Federal Aviation Administration

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 Editor's

PERSPECTIVE...

by Mike Wayda

Two Decades of Amazing Progress

Mike Wayda, your editor for the past 26 years, is retiring, and Dr. Fraser has asked him to share his retrospective regarding the changes he has seen to the medical certification procedures over the years.

Medical certification has evolved significantly in 20 years. The certification backlog was a big challenge two decades ago. It still is, but the Federal Aviation Administration is on-target for same-day certification for airmen. We're nearly there.

Twenty years ago, Dr. **Jon Jordan**, then-Federal Air Surgeon, presided at a meeting with aviation industry representatives and Office of Aerospace Medicine leaders to propose new certification procedures. "Our AMEs appear to be a vast, but only partially tapped resource," he said. The industry experts agreed that aviation medical examiners should be given more opportunities to not defer applicants by using available resources and their Regional Flight Surgeons.

Summarizing the meeting outcomes, Dr. Jordan outlined plans to revise the *Guide for Aviation Medical Examiners* to "identify conditions where the AME should be allowed to make the certification condition without deferring to the FAA."[1] Thus, the concept was the predecessor that eventually became CACI—Conditions AMEs Can Issue.

A year later, the FAA announced final rules that comprehensively revised pilot medical standards and certification procedures, affecting 654,000 pilots. Coinciding with that announcement, the Civil Aerospace Medical Institute launched its new website, and we posted the first online version of the *Federal Air Surgeon's Medical Bulletin*.

The Revolution

Something along the way revolutionized the way we communicate with others—the Internet. The Internet—the technological development that enabled us to do far more than we could imagine—connect, share, collaborate, and even medically certify pilots. Bull's eye!

Because the Internet beckoned and its prospects looked appealing, the Office of Aerospace Medicine's medical certification people decided to participate, and they invented a mail-less and paperless solution to greatly improve the certification process. So, in October 1992, the Aerospace Medical Certification Subsystem became operational, and aviation medical examiners could send their completed 8500-8 application forms in electronically via the Internet.

A few years later, the Aerospace Medical Certification Subsystem was made mandatory, inaugurating a new era of medical certification.

The goal of same-day certification became a distinct possibility, not just an "elusive dream," as Dr. Jordan had said in 2003. "While technology is not the answer to every question, the appropriate use of technology will bring us closer to achieving our goals," he concluded.[2]

Other developments came about in response to the need for speed. The *Guide for Aviation Medical Examiners* was published online. The online Medical Express (MedXPress) program, a novel concept that offered pilots and AMEs a paperless way to apply for medical certification, was available, and later became mandatory after a successful trial period.

By 2006, the benefits of the new systems were becoming apparent. The Document Imaging and Workflow System had been enhanced, the regional offices were participating more in airman certification, and certification decisions were zipping along faster. The new Federal Air Surgeon, Dr. **Fred Tilton,** advised AMEs that "When you are debating with yourself about a questionable case, do not automatically defer…call the AMCD or your Regional Flight Surgeon."

The probability was "very likely," Tilton stated, that questions would be answered and a certificate issued "on the spot," allowing the agency "to provide better service to our customers" and reduce the certification backlog. [3]

- ★ During the growth and expansion of the Office of Aerospace Medicine website, automatic distribution of forms and mailing supplies became routine through online forms management.
- ★ A new government policy in 2011 required agencies to use the Internet to distribute information to their stakeholders, so we discontinued printing and mailing the *Bulletin*.
- ★ The system the Federal Aviation Administration used to support medical certification was changed to a Web-based version on March 18, 2013.

Writing in 2013, Dr. Tilton noted that, since the MedXPress was made mandatory in 2012, "all applicants have walked into your office after having completed their applications on-line…" and "more than 90 percent of them left your office with a medical certificate in-hand."[4]

Dr. Tilton retired the next year, and Dr. **James Fraser** became the next Federal Air Surgeon. He proposed that the 10 percent figure of pilots that are deferred could be helped by two new certification tools, CACI and AME-Assisted Special Issuance, recommending also more user-friendly applications and to widen the capabilities of these tools to expand "the number of airmen that can leave…with a regular medical certificate in hand."[5]

According to 2014 statistics, 96 percent of all airmen left their aviation medical examiner's office with their medical certificate in hand. The hard work has paid off and we are, indeed, almost there.

Continued →

Unchanging Philosophy

The Office of Aerospace Medicine continually searches for ways to better serve the needs of designees and airmen by periodically sending questionnaires to AMEs for their comments, many of which find their way into business practices. Each aviation medical examiner seminar and online course offers attendees the opportunity to comment on the effectiveness of their learning activity.

Reaching out to airmen, our senior managers, medical certification and education staff members travel to the major airshows (Oshkosh, Wis., and Lakeland, Fla.) to assist pilots with their certification and physiological training needs, so for days on end they also must endure the rigors of heat, dust, rich food, and long hours to serve their airmen, even doubling down on the certification backlog in their "spare time."

What hasn't changed in 20 years is a willingness to provide the best service possible.

Another bull's eye.

Thanks, Mike, for your perspective. I heartily agree that all the hard work and innovative ideas have paid off. We have relied more on the "vast resource" of aviation medical examiner talent. We have improved the service to our airman population. Further enhancements to our system and sharpening our skills will make us even more efficient—and Dr. Jordan's dream of same-day certification will at last be attained.

Finally, I wish Mike, who is also a former United States Navy Airedale, fair winds and following seas during his retirement.

—Jim

[1] "Proposed New Certification Procedures Discussed," *Federal Air Surgeon's Medical Bulletin,* Spring 1995, p. 1.

[2] "Same Day Certification," by Jon Jordan. *Federal Air Surgeon's Medical Bulletin* Vol. 41, No. 4, p.2.

[3] "When in Doubt," by Fred Tilton. *Federal Air Surgeon's Medical Bulletin,* Vol 44, No. 1, p. 2.

[4] "11 Medical Conditions no Longer Require Special Issuance," by Fred Tilton. *Federal Air Surgeon's Medical Bulletin,* Vol. 51, No. 2, p2.

[5] "Anchors Aweigh," by James Fraser. *Federal Air Surgeon's Medical Bulletin,* Vol. 52, No. 2, p. 3.

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Critical Dates in Recent Medical Certification History

By David Nelms

1999—The year that the last paper version of the *Directory for Aviation Medical Examiners* was published and distributed. Beginning in the year 2000, the directory was made available solely on the Internet. Not only was it much more efficient to publish it online, we save well over $100,000 each year by avoiding the printing and distribution costs.

September 24, 2003—the *Guide for Aviation Medical Examiners* was made available on the Internet. Like the *AME Directory,* making the *AME Guide* available solely on the Internet was a much more efficient and cost-effective means of distributing important information.

2005—MedXPress was deployed and available for use, a major step in fully automating pilot medical certification.

2012—Conditions AMEs Can Issue (CACI) was implemented, allowing AMEs to issue unrestricted medical certificates to airmen with common medical conditions when specific requirements are met. Previously, AMEs would have deferred these types of cases.

March 2013—Document Imaging and Workflow System (DIWS) was deployed. This is a Web-based version of DIWS, the mission-critical application used to manage medical information on the airmen community, meaning we no longer utilize outdated technology for one of the FAA's mission-critical applications.

August 2014—The antiquated method for receiving airman electrocardiograms (ECGs) from AMEs was replaced. As part of the new solution, AMEs now include electrocardiograms with the examination information transmitted. This new methodology has significantly improved the business processing in the Aerospace Medical Certification Division.

