage in these cases.

Ectopic pregnancies are the least common but most likely to be fatal. A high index of suspicion must be maintained. Historical risk factors include: previous ectopic, pelvic surgery, pelvic infection, endometriosis and/or infertility. Ovarian cysts, multiple pregnancies, previous miscarriages are **NOT** risk factors. Always consider ectopic pregnancy regardless of risk factors since most ectopic pregnancies occur in their absence. The treatment of ectopics is surgical and occasionally medical (methotrexate) with close observation. You must therefore know your resources!

Nausea/vomiting of pregnancy is another common disorder. This is most common from weeks 5-15 but may occur from the beginning to the end of pregnancy. This may be exacerbated by stress, emotions of an unplanned pregnancy, which can certainly occur on a ship. Initial treatment would include oral, rectal, or parenteral Phenergan, Tigan, Compazine or Reglan (PO/IV). Water intake is a prime concern so intravenous fluids must often be employed. Excessive cases of nausea and vomiting of pregnancy (hyperemesis gravidarum) may require 24 hours of NPO plus intravenous fluids, glucose and multivitamins. A mental health professional should also be considered in severe cases. These cases must be evaluated for multiple gestation, hyperthyroidism and

molar pregnancy. Other signs of molar pregnancy include vaginal passage of vesicles, hypertension prior to 20 weeks, and intrauterine "snow-storm" pattern on ultrasound.

Other Normal Pregnancy Concerns

Dietary increase is necessary. Additional 100-300 kcal/day is expected. Prenatal vitamins should be started immediately. Alternatively, multivitamins with iron (30 mg/d of ferrous iron) and at least 0.4 mg/d of folate. The recommended daily allowance of other vitamins is sufficient. Excess vitamin A (>10,000 IU/d) should be avoided as it can be associated with fetal abnormalities. Water is the most significant supplement. A pregnant woman's metabolic changes, increased renal blood flow and hemodynamic changes, require additional water intake. Typical hemodynamic changes in pregnancy may cause dizziness, lightheadedness and syncope. These are significantly exacerbated by dehydration commonly found in pregnancy and exaggerated by working conditions on the ship.

Refer to OPNAVINST 6000.1A for specific administrative guidelines for managing pregnancy. Included in the table on the next page are some highlights of this important instruction. Note that the table is not the instruction, I have provided highlights in my own words. Look at the instruction for the official guidelines.

Many environmental exposures on a ship are hazardous. The actual risks are predominantly ill defined. Patient's perceived risk can be just as significant. Given the frequent occurrence of spontaneous abortions, any hazard could be perceived as the cause. For this reason, pregnant patients should be removed from the ship at the earliest possible time. The mission of the ship may be adversely affected by these medical recommendations, but the patient's health must be a primary concern. If the crew does not observe this fact, general morale could be adversely affected.

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Highlights of OPNAVINST 6000.1A: Management of a Pregnant Servicewoman.

(refer to instruction for official guidance)

- A. Work Reassignment:** The CO with the health care provider shall consider reassignment within the command for the remainder of the pregnancy in:
1. the presence of environmental hazards or toxins
 2. cases where symptoms may impair the performance of her duties. She shall not be assigned to duties where she is a hazard to herself or others. She shall not be assigned to duties involving diving.
- B. General limitations.** Exemption from:
1. Regular physical training. She may participate in an American College of Obstetricians and Gynecologists (ACOG) approved exercise program.
 2. Physical readiness testing through pregnancy and 6 months post partum.
 3. Working with chemical, toxic or other environmental hazards.
 4. Standing at parade rest for >15 minutes
 5. All routine immunizations except tetnus/diphtheria unless clinically indicated. [Note: ACOG considers influenza vaccination safe at any stage of pregnancy and recommends it in the 2nd and 3rd trimesters especially for those at high risk]
 6. Weapons training, swim qualifications and other physical training considered adverse to her health.
- C. Not exempt from:**
1. Working shifts
 2. Working in areas exposed to radio frequency radiation provided it is within the limitations for non-pregnant individuals.
 3. Working in areas exposed to ionizing radiation (limit as much as possible) limited to 0.5 rem during entire gestation.
- D. Specific limitations after 28 weeks:**
1. Allowed rest for 20 minutes every 4 hours.
 2. Limited to 40 hour work week based on presence at work station and not work type performed. The CO, the healthcare provider and occupational health provider, must approve members working beyond 40 hours in a week. Waivers to extend 40 hour work week may be requested by the member in consultation with the healthcare provider.
- E. Assignments**
1. May NOT be assigned [to go] overseas or travel overseas after 28th week.
 2. May be assigned shore OCONUS duty BEFORE the 28th week provided there are adequate obstetrical facilities, the member does NOT plan to place child up for adoption, and base or alternate housing is available.
- F. Shipboard:**
1. The CO and healthcare provider may continue the member's shipboard duties based on member's condition, environmental hazards and/or toxins.
 2. Member shall NOT remain onboard if medevac capabilities to a facility capable to handle obstetric emergencies will take more than three hours.
 3. For enlisted: shall not remain on board beyond 20 weeks of gestation
 4. Shipboard assignments are deferred for 4 months after delivery unless member volunteers for earlier date.
- G. Aviation**
1. Pregnancy is considered disqualifying for all duties involving flying and air traffic control.
 2. Waivers may be granted up to the 28th week for transport, maritime and helicopters with cabin altitude less than 10,000 feet.
 3. Designated aviators waived to service group 3 only.
 - a. provided an uncomplicated pregnancy
 - b. LBFS and OB/GYN specialist
 - c. Upchit allowed after LBFS and OB/GYN specialist while awaiting waiver
 - d. Maximum waiver is 60 days
 - e. Notify NAMI after completion of pregnancy
 4. Air traffic controllers
 - a. May work up to 28th week of gestation
 - b. After 28th week in administrative capacity only
 - c. Restricted from the Tower after the 27th week.
 5. Pregnant members assigned to sea duty squadrons due for deployment should be reassigned to a squadron not scheduled to deploy until after pregnancy and recuperative period.

Topics in Aerospace Medicine Research

A New Paradigm for Hypoxia Training?

The journal of the Aerospace Medical Association, Aviation, Space, and Environmental Medicine, frequently contains articles detailing research in various areas of aerospace medicine. A recent article entitled "The Reduced Oxygen Breathing Paradigm for Hypoxia Training: Physiological, Cognitive, and Subjective Effects" (1) presents research directed at improving the safety and efficacy of hypoxia training (training similar to that which Student Flight Surgeons receive during the Aviation Preflight Indoctrination (API) course while in Pensacola). A "paradigm" is a fundamental approach or strategy used to accomplish a task, and the paradigm discussed in this article involves the use of "reduced oxygen breathing" (ROB) to induce the signs and symptoms of hypoxia as a substitute for the current paradigm of using hypobaric exposure in a low pressure chamber. The research reported in this article was a joint effort by the Naval Aerospace Medical Research Laboratory (NAMRL) in Pensacola and the Naval Experimental Diving Unit (NEDU) in Panama City, FL.

Proficiency in recognizing the signs and symptoms of hypoxia is an important part of the physiological training provided to aviation personnel due to the potential for impairment and incapacitation if exposed to a hypoxic environment (e.g. at high altitude). This training is currently provided using hypobaric exposure in a low pressure chamber to simulate conditions at high altitude, and is given both during initial training after accession into the naval aviation program and at periodic intervals thereafter. This training is conducted while using air as the breathing mixture (with a fixed percentage of oxygen) and slowly reducing the pressure in the low pressure chamber to simulate the environment present at the desired altitude (typically 24,000-35,000 feet). Although the percentage of oxygen remains unchanged, the partial pressure of oxygen falls as the total pressure within the chamber is reduced. As the partial pressure of oxygen is reduced, the participant displays the signs and experiences the symptoms of hypoxia (as if exposed to a high altitude environ-

ment). This type of hypoxia is termed "hypoxemic" or "hypoxic" hypoxia and is caused by the reduced oxygen partial pressure in blood due to the low partial pressure of oxygen in the inspired gas.

