



# 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.

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#### Federal Air Surgeon's Medical Bulletin

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## from the Federal Air Surgeon's **PERSPECTIVE...**

by James R. Fraser, MD, MPH

#### NEW OBSTRUCTIVE SLEEP APNEA GUIDANCE, TAKE 2

OBSTRUCTIVE SLEEP APNEA is a disqualifying medical condition for an airman medical certificate under Title 14 of the Code of Federal Regulations, part 67 (Medical Standards and Certification). Obstructive sleep apnea is a significant cause of fatigue, and therefore it is a hazard to the safety of the National Airspace System and health of airmen. Obstructive sleep apnea inhibits restorative sleep and can cause excessive daytime sleepiness, personality disturbances, cardiac dysrhythmias, myocardial infarction, stroke, sudden cardiac death, and cognitive impairments (decreased memory, attention, planning, problem solving, and multi-tasking).

Citing the significant medical and safety implications of obstructive sleep apnea (OSA), plus the fact that it is underdiagnosed in the U.S. pilot population, as well as observing recommendations from the National Transportation Safety Board (NTSB), the FAA Federal Air Surgeon proposed guidance to aviation medical examiners (AMEs) on screening for OSA ["New Obstructive Sleep Apnea Policy," *Federal Air Surgeons Medical Bulletin*, Vol. 51, No. 4, p.2].

At that time, Dr. **Tilton** advised AMEs that they would be expected to calculate the body mass index (BMI) for every airman and refer individuals with a BMI of 40 or higher to a sleep medicine specialist to determine need for treatment. Following treatment, if indicated, these individuals would receive Special Issuance medical certification. While the proposal was designed to identify only the highest risk individuals, the announcement created concerns in the aviation community and ultimately resulted in proposed legislative prohibitions from Congress.

Responding to industry stakeholder and Congressional concerns, the Office of Aerospace Medicine deferred issuing new OSA medical screening guidance to AMEs. We have subsequently worked with AMEs, pilot advocacy organizations, and the aviation industry stakeholders to incorporate their ideas for a more inclusive approach for airmen that would also address the safety concerns of the FAA and the NTSB.

I believe this new OSA screening guidance will significantly improve upon the safety of the National Airspace System. A significant secondary benefit will be improved pilot health and career longevity. The changes in the certification process substantially expand physician screening options to reduce the frequency and costs of unnecessary evaluations and testing.

For those airmen determined by the AME to be at substantial risk, one of the most significant benefits is the result of the issuance of a medical certificate with accompanying Federal Air Surgeon request for further evaluation. This will save months of flying—compared to the current policy requiring deferral.

Overall, aviation safety and pilot health will be enhanced while reducing the financial burdens and disincentives for obtaining OSA evaluation and treatment. Improved AME and pilot awareness of the dangers of OSA and the benefits of treatment will continue to grow. We will publish new OSA guidance in the Guide for Aviation Medical Examiners on March 2, 2015.

#### MAJOR POINTS IN THE NEW OSA SCREENING GUIDANCE

- No disqualification of pilots based on BMI alone. The risk of OSA is determined by an integrated assessment of history, symptoms, and physical/clinical findings.
- The OSA screening process must be completed by the AME using the American Academy of Sleep Medicine guidance to be provided by reference material incorporated in the Guide for Aviation Medical Examiners.
- Documentation of the OSA screening can be provided by the AME simply by checking the appropriate block while completing the airman's 8500-8.
- Pilots determined to be at significant OSA risk will be issued a medical certificate and referred for an evaluation.
- OSA evaluations may be completed by any physician (including the AME), not just sleep specialists, using the American Academy of Sleep Medicine's guidance.
- Evaluations do not require a laboratory sleep study or even a home study if the evaluating physician determines the airman does not require it.
- Results of the evaluations can be given to the AME, forwarded to the Aerospace Medical Certification Division (AMCD), or sent to the Regional Flight Surgeon's (RFS's) office within 90 days of the FAA exam to satisfy the evaluation requirement. The pilot continues to fly during this period.
- If the pilot needs additional time beyond 90 days to complete the evaluation, a 30-day extension will be granted by the AMCD or the RFS on request.
- Pilots diagnosed with OSA can send documentation of effective treatment to the AMCD or the RFS's office in order to receive consideration for a Special Issuance medical certificate.
- The FAA will send the pilot a Special Issuance letter documenting the follow-up tests required and timing of the reports.
- Most follow-up reports will only require usage data from the CPAP machine and a brief statement from a physician.

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## OAM ANNOUNCES PERSONNEL CHANGES

By Michael A. Berry, MD, MS Deputy Federal Air Surgeon

#### Dr. Giovanetti Receives Headquarters Assignment

I am very pleased to announce that **Penny Giovanetti,** DO, MS, was selected to manage the Office of Aerospace Medicine's

Medical Specialties Division in Washington, D.C. She brings a great deal of Aerospace Medicine experience from her time in the Air Force and with the Aerospace Medical Certification Division in Oklahoma City for the past 2 ½ years

In her new position, Dr. Giovanetti is responsible for developing aerospace medicine policies and procedures, overseeing the process of medical appeals to the Federal Air Surgeon, providing oversight of FAA employee drug and alcohol testing, managing and admin-



Dr. Giovanetti Manager, Medical Specialties Div.

istering complex psychiatric cases, and providing aerospace medicine expertise and advice to the Federal Air Surgeon.