March 2015—A new policy made obstructive sleep apnea screening part of the application process for a medical certificate.

2015—Microsoft announced they would no longer support Microsoft 2003 server, so MedXPress, AMCS, and CPDSS were subjected to a technology refresh.

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Mr. Nelms is a program manager in the Aerospace Medical Certification Division.

Chaperones During FAA Examinations Advised

By Denise Baisden, MD

The use of chaperones during physical examinations of members of the opposite sex has been a common practice in the medical community. The American Medical Association (AMA), in its Opinion 8.21, *Use of Chaperones During Physical Exams,* recommends having chaperones available on a consistent basis for patient examinations. The AMA recommends that each health care setting establish a policy that patients may request a chaperone. These chaperones should be authorized health professionals whenever possible.

But what about FAA airman examinations? FAA Order 8520.2G, *Aviation Medical Examiner (AME) System,* does not specifically address the issue of chaperones. The use of chaperones for physical examinations of airmen of the opposite sex provides reassurance for the airman as well as protection for the AME should allegations of misconduct arise.

Thus, the Office of Aerospace Medicine recommends that a chaperone be made available during the examination and that you should clearly communicate the option to the airman.

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Dr. Baisden is the Southwest Regional Flight Surgeon.

Injury Mechanism Analysis in Accident Investigation Workshop

The Federal Aviation Administration's Civil Aerospace Medical Institute is hosting a workshop for members of the aeromedical community (government, academia, and industry) on the appropriate methods of forensic evidence collection in the investigation of aircraft accident injuries. Determining the mechanism of injuries in support of injury research will also be discussed.

The two-day workshop is free and will be held November 3-4, 2015, at the Civil Aerospace Medical Institute in Oklahoma City, Okla.

Additionally, a four-hour lecture on aerospace forensic pathology will be held the morning of the next day, November 5.

Registration is limited, and on-site registration is not available.

For information, contact:
http:•//www.faa.gov/data_research/research/med_humanfacs/aeromedical/aai_workshop/

Location:
Federal Aviation Administration
Civil Aerospace Medical Institute
Mike Monroney Aeronautical Center
6500 S. MacArthur Blvd.
Oklahoma City, OK 73169

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Aviation Medical Examiner Information Links

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

Register for an AME Seminar

AME Training Information

AMCS Online Support

Regional Flight Surgeon Contacts

Pilot Safety Brochures

Multimedia Aviation Medical Examiner Refresher Course (MAMERC):

Medical Certification Information

Video Training Topics

MedXPress Login & Help

MedXPress Video Page

FASMB Archives

CAMI Library Services

SLEEP APNEA INFORMATION (links)

Frequently Asked Questions

Sleep Apnea Protocol

Quick Start Guide

Specification Sheet A: Information Request

AASM Tables 2 & 3

Specification Sheet B--Assessment Request

Obstructive Sleep Apnea Information Brochure

NEW
Residents Reports Index: 2014-2015

Aviation Medical Examiner Seminars

2015		
November 20-22	St. Louis, Missouri	Refresher (1)
2016		
January 29-31	Houston, Texas	Refresher (1)
March 21-25	Oklahoma City, Oklahoma	Basic (2)
April 25-28	Atlantic City, New Jersey	AsMA (3)
June 20-24	Oklahoma City, Oklahoma	Basic (2)
July 15-17	Jacksonville, Florida	Refresher (1)
September 8-10	Rochester, Minnesota	CAMA (4)
October 24-28	Oklahoma City, Oklahoma	Basic (2)
December 2-4	Tucson, Arizona	Refresher (1)

NOTES

(1) A 2 ½-day Aviation Medical Examiner (AME) refresher seminar consisting of updates in aerospace medicine and FAA policies. Registration must be made through the Designee Registration System on the AME seminar Web page.

(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.

BASIC AME SEMINAR CLASS. Participants are pictured on October 27, 2015, with the Lear Fanjet on static display at the Civil Aerospace Medical Institute. This was the final basic seminar for the year; three are scheduled for 2016, and five refresher seminars are also planned for next year.

An Aviation Medical Examiner With a Mission

By Mike Wayda

Dr. **Sean Malone**, from Salisbury, N.C., has been an aviation medical examiner for only three years, but he knows aviation medicine and aviation safety well beyond those years. He is an Internist with Rowan Diagnostic Clinic, which has offices in Salisbury, Spencer, and Cooleeme, N.C.

Dr. Malone is a pilot, owns his own aircraft, is the founder and president of his flying club, and is active in outreach activities to pilots across North Carolina. We contacted Dr. Malone because of an article that was published this year in the *Salisbury Post* highlighting his work in the community. Highlights of our conversation follow.

How did you become interested in becoming an aviation medical examiner?

I have heard through friends and colleagues about other airmen having poor AME experiences. I decided to become an AME so I could serve as an advocate for other pilots as an AME who is also an avid pilot. Despite some opinions to the contrary, being an AME is not the way to get rich! I do it because I love flying, and I love combining my two passions to enhance the safety and joy of aviation. I understand firsthand the importance of having assistance in obtaining a valid medical.

Do you have any tricks or secrets to putting pilots at ease?

We talk about flying, aircraft, and so on to get the ball rolling, generally for about 15 minutes prior to starting the exam. It helps relax the airman and helps me find out how I can best serve him or her.

How many airmen do you see a year?

I see about 20-30, not many compared to other AMEs, I'm sure, but I am also a full-time Internist.

Do you have a "system" for your certification approach?

I ask pilots to make an appointment well ahead of time before their medical is due to discuss any possible issues before we get into the official phase of things. After the exam is initiated, the clock starts ticking and I have only 14 days (7 days for student medicals) to send in the completed forms. This works, because if they are on disallowed medications or have medical issues, we can get them settled ahead of time, so the chances of requiring a deferral are minimal. Using this method, I have had 95% of my airmen walk out after the visit with their medical in hand.

What do you look for when you examine pilots?

"Are they being honest with me?" is the main thing? Does the story they are telling me on their MedXpress match what they are telling me in the office and through their body language? A young man came in once for a student pilot medical,

AME Dr. Sean Malone welcomes certification applicants with warmth and strives to put them at ease.

and right off I caught him in three lies, so I had to tell him I could not help him. "Is this someone that I'd fly with?" is also an important impression I strive to establish. Pilots generally get a good sense about other pilots thorough their interactions. Are they thinking clearly, or acting oddly? I also try to see if applicants are mentally prepared for the rigors of flying.

What are the most common medical problems you see in pilots?

Medications—most non-AME doctors have no clue about how certain prescription drugs and OTC [over-the-counter] meds affect flying. Also, older pilots with increasing medical problems—I try to keep them flying, or get them back in the air again using the new CACIs or a Special Issuance, if need be. I can also suggest to their primary care doctor they change medications if they are taking disallowed ones and give them options for approved ones.

"AMEs generally cannot make a living on FAA exams alone, so our motivation is not financial. We truly want our fellow airmen, and the people who trust them, to fly safely, to be healthy behind the yoke..."

Are pilots stressed about passing their medical exam?

Oh my gosh, YES! Very much so…I know I am when it's time for my medical. So we talk about aviation, airplanes, anything to relax them and put them at ease. I want them to know I understand their situation and for them to know that I am there to help them get their medical, not find ways to deny or delay it.

Do you think that AMEs contribute to aviation safety?