Although these signs and symptoms seem to faithfully reproduce that which occurs when experiencing hypoxia at high altitude, this method of training can result in the participant developing decompression sickness (DCS). The incidence of DCS as a result of hypoxia training using hypobaric exposure worldwide averages about 0.1% (1 case per 1,000 exposures). In this case, DCS is caused by the relatively high differential of dissolved nitrogen partial pressure that exists between the body tissues (which were previously equilibrated with the ground level atmosphere) and the relatively low nitrogen pressure in the hypobaric chamber (which exists when simulating high altitude). This high differential of dissolved nitrogen partial pressure causes the evolution of nitrogen within body tissues and can result in DCS in some susceptible individuals. Barotrauma is also a risk of hypobaric exposure, and results when pressure cannot be equalized between a rigid body cavity and the surrounding environment. It most commonly occurs when experiencing a decrease in altitude, when rigid body cavities like the paranasal sinuses and the middle ear must be repressurized to ground level pressure. Both occur as a result of the method used to induce hypoxia (by hypobaric exposure) rather than a direct result of the resulting hypoxia. Record review at the Naval Operational Medicine Institute (NOMI) hyperbaric chamber (the local military DCS treating facility in Pensacola) revealed that from January 1993 to October 2000, 71 cases of DCS were diagnosed following 31,102 exposures to hypoxia training at the NOMI hypobaric chamber (a rate of approximately 10 per year). Record review at the NAMI ENT clinic from January 1998 to October 2000 demonstrated 296 cases of barotrauma (ear, sinus, or teeth) were diagnosed following 11,463 exposures to hypoxia training at the NOMI hypobaric chamber (a rate of approximately 100 per year).

The use of the hypobaric chamber at NOMI to conduct hypoxia training thus resulted in cases of DCS and barotrauma which did not contribute to the training objectives and resulted in (at least) temporary interruptions in training for the affected indi-

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viduals as well as the unnecessary consumption of treatment resources. A search for an alternative training technique to simulate high altitude hypoxia led to the evaluation of ROB as a possible substitute. ROB uses equipment that can change the relative concentration of oxygen and nitrogen while remaining at ground level pressure. Hypoxia can thus be induced by lowering the partial pressure of oxygen and increasing the partial pressure of nitrogen without changing the total pressure experienced by the participant. This essentially eliminates the risk of DCS while using ROB because of the relatively small nitrogen overpressure that occurs (exactly matching the decrease in oxygen partial pressure) as compared to the large nitrogen overpressure that results during a hypobaric exposure. Because the participant experiences no change in total pressure under ROB, the risk of barotrauma is also eliminated.

The study reported by this article had two main objectives. First, to ensure that the physiological, cognitive, and subjective changes resulting from ROB are similar to those expected from exposure to a hypoxic environment. Second, to document the physiological, cognitive, and subjective changes to hypoxia that are induced using ROB. Several outcomes of interest (dependent variables) were selected to detect these changes during the study. Physiological variables selected included heart rate, end tidal carbon dioxide, oxygen saturation, and blood

pressure. Cognitive effects were measured using a Continuous Tracking Test (CTT), which requires that the subject manipulate a joystick to place and maintain a set of randomly perturbed cross hairs on a fixed target. Subjective effects were measured using a Hypoxia Symptom Questionnaire (HSQ) that grades fifteen symptoms commonly experienced with hypoxia (e.g. tingling, dizziness, tunnel vision, etc.). The exposures of interest (independent variables) consisted of three different breathing periods (Ambient, Test Gas, and Recovery) with four different test gases (one ambient and three with a reduced oxygen content similar to that experienced at about 25,000 feet altitude).

Twelve healthy male USN divers aged 25 to 48 years old were used as experimental subjects. All subjects were exposed to all experimental gas mixtures randomly and were blinded to the test gas. In this study design, each subject acts as his/her own matched control, minimizing possible confounding bias. The physiological variables were measured and a CTT was performed during each test gas period. The HSQ was administered at the completion of each test series. Each subject rotated through each of the four test gases. The Analysis of Variance (ANOVA) method was used to evaluate possible associations between the multiple independent and dependent variables. Experimental gases were presented using a randomized, double blind procedure with a minimum of four hours separating each experimental session. Subjects were limited to par-

First Aircraft Carrier Landing
USS Pennsylvania on San Francisco Bay
January 18, 1911 - 1158 hours PST



First Aircraft Carrier Landing USS Pennsylvavania 18 January 1911 San Francisco Bay

icipating in no more than two sessions per day.

Results from the CTT showed a significant difference (degradation) when breathing any of the test gases as compared to breathing ambient air. Most physiological variables showed significant differences (consistent with hypoxia) when breathing the test gases as compared to breathing ambient air. Results from the HSQ also showed significant differences (consistent with hypoxia) when breathing the test gases as compared to breathing ambient air. Thus, the physiological, cognitive, and subjective outcome variables measured during the use of ROB demonstrated changes consistent with those experienced in the hypobaric chamber during hypoxia training.

The benefits of ROB thus include a reduced risk of DCS and a reduced need for hypobaric and hyperbaric support personnel and equipment while maintaining the signs and symptoms similar to that experienced during hypobaric exposure. The smaller and simpler equipment used in ROB can also be integrated into more realistic simulator training than is possible with hypobaric exposure. Shortfalls of ROB include the inability to provide practice exposure to sudden decompression and the inability to assess tolerance to the hypobaric environment (such as indicating susceptibility to barotrauma in new aviation personnel and equalization training/practice for all personnel). Although this study showed that the physiological, cognitive, and subjective changes resulting from ROB are similar to those expected from exposure to a hypoxic environment, future research is needed to show a direct comparison between the use of ROB and the hypobaric chamber experience. A study addressing this issue is currently underway at NOMI and NAMRL and will provide further information in the evaluation of this new paradigm for hypoxia training.

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Puckett's Perspective from PERS

After being an assignment officer for over a year now, I have heard just about every detailer joke uttered. From "know how to tell if a detailer is lying?" to "what do you call a bus load of detailers at the bottom of a lake?" I've also come across colleagues who are reluctant to even talk with their detailer. While the jokes may have some cord of truth in them, little could be less productive than avoiding or delaying contact with your assignment officer.

As with many new traditions in our rich Navy heritage, there is a new generation of detailers at the Bureau. Think of detailers as your personal representatives in the distribution and assignment process. We are charged to balance community needs with personal and professional goals. Suffice it to say, we best represent those interests when we know what they are. With that in mind, I would like to share my thoughts about those times when it's imperative that you be in contact with your detailer, regardless of specialty.

First, one year prior to your PRD you should contact PERS to discuss follow-on tour and PRD extension options. Although it may be a tad bit early to cut orders, beginning to craft the plan then will not only ensure the detailer is abreast of your career goals but he/she can be mindful of your preferences and needs as the PCS dominos begin to line up.

Next, if you plan to apply for graduate medical education, let the detailer know about one year out. That will give PERS adequate time to arrange for your relief and will be particularly important if you plan to move after 2 years of a 3-year tour. Also, it won't be our primary focus, but doing so will give us time to identify all options in the unlikely event you're not selected for residency.