Dr. Giovanetti joined the FAA in August 2012, coming from private practice in Physical Medicine and Rehabilitation. She retired from the US Air Force in 2007 after a 27-year career as a flight surgeon, staffer, and commander. She held numerous positions in aeromedical standards to include the Tactical Air Command Surgeon's Office, Air Force Surgeon General's Office and the US Air Force Academy. She was Vice Wing Commander of the 311th Human Systems Wing, host to the USAF School of Aerospace Medicine.

She holds a doctorate in osteopathic medicine from Des Moines University, master's degrees in Preventive Medicine and Environmental Health from the University of Iowa, National Security Strategy from the National War College, and a bachelor's degree in English from Stanford University. She completed residencies in Aerospace and Occupational Medicine, and is a Diplomate of the American Board of Preventive Medicine in Aerospace Medicine and Occupational Medicine. She also completed a residency in Physical Medicine and Rehabilitation and is a Diplomate of the American Board of Physical Medicine and Rehabilitation. She is a Fellow of the Aerospace Medical Association, and winner of the **Howard R. Unger Award** for the best published paper by a USAF flight surgeon. Dr. Giovanetti is also a licensed private pilot.

Dr. Giovanetti fills the vacancy that was created when Dr. **Michael Berry** was selected to become the Deputy Federal Air Surgeon.

New Alaskan Regional Flight Surgeon Selected

We are pleased to announce that we have selected **Marcel V. Dionne**, MD, MSPH, as the new Alaskan Regional Flight Surgeon to fill the position vacated by Dr. **Willis Simmons**. We are very excited to have Dr. Dionne join the Office of Aerospace Medicine family and ask that you welcome him to Alaska. His start date was January 11, 2015.

Most recently, Dr. Dionne served as Director of Medical Services, Fairweather LLC, a company providing advanced logistics services to



Dr. Marcel Dionne Alaskan Regional Flight Surgeon

offshore oil companies in Anchorage, Alaska. Prior to that, he had a distinguished 21-year career as a Flight Surgeon in the United States Air Force, retiring in 2013. In the Air Force he had a number of command positions, one of which was the Chief of Aerospace Medicine at Elmendorf AFB, Alaska, for five years. His last assignment was as a medical inspector and team chief at the Air Force Inspection Agency. He was rated a Chief Flight Surgeon.

He graduated from the University of Maine summa cum laude with a bachelor of arts in chemistry in 1982. He received a doctorate in medicine from Tufts University School of Medicine in 1986 and completed a residency in family medicine in 1989. He is a Diplomate of the American Board of Family Medicine. After spending a few years in a rural private practice, Dr. Dionne was commissioned in the Air Force Medical Corps in 1992. In 1999, he received a master of science in public health degree from the University of Colorado Health Sciences Center, and in 2000, he completed residencies in aerospace medicine and occupational medicine at Brooks Air Force Base, Texas. He is a Diplomate of the American Board of Preventive Medicine in Aerospace Medicine and Occupational Medicine.





OAM REMEMBERS DR. SAENGER By Michael A. Berry, MD, MS

**Saturday morning**, November 15, 2014, we lost one of our long-time members, Dr. **Arleen Saenger**, the Manager of the Aeromedical Standards and Policy Branch in AAM-200. Arleen had been with the Federal Aviation Administration for 12 years and was the Branch Manager when I came to AAM-200 as the Division Manager eight years ago. I have actually known Arleen since she was a Resident in Aerospace Medicine in the Air Force. I considered her a friend, and colleague, more than an employee. She was integral to the mission and accomplishments of AAM-200. I said on many occasions and often to her, that I could not imagine doing my job without her working with me.

Now we must do so.

This is a sad loss for the Office of Aerospace Medicine, as well as for me personally and for many of you who knew her. Arleen had been fighting lung cancer for the last three years and finally lost the battle.

Dr. Berry is the Deputy Federal Air Surgeon.

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## AVIATION MEDICAL EXAMINER INFORMATION LINKS

Guide for Aviation Medical Examiners www.faa.gov/go/ameguide

Register for an AME Seminar www.faa.gov/other\_visit/aviation\_industry/designees\_ delegations/designee\_types/ame/seminar\_schedule/

> AME Training Information www.faa.gov/go/ametraining

AMCS Online Support www.faa.gov/go/amcssupport

Regional Flight Surgeon Contacts www.faa.gov/go/rfs

Pilot Safety Brochures www.faa.gov/go/pilotsafetybrochures

Multimedia Aviation Medical Examiner Refresher Course (MAMERC): www.faa.gov/go/ametraining