Yes, if we do our jobs correctly and promote honesty from our airmen. We should encourage airmen to take care of themselves throughout the year—seek medical care if they're sick, get help when they need it. We should encourage them to ask questions if a problem pops up. Rarely, we pick up medical issues that their primary care doc may have missed, but that

does not occur very often. I like to encourage the airmen to seek me year around. I feel I am not their AME only for the hour they are in my office but should be a constant resource for their health and safety.

Describe your activities with the FAASTeam.

I speak to pilots and pilot groups about aeromedical topics for WINGS credit. I lecture on Conditions AME Can Issue, over-the-counter meds, questions pilots should be asking of their AME, among other topics the group may request. I tell pilots to challenge their AMEs to get answers for them. If a pilot is not getting the service they feel they deserve, I think they should shop around. The pilot/AME relationship is far too important to accept less than satisfactory service.

Tell us about your high-altitude training system for teaching hypoxia awareness.

I have a system in my office that mixes 100% nitrogen with room air that simulates altitudes up to 20,000 ft. It's optional for pilots and others to see how they respond to high altitude.

How do you like the CACI program (Conditions AME Can Issue)?

I love it…I feel AMEs should have more latitude in making certification decisions at the time of the exam and only rarely defer. I know the FAA would like that as well, given the large backlog of medicals that already exists.

Do you have any suggestions for other AMEs that might make the practice of aviation medicine more efficient…?

The system I have developed works well: Open your office for consultation before starting the official process…this puts airmen at ease well before the clock gets started. They are more apt to be honest and forthright if they trust you. I can't imagine why an AME would not also be a pilot, so I'd love to see a requirement for all AMEs to also be a pilot. But I also understand the numbers just don't work out that easily.

As a pilot, do you think the third-class medical should be eliminated?

No. And I know this is not likely a popular position among my fellow pilots. But if the airman walks out of the AME's office feeling the exam was pointless, as some say, then maybe that examiner isn't doing his job properly. They should take plenty of time—45-60 minutes with each applicant— to make the process work properly and for the airmen to feel they are getting value for their dollar. AMEs generally cannot make a living on FAA exams alone, so our motivation is not financial. We truly want our fellow airmen, and the people who trust them, to fly safely, to be healthy behind the yoke. I want to do my small part to help reduce the tension between the FAA Aerospace Medical Certification Division and the general aviation population by having an open dialogue about everyone's concerns and needs.

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CAMI Director Receives Top FAA Office of Aviation Safety Award

Dr. **Melchor Antuñano**, Director of the Civil Aerospace Medicine Institute, received this year's Champion of Safety Award. The award was presented by FAA Office of Aviation Safety Associate Administrator **Peggy Gilligan** in Washington, D.C., on September 2, 2015.

"I consider myself the luckiest person in the FAA, because I don't have a job, I have a hobby that has a salary," Dr. Antunano said during his acceptance speech. "What else could I ask for? I joined in 1992. I would not change anything."

He thanked Ms. Gilligan and Federal Air Surgeon Dr. **Jim Fraser** for empowering him, as well as his team. "Your people make or break you," he said. "My people love what they do, and that's what makes a huge difference in our programs. I receive this on behalf of my entire team."

Among Antuñano's accomplishments was anticipating new entrants into the National Airspace System, particularly commercial space flight. He was hailed as the embodiment of the FAA's Global Leadership Strategic Initiative. Well respected in the international community, he is frequently invited to lecture on fatigue, cabin environment issues, and human factors.

The Office of Aviation Safety's top honor, the Champion of Safety Award, was renamed after **Jay Pardee**, former FAA Chief Scientific and Technical Advisor for Vulnerability Discovery and Safety Measurement, who passed away in June.

FAA Administrator **Michael Huerta** provided opening remarks, noting that honoring FAA employees at award ceremonies was one of the best parts of his job.

"Every day in America, people get on airplanes and they don't worry about whether it's safe. That's what we do," said the Administrator. "When I look at our team, I have every confidence we can tackle the challenges that lie ahead of us."

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—Information and photo provided by AVS Flyer

OAM Physicians On Call, Part 6

Issue When You Can: Kidney Stones, DUI, Allergies

By Richard Carter, DO, MPH

The theme of this series, Issue When You Can, continues with some general topics/conditions that may allow you to issue, and also may prompt your calls to the Office of Aerospace Medicine Physician on Call.

I. Kidney Stones

If the applicant had kidney stones, you have been allowed to issue, providing that you have a favorable report and radiologic evidence that the stone has passed and there is no further retained stone. We allow a KUB [kidney, ureter, and bladder] x-ray procedure for this purpose.

You may not (regular) issue for a simple, uncomplicated, stable, retained kidney stone, even one retained in the parenchyma for many years and very unlikely to pass. There is no CACI (Conditions AME Can Issue) for that—or is there?

As of 9/30/15 there is new information in the *Guide for Aviation Medical Examiners* (*Guide)* on kidney stones. In short, if an airman had a kidney stone episode 5 or more years ago and has not had any further problems, you can issue with notes in Block 60. A kidney stone episode could be renal colic, a verified stone, a stone that required a procedure to clear, or an incidental finding of a stone on an imaging study. However, if the airman had a stone event within the last 5 years, you have two options.

1. If a single stone passed and was verified on imaging, then as previously, you can just issue, with notes in Block 60.
2. If the stone episode occurred less than 5 years ago, there were more than one stone, or there is not a follow-up image to verify it has passed, you may still be able to issue under the CACI program. For this to occur, the airman must bring you a status report from the treating doctor that verifies the information on the CACI worksheet.

The most important part of the CACI kidney stone program is to remember what conditions you **cannot** issue under it. This would be any airman who has an underlying cause for stone formation, an airman who requires treatment, or one who is not stable.

Examples

- An airman had a stone episode 2 weeks ago. The stone has not passed, and the treating physician or urologist will monitor for 2 weeks before deciding if a procedure is warranted. This applicant is **not** CACI-qualified.
- An airman with symptoms went to the ER, was diagnosed with a kidney stone, and a stent was placed and has not been removed. As the stent is still in place, this is considered treatment and is **not** CACI-qualified.
- An airman who has known retained stones. If the note from his urologist shows there are more stones or there is any increase in size, this does **not** qualify for CACI.

In any of these cases, you should defer and submit the information listed on the disposition table page. In many cases, the airman will still qualify for a special issuance.

II. Driving Under the Influence (DUI)

What do you do when the airman presents to you with a recent DUI arrest? You have an important decision to make. The Guide provides assistance and parameters that allow you to issue the certificate in some cases. Located in Applicant History (Items 1-20), the Guide specifically advises that "a single driving while intoxicated (DWI) arrest, conviction and/or administrative action usually is not cause for denial, provided there are no other instances or indications of substance dependence or abuse." Locate: 18v. History of Arrest(s), Conviction(s), and/or Administrative Action(s). If the airman has had a DUI, simply follow the steps below to decide if you can issue.

1. Obtain the history—what happened, and when. Ask the airman to provide a personal statement, both of the alcohol consumption history and the circumstances of the alcohol-related driving offense. The airman must also provide court/hearing records and a copy of the investigating police officer's narrative report.
2. Review the blood or breath alcohol level. You must defer if the BAC (blood alcohol concentration) was 0.15 or higher, or if the airman (perhaps on legal advice) refused a BAC test. A documented BAC of less than 0.15 allows you to proceed and, possibly, issue.
3. Remind/advise airman that it is not enough to report the DUI to an AME; it is also required to report to the FAA Security Division within 60 days of the occurrence, as follows: Security and Investigations Division, AMC-700, P.O. Box 25810, Oklahoma City, OK 73125-0810.
4. After reviewing the reports, if the *Guide* permits you to consider issuance, document your findings in Item 60/Block 60.
5. Issue the certificate, if criteria allow. Pay careful attention to the history—specifically that this was a single event, of poor judgment, and no indication of substance abuse/dependence. Transmit the exam and submit the reports.