Another key time to contact your assignment officer is no less than one year out from your promotion selection board. A useful rule of thumb is that your first look will be around 5 years following the promotion date into your current rank. Following in-zone and below-zone trends over time may also give you an idea of when you may be considered. While your record should always be current, it must be

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“polished” when it goes before a selection board. Twelve months will be plenty of time to track “last minute” items that should be added to the record. I’ll go into greater detail about just what the board will be looking at in the next issue of SUSNFS Newsletter.

Last, should your near-term plans include returning to the civilian sector, you should contact your detailee no later than 12 months prior to your targeted retirement or release of active duty date. PERS requires a written request for both of these events (with command endorsement) to be on file no less than 9 months in advance. Delaying to less than 9 months may ultimately result in a delay of your release date. Your detailee can provide you with the appropriate request format and points of contact information to track your request. Not only will twelve months minimize the chance of gapping your billet, it will also give us 12 months to identify the “perfect billet” that will keep you on active duty!

The most casual of readers will note a common theme in the above four key times to contact your detailee. One year out from any major career event (especially PCS, GME, promotion selection board and resignation/retirement) will allow plenty of time to maximize options and minimize surprises. And while we certainly need to be engaged before these career landmarks, we welcome your calls or notes anytime. Think of your assignment officer as your personal concierge at BUPERS, someone who is there to help with anything from career planning to administrative record changes to retirement. Ours is a support mission and we are standing by to assist.

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BEST PRACTICE SQUADRON TIME?

To answer this question, the squadron activity of our Flight Surgeon of the year (Top FS) was compared with the average of all Flight Surgeons (Mean FS) at 3rd MAW. Squadron activity was based on a survey of 29 Flight Surgeons in garrison over a 3 month period from November 2000 to January 2001, and the results are below:

TYPE ACTIVITY	SQUADRON TIME	
	(Top FS)	(Mean FS)
Office hours (at squadron)	11%	21%
Curbside consult	19%	16%
Rounds (visit CO, etc)	21%	14%
Monitor spaces (hangar, etc)	8%	5%
Meetings (HFC, etc)	12%	13%
Waivers (prep AMS)	6%	10%
Exercise	5%	6%
Lectures	7%	6%
Fly	10%	5%
Other	1%	2%



Based on the range of data, statistical analysis showed that the top flight surgeon’s activity was significantly different (more than 2 standard deviations) from the mean flight surgeon in one activity: spent less time at office hours in the squadron. In addition, the top Flight Surgeon spent more time than the average

one walking around in the squadron spaces (curbside consults, rounds, and monitor spaces combined).

With the assumption that squadron time is essential for selection as top Flight Surgeon and for our aeromedical mission, the above results suggest that better use of squadron time involves walking around rather than sitting at office hours in the squadron.

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Hypoxia Episode in a F/A-18 Canadian Aviator

Hypoxia is a general term that defines a state of oxygen deficiency within the tissues. Respiratory physiologists have defined four different types of hypoxia: hypoxic (altitude) hypoxia, stagnant hypoxia, histotoxic hypoxia, and hypemic hypoxia. In this case study, I will review the etiology, clinical manifestations, treatment, and prevention of hypoxic hypoxia. Discussion of the other types of hypoxia is beyond the scope of this case.

Brief case history

The patient is a 30-year-old Canadian F/A-18 pilot with 810 total hours of experience in fixed wing aircraft, and 520 hours in the F/A-18. He presented to the branch medical clinic following a mild hypoxic episode during a routine flight.

During the initial interview, the patient said he felt light-headed and fatigued while ascending from 10,000 feet to 25,000 feet at a speed of 300-350 knots during the first phase of the flight. His first reaction was to check the connections of the oxygen delivery system. He realized that even though his mask was appropriately fastened, he was not getting oxygen. He continued to be fixated in adjusting his mask and decided to try the emergency oxygen supply system by pulling on the green oxygen ring located in the lower part of the seat, but the system did not work. By this time, his symptoms included air hunger, slow thinking, "uneasy" feeling and increased respiratory rate. At that time, looking at his cockpit pressure altitude indicator (cockpit altimeter), he noticed that his cabin pressure was 25,000 feet. Having been in the pressure chamber recently, he was able to recognize that his symptoms were most likely related to altitude sickness, or hypoxia.

The patient signaled his wingman the appropriate "oxygen-out" hand signal, and descended to 9,000 feet. Within 10-15 seconds his thinking cleared and his sense of fatigue and dizziness disappeared.

He landed the aircraft without difficulty. The total time of this sequence of events was approximately three to four minutes. Following the post-flight brief, he drove to branch medical clinic for my initial evaluation.

Definition and etiology

A deficiency in alveolar oxygen exchange is referred to as hypoxic hypoxia. Three main factors will contribute to this oxygen-depleted state. A decrease in the oxygen partial pressure (PO₂) in the inhaled air, the presence of diffusion barriers within the lung parenchyma, and a reduction in the effective gas exchange area of the lung. The outcome of reduced PO₂ is a decrease in oxygen concentration in the alveoli, which will ultimately lead to a decrease in the oxygen available to vital tissues [1]. Hypoxic hypoxia is usually caused by exposure to low barometric pressure and is often referred to as altitude hypoxia, or altitude sickness. This is a very important topic within aerospace medicine, one frequently overlooked by aircrew personnel as well as Flight Surgeons.

In this particular case, the patient's hypoxic episode was due to a combination of factors:

- A reduction of alveolar PO₂ from breathing air at reduced barometric pressure (cockpit pressurization malfunction).
- An improperly connected oxygen delivery system (failure to preflight).
- Physiologic shunting from hypoxia caused a reduction in the gas exchange area within the lung parenchyma (vasoconstriction effects).

Respiratory physiology

Alveolar oxygen partial pressure is the key element to consider when studying altitude-induced hypoxia. Based on the oxygen dissociation curve, alveolar PO₂ determines the degree of oxygen saturation of hemoglobin. Much speculation has been made concerning the effects of the position of the oxygen dissociation curve at high altitude on oxygen delivery [3].

In general, as altitude increases (thinner air), alveolar PO₂ decreases, leading to a reduction in the pressure gradient across the diffusion barrier in alveolar capillary interface [2].

At higher altitudes, without supplemental oxygen, the oxyhemoglobin saturation decreases. Low levels of oxygen saturation will make hypoxic symptoms appear more quickly.

An interesting phenomenon happens at altitudes above 25,000 ft. Above this altitude alveolar PO₂

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may actually be lower than the partial pressure of oxygen in the mixed venous blood. This situation reverses the direction of oxygen flow in the lung, and oxygen diffuses from the blood back into the alveoli. This reduces the arterial oxygen content and subsequently oxygen delivery to tissues and brain. The onset of hypoxia is more sudden and profound and the time of useful consciousness is shorter [1].

Clinical manifestations of hypoxia

The effects of hypoxia begin immediately upon ascent to altitudes above 10,000 feet. Hypoxia presents itself insidiously, and its signs and symptoms are nonspecific. Organs at higher risk are the brain, heart (myocardium), and eyes.

As Flight Surgeons, our most important role is to focus on accident prevention and aircrew well-being. As hypoxic symptoms escalate, the aviator's performance in the cockpit is significantly impaired. Hypoxia affects the time of useful consciousness (TUC). TUC refers to the amount of time an individual is able to fly, or perform different cockpit tasks, in an environment of inadequate oxygen. Suffering from impaired judgment, slow thinking, and lower mental alertness, the individual is no longer capable of taking proper corrective actions. Data suggests that at 18,000 feet, TUC is approximately 20 to 30 minutes, whereas at 25,000 feet TUC drastically decreases to 3 to 5 minutes. At altitudes above 40,000 ft TUC is in the vicinity of 15-20 seconds [1].

