United States Government Accountability Office

Report to Congressional Committees

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AVIATION SAFETY

FAA Should Improve Usability of its Online Application System and Clarity of the Pilot's Medical Form

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Why GAO Did This Study

FAA developed its medical standards and pilot's medical-certification process to identify pilot applicants with medical conditions that may pose a risk to flight safety. The Pilot's Bill of Rights (P.L. 112-153) mandated GAO to assess FAA's medical certification standards, process, and forms.

This report addresses: (1) FAA's medical standards, policies, and certification processes, along with medical experts' views on them, and (2) steps that FAA could take to promote private pilots' understanding of its medical requirements. GAO reviewed statutes, regulations, FAA documents, and interviewed officials from FAA, NTSB, pilot associations, and 20 aviation medical experts primarily identified by the National Academies' Institute of Medicine. Experts were selected based on their type and depth of experience, including recognition in the aerospace-medicine professional community. GAO also interviewed FAA's medical certification division and evaluated the usability of FAA's online application system and the clarity of its application form against federal writing guidelines and best practices in website usability.

What GAO Recommends

GAO recommends that FAA (1) develop a timeline for implementing high-priority technological improvements to the internal computer systems that support the medical certification process, and (2) enhance the online medical-application system by clarifying instructions and questions on the form and providing useful information. The Department of Transportation agreed to consider the recommendations.

View GAO-14-330. For more information, contact Gerald L. Dillingham, Ph.D., at (202) 512-2834 or dillinghamg@gao.gov.

What GAO Found

Aerospace medical experts GAO interviewed generally agreed that the Federal Aviation Administration's (FAA) medical standards are appropriate and supported FAA's recent data-driven efforts to improve its pilot medical-certification process. Each year, about 400,000 candidates apply for a pilot's medical certificate and complete a medical exam to determine whether they meet FAA's medical standards. From 2008 through 2012, on average, about 90 percent of applicants have been medically certified by an FAA-designated aviation medical examiner (AME) at the time of their medical exam or by a Regional Flight Surgeon. Of the remaining applicants, about 8.5 percent have received a special issuance medical certificate (special issuance) after providing additional medical information to FAA. Approximately 1.2 percent were not medically certified to fly. According to an industry association, the special issuance process adds time and costs to the application process, in part, because applicants might not understand what additional medical information they need to provide to FAA. Officials from FAA's medical certification division have said that technological problems with the aging computer systems that support the medical certification process have contributed to delays in the special issuance process. FAA's medical certification division has identified about 50 potential technological enhancements to its internal computer systems that support the medical certification process, of which about 20 have been identified as high priority, but the division has not yet implemented them or developed a timeline to do so. By developing a timeline to implement the highest-priority enhancements, FAA would take another step toward expediting the certification process for many applicants hoping to obtain a special issuance. FAA recently established a data-driven process using historic medical and accident data that authorizes AMEs to certify a greater number of applicants with medical conditions who had previously required a special issuance. Officials expect this effort to allow more applicants to be certified at the time of their AME visit and to free resources at FAA to focus on applicants with higher-risk medical conditions.

GAO's analysis and medical experts' opinions indicate that FAA could improve its communication with applicants by making its online application system—part of FAA's internal computer systems discussed above—more user-friendly and improving the clarity of the medical application form. Specifically, GAO found that the online application system requires applicants to scroll through a lengthy terms-of-service agreement and does not provide clear instructions, and that the application form contained unclear questions and terms that could be misinterpreted by the applicant. FAA could enhance its online application system by using links to improve navigability of the system and providing information that is more useful to applicants—for example, links to information about the risk that specific medical conditions pose to flight safety and any additional medical information applicants with those conditions would need to provide to FAA. FAA could also improve the clarity of its medical application form by incorporating guidelines established in FAA's Writing Standards, including shorter sentences and paragraphs, active voice, and clear terms and questions. These clarifications could not only aid an applicant's understanding of the medical standards and requirements, but also may result in more accurate and complete information provided by applicants to better inform FAA's certification decisions.

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Abbreviations

AASI	AME Assisted Special Issuance (see below for AME)
ALPA	Air Line Pilots Association
AMCD	Aerospace Medical Certification Division
AME	Aviation Medical Examiner
AMSIS	Aerospace Medicine Safety Information System
AOPA	Aircraft Owners and Pilots Association
CACI	Conditions an AME Can Issue
CAMI	Civil Aerospace Medical Institute
DIWS	Document Imaging Workflow System
FAA	Federal Aviation Administration
FDA	Food and Drug Administration
EAA	Experimental Aircraft Association
ECG	electrocardiogram
ITDM	insulin-treated diabetes mellitus
MOU	memorandum of understanding
NTSB	National Transportation Safety Board
OMB	Office of Management and Budget
SMS	Safety Management System
SODA	Statement of Demonstrated Ability
SSRI	selective serotonin reuptake inhibitors

U.S. GOVERNMENT ACCOUNTABILITY OFFICE

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April 8, 2014

The Honorable John D. Rockefeller IV
Chairman
The Honorable John Thune
Ranking Member
Committee on Commerce, Science, and Transportation
United States Senate

The Honorable Bill Shuster
Chairman
The Honorable Nick J. Rahall II
Ranking Member
Committee on Transportation and Infrastructure
House of Representatives

The primary mission of the Federal Aviation Administration (FAA) is to ensure a safe and efficient flying environment. As part of its mission, FAA oversees the medical certification of about 600,000 pilots[1] to certify that they meet FAA's medical standards and are physically and mentally fit to fly. According to FAA officials, most applicants for a medical certificate meet FAA's medical standards and are medically certified after completing a physical exam by a FAA-designated physician. However, for applicants with a disqualifying medical condition, FAA's Federal Air Surgeon may, on a case-by-case basis, authorize a special issuance medical certificate (special issuance) for a specified period. An authorization for a special issuance requires the applicant to show to the satisfaction of the Federal Air Surgeon that the required operations can be performed without endangering public safety during the period of the special issuance. Medical conditions that generally disqualify applicants from medical certification to fly include certain heart conditions, diabetes, epilepsy, impaired hearing or vision, psychosis, drug and alcohol dependence, and also generally any disease, defect, or treatment that could prevent a pilot from safely operating an aircraft.[2] About 10 percent

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[1]Persons not required to hold a medical certificate include, among others, sport pilots, with glider and balloon privileges (14 C.F.R. § 61.23(b)).