The *Guide* advises regarding events to be reported, specifically identified in Item 18.v. of FAA Form 8500-8. If *yes* is checked, the applicant must describe the arrest(s), conviction(s), and/or administrative action(s) in the EXPLANATIONS box. Consider an elective new exam at this point (if it was not already planned) to document that the airman has complied with the required full reporting.

Continued ⟶

DUI Issue Criteria

You may issue if:

• For reported incident(s) when the most recent incident occurred more than 5 years prior to the exam

• For reported incident(s) when the most recent incident occurred within the preceding 5 years of the exam, based on the exam, detailed interview AND review of the court record(s) and arrest report(s), you determine the applicant's history does not indicate a possible substance abuse or dependence problem.

Deferral Criteria (any one of these requires deferral)

- Inability to obtain and review the court and arrest records within 14 days of the date of the exam
- Blood alcohol level 0.15 or higher
- Any arrest, conviction, administrative action for which the applicant refused blood alcohol testing

PLEASE be careful with the above guidelines. Example: An airman may have had a single DUI that was more than 5 years ago, and you might initially believe it is acceptable to issue. However, if the blood alcohol concentration for that DUI was 0.24, that would certainly be aeromedically concerning and warrants, at a minimum, a phone call to the AMCD and possibly a deferral.

Review of the 5-steps for (basic) DUI assessment

1. Get the history (airman's statement), court records, and arrest reports
2. Determine the BAC
3. Remind/advise the airman to report the incident to the Security Division
4. Document findings in Block 60
5. Issue, with favorable reports & a documented BAC less than 0.15

If you have any doubts or concerns about whether or not you can or should issue the certificate, please first try to call one of the AMCD physicians to discuss the case and confirm what action would be appropriate.

III. Epinephrine Injection, or Auvi-Q, and History of Severe Allergy

Does the FAA allow epinephrine injectors (Epi-Pen)—in-flight? The answer is *yes*. You should review the history with the airman. Has there been a significant event (anaphylaxis in-flight, or motor vehicle accident involving severe allergic reaction)? Was the airman's driver's license suspended?

Depending on the condition and circumstances, a special issuance may be required. In all cases, when the treating physician advises the airman to carry an epinephrine auto injector, the FAA needs to be notified. The FAA approach is similar to a DUI (like a DUI, the airman will be sensitive about such serious incidents as an auto accident).

You should be aware of the usual cautions we provide to airman in our letters. For example,

> "…we are aware that you have a condition which requires an epinephrine Auto-Injector (EpiPen) be available. Be sure and take an EpiPen with you at all times in the aircraft. If symptoms require in-flight use, you must notify air traffic control and land as soon as conditions permit. You should not act as pilot in command following any use of an EpiPen until all symptoms have subsided and you are examined by a physician and cleared to resume all activities."

Similar to DUI, steps for assessing airman's use of epinephrine injection and severe allergy history:

1. History, events (was there an accident, or in-flight event?)
2. Determine severity of allergic reaction, medical follow-up, treatment, and prognosis
3. Document findings in Block 60
4. Issue, with favorable reports and good prognosis

Team Effort

We ask that you help us limit unnecessary deferrals and delays in certification. Many complex medical conditions do eventually get a waiver (special issuance or SODA). Together, we can expedite the timely medical certification of pilots.

Stay Tuned

Coming up in the next issue of the *Bulletin*, we will discuss more conditions and what aeromedical dispositions are needed to keep the airman flying safely.

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Dr. Carter is a Medical Review Officer in the Aerospace Medical Certification Division.
Special thanks to Matt Dumstorf, MD; and Mitchell Selensky, BS, RN, Supervisor-Review, Qualifications, and Evaluation Section, AMCD; and Charlotte Kelley, Quality Assurance Supervisor-Review, Qualifications, and Evaluation, Section, AMCD, for their review and guidance regarding the topics discussed in this article.

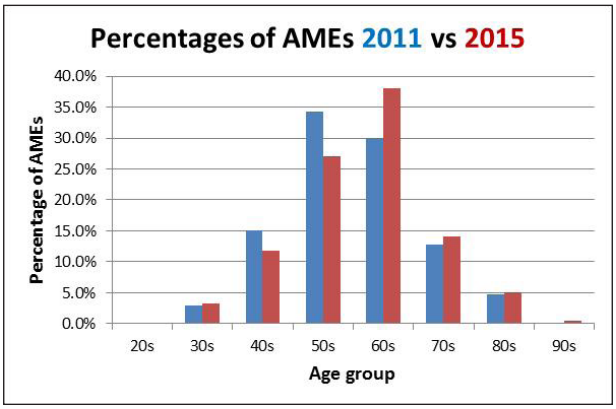
Working Longer

by Mike Wayda

Physicians have never been the kind of people who take early retirement. So many of us find our work emotionally stimulating and satisfying that we keep on working as long as we can.[1]

—Peter W. Carmel, MD

More aviation medical examiners (AMEs) are working longer, even into their nineties. The statistics bear this out from our studies of data from 2011, 2013, and the current year.[2] In 2011, the average age of an AME was 60.0, today it is 61.5, a 2.5% increase. Graphing out the 2011 data versus the 2015 data gives us a sense of how these changes are distributed throughout the AME population.



This graphic shows percentages (where both blue and red bars sum to 100%). These percentages show how 2011 data (blue bars) clearly "leaned left," whereas 2015 data (red bars) "lean right," reflecting an older AME population today than four years ago.

The reasons that AMEs continue well beyond the customary retirement age are varied. Job satisfaction is certainly one reason. One such AME, Floridian **Louis Moore,** agrees that working in aviation medicine is interesting—enough so to keep him occupied for 55 years. Dr. Moore has practiced as an AME since 1960.

We featured Dr. Moore in earlier articles (2002, 2011, 2013) and checked in again with him recently only to learn that he had just retired—for good, this time, he says. He had retired briefly before but went back to work when his pilots demanded it. Now, at age 92, health issues have ended his practice.

A few of his thoughts about aviation medicine are reprised:[3]

- ★ Most of the changes through the years I have considered to be helpful in improving efficiency without jeopardizing safety—such as reducing the hearing test to spoken voice, both ears.
- ★ Assistance from Oke City is always great! —prompt and courteous.
- ★ I wish all AMEs (and tower operators) were active pilots.
- ★ I enjoy reading the Bulletin and usually find one or two articles of special interest to me. I have been a pilot for 53 years and an AME for 41 years [in 2001], but still have a few things to learn.

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[1] Carmel PW. "Senior physicians keep working, putting off the R-word." Admednews.com Apr 30, 2012. Downloaded from http://www.amednews.com/article/20120430/opinion/304309967/5/

[2]Aviation medical examiner statistics provided by David Nelms, AAM-300.

[3] "AME Profile: Louis S. Moore, MD," *FASMB* Spring 2002, p. 5.

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See the accompanying article by Dr. Knecht for a more thorough analysis of how the aviation medical examiner workforce is trending.