Aerospace medicine specialists have defined four stages of hypoxia. Table 1 summarizes the cockpit performance effects of each stage.

Interestingly, the clinical signs and symptoms for hypoxia vary greatly. The stages described above are not absolute. Many factors contribute to exacerbate hypoxic symptoms in our patient population. Factors such as time spent in altitude, rapid rate of ascent, and extreme environmental temperatures will play an important role in the clinical presentation of these patients. Finally, self-imposed stresses including fatigue, alcohol consumption, tobacco, improper nutrition, and medications need to be considered when evaluating a patient with hypoxia.

Treatment

Treatment of acute hypoxia involves the following steps:

1. Administration of 100-percent oxygen.
2. Check oxygen delivery system connections.
3. Monitor and control breathing (avoid hyperventilation)
4. Immediate descend to altitude below 10,000 feet.
5. Communicate the problem.

Fitness to fly

A 24-48 hour grounding period is recommended for all aircrew with a documented hypoxic episode. There is an increase in susceptibility to hypoxia at lower altitudes within the first 24 hours of the initial episode. There may be a period of increase severity of symptoms following the administration of supplemental oxygen. This has been described in the literature as the oxygen paradox phenomenon. Reassure your patient that the symptoms are transient without sequelae.

Table 1. Hypoxia Stages

Stage(Altitude)	Clinical manifestation
Indifferent (0-10,000 feet)	Dark adaptation is affected (5-10% reduction in night vision) Slight increased in heart rate. Symptoms usually go unnoticed at this stage.
Compensatory (10,000-15,000 feet)	Drowsiness, decreased memory. Slow thinking and fixation (tendency to repeat courses of action). Poor judgment. Decrease mental alertness.
Disturbance (15,000-20,000 feet)	Headache, dizziness, air hunger, fatigue. Motor performance is impaired. Cardiovascular and respiratory compensatory mechanisms are no longer capable of providing adequate oxygenation of tissues.
Critical (20,000-23,000 feet)	Mental confusion, euphoria, incapacitation with loss of consciousness with no warning.

Key points

- Hypoxia is the most frequent hazard in aviation.
- Emphasize good preflight of equipment. Advise aircrew to check connections prior to taxiing. The oxygen mask should be worn from engine start to engine shut off as per NATOPS (in tactical aircraft) and above 10,000 ft in other aircraft.
- Pilots must check the cabin's altitude pressure indicator while ascending to more than 10,000 feet. A second check is recommended at 18,000 feet to make sure that the analog cockpit altimeter is tracking.
- The immediate treatment for hypoxia is descend to a lower altitude (below 10,000 feet).
- Remember that 3 to 5 percent of people with hypoxic episodes may develop decompression sickness (DCS) symptoms. A good clinical pearl is to monitor patients for at least 3 to 6 hours.
- Emphasize to every pilot and aircrew that they should be aware of hypoxia and be able to recognize those subjective symptoms. The altitude chamber offers each person the opportunity to experience hypoxia in a safe and controlled environment.
- Pressurization schedules are different between different aircraft. Aircrew must be familiar with this system. In general, cabin altitude will remain at around 8,000 feet until the aircraft reaches an altitude of 23,000 feet. At higher altitudes, the cockpit pressure altitude will compensate at a rate of approximately forty percent of the aircraft altitude (i.e. at an altitude of 40,000 feet, the cabin altimeter should indicate roughly 15,000 feet).
- In F/A-18 aircraft there is no caution in the event of loss of cockpit pressurization [4].

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You Know You Have Been at Sea Too Long When

- You talk to your tool box half way through your shift.
- You don't notice the 400 cycle hum throughout the ship.
- The water no longer tastes like JP-5.
- You know exactly what is on the menu and you don't have to look at the Plan of the Day.
- You do major overhauls and write A-799 on the MAF.
- The Master At Arms doesn't tell you to get a haircut.
- You are in the shop and you can tell the side number of the plane that just launched.
- You watch the 10th rerun of M*A*S*H.
- The Captain says "Good morning gents, we have just been extended," and you hear no moans.
- The coffee tastes like coffee.
- You write FREE on the cover of your MAF.
- You feel guilty about not taking a Navy Shower.
- You listen to all 100 of your tapes and discover that the first fifty are exactly the same as the last fifty.
- You look up the definition of land....and it is not in the dictionary anymore.
- You miss five paydays and still have a couple of hundreds in your wallet.
- You receive a fifth in the mail and don't know what to do with it.
- You no longer have to figure out the Peso to Dollar exchange rate.
- The new song you just heard is three months old in the States.
- You refer to overseas as the United States.
- You find yourself saving all your money for a jitney.
- You refer to the President and it is understood you mean Marcos.
- You stand at attention to the Philippine National Anthem.
- Submitted as a piece of Carrier history by..

CAPT John Calcagni (retired)

The Little Red School House

Billet Selection Process

Do you frequently reminisce over your first billet selection process as a Student Flight Surgeon? Do you remember how you felt as each billet that you really wanted was just “given” to another student and you ended up with what’s left? Did you feel cheated because you were better qualified and should have got it. Well, if you answered “YES” to any of the previous questions then read on.

Gone are the days when Student Flight Surgeons detail themselves. SFS Class 0103 became the first class to have optimal detailing. Now instead of using the “Docket Board” to fill billets, Student Flight Surgeons are personally detailed by the Academics Department Head and the Flight Surgeon Detailer. Approximately 10 weeks prior to graduation, the projected billet vacancies are released to the class. The students are allowed 10-14 days to personally research their prospective billets and create a “wish list”. Student’s credential status for state licensure interviews are confirmed and finally, interviews are conducted with the students to ensure optimal detailing - “the right Flight Surgeon to the right billet for the right reasons”.

The results should be very rewarding for both the students and the aeromedical community. No longer will luck be taken into the equation for placing new Flight Surgeons into their first tour billets. No longer should there be the occasional adversarial relationship between fellow students while vying for a particular billet. The aeromedical community and our aviator customers deserve our leadership for placement. Congratulations Student Flight Surgeon class 0103.

CAPT Jay S. Dudley, MC, USN (FS)

Head, Medical Corps Programs

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www.nomi.med.navy.mil/NAMI/Training/index.htm

Diets and Consequences

Recently, we have been getting quite a few requests for dietary information from Sailors and Marines. Many people are confused and even overwhelmed by the large quantity of information being put forth on the subject of diets today. Our collective success raising the awareness level of our fleet aviators and aircrew for the need for better nutritional habits is a great achievement. However, now they need our guidance to safely navigate through the plethora of “wonder diets” available. The following information is an attempt to arm our students, and perhaps coordinate our efforts by offering them the reasons why these “wonder diets” are only effective for short periods of time and do not produce the results they are after.

We all know losing weight is easy. Keeping it off is the hard part. Losing fat is a very difficult process. Anyone can lose weight with any diet that limits a person’s calories to 1400 to 1500 calories per day. There are literally hundreds of diets and diet products out there on the market that claim to make you lose weight. You can go into any grocery store and see diet “propaganda” in the check out lane. Of the hundreds of diets out on the market today, one question that is asked often is which one is the healthiest and most likely to keep the weight off?

The United States Department of Agriculture is taking some decisive actions to answer this question by reviewing several scientific studies on various diets out on the market today. This analysis has revealed several interesting facts.