[2]Specific medical standards and certification procedures for issuing medical certificates and for remaining eligible for a medical certificate are set out in federal regulations at 14 C.F.R. Part 67.

of applications—nearly 40,000 a year—may require, among other things, further medical evaluation, medical flight testing, or submitting additional documentation that can add time to the certification process. However, through the special issuance process, FAA has allowed some pilots to fly for a specified period with heart transplants, permanent cardiac pacemakers, and insulin-treated diabetes mellitus, among other conditions that would otherwise disqualify pilots from flying.

The Pilot's Bill of Rights mandates that GAO assess FAA's medical certification process and the associated medical standards and forms.[3] This report discusses

- FAA's medical standards and certification processes, along with medical experts' views on them, and

- steps that could be taken to promote private pilot applicants' understanding of FAA's medical requirements, including potential revisions to the medical application form.[4]

To address our objectives, we commissioned the Institute of Medicine of the National Academies to identify experts knowledgeable about aviation medicine.[5] From the list of 24 experts identified by the National Academies, seven experts were either unavailable, had concerns over their ability to respond to the questions because of their unfamiliarity with

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[3]Pub. L. No. 112-153, 126 Stat. 1159 (2012).

[4]Federal regulations establish three classes of medical certification that correspond to the duties that pilots perform. First- and second-class pilots fly for commercial purposes, whereas third-class pilots fly for noncommercial (private) purposes. The pilot medical certification process is similar for all classes of pilots. The General Aviation Pilot Protection Act of 2013 (H.R. 3708, 113th Cong. (2013)) was introduced in December 2013 and, if enacted into law, would eliminate the medical certification requirement, under a specific set of conditions, for private (third-class) pilots flying recreationally. We did not review the proposed legislation and its potential implications as part of this study.

[5]We selected these experts based on their relevant experience in aviation medicine. The experts represented private, public, and academic institutions. Fourteen of the experts are board certified by at least one of the American Board of Medical Specialties member boards, including nine who are board certified in aerospace medicine. Eight of the 20 medical experts we interviewed are Aviation Medical Examiners (AMEs) for the FAA, and 16 are pilots or have had pilot experience in the past. Two experts are from aviation authorities in Australia and New Zealand, and a third expert was from the United Kingdom. We asked each interviewee to verify that they had no conflicts of interest in participating in our study.

FAA's medical certification program, or had a conflict of interest, and we added three experts recommended to us, for a total of 20 aviation medical experts. We conducted semi-structured interviews of the experts to solicit their views on FAA's medical standards, the medical application form, and FAA's communication with physicians and pilot applicants. We also interviewed officials from FAA, and we visited the Civil Aerospace Medical Institute (CAMI) in Oklahoma City to interview representatives of FAA's Aerospace Medical Certification Division (AMCD) about FAA's medical standards, the medical application form, and FAA's methods for communicating pilot medical-certification information with physicians and pilot applicants. In addition, we interviewed officials from the National Transportation Safety Board (NTSB), representatives from two pilot associations, and representatives from the American Diabetes Association.[6] We also received written responses from three regional airline representatives and two aviation medical associations regarding their views on FAA's current medical standards, the clarity of the medical form, and FAA's efforts to provide information to pilots and pilot applicants.[7] Further, we analyzed FAA's Form 8500-8 (medical application form) and MedXPress.faa.gov (FAA's online application system), against the federal government's plain language and website usability guidelines. (See app. I for further information on our scope and methodology, including a list of medical experts we interviewed.)

We conducted this performance audit from January 2013 through April 2014, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

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[6]We also contacted the American College of Cardiology and the American Academy of Neurology to solicit their views, but they did not reply for an interview.

[7]Throughout the remainder of the report, we use the term "applicant" to refer to new applicants and to pilots who are applying to periodically renew their medical certificate.

Background

According to FAA officials, FAA's medical certification requirement was established to prevent or mitigate the effect of various medical conditions that present an undue risk to the safety of pilots, passengers, or others.[8] While most general aviation accidents are attributed to pilot error involving a loss of aircraft control, according to information provided by NTSB,[9] medical causes were a factor in approximately 2.5 percent of the accidents from 2008 through 2012.[10] By ensuring that applicants meet medical standards, FAA aims to reduce the likelihood of incapacitation of a pilot due to a medical cause.[11]

Federal regulations establish three classes of medical certification that correspond to the types of operations that pilots perform. Airline transport pilots who serve as pilots in command of scheduled air-carrier operations must hold first-class medical certificates. Pilots who fly for compensation or hire generally hold second-class medical certificates. Private pilots hold

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[8]Among other statutory authorities, the Administrator of the FAA is required to promote safe flight of civil aircraft (49 U.S.C. § 44701) is authorized to issue airman certificates (49 U.S.C. § 44702) and is required to issue such certificates after investigation that the individual is qualified for, and physically able to perform the duties of the position authorized by the certificate (49 U.S.C. § 44703).

[9]The National Transportation Safety Board is an independent federal agency charged by Congress with investigating every civil aviation accident in the United States and significant accidents in other modes of transportation. The NTSB determines the probable cause of the accidents and issues safety recommendations aimed at preventing future accidents.

[10]Under 49 C.F.R. § 830.2, an *aircraft accident* means an occurrence associated with the operation of an aircraft that takes place between the time any person boards the aircraft with the intention of flight and all such persons have disembarked, and in which any person suffers death or serious injury, or in which the aircraft receives substantial damage. NTSB officials told us that the actual portion of accidents with medical causes or contributing factors may be higher because they do not investigate all accidents in the same way, making it difficult to identify medical causes in some cases. According to NTSB officials, methods of accident investigation may vary, depending on whether or not the accident was fatal, the condition of the aircraft and pilot, and other factors. Additionally, according to FAA officials, 30 to 50 percent of fatal accidents are attributed to faulty aeronautical decision making. FAA officials also said that human behavior is recognized as a key component of aeronautical decision making, but the specifics of medical contributing factors—for example, the role of fatigue secondary to obstructive sleep apnea—are not well mapped.