Analyzing Age Trends in the AME Population

by William R. Knecht, PhD

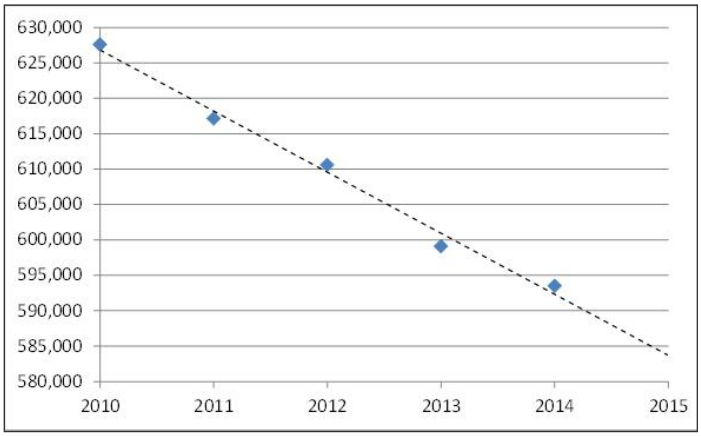
As Mike observed earlier, aviation medical examiners (AMEs) are working longer. Since 2011, the average age increased 2.5%, from 60.0 to 61.5.

The reasons for working well beyond the customary retirement age are varied. Job satisfaction is certainly one reason. Dr. Carmel adds that an unstable economy may also make retirement "unaffordable to many." That is consistent with U.S. Bureau of Labor Statistics figures, which show a national trend toward longer work life. In 2012, 26.8 % of Americans aged 65-74, and 7.6% of those 75 and older remained in the workforce. By 2022, that is projected to increase to 31.9% and 10.5%, respectively.[1]

Fewer AMEs

The average number of AMEs is decreasing, as well: 2011 figures show 3,519; in 2015, there are 2,846, a decrease of 673 (19.1%).[2]

Part of this may reflect the 5.4% nearly straight-line drop in the overall number of U.S. pilots from 2010-2014 (627,588) to 2014 (593,499).[3]



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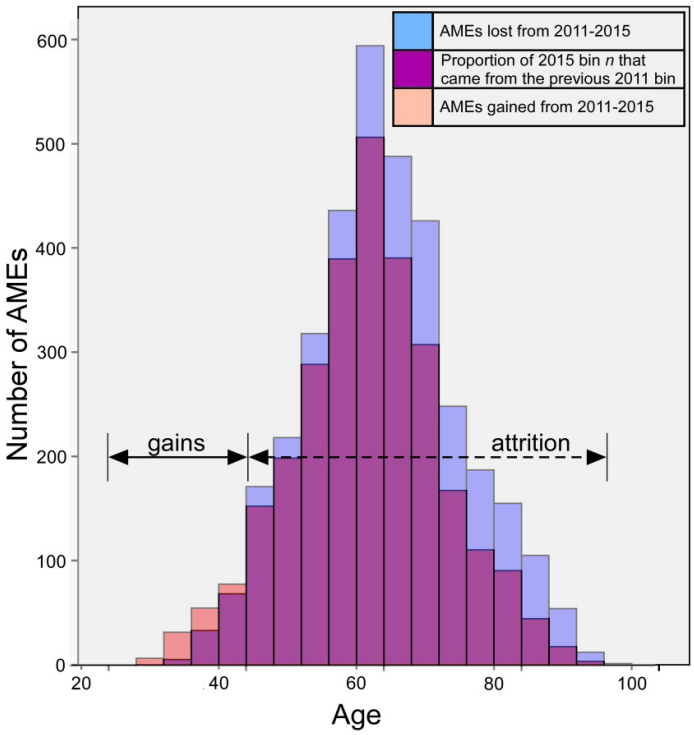

The remaining decrease remains more of a mystery. A bit of mathematical magic lets us estimate which age groups are experiencing gains versus attrition.

This overlay graph (above) shows numbers of AMEs grouped into 4-year-wide age bins. The salmon-colored bars represent the relatively small number of new hires from 2011 to 2015. The purple bars estimate how many AMEs stayed in their jobs and simply got 4 years older. The sky-blue bars represent AMEs who left the workforce over the past 4 years.

This figure makes it plain what is happening. While a small number of AMEs who left from 2011-2015 did so in their mid-40s to late-50s, the vast majority were age 60 and greater—exactly the ages we would expect them to retire.

The only remaining mystery is why there haven't been more new hires. If any readers can inform us, we would enjoy hearing from you.

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[1]Bureau of Labor Statistics, U.S. Department of Labor, *The Economics Daily*, Labor force participation projected to fall for people under age 55 and rise for older age groups. Downloaded 9/10/15 from http://www.bls.gov/opub/ted/2014/ted_20140106.htm

[2]AME age statistics, current as of 9/2/2015, were provided by David Nelms, AAM-300.

[3]2014 Active Civil Airmen Statistics, Table 1. Downloaded 9/18/15 from https://www.faa.gov/data_research/aviation_data_statistics/civil_airmen_statistics/

Dr. Knecht is an engineering research psychologist in the Office of Aerospace Medicine's Human Factors Research Division.

Residents in Aerospace Medicine Case Reports

Genesis of Case Reports

The *Federal Air Surgeon's Medical Bulletin* (FASMB) has been published on a quarterly basis since June 1964 by the Aerospace Medical Education Division of the Civil Aerospace Medical Institute, or CAMI.[1] One of the regular features included in the FASMB has been the discussion of special aeromedical certification cases involving pilots.

Until 1996, these cases were produced by FAA medical officers. However, due to competing work priorities, it was not possible to have a sufficient supply of these cases for publication in every issue of the FASMB. Therefore, starting that year, Dr. **Melchor Antuñano,** who was the manager of the Aeromedical Education Division, implemented a new approach to task every Aerospace Medicine resident from Wright State University in Dayton, Ohio, rotating at CAMI, to identify and select interesting and/or complex aeromedical certification cases in conjunction with the Manager of the Aerospace Medical Certification Division to publish them in the FASMB.

These cases are used for instructional purposes among FAA aviation medical examiners to promote their compliance with pilot medical certification standards and special medical issuance criteria and appropriately issue or defer the issuance of pilot medical certificates. Due to the success of this approach, over the years the Aerospace Medical Education Division has added this task to Aerospace Medicine residents rotating at CAMI from other educational institutions, including the University of Texas Medical Branch in Galveston, Texas; the USAF School of Aerospace Medicine in Wright Patterson Air Force Base, Ohio; the US Navy School of Aerospace Medicine in Pensacola, Fla.; the Mayo Clinic in Rochester, Minn.; and the National University of Colombia, main campus in Bogota, Colombia.

Thus, the participants' major deliverable would be a written case report about a pilot's medical certification problem. Plenty of interesting medical issues to research and write about existed—since the first year to the present, we have published 154 case reports (including three in this issue) on topics ranging from acoustic neuroma to Wolf-Parkinson-White disease.

What's New: Recent Report Posting

Starting with this issue, we will post in a special section all case reports published in the *Bulletin* during the past two years, and you can look up various medical issues to see how the FAA prefers that they be handled. The cases are recent enough that the medical standards are still current. Click on this link to view.

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Thanks to Dr. Antuñano, the Director of the Civil Aerospace Medical Institute, for providing this information.

[1]At that time, CAMI was known as the Civil Aeromedical Institute, and the Aerospace Medical Education Division was known as the Aeromedical Education Division.The name changes were instituted in 2001.

