



# 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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from the Federal Air Surgeon's  
***PERSPECTIVE...MedXPress Lessons Learned***

BY FRED TILTON, MD

**Happy New Year, Everyone!**

**I**t has been a few months since we made the use of MedXPress mandatory for all pilots. The transition was fairly smooth, and MedXPress has made the medical application process much more efficient than the old paper system. However, we did experience some “growing pains.” I thought it might be helpful to share some of the lessons we have learned, and to let you know that we are working hard to make this system as efficient and effective as it can possibly be.

In January 2013, we received a call from an aviation medical examiner (AME) who said that he had an airman in his office who was completing his MedXPress application using the AME's computer. The airman was attempting to enter the date of his most recent exam which had been accomplished in January of 2012. However, each time the airman entered the exam date, he got an error message stating that he could not enter a future date for a previous exam. Needless to say, the airman and the AME were very frustrated. It turns out that the AME had installed his computer in 2004 and never updated the system clock. Consequently, the system would not let the airman enter a date that it “thought” was eight years into the future. Remember to keep your system's clock up to date — LESSON 1.

We received calls stating that the aerospace medical certification subsystem (AMCS) would not retrieve an application when a confirmation number was entered. MedXPress automatically eliminates applications if an airman has not provided the AME with a confirmation number within 60 days of application submission — LESSON 2.

Airmen have wished to make corrections to a submitted application, but they discovered they no longer had access. If an airman calls you with this concern, simply tell him or her you can make the corrections in your office. You can revise every item on the applicant's history page with the exception of block 20 (Applicant's National Driver Register and Certifying Declarations) — LESSON 3.

I understand some AMEs are experiencing printing problems. Some of these problems are resolved as AMEs get more familiar with the system. However, there also appear to be some issues with Adobe Reader, the free PDF Reader application. We are working to simplify the printing process, but in the meantime if you experience any printing problems, you can email us at 9-AMC-AAM-certification@faa.gov, and we will help you resolve your problem — LESSON 4.

If you do not print an airman's certificate before you leave the submission confirmation screen, the system will not allow you to print a certificate. So, remember to print **before** leaving that screen— LESSON 5. Note: I do not agree with this restriction, and you will eventually see this change.\*\*

Applicants do not understand why the system does not automatically repopulate the history information on subsequent exams. They have also complained about having to remember exact dates from previous health professional visits. MedXPress was first designed so that it would repopulate the history. However, we had to eliminate this feature for legal reasons. For example: A 25-year-old man is seeking a third-class medical certificate. He correctly marks *no* to Item 18 l (neurological disorders; epilepsy; seizures; stroke; paralysis; etc.). When he is 28 years old, he has a seizure, which he fails to report to the FAA, and he continues to fly. When he is 30, he submits another application using MedXPress, and the system populates his application with the *no* 18 l answer from his previous exam. Our attorneys have informed us that they could not pursue legal action because the airman could allege that he simply missed this question, and the system caused him to inadvertently provide a false answer.

In order to pursue a falsification case, the airman would have to take the definitive action of actually marking the *no* answer on his new MedXPress application. It is, therefore, very unlikely that we will modify the system so that it repopulates the history. The system urges the airman to print a copy of his application so that he can bring it with him to the exam, and I am asking you to remind the airman to keep a copy in his records so that he can use it to help him complete his next exam — LESSON 6.

In regard to the dates issue, we are looking into the possibility of the system repopulating information that will never change such as tonsillectomy at age 8. In the meantime, estimated dates are perfectly acceptable — LESSON 7.

Enough lessons for one editorial. I hope this information is helpful. If you have other concerns or suggestions, please let us know immediately. We will do our best to find a resolution to all your issues so that we can provide the most “user friendly” system for you and the airmen you serve.

And, as always, thank you so much for all you do for our airmen and protecting the safety of the national airspace.

—Fred

*\*\*Note: This paragraph clarifies the previous version originally published on 2/8/2013.*



**CUTTING THE RIBBON.** Commemorating CAMI's 50th anniversary, officials and visitors rededicate the CAMI building to signify completion of an extensive renovation project—and the beginning of the second 50 years. Shown include (L-R) Dr. Antuñano, Dr. Fraser, Lindy Ritz, Peggy Gilligan, and Michael Huerta.

## CIVIL AEROSPACE MEDICAL INSTITUTE CELEBRATES 50 YEARS OF AEROSPACE MEDICAL EXCELLENCE

*Refurbished and Ready for 50 More Years*

**A** CELEBRATION WAS HELD on December 12, 2012, commemorating the fiftieth anniversary of the Civil Aerospace Medical Institute (CAMI) in Oklahoma City, Okla. Then-Acting Administrator **Michael Huerta** and Associate Administrator for Aviation Safety **Peggy Gilligan** joined Director of the Mike Monroney Aeronautical Center **Lindy Ritz**, CAMI Director **Melchor Antuñano**, and Deputy Federal Air Surgeon **James Fraser** to reflect on highlights of the medical research and the many educational programs and achievements made at CAMI over the last 50 years.

“For the past 50 years, CAMI has been at the nexus of aerospace medical research, education, and certification, Administrator Huerta said. “CAMI is working to make sure that the human body can keep pace with the human spirit’s desire to expand the envelope of flight. All of this is possible because of the men and women who keep this place running. The public service you exude, the professionalism for which you’re known ... well, that comes from the deep seeds of character that were sown long before you came to the FAA. Everywhere I look here at CAMI, I see a pride, a desire to go above and beyond,” he added.



FAA Administrator Huerta

“The Institute has certainly set the gold standard in its commitment to ensure the safety of every person involved in aviation—on the flight deck, in the cabin, control tower and maintenance bay,” Peggy Gilligan said. “All of us who fly are deeply grateful for their contributions.” Over the last half century, CAMI has dealt with more than 20 million medical applications, and currently manages the medical certificates for roughly 400,000 U.S. pilots each year. CAMI staff manages aerospace medicine, education, scientific research, and occupational and environmental health, in addition to supporting the FAA Academy and the Transportation Safety Institute.

CAMI’s contributions to aviation safety span the entire range of human involvement in aviation systems including the identification and mitigation of medical and performance risk factors during flight to breakthroughs in crash safety design and aircraft evacuation. CAMI researchers create and apply aviation-specific medical knowledge to enhance aviation safety. CAMI’s programs communicate vital aeromedical safety information to the civil aviation community.

Other contributions include drop-down oxygen masks, evacuation floor lights, and water survival techniques.

By using the latest medical technology to assess an airmen’s medical fitness to fly and always putting safety first, CAMI has helped the FAA achieve the most flexible, pilot-friendly medical certification program in the world.

The four-story CAMI facility was recently refurbished, and included a time capsule reminding future generations of the accomplishments made to date. Staff is eager to focus on the future, though, upholding the world-class tradition they have built at CAMI. Here’s to 50 more!

—Information from AVS Flyer

MedXPress Question

Dear Editor:

Prior to MedXPress, the information submitted by the pilot was correct (hopefully) up to the date of the flight physical, because that was the date the pilot submitted the form.

