Federal Air Surgeon's
Medical Bulletin

Aviation Safety Through Aerospace Medicine

For FAA Aviation Medical Examiners, Office of Aerospace Medicine Personnel, Flight Standards Inspectors, and Other Aviation Professionals.

02-2
Summer 2002

U.S. Department of Transportation
Federal Aviation Administration

HEADS UP

AME Profile

Friends for Life

Submitted by FAA Northwest Mountain Region Medical Division

Whoever charted the lives of Drs. **Guy Gorrell** and **David Holmes**, of Aurora, Ore., must have intended for them to be together for a long time. Native Northwesterners, they are both aviation medical examiners—Dr. Holmes was designated in 1960 and Dr. Gorrell in 1970.

During WWII, both were in US military aviation. Dr. Gorrell flew P-40 Warhawks in the Army Air Corps, while Dr. Holmes flew TBM Avengers for the Navy. Some believe this advance knowledge brought about the early Japanese surrender.

The similarities don't stop there, though. After the war, both men attended the University of Oregon Medical School (now Oregon Health Sciences University, OHSU). After graduation and internship, both became family practitioners in the area for three years before specializing: Dr. Gorrell in general surgery at OHSU and Dr. Holmes in anesthesiology at OHSU. Both doctors practiced at Emanuel and Meridian Park Portland Hospitals, where they often were teamed on surgical cases.

After 30 years in their respective practices, both have retired from specialty practice but continue their aviation medicine practice in the Portland area. Both were also enthusiastic private pilots until they sold their airplanes two years ago.

They are active members of the Columbia Aviation Association, a 50-year-old club of 200-some members with facilities at the Aurora Airport (see their Web site, www.caapilots.com). The members meet every Thursday night for dinner and to enjoy aviation-oriented programs—featured speakers often include flight surgeons and aviation experts, as well as the occasional astronaut, cosmonaut, and celebrity.

AMEs Dr. David Holmes (l.) and Dr. Guy Gorrell of Aurora, Ore.

This group has an "enviable" safety record on their numerous flyouts, beginning in 1950 with 92 airplanes flying together to Cuba. Other such excursions have been to destinations over most of North America and even to distant Australia, New Zealand, and Africa.

Drs. Gorrell and Holmes have enjoyed many such trips. But one of their most memorable was an independent flight to the 1994 FAA aviation medical examiner seminar in Anchorage, Alaska. ✈

Notice to Aviation Medical Examiners

On July 1, 2002, the current issue of Certification Return Envelopes (FAA Form 1360-47) no longer complies with US Postal Service regulations and may no longer be used. You are, therefore, instructed to destroy your current stock of these envelopes.

The FAA Office of Aerospace Medicine has printed revised envelopes that comply with the new US Postal regulations, and we have provided you with a supply of the revised envelopes that should have been in your possession by July 1, 2002. If, however, you have not received the new envelopes, it will be necessary for you to use your own envelopes and postage to send documents to us until the new envelopes are received.

Security for American Aviation

The Federal Air Surgeon's Column

By Jon L. Jordan, MD, JD

ALMOST A YEAR HAS NOW GONE by since terrorist acts in New York, Washington, and Pennsylvania shook the foundations of our society. While these acts of terrorism had a pronounced emotional effect on almost all U.S. citizens, for those of us who directly serve the aviation community, carrying out our duties and responsibilities has been impacted as well.

As the element of the Federal Aviation Administration with the responsibilities for medical oversight of the Federal Air Marshal (FAM) program, the Office of Aerospace Medicine was called upon to assist in bringing onboard thousands of new FAMs. This entailed providing physical and psychological assessments of applicants and issuing medical clearances for those found qualified. Like many other offices within FAA, staff from our office lent a helping hand to our security folks in carrying out a number of tasks that were an outgrowth of the September 11 events. Part of this related to interacting with law enforcement organizations in respect to information in our files regarding the terrorists. In the midst of all of this, we here in the Washington area were hit with the anthrax mail contamination problem. As might be expected, the Office of Aerospace Medicine was called on to deal with issues related to possible contamination of incoming mail to buildings occupied by agency employees – but that's another story.

With the creation of the Transportation Security Administration, a number of FAA security responsibilities have been assumed by the new Administration. While this may be the case, FAA continues to play an active role in the security issues related to aviation. It is now clear that terrorists are more than willing to sacrifice their own lives in promotion of their cause and to use aircraft as a means of destruction. Therefore, since gaining medical certification and flight proficiency are significant elements of the equation, we must look at what we might do to contribute to the nation's security.

After September 11, a number of aviation medical examiners recalled having examined applicants who behaved suspiciously during the course of an examination. Sometimes names of the applicants could be remembered and sometimes they could not. AMEs were encouraged to contact law enforcement organizations with useful information, and FAA medical certification staffs did as well. Since September 11, AMEs have asked, and we in the agency have asked ourselves, "What more can be done?"

Suspicious behavior alone, unless it is unique, may not be a basis to withhold issuance of a medical certificate. It is, however, something that deserves notice and possible investigation. Therefore, AMEs are encouraged to make known to our regional flight surgeons or to our certification personnel in Oklahoma City, any applicant who displays behavior that raises suspicion that pursuit of medical certification may be for illegitimate purposes. It is best to convey this information verbally, but it also should be noted in Item 60 of the application form.

AMEs should be aware that on occasion, individuals have attempted to be examined in the name of another person. As referenced on page 17 of the *Guide for Aviation Medical Examiners*, if the applicant is new to the examiner, the examiner should request some evidence of positive identification. If the airman objects to providing identification, the examiner should not withhold certification, but should report the incident to the FAA. In view of the September 11 events, the need for positive identification of applicants for medical certification takes on a new dimension. We are, therefore, in the process of drafting new guidance on requirements for verifying the identity of applicants. We anticipate publishing the guidance in the next issue of the *Bulletin* and, in the near future, to amend the *Guide.*

Please stay tuned.

JLJ

Federal Air Surgeon's Medical Bulletin

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Counterfeit Medications

By Stephen H. Goodman, MD

Counterfeit medicines look real and are impossible to distinguish between the real thing and the fake…hard to identify, difficult to track down. Use of these phony pills by unsuspecting individuals can leave them seriously ill, even lead to death, and possibly impact the National Airspace System.

"WHAT'S IN THAT PILL?" you ask the airman who is showing it to you, as you take a history and prepare to conduct the physical examination for an airman medical certificate?

The airman tells you that it is a medication bought while overseas at a pharmacy in Macau, China, while attending an international conference. The pill looks right and has the right pharmaceutical markings. You look it up in your recent PDR and identify it as the sleep medication, Ambien.

But are you sure? And how do you check on the ingredients in the pill so you can advise your airman that it is safe to take?

You look it up again in the current edition of Martindales, you identify the preparation and it looks okay, but there is something in your "mind's eye" that makes you uncertain. What to do?

It's the perfect crime: counterfeit medicines that look real and are impossible to tell the difference between the real thing and the fake! They are hard to identify, and difficult to track down and determine where they came from. When you counterfeit a CD or a videotape it does not have a health impact. It just means that Microsoft or Sony Pictures won't get royalties. But to subject unsuspecting individuals to the hands of criminals can leave your airman seriously ill and even lead to death and possibly impact the National Airspace System.

Counterfeit preparations have shown up in China, Guangxi Province, last October, where a traditional Chinese medicine was laced with an expired Western antibiotic that resulted in the serious illness of 70 patients who took the preparation. In the 1990s, a multinational Philippine drug company discovered the counterfeiting of its asthma inhalers. In India, the Indian Pharmaceutical Alliance estimates that 20% of the drugs on the market in India are fake and that for certain brands the rate may be as high as 35-40%.

Obviously this is a multinational issue with cross-border networks and implications. The US House of Representatives' Energy and Commerce Committee has indicated that there is some evidence that this trade has connections with terrorism.

What is being done about this emerging health issue? The prime responsibility for prevention and control of counterfeiting medication resides with government regulation and the healthcare infrastructure. The World Health Organization collects information on the incidence of counterfeiting and provides guidance to those governments on measures to take to counteract the problem. Members of the pharmaceutical industry are taking action internationally to collect, analyze, and inform governments and international agencies about this covert activity in their respective areas of the world.