Medical Certification Information www.faa.gov/go/ame/

Video Training Topics http://faa.gov/tv

MedXPress Login & Help https://medxpress.faa.gov

MedXPress Video Page www.faa.gov/tv/?mediaId=554

> FASMB Archives www.faa.gov/go/fasmb

CAMI Library Services www.faa.gov/go/aeromedlibrary

Airman Education Programs & Aerospace Physiology www.faa.gov/pilots/training/airman\_education/aerospace\_physiology/

2013 Medical Certification Statistical Handbook www.faa.gov/data\_research/research/med\_ humanfacs/oamtechreports/2010s/media/201415.pdf

## CAMI RECEIVES 'ACCREDITATION WITH COMMENDATION' Team Lead for AME Education Worked Hard to Receive ACCME Accreditation for Six Years, Instead of Four—Twice

THE ACCREDITATION COUNCIL for Continuing Medical Education (ACCME) accredits organizations, such as the FAA's Civil Aerospace Medical Institute (CAMI), which offers continuing medical education for some 3,200 aviation medical examiner (AME) designees. CAMI recently applied for and was awarded Accreditation with Commendation, which means they won't have to reapply for another six years, instead of the usual four years. This will not only save money in application fees, but it will save an immense amount of time.

Aerospace Medical Education Division (AMED) Team Lead for AME Education, **Janet E. (Jan) Wright**, estimates that it took her four months of work explaining, documenting, and illustrating what CAMI does and how it meets ACCME criteria in preparation to apply for the formal review process.



Jan Wright

"It involved putting together a 146- **AMED Team Lead** page self-study in addition to 15 seminar-specific 12-page activity documents. We had to prove that we consider stakeholders' needs; work with the aviation community; provide education through a variety of means, including brochures and the *Federal Air Surgeon's Medical Bulletin* that we use to educate and inform pilots and AMEs; and that we have some system of quality assurance. Then we had a face-to-face interview to explain, clarify and defend."

As physicians, AMEs are required to meet continuing medical education requirements. Since CAMI's medical education program meets ACCME standards, AMEs can attend training and not only get FAA policy, procedures, and best practices, they also get continuing medical education that helps them stay board certified.

"I'm thrilled about this," Jan said. "I did this six years ago when I first got here. The reaccreditation was my first assignment in Aerospace Medical Education. We got six years last time, and we got six years this time. CAMI was the first organization using the 2006-updated criteria to get Accreditation with Commendation six years ago. It was a lot of work. I'm proud of the accomplishment, and I'm proud of our ability to provide this to our AMEs."

> ↔ Information provided by AVS Flyer

## AVIATION MEDICAL EXAMINER SEMINAR SCHEDULE 2015

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March 23-27	Oklahoma City, Oklahoma	Basic (2)
May 11-14	Orlando, Florida	AsMA (3)
June 8-12	Oklahoma City, Oklahoma	Basic (2)
July 17-19	Philadelphia, Pennsylvania	Refresher (1)
October 8-10	Fort Worth, Texas	CAMA (4)
October 26-30	Oklahoma City, Oklahoma	Basic (2)
November 20-22	St. Louis, Missouri	Refresher (1)

## NOTES

- A 2½-day theme aviation medical examiner (AME) seminar consisting of aviation medical examiner-specific subjects plus subjects related to a designated refresher theme. Registration must be made through the Oklahoma City AME Programs staff, (405) 954-4831, or online through the link on the <u>AME seminar webpage</u>.
- (2) A 4½-day basic AME seminar focused on preparing physicians to be designated as aviation medical examiners. Call your Regional Flight Surgeon.
- (3) A 3½-day refresher AME seminar held in conjunction with the Aerospace Medical Association (AsMA). This seminar is a Medical Certification refresher, with aeromedical certification lectures presented by FAA medical review officers, in addition to other medical specialty topics. Registration must be made through AsMA at (703) 739-2240. A registration fee will be charged by AsMA to cover their overhead costs. Registrants have full access to the AsMA meeting. CME credit for the FAA seminar is free.
- (4) This seminar is being sponsored by the Civil Aviation Medical Association (CAMA) and is sanctioned by the FAA as fulfilling the FAA recertification training requirement. Registration will be through the CAMA website: www.civilavmed.com

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

## NEW CAMI RESEARCH FACILITIES FULLY OPERATIONAL By Mike Wayda

The Civil Aerospace Medical Institute, CAMI, recently upgraded three advanced facilities that could positively affect aviation safety in the years to come.

#### Van Gowdy Research Test Track

A new impact test facility features a computer-operated sled

A on a 110-foot track that runs more efficiently and at higher acceleration levels than the track it replaces, allowing CAMI researchers to obtain data that will eventually help passengers and crew survive commercial



aircraft accidents. The main research application is to improve the crash safety provided by aircraft seats and restraint systems.

Impact tests are conducted using an accelerator-type sled system. Test specimens are mounted on a sled that is propelled along precision rails by a pneumatic cylinder and controlled by a servo hydraulic brake system. This system can accurately reproduce the high frequency/high G accelerations that occur during survivable aircraft crashes.