With MedXPress, however, the information is correct up to the date the form is submitted, but that can be up to two months prior to the date of the flight physical. Since things may happen at any time, therefore, it is entirely possible that something noteworthy may occur between the time the form is submitted and the physical is actually completed.

This aspect has not, to the best of my knowledge, been taken into account when MedXPress was mandated.

Larry E. Nazimek  
Chicago, IL

*Dear Mr. Nazimek:*

*Thank you for your question. As you know, you may input your history into MedXPress up to 60 days prior to your AME exam. However, you are always responsible for notifying the FAA about any changes in your medical history.*

*So, as you stated, changes may have occurred that would affect your medical certificate. You are required to notify your AME at the time of your exam to any of these changes. The AME has options in their system, AMCS (Aerospace Medical Certification Subsystem), to update your history as needed.*

*NOTE TO AMEs: We need your detailed comments in block 60. This provides the examiner with an opportunity to report a detailed summary of the history, and any changes in airman history all summarized in block 60. You must comment on each 'yes' answer in block 18, each abnormal physical exam finding, and any changes to page 1 of the AMCS record (which is the MedXPress history reported by the airman). This should include any changes that have occurred in the medical history prior to the AME exam.*

Richard Carter, MD  
Certification Division Medical Officer

And Another MedXPress Question

Dear Editor:

The AME is about to transmit new exam, and has in hand a Letter of Authorization, but not an AASI (AME Assisted Special Issuance). The airman is not yet "due" for a new exam (for example, class 3). Can the AME print a certificate, even though a new exam was not done, and the airman is not on an AASI letter? How does that work?

Peter Lambrou, MD  
Moon Township, Pa.

*Dear Dr. Lambrou:*

*If the airman is approved for a special issuance with an interim issuance (the AMCD letter should specify), then you can print the interim certificate through AMCS.*

*After logging in to AMCS, click on the SEARCH APPLICANTS tab and search for the airman. Once the airman's name is displayed, check the lower portion of the screen for the associated list of exams. If the airman is eligible for an interim certificate (a certificate between exams), there will be a link in the upper right-hand corner of that list called "INTERIM CERT." Click on that link to bring up the certificate printing screen. You will update the expiration date contained in the limitation and certify that the airman provided the appropriate documentation. After printing the certificate, you should mail all the supporting documentation to the AMCD.*

Jana Weems  
AMCD Program Analyst



# YOUR VOICE HAS BEEN HEARD: AME SURVEY RESULTS

By KATRINA AVERS, PhD

**T**HE CIVIL AEROSPACE Medical Institute (CAMI) recently distributed a survey to aviation medical examiners (AMEs) to evaluate the degree of satisfaction with services and identify specific areas of improvement for aerospace medical certification services. The polls have closed and we received a record number of responses from AMEs (n=1,879) from each region in the United States. Your voice has been heard and your recommendations for improvement are being reviewed by each respective office.

Overall, the majority of AMEs (more than 88%) reported being satisfied with aerospace medical divisions and offices. Most reported being satisfied with products and tools (for example, EKG, 77% satisfied; Aerospace Medical Certification Internet Subsystem, 88% satisfied; MedXPress, 84% satisfied; OAM website, 83% satisfied). Although most AMEs reported satisfaction, they identified opportunities for improvement. AMEs prioritized their recommendations for each division or office. The top ten recommendations include:

1. Electronic notification to AME of changes in deferral status
2. Online tracking of deferrals
3. Publish unofficial list of disallowed medications with trade and generic names
4. Ability to retrieve a MedXPress application without a confirmation number
5. Electronic notification to applicant of changes in deferral status
6. More online training options
7. Ability to retrieve an imported pending MedXPress application deleted by mistake
8. Conduct an online review of recent changes to AME processes
9. Provide feedback on inappropriate deferrals
10. Provide advanced training to expand AME-assisted special issuance authority

Some recommendations may not be immediately feasible due to financial, technological, or regulatory constraints. Future issues of the *Federal Air Surgeon's Bulletin* will discuss how your suggestions are being used to improve aerospace medical certification services. A special thanks to all of you that responded to this survey!



*Dr. Avers is a research psychologist in the Aerospace Human Factors Research Division at the Civil Aerospace Medical Institute.*

## AVIATION MEDICAL EXAMINER INFORMATION LINKS

AME Guide

[www.faa.gov/go/ameguide](http://www.faa.gov/go/ameguide)

AME Training Information

[www.faa.gov/go/ametraining](http://www.faa.gov/go/ametraining)

AMCS Online Support

[www.faa.gov/go/amcssupport](http://www.faa.gov/go/amcssupport)

Regional Flight Surgeon Contacts

[www.faa.gov/go/rfs](http://www.faa.gov/go/rfs)

Pilot Safety Brochures

[www.faa.gov/go/pilotsafetybrochures](http://www.faa.gov/go/pilotsafetybrochures)

Medical Certification Information

[www.faa.gov/go/ame/](http://www.faa.gov/go/ame/)

MedXPress Login & Help

<https://medxpress.faa.gov>

MedXPress Video Page

[www.faa.gov/tv/?mediaId=554](http://www.faa.gov/tv/?mediaId=554)

FASMB Archives

[www.faa.gov/go/fasmb](http://www.faa.gov/go/fasmb)

CAMI Library Services

[www.faa.gov/go/aeromedlibrary](http://www.faa.gov/go/aeromedlibrary)

## 'TIGER TEAM' TRAINING INITIATES NEW AMCD PHYSICIANS

### *Combined Effort Accelerates Certification Process*

By Richard Carter, DO, MPH

THE "TIGER TEAM" is a special project initiated by Aerospace Medical Certification Division (AMCD) manager Dr. Courtney Scott, continuing a process initiated by Dr. Warren Silberman to improve customer service and reduce the backlog of certification cases. Previous Tiger Team efforts have been successful, so Dr. Scott again called on new hires Drs. Joe Ray and Matt Dumstorf, with Dr. Judy Frazier and the assistance of Dr. Harriet Lester, to jointly process a backlog of complex certification cases while taking on-call inquiries from AMEs.

The Tiger Team training program was conducted on January 18, 2013. Tiger Team efforts, combined with additional certification work by Regional Flight Surgeons, eliminated more than 200 deferred exam cases. If you had called in that day for certification assistance (AME verbal authorization to issue), you talked to Dr. Lester and had the opportunity to participate. This virtual, online Tiger Team joined a team of medical officers at work in a CAMI conference room in Oklahoma City to simultaneously attack the backlog of medical certification cases and helped to quickly bring the new AMCD doctors up to full speed in certification tasks.

Thus, the Tiger Team kicked off a five-week AMCD training program to introduce new hire staff to AMCD policies and procedures—the "new" AMCD that is rapidly evolving with a goal to further minimize delays in certification. There is no single solution, but rather a combination of strategies that will be used to reach this goal. For example,

- The AMCD on-call program has been expanded to include many Regional Flight Surgeons, all for the purpose of giving you a verbal authorization to issue with minimal delays.
- There are new staff doctors you will be talking to when you call in—to include Drs. **Roger Bisson**, Ray, and Dumstorf—although they are not really new to most AMEs [see article on page 7].
- The AMCD has integrated some internal certification processes more closely with our "Reviewers" (LIE – Legal Instrument Examiners), also to minimize delays, particularly on deferred exams.
- AMCD medical officer staffing is improving to better handle the case workload.