So what does this mean to you—the aviation medical examiner—and the National Airspace System? As globalization hits home in your local communities and your individual medical practices, the threat of counterfeit medications becomes more of reality to manage.

- Know who you are examining, not only for an airman medical certificate but for general medical care as well.
- Take a good history, especially from the airman who travels internationally, and ask about medical preparations purchased abroad.
- Inspect the medication that the individual is taking, and be circumspect if the package has an abnormal appearance or the contents do not look uniform.
- And finally, do not hesitate to ask where the medication came from and the purpose of its use by the individual.

If you are uncertain about who you are examining and medicinal preparations being used, then take the time to call your respective health agency for guidance. This will ensure that you take the appropriate action and safeguard the integrity of the National Airspace System.

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SHARE

This Information With
Your Staff and Patients

Dr. Goodman is the Regional Flight Surgeon of the Federal Aviation Administration's Western Pacific Region. This article also appeared in the FlightPhysician*, the newsletter of the Civil Aerospace Medical Association.*

Certification Issues

By Warren S. Silberman, DO, MPH

SINCE IT APPEARS TO BE RELATIVELY PEACEFUL in Aeromedical Certification, I shall present you with some more certification cases to practice on. By the way, the previous cases have been well received by all, and I have enjoyed coming up with them. I attempt to make some teaching point in each one.

Note: Only the Federal Air Surgeon, Regional Flight Surgeons, or the Manager of the Aerospace Medical Certification Division can grant an Authorization for Special Issuance. Each case that requires some medical decision or waiver is given an individual review by one of our physicians.

1. An airman with a history of diffuse large B-cell lymphoma comes into your office for an FAA flight examination. This fellow is 60 years old, has 5500 flight hours, and desires a 2nd class medical certificate. The tumor was discovered in the gastric antrum and perigastric lymph nodes. He has had radiation therapy and is presently on his fourth month of CHOP therapy. Noting that the applicant is stable, you issue an unrestricted medical certificate. *Was this correct?*

ANSWER: No. In general, while an airman is receiving treatment for any malignancy, issuance is not granted. We normally wait for one year after the therapy has been completed and then request a current status of the medical condition. If the tumor is not likely to metastasize to the brain, the airman probably will receive medical certification under the special issuance procedures. Earlier consideration may be given, depending on the tumor. (*AME Guide,* pages 22, 60*)*

2. Joe M. Cool is a 1st-class airman who had a bleeding gastric ulcer that was diagnosed via endoscopy. One month ago, a biopsy was negative for malignancy. Presently, he is taking a H2 blocker, his hemoglobin is 10 gms, and he is asymptomatic. There has been no study to evaluate treatment. The airman, rightly so, ceased exercising the privileges of his medical certificate. He phones your office to ask what he needs to do to resume flying. *What should you advise?*

ANSWER: The airman will not be permitted to fly for approximately 6 months, after which time he should demonstrate to the AMCD that the ulcer has been resolved. In this case, a repeat endoscopy must be performed. The hemoglobin is borderline. The AMCD is concerned about the oxygen-carrying capacity of the blood and, in general, does not like to see the hemoglobin drop below 10 gms. We accept all of the H2 blockers as treatment and prophylaxis for peptic ulcer disease. (*AME Guide* page 51*)*

3. Anthony Soprano is scheduled to spend a few years in the local Federal penitentiary for money laundering. He comes to your office and requests a 3rd-class medical certificate. When questioned about his "yes" answers to 18. w., he relates the story of the misdeeds that attracted unwanted attention by the FBI. What should you do?

ANSWER: Since the examination has already been completed, you need to take a good history, evaluate the airman's psyche, and document your findings for the record. You should defer the decision to the AMCD and inform the airman that, since he is facing jail time, he would be best advised to further pursue certification after completing his sentence. If he wants to pursue certification nonetheless, you should inform him that he most certainly will be asked to provide the results of a psychiatric and psychological evaluation to determine whether he has an underlying mental disorder that would be disqualifying. If he doesn't develop any disqualifying medical conditions while in prison and his psychiatric and psychological evaluations are favorable, he will likely be granted medical certification.

4. Bill Hurst, a 50 y/o airman with a history of mechanical aortic valve replacement, has come to you wanting to know if the FAA will grant him a 3rd-class medical certificate. He is on Coumadin and provides you with his preoperative heart catheterization study, which showed no evidence of CAD and moderate-to-severe aortic stenosis. He also has an operative report that tells you that his surgery was performed over six months ago. A standard Bruce Protocol stress test has recently been completed and the airman went 10 minutes with a maximum heart rate of 160. The current 2-D echocardiogram did not demonstrate any perivalvular leaks and no significant gradient across the valve. A 24-hr Holter monitor revealed occasional PACs but no sustained dysrhythmia. He also brought you the last 6months of INR (International Normalized Ratio) levels, which were: 1.4, 1.8, 1.6, 2.6, 2.8, and 3.5. After reviewing all the material, you issue an unrestricted medical certificate. *What's wrong here?*

ANSWER: You should not have issued! Valve replacement is one of the 15 specifically disqualifying conditions and thus should have been deferred to the AMCD. You could have phoned us or the Regional Medical Office, presented the situation, and had the INRs been acceptable, you might have been given verbal authorization to issue a time-limited medical certificate. Valve replacement always requires an Authorization for special issuance, and the

Dr. Silberman manages the Civil Aerospace Medical Institute's Aerospace Medical Certification Division.

Continued ➢

airman is required to provide the FAA with follow-up material to substantiate issuing future medical certificates. By the way, the FAA wants the INR levels for this condition to be between 2.5 and 3.5. We would like to see 80% of the levels provided to be between these values. In this particular case, 50% of the INRs were out of the allowed range and thus, the Authorization would **not** have been granted. (*AME Guide,* pages 43, 45)

5. Lucky Strike, a 65 year old airman, requests a 2nd class medical certificate during his yearly flight exam. Over the past year, he has been diagnosed with chronic obstructive pulmonary disease . He claims to only be dyspneic with moderate exertion. His medications are a beta adrenergic inhaler and a steroid inhaler. He brings a copy of a recent pulmonary function study, which demonstrates a FEV1/FVC ratio of 42% of predicted with minimal improvement after bronchodilation, bringing the value to 48%. You observe that the airman is quite stable on his treatment, and you issue an unrestricted medical certificate. *Were you correct?*

ANSWER: No. The Federal Air Surgeon allows the AMCD to issue medical certification for all classes of airmen with COPD. This airman appears to be stable, and the medications that Lucky was taking are acceptable. However, the problem here is the *degree* of disease. We do not usually grant medical certification when the FEV1/FVC ratio drops to 50% or below. To help us determine the outcome, you should, with the airman's consent, obtain pulse oximetry at room air, or even perform a Bruce stress test with recorded pulse oximetry each minute during and after the study. These cases are almost always special issuance and also require permission to certify to come from the AMCD or the Regional Medical Office.

6. Airman Samuel Adams had notified the FAA of a DUI incident during his last flight exam 2 years ago. He comes in for a new 3rd class medical certificate and informs you that 2 months prior, he was pulled over by a State Trooper and refused the sobriety test. *What is going to happen to Mr. Adams?*

ANSWER: We look upon a *refusal to take a sobriety test* as if it were a DUI conviction, and thus, you should defer issuing the medical certificate, and recommend that the airman provide us with the police documents surrounding the incident. We will require the airman to provide us with a written statement regarding his alcohol use, and obtain a substance abuse evaluation from a qualified evaluator. (*AME Guide, pages 28-30; 66, 67, 71)*

7. Chet "the Jet" Roberts, a 17 y/o airman who plans to attend a prestigious university's airline management track, comes to you for his initial FAA medical certification examination. You administer the color vision test using the pseudoisochromatic plates, AOC 1965 edition, and he makes 6 errors on plates 1-15. You don't bother to look at your *AME Guide* and tell Mr. Roberts that his medical certificate must have a restriction stating: NOT VAILID FOR NIGHT FLYING OR BY COLOR SIGNAL LIGHT CONTROL. *Were you correct?*

ANSWER: You surely were not! On page 89 of the *AME Guide* (October 1999), you can see that the airman actually passed the test and would not require any restriction on his medical certificate.