Any impact vector can be replicated by adjusting the orientation of the test article on the sled. During impact tests, the seats are occupied by instrumented anthropometric test dummies (ATDs)

#### Portable Reduced Oxygen Training Enclosure

Hospite that, relatively few pilots have had practical training to combat this danger. The Civil Aerospace Medical Institute was one of the first to offer hypoxia training to the civil aviation community through the use of altitude chambers.

CAMI's altitude chambers have been used successfully for well over 50 years and have an impressive safety record, but they also have limitations. First, pilots have to be clear of any upper respiratory ailments that could cause ear and sinus issues. Second, even though the chambers are considered safe, there is still a remote chance of developing decompression sickness associated with unpressurized flights to high altitudes. Finally, pilots must travel to Oklahoma City to get the training because the altitude chamber is immobile.



The Portable Reduced Oxygen Training Enclosure (PROTE) solves all of these problems. The PROTE uses mixed-gas technology to induce hypoxia, so it has distinct ranging in size from a 1-year-old child to a 95<sup>th</sup> percentile male. Accelerations, forces, and deflections measured inside the ATDs during a test are recorded on a multi-channel, high-speed data acquisition system and evaluated to determine the risk of injury. The impact facility became fully operational in June of 2014.

#### **Flexible Aircraft Simulator**

The second new research facility now operational is the

Flexible Aircraft Simulator, or FlexSim. While we covered this remarkable research facility in the previous *Bulletin* ("FlexSim

Debuts at CAMI," Vol. 52, No. 4, p. 5), it deserves another mention.

FlexSim's mission is to provide simulations of single-aisle transport category airplanes (airliners) with seating for up to 120 passengers. The FlexSim



is mounted on electro-mechanical scissor lifts that can raise the cabin to doorsill heights applicable to a range of airplane types, as well as pitch and roll the cabin to simulate various landinggear-out, post-crash configurations. The purpose of this capability is to allow research into emergency procedures and evacuations from multiple crashed configurations.

The equipment was procured as part of the Aerospace Medical Equipment Needs program that was initiated in 2009. Both of these facilities were dedicated in November 2014.

'These upgrades enhance CAMI's capabilities to conduct applied research in aerospace medicine and human factors, and provide unique tools to conduct practical training that promotes and enhances the National Airspace System' —Melchor J. Antuñano, Manager, CAMI

advantages over existing altitude chambers. Since mixed gas is used, issues with ears and sinuses are diminished, as well as the risk of decompression sickness caused by exposures to altitudes of 18,000 feet or higher.

Aviators can experience their personal symptoms of hypoxia without risking any of the above-mentioned issues of pressure reduction. An added bonus is that the PROTE is portable. It can be shipped to various locations and be operational in two hours. Pilots enter, sit down for five minutes to discover their personal symptoms of hypoxia, don an aviation oxygen mask, and their hypoxia symptoms quickly disappear. Pilots walk out of the training chamber knowing their personal symptoms of hypoxia, so they can use that awareness while flying to identify hypoxia symptoms and take corrective action.

## NEW VIDEO SERIES HIGHLIGHTS RECENT UPDATES AND COMMON ERRORS *New Online Video Series Posted* By Judith Frazier, MD, MBA

Are you or your staff having trouble keeping up with all of the new updates to the Guide for Aviation Medical Examiners? Are you unsure of how to issue a certificate under the CACI (Conditions AME Can Issue) program or how to issue an interim certificate? We have the answers for you.

Thanks to collaboration between the Aerospace Medical Education Division and the Aerospace Medical Certification Division, the Aviation Training Network studio, and FAA Media Solutions, a video series is available for you to keep up with the ongoing changes and updates to the Guide for Aviation Medical Examiners.

We understand the frustration of being in a busy clinic practice with limited time to stop what you are doing to look up information. This brief series will help you work more efficiently and knowledgeably. Each video is less than 20 minutes, so they can be viewed with minimal inconvenience to your busy schedule.

The title of the series is "Updates and Common Errors," and it goes through the current certification process on different conditions, the common errors we see, and how to avoid them. Topics covered include:

- Video 1—Certification Updates and Common Errors: Series Introduction (run time: 14:40)
- Video 2—Certification Updates and Common Errors: Medications (run time: 13:32)
- Video 3—Certification Updates and Common Errors (CACI) conditions—Asthma, Arthritis, Colitis, Glaucoma, and Hepatitis C (run time 16:47)
- Video 4—Certification Updates and Common Errors: CACI conditions—Hypertension, Hypothyroid, Migraine and Chronic Headache, and Pre-Diabetes (run time: 9:33)
- Video 5—Certification Updates and Common Errors: (CACI) conditions—Renal, Prostate and Testicular Cancer (run time: 6:21)

The videos are located on the http://faa.gov/tv website. Enter CACI or medical certification in the search box. Then look for FAA TV.

Additional educational activities are planned regarding updates and common errors including a short series on navigating the Guide for Aviation Medical Examiners, and the second annual update via satellite broadcast to the regional office conference rooms, tentatively scheduled for April 2015.

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Dr. Frazier is a medical review physician in the Aerospace Medical Certification Division.