[11]We use the term *incapacitation* to refer to *sudden* or *subtle* forms of incapacitation. Any medical certification process would be unlikely to prevent all accidents with medical causes due to the unpredictable nature of some medically incapacitating events, such as a heart attack, and the relative infrequency of the medical evaluations for some pilots.

third-class medical certificates. (See table 1.) Depending on their age and the class of medical certificate sought, pilots must renew their medical certificate periodically, from every 6 months to every 5 years (e.g., commercial pilots—generally those needing first- or second-class medical certificate—must have their medical certificate updated more frequently than private pilots). After obtaining a medical certificate, and between renewal periods, pilots are prohibited from performing pilot operations when they know or have reason to know of a medical deficiency that would make them unable to fulfill their pilot operation.[12]

Table 1: Frequency of Medical Certification Requirement and Distribution of Pilots by Medical Class (2011)

Class of certificate	Age	Frequency	Approximate percentage of pilots per class
First class (commercial)	> 40 years of age	Every 6 months	8.4
	< 40 years of age	Every year	12.4
Second class (commercial)	> 40 years of age	Every year	3.3
	< 40 years of age	Every year	11.8
Third class (private)	> 40 years of age	Every 2 years	30.8
	< 40 years of age	Every 5 years	33.4

Source: GAO analysis of FAA data from 2011 Aerospace Medical Certification Statistical Handbook.

In the fiscal year 2014 budget submission, FAA estimated that its Office of Aerospace Medicine would need about $56.1 million in funding—about 4.7 percent of the total Aviation Safety budget—to carry out its mission. To assist in the nearly 400,000 medical evaluations of pilots and new applicants[13] each year, FAA designates medical certification authority to approximately 3,300 private physicians, or Aviation Medical Examiners (AMEs). The AMEs review applicants' medical histories and perform physical examinations to ensure that applicants meet FAA's medical

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[12]Pursuant to 14 C.F.R. § 61.53(a), *Prohibition on operations during medical deficiency* prohibits a person who holds a medical certificate from acting as pilot in command or in any other capacity as a required pilot flight crew member while that person: (1) "knows or has reason to know of any medical condition that would make the person unable to meet the requirements for the medical certificate necessary for the pilot operation"; or, (2) "Is taking medication or receiving other treatment for a medical condition that results in the person being unable to meet the requirements for the medical certificate necessary for the pilot operation."

[13]Throughout the remainder of the report, we use the term "applicant" to refer to new applicants *and* to pilots who are applying to periodically renew their medical certificate.
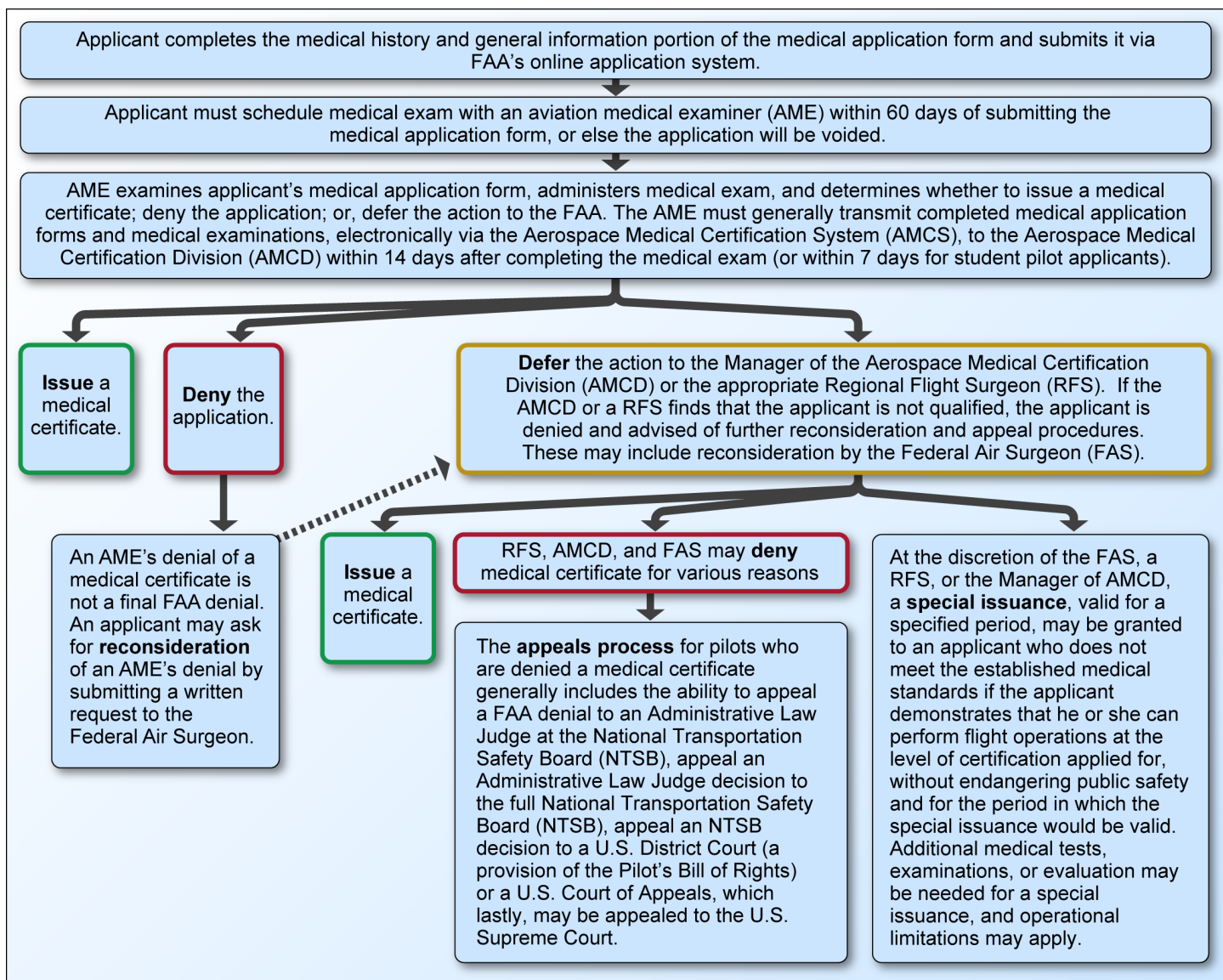
standards and are medically fit to operate an aircraft at the time of their medical exam. Although AMEs are not FAA employees, they are trained in aviation medicine by the FAA and entrusted to make medical eligibility determinations for the majority of applicants, on behalf of the FAA. In order to become an AME and be authorized to administer medical exams, FAA requires AMEs to complete online courses in clinical aerospace physiology and medical certification standards and procedures before attending a one-week basic AME seminar. AMEs must also complete at least 10 pilot medical exams each year and a subsequent refresher courses every 3 years.[14]

All applicants for medical certificates and renewals follow a similar process. Applicants begin the medical certification process by completing Form 8500-8, *Application for Airman Medical Certificate or Airman Medical & Student Pilot Certificate* (medical application form) in MedXPress (online application system). For applicants with disqualifying medical conditions or for those who do not meet FAA's medical standards, the AME must defer the applicant to FAA to authorize a special issuance. The special issuance process may require additional medical information and evaluations from, for example, a primary care physician or medical specialist. Also, a special issuance may be subject to operational limitations for safety reasons, or may be valid for a shorter time period than an unrestricted medical certificate. As a provision of the special issuance, FAA may authorize AMEs to make future medical determinations of the applicant—separate from the centralized special issuance process—under the AME Assisted Special Issuance (AASI) process.[15] Figure 1 describes the medical certification process and various outcomes.