8. An airman applying for a 1st-class medical certificate fails the conversational voice test and has the following results on her audiogram: right ear: 500Hz 10, 1000Hz 5, 2000Hz 30 and 3000Hz 35, left ear: 500Hz 25, 1000Hz 35Hz, 2000Hz 60 and 3000Hz 75. Did the airman pass? *What should you do?*

ANSWER: She failed both the conversational voice and the audiogram. You should hold the exam and refer her to an audiologist for a speech discrimination test. If the applicant scores at least 70% in one ear at an intensity of 65db, you may issue the medical certificate. (*AME Guide,* page 79)

9. A 25 y/o 2nd-class airman is diagnosed with Hodgkin's lymphoma, which is found in the cervical lymph nodes and paratracheal nodes. He is prescribed chemotherapy, and during his radiation treatments comes to you for his FAA medical exam. You note that on recent evaluations there is no evidence of any tumor, and so you issue an unrestricted medical certificate. *Was this appropriate?*

ANSWER: It most certainly was not! According to page 60 of the *AME Guide*, Hodgkin's lymphoma should be deferred to the AMCD for certification, since it will require an Authorization for special issuance. Also, we do not grant medical certification while an airman is receiving chemotherapy or radiation treatments. AMCD also usually waits 1 year after treatment for cancer or lymphatic tumors. Page 22 of the *AME Guide* also mentions that one should not issue a medical certificate to an airman who is receiving chemotherapeutic agents. Each case is reviewed on its own merits, but we do not grant medical certification until cancer treatment has been completed. Also note, that this is one of the diseases that have been included in the *QuickCert* program that was mentioned in the last *FAS Bulletin*. However, in this case the airman is requesting a 2nd class medical, the *QuickCert* Program only applies to 3rd-class airmen at this time.

10. An airman for 3rd-class medical certification comes in for her medical examination. She reports to you that she had been diagnosed 6 months ago with a peripheral neuropathy and was given the medication *Neurontin* (gabapentin). *Should you issue the certificate or…?*

ANSWER: No, you should not issue. While the *AME Guide* does allow medical certification for a peripheral neuropathy, anti-seizure medications are not acceptable—even (as in this case) if they are not being used for a seizure disorder. The side-effect profile of these medications is not compatible with aviation duties.

FAA Annual Awards Ceremony Recognizes Achievements

By Kyisha Russ

The Office of Aerospace Medicine's (AAM's) ninth annual awards program recognized 45 individuals at a ceremony held recently in Costa Mesa, Calif. The awards reinforce the contributions of individuals and teams in AAM. AAM employees across the country nominated their associates for specific award categories. Nominations were also solicited for a separate award, the "Friend of AAM," for which only individuals outside of the AAM organization are eligible. A national awards panel selected the winners in each category. Each award recipient was given a special recognition plaque by Federal Air Surgeon **Jon L. Jordan**, MD.

Listed are the award categories and recipients.

AAM WINNERS. Pictured at the annual awards ceremony in Costa Mesa, Calif.

Outstanding Manager
Edward Y. Matheke, MD, AAM-700

Outstanding Leadership
Julia C. Pounds, PhD, AAM-510

Outstanding Innovator
Scientific/Technical:
G.A. McLean, PhD, AAM-600
Administrative/Support:
Saida O. Pierri, ASO-300

Outstanding Team
Federal Air Marshal Applicant Implementation Team
Janet S. Kirkham, ANM-300
Penny Sibley, ANM-300
Kara Semer, ANM-300
Lucy R. Musatti, ANM-300
Christopher S. Taylor, MD, ANM-300
Joel A. Dickmann, DO, ACE-300
Harriet Lester, MD, AEA-300
Dominick S. Zito, MD, AEA-300
Michael J. Jordan, MD, AEA-300
Jeanne Rafferty, RN, AEA-300
Marianne Patrick, RN, AEA-300
Deborah Stauffer, AEA-300
Kathy M. Orlando, AEA-300
Yvonne Muldrow, AEA-300
Antoinette R. Roderick, AEA-300
Regina Richter, AEA-300
Carmen D. Alejandro, AEA-300
Audrey A. Figurski, AEA-300
Christopher R. Alexander, AEA-300
Mary Lewis, AEA-300
Twyla A. Walker, AEA-300
Tonya F. Templeton, AAM-200
LoLisa Tucker, AAM-200
Maureen J. Coe, AAM-200
Tawawn Y. Harrison Glymph, AAM-200
Scott M. Goldman, AAM-500
Clara A. Williams, AAM-500
Edna R. Fiedler, PhD, AAM-500
Raymond E. King, PsyD, AAM-500
David J. Schroeder, PhD, AAM-500

Administrative Excellence
Patricia L. Calvert, AAM-600
Antoinette Roderick, AEA-300

Technical/Scientific Publication
Vicky L. White, AAM-600

AAM Mission Support
Barton Pakull, MD, AAM-201

Outstanding Customer Service
Roni G. Hemken, AAM-400

Friend of AAM
Daniel A. Boyle, ANM-500
Christine Lawrence, DTI-20
Frank Del Gandio, AAI-200

Flight Surgeon of the Year
Christopher S. Taylor, MD, ANM-300

Inspector of the Year
Mark L. Crispi, PhD, AAM-820

AAM Office of the Year
Eastern Region Aerospace Medicine Division, AEA-300

Exceptional Regional Employee Performance
Janet L. Sanner, RN, ASO-300

The Peripheral Vascular System in Pilots: Beyond Deep Vein Thrombosis

Basic Principles Governing the Peripheral Vascular System's Response to the Aviation Environment

By Donato J. Borrillo, MD, JD

In April 2001, Dr. **Michael Bagshaw** chaired and published an excellent review article by the Aerospace Medical Association on "Traveler's Thrombosis." This position paper put into perspective how deep vein thrombosis (DVT) may be *weakly associated with* but *not caused by* air travel.

Fortunately, the same public and media concern regarding DVT in passengers has not influenced either pilots or the aviation medical examiner (AME) community.[1] Certainly, peripheral vessel disease and the effects of gravity on the arterial system have intrigued AMEs; however, military flight surgeons have more of a vested interest regarding G tolerance.

While many of the physiological concerns of a fighter pilot do not apply to the recreational, or commercial pilot, the AME, as the local aviation expert, should have a good working knowledge of how peripheral vessels respond to the aviation environment. This article will review some of the basic principles governing the response of the peripheral vascular system to the aviation environment.

Traditionally, AMEs viewed questions 18g and 18h on FAA form 8500-8 as a screen for vascular or blood pressure disease (i.e., hypertension, arteriosclerosis, or peripheral vascular disease). As an aviation medical specialist, the AME must understand the importance of systemic vascular resistance; specifically, the peripheral vascular component as it adapts to the flight environment.

Peripheral vascular resistance changes with gravitational force, both excessive and insufficient forces. The most common example of increased gravitational force can be seen in centrifuge training for jet fighter pilots. Inversely, an insufficient gravitational force is typically seen in space flight.

Although recreational or commercial pilots may not have the same stressors as a fighter pilot or astronaut, the same principles, to a much lesser degree, apply to their vascular system. Indeed, one could argue that the lack of G training to tolerance in the non-military pilot places the general aviation pilot at a greater risk for its effects. The AME should recall that the recreational and student general aviation pilot might often practice unusual attitude maneuvers (spins, stalls) and basic aerial tricks (rolls, loops).

In review, blood pressure in the vascular system is based upon resistance to flow. The relationship of these variables is found in electrical circuitry, as defined by Ohm's Law, where resistance (R) is equal to pressure (E) divided by flow (I). In human hemodynamics, systemic vascular resistance (SVR) can be measured from the differential pressure between the mean arterial pressure and the central venous pressure divided by the flow (i.e., the cardiac output). After an adjustment to the proper unit by a conversion factor, one often uses SVR in the clinical setting to estimate after load. After load, defined as the resistance to ventricular ejection, is obviously an important determinant of ventricular function.