Dr. Fraser (right) is congratulated by Civil Aviation Medical Association President Mark Eidson, MD.

## DR. FRASER RECEIVES CAMA AWARD By AVS Flyer

FEDERALAIR SURGEON **Dr. James Fraser** was presented with the Forrest and Pamela Bird Award at the annual scientific meeting of the Civil Aviation Medical Association (CAMA) on October 10, 2014, in Reno, Nev.

The award is given to an aircrew member, technologist, legislator, physician, or passenger who has provided service to avert or limit injury or danger to others in the aviation field, whether through education, legislation, or service during an in flight emergency. In this case, Dr. Fraser was recognized for "exceptional contributions to all aspects of Aerospace Medicine as a clinician, teacher, author, researcher, and administrator." Dr. Fraser, a longtime CAMA member, was recognized for both his current leadership of the Office of Aerospace Medicine and his prior service as a highly decorated Navy physician.

"I was truly surprised to receive such an honor," said Dr. Fraser. "You hear this a lot, but I mean it, even though I received the award, the real credit goes to my colleagues here in the Office of Aerospace Medicine who do such great work."

CAMA officials also lauded Dr. Fraser's contribution to the association, calling him "one of our most valued resources in our mission to support and educate aviation medical examiners (AMEs)."

For his part, Dr. Fraser expressed appreciation for CAMA's contribution to aerospace medicine. "CAMA plays a vital role in representing our most senior and experienced AMEs," he said. "We depend on AMEs to be our designees at the tip of the spear, interacting with airmen on a daily basis."

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## ALCOHOL-RELATED MOTOR VEHICLE ENCOUNTER WITH A COW By Michael D. Jacobson, DO, MPH

More than 32,000 aviators with a history of drug/ alcohol abuse or dependence or drug/alcohol-related offenses currently hold FAA airman medical certificates (Skaggs, Norris, & Johnson, 2012). Despite a proven, effective deterrence and rehabilitation program for airline pilots, alcohol is still associated with 6-8% annually of pilot fatalities in aviation mishaps, especially in general aviation. This article presents the case of an alcohol-related auto accident involving a first-class pilot and reviews the history and state of relevant FAA policy.

#### Background

A40-YEAR-OLD MALE FIRST-CLASS pilot with 900 total flying hours and 150 in the last six months, presented for firstclass medical recertification four months after an alcohol-related motor vehicle accident. At the time of the incident, he held Airline Transport and Commercial Airman certificates.

The airman was restrained in his vehicle and traveling alone at night when he struck a cow in the road, triggering airbag deployment, a brief but indeterminate loss of consciousness, and multiple injuries. He was transported to a trauma center where comprehensive x-rays and CT scans revealed fractures of multiple ribs, sternum and scapula, and small, bilateral, apical pneumothoraces. Blood-alcohol concentration (BAC) in the emergency department was 105 mg/dL (0.105%).

He was hospitalized, treated conservatively for his injuries, and after three days was discharged on a normal diet and oral analgesics. The head injury was ruled a concussion (normal head CT), and he recovered uneventfully. Due to the blood-alcohol level, his airline employer requested a formal evaluation for alcohol/substance use disorder. A substance abuse professional reported that the airman had a history of controlled alcohol use without any consequent legal issues or offenses. Since the airman did not meet DSM-IV criteria for alcohol dependence, the substance abuse professional's findings were inconclusive, and a recommendation of total abstinence from alcohol was rendered.

#### Aeromedical concerns

Alcohol depresses the central nervous system, thereby degrading mental and physical performance in a dose-response manner, ranging from subtle impairment, such as inattention, prolonged reaction times and forgetfulness, to visual disturbances, ataxia, dysarthria, respiratory depression, and myocardial conduction disturbance (Franzos et al., 2012). Mumenthaler et al. (2003) showed that impaired performance continues beyond the eight-hour sobriety period in pilots intoxicated to 0.10%. **Outcome** 

Each time an airman applies to the FAA for a medical certificate, he/she must acknowledge (Block 18v) if arrested, convicted, or had an administrative action taken in regard to driving while under the influence of alcohol or any other drug.

#### ETIOLOGY OF ALCOHOL ABUSE

The prevalence of alcohol abuse and dependence in the general population is estimated to be 10% (Franzos, Franzos, Woolford, & McDonald, 2012). Its relevance to the safety of flight became a sudden and primary concern to the public in the wake of a 1964 article by Harper and Albers (Harper & Albers, 1964). Their study of blood and tissue specimens of 158 general aviation fatalities revealed that over one-third (35.4%) were positive for alcohol at a time when the alcohol-related pilot fatality rate was believed to be only 4%. Since ethyl alcohol from autopsy tissue can come not only from oral ingestion but as a byproduct of cellular decomposition, this study may have overestimated the level of drinking in pilots. Nevertheless, the article dramatically brought the issue of aviator substance abuse to the forefront of the public's attention. In the 1970s, the Air Line Pilots Association joined efforts with the federal government to develop what became the Human Intervention Motivation Study, a program to treat alcoholism in the airline pilot community and get them back to work.