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[14]FAA annually issues an Individual AME Performance Summary Report to each AME, which summarizes AME training and performance to help ensure that the AME completes required training and submits medical exam results to FAA in a timely manner. FAA has also developed a quality assurance review program to help it determine that AMEs have properly issued medical certificates. See GAO, *Aviation Safety: FAA Has Taken Steps to Determine That It Has Made Correct Medical Certification Decisions*, GAO-08-997 (Washington, D.C.: Sept. 17, 2008).

[15]Alternatively, if FAA determines that an applicant's medical condition is static and non-progressive and has found the applicant capable of performing pilot duties without endangering public safety, the FAA may grant a Statement of Demonstrated Ability (SODA) to the applicant, which does not expire and authorizes AMEs to make future medical determinations of the applicant, without requiring the applicant to go through the special issuance review process.

Figure 1: Overview of FAA's Medical Certification Process

Applicant completes the medical history and general information portion of the medical application form and submits it via FAA's online application system.

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Applicant must schedule medical exam with an aviation medical examiner (AME) within 60 days of submitting the medical application form, or else the application will be voided.

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AME examines applicant's medical application form, administers medical exam, and determines whether to issue a medical certificate; deny the application; or, defer the action to the FAA. The AME must generally transmit completed medical application forms and medical examinations, electronically via the Aerospace Medical Certification System (AMCS), to the Aerospace Medical Certification Division (AMCD) within 14 days after completing the medical exam (or within 7 days for student pilot applicants).

Issue a medical certificate.

Deny the application.

Defer the action to the Manager of the Aerospace Medical Certification Division (AMCD) or the appropriate Regional Flight Surgeon (RFS). If the AMCD or a RFS finds that the applicant is not qualified, the applicant is denied and advised of further reconsideration and appeal procedures. These may include reconsideration by the Federal Air Surgeon (FAS).

An AME's denial of a medical certificate is not a final FAA denial. An applicant may ask for **reconsideration** of an AME's denial by submitting a written request to the Federal Air Surgeon.

Issue a medical certificate.

RFS, AMCD, and FAS may **deny** medical certificate for various reasons

The **appeals process** for pilots who are denied a medical certificate generally includes the ability to appeal a FAA denial to an Administrative Law Judge at the National Transportation Safety Board (NTSB), appeal an Administrative Law Judge decision to the full National Transportation Safety Board (NTSB), appeal an NTSB decision to a U.S. District Court (a provision of the Pilot's Bill of Rights) or a U.S. Court of Appeals, which lastly, may be appealed to the U.S. Supreme Court.

At the discretion of the FAS, a RFS, or the Manager of AMCD, a **special issuance**, valid for a specified period, may be granted to an applicant who does not meet the established medical standards if the applicant demonstrates that he or she can perform flight operations at the level of certification applied for, without endangering public safety and for the period in which the special issuance would be valid. Additional medical tests, examinations, or evaluation may be needed for a special issuance, and operational limitations may apply.

Source: GAO analysis of FAA information.

According to FAA, on average, from 2008 through 2012, approximately 98.8 percent of the applications were approved and issued medical certificates, including approximately 8.5 percent of applications approved for a special issuance after additional FAA review. About 1.2 percent of all applications were denied an FAA medical certificate because (1) they did not meet FAA's medical standards and did not provide sufficient medical

information to demonstrate that their condition was adequately controlled and stable, or (2) because of questions about the applicant's fitness for certification that were deemed to be cause for disqualification, such as arrest(s) and/ or conviction(s) affecting driving privileges or an intentional false statement on their application form that precluded them from obtaining a medical certificate.[16] FAA regulations require each person holding certain FAA certificates, such as a medical certificate, to provide a written report to the FAA of each motor-vehicle-related conviction or administrative action within 60 days of such action.[17]

Experts Generally Agreed with FAA's Medical Standards and Supported FAA's Move toward a Data-Driven Approach to Its Certification Process

FAA Uses Several Approaches to Update Its Medical Standards

According to FAA officials, pilot medical standards were developed to help manage safety risk. FAA's current medical standards have been codified in federal regulation since March 19, 1996. The regulations set out 15 medical conditions that are specifically disqualifying. Medical conditions identified during an evaluation that are not specifically listed as disqualifying but do not meet the general medical standard regarding safe

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[16]Applicants who are denied medical certification by an AME or the FAA may appeal the decision (14 C.F.R. § 67.409, 49 U.S.C. 44703(d)); however, according to FAA officials most applicants who are denied medical certification do not pursue an appeal or do not provide FAA with additional requested information necessary for a special issuance. A denial is considered a "final" action by the FAA and is subject to review by the NTSB. The Manager of AMCD and Regional Flight Surgeons may also issue a final denial to an applicant who fails to provide additional requested information within the time frame specified by FAA. Based on information provided by FAA, from 2008 through 2012, on average, approximately 4,930 applicants were denied each year, and about 12 percent of those denials were deemed final by FAA.

[17]14 C.F.R. § 61.15(e).

performance of duties and exercise of privileges, are also disqualifying under general medical standards, according to FAA. (See app. II for a summary of selected FAA medical standards.) According to FAA officials, the standards and the medical certification process were developed to manage the risk of an aircraft accident or incident by identifying applicants with medical conditions that could potentially incapacitate them in the flight environment or during critical take-off and landing periods.[18]

FAA takes steps designed to ensure that its medical policies and procedures are consistent with current medical and aeromedical practice, and that these steps result in periodic updates to its medical policies. The Federal Air Surgeon establishes medical policies and medical certification procedures that are published in internal guidance for FAA's Office of Aerospace Medicine and for AMEs in the *Guide for Aviation Medical Examiners* (AME Guide). The agency uses several techniques to update policies:

- First, the Aeromedical Standards and Policies Branch develops policy recommendations for the Federal Air Surgeon, which address medical conditions, medication use, and medical procedures. According to FAA officials, medical policy review is a continuous process influenced by several factors, which include (1) announcements of significant new developments in the medical literature; (2) medical appeals to the Federal Air Surgeon; (3) announcements and alerts by the Food and Drug Administration; (4) inquiries by aviation stakeholder groups and pilot advocacy groups; (5) aircraft accidents or events; (6) inquiries by the Office of Aerospace Medicine personnel and AMEs; and (7) communications with international aviation authorities, and medical advocacy groups, among other things.