1) Extremely low calorie diets such as the one recommended by Dr. Dean Ornish to reverse cardiac disease as well as the Pritikin program are deficient in vitamins E, B12 and zinc.

2) High-fat, low-carbohydrate diets are nutritionally inadequate. They are low in vitamins E, A, thiamin, B₆, folate, calcium, magnesium, iron, zinc, potassium, and dietary fiber.

3) Moderate fat-reducing diets such as Weight Watchers and the USDA’s Food Guide Pyramid are designed only as “nutritionally adequate”. The mod-

erate-fat reduction diet is optimal for ensuring adequate nutritional intake.

In the short term, low-carbohydrate diets cause a greater loss of body water than body fat. Once the diet is ended and normal eating patterns resume, the water weight returns. In the long run, however, this form of diet can result in a loss of body fat if the diet can be maintained. High fat, no carbohydrate diets also enable people to lose weight. Often times, this occurs very rapidly due to the rapid rate of water loss. However, further research is needed on the long-term effectiveness of high fat, low (or no) carbohydrate diets (such as the Atkin's diet) as well as the long term health consequences (benefits and risks) due to the ingestion of high fat (saturated fat)/high cholesterol foods.

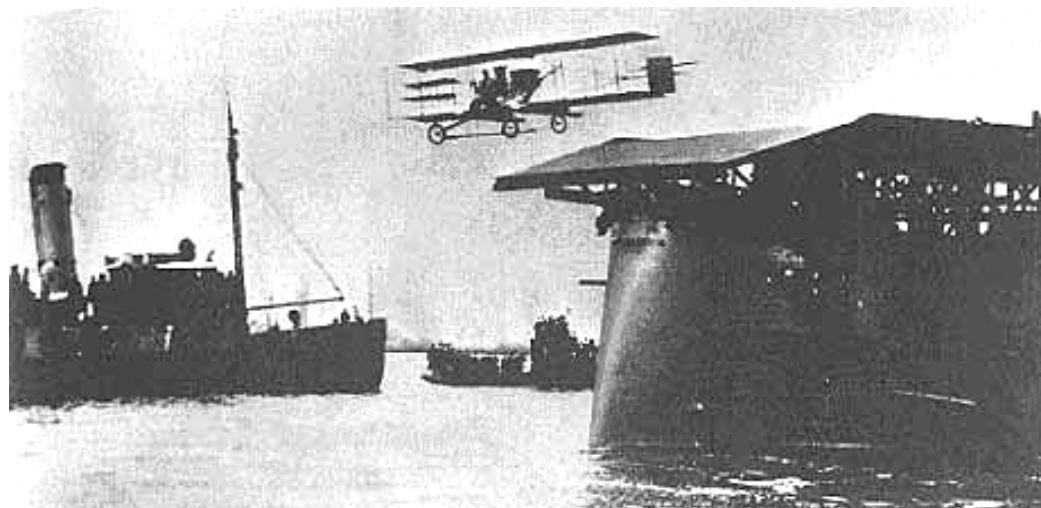
Long-term body weight regulation appears to be controlled by hormonal signals from the endocrine pancreas and adipose tissue, i.e., insulin and leptin. Since insulin secretion and leptin production are influenced by the macronutrient content of the diet, effects of different diets on these long-term regulators of energy balance also need to be considered. In analyzing popular diets, it is important to keep certain facts in mind. 1) Low-carbohydrate diets result in ketosis, and may cause a significant increase in blood uric acid concentrations. 2) Blood lipid levels (e.g. total cholesterol, LDL, HDL and triglycerides) decrease as body weight decreases. However, the macronutrient and fatty acid composition of energy-restricted diets can exert a substantial effect on blood lipid levels. There is a significantly greater decrease in LDL cholesterol during active weight

loss when diets are low in saturated fatty acids as compared to diets high in saturated fats. Additionally, changes in HDL cholesterol depends on the fat content of the diet and the duration of energy restriction.

Long-term compliance to any diet means that short-term weight-loss has a chance to become long-term weight maintenance. Dietary compliance is more likely a function of psychological issues (e.g. frequency of dietary counseling, coping with emotional eating, group support) rather than macronutrient composition. Being conscious of ones behaviors, using social supports, confronting problems directly, and using personally developed strategies may enhance long-term dietary success. It is especially interesting to note that research has found that successful weight loss and maintenance may be predicted by an individual's belief system rather than some other social, psychological or even biological factor.

It is unfortunate that the USDA report only supports the facts that are already known in the field of obesity/weight management research. The one variable that was not directly addressed in this study was the effect of regular exercise used to augment the weight loss of the diet program. As we know, physical activity is an important factor with respect to increasing lean body mass and should be promoted to enhance the effects of diet on body composition. This could be an area of further research by the USDA.

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Second Aircraft Carrier Take-Off, USS Pennsylvania 18 January 1911 San Francisco Bay

Reflections Of A “New” Flight Surgeon

OK, so not so new. . . However, not having practiced Flight Surgery or even “real” medicine* for 15 years, kind of qualifies me as new. One of the wonderful things about being a Navy doctor is that you can change careers, do things no civilian doc would ever get to do (and perhaps a few things most would never want to), do second residencies (sometimes), and even make a full circle. I have had the chance to do just that.

In 1983 I had my first tour as a Flight Surgeon with VQ1 on Guam, did a second tour at Kaneohe MCAS (hardship duty), and then wandered about (some might say aimlessly) for the next 15 years. Six months ago, I was allowed to make that full circle, left NAMI Psychiatry, and received orders to the Branch Medical Clinic in Brunswick, Maine as a Flight Surgeon. It was a bit daunting to say the least, but the diseases were pretty much the same and the human physiology has not had quite the requisite 80,000 years to evolve much since I finished med school. Prior to leaving NAMI, several of my colleagues (CAPT Ambrose and LCDR Kleinberg in particular) actually thought they might be able to make a real doctor out of me. They loaded me up with the proper books, had me sit through many of the Flight Surgery classes, and watched as I figured out which end of the stethoscope to use. Dr. Kleinberg even wanted me to sit through eight hours of tapes on heart sounds but I drew the line at that!

Arriving in Brunswick was a very pleasant surprise – guess I shouldn’t let the word out, but it is absolutely the best place to be stationed in the entire Navy. At first I thought they must put SSRIs in the base water supply, but the fact is, the majority of people stationed here really want to be here. OK, sorry, back to the point of this – I could wax ecstatic

about Maine all day. . . .

I was assigned to the GMO, LT Travis, as my supervisor to do 100% record review – geez, bad enough he had to look at every record, but to have to supervise an old fart takes certain qualities – he indeed has my utmost respect. My thanks also to our fantastic PA’s (LCDR Regan, LT Bastin, and LTJG Reny) who’s offices I am constantly running into requesting assistance; “err, this x-ray looks normal, doesn’t it?” or “could you take a look at this crotch rash?” Very patient, the bunch of them. Of course how to do most of the routine stuff comes back as an



almost vestigial skill, but it took a few days to figure out what in the heck was a statin and a triptan. If there is anything not absolutely covered in the waiver guide, I email NAMI. I think LCDR Kane is still trying to find a way to block my emails from arriving at his computer.

So, what is the point to all this rambling? Primarily just to reiterate how much fun it is to be a Flight Surgeon at whatever stage you are in your career. Second, there is one other item I’d like to cover. This is something I think I remember learning 15 years ago, but relearned very quickly and want to recommend. **The Admin Up Chit.** Aha! The first time the AVT brought in a check-in up chit for me to sign, I automatically asked him to check the guy in and let me talk with him and look through his record. Not that I didn’t trust the AVT to check the things he was trained to check, but experience has taught me that things are not always as they seem. Yup, the first guy I talked with needed a waiver for hypertension that had not been completed. About 15-20% of the “admin up chits” have something that needs to be addressed. Not that they can’t get an up chit most of the time, but a significant number need some sort of follow-up or further evaluation.