INTO THE FRAY. Drs. Richard Carter and Judy Frazier (back row) explain the intricacies of medical certification to Dr. Joe Ray and Dr. Matt Dumstorf (left-right).

- AMCD is also much more closely integrated with Regional Flight Surgeons, such that we can say with great confidence: *We are all on the same team.*
- Some of the most difficult medical certification challenges (think – drug and alcohol issues, complex cardiac disease, etc.) are getting a fresh look to determine what we really need for reports and testing.
- During the week we launched the Tiger Team, another major activity also was conducted by AMCD. Dr. **Brian Johnson** and Dr. **Ben Zwart** held an intense cardiac panel discussion with the Federal Air Surgeon's top cardiology consultants. New policies will be developed from this process to address certification decisions – all for the better!

In summary, this is not your "grandfather's certification division," and we will continue to endeavor to provide safe, effective, and efficient medical certification.

*Dr. Carter is a Certification Division Medical Officer.*



## TRANSITIONS IN THE AMCD: NEW CERTIFICATION PHYSICIANS

Four physicians have joined the staff of the Aerospace Medical Certification Division to replenish the void created by recent departures and will be assisting the other staff physicians soon.

### New AMCD Supervisory Physician



**Penny Giovanetti, DO.** Dr. Giovanetti joined the FAA 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 U.S. 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, and National Security Strategy training from the National War College. She is board certified in Aerospace Medicine and Occupational Medicine, a Fellow of the Aerospace Medical Association, and the winner of the **Howard R. Unger Award** for the best published paper by a United States Air Force flight surgeon. Dr. Giovanetti is also a licensed private pilot.

### Profiles



**Dr. Roger Bisson** returns to Medical Certification after an eight-month hiatus and the opportunity to telework from home became an option. He had spent five years in the Aerospace Medical Certification Division, separating from the agency in January 2012 to join his wife, who is an active-duty physician assigned to RAF Lakenheath, so "home" in his case involves teleworking from the United Kingdom.

Dr. Bisson, a federal retiree, was rehired by the Office of Aerospace Medicine as a "mission essential retired annuitant." He will help AMCD decrease the backlog of case work and minimize certification delays of deferred exams.

A pilot for 40 years, Dr. Bisson has 30 years' experience as a flight surgeon and has been an FAA aeromedical examiner for many of those 30 years. He is board certified in Aerospace Medicine. He has served as flight surgeon for the SR-71 and U-2 blackbirds and was the first B-1B bomber weapon system flight surgeon. Dr. Bisson has authored 17 publications related to research interests in human performance, fatigue, and long-duration flight. He supported more than 14 space shuttle missions as Chief of Space Operations Medical Support, DoD Manned Spaceflight Support Office. He is the recipient of the **Theodore C. Lyster Award** for outstanding contributions to the field of aerospace medicine, as well numerous other honors.

**Matthew Dumstorf, MD, MS,** since 2006 was the FAA's



Deputy Regional Flight Surgeon for the Great Lakes Region. As the Deputy in Great Lakes, he managed the office's Airman Medical Certification program, Aviation Medical Examiner program, and AME Surveillance program. His time as Deputy afforded Dr. Dumstorf opportunities to interact with airmen, AMEs, and air traffic controllers, while continuing his professional pursuits in the interest of aviation safety.

Dr. Dumstorf began his medical career as an urgent/acute care staff physician in the Dayton, Ohio, area in 2001, while working on his Aerospace Medicine degree. He went to American Airlines as the Area Medical Director at Chicago's O'Hare airport in 2004, and he was also the Independent Medical Sponsor for more than 50 pilots that were in the FAA's Special Issuance/HIMS program for substance abuse/dependence problems. In addition, he completed nearly 90 DOT random drug testing verifications as a Medical Review Officer.

He is a Diplomate of the American Board of Preventive Medicine in both Aerospace Medicine and Occupational Medicine, an Associate Fellow of the Aerospace Medical Association, and he is a member and the current treasurer of the Airline Medical Director's Association.

**Joseph Ray, MD,** finished medical school on a United States



Air Force Health Professions Scholarship program and then practiced at Tyndall AFB in Panama City, Fla., on active duty. Following a lengthy period in private practice, he became an aviation medical examiner in the New England area in 2007. He joined the New England Region as the Deputy Regional Flight Surgeon in 2009. He is board certified in both internal medicine and emergency medicine.

The most recent review physician to depart, Dr. **Bill Mills**, is transferring to the Civil Aerospace Medical Institute's Aerospace Medical Research Division after almost 15 years in the AMCD. For the majority of this time, he was the CAMI contact point for the Alcohol and Drug Unit. He reports he has long had an interest in research and obtained a PhD from the Biostatistics and Epidemiology Department at the University of Oklahoma Health Sciences Center in 2005 to help prepare for this career switch. He will be working on the Medical Research Team of the Aeromedical Protection and Survival Laboratory. "I will miss my usual interactions in the Certification Division and the rest of the certification community," he says, but anticipates "exciting new challenges" in medical research.



# OBSTRUCTIVE SLEEP APNEA IN A PILOT

By J. RON ALLEN, MD, MPH

*Insufficient sleep is an ever-worsening public health problem within the United States. This growing problem is linked with motor vehicle accidents, aircraft mishaps, industrial disasters, medical and other occupational errors.<sup>1</sup> Obstructive sleep apnea (OSA) is a major contributor to the insufficient sleep epidemic. It is estimated that OSA affects 4-7% of middle-aged adults, 70% of the clinically obese population, 30-50% of those with heart disease, and 60% of those suffering strokes.<sup>2</sup> This article presents a case of a third-class pilot with OSA and the related aeromedical concerns.*

## History

**A** 65-YEAR-OLD MALE THIRD-CLASS pilot with 650 hours of flight time presented to his AME for his medical recertification with a new diagnosis of obstructive sleep apnea. He had been relatively healthy previously with only a documented history of hypertension. Over the past couple of years, his blood pressure had become increasingly difficult to control and required escalating doses of atenolol to achieve control, with his current requirement being 100mg daily. He had been snoring for years; his weight was steadily on the rise, with his BMI increasing from 41 to 43.5 kg/m.<sup>2</sup> He was sent for a polysomnograph secondary to his symptoms and risk factors that included: obesity, daytime fatigue, hypertension, and snoring. He denied routinely taking naps and stated that he had never fallen asleep while he wanted to remain awake, including while driving and flying. The polysomnograph was positive with an AHI of 21.3. He was titrated with CPAP to a pressure of 10 cm during the split-night protocol. He attempted to use the CPAP machine at home but did not tolerate it for various reasons. He switched to a mouth guard specifically designed for OSA and reported improvement. He remained mildly sleepy during the day with minimal snoring at night, confirmed by his wife. He was sent for a maintenance of wakefulness test, which he was able to remain awake throughout; however, due to continued daytime somnolence, he was denied re-certification. He will be able to re-apply once he has been adequately treated and therapeutic benefit can be validated.