- Second, according to FAA officials, the agency refers dozens of individual cases annually for independent review by experts in a wide

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[18]Because medical incapacitation risk is a factor of the *likelihood* an incapacitating medical event and the *consequence* of the event, FAA also may manage medical incapacitation risk by building redundancies in the flight environment, for example, as FAA currently manages safety risk, by requiring co-pilots for commercial flight. According to FAA officials, in addition to 'sudden' incapacitation, several other potential medical causes for aircraft accidents are considered in the medical evaluation process. These include: factors that could alter judgment, conditions that can alter special senses (such as visual acuity and color vision), factors that could alter the ability to communicate, conditions that may cause difficulty with coordination or may alter the state of alertness, and medication side effects.

variety of medical specialties, such as cardiology, psychology, and neuropsychology. FAA officials stated that implicit to the process of reviewing each case is to consider changes to current policy based on current medical practice. FAA also periodically uses independent medical experts to evaluate its medical policies, particularly with regard to cardiovascular conditions, which were present in more than one-third of the applicants who received special issuances in 2012. In January 2013, for example, FAA hosted a cardiology roundtable to review FAA's policies with regard to cardiovascular conditions and to suggest updates to the policies, if necessary. The roundtable's suggested policy changes were presented to the Federal Air Surgeon, who approved several of them. However, FAA officials have said that they do not convene such roundtables frequently due to time and cost constraints.

- Third, the results of CAMI's aerospace medical and human factors research have been used to inform changes to FAA guidance and policies. In particular, CAMI's aerospace medical research focuses on the biomedical aspects of flight, including studies on aviation safety associated with biomedical, pharmacological, and toxicological issues. For example, CAMI's research on sedating medication influenced guidance in this area. According to FAA officials, a review of accident investigation data showed that many pilots involved in accidents were using over the counter and prescription sedative medications. As a result, FAA, in coordination with the aviation industry, issued guidance extending the length of time a pilot should wait after using these medications and before operating an aircraft. A letter jointly signed by the FAA and all major aviation advocacy groups was sent to all pilots and published on the FAA website and in various public and private publications advising pilots to comply with the new guidance.

- Fourth, CAMI's library allows research staff to collect and review academic journals on aviation medical issues, general medical research, engineering, management, and other general topics. CAMI researchers have also published approximately 1200 aerospace medicine technical reports on topics including, for example, pilot age, alcohol and substance abuse, fatigue, psychology, and vision.[19] FAA's policy branch periodically reviews this and other medical literature, which FAA officials say can also result in a possible revision.

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[19]http://www.faa.gov/data_research/research/med_humanfacs/oamtechreports/.

In addition, FAA has recently begun analyzing aviation accident information to develop a predictive model based on historic data of medical conditions that have been identified as contributing factors to aircraft accidents. The officials stated that they plan to use the model as a data-driven guide to help inform how they determine the relative risk of various medical conditions. FAA officials noted that the agency has begun this work as part of a broader Safety Management Systems (SMS) initiative that seeks to further enhance safety by shifting to a data-driven, risk-based oversight approach.[20]

Experts Generally Agreed FAA's Medical Standards Are Appropriate, but Some Experts Suggested Modifying Some Policies

All aerospace medical experts we interviewed generally agreed that FAA's medical standards were appropriate, and most (16 of 20) said that the standards should be applied to commercial and private pilots.[21] Some of these experts said that standards should apply equally to private pilots because they share airspace with commercial pilots or because private pilots typically do not fly with a copilot—an important safety feature for commercial flight operations. In addition, although some of the experts (7 of 20) suggested no changes to FAA's policies, many of the experts (13 of 20) identified at least one medical standard for which they considered FAA's policies to be either too restrictive or too permissive. A restrictive policy might lead FAA to deny certification to an applicant who may be sufficiently healthy to safely fly a plane, or may result in FAA requiring a more thorough medical evaluation than the experts considered necessary. A permissive policy, on the other hand, might lead FAA to certify an applicant with health issues that could impair his or her ability to safely fly a plane, or may result in FAA not completing as thorough a medical evaluation as the experts considered necessary.

Although expert opinions varied regarding which standards were too permissive or restrictive, neurological issues were most commonly

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[20]See, for example, GAO, *Aviation Safety: Additional FAA Efforts Could Enhance Safety Risk Management*, GAO-12-898 (Washington, D.C.: Sept. 12, 2012).

[21]We interviewed 20 aviation medical experts and we use the indefinite quantifiers ("few" = 2-3 experts; "some" = 4-9 experts; "half" = 10 experts; "many" = 11-15 experts; "most" = 16-19 experts) to inform the reader of the approximate quantity of medical experts who agreed with the particular statement or idea (See app. I for an explanation of how these indefinite quantifiers are used, and a list of medical experts interviewed.)

discussed by some (9 of 20) of the experts.[22] For example, some experts noted that the FAA medical certification requirements for applicants who use antidepressants, including selective serotonin reuptake inhibitors (SSRI), are restrictive and onerous and may require an applicant not to fly for an extended period of time. A medical representative from the Aircraft Owners and Pilots Association (AOPA) said that FAA's policies may require a pilot using antidepressants to undergo costly cognitive studies that were viewed as medically unnecessary for milder cases of depression.

Alternately, some medical experts said that policies regarding cognitive functioning in aging pilots, traumatic head or brain injuries, and attention deficit disorders may be too permissive. An FAA official stated that the area of neurology is complex and has been somewhat difficult for AMCD due, in part, to variation in opinion as to how to assess cognitive function and when testing should be done. The agency hosted a neurology summit in 2010 that convened neurology experts to review FAA policies on neurological issues—including traumatic brain injury, migraine headaches, and neurocognitive testing—and resulted in recommendations that the Federal Air Surgeon adopted regarding migraine treatments, among other neurological conditions. Also, the Division Manager of AMCD said that they consult with neurologists, as needed, to review the application of certification policies regarding individual applicant cases.