The three questions I recommend always asking during the check in process and during physicals are:

- 1) Are you on a waiver?
- 2) Have you ever been on a waiver? (Most who might not offer the info otherwise, will answer this one honestly)
- 3) Are you taking any medication or been diagnosed with anything that you think might require a waiver? (I have been amazed what this one opens up)
- 4) Are you taking any nutritional supplements? (the ECA Stack one 25-year-old was taking was the direct cause of his resting tachycardia, and telling him he may pop positive for amphetamines from the ephedra got his attention!)

Most of the guys (this is a generic term applying to both sexes) I deal with are not too scared of dealing with the Flight Surgeon as long as they know that they will be treated honestly and with common sense. Of course the axiom of aviators – “When seeing the Flight Surgeon the best you can do is break even,” still applies. But when the reasons for requiring a waiver and needing a period of grounding are explained, and related to terms of risk and safety of flight, most can accept it. If something doesn’t make sense then that can (and should!) be addressed through a process also – you can have a dialogue with the appropriate code/division and if the current waiver process doesn’t make sense (particularly if you have current peer-reviewed data supporting your view) they will generally be happy to address this through the NAMI process of the Aeromedical Advisory Council.

In any case – best wishes to all of you serving our Navy and Marine aviation and support personnel. I’m proud to be back with you (particularly after Sept 11th!). Please drop in and visit if you get to Maine :>)

Have a safe and happy holiday season.

** No offense to my psychiatric colleagues – you know what I mean. . . .*

CAPT D. J. Wear-Finkle, MC, USN
Branch Medical Clinic Brunswick

The U.S. Army Medical Research Institute of Infectious Diseases (USAMRIID)

During World War II the US began an offensive program to develop biological weapons (BW) in response to the discovery of a robust BW program by the Japanese. Between 1943 and 1969 the U.S. produced several biological weapons in its arsenal. The US program continued until November 1969 when President Nixon terminated it. In 1972 USAMRIID was born as the Department of Defense’s lead laboratory for investigating the medical aspects of biological defense. The institute is involved in the development of vaccines, drugs and diagnostics to protect U.S. service members from biological warfare agents and other infectious diseases with military relevance. USAMRIID also investigates naturally occurring infectious diseases that require special containment, and is the only DoD laboratory equipped to study highly hazardous viruses (e.g. Smallpox, Ebola, Marburg, etc.) at Biosafety Level 4 – the highest level of biocontainment. The only other U.S. laboratory with this capability is at the Centers for Disease Control and Prevention in Atlanta. The institute operates a world-renowned reference laboratory for providing definitive identification of biological threat agents, a major national resource during the recent anthrax investigation. USAMRIID also formulates strategies, information, procedures, and training programs for medical defense against biological threats, and provides threat evaluation and consultation. We have over 130 doctoral level scientists and physicians in a diverse array of specialties.

In October 1999 I transferred from the White House Medical Unit and began working in the Operational Medicine Division at USAMRIID where I serve as a Flight Surgeon and emergency physician for the Aeromedical Isolation Team (AIT). The OPMED Division plays an important role at the institute. Our eight officers (including 6 physicians, 1 veterinarian and 1 psychologist) serve as information conduits to the medical and public health communities, delivering clinically relevant information to patient care providers serving in the hospitals, clinics, and with the operating forces. Four times a

(continued on page 44)

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year we teach the DoD gold standard course on the "Medical Management of Chemical and Biological Casualties" in conjunction with our sister organization USAMRICD (U.S. Army Medical Research Institute of Chemical Defense). Our staff lectures and publishes widely, and operates a travel medicine clinic.

OPMED medical personnel also staff our in-house patient care ward and Intensive Care Unit

known as the "Slammer."

USAMRIID maintains a BSL-4 patient care suite for individual patients, and could provide intensive care for critically ill patients with specialized personnel and equipment augmentation from Walter Reed Army Medical Center (WRAMC). The BSL-4 suite was designed to care for USAMRIID personnel in the event of a potential exposure

to a highly hazardous disease agent, whether in the laboratory or while investigating a disease outbreak abroad. In addition, it could be activated to support a limited number of military personnel or civilians during a natural disease outbreak or following the deliberate release of a biological agent. A 12-bed Biosafety Level 3 (BSL-3) clinical research ward could be converted to containment patient care if needed.

In September 2000 I was appointed the Medical Director of the USAMRIID Aeromedical Isolation Team – the first Naval Flight Surgeon to hold this position. The AIT is a rapid response team capable of deploying worldwide to evacuate and manage patients under BSL-4 conditions. There are two scenarios in which the AIT may be deployed. First, USAMRIID military and civilian scientists investigate foreign and domestic infectious disease outbreaks, such as those due to Ebola and other viral hemorrhagic fevers (VHF's). These diseases re-

quire special handling because they are highly infectious, often lethal and sometimes transmissible from person to person. Many have no effective treatments or vaccines. Our investigators routinely place themselves at risk for infection – consequently, the AIT serves as a deployable platform to safely evacuate patients exposed to or infected with any of these agents. The AIT could also be used in contingency operations in the event troops are exposed to contagious or unknown biological warfare agents. Rapid

diagnosis and medical care for these illnesses would be aided by evacuating a small number of patients to a facility with containment clinical and laboratory facilities such as USAMRIID. The AIT is not equipped or staffed for mass casualty management of large numbers of biological warfare casualties.

USAMRIID can deploy two AIT teams simultaneously. Each

team, which can transport and manage one patient, consists of one Flight Surgeon, one registered nurse and four to six enlisted personnel with medical, laboratory or veterinary training. AIT would use Army or Air Force transportation assets, such as the CH-47 Chinook, C-130 Hercules, C-141 Starlifter, C-9 Nightingale or C-17 Galaxy aircraft. Specialized equipment includes an Aircraft Transport Isolator, Stretcher Transport Isolator and Portable Laboratory Isolator units, capable of maintaining BSL-4 containment through the use of protective barriers, negative pressure and HEPA filtration. Our personnel wear protective hoods and powered air-purifying respirators with HEPA filters. We also carry a full array of advanced patient care equipment and medications.

The AIT trains regularly with the West Virginia Air National Guard's 167th Aeromedical Evacuation Squadron based in Martinsburg, West Virginia. We are deployable worldwide on 12 hours notice. Past missions include:



- Supported containment of Ebola outbreak in primate colony, Reston, Virginia, 1989
- Deployed in support of hemorrhagic fever patient management, Sweden, 1989
- On call for Yale researcher exposed to Sabia virus, 1994
- On alert during outbreak of Ebola virus in Zaire, 1995
- Deployed to handle biological bomblets at Wright-Patterson Air Force Base, 1995
- Supported Bronx Zoo in New York City with West Nile virus investigation, 1999
- On call for physician potentially exposed to Ebola virus while working for "Doctors Without Borders" in Uganda, 2000
- Currently on high alert to respond to any use of biological weapons against U.S. personnel fighting in Afghanistan

I have had a number of interesting experiences over the past 2 years working for the Army at USAMRIID. The AIT has trained with our British counterparts in several exercises and recently I was invited to assist the German government in the development of an Aeromedical Isolation Team for their armed forces. These experiences have been highly rewarding. It has been my honor to serve as the first Naval Flight Surgeon and Medical Director of the Aeromedical Isolation Team. My PRD is in 2003 and I would recommend this billet to any experienced Flight Surgeon seeking a challenging and important job. The learning curve will be steep, but interesting, while acquiring subject matter expertise in the medical aspects of biological weapons. Please email or call me if you have questions. If you are visiting the Fort Detrick area give me a call and I would be happy to give you a tour of our facility. If you are interested in the subject of aeromedical evaluation of biological warfare casualties please see the supplement to Military Medicine, Vol 165, no 11 November 2001.