The peripheral vascular system can only sense blood pressure, not cardiac output or systemic vascular resistance. Therefore, the minute-to-minute changes in circulatory control are made exclusively on the basis of the assessed blood pressure. Any decrease in blood pressure will cause less stimulation to the baroreceptors of the carotid sinus and aortic arch, and lead indirectly to an increase in output of the sympathetic nervous system. The large veins contract, leading to increased volume as blood flow returns to the heart and thereby increases cardiac output by way of the Frank-Starling law of the heart. Heart rate and cardiac force contraction then increase, with the aim of increasing flow; arteriolar vasoconstriction occurs, resulting in an increase in peripheral resistance.

It was first noted after the Gemini and Apollo flights that a decrease in orthostatic tolerance existed in astronauts upon their return to Earth's gravity. This diminished ability of the cardiovascular system to respond to weightlessness sometimes resulted in pronounced increases in heart rate and decreases in pulse pressure. However, 48 hours or less usually sufficed for orthostatic responses to regain an astronaut's preflight status. It was against the background of planned 28-day flights in the first Sky Lab missions that orthostatic intolerance gained greater importance. From this concern was born the objective of the Sky Lab lower body negative pressure experiments.[2]

What was noted during lower body negative-pressure experiments was the increased outflow of the astronauts' legs veins, which tended to reduce local venous pressure and, in turn, increase transfer of extracellular fluid into the capillaries. The capillary exchange of fluids became a highly dynamic process capable of moving large volumes of fluid very rapidly in either direction between capillaries and surrounding tissue This resulted in a marked decrease of lower limb volume; in contrast, the veins in regions above the heart (i.e., the head) were not normally subject to venous pressure increases of more than small magnitudes.

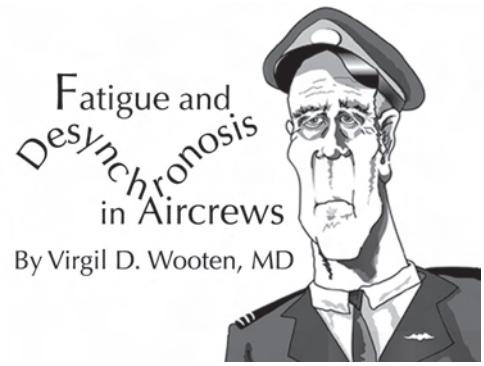
Typically, facial photographs and descriptions by the astronauts indicated that cervical and cranial veins became distended early in flight and remained distended throughout flight. The total circulating blood volume is reduced and some hemoconcentration occurs, with a significant fraction of fluids previously located in the legs accumulating in the veins and tissues of the upper body.

In sharp contrast to the use, or exposure, of negative pressure on the lower extremities, positive pressure has often been used in the treatment of trauma patients. The use of medical anti-shock trousers (MAST) have helped to cope

Continued on page 11

[1] This author's review of the literature found only two cases of DVT associated with air travel in pilots during 2001.

[2] By segregating blood in the veins of the lower half of the body, lower-body negative pressure stresses the cardiovascular system by reducing the effective circulating blood volume, thereby reducing the return of blood to the right heart and ultimately reducing cardiac output.



Since World War II, flight operations have been increasingly performed over longer distances, longer intervals, and across multiple time zones. The biology governing the performance of men and women has not changed, however. The timing, quality and quantity of sleep needed may vary among individuals, but among all people, unalterable physiological needs exist.

Efforts are being made within aerospace to design and employ behavioral and pharmacological interventions to overcome the effects of fatigue and sleepiness in personnel required to operate in a sleep-deprived condition and at times when they would normally be sleeping.

Accidents are caused by human error 80% of the time. The role of fatigue and circadian rhythm disorders (desynchronosis) in these mishaps is probably underestimated. Recognition of the causes and signs of fatigue is central to safe and effective air operations.

The tendency to sleep cycles over a 24-hour period. Maximal sleepiness occurs between 0200 and 0600. Although not as imposing, another episode of sleepiness occurs between 1400 and 1600. Adaptation to a new time zone or shiftwork pattern takes up to 3 weeks, depending on individual differences, the frequency and magnitude of the time shifts. Various environmental (light, activity) and social factors (sleep habits, social interactions, work schedule) may either assist or prevent the accommodation to a new schedule.

Sleepiness and fatigue cause reduced ability to function. Lapses (the failure to respond to a situation) increase. Lapses may be associated with microsleeps (episodes of sleep lasting 0.5 to 10 seconds) but can also occur without sleep onset. The four sleep-related factors involved in fatigue-induced performance impairments are the circadian phase of the biological clock, the presence of acute sleep loss, the presence of cumulative sleep loss and the presence of sleep inertia. Lapses increase 2 to 10 times during night operations without pre-existing sleep loss. Acute sleep loss (following a single night of sleep loss) results in 4 to 10 times more lapses, while chronic sleep deprivation by reducing sleep 2-3 hours per night for 1 week may increase lapses by 3 to 5 times normal. Sleep inertia is the difficulty awakening from a sleep episode. Sleep inertia results in increased lapses and is most likely to be present after abrupt awakenings and awakening from stages 3 and 4 NREM sleep.

The potential for catastrophe due to lapses is enormous. An aircraft going 250 kts on a glidepath, for example, can travel over 400 feet during a 1-second lapse. Microsleeps have been shown to occur in aircrew during landing approaches in commercial carriers.

The degree of resulting fatigue and risk of mishaps are dependent on the type of aircraft, mission, operations schedule, and environmental conditions. Increased workload and turbulence tend to exacerbate the effects of sleep loss and jet lag. Reaction times may be markedly slowed, which can be critical when rapid reactions are necessary. False responding also increases, i.e. the pilot may take action when no action is warranted, especially when aware of having missed signals. The resulting anticipation of another event and over attention on individual signals or problems further reduces situational awareness. Fatigue increases calculation errors, logical errors, and ineffective problem solving. The member is less able to think of new solutions and repeatedly tries the same approach to a situational problem.

Recognition of the causes and signs of fatigue is central to safe and effective air operations

Memory deficits progressively worsen with fatigue and sleep loss. The sleepy and tired crewmember reads or hears instructions repeatedly but cannot retain the information, leading to critical errors and uncertainty about the status of the situation. Performance variability results from increased lapses and errors of omission. Although the member often becomes aware of the shortcomings in performance and responds by trying to increase self-motivation and effort, performance improvement is short-lived. He/she may perceive the operation as more stressful and tiring as the effort continues. Ultimately, the crewmember's motivation to perform well and avoid risks erodes.

No individual is immune to the effects of sleep loss and fatigue, although there are individual differences in the ability to tolerate sleep loss. After one night of sleep loss, half of healthy individuals perform reasonably well, but the remainder exhibit moderate to severe performance deficits. After 36 hours, there is little difference between individuals in their ability to perform—all have severe performance deficits.

The ability of a fatigued crewmember to self-assess alertness is also limited. In fatigued individuals, initial good performance early on may give a false sense of security. As time goes by, performance deteriorates. A crewmember is also more likely to overestimate his or her ability to perform if asked about being tired or able to perform. Relief from other crewmembers when signs of fatigue are observed (eyelids drooping, yawning, irritability, forgetfulness) is crucial.

Dr. Wooten is a special medical consultant in sleep disorders to the Federal Air Surgeon, is an FAA aviation medical examiner, and is the Medical Director of TriHealth Sleep and Alertness Center, Good Samaritan and Bethesda Hospitals, Cincinnati, Ohio.

Continued ➤

Every flight operation has its own tempo, time required to perform the major tasks, personnel structure, and number of personnel. There are a number of different aerospace scenarios, ranging from mundane short- and long-haul ferrying operations, to combat and space flight. Prevailing cultural attitudes may pose a hindrance to adequate resting and napping. Our society now sleeps about an hour less on average than our ancestors a century ago. Sleep and the demand for productivity are at odds, and adult napping is virtually frowned upon.