Brugada Pattern and Syndrome

Case Report, by Maximilian S. Lee, MD, MPH

Brugada syndrome was first characterized by Drs. Pedro and Josep Brugada in 1992 as an electrocardiographic right bundle branch pattern with persistent ST-segment elevation in the right precordial leads. It is associated with sudden cardiac death (1), as the electrical abnormality can lead to sudden cardiac dysrhythmias, loss of consciousness, and death. Recent advances in electrocardiogram screening, genetic testing, long-term outcomes, and treatment modalities have established guidelines for evaluating at-risk populations. With careful cardiovascular evaluation, risk assessment, and follow-up, a pathway for Special Issuance of an FAA medical certificate is possible.

Case Presentation

A 35-year-old male commercial airline pilot from the middle east with no significant medical history presented for his annual FAA first-class medical certificate. The pilot reports being in his usual state of excellent health and does not report using prescription medications, over-the-counter supplements, recent surgeries, or medical problems since his last exam. He recently turned 35 years old, and a screening ECG was performed. The ECG showed a right bundle branch (RBBB) pattern with elevated ST segments and positive T wave morphology in leads V2 and V3.

Case Discussion

Brugada pattern and Brugada syndrome are autosomal dominant conditions involving the cardiac sodium channel associated with characteristic ECG pattern of RBBB and ST segment elevations in V1 to V3 leads. Brugada pattern describes the ECG pattern in an asymptomatic patient. The Brugada pattern can be further divided into two main types.

1. Brugada type 1 ECG pattern is characterized by a widened terminal R,[1] ST segment elevation, and terminal T wave inversion that is described as "coved type" pattern
2. Brugada type 2 ECG pattern represents a narrower RBBB pattern with J point elevation and ST segment elevation with a positive T wave deflection, also known as "saddleback" pattern

While three different types of Brugada patterns were initially described, two distinct Brugada ECG pattern types are currently used for assessment, treatment, and risk evaluation (1). Brugada syndrome is characterized by either Brugada type of ECG pattern, along with history of sudden, unexplained death of a family member, history of ventricular fibrillation, or syncope.

Different prevalence rates have been reported. In Japan, the prevalence of Brugada ECG pattern is as high as 1.0%, while prevalence in US urban population ranged from 0.012 to 0.4 % (2,3). Early studies investigating sudden, unexpected death looked at structural cardiac abnormalities in post-mortem autopsies. Although some researchers found evidence of cardiac dilation, localized inflammation, and fibrosis, newer studies show associations with SCN5A and SCN10A cardiac sodium channel gene mutations. Of note, the presence of a genetic mutation is associated with only 17 to 30% expression of Brugada syndrome (4).

Brugada Pattern and Syndrome

Brugada syndrome was first described as a clinical entity with specific ECG findings in 1992, but southeast Asian cultures have long recognized sudden unexplained death syndrome known as bangungot (Philippines), pokkuri (Japan), and lai tai (Thailand) as one of the leading causes of death in males younger than 50 years (7). Brugada syndrome is considered an autosomal dominant sodium channelopathy with a population ECG prevalence as high as 1% in Japan and average age of first diagnosis at 41 (2,8). Recent research has linked genetic mutations to Brugada pattern, but less than half of patients that have the mutation manifest as clinical Brugada syndrome.

ECG morphology and clinical history are important factors in determining the category of disease and assessing risk for sudden cardiac events. ECGs with RBBB with prolonged R[1] and inverted T wave in V1 to V3 are considered to have Brugada type 1 or "coved type" pattern. ECGs with RBBB with J point elevation, ST segment elevation and positive T wave are Brugada type 2 or "saddleback" pattern. History of ventricular arrhythmia, unexplained syncope, and family history of sudden deaths in first-degree relatives with Brugada ECG findings are consistent with Brugada syndrome, rather than Brugada pattern.

FAA risk assessment for Brugada *pattern* versus *syndrome* involves ruling out other cardiac disease, obtaining history of unexplained syncope or ventricular arrhythmias, family history of sudden unexpected death, and assessing the Brugada type that could contribute to an incapacitating event. Therefore, an evaluation by a cardiologist or an electrophysiologist with detailed history for ventricular arrhythmias, family history, arrhythmia-related symptoms, and risk assessment for annual recurrence are required for consideration of special issuance of an FAA medical certificate (7). Dysrhythmias should be assessed with a 24-hour Holter monitor study, structural abnormalities evaluated with an echocardiogram or cardiac MRI, ischemia analyzed with a maximal exercise stress test, changing morphology of ECG pattern tested with three serial ECGs done at least 24 hours apart, and classification of Brugada pattern versus Brugada disease by obtaining a detailed personal and family history for symptoms (9).

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Aeromedical Issues

The primary aeromedical concern for Brugada pattern and syndrome is related to the risk for sudden incapacitation secondary to ventricular arrhythmias while performing aviation duties. The etiology for ventricular arrhythmias may be due to blunted sodium channel depolarization that results in decreased propagation of the action potential (5). The combination of localized block and short refractory period could serve as the foci for localized reentry and ventricular arrhythmia (5).

Results from long-term Brugada registry showed a 7.7% cardiac event rate per year in patients with Brugada type 1 syndrome with history of ventricular fibrillation, 1.9%-5% with history of syncope, and 0.5% in asymptomatic patients (6).

Risk factors associated with higher rates of cardiac events include male sex, family history of sudden unexplained death, Brugada type 1 ECG morphology, and syncope (7). Currently, opinions differ for the need for provocative testing for stratifying risk in patients with Brugada pattern. While Benito's group (7) found higher rates of overall cardiac events in electrophysiologically inducible patients, the FINGER long-term registry study did not find increased risk (6).

Overall, patients with Brugada type 1 syndrome may develop ventricular arrhythmia at a rate of 7.7% per year; patients with Brugada type 1 pattern have a rate of 2.3% events per year. Therefore, Brugada type 1 pattern and syndrome are disqualifying for all FAA medical certification (6).

Pilots that have Brugada type 2 syndrome (saddleback ECG findings) and history of ventricular fibrillation or syncope have 1.39% calculated events per year; therefore, the Brugada type 2 syndrome is also disqualifying (8). However, Brugada type 2 ECG pattern without symptoms have less than 0.5% events per year and may be eligible for a time-limited FAA medical certificate (9, 10).

In some patients, the characteristic ECG changes of the Brugada pattern are transient or variable over time. Type 2 pattern initially may subsequently manifest type I morphology. Among patients with the type 2 Brugada ECG pattern, the type 1 Brugada ECG pattern can be unmasked by sodium channel blockers (e.g., flecainide, procainamide).

Outcome

The pilot obtained an electrophysiology cardiology consult. A detailed history showed no evidence of syncope, light headedness, palpitations, or nighttime agonal respirations. His family history did not reveal any sudden, unexpected deaths. He denies taking any over-the-counter medications or sports nutritional supplements. Cardiac evaluation found normal echocardiogram, normal maximal exercise stress test without development of arrhythmia or ischemia, and a normal Holter monitor study. Three separate ECGs performed over the course of 7 days showed normal ECG without RBBB pattern. However, the ECGs continued to show ST segment elevation in V2, consistent with Brugada type 2 "saddleback" pattern. The Federal Air Surgeon's cardiology consultant for EP recommended provocative challenge with flecainide or procainamide, if no conversion to type I then certification.

The airman remains unissued pending the provocative drug challenge.

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About the Author

Maximilian S. Lee, MD, MPH, Lt Col, USAF, MC, SFS, was a resident in aerospace medicine. He currently is a third-year resident in aerospace medicine at the USAF School of Aerospace Medicine at Wright-Patterson Air Force Base, Ohio. He wrote this report while on rotation at the FAA Civil Aerospace Medical Institute in Oklahoma City, Okla.