CAPT (sel) Rob Darling, MC, USN (FS)

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Letters to the Editor

Letters to the Editor is a column that permits readers to comment on CONTACT content or other topics of interest to Navy Flight Surgeons. We reserve the right to edit and condense all letters submitted.

Dear Editor,

I'm still trying to get some data from Bob Hubbard on how many "saves" have been attributed to the HANS since it was first introduced. It'll probably be a subjective call, but they do have accelerometer data from CART and F-1 crashes for the past several years. And NASCAR is going to be putting instrumentation in their Winston Cup cars next year. So death, survival, and injury can be tied to the recorded Gs.

Of interest is that researchers from Wright-Patterson are outfitting some drivers with ear canal accelerometers to get readings on the actual Gs sustained by the driver's head. At present, the accelerometers are in the center of the car under the driver's seat, and can only tell what G forces the car's tub sustained. In most crashes the driver gets less...for many reasons. But the present system does give the researchers comparative data, which is why Olvey has said that 66 frontal Gs has always caused unconsciousness, with serious head and neck injuries and even death, prior to the use of the HANS.

CDR Jay Phelan, MC, USNR

Head, Otorhinolaryngology

Naval Aerospace Medical Institute

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Dear Editor,

As I am now fully retired I started cutting back on my association memberships and converted others to retired status. As part of the process I had considered doing so with the Society of U.S. Naval Flight Surgeons based on the rationale that is a part of my past, a part that has passed me by. However, on reading your latest newsletter, I found I have too much sentiment invested in this great group of people for it to be JUST a part of my past. I was in class 111 with Frank Dully and Charley Bercier and likewise was in the residency class with Charley and Dan Lestage, all who went on to bigger and better things in Aerospace Medicine and gave so much to the profession. Although I eventually moved full time into Occupational

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Medicine, and even for a short period wore a U.S. Air Force uniform, Naval Aviation and Naval Aviation Medicine were always my first love. I cannot improve upon the article written by Frank in giving reasons why. The rewards of working and living with flight crews, air and ground, at work and at play, are hard to beat, be it as a spanking new, wet behind the ears, Flight Surgeon with MAG 26, SMO on the USS Constellation as junior LCDR, or SMO on the USS Independence as a Captain. To paraphrase the writings of one of our members, even after a bad day, one could stand on the fantail and say to himself, "I am one of only fifteen people in the world lucky enough to have this job."

John A Calcagni

CAPT, MC, USN (ret)

Dear Editor,

I have received the Navy Flight Surgeon newsletter since becoming a Charter member of that organization over thirty(30) years ago. Hence, I have received hundreds of newsletter issues.

It gives me great pride to state that your July 2001 issue is by far the finest one published to date. I received my copy today in my apartment mail. I read it from cover to cover and did not stop until I finished the last page. I did this in spite of the fact that our outdoor temperature was hovering around the 108 degree mark and our apartment pool water, as viewed from my balcony, was very inviting as a means of "keeping cool."

Congratulations, CAPT Valdez, in publishing such a fine, varied and interesting to all of our Aviation Medical community members, issue. (Especially interesting to those of us who received our Flight orientation and training in the SNJ and T-28 aircraft years ago.)

My old and dear friend Bob Mitchell and I were Flight Surgeon classmates in Class No. 75, graduating on 24 June 1955. Also, I am proud to say that I became a member of "The Aero Medical Association" on 24 March 1955, while our class of student Flight Surgeons attended the annual scientific meeting of the Association in Washington, D.C., held at that time.

John C. Ralston, Jr.

CAPT, MC, USN (Ret)

Dr. Bob Hubbard is the designer of the HANS® device and founder of the company that sells it. He was pleased we were presenting this subject and provided us with some of his thoughts.

Dear Editor,

The HANS concept is very robust and diversely applicable. In the late 1980's, I tried to get the military interested in HANS by some SAFE Society presentations. I even was a biomechanics consultant to the U.S. Navy for helmets and helmet mounted equipment. But, no one was interested back then and I grew weary of pushing.

I have a pretty good understanding of military flight environments and I am quite sure that HANS could help in a variety of applications. I won't go into all of this in detail here except for the following.

1. Helicopters crash with a downward and forward velocity and their pilots heads and helmet (and attached gear) swing forward causing head impacts and head/neck tension injuries (e.g. basilar skull fx.). HANS could be configured to fit these guys and it would help them (save them) no doubt.

2. Fighter pilots fly with extreme head motions to look back and they are in high G maneuvers. Support of their heads would best be mounted on their shoulders. HANS can be configured to allow complete, unrestricted head motions relative to the torso. HANS tethers could be active with commands for the plane's controls. This will require study of the application, but it is feasible. In ejection, HANS would restrict head motions relative to the torso. The HANS tethers could be retracted for needed motion control and support.

3. For transport pilots, HANS could be made without a helmet — all that is needed is a strap that carries the HANS tether loads to the forehead.

All of the versions of HANS would require careful study of the user needs, and HANS is certainly applicable for these and other military applications.

Dr. Bob Hubbard

hubbard@msu.edu

The 2002 Operational Aeromedical Problems (OAP) Course

(Now is the time to start filling out our TAD/TDY request forms for the best aerospace medical CME value on the planet.)

The Navy Environmental Health Center (NAVENVIRHLTHCEN) is hosting the 42nd Navy Occupational Health And Preventive Medicine Workshop 14-22 March 2002 in Chesapeake Virginia and Virginia Beach, Virginia. The workshop will provide an opportunity for professionals and technical personnel from the military, other federal agencies, state and community agencies, and academia to transfer information, discuss common problems, identify needs, and develop a course of action to improve navy occupational health, preventive medicine, readiness and health promotion programs. The theme for the workshop is "Forging The Future Through Prevention."

The Forty-Second Workshop will provide Continuing Medical Education credits (CME) at minimum cost to the government and no registration cost to you. In 2001 over 27,400 CEUs/CMEs were awarded to Workshop attendees. The coming workshop will include the Eighth Independent Duty Corpsman (IDC) and Preventive Medicine Technician (PMT) Conference, and our own Operational and Aeromedical Problems Course.

Information and registration for the Operational and Aeromedical Problems Course will be managed through the NAVENVIRHLTHCEN workshop registration process. There are no registration fees for the workshop or conferences. The preliminary program, workshop registration and hotel registration information is available via links on NAVENVIRHLTHCEN's home page: www.nehc.med.navy.mil. If you are unable to access the program electronically, or desire a copy on disk, please contact NAVENVIRHLTHCEN at that time. You will be able to register for the workshop via a web based registration program beginning on 1 December 2001.

For those interested in displaying a post presentation at the Poster session, NAVENVIRHLTHCEN will accept abstracts for the 2002 Workshop poster session through 30 January 2002. Interested indi-

viduals may obtain the guidelines for abstract submission and the official workshop abstract form by contacting the Poster Session team at postersession@nehc.med.navy.mil. Or from LT Jeff Benjamin, CEC, USN at (757) 462-5558 or the Workshop web site at www-nehc.med.navy.mil. The registration coordinator is Ms. Norma Thrower at (757) 462-5452 or you may e-mail to: workshop@nehc.med.navy.mil. The DSN prefix for all numbers is 253.