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[22]We interviewed 20 individuals with broad aerospace medicine expertise to provide their expert opinion on FAA's medical standards and qualification policies. Our criteria for identifying and selecting experts included (1) type and depth of experience, including recognition in the aerospace medicine professional community and relevance of any published work; (2) employment history and professional affiliations, including any potential conflicts of interest; and (3) other relevant experts' recommendations. Our group of experts includes AMEs and pilots, as well as experts from aviation authorities in the United Kingdom, Australia, and New Zealand. Fifteen of the experts are board certified by at least one of the American Board of Medical Specialties' member boards, including nine who are board certified in aerospace medicine. We provided all medical experts with relevant background information prior to our interview, and we provided the option to bypass questions if experts believed they were unqualified to respond in a professional capacity. While the experts provided their opinions on some specific standards, we do not believe that these opinions alone provide sufficient evidence to recommend any specific changes to FAA medical standards and policies. Rather, the information from these interviews provides us with an overall expert assessment of FAA's medical standards, policies, and practices.

To a lesser extent, some (5 of 20) experts had mixed views on the policies for diabetes and medical conditions related to endocrine function. Of those, three experts thought that FAA's current policies on diabetes might be too restrictive, for example, because the FAA has not kept pace with medical advances and treatment options currently available to pilots. One expert noted that some commercial pilots with insulin treated diabetes mellitus (ITDM) may be medically fit to fly a plane with a special issuance if they can demonstrate that their condition is stable, just as private pilots are allowed to do. In addition, representatives from the American Diabetes Association and a member of the Regional Airline Association stated that FAA's policies for commercial pilots with ITDM have not kept current, when considering the advancements in medical treatment of ITDM and the redundancy of having a copilot and crew in commercial aircraft to reduce the risk associated with commercial pilots with ITDM. Conversely, two experts thought that FAA may be too permissive with regard to diabetes, citing, for example, concerns about the increase in diabetes among Americans, in general, and the potential for undiagnosed cases.[23] FAA officials agreed that there have been improvements in the clinical care for diabetes and the Office of Aerospace Medicine has studied the safety and efficacy of new diabetes treatment over the past several years, including the risks associated with new medications and insulin formulations. However, according to FAA officials, independent consultants—including endocrinologists and diabetes experts—have told the FAA that the risk of incapacitation related to hypoglycemia has not changed regardless of advancements in treatment.

All of the experts suggested ways FAA could ensure its medical standards are current, many of which were consistent with approaches FAA is already taking. For example, some of the experts (9 of 20) said FAA could review its medical standards at regular time intervals or as medical advances occur, and some (8 of 20) of the experts said FAA could review its medical standards based on evidence of the likelihood of each condition causing an accident. Some experts (5 of 20) specifically suggested FAA should convene a panel on neurology and mental health issues. FAA convened a panel on neurological issues in 2010.

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[23]A few experts (3 of 20) also identified standards related to cardiovascular and drug or alcohol use as too permissive or restrictive.

Experts Suggested FAA Should Continue Efforts to Make the Certification Process Data-Driven

As previously mentioned, FAA is currently undertaking an agency-wide initiative—SMS—that seeks to further enhance safety by shifting to a data-driven, risk-based safety oversight approach. As part of this approach, FAA implemented the Conditions an AME Can Issue, or CACI, program in April 2013. The CACI program authorizes AMEs to issue medical certificates to applicants with relatively low risk medical conditions that had previously required a special issuance from the FAA.[24] FAA developed the program by identifying medical conditions that, in most cases, did not pose a safety risk, based on FAA analysis of historic medical and accident data. Agency officials expect the program to allow more applicants to be certified at the time of their AME visit while freeing resources at FAA to focus on medically complex applicants with multiple conditions or medical conditions that may pose a greater risk to flight safety, such as applicants who have had coronary artery bypass surgery.

Based on information provided by FAA, as of December, 31, 2011, approximately 19 percent of all pilots reported medical conditions that may now be evaluated by their AME as a result of the CACI program. Of those pilots, about one-third—or nearly 39,000 pilots—reported no additional medical conditions, making it more likely that in the future, they may be certified at the time of their AME visit, rather than through the special issuance process. Other medical conditions have been proposed for the CACI program but have not yet been approved by FAA officials.[25] Most medical experts (18 of 20) we interviewed approved of the CACI program, and some (8 of 20) believed that FAA should continue to expand it to include additional medical conditions. Representatives of an industry association agreed and noted that by authorizing AMEs to make a greater number of medical certification decisions, AMCD officials could speed up the application process for more applicants.

Some (8 of 20) aerospace medical experts we interviewed identified specific, relatively common medical conditions that currently require an

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[24]Medical conditions that FAA deems low risk and has approved for an AME to issue under the CACI program include: arthritis, asthma, colitis/irritable bowel syndrome (IBS)/Crohn's, glaucoma, hepatitis c, hypertension, hypothyroidism, migraine and chronic headache, pre-diabetes (glucose elevation/intolerance), prostate cancer, renal cancer, and testicular cancer, among others.

[25]Medical conditions that were proposed but not yet approved for CACI, include, for example: carotid stenosis, bladder cancer, leukemia, and lymphoma.

FAA authorization for a special issuance that they believe should be considered under the CACI program. Their suggestions included, for example, non-insulin-treated diabetes, which was a factor in about 17 percent of the special issuances in 2012; sleep apnea and other sleep disorders, which were a factor in about 11 percent of the special issuances in 2012;[26] and various forms of cancer, which were a factor in about 10 percent of special issuances in 2012.[27] FAA officials have begun to allow AMEs to make medical determinations for applicants with certain types of cancer under the CACI program and have said that they will evaluate other medical conditions to include in the CACI program in the future.

Although neurological conditions (including migraines, head trauma, stroke, and seizures) accounted for approximately 4 percent of special issuances in 2012, some experts (5 of 20) thought, as mentioned above, that FAA should convene an expert panel to re-evaluate its policies in this area. Half of the experts we interviewed also said that FAA could evaluate its medical standards based on the relative risk of incapacitation associated with various medical conditions, assessed through greater use of data. That is, with a better understanding of the likelihood of each medical condition to cause a suddenly incapacitating event in flight—

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[26]As of April, 2014, FAA officials told us that they were working to revise the agency's sleep apnea policy and consider how it may be implemented, to ensure that as many applicants as possible are issued a medical certificate at the time of their FAA examination. FAA currently instructs its AMEs to screen for sleep apnea by asking applicants about signs or symptoms and looking for major risk factors of sleep apnea and related conditions as part of the medical exam. First-time applicants known to have sleep apnea must currently go through the FAA special issuance process, which requires them to provide results from a polysomnogram sleep study, among other requirements.