Extensive government research into fatigue has yielded important information about techniques to improve performance and safety during prolonged and/or night-time flying. Basic principles to keep in mind are listed below. *Naps* are defined as intentional sleep lasting less than half the length of the major sleep period.

- Do not overwork or under-sleep before flying
- Naps taken before and at the beginning of flights at night improve performance.
- Two nights of normal sleep before flying greatly improve performance.
- Two nights of normal sleep at the end of an operation are necessary to recover from the effects of sleep deprivation.
- A night off in a long series of night operations helps restore function.
- Naps are possible during the day, especially in the mid-afternoon sleepiness phase.
- Naps are a stopgap approach to improve performance and safety for limited periods of time, not an indefinite substitute for long sleep periods during biological night.
- Make an attempt to anchor sleep when sleeping in a different time zone by getting some of the sleep during home base sleeping hours.
- The longer the nap, the better the improvement in performance.
- The longer the nap, the longer it takes to awaken (more sleep inertia).
- Longer and harder operations require more napping.
- At least 20 minutes should be allowed to awaken from a nap to allow dissipation of sleep inertia.
- Noise and activity help dissipate sleep inertia.
- When possible, engage in conversation, stretch, and move about to improve alertness.
- Caffeine can help maintain alertness but may disrupt sleep if used too close to desired sleep times.
- Alcohol use may interfere with sleep quality and performance.
- Napping will not promote circadian adjustment to night flying.
- Relaxation techniques and sleep hygiene can assist napping and adjustment to a new circadian schedule.
- The napping environment should be as free as possible from noise, light, temperature extremes, and interruptions.
- Lying down and sleeping is more beneficial than trying to sleep with chest elevated.
- Maintain a meal schedule with healthy and nutritional food to minimize gastrointestinal problems associated with night operations.

Stimulants and sedatives are currently used in US military and foreign commercial operations. There may be a role for stimulants such as modafanil, pemoline, methylphenidate, and amphetamines in defined settings. The same is true for short- and intermediate-acting sedatives. Even short-acting sedatives can impair next-day performance, however, and reasonable concerns exist about the effect of stimulants on sleep, emotions, and performance. For the time being, though, US private pilots and flight crews are prohibited from using medications discussed above.

Poor Sleep Habits May Contribute to Fatigue. These Sleep Hygiene Techniques Are Useful Countermeasures for Desynchronosis.

- Use the bed primarily for sleep.
- Avoid looking at the time. Set an alarm and ignore the time.
- Avoid alcohol, caffeine, and heavy meals before bed.
- Schedule a worry time, planning session, and wind-down time before getting into bed. Make lists of things to do the next day.
- Make the bedroom quiet, comfortable, dark, and secure. Use white-noise generators if the environment is noisy. Minimize disruptions.
- Get out of bed after lying awake for more than 20 minutes—do something boring or try relaxation techniques.
- Avoid exercise and hot baths within 3 hours of bedtime.
- Exercise regularly, in the morning or afternoon.
- Keep a regular bedtime and get-up time.
- Do not spend excessive amounts of time in bed, e.g., if you can sleep only 7 hours, spend no more than 7.5 hours in bed.
- Avoid excessive napping, which can interfere with your ability to sleep at night.

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An Airman with Alpha-1 Antitrypsin Deficiency

Case Report, by Luis A. Moreno, MD, and Alex M. Wolbrink, MD

Alpha-1 antitrypsin deficiency, caused by a rare genetic defect, may manifest in adults as early-onset chronic obstructive pulmonary disease (COPD). Clinical suspicion for this disorder may be derived from history and physical examination alone and the diagnosis may be confirmed by appropriate testing. Confirmation of the diagnosis does not necessarily lead to revocation of medical certification, especially for those airmen who can demonstrate stable conditions.

Background

A 49-YEAR-OLD, NONSMOKER, caucasian male with 725 total hours of flight time applied for renewal of his third-class FAA airman medical certificate. His medical history was significant for chronic obstructive pulmonary disease secondary to hereditary alpha-1 antitrypsin (AAT) deficiency (ZZ type). His outpatient management included daily bronchodilator therapy with ipratropuim bromide (Atrovent) and beclomethasone dipropionate (Beclovent), as well as biweekly intravenous AAT replacement therapy (Prolastin). On physical examination, distant sounds were not heard during lung auscultation and hepatomegaly was not evident from abdominal palpation. Inspection of the thorax, however, revealed a "slight increase" in anterior-posterior diameter of the chest. The remainder of the exam was described as unremarkable.

The airman was initially diagnosed six years earlier with AAT deficiency. Mild dyspnea with exertion characterized his major symptom at the time of presentation. Clinically, the patient did not report worsening conditions since the time of diagnosis. However, his most recent pulmonary function tests (PFTs) indicated severe airway obstruction with hyperinflation. Diffusing capacity demonstrated a significant decrease compared with that from the previous two years (D_LCO 70% vs. 55% of predicted). Although not significant, flow rates also revealed a decrease compared with that from the previous two years (FEV_1/FVC ratio of 35% vs. 32% of predicted).

At post-bronchodilator treatment, the PFTs also revealed a FVC and FEV_1 as 106% and 33% of predicted, respectively. In addition, a total lung capacity and residual volume of 127% and 197% of predicted, respectively, demonstrated air trapping. There were no reported findings of clinically significant hepatic or dermal involvement and no reported findings of bleb or bullae formation on chest radiographs.

Alpha-1 Antitrypsin Deficiency

Alpha-1 antitrypsin deficiency is a lethal hereditary disorder, which is characterized by early onset chronic obstructive pulmonary disease in afflicted adults. The reduced serum levels of AAT, a protease inhibitor (PI) glycoprotein, allow unconstrained proteolytic destruction of normal lung parenchyma. Liver disease derives from continued accumulation of polymerized forms of AAT protein within the hepatic cytoplasm. These intracellular inclusions have hepatotoxic effects.[2]

Adults in their third to fourth decade with AAT deficiency are predisposed to pancinar emphysema, hepatic cirrhosis, panniculitis, and vasculitis.[3] In addition, the hepatic cirrhosis may progress to hepatocellular carcinoma.[2] However, the clinical suspicion of AAT deficiency for adults often emerges with early onset emphysema, whereas, for the pediatric population, liver involvement is the earliest manifestation of this disease. Persons at risk are usually Caucasians of Northern European descent. The frequency of AAT deficiency is 1:3,500 live births with a predicted prevalence of 100,000 Americans.[1,2,3] Nevertheless, due to misdiagnosis and under-diagnosis, only an estimated 6-10% of all affected individuals have been identified.[2,5,6]

Although several types of alleles have been identified, the homozygous Z type (ZZ), a mutation of the protease inhibitor (PI) gene, is associated with the majority of the clinical manifestations. In most cases, a single base transposition within DNA sequencing causes the mutation. As a result, the AAT PI of the Z type contains an amino acid substitution that alters the conformation of AAT glycoprotein. The alteration causes AAT molecules to polymerize into proteinaceous sheets that cannot be secreted extracellularly. Consequently, without PI inhibition against active neutrophilic elastase, unrestricted elastin degradation results in emphysematous structural changes within the lung parenchyma.

Low serum AAT levels, usually 10-16% of normal values, characterize the diagnosis of AAT deficiency.[1] Confirmation of the diagnosis is made either by PI phenotyping or liver biopsy. Screening of first-degree relatives seems prudent.

Standard treatment includes the maintenance of present pulmonary function and the prevention of infection. Education on tobacco usage and general health measures continues to be mainstay advice.

Controversy exists concerning the clinical efficacy of human plasma ATT and the economic burden of therapy over the adjunctive measures of intravenous AAT replacement.[5]

Discussion

In general, any lung pathology, including COPD, may be considered a disqualification for medical certification under Title 14; Code of Federal Regulations (CFR) Part 67: subsections 113(b), 213(b), or 313(b). For those cases that need additional circumspection, the recommendation for AMEs is to defer issuance to the Aeromedical Certification Division

At the time this article was written, Dr. Moreno was a resident at the Department of Community Health - Aerospace Medicine program from Wright State University. Dr. Wolbrink is a research medical officer at the Civil Aerospace Medical Institute's Aircraft Accident Research Team.