The FAA has monitored alcohol-related motor vehicle convictions for pilot involvement since 1990. In accordance with Title 14 of the Code of Federal Regulations (CFR) part 61.15, pilots must report such incidents to their AME and to the FAA Civil Aviation Security Division ("FAA Security") within 60 days of an event. The FAA also prohibits any aircrew member from working in that capacity within eight hours of consuming alcohol ("bottle-to-throttle"), while under its influence, or with a BAC of 0.04% (40 mg/dL) or higher (14 CFR 91.17).

Policy changes and interventions have witnessed a sharp decline in alcohol-related aviation fatalities. Data from the Civil Aerospace Medical Institute (CAMI) indicate that mishaps, in which blood alcohol exceeded the 0.04% threshold, dropped from over 30% in the 1960s to 8% by 1993 to as low as 6.4% (Chaturvedi, Craft, Canfield, & Whinnery, 2005). The most recent five-year interval report (2004-2008) identified 1,353 pilot fatalities, of which 92 (7%) were found to have alcohol present in their systems in excess of 0.04%. Eighty-six (94%) were flying general aviation aircraft. Of the 208 pilots who died while holding an air transport pilot (ATP) rating, only 13 had alcohol in excess of standards, and none was on ATP duty at the time of the crash (Canfield, Dubowski, Chaturvedi, & Whinnery, 2012). Nevertheless, alcohol violations still occur in airline pilots. A study of 350 newspapers by Kraus & Li (2006) discovered 13 alcohol violation incidents involving 17 airline pilots between 1990 and 2006. In 85% of cases, the impaired pilot was first identified by airport personnel (e.g., security screeners). The average BAC was 90 mg/dL. Six of the 17 pilots were prosecuted criminally, with five serving jail time.

#### Alcohol from page 8

Since no legal BAC was performed and this airman was never cited for a DUI, he had no obligation to report this incident under that requirement. However, additional instructions in the FAA's Guide for Aviation Medical Examiners for the application's Item 47 (psychiatric history) defines substance abuse as "Use of a substance in the last 2 years in which the use was physically hazardous (e.g., DUI or DWI) if there has been at any other time an instance of the use of a substance also in a situation in which the use was physically hazardous." In light of the obvious safety concern, the airline notified the FAA. After review, the FAA issued a letter affirming that the airman was still eligible for a first-class medical certificate, but warned him that any further alcohol-related offense or evidence of abuse would require a re-evaluation of his medical certification. This is the same likely FAA disposition if this were a first and only DUI offense (Guide for Aviation Medical Examiners, 2012).

#### About the Author

Colonel Michael D. Jacobson, USAF, MC, SFS, is Director of the joint United States Air Force Residency in Aerospace Medicine/Wright State University Family Medicine Residency Program. He is board certified in aerospace, family, and addiction medicine. Prior to returning to military service, Dr. Jacobson served as a civilian medical review officer and as medical director of an addiction treatment center, where he developed drug-free workplace and outpatient opiate treatment programs. He wrote this report while on rotation at the Civil Aerospace Medical Institute.

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## MEDICAL CERTIFICATION OF A PILOT WITH GLOMUS JUGULARE TREATED WITH FRACTIONATED STEREOTACTIC RADIOSURGERY

CASE REPORT, BY JAMES C. MCEACHEN, MD, MPH

This article presents a case report of a first-class pilot who was diagnosed with a right-sided glomus jugulare tumor and subsequently treated with fractionated stereotactic radiosurgery. The article includes a brief review of the airman's medical history and outcome data, as well a discussion of the pertinent aeromedical issues.

#### History

A6-YEAR-OLD MALE FIRST-CLASS pilot with over 12,000 hours of flight time applied for first-class medical recertification following fractionated stereotactic radiosurgical treatment of a right-sided glomus jugulare tumor using a CyberKnife<sup>®</sup> System.

The airman had a history of hereditary paraganglioma syndrome. He was initially diagnosed following work-up of uncontrolled hypertension, despite three antihypertensive medications. Following a positive 24-hour urine metanephrine test, the airman was referred to an endocrinologist and underwent multiple imaging studies, to include an abdominal CT scan and an MIBG (metaiodobenzylguanidine) nuclear study. The composite evaluation helped confirm a functioning paraganglioma in his mediastinum, which was subsequently removed surgically. A CT of the neck, combined with angiography, demonstrated both a left-sided carotid body tumor that was surgically excised and a right-sided glomus jugulare tumor. Neither tumor showed increased uptake on MIBG scanning, suggesting non-functioning lesions.