## Aeromedical Issues

Daytime drowsiness and the implications for flight safety is an obvious aeromedical concern. However, the implications and severity of the situation may not be fully appreciated by airman. It has been reported that people with mild to moderate OSA can have degradation in their performance that is equivalent to a blood alcohol level of 0.06-0.08%, legal intoxication in most states.<sup>2</sup> Not only is the degradation in performance concerning, but micro naps and the inability to maintain wakefulness while flying may be hazardous. Issues with concentration, attention span, memory, headaches, and irritability are all associated with OSA. These present unique risks in the aviation environment.

The direct effects of OSA and one's ability to fly are very concerning. Secondary complications and comorbid conditions

## OBSTRUCTIVE SLEEP APNEA

The growing obesity problem for the United States is leading to a subsequent obstructive sleep apnea epidemic. This rise in OSA has become a concern not only for the impact on the individual but on the safety of the population as well. The National Highway Traffic Safety Administration reports people with OSA have a six times greater risk for automobile accidents. Drowsy drivers account for 100,000 accidents, with 1,550 fatalities and 40,000 injuries annually.<sup>5</sup> The National Sleep Foundation estimates that sleep deprivation and sleep disorders cost the United States more than \$100 billion annually when lost productivity, property damage, and medical expenditures are taken into account.<sup>6</sup> This growing problem for the aviation community was highlighted in February 2008 when a commercial aircraft with three crewmembers and 40 passengers continued past their scheduled destination. The National Transportation Safety Board concluded that the captain's undiagnosed OSA and the flight crew's recent work schedule contributed to both the pilot and the first officer falling asleep and subsequent missed arrival.<sup>2</sup> Thankfully, no one was injured, but this case highlights the importance of OSA in today's aviation environment. The increasing OSA population, combined with other fatigue risk factors of alcohol, time zone changes, and irregular work schedules, presents a significant risk to aviation safety.

OSA is a treatable condition with many well established treatment options, including weight loss.<sup>7</sup> The issue then becomes recognizing the risk factors, especially the modifiable ones, and increasing the population's self-recognition of the warning signs, as well as AMEs awareness of the disease and responses on history that are suggestive of OSA. Daytime somnolence, uncontrolled hypertension, snoring, a narrow oropharyngeal airway, and a BMI >30 should all alert the clinician to a possible issue of OSA.<sup>8</sup> Prevention, recognition, and treatment will lead to safer skies through mitigation of an unnecessary risk.

*Continued on page 9*

present challenges and hazards as well. Heart disease, hypertension, stroke, myocardial infarction, heart failure, cardiac arrhythmia, diabetes, and metabolic syndrome have all been associated with OSA.<sup>3</sup> These conditions may directly or indirectly have severe implications for the airmen and their ability to fly safely.

OSA is disqualifying from flying for all classes of medical certification in accordance with Title 14 of the Code of Federal Regulations, part 67. It requires for initial special issuance, at a minimum, a current status report, all pertinent medical information, medication report, and polysomnograph with titration study results.<sup>4</sup> The aviation medical examiner should be vigilant for the risk factors, as well as the signs and symptoms of sleep apnea. An airman presenting with daytime sleepiness, BMI >30, or excessive snoring should alert the AME of a potential problem. Once a diagnosis has been established, the minimum requirements (above) must be submitted and, depending on the treatment plan (uvulopalatopharyngoplasty, continuous positive airway pressure, or oral device), additional testing may be required to demonstrate therapeutic improvement and mitigation of the more significant aeromedical safety concerns.

Therapeutic improvement for OSA often requires uvulopalatopharyngoplasty or continuous positive airway pressure (CPAP). Dental devices may be an alternate form of therapy as well. Regardless of the treatment course chosen, evaluation of the effectiveness of eliminating the primary aeromedical concern daytime hypersomnolence, also known as excessive daytime sleepiness, will need to be established. This can often be accomplished with a follow-up sleep study in those who have had surgery or a CPAP titration report from the initial split-night polysomnogram. For initial issuance, these reports, along with the airman's acknowledged improvement in symptoms, will usually suffice. If an airman is seeking a re-issuance, then a compliance report from the CPAP machine may be required per AME Assisted Special Issuance requirements.

The effectiveness of a dental device may be more difficult to analyze. A maintenance of wakefulness test (MWT) may be of benefit. In this study, the applicants are monitored similar to a polysomnograph; however, they are requested to remain awake during four 40-minute daytime test periods spaced at two-hour intervals throughout the day. These data are then compared against normative values with the endpoints being completion of the 40-minute period or sleep onset. The results determine a propensity to fall asleep during the day. These studies, along with the clinical picture and co-morbid conditions, are used to evaluate the safety of flight issue for any given airman.

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## About the Author

*Lt Col. J. Ron Allen, MD, MPH, is a USAF flight Surgeon board certified in Family Medicine and currently participating in the USAF residency in Aerospace Medicine program. He wrote this report while rotating at the FAA's Civil Aerospace Medical Institute.*



# CHRONIC RENAL FAILURE IN AN AIRMAN APPLICANT

CASE REPORT, BY KATHLEEN M. SAMSEY, MD, MPH

*Chronic renal failure (CRF) due to any etiology can have a potentially devastating effect on an airman, and with rare exception, is incompatible with flight duties. This case report reviews the aeromedical concerns posed by CRF and sheds light on the FAA's decision-making process regarding this condition.*

## History

A 32-YEAR-OLD THIRD-CLASS APPLICANT'S physical exam was forwarded to the FAA's Aeromedical Certification Division (AMCD) for consideration, with a history of left nephrectomy at age 3 for multicystic dysplastic kidney disease. On the Form 8500-8, the airman reported that he was "in very good health, other than I only have one kidney." The airman's primary care provider endorsed the application, stating that the applicant also had Stage 5 chronic kidney disease (of unspecified etiology), but that he demonstrated no hypertension and had been "medically stable for the past several years."

Likewise, the AME inexplicably also endorsed the application, stating, "I would fly with him," despite current lab values of BUN 111 mg/dL (normal 10-22), creatinine 11 mg/dL (normal 0.6-1.2),  $\text{HCO}_3^-$  18 mmol/L (normal 22-30), calcium 6.5 mg/dL (normal 8.7-10.2), and phosphorus 6.2 mg/dL (normal 2.5-4.5). Most impressive was his estimated GFR of 5 mL/min/1.72 m<sup>2</sup> (normal is > 59).

This airman's medication list included febuxostat (Uloric, to decrease uric acid), paricalcitol (Zemplar, to increase vitamin D), rosuvastatin (Crestor), sodium bicarbonate, vitamin D, Tums, and epoetin alfa (Procrit) 20,000 units monthly.

## Aeromedical Concerns

With regard to cases of chronic renal failure and FAA decision-making, the general approach includes reviewing the relevant peer-reviewed medical literature and obtaining specialist consultation. Often, a review is also conducted of relevant US military services' waiver guides, as well as the published policies of the European Aviation Safety Agency and International Civil Aviation Organization (according to personal communication with Dr. Arleen Saenger, Manager of the FAA Aeromedical Standards and Policy Branch, 15 March 2011).