[27]The percentages in this paragraph describe the portion of the approximately 10.2% of applicants who were granted a special issuance by FAA in 2012. If considering the portion of *all* applicants, about 1.8 percent of *all* applicants had received a special issuance for non-insulin treated diabetes; about 1.1 percent of *all* applicants had received a special issuance for sleep apnea and other sleep disorders; and, about 1.0 percent of *all* applicants had received a special issuance for various forms of cancer.

based on historic data of accidents and incidents—FAA could modify its risk threshold for various medical standards and policies to manage risk.[28]

As previously mentioned, FAA has begun to collect and analyze data that will help it develop a proactive approach to managing aviation medical risk; however, FAA officials told us that data from historic accidents and incidents can be difficult to obtain and link to medical causes. The officials also said that they would need to change how they code, or classify, the medical information they collect—and re-code medical information they already have—to more accurately classify medical conditions of applicants and, therefore, improve the reliability of their predictive model. Without more granular data collection on health conditions, officials said it is difficult for FAA to accurately determine the level of risk, associated with various medical conditions. In addition, officials at FAA and NTSB noted that data on medical causes of accidents and incidents are likely to be incomplete because not all accidents are investigated in the same way and medical causation can be difficult to prove in light of other contributing factors. For example, an official from NTSB explained that there are different levels of medical investigations performed after accidents, depending on factors like whether or not the pilot has survived, the condition of the aircraft or severity of the crash, and the number of people impacted. As of February 14, 2013, NTSB and FAA agreed to a memorandum of understanding (MOU) that will facilitate NTSB's data sharing and record matching for aircraft accidents and incidents with CAMI.

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[28]An example of a risk threshold that has been applied to the medical fitness of pilots, in the United Kingdom and elsewhere, is the "one percent rule," which would result in a pilot applicant being denied a medical certificate if their risk of medical incapacitation due to a particular medical condition (e.g., heart attack, stroke, seizure, sudden unconsciousness, etc.) was determined as being greater than one percent during the year. That is, if there were 100 pilots with an identical medical condition, one of them would be predicted to become incapacitated at some point during the next 12 months (and 99 would not).

FAA Has Identified Technical Solutions to Improve Its Medical Certification Systems, but Has Not Set Time Frames for Implementation

Although most medical certification determinations are made by one of the approximately 3,300 FAA-designated AMEs at the time of an applicant's medical exam, approximately 10 percent of applications—or nearly 40,000 annually—are deferred to FAA for further medical evaluation if the applicant does not meet FAA's medical standards or has a disqualifying medical condition. According to FAA officials, the 10 percent of applicants who are deferred requires a significant amount of resources from FAA's medical certification division, which in recent years, has experienced a backlog of special issuance applications in need of review. As of February 2014, an FAA official estimated this backlog at about 17,500 applications.

FAA has not met its internal goals for responding to individuals whose applications have been deferred. Specifically, FAA has set an internal goal of 30 working days to make a medical determination or to respond to an applicant with a request for further information. However, according to FAA data, the average time it takes FAA officials to make a medical determination or request further information from an applicant has increased over the past 6 fiscal years, taking an average of approximately 45 working days—or about 9 weeks—in fiscal year 2013, and more than 62 working days in December 2013.[29] If FAA makes multiple requests for further information from an applicant, the special issuance process can take several months or longer.

Officials from AOPA stated that some applicants for private pilot medical certificates discontinue the application process after an initial denial from the FAA because the applicants decide that the cost of extra medical evaluations and added time is too great to support what the applicant

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[29]This estimate may not account for the full processing time it takes an applicant to complete the process, because FAA only measures the time that FAA's AMCD manually codes and enters applicants' information into its Document Imaging Workflow System (DIWS) to when it either makes a determination to issue or deny a medical certificate, or requests further information from the applicant.

views as a recreational activity.[30] However, an official from FAA noted that delays can also occur as a result of applicants who may take a long time to respond to an FAA request for further evaluation. According to AOPA, having information upfront would speed up the process by helping applicants understand FAA's additional medical requirements for a special issuance. FAA has increasingly encouraged its Regional Flight Surgeons to become more actively involved in making medical determinations for applicants seeking a special issuance.

FAA officials at AMCD stated that there are several reasons for the increased processing time for applicants requiring special issuances. For example, AMCD has faced a technical issue deploying the Document Imaging Workflow System (DIWS), a web-based computer system used by AMCD to process, prioritize, and track all medical certification applications. One AMCD official noted that delays in deployment of the system have decreased productivity of the AMCD to as low as just 25 percent of normal levels. In addition, officials cited multiple backlogs throughout the division, such as, the electrocardiogram (ECG) unit, which receives up to 400 ECGs each day, and the pathology-coding unit, which may require manual coding of medical conditions to feed information into DIWS.

Part of the challenge, identified in FAA's National Airspace Capital Investment Plan, is that the current medical certification systems are based on obsolete technology from the 1990s. Accordingly, technical working groups at AMCD have identified more than 50 problems and potential technological solutions to enhance their systems, including the special issuance processes, of which about 20 have been identified as high-priority, including improvements to the online application system, AMCS, DIWS, and the ECG transmittal and review process. For example, officials stated that updating DIWS to import and read electronic files would reduce the need to manually scan from paper documents, and

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[30]FAA estimated the cost of a medical exam at $88 (in 2006 dollars). We adjusted this value, using the consumer price index (CPI), which would be $102.11 (in 2014 dollars). FAA also estimated the hourly value of a third-class pilot's time, based on an hourly wage estimate, at $39.13/hour and estimated travel time for the exam at one-and-a-half hours; a half-hour to complete the medical application form; and, a one-hour exam. Using these estimates and adjusting to 2014 dollars, the total cost to a third-class pilot would be about $240 for time and exam expenses. For FAA's initial estimates, see:Department of Transportation, *Regulatory Evaluation, Regulatory Flexibility Determination, International Trade Impact Assessment, and Unfunded Mandates Assessment* (December 2007).

providing AMEs or applicants limited access to DIWS so they can check the status of an application could reduce the number of calls AMCD receives at its call center.[31] As of February 2014, FAA officials stated they received funding they requested in June 2013, to upgrade the ECG system from analog to digital—a process which they estimate will take about 11 months to complete. In addition, FAA has not established a timeline for implementing its broader set of technology enhancements, some of which may be less contingent on resource constraints. A timeline to guide the implementation of the highest-priority enhancements would help the agency take another step toward reducing the delays and bottlenecks in the special issuance process related to FAA's technology issues.