The characteristics of the glomus jugulare tumor favored a non-surgical approach to treatment. Following consultation with a radiation oncologist, the airman underwent fractionated stereotactic radiosurgery using the CyberKnife to treat the right-sided lesion. No post-procedural sequela was reported. **Aeromedical Issues** 

Depending on its location, growth pattern, and secretory nature, glomus jugulare tumors have the potential to significantly affect one's hearing, vestibular response, vision, speech, and/ or hemodynamic response. Symptoms from glomus jugulare tumors are typically caused by tumor mass effect, invasion of adjacent lower cranial nerves, high blood flow through the lesion (pulsatile tinnitus), or neuroendocrine effects.<sup>1,2</sup>

The interval from the first symptom to diagnosis is approximately three to six years.<sup>2</sup> A review of the recent literature has shown that glomus jugulare tumors have been associated with a variety of head and neck symptoms, to include: sensorineural hearing loss, positional vertigo, aural pulsations, tinnitus, dizziness, headaches, monocular vision loss, diplopia, periorbital pain, hoarseness of voice, vocal cord paralysis, absent gag reflex, dysphagia, and lower cranial nerve palsies.<sup>1,2</sup>

#### Role of the AME

The general medical standards for medical certificates annotated in Title 14 of the Code of Federal Regulations (CFR) parts 67.113, 67.213, and 67.313 include no organic, functional or structural disease, defect, or limitation that may reasonably

be expected, for the maximum duration of the airman medical certificate applied for or held, to make the person unable to perform those duties or exercise those privileges.<sup>5</sup>

In an airman with an initial diagnosis of glomus jugulare tumor, the aviation medical examiner (AME) should obtain a detailed history and physical examination for submission with the case on deferral to the FAA Aerospace Medical Certification Division (AMCD). The Guide for Aviation Medical Examiners outlines the standard evaluation procedures that should be used to evaluate an airman's hearing, vestibular response, vision, and speech.

For airmen with a glomus jugulare tumor treated with stereotactic radiosurgery, the AME should not perform a post-treatment medical examination until the airman's oncologist reports that the tumor is controlled and stabilized. Once this is achieved, the AME should pay particular attention to the head and neck evaluation to include assessment of the cranial nerves to help better determine the airman's functional capability for operating an aircraft. When questions arise, the AME can seek guidance from the Regional Flight Surgeon's office or the AMCD.

#### Outcome

Approximately six months after completing fractionated stereotactic radiosurgery treatment, the pilot's oncologist obtained an MRI of the neck that demonstrated no further growth in the right-sided lesion. A nuclear MIBG study showed no uptake within the mass, consistent with a non-functional tumor. A urine metanephrine test was negative. Upon presentation to his AME for medical re-certification evaluation, the pilot was found to have no aeromedically significant limitations with regard to his functional capacity to operate an aircraft.

In accordance with 14 CFR part 67.401, at the discretion of the Federal Air Surgeon, an Authorization for Special Issuance of a Medical Certificate, valid for a specified period, may be granted to an airman who shows to the satisfaction of the Federal Air Surgeon that the duties authorized by the class of medical certificate applied for can be performed without endangering public safety during the period in which the Authorization would be in force.<sup>4</sup>

Based on the pilot's history, physical examination and reassuring oncology documentation, approximately seven months after completion of CyberKnife treatment, the airman was authorized a Special Issuance by the AMCD. The Special Issuance was time-limited to six months, with subsequent re-issuance contingent upon continued satisfactory oncology consultation

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reports and neck MRI results. Imaging follow-up at six-month intervals over the next two years revealed no further growth in the mass. After two years of close surveillance, the time limitation on the airman's special issuance was amended to one-year intervals. He continues to fly as a first-class pilot.

#### **ETIOLOGY OF PARAGANGLIA**

Paraganglia represent extraadrenal neuroendocrine tissue with unique regulatory functions.<sup>1,5,6</sup> They are located throughout the body near vessels and nerves that aid in their chemoreceptor function.<sup>1</sup> Paragangliomas are tumors of the paraganglia that can arise where such extraadrenal tissue is located.<sup>1</sup> Within the head and neck, the four most common sites are at the carotid artery bifurcation, the jugular foramen, along the vagus nerve, and within the middle ear.<sup>1,6</sup>

Glomus jugulare tumors represent rare, slow-growing, highly vascular paragangliomas that arise within the jugular foramen of the temporal bone.<sup>6</sup> The incidence is approximately 1 in 1.3 million people, with a female preponderance.<sup>3,6</sup> The typical patient is middle-aged and presents late in the course of the disease with a painless, slow-growing mass.<sup>1,2,3,6</sup> The average age of presentation is between 50-60 years (range of reported cases: six months to 88 years).<sup>2,3,6</sup> Paragangliomas occur as sporadic or familial tumors.<sup>8,9</sup> Patients with familial glomus jugulare tumors exhibit an autosomal dominant penetrance, a younger median age at diagnosis, and a higher incidence of multicentric tumors.<sup>3</sup> While paragangliomas are known to display neuroendocrine activity through catecholamine secretion, functioning glomus jugulare tumors in the head and neck are exceedingly rare, accounting for 1-3% of cases.<sup>3,5</sup>