A review of those various US military services' waiver guides clearly delineates the aeromedical concerns related to chronic renal failure. According to the US Army, "Significant renal disease may lead to chronic fatigue, near syncope, or loss of consciousness. [The] aviation environment (heat, dehydration, prolonged [flights]) may exacerbate such conditions" (4). The U.S. Navy Aeromedical Waiver Guide indicates that renal failure can lead to fatigue, susceptibility to infection, edema, and electrolyte disturbances (5). The U.S. Air Force waiver's aeromedical concerns include "malaise and subtle declines in general health and mental clarity" (6).

## CHRONIC RENAL FAILURE

Chronic renal failure, or Stage 5 chronic kidney disease, is defined by the National Kidney Foundation as either a GFR level <15 mL/min/1.73 m<sup>2</sup> (which is accompanied in most cases by signs and symptoms of uremia) or a need for initiation of kidney replacement therapy (1). This definition was set forth by the National Kidney Foundation's Kidney Disease Outcomes Quality Initiative (KDOQI) and their well-established clinical practice guidelines in 2002; prior to this, there was no uniform definition of chronic kidney disease, and thus no uniform approach to its screening and treatment.

The Third National Health and Examination Survey (NHANES III, 1988-1994) estimated that 19.2 million Americans had chronic kidney disease, 300,000 of them with Stage 5 (2). The most common etiologies in the United States include vascular disease, primary and secondary glomerular disease, tubulointerstitial disease, and urinary tract obstruction (2). Frequent complications of CRF include acid-base disturbance (typically mixed metabolic acidosis), electrolyte abnormalities (especially hyperkalemia, hypo/hypercalcemia, and hyperphosphatemia), renal bone disease/secondary hyperparathyroidism, anemia, and accumulation of waste products, especially urea. The manifestations of uremia in end state renal disease can vary, but commonly include pericarditis, encephalopathy, peripheral neuropathy, gastrointestinal symptoms, fatigue/somnolence, and malnutrition (2).

The indications for dialysis are not always clear and consistent; the decision to initiate dialysis involves a combination of objective and subjective parameters, with input from both the physician and patient. It is a decision that must not be taken lightly, as the morbidity and mortality associated with chronic dialysis is significant. The 5-year survival rate for a patient on chronic dialysis in the US is 35%; the most common cause of death of all patients with chronic renal failure (whether on dialysis or not) is cardiovascular disease (2). Common indications for initiating dialysis include pericarditis/pleuritis, progressive uremic encephalopathy/neuropathy, clinically significant bleeding, diathesis attributable to uremia, fluid overload refractory to diuretics, significant hypertension with poor response to antihypertensive medications, persistent metabolic disturbances, persistent gastrointestinal symptoms, and evidence of malnutrition (3).

*Continued on page 11*

In the case of this airman applicant, whose current renal status would seem to indicate requiring dialysis in the near future, it is reasonable to assume that even a mild gastrointestinal illness could cause significant fluid, electrolyte, and acid-base disturbances. His calcium is already very low, despite active replacement with oral calcium and vitamin D, and his bicarbonate indicates a mild metabolic acidosis. The urea is also significantly elevated at 111 mg/dL. His potential for sudden and severe incapacitation with fatigue, confusion, and syncope cannot be ignored.

Although this applicant is not having dialysis, a discussion of the FAA's position on hemodialysis (HD) is worthwhile. The most recent case reviewed by the FAA occurred in 2006, when an appeal was made to the Federal Air Surgeon. As part of the official specialist consultation, a thorough literature search was performed. The main question being asked was, "Does end stage renal disease treated with hemodialysis have an unacceptable risk of sudden death or incapacitation that would preclude medical certification to fly in an airplane?" The specialist's investigation revealed the following (7):

- Annual mortality rates for HD patients are 6-16%, primarily secondary to cardiovascular disease
- After allowing for stratification for age, race, and gender, the prevalence of cardiovascular disease in HD patients is 10-20 times higher than for the general population

The primary risks of sudden death or incapacitation are:

1. Risk of ventricular arrhythmias; there is a death rate of 20/1,000 patient-years in patients ages 20-44 due to cardiac arrest/sudden death
2. Hyperkalemia (may occur in up to 10% of HD patients)
3. Central neurologic complications, including focal white matter changes, cerebral/cerebellar atrophy, osmotic demyelination syndrome, and intracranial hemorrhage

After assessing this information, and based primarily on risks #1 and #2 above, the conclusion was made that no medical certification should be given for chronic renal failure on hemodialysis to any aviator, in any class (7).

### Role of the AME

This case highlights the importance of common sense on the part of the AME when assessing the medical fitness of an airman applicant. We are all inclined to "advocate for the flyer," but that enthusiasm must be tempered with the reality of an airman's medical conditions and the risks they pose to the airman, as well as the general public.

### Outcome

Not surprisingly, this third-class application was quickly issued a general denial for chronic renal failure, under 14 CFR Part 67.313(b) (8). Should the airman seek reconsideration, he could appeal to the Federal Air Surgeon, but a significant amount of information would be required. A current status report from the treating nephrologist should be provided, including current symptoms, laboratory values, medications and any side effects, prognosis, and follow-up plan (7). Specialized imaging may also be required. Under the current FAA standards, if clinically indicated, the airman could also utilize peritoneal dialysis and request consideration for a Special Issuance, though this occurs rarely.

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### About the Author

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# FAA PILOT PUBLICATION HIGHLIGHTS AEROSPACE MEDICINE

By MIKE WAYDA

**T**HE JANUARY/FEBRUARY ISSUE of FAA Safety Briefing magazine, the premier Federal Aviation Administration publication for general aviation pilots, takes aim at the world of “Aeromedical Advances” with articles ranging from medical check rides, refractive eye surgery, to the making of an aviation medical examiner.

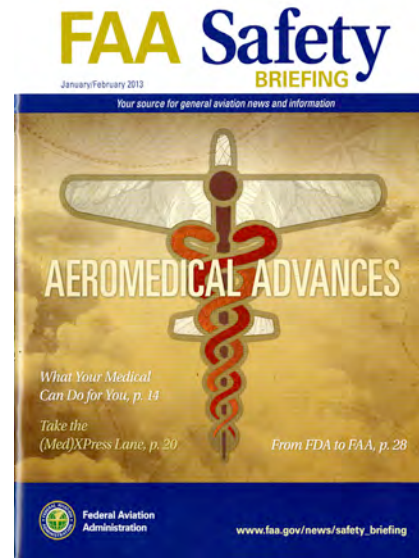
Federal Air Surgeon Dr. **Fred Tilton** leads off by reassuring pilots that “we’re here to help,” explaining that our mission is “to protect the safety of the National Airspace System and our desire is to issue a medical certificate to every airman applicant as long as it is safe to do so.” Dr. Tilton provides a thumbnail description of how the medical certification process functions to balance these priorities and concludes with a promise to pilots: “Work with us, and we will most certainly work with you to accomplish our shared goal of getting you safely into the sky.”