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(AMCD). The endorsement for certification is directed by PFTs results (particularly FVC, FEV_1, or FEV_1/FVC), abnormal radiographic findings, and, in selected cases, the performance during an exercise stress test with oximetry.[4]

Outcome. In this case, the airman was initially denied medical certification. He then requested consideration for discretionary issuance from the AMCD after self-referral to a hypobaric (altitude) chamber evaluation. During the evaluation, he did not demonstrate any clinical signs or objective findings for hypoxic hypoxia at 8,000 ft. He did, however, desaturate to 90% at 12,000 ft and was unable to maintain adequate pulse oximetry without oxygen supplementation at 2 L/min via nasal cannula. With the information provided by this study, authorization for discretionary issuance (§ 67.401) for a third-class medical certificate was granted. The following limitations were applied with the certificate:

1. Must use oxygen at 2 liters per minute above 8,000 feet.
2. Not to exceed altitudes above 12,000 feet.
3. Must wear and monitor a pulse oximeter while flying.
4. In addition, at the time of renewal (24 months after the date of issuance) for the next medical certificate, the airman must provide a follow-up PFT with diffusion capacity, as well as pulse oximetry values during rest and exercise.

For adults at risk, the differential diagnosis of early onset COPD includes ATT deficiency. A family history of COPD or liver disease, a past personal history of childhood liver disease, and a history of tobacco usage could be useful subjective findings. Serial PFTs may be appropriate for identified patients. Pneumoccoccal and influenzal vaccinations are also recommended.[2] Within the aviation community, confirmation of the diagnosis does not necessarily lead to the relinquishment of medical certification, particularly for unprogressive and manageable disease states.

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Peripheral Vascular System *(from page 7)*

with emergency situations that require rapid resuscitation, stabilization, and immobilization. The MAST device prevents further blood loss by directing circulating blood to the vital areas and increasing profusion pressures with artificial (externally applied) peripheral resistance.

Another recent, but clinically unproved technique that plays upon peripheral resistance is Enhanced External Counter Pulsation (EECP). An EECP device inflates and deflates a series of compression cuffs wrapped around the patient's calves, lower thighs, and upper thighs. Vents modulate inflation and deflation of the cuffs, in the cardiac cycle, via computer-interpreted ECG signals. During diastole the cuffs sequentially inflate, proximately from the calves, resulting in augmented diastolic pressure and increased coronary profusion pressure. Compression of the vascular bed of the legs also increases venous flow returning to the heart and increases cardiac output. Rapid and simultaneous decompression of the cuffs at the onset of systole permits unloading and decreased cardiac workload. Providers of this therapy claim to offer symptomatic and clinical relief in patients, thereby reducing the need for anti-angina medication. In sum, we have learned clinically to provide positive pressure, negative pressure, and timed pressure to lower extremities, altering peripheral vascular resistance as needed.

In aviation, the most common management of peripheral vascular resistance and alteration of venous return (preload) are seen in today's military aircraft, which accelerate quickly and turn rapidly. The human body, for all of its extraordinary capabilities, is not made to tolerate 6, 8, or 12 times the normal force of gravity; and its response to this assault varies from impaired vision to loss of consciousness. If a force of 4 to 6 Gs is sustained for more than a few seconds, blood pressure in the head usually drops, starving the brain and initially impairing vision. Under these conditions, pilots first experience loss of color vision (gray out), then narrowing peripheral vision (tunnel vision), followed by blackout (gravity-induced loss of consciousness, or GLOC). Tests show that GLOC can last 15-20 seconds and it may take pilots 30 seconds to a couple of minutes to recover from an episode. In a battle or when flying low to the ground, such episodes could be fatal.

Traditional G-suits, which are basically air-inflatable pants, push blood back up towards the head, but some researchers are testing a different flight suit that simulates immersing the body in water. The Swiss have developed a new suit called the Libelle. It has channels of fluid encased in the garment to help simulate the protective affect enjoyed by a "fetus floating in a womb." It has two tubes running from the neck to ankle down the front and another down the back, "liquid muscles" filled with liquid. Under high-G acceleration, the hydrostatic forces increase the pressure of the fluid at the bottom of the tubes, causing them to swell and apply tension to the suit fabric; this external pressure prevents the rush of blood to the lower parts of the body.

It is important for the aviation medical examiner to appreciate how extreme changes in gravity affect the peripheral vascular system so that the importance of vascular health and physical fitness can be conveyed to pilots. ✈

Dr. Borrillo is the Medical Director of Occupational and Hyperbarc Medicine, The Toledo Hospital, ProMedica Health System. He is also an aviation medical examiner with a Commercial Pilot's rating.

Letters to the Editor

RE: Letter, FASMB Spring 2002

Dear Editor:

Dr. Myers' letter in the Spring 2002 issue [Letters, *Federal Air Surgeon's Medical Bulletin*, spring 2002, p. 13] is a complaint regarding "inadequate" sphygmomanometers and stethoscopes on commercial aircraft, particularly TWA. As the last TWA medical director, I had the responsibility for reviewing such letters and advising the company on changes to the in-flight medical kit.

By way of background, I had 20 years of military experience from Viet Nam to Desert Storm flying air rescue and aeromedical transport of patients. I am personally very familiar with the difficulties of caring for patients in flight. A commercial airliner is not a flying ICU. Yet monthly, we received letters from various specialists insisting that very complex and sophisticated medical devices be purchased and made available on the aircraft for their use. One wanted every aircraft to be equipped with his personal patented stethoscope. What was good enough for one doctor was inadequate for the next. They forgot that the stethoscope was there to put in your ears so people will stop talking long enough for you to think.

On average, we carried 3.5 million passengers per month with 11 medical events, most of which did not require a physician. Our most common events were asthma and epilepsy, and most of these were due to patient non-compliance with prescribed medications and the passengers were also traveling against medical advice. Buying more sophisticated medical equipment, which often did not work well under flight conditions, was not a solution to this problem.

As Dr. Myers noted, a stethoscope does not work well in a modern jet. It works even less in a rescue helicopter under fire. The answer then was the same as now—palpate the systolic pressure. An electronic blood pressure cuff won't give you more useful information but it is much more expensive (multiply times fleet size of 300), needs costly periodic maintenance, and when it breaks, you get no information at all.

Revision of the medical kits in aircraft came by a long process involving the FAA, the airlines and the Aerospace Medical Association working together to develop medically effective kits that meet the actual demands of most situations encountered in flight. In addition we sponsored the Aviation Medical Assistance Act, which provides Good Samaritan protection for health care responders. Even though a provider was protected from suit, this was in theory, and most carriers also provided insurance for those who responded. We were always grateful for their help. We would be happier if those who were very ill listened to their doctors and did not fly. In my seven years as an airline medical director, I never had an in-flight problem with any patient whose doctor consulted me before flight. All AMEs should use their authority vested in them by the Federal Air Surgeon to advise other health care providers and patients as to medical status before traveling. Do not expect a commercial airliner to be and emergency room and flying intensive care unit. Such fantasies are for plaintiff attorneys.

"Do not expect a commercial airliner to be an emergency room and a flying intensive care unit."

A. J. Parmet, MD,Kansas City, Mo

Farnsworth Lantern Test Availability

Dear Editor:

I have noted several times recently that FAA articles say that the FALANT test is "no longer available" [*Color Vision in Black and White*, by Ingrid Zimmer-Galler, MD, spring 2002 *FASMB*, p. 11]. That is a surprise to us at the UTMB [University of Texas Medical Branch] Aviation Medicine Center since we have been doing them for years and continue to do so. In addition, I know that others do them because up road 30 miles NASA-JSC has FALANT testing as well.

At the UTMB Aviation Medicine Center, we provide FALANT tests at no charge to aviators that have had difficulty passing plates or other tests of color perception. This can help avoid testing through the FSDO [Flight Standards District Office].