Treatment options for these tumors include surgery, radiotherapy, and embolization.<sup>2</sup> A growing body of research continues to support the effectiveness and safety of radiosurgery for treatment of glomus jugulare tumors while minimizing adverse side effects.<sup>3,7,10</sup> Complications of radiosurgery have included internal carotid artery thrombosis, pituitary-hypothalamic insufficiency, cerebrospinal fluid leak, tumor growth, and radiation necrosis of bone, brain, or dura.<sup>6</sup> Glomus jugulare tumors are generally benign but 1-3% metastasize.<sup>2,3</sup>Common sites for metastases, in order of decreasing frequency, are lung, adjacent lymph nodes, liver, and spine.<sup>2</sup> Twenty years after treatment, the survival rate is 94%, and 77% of patients remain symptom-free.<sup>6</sup>

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## AEROMEDICAL IMPLICATIONS OF THE TREATMENT OF MALE HYPOGONADISM Case Report, by Justin B. Nast, MD, MPH

Male hypogonadism does not simply refer to the potential for testosterone deficiency that occurs with normal aging. Primary hypogonadism results from testicular disease and secondary hypogonadism results from disease of the hypothalamic-pituitary axis or lack of response to testosterone. This article presents a case report of a third-class pilot diagnosed with secondary hypogonadism that was being treated with clomiphene citrate.

#### History

A 35-YR-OLD MALE THIRD-CLASS pilot with nearly 300 hours' flying time was diagnosed with idiopathic secondary hypogonadism and was started on clomiphene citrate (Clomid), one 50 mg tablet three times per week. His medical history is significant only for right inguinal hernia repair and shoulder surgery. The airman was stable and without symptoms on this dose of clomiphene citrate (Clomid) when he applies for medical certification. He presents to his aviation medical examiner (AME) with a report from his treating physician.

#### **Aeromedical Issues**

The symptoms of untreated male hypogonadism with aeromedical implications include fatigue, sleep disturbances, anxiety, and depression (1). The general medical standards under Title 14 of the Code of Federal Regulations (CFR), parts 67.113, 67.213, and 67.313 indicate that the individual must have no organic, functional, or structural disease, defect, or limitation that would make them unable to safely exercise the privileges of their respective airman certificate. This regulation also states that any medication used to treat such a condition must not make the individual unable to safely perform the duties required of their certificate (2). The AME must make two determinations of the airman with male hypogonadism: Are the symptoms (whether treated or untreated) severe enough to preclude issuing a certificate? and are there any medications the airman is using to treat hypogonadism that are potentially unsafe for flying duties?

Testosterone therapy is a well-established, safe, and efficacious treatment for male hypogonadism. Potential side effects include skin irritation and a small risk of exacerbating prostate cancer (3). These side effects have no significant aeromedical implications, and an airman with hypogonadism that is being successfully treated with testosterone should be issued his certificate if there are no other disqualifying conditions.

Clomiphene citrate is a selective estrogen receptor modulator that has commonly been used to treat female infertility. It can also be used to treat male infertility in specific clinical scenarios (4). The use of Clomid in the treatment of male hypogonadism is an off-label use, but it has been shown to be both safe and effective for this purpose (5). According to the Guide for Aviation Medical Examiners, a medication is disqualifying if it has not been approved by the Food and Drug Administration to treat a particular medical condition (6). Because this airman

#### MALE HYPOGONADISM

Male hypogonadism is marked by low testosterone and low sperm count. Primary or hypergonadotropic hypogonadism is marked by above normal luteinizing hormone (LH) and follicle stimulating hormone (FSH). Secondary, or hypogonadotropic hypogonadism, is marked by normal or decreased levels of LH and FSH (9) Hypogonadism increases with age; the estimated prevalence is 39% in men over 45 (10). The most common causes of primary hypogonadism include genetic abnormalities, testicular trauma, mumps orchitis, and radiation/chemotherapy. Causes of secondary hypogonadism can also include genetic conditions, pituitary tumors, medications, and idiopathic cause. Mixed hypogonadism can be associated with systemic diseases such as liver failure, hemochromatosis, HIV, and chronic alcohol abuse (10).

is continuously using Clomid for the off-label treatment of hypogonadism, his application must be deferred to the FAA for disposition.

#### Outcome

The AME deferred the application to the Aeromedical Certification Division (AMCD). Initially, the AMCD granted a Special Issuance with the restriction of no flying 72 hours after each dose. This restriction was based on the normal dosing for Clomid when used to treat female infertility and included a 30-day limit.

The airman appealed this restriction because he would be unable to adhere to treatment three times per week and still be able to fly. Side effects of Clomid include hot flushes and mild abdominal discomfort occurring in less than 10% of patients. Visual disturbances have also been reported with Clomid use, and this does have aeromedical implications. There are conflicting cases in the literature regarding these visual disturbances, which can include persistent after-images (palinopsia), peripheral field distortion, and photophobia. An older study documented persistent changes in women undergoing infertility treatment, *Continued on page 13* 

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while a newer study found only very minimal changes that were insignificant and entirely reversible (7, 8). Because this airman had been stable on his current dose of Clomid with no visual changes for 12 months, he was granted a one-year time-limited certificate with no restrictions for the chronic use of Clomid, provided the dose not exceed 100 mg per day and he remains free of side effects.

Continued certification was contingent upon reporting any changes in the treatment regimen, and the AME would be able to reissue the time-limited certificate with a report from the treating physician.

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