“Ask Medical Certification” is a regular feature of *Safety Briefing*, and each quarterly issue features a question and answer forum hosted by **Courtney Scott**, DO, manager of the Aerospace Medical Certification Division. He replies to questions from pilots who have medically-related issues that threaten their freedom to fly—kidney stones, prostate cancer, Crohn’s disease, hypertension, and erectile dysfunction—as examples of questions that are posed to Dr. Scott through the magazine’s editors so as to shield pilots from potential action by the agency.

Did you know that as a graduate of the United States Merchant Marine Academy, Dr. Scott was once a deck hand on seagoing vessels? His interest in medicine was launched from that experience and is profiled in a “FAA Faces” article in this issue.

Another article in the Aeromedical Advances issue, “The Making of an Aviation Medical Examiner,” describes the requirements, training, and support of the 3,400 designated examiners in the system. It helps pilots answer the question, “How much do you know about your aviation medical examiner?”

Aerospace Medical Education Division manager, **Brian Pinkston**, MD, explains how AMEs are supported by the Division from their location in Oklahoma City, Okla. Selection, training, and oversight functions of the designated examiners is crucial, he explains, because they have been granted the authority to act as representatives of the FAA administrator to support the agency’s safety mission. For that reason, “We take monitoring the performance of AMEs very seriously,” says Dr. Pinkston. “If we receive complaints or notice an increase of errors or incomplete applications, we will coordinate with the Regional Flight Surgeons and investigate the issue.”



The *FAA Safety Briefing* is a bimonthly publication designed to make the non-commercial general aviation community aware of FAA resources, help readers understand safety and regulatory issues, and encourage them to focus on continued training and skills development. The editorial content capitalizes on the magazine’s unique ability to be the policy voice of FAA, as well as provide safety information to the non-commercial general aviation community.

*FAA Safety Briefing* is available free online at

[www.faa.gov/news/safety\\_briefing](http://www.faa.gov/news/safety_briefing)

and has special versions for use on handhelds (iPads, Kindles, etc). Printed copy subscriptions are available through the Government Printing Office:

<http://bookstore.gpo.gov>

The remainder of this issue’s topics:

- Medical check rides
- How the FAA evaluates drugs for aeromedical use
- Refractive surgery
- Fast-tracking your airman medical certificate
- “Infographic” that graphically depicts certification navigation chart
- What kind of medical must I hold?
- Preventing DUIs in the sky



# AEROSPACE MEDICAL EDUCATION NEWS

## Exam Error Rates Decline

By BRIAN PINKSTON, MANAGER OF THE AEROSPACE MEDICAL EDUCATION DIVISION

**C**ONGRATULATIONS! WE ARE reaping the fruits of your labor through another drop in aviation medical examiner (AME) examination error rates, as observed from our QA program. Most notably, there were ZERO errors related to ECGs for the period from January to June of 2012. Thanks to you and your staff for your OUTSTANDING attention to detail.

So how do we continue to improve our quality of examinations? Here are a few “gotchas” to think about when you are finishing an examination:

Mind the “Big Three”: ECGs, medications, and hypertension.

A. The key for ECGs is to interpret the results and include the interpretation in Block 60 of the 8550-8 in AMCS. If you have questions on interpretation, you can always call the Physician-on-call line at the Aerospace Medical Certification Division or your region. They can help lead you through the appropriate disposition. Additionally, Dr. **William Fors** (who interprets ECGs for AMCD) has been kind enough to provide us with a Webinar about improving ECG quality. His session may be found at

[www.faa.gov/tv/?mediald=557](http://www.faa.gov/tv/?mediald=557).

B. Medications are sometimes a challenge for AMEs due to the myriad of new drugs entering the market annually and drug to drug interactions that may have aeromedical significance. Although my list of 10 rules to keep you safe regarding drugs is somewhat simple, if a drug question falls outside the scope of the rules, you should probably give us a call. Here are my 10 rules:

1. If the medication OR condition poses a risk of subtle or sudden incapacitation – do not issue (i.e., insulin dependent diabetes)
2. If the medication is centrally acting – do not issue. (i.e., clonidine, reserpine, methyldopa)
3. If the medication is sedating, do not issue. (i.e., Ambien, diphenhydramine) This situation is can be complex because these drugs are acceptable if there is an appropriate washout period prior to flight – 5 drug half-lives
4. If the medication is highly vasoactive, do not issue (i.e., nitroglycerin, sumatriptan, vagary)

There are cases to use some of these medications, but without proper washout, they may pose a risk to safety. You also have to look at the underlying disease and risk to safety.

5. If the medication is psychoactive, do not issue (i.e., trazodone, sertraline)

6. If the medication is a scheduled narcotic, do not issue (i.e., oxycontin, dextroamphetamine).
7. Do not issue for any drug which has been approved by the US Food and Drug Administration for less than 1 year.
8. If the medication, nutritional supplement, or herbal preparation alters the sensorium, impairs judgment, or reduces alertness, do not issue.
9. If the medication is acceptable for use by the FAA, but it is being used for an off-label purpose, it is managed as if being used as the primary approved purpose for aeromedical disposition.
10. If you have any questions about a medication, call your Regional Flight Surgeon’s office or the Aerospace Medical Certification Division.

Just because you don’t issue doesn’t mean the end of the road. Many times the FAA can allow certain medications to be used from this list, but it may require a Special Issuance. A great example is the use of medications on the selective serotonin reuptake inhibitor protocol.

C) Improving certification for airmen with hypertension really involves three major components: recognizing hypertension, ensuring the airman has a complete workup for hypertension as required by the AME guide, and finally ensuring that the airman’s treatment brings the blood pressure to below 155/95. If you document this information in block 60 and forward the supporting documents, issuing a certificate should give you no worries.

D) Finally, here’s a small list of ways to be the most efficient and effective in your AME practice:

- Limit unnecessary deferrals
- Call for help
- Review and interpret ECGs, consults, and lab data
- Comment on airman history and findings
- Ensure airman history is complete.
- Login to AMCS frequently for updates
- Read the *Federal Air Surgeon’s Medical Bulletin*
- Ensure all of your airmen are using MedXPress

Thanks for all you do to improve the safety of the National Air Space!



# CARCINOID TUMOR IN AN AIRMAN

CASE REPORT, BY JOHN J. COTTON, MD, MPH

*Carcinoid tumor is a rare form of intestinal cancer that grows very slowly. Given its indolent nature and relative lack of symptoms, carcinoid tumors are usually found incidentally during evaluation for other conditions. This article presents a case report of a carcinoid tumor in a first-class pilot who was being evaluated for a urological condition.*

## HISTORY

**A** 43-YEAR-OLD MALE FIRST-CLASS pilot with more than 8,900 hours of flight time applied for recertification after treatment for a carcinoid tumor of the small bowel and kidney stones.

The airman was referred to a urologist by his primary care physician for evaluation of urinary frequency of unknown etiology. At the time, the airman also reported chronic diarrhea for several months. The urologist ordered a CT scan of the abdomen and pelvis, which revealed a non-obstructing stone in the inferior pole and in the renal pole of the left kidney. Unexpectedly, there was also a 1.2-cm mass in the small bowel. He was then referred to a general surgeon, who performed an exploratory laparotomy.