Richard T. Jennings, MD, Galveston, Texas

Dear Editor:

The FALANT is still available at many military installations and most would be happy to provide testing for the civilian pilot applicants (good public relations and it doesn't really impact the routine since the test only takes a few minutes). The lantern is still available as an OPTEC 900, which can be purchased from Stereo Optical (cost is about $5000 — very expensive, however).

Richard J. Hackman, CDR, MSC, USN
Naval Air Station, Pensacola, FL

Dr. Zimmer-Galler's response:

Perhaps I should rephrase - it would have been better to say "Not readily available." The Farnsworth Lantern Test (FALANT) is still considered the definitive color vision test for most military applications. However, even the military only has Farnsworth Lanterns in a few of its examining facilities. The Farnsworth Lantern itself is fast becoming extinct (and I believe is no longer being produced). The Farnsworth Lantern can still be found at some military facilities and NASA(and UTMB according to Dr. Jennings). A very few academic institutions may still have a Farnsworth Lantern as well, but the vast majority do not. It is safe to say that virtually no (if any) ophthalmologists and optometrists in private practice have a Farnsworth Lantern. In fact, the majority of eye care professionals in practice today have never even seen a Farnsworth Lantern because they are so rare.

For all practical purposes, therefore, the FALANT is not readily available to the general public and the vast majority of aviators (non-military) will not be able to locate a facility capable of administering the FALANT.

Nonetheless, I stand corrected, and as I said above, I should have stated "not readily available" rather than "no longer available."

On being a diabetic pilot, mentors, dreams

Dear Editor:

I began flying when I was 16 years old, soloed when I was 16, and I got my pilot's license when I was 17. Then, a day after I got my license, I got really sick—losing a lot of weight, constantly

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drinking water trying to quench my thirst, which I never did. For a week I was getting sicker, losing weight, and I was looking like death. My mom took me into the emergency room, because I was barely alive. They did tests on me and found out that I had diabetes, blood sugar was over 900. The doctors were surprised that I did not go into a diabetic coma, which can result in death. I was very lucky to be alive.

When they told me [in 1998] that I was a diabetic, the first thing that came into my mind was I thought my flying days were over.

During the week in the hospital, I was depressed, and I just wanted to sit there and die because I knew that I would never be able to fly again, and flying was life to me.

When I got home from the hospital, I learned that my best buddy had found an article on the Internet about how a diabetic pilot, **Mike Bilcik** from Oklahoma City, got his medical and was cleared to fly again [Diabetic Pilot "Overjoyed" to Fly Again, *Federal Air Surgeon's Medical Bulletin*, summer 1997, p. 1]. That article brought me back to life. I was so happy, and my hopes of flying again were great.

Jeff Gorder (center) with mentors Mike Bilcik (rt.) and Mike Bordeaux.

I was excited and wanted to talk to Mike to see how could I get my medical back. I ran a "people search" on the Internet and found his phone number. I called him, and am glad I did because it changed everything. He gave me hopes of flying again. He told me what to do, and he also gave me tips about controlling my diabetes. Right then and there, I decided that I was going to get my act together, and I was going to control my diabetes.

For six months, I showed the FAA that I could control my diabetes. I read everything I could find about diabetes, checked my blood sugar about eight times a day, watched what I ate, and I exercised.

After six months of controlling my diabetes and not flying, the FAA gave me clearance to fly again. That was the happiest day of my life! Right after I got my clearance, I rented a Cessna-172, and I flew five hours from Minnesota to Oklahoma City to see Mike.

Mike just took me under his wing and we hit it off. He was great guy to be around with, including his wife and his friends. One of his friends, **Mike Bordeaux,** was an United Airlines captain. He took me under his wing, too, gave me a tour of a Boeing 737, and he talked about being an airline pilot.

When I got back from Oklahoma, I completed my Instrument Rating. After I graduated from high school, I went to Denver to attend college.

In Denver, I got my Commercial Rating, and recently, I got my Flight Instructor's Rating. Right now, I'm working on my CFII and also getting my Multi-Engine Rating.

Looking back now, if I had never called Mike Bilcik and if he did not take the time to help me, I never would have gotten any of my ratings. I would never be flying again to this day if it was not for Mike Bilcik, his friends, and my family.

My family gave me a lot of support to get me through this. They kept on telling me, "Never give up, keep on going toward your dream."

My dream is to become an airline pilot. Right now, I can't because I only can get a third-class medical, and you need a first-class to fly for an airline. But I have three years or more until I finish college. I hope within that time, something will change, and the FAA will grant me a first or even a second-class medical.

I pray for that day to come, but in the meantime, I will keep on flying and hope for the best.

Jeffrey D. Gorder
Aurora, Colo.

Conversations With Joe

By Harriet Lester, MD

In sadness, we acknowledge the passing of **Joseph C. Fischer**, MD, an aviation medical examiner from Syracuse, New York. Joe died on 4/24/02, when his private aircraft crashed in Parish, New York. Another pilot was aboard and also did not survive the accident.

Joe Fischer was not only an enthusiastic AME, he was also an avid pilot over the last several years. I had the pleasure of getting to know him at the Basic AME course in Oklahoma City, and I designated him a month later, in April 2001.

Joe was very talented and was also a genuinely nice person. It turned out that we had a mutual friend, **Randy Sherman**, MD, a Senior AME from Los Angeles, Calif., and the Chairman of Plastic Surgery at USC. Randy had been Joe's senior resident in surgery at SUNY Upstate, and they both became plastic surgeons. I found out after Joe passed that my sister, **Benisse Lester**, MD, had trained with him at New York University Medical Center while Joe was doing his plastic surgery fellowship and she her orthopedics residency—she remembers him fondly. Small world.

I spoke with Joe Fisher's wife, **Kathy**; and with one of his sons, **Bryan**, age 15. Joe had 5 children and was one of 7 children himself. Kathy spoke of the outpouring of sympathy after his death and said simply, "He touched a lot of people."

She said that in becoming a pilot, Joe had connected in a special way with his father, a former fighter pilot, who had been shot down over Germany during WWII and captured. He later served in the Korean war and is still living. Joe and I had spoken of his father and his love of flying. My father had also served in WWII. We had spoken of our parents and my parents' recent deaths.

Joe was very conscious of his mortality. He used this awareness to enrich his life and the lives of others. Joe treasured his loved ones, and he knew life wasn't for keeps. It was a rich conversation.

Joe will be missed.

Living and Flying 'Over Gross'

How to Jettison Fat

By Glenn R. Stoutt, Jr., MD
Senior FAA Aviation Medical Examiner

"The time has come the Walrus said, to talk of many things…"
—From Lewis Carroll's *The Walrus and the Carpenter*

THIS JUST MIGHT BE THE TIME to decide to lose some weight, especially since summer is here, and bathing suits and shorts show it like it is. There is no problem with motivation. Take just about any three people you see: The odds are that one needs to lose weight and one is obese.

Lifting the Fog

Motivation books are really worthless because anyone who buys one is already motivated. *The problem is self-discipline*.

The search for the easy fix leads to myriad diets and resolutions to lose weight. Diet-book writers dance on the table and promote erroneous and dangerous fads that sell, and sell and sell. Millions spend millions of dollars to join the dog-and-pony shows in a burst of enthusiasm *and do lose weight fast*.

But, the point is not to lose weight but to lose fat. You can easily lose twenty pounds of weight in two weeks. First goes the glycogen (sugar) in your liver, then goes water, and finally muscle protein is burned. The immutable law of metabolism is that 3500 calories must be burned to lose a pound of fat.

All miracle diets—when studied carefully—are actually low-calorie diets. Eventually, after a few months or so you either become sick of the diet, or become sick physiologically.

"I can't lose weight. I have a very low metabolism. It's hereditary—everyone in my family is fat. My thyroid is not working right. I have cellulite all over." These are excuses, not reasons.

Think of this: If the person dearest to you would die if you did not lose fat (in a reasonable time) it's inconceivable that you would not do so. Self-discipline would then take care of the fat. So, the argument that you *cannot* lose fat is not valid.