Right Bundle Branch Block

Case Report, by Kevin D. Hettinger, MD

The prevalence of right bundle branch block in the general population is estimated at between 0.2% and 0.8%. Right bundle branch block in asymptomatic men without evidence of intrinsic cardiac pathology is a manifestation of a primary abnormality of the cardiac conduction system but has no demonstrable adverse effect on long-term cardiac morbidity or mortality. This article presents a case report of a first-class pilot who presented with new onset right bundle branch block, as well as associated aeromedical issues.

History

Your last patient on a Friday afternoon is a 61-yr-old male first-class pilot with over 8,500 hours of flight time applying for first-class medical recertification. The airman has been asymptomatic. He does walk for exercise without limitation. He denies exertional chest pain, shortness of breath, light-headedness, syncope, orthopnea, paroxysmal nocturnal dyspnea, edema, or palpitations. He has never been diagnosed with hypertension, although he does have dyslipidemia. He has never had a heart attack, heart failure, arrhythmia, stroke, transient ischemic attack, or thyroid disease. He does snore, but he has not been witnessed to stop breathing. He does feel well rested in the mornings. His sister has a history of supraventricular tachycardia, and his mother has a cardiac pacemaker. He has occasional caffeine intake and alcohol use and denies history of smoking or drug use. However, a routine electrocardiogram (ECG) reveals an incomplete right bundle branch block, which is new compared with the ECG from the year prior.

Aeromedical Issues

The primary aeromedical concern with new ECG changes are whether these changes are indicative of existing significant cardiac pathology or warning signs of a future cardiac event that could affect the airman's ability to safely operate an aircraft.

The term *bundle branch block* (BBB) refers to impaired transmission of electrical impulses through specialized conduction pathways within the ventricles of the heart known as bundle of His and right and left bundle branches. Impaired conduction through each is termed *left bundle branch block* (LBBB) and *right bundle branch block* (RBBB). LBBB and right bundle branch block, separately, produce no symptoms and are recognizable only by duration of the QRS on ECG.[2] Typically, complete right bundle branch block (CRBBB) is defined as a QRS complex of 0.12 sec in duration; incomplete right bundle branch block (IRBBB) is defined as a duration of greater than 0.1 but less than 0.12 sec.[7]

When compared with control groups matched for the age at which RBBB appeared, men with RBBB showed no difference in the prevalence of antecedent coronary risk factors or obstructive lung disease. RBBB in asymptomatic men manifesting as a primary abnormality of the cardiac conduction system has no demonstrable adverse effect on long-term cardiac morbidity or mortality.[6,8]

IRBBB among athletes is thought to result from enlarged right ventricular cavity size and increased cardiac muscle mass from exercising. It occurs in 35–50% of athletes, compared with 10% in young, healthy controls. Studies in this population support current consensus guidelines that suggest this ECG change does not require further investigation if the family/personal history and physical examination are normal and the athlete is asymptomatic.[9]

IRBBB has a good long-term prognosis, usually does not progress toward high-degree A-V block, and its maximum prevalence is at ages 20-29 years with a sharp decrease at older ages. Therefore, certification of an IRBBB depends upon its etiology. The cardiac pathologies producing the pattern, which by themselves may be disqualifying, can be detected by noninvasive methods. If the pattern merely arises from a conduction disturbance or delay in the right bundle branch, it does not imply a risk; as an isolated modification of the ECG, it does not merit any limitation of flying activities.[1] A number of USAF subjects with RBBB or LBBB have been maintained on flying status in the absence of objective evidence of cardiovascular disease.[10]

Decision Considerations/Outcome

According to the *Guide for Medical Examiners*, for all classes, left and right bundle branch blocks require a cardiovascular examination (CVE) and a graded exercise stress test (EST). If there is no evidence of structural, functional, or coronary heart disease, the aviation medical examiner can issue; otherwise, the certification is deferred. A current cardiovascular evaluation must include:

- personal and family medical history assessment
- clinical cardiac and general physical examination
- assessment and statement regarding the applicant's medications, functional capacity, and modifiable cardiovascular risk factors
- prognosis for incapacitation
- blood chemistries (fasting blood sugar, current blood lipid profile to include total cholesterol, HDL, LDL, and triglycerides) performed within the last 90 days[3]

The *Guide for Aviation Medical Examiners* Disease Protocols further clarify that if the BBB has been previously documented and evaluated, no further evaluation is required. A medical

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Right Bundle Branch Block

The right bundle branch is a long, thin, and discrete structure composed of high-velocity conduction Purkinje fibres. It is located in the right side of the interventricular septum and occupies a subendocardial position in its superior and inferior thirds and deeper position in the middle third. The appearance of a right bundle branch block alters the ventricular activation sequence, produces a QRS prolongation, and changes the orientation for R- and S-wave vectors, thus generating a typical electrocardiogram pattern.

The prevalence of RBBB in the general population is estimated at between 0.2% and 0.8%, and it clearly increases with age. It may be associated with different cardiac structural diseases such as ischemic heart disease, myocarditis, hypertension, congenital heart disease, cor pulmonale, and pulmonary embolism. Its prognosis depends on the type and severity of the associated heart condition; for example, in patients with ischemic heart disease the presence of RBBB is a well-established mortality predictor. Data suggest an excellent prognosis in patients otherwise free of heart disease.[5]

certificate should not be issued to any class if the applicant has a new onset of a BBB. A RBBB in an otherwise healthy person 30 years of age or younger should not require a CVE. All others who do have a RBBB require a CVE, but a radionuclide study should not be required unless the standard exercise stress test cannot be interpreted. A stress echocardiogram may be sufficient in most cases. A LBBB in a person of any age should have a CVE and should include a pharmaceutical radionuclide perfusion study. Those individuals who have a negative workup may be issued the appropriate class of medical certificate. No follow-up is required. If any future changes occur, a new current CVE will be required.[4]

For those cases of new RBBB in young aviators (less than 30), the AME should consider consultation with the Regional Flight Surgeon or the Aeromedical Certification Division. An airman who has an incomplete RBBB pattern on previous ECGs, and then demonstrates a complete RBBB, does not require an evaluation.[11]

Outcome

You referred the airman for cardiology specialty examination and a standard EST. The results of the EST were 1) negative, 2) rate-related BBB, and 3) good exercise capacity. The remaining cardiology examination and lab work revealed no other cardiac pathology or significant risk factors.

The airman was granted a first-class medical certificate with an eligibility letter stating, "…operation of aircraft is prohibited at any time new symptoms or adverse changes occur or any time medication and/or treatment is required."

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Epilepsy

Case Report, By Jeffrey S. Woolford, MD, MPH

Epilepsy is diagnosed after two unprovoked seizures occur greater than 24 hours apart.[1] This condition is wholly incompatible with aviation duties and is one of the 15 disqualifying medical conditions per 14 CFR part 67.[2] However, under the provisions of Authorization of Special Issuance, the FAA may exercise discretionary authority and issue a third-class airman medical certificate.[3]

History

A 27-yr-old male pilot walks into your clinic with his wife, and drops a loosely assorted pile of papers on your desk, including his second-class medical certificate with your signature on it. He extends his hand to shake yours, and blurts, "I'm going to need some help here!" You open his file and your eyes are immediately drawn to the provisional diagnosis of "seizure" across the top of an emergency room discharge report dated two days prior. You remember issuing him his medical certificate last summer but don't recall any seizure concern listed on his MedXPress FAA Form 8500-8. You ask him to take a seat and, without prompting, he begins to chronicle his recent medical history.