During the procedure, a 1.2-cm mass was confirmed in the mesentery at the junction of the distal small bowel, and it was excised. A Meckel's diverticulum in the distal bowel was also discovered, and it, too, was resected. All tissue samples were sent to pathology, where the mass was determined to be a carcinoid tumor. Additionally, one of three local lymph nodes was positive for tumor. The Meckel's diverticulum was found to be benign.

A post-operative PET scan showed a 2-cm hypermetabolic focus in the small bowel, suspicious for metastasis, and serotonin and chromogranin A levels were found to be elevated. The airman underwent two rounds of chemotherapy with bevacizumab (Avastin), 5-FU, and streptozocin. A repeat CT scan showed a negligible decrease in size of the focus, so an exploratory laparotomy was performed and a 2 cm tumor was removed from the ileocecal junction. Pathology again confirmed carcinoid tumor, but all 13 lymph nodes removed were negative for cancer. The airman then underwent two more courses of the same chemotherapy protocol.

The airman had follow-up CT and PET scans, which were negative for tumor recurrence, but it did show persistence of the renal calculi. This was successfully treated with external shock wave lithotripsy. A metabolic workup revealed increased uric acid levels, so the patient was started on allopurinol. The airman subsequently underwent three more courses of chemotherapy, after which repeat CT and PET scans every six months over 18 months were negative for tumor recurrence. Repeat serum serotonin and chromogranin A levels declined to normal levels.

Two and a half years post-operatively, the airman has remained disease-free and without recurrence of kidney stones. His only complaint was diarrhea from foreshortened small bowel, which was adequately treated with the use of cholestyramine, and occasional diphenoxylate (Lomotil).

## AEROMEDICAL ISSUES

There are three medical conditions that require aeromedical consideration, the first being the airman's history of carcinoid tumor. With all neoplasms, there is the risk of recurrence, and distant metastatic disease to the brain can be incapacitating if it causes a seizure, a hemorrhage, or if there are deficits to judgment or vision due to mass effect.<sup>1</sup> With appropriate surveillance for recurrence, though, the risk for sudden incapacitation is low.

The second condition is the history of kidney stones. The primary aeromedical concern is that of sudden incapacitation from severe, debilitating pain. However, since this condition was asymptomatic in the airman, the risk can be deemed to be low. Moreover, since the airman started taking allopurinol, this would effectively mitigate the risk factor from increased serum uric acid.

Finally, and most importantly, chronic diarrhea from extensive removal of the small bowel can be problematic during flight. While not necessarily incapacitating, urgency can be distracting. Diphenoxylate is not suitable for use while flying due to its sedating properties.<sup>2</sup> The FAA does allow the use of loperamide (Imodium) for the treatment of diarrhea, as its side effect profile is more favorable. Cholestyramine, a bile acid sequestrant, has been used for the treatment of chronic diarrhea associated with inflammatory bowel disease. Its side effect profile is also favorable. Since the airman discontinued the use of diphenoxylate, this was ultimately not a factor in the certification decision.

## ROLE OF THE AME

In accordance with Title 14 CFR 67.113(b)(c), 67.213(b)(c), and 67.313(b)(c), all abdominal/visceral malignancies are disqualifying for all classes.<sup>3</sup> The AME should defer to the FAA for disposition. For all neoplasms—all operative and pathology results, a current oncological status report, including tumor markers and any other testing deemed necessary—should be forwarded to the FAA for consideration.<sup>4</sup>

In accordance with the same federal regulation, a single episode of a renal calculus is disqualifying for all classes.<sup>5</sup> The AME must defer to the FAA for evaluation. Any diagnostic imaging studies and treatment reports must be submitted, along with a current status report and metabolic evaluation. Special issuances have been granted with retained kidney stones, providing the stones are not likely to pass and the airman does not prove to be a chronic stone former.

*Continued on page 15*

Chronic usage of sedating medications is also disqualifying. The AME should defer issuance of a medical certificate if the airman is taking such a medication.

### OUTCOME

Since the airman was cancer-free for 2½ years, there was no recurrence of kidney stones, and he had adequate control of diarrhea with the use of cholestyramine, a Special Issuance was granted for a first-class medical certificate, good for one year. The airman was required to submit annual surveillance studies (CT and PET scan results, serum serotonin, and chromogranin A levels) and oncological status reports to maintain the validity of his Special Issuance. He was also issued a warning regarding the necessity to maintain adequate hydration and report the occurrence of any renal colic that might signal the recurrence of kidney stones.

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### ABOUT THE AUTHOR

*John J. Cotton, MD, MPH, Lt Col, USAF, MC, FS, was a resident in Aerospace Medicine when he wrote this case report at the Civil Aerospace Medical Institute. Currently, he commands the 35<sup>th</sup> Aerospace Medicine Squadron at Misawa Air Base, Japan.*

### CARCINOID TUMOR

Carcinoid tumor is the one of the rarer forms of gastrointestinal cancer, with an estimated annual incidence of 2.47 per 100,000 for men, and 2.54 per 100,000 for women.<sup>6</sup> Incidence is higher in African Americans (4.48 per 100,000 for men and 3.98 per 100,000 for women).<sup>7</sup> Carcinoid is the most common form of neuroendocrine tumor, though, with serotonin being the most commonly secreted product.

Carcinoids usually arise from the gastrointestinal tract, but bronchogenic and pancreatic tumors have been described. In the gut, most carcinoid tumors occur in the small intestine, particularly the terminal ileum, followed by the rectum.<sup>8</sup>

Diagnosis is challenging since carcinoids are slow-growing and manifest few symptoms, unless they produce significant biologically active compounds. The classic carcinoid syndrome constellation of symptoms is that of flushing, diarrhea, wheezing, and heart valve symptoms. When present, the recommended screening is a 24-hour urine for 5-hydroxyindoleacetic acid (5-HIAA) and a serum chromogranin A (CgA) level.<sup>9</sup> When bowel symptoms are present, imaging is recommended. Although CT scanning has poor sensitivity, it is often used in early diagnosis, and it plays a definite role in surveillance for recurrent disease. Somatostatin scintigraphy (Octreoscan™) has a 90% sensitivity and is effective at tumor localization.<sup>10</sup> More recently, the role for PET scans has increased, with advances in biological tracers.

The treatment for carcinoid tumor is primarily surgical. For tumors smaller than 1 cm, resection may be curative. Chemotherapy and somatostatin analogues are used for more extensive or metastatic disease and when carcinoid syndrome is present. Prognosis depends on the extent and location of disease, age, tumor size, type, and histology, but five-year survival for all tumor types exceeds 67%.<sup>11</sup>

# MEDICAL CERTIFICATION FOLLOWING SUBARACHNOID HEMORRHAGE

CASE REPORT, BY L. RENEE BOYD, MD, MPH

*This case report details the sequences of events of an airman who developed a subarachnoid hemorrhage and describes the aeromedical considerations required in ultimately returning him to the cockpit.*

## History

**W**HILE PAINTING A door at his residence, a 60-year-old, otherwise healthy private pilot with 1,250 hours of flight time, developed a severe, posterior headache that progressed to a generalized headache, searing in nature and radiating to his neck. There was no reported diplopia, slurred speech, facial asymmetry, or unilateral weakness/numbness of the arms/legs to suggest stroke. After presenting to a local hospital, a CT scan of the brain showed a prominent subarachnoid hemorrhage in the region of the Circle of Willis and anterior to the brainstem.