Diets

A psychological barrier with most diets is that they emphasize what you *cannot* eat—they accentuate the negative. Here is a positive, **foolproof** way to eat properly and still never go hungry. No one should ever go on a diet. Instead, learn to eat properly. Stay on this list of foods until you get to your desired weight. Plan on losing a pound a week (see sidebar).

Until you have attained your goal, if a food is on this list, eat it. If not, don't.

There is absolutely no way to avoid losing fat if you eat only these foods. And, you will not lose an ounce of muscle.

Forget that there is such a word as "diet."

Scales

Stop weighing yourself. How do your clothes fit? How do you look unclothed in the mirror? Scales tell nothing but how much you weigh.

Patience

Be patient. Losing 50 pounds of fat might take as much as a year. But, it probably took over a year to accumulate the pounds. New clothes do not become snug or tight in just a few months. If just your pants or skirt are too tight, even a few weeks of proper eating will accomplish wonders—for your appearance and mood.

Snacks

A snack at mid-morning, mid-afternoon, and late evening will keep any hunger away. Six small meals are always much better than the three regular ones we are accustomed to.

Meats

Choose one: fish, chicken, turkey, or beef once a day. Not all four.

Exercise

Regular exercise is absolutely necessary. A rule of thumb for fat loss: about 80% from diet and 20% from exercise. Both are essential.

Balance

When you attain your desired body proportions (not just weight), relax a bit down to the *Rule of 80/20.* Eat in moderation about 80 percent of the time, and enjoy what you like to eat (again, reasonably) the other 20 percent of the time. You don't have to give up the pleasures of foods you really like.

Dr. Stoutt is a partner in the Springs Pediatrics and Aviation Medicine Clinic, Louisville, Ky., and he has been an active AME since 1960. No longer an active pilot, he once held a commercial pilot's license with instrument, multi-engine, and CFI ratings.

Moderate

Self-discipline is the key to attaining and keeping your optimum body fat all your life.

No use being a zealot. A couple of teaspoons of sugar on your morning oatmeal or cereal, and beans or greens cooked in a small amount of bacon or ham won't wreck your routine. Eat just about anything you want or crave (*reasonable amounts*) for one meal a week. Life without pizza on the weekend would be unendurable for some people. One alcoholic beverage (a beer, glass of wine, or a drink) once a week at mealtime is fine. Any eating plan will fail if it is too rigid.

Size

You have nothing to lose but fat, and some sizes in your belt and clothes.

Timing

Is this *your time* for blubber elimination? King Solomon wrote of the proper "time for everything under the sun": a time to sow and a time to reap, a time to live and a time to die—and so on. No one will decide to lose fat (or stop being an alcoholic) until the proper time is reached—for him or her. For people who are tortured by being overweight, the time just might be right now.

Yours for good health and safe flying

Glenn Stoutt

The Best of the Best Foods

Feature them in your foolproof eating plan

All-bran cereals
Apples
Asparagus
Bananas
Beans
Beef (lean cut; four ounces per day)
Beets
Berries
Bread (whole-grain) 1-3 slices a day
Broccoli
Brussels sprouts
Buttermilk (low-fat)
Cabbage
Cantaloupe
Cauliflower
Celery
Chicken breast (no skin; broiled or baked) 4 ounces per day
Collard greens
Condiments (just about any that don't have a lot of fat, sugar, or salt)
Cottage cheese (low-fat or no-fat)
Cream (fat-free sour cream)
Cucumbers
Eggs 1-2 a day if your cholesterol is OK. (hard-boiled or poached)
Fish (cod is great)—not fried!
Kale
Lettuce
Margarine (no fat)
Milk (skim; no-fat)
Mushrooms
Mustard greens
Nuts (handful a day at most)
Oatmeal
Olive oil (moderate amounts for salads and flavoring)
Onions
Oranges
Pears
Peas
Peppers, green or red
Pickles
Pineapple
Popcorn, unsalted and unbuttered
Pork (lean; 4 ounces a day)
Potatoes (Irish or sweet, with skin) one big or two small
Radishes
Rice (brown or wild)
Salad dressing (no-fat)
Salsa
Soft drinks (no sugar)
Soy products (tofu, etc.)
Spinach
Squash
Sugar substitutes (Aspartame and Saccharine)
Tomatoes
Turkey breast (no skin; broiled or baked) 4 ounces per day
Turnip greens
Turnips
Yams
Yogurt (plain; unsweetened)
Zucchini

Note: The views and recommendations made in this article are those of the author and not necessarily those of the Federal Aviation Administration.

CAMI Education Division Manager Named

Dr Jones

The director of the Civil Aerospace Medical Institute (CAMI), **Melchor J. Antuñano**, MD, announced the selection of **Richard F. Jones**, MD, MPH, as the new manager of CAMI's Aerospace Medical Education Division.

"It is with great pleasure that I welcome Dr. Jones to our management team at CAMI," Dr. Antuñano stated. "Dr. Jones has accepted the challenge to lead and promote the FAA's Aerospace Medical Education Programs. He possesses the right combination of technical and managerial qualifications to take the Aerospace Medical Education Division into the next level of organizational effectiveness and efficiency."

Dr. Jones most recently was Medical Director of the Prevea Clinic Occupational Medicine Department in Green Bay, Wisconsin, where he practiced clinical Occupational and Aerospace Medicine. He was also Medical Director for Travel Care International, Hillshire Farms & Kahn, and the Oneida Tribe of Indians, along with other medical responsibilities in the state.

He retired with the rank of colonel in 1995 after a 27-year career in the US Air Force. In his last USAF position, he served as the Commander/Deputy Director of the Armstrong Laboratory, Brooks AFB, Texas.

Commenting on his selection, Jones said he is "very excited about this opportunity. All of my past professional experiences seem tailor-made to prepare me for this job. In fact, this was a position I have desired since teaching Air Force flight surgeons. If this job had been available when I left the USAF, I would have never gone into private practice. I can't wait to begin this next phase of my life, but I particularly look forward to forming new associations, working relationships, and friendships with CAMI personnel."

Aviation Medical Examiner

2002-3 Seminar Schedule

July 12 - 14 ---------- Bellevue, WA ---------- N/NP/P (2)
August 16 - 18 -------- McLean, VA ---------- AP/HF (2)
September 9 - 13 ----- Oklahoma City, Okla. ---------- Basic (1)
December 2 - 6 ------- Oklahoma City, Okla. ---------- Basic (1)

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January 10 - 12 ------- Phoenix, Ariz. ---------- CAR (2)
March 10-14 ---------- Oklahoma City, Okla. ---------- Basic (1)
April 25-27 ---------- Atlanta, Ga. ---------- OOE (2)
May 5-8 ---------- San Antonio, Texas ---------- N/NP/P (3)
June 9-13 ---------- Oklahoma City, Okla. ---------- Basic (1)

CODES

AP/HF Aviation Physiology/Human Factors Theme

CAR Cardiology Theme

OOE Ophthalmology - Otolaryngology - Endocrinology Theme

N/NP/P Neurology/Neuro-Psychology/Psychiatry Theme

(1) A 4½-day basic AME seminar focused on preparing physicians to be designated as aviation medical examiners. Call your regional flight surgeon.

(2) A 2½-day theme AME seminar consisting of 12 hours of aviation medical examiner-specific subjects plus 8 hours of subjects related to a designated theme. Registration must be made through the Oklahoma City AME Programs staff, (405) 954-4830, or -4258.

(3) A 3½-day theme AME seminar held in conjunction with the Aerospace Medical Association (AsMA). Registration must be made through AsMA at (703) 739-2240.

The Civil Aerospace Medical Institute is accredited by the Accreditation Council for Continuing Medical Education to sponsor continuing medical education for physicians.

New International AMEs. Pictured at a recent Basic AME seminar are(L-R): Drs. **Surendra Sodhi** (Abu Dhabi, UAR), **Nora Lari-Castrillon** (Lima, Peru), and **Michael Rosser** (St. Helier, Channel Isles). **Bobby Ridge** (Contract Administrative Assistant for the International Region), explains coordination rules with the newly-appointed examiners.