The current OAP Course schedule is provided on the next page for your review. Plan to attend this great conference.

CAPT Jay S. Dudley, MC, USN (FS)

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www.nomi.med.navy.mil/NAMI/Training/index.htm



Operational Aeromedical Problems Course

	Monday March 18	Tuesday March 19	Wednesday March 20	Thursday March 21
0800-0850	Opening Ceremonies	Flight Line Clinics/ Aviation Medicine Department & Patient Safety Issues - CAPT Merchant	Differential Dx of the Red Eye in the Field - CDR Tanner	Non-sedating antihistamines in aircrew - CDR Phelan
0850-0940	Opening Ceremonies	Naval Safety Center 2001 Statistics Update - CAPT Fraser	Current Naval Aviation Policy Issues with Photorefractive Surgery -CDR Tanner	Clinical Hyperbarics DCS Recognition & Initial Treatment - CAPT Giebner
0940-1000	Break	Break	Break	Break
1000-1050	Opening Ceremonies	Naval Safety Center - 2001 Mishap Guide Pocket Checklist & Recent 3750 Policies Changes - CDR Webster	SD Mishap Situations Demographics/SD Prevention Training/ Mishap Incidents - LCDR Wechgelaer	OCONUS MTF (Europe) - CAPT Anzalone
1050-1140	Opening Ceremonies	Emerging Infectious Diseases - West Nile Virus Encephalitis - CDR Farr	Carrier Medicine Update AIRLANT - CAPT Hiland	Evaluation of the the Acute Abdomen for FS's - CAPT Perciballi
1140-1300	Break	Break	Break	Break
1300-1350	State of the Medical Corps - RADM Arthur	Changes to Aeromedical Waiver Guide for Hepatitis in Aviators - CDR Farr	AIRLANT/AIRPAC Update - CAPT Hiland	Sports Medicine Injury Rehab & Rehabilitation -A Physiatic Approach - CDR Jim Bowen
1350-1440	Aerospace Medicine Billet status overview and Leadership Training Opportunities - CDR Puckett	Naval Aeromedical Research Laboratory - Current Reasearch to aid the aviator - CAPT Anderson	NAMI Psychiatry Combat Stress and Primer on Critical Incident Stress Debriefing Part I - CAPT McDonald - CAPT Almond	Anterior Knee Pain: A Kinetic Chain Perspective - CDR Jim Bowen
1440-1500	Break	Break	Break	Break
1500-1550	Aerospace Medicine Specialty Leader BUMED Code 23 - CAPT D Fulton	NAMI Update from Internal Med & Neurology - CDR Kane	NAMI Psychiatry Combat Stress and Primer on Critical Incident Stress Debriefing Part II - CAPT McDonald - CAPT Almond	Common Dermatologic Conditions encountered in the field/ onboard ship - CDR Anthony
1550-1650	Current Issues in the Naval/Army Aerospace Medicine Residency - CAPT Valdez	Common Orthopedic Conditions encountered in the field/ onboard ship - CDR Unger	Update on Naval Aeromedical Waiver Policies/Procedures - LCDR Kleinberg	Current Aviation Life Support Issues

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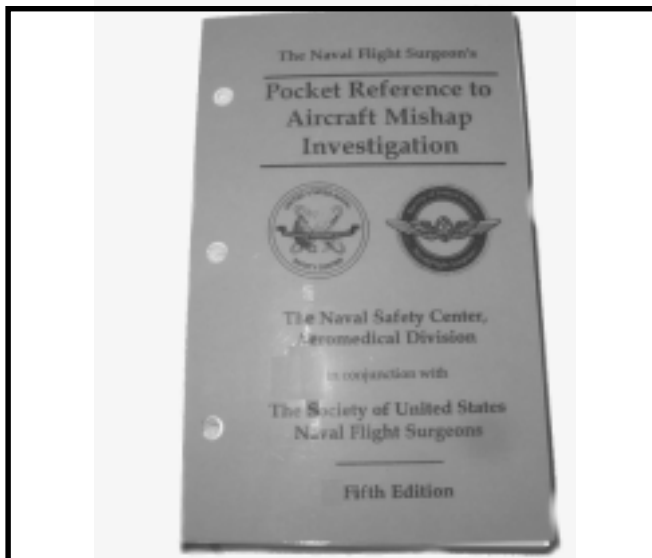
Full Size 14K Gold Flight Surgeon Wings



Sweetheart FS Wings Necklace, 14K Gold/Diamond Chip



Ultimate Flight Surgeon 2001 CD-ROM

Selected SUSNFS Merchandise Items Catalog**SUSNFS Patch****The New Pocket Reference****Magnet****Mug****Tie****Women's Bow Tie and Scrunchy**



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dckleinberg@nomi.med.navy.mil

Address Change, Subscription/Membership Renewal, Price List, and Order Form (NOV 2001)

#	ITEM	PRICE		SUB-TOTAL
	(Indicate Size and Color Where Appropriate)	Non-Member/Member		
___	T-shirt: SUSNFS "Keep'em Flying" (M, L, XL, XXL)	24.00	19.00	_____
___	Polo Shirt: FS Wings (M, L, XL) (Navy Blue, White)	38.00	33.00	_____
___	NEW - NAMI Flight Surgeon Belt Buckle!!!!	24.00	24.00	_____
___	2001 The Ultimate Flight Surgeon Reference CD	25.00	20.00	_____
___	Naval FS Pocket Reference to Mishap Investigation (JAN 2002)	25.00	20.00	_____
___	Sweetheart FS Wings Necklace, 14K Gold/Diamond Chip	200.00	160.00	_____
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___	Full Size 14K Gold Flight Surgeon Wings	240.00	200.00	_____
___	Mess Dress 14K Gold Flight Surgeon Wings	160.00	128.00	_____
___	SUSNFS Patch (only a dollar a patch for shipping)	6.00	5.00	_____
___	FS Wings Tie	22.00	20.00	_____
___	Refrigerator Magnet: FS Wings (price includes shipping)	2.00	1.50	_____
___	Travel Mug: SUSNFS Logo	6.00	5.00	_____
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___	FS Wings 'Skrunchie'	1.50	1.50	_____
___	T-shirt: FS Wings (check by e-mail on availability)	12.00	12.00	_____
___	Tank Top Shirt: SUSNFS "Leonardo" (check on availability)	10.00	10.00	_____
___	Running Shorts: (Blue with Gold SUSNFS Logo) (check on availability)	10.00	10.00	_____
___	Sweat Shirt: FS Wings (check by e-mail on availability)	20.00	20.00	_____
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(continued from page 29)

structed lines and tubes. Cramped spaces and movement increase the possibility that lines and tubing will be compromised.

- Simple supplies can be very helpful. In addition to a CO2 detector, a small spiral notebook is useful. Having a way to record drug dosages, times, and exam findings makes for better care and allows the receiving facility to be better informed. Finally, duct tape makes a good patient restraint and can also secure equipment.

LCDR Scott Pusateri

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Address Correction Requested

Heard in a UK fighter squadron's crew room as submitted by Simon Brown, former RAF pilot.

Unit Medical Officer (in flying suit): "According to QRs (Queen's Regulations), apart from aircrew I'm one of the only people on the station entitled to wear a flying suit".

Squadron member: "And you're probably the only one on the station wearing a flying suit with the time to read QRs!"

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Submissions should clearly indicate the author's return address and phone number. All submissions should reach the Editor one month prior to the scheduled date of publication. Correspondence should be sent to:

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