He was treated with pain medication and labetalol and nimodipine to lower his blood pressure and prevent narrowing of his cerebral arteries. His posterior headache did not completely resolve with treatment, and he complained of dizziness, minimal blurry vision, and occasional tingling in the left side of his face. Due to his serious but stable condition, he was subsequently transported via air ambulance to a hospital with a higher level of care for admission to a neurosurgical intensive care and evaluation by a neurosurgeon. A cerebral arteriogram was ordered to give a more in-depth evaluation of the cerebral arteries to localize the bleed. This study found no evidence of an aneurysm, vascular malformation, or recurrent bleed. A brain MRI and MRA to examine the brain soft tissue were also unremarkable and did not show any obvious areas that resembled a stroke. After evaluation of these studies by his neurosurgeon, there was no clear etiology of the subarachnoid hemorrhage. A repeat CT of the brain without contrast was then obtained, which showed resolution of the subarachnoid hemorrhage. The airman was discharged from the hospital four days after initial presentation and checked into a local hospital to have a repeat cerebral arteriogram completed in the next five days. This study also showed no obvious aneurysm or bleed. Eleven days after initial presentation, the airman resumed work as a mason and did not report any subsequent headaches or neurologic complaints.

## Aeromedical Concerns

As outlined in 14 CFR part 67.401, an airman with a subarachnoid hemorrhage (SAH) requires an FAA decision. The airman must demonstrate an ability to execute airman duties without endangering public safety. Submission of all treatment records, including current status reports from a neurologist or neurosurgeon, is required, along with appropriate laboratory and imaging studies. These include pertinent medical records, current neurologic report, to include brain MRI, bilateral carotid ultrasounds, name and dosage of medication(s) and side effects (3). Cerebral arteriography may be necessary for review in cases of subarachnoid hemorrhage (3). It is the airman's

### SUBARACHNOID HEMORRHAGE

A subarachnoid hemorrhage (SAH) is a bleed in the brain that can cause devastating consequences, such as stroke and death, even when diagnosed early. Immediate referral to a neurosurgeon is necessary due to the concern of continued bleeding or rebleeding. It may occur due to head trauma, which is the most common cause, or spontaneously due to rupture of a dilated blood vessel (cerebral aneurysm), or leaking from a complex cluster of thin-walled arteries and veins called arteriovenous malformation (1). Cerebral aneurysms are commonly referred to as "berry" aneurysms because of their shape. They may present at birth and later rupture when individuals are in their 30s or 40s. Other possible causes of SAH are bleeding disorders such as hemophilia (reduced ability to clot) or from excessive use of anti-coagulant medications such as warfarin sodium (Coumadin) or clopidogrel bisulfate (Plavix). Patients are classically described in the medical literature with the sudden onset of "the worst headache of my life." Diagnosis is confirmed by head CT scan and/or lumbar puncture (spinal tap). Cerebral arteriography, which looks at the blood vessel architecture, is usually needed to identify the source of the hemorrhage.

responsibility to prove that the condition is stable and does not interfere with cognitive or physical requirements necessary to safely pilot an aircraft.

In this case with a subarachnoid hemorrhage, the primary concerns are that the headache may be associated with a brief loss of consciousness, seizures, and altered mental status, or coma may result as a direct result of the bleed, which can be incapacitating in flight (2). Vasospasm, pathologic narrowing of the cerebral arteries, usually begins around day three after the hemorrhage and reaches a peak on days six to eight (2). Complications from subarachnoid hemorrhage can be significant, as severe vessel narrowing can lead to stroke and death in up to one-third of patients who have SAH (4). Specific neurologic signs and symptoms depend on the involved vessels.

### Role of the AME

Due to the complications of subarachnoid hemorrhage, a reasonable time frame should pass to allow the AME to assess if the patient has any recurrent issues, along with neurologic

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## Hemorrhage from page 16

deficits and timely follow up with a neurosurgeon before completion of medical certification to the FAA. Fortunately in this case, the patient did not have any noteworthy headaches or deficits to claim.

After followup from a subarachnoid hemorrhage with medical certification by the FAA, a careful history of any headaches or headaches that may appear as a migraine should be taken. The history should focus on intensity, duration, neck stiffness, nausea, vomiting, photophobia, loss of consciousness, blurry/double vision, difficulty speaking, facial droop, unilateral weakness/numbness, seizures, any subsequent ER visits or hospitalizations, or any headache associated with stroke symptoms. It will also help to know the location of the bleeding and if there was any shift from the midline of the brain tissue.

### Outcome

FAA policy guidelines indicate that if the airman has no sequelae after one year and the etiology was not a head trauma, applicants may be issued a medical certificate. Eight months after the initial presentation, a repeat head CT showed no recurrent bleeds and symptoms, so his neurosurgeon advised that since the applicant had no adverse changes in his condition, he wrote supporting, favorable medical documentation to the FAA. After sending in all supporting medical documentation,

which included all his radiologic studies and hospital admissions, the airman requested a first-class medical certificate. His medical file was reviewed, and the airman was issued a first-class medical exactly one year after the initial presentation of his subarachnoid hemorrhage.

### References

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4. MacDonald RL. Cerebral vasospasm. In: Welch KMA, Caplan LR, Reis DJ, et al., Eds. Primer on cerebrovascular diseases. San Diego, CA: Academic Press; 1997 p. 490-7.

### About the Author

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## 2013 AME SEMINAR SCHEDULE

|                     |                      |                    |
|---------------------|----------------------|--------------------|
| February 25–March 1 | Oklahoma City, Okla. | Basic (2)          |
| March 15–17         | Dallas, Texas        | NEU (1)            |
| May 13–16           | Chicago, Ill.        | AsMA (3)           |
| July 15–19          | Oklahoma City, Okla. | Basic (2)          |
| August 9–11         | Arlington, Va.       | OOE (1)            |
| September 26–28     | Orlando, Fla.        | CAMA (4)           |
| October 28–Nov. 1   | Oklahoma City, Okla. | Basic (2)          |
| November 15–17      | Sacramento, Calif.   | CAR (1; TENTATIVE) |

### NOTES

- (1) A 2½-day theme aviation medical examiner (AME) seminar consisting of aviation medical examiner-specific subjects plus subjects related to a designated theme. Registration must be made through the Oklahoma City AME Programs staff, (405) 954-4831. NEU= Neurology, OOE= Ophthalmology-Otolaryngology-Endocrinology, CAR= Cardiology.
- (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 theme AME seminar held in conjunction with the Aerospace Medical Association (AsMA). This seminar is a new Medical Certification theme, with 9 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](http://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.*