He explains the first time he had a seizure-like experience was Thanksgiving night after enjoying a few pints of beer. Although he doesn't recall the details of the event, his wife explains that she had witnessed what she describes as his "uncontrollable shaking" while she was turning-down the bed. She says his eyes were open, but he was unresponsive to her voice. After several minutes, his tremor stopped, and although he regained his composure, he appeared mildly confused. Due to his complaint of worsening left shoulder pain and noting a small trickle of blood in the corner of his mouth, she insisted on taking him to the hospital.

Following a comprehensive physical and neurological examination, including laboratory studies that revealed a blood alcohol concentration of 0.02 g/dL, the attending physician diagnosed a provoked seizure, likely due to the alcohol. He was discharged home without medication. Assuming it was a one-time event, he thought it unnecessary to inform you, since he hadn't been diagnosed with epilepsy and required no further evaluation. However, two days later, he experienced a similar event, and he hadn't consumed any alcohol beforehand. He was seen in a different emergency department and was started on Keppra (levetiracetam) for seizure prophylaxis. He was discharged with instructions to follow up with his primary care manager with a presumptive diagnosis of epilepsy. As his aeromedical examiner, he now thinks you should know what is happening.

Aeromedical Concerns

Key considerations when addressing any aeromedical neurologic concern includes the degree of incapacitation and the unpredictability of such occurrence. The diagnosis of epilepsy is wholly incompatible with aviation duties in both respects, and most definitely constitutes an unacceptable safety risk. For

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Epilepsy Etiology

Seizures are caused by excessive neuronal electrical activity that ensues when a genetically determined threshold is exceeded. Epilepsy is a chronic convulsive disorder characterized by two or more unprovoked seizures occurring greater than 24 hours apart and has a cumulative incidence between 1.3% and 3.1% by age 80.[1] The diagnosis is idiopathic in two-thirds of patients, therefore a neurological history assessment is the primary means of confirming epilepsy.[1] A careful reconstruction of preceding events helps to ascertain whether the seizures were provoked or unprovoked in nature, a critical discriminator. Attention should be focused on assessing sleep status, medication/illicit drug use, and alcohol intake. In combination or singularly, these elements have the potential to lower the seizure threshold.

Necessary studies following a suspected seizure require magnetic resonance imaging of the brain, with and without gadolinium, as well as wake and sleeping sleep-deprived electroencephalogram (EEG) studies.[4] In the case of an initial focal presentation, it is critical that potential precipitating factors, including a gliotic scar, tumor, or abscess, be identified if present.[1]

A generalized tonic-clonic seizure is characterized as an upper-extremity tonic episode lasting 10 to 20 seconds, followed by a brief period of flexion, then muscular rigidity of raised externally rotated arms abducted with partially flexed elbows. Back, neck, arm, and leg extension then follows, accompanied by apnea and cyanosis, with eyes open and deviated upward. In some cases, expired air results in an "epileptic cry" as it passes partially obstructed vocal cords. Tongue biting and urinary incontinence may occur. Finally, a clonic phase follows with characteristic alternating tone and relaxation, declining in frequency until cessation. Additionally, generalized seizures are followed by a postictal state, with subsequent confusion and often amnesia of the event.[1]

While a definitive diagnosis of generalized seizure can be made with a positive EEG demonstrating epileptiform discharges, negative (normal) readings do not rule out such a diagnosis, as nearly 40% of individuals with confirmed epilepsy demonstrate normal EEG studies throughout their lives. It is important to remember that a single seizure episode does not establish the diagnosis of epilepsy. A definitive diagnosis requires two or more unprovoked events. However, it is worth noting that recurrence risk from unprovoked seizures ranges from 26% to 33% over 5 years.[1]

aeromedical purposes, any seizure type that results in serial events is adequate for the diagnosis of epilepsy; whether they are general, simple-partial, or complex-partial in etiology.[1]

As his aeromedical examiner, you know epilepsy is cause for denial as one of the 15 disqualifying medical conditions, and you are responsible for informing him of his permanent disqualification from flying duties. However, you might want to share with him that under the provisions of Authorization of Special Issuance, the FAA may exercise discretionary authority and issue a third-class airman medical certificate—if the airman remains seizure-free for 10 years and does not require anticonvulsant medication for at least three years before being considered for medical re-certification.[3] Of note, the FAA will not permit the use of antiseizure medications to treat any medical condition, as their potential side-effects are incompatible with flying.[5]

Outcome

Epilepsy is a disqualifying medical condition, and you can expect it will be a difficult discussion. After explaining the reason for his disqualification, you should retain the airman's now invalid medical certificate, and notify the Civil Aerospace Medical Institute of his epilepsy diagnosis requiring medication prophylaxis. Make certain to include relevant medical records pertaining to history and treatment, and a current status report. Finally, encourage the applicant to return when he is eligible for waiver consideration under the provisions of Authorization of Special Issuance.

This case report is based on an article Dr. Wolford prepared for the Aerospace Medical Association publication, Aerospace Medical Performance.[6]*—Ed.*

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About the Author

Jeffrey S. Woolford, MD, MPH, MAJ, USAF, MC, was a resident in aerospace medicine when he wrote this case report at the Civil Aerospace Medical Institute.

Federal Air Surgeon's Medical Bulletin Editor Retires

By Melchor J. Antuñano, MD, MS

I had the pleasure of meeting **Mike Wayda** when I was hired as Manager of the Aerospace Medical Education Division of the FAA Civil Aerospace Medical Institute (CAMI) in July of 1992. Since then, it has been a great opportunity to work with Mike, who is a detail-oriented individual and very passionate about his job as Writer/Editor.

FAA Photo by Richard Butler

Mike has been responsible for coordinating the development and publication of the quarterly *Federal Air Surgeon's Medical Bulletin*, Office of Aerospace Medicine research technical reports, educational aeromedical safety brochures, and other educational materials used to disseminate medical information to promote aerospace safety. Mike has used his skills to make sure all CAMI publications have a great style, a highly professional appearance, and an appropriate knowledge level for the target populations. He ensures the information provided (in many cases, very technical in nature) is accurate, concise, and understandable.

Over the years, hundreds of thousands of copies of these publications and educational materials have been distributed among personnel in the aerospace community both nationally and internationally. In addition to his duties as writer/editor, Mike has also assisted in other tasks utilizing his skills in photography and artistic composition.

Mike has also been involved in the review and editing of technical and professional articles submitted by CAMI researchers, scientists, and other subject-matter experts for publication in the peer-reviewed literature or for public presentation at multiple scientific venues. He has always strived for high quality in everything he works on and this has been publicly recognized with multiple awards.

Thanks to Mike's hard work, attention to detail, commitment to excellence, team work, and passion for his job, the Civil Aerospace Medical Institute, the FAA Office of Aerospace Medicine, and the FAA as a whole have been the beneficiaries of a positive public image based on the high quality of the publications he has edited and produced.

Mike has decided that, after 26 years as editor, it is time to retire. He will be greatly missed by the many of us who benefited from his expertise as a writer and editor. On behalf of everybody at CAMI, I express to Mike our most sincere and heartfelt appreciation for his many years of dedication in support of our programs. We wish him the best in his retirement!

Dr. Antuñano is the Director, FAA Civil Aerospace Medical Institute.