In addition to the proposed enhancements, the Office of Aerospace Medicine collaborated with the Volpe National Transportation Systems Center (Volpe Center), in 2013, to define broader challenges of the current medical certification process and develop a strategy to reengineer the existing business processes, including the online medical-certification system and its supporting information-technology infrastructure. Officials from the Office of Aerospace Medicine have said that their effort with the Volpe Center will ultimately inform their plan to replace FAA's current medical information systems with the Aerospace Medicine Safety Information System (AMSIS), which the agency plans to begin developing in fiscal year 2015. FAA officials stated that they envision several long-term positive changes that may result from AMSIS—including redesigning the online application system and form, providing applicants with information on actions to complete before they meet with their AME, and a more transparent special issuance process with the capacity for applicants to check the status of their applications. However, FAA officials have also identified several challenges to implementing AMSIS, including working within the confines of legal and regulatory requirements, protecting sensitive information, and obtaining the estimated $50 million needed to fund the system.

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[31]AMCD officials estimated that the AMCD receives about 10,000 pieces of mail each month, much of which must be scanned and linked to applicant files. FAA currently employs approximately 20 FTEs to scan applications and supporting paperwork into DIWS, and about 8 FTE call center operators and one supervisor to handle about 10,000 calls per month.

FAA Could Enhance its Online Application System and the Clarity of its Medical Application Form for Private Pilots

FAA Could Enhance Usability of its Online Medical Application System

One of FAA's main tools to communicate its medical standards directly to applicants, and to solicit medical information from them, is its online medical application system. While FAA also offers training and produces pamphlets, videos, and other educational material for AMEs and pilots, the online medical application system is used by all applicants to apply for a medical certificate. (See app. III for FAA's training programs and other communication tools for AMEs and pilots). The system includes information such as the online medical-application form and instructions used by applicants to submit medical information to their AME and to FAA, and a link to the *AME Guide*, which contains pertinent information and guidance regarding regulations, examination procedures, and protocols needed to perform the duties and responsibilities of an AME.

We compared the online application system with select guidelines related to content, navigation, and design that are considered good practices by Usability.gov.[32] Based on our evaluation and discussion with experts, we identified areas in which FAA might enhance the usability of the online application system by (1) providing useful information directly to applicants, and (2) using links to improve how applicants navigate through the application system.

Providing Additional Useful Information Directly to Applicants: According to Usability.gov, a good practice in website design includes providing useful and relevant information that is easy to access and use. Some experts (7 of 20), including four who were also AMEs, said that applicants may be unsure about medical requirements and documentation.

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[32]Usability.gov, maintained by the Digital Communications Division of the U.S. Department of Health and Human Services, is a resource for federal web designers to make websites more usable, useful, and accessible.

Representatives of two aviation medical associations also said a lack of clarity can lead to delays in processing the medical certification if applicants learn during their medical examination that they must obtain additional test results or documentation from their primary care physician. Some medical experts (4 of 20) said that technological improvements would be helpful. For example, FAA could develop a Web page on its website or within the online application system with more information for applicants. In addition, two pilot associations stated that a specific Web page or website for applicants with links to information on various medical conditions, their risks to flight safety, and additional medical evaluations that might be needed for applicants with those conditions would be helpful. The online application system currently contains a link to the *AME Guide*; however, applicants may find the 334-page *AME Guide*—written for aviation medical examiners—difficult to navigate and understand and therefore, may be unable to find information about specific documentation and additional medical evaluations they may need.

FAA officials in the medical certification division said that providing documentation requirements to applicants could reduce certification delays, AME errors, and the number of phone calls to AMCD's medical certification call center because the applicants would know what additional evaluations or documents they should get from their primary care physician before they visit their AME for a medical exam. Similarly, the FAA officials noted that applicants may not recall information they had previously reported in prior medical certificate evaluations or may not disclose their complete medical history when they see a new AME. NTSB officials stated that the AME cannot see information about any previous applications and knows only what the pilot has reported on their current application. This means that the applicant has to recall all of his or her past medical history each time they apply for a medical certificate. Additionally, according to the NTSB officials, it would be useful for the pilot to access previously reported information and update only what has changed since their previous exam. As part of the more than 50 technological solutions discussed earlier that FAA has identified to enhance the special issuance process, the agency has proposed providing access to worksheets which specify required medical documentation and providing access to previously reported medical data to applicants and AMEs. FAA officials stated that these issues, if addressed, would facilitate information flow between the applicant, the AME and FAA and allow AMCD officials to more efficiently do their work.

Additionally, some experts (9 of 20) said that it would be helpful to applicants and treating physicians if FAA posted a list of banned

medications. In a couple experts' view, without a public list of banned medications, applicants may not disclose their medical treatment regimen to FAA out of fear of losing or not receiving their certification. NTSB recommended in 2000 that DOT develop a list of approved medications and/or classes of medications that may be safely used when operating a vehicle; however, DOT—including FAA—did not implement the recommendation because, in DOT's view, a list of approved medications would be difficult to maintain and would be a liability for the transportation industry if the Department approved a medication that later caused an accident.[33] Officials from AOPA told us that the association provides an unofficial list of approved and banned medications to its members but believes that this information should be made public and provided by FAA.

However, FAA states in its AME guide that maintaining a published list of approved medications would not contribute to aviation safety because it doesn't address the underlying medical condition being treated. Instead, FAA's current policy prohibits AMEs from issuing medical certificates to applicants using medications that have not been on the market for at least one year after approval by the Food and Drug Administration (FDA), and FAA has recently updated its AME Guide, to include a "Do Not Issue—Do Not Fly" list of several general classes of medication and some specific pharmaceuticals and therapeutic medications.[34] The "Do Not Issue" list names medications that are banned—meaning the AME should not issue a medical certificate without clearance from FAA—and the "Do Not Fly" list names medications that the pilot should not use for a specified period of time before or during flight, including sleep aids and some allergy medications. FAA officials said that the "Do Not Issue—Do Not Fly" list is intended to be a "living document" that they will revisit periodically. NTSB officials suggested that it would be helpful if medications that an applicant discloses on the medical application form could be automatically checked against the "Do Not Issue—Do Not Fly" list to notify their AME of the applicant's use of a medication on the list.

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[33]NTSB closed recommendation (I-00-2) in 2010, citing unacceptable action by DOT, after DOT said that it had no plans to implement it. However, NTSB credited FAA for implementing related recommendations on providing information to pilots on the hazards of using specific medications when flying (A-00-5) and educating pilots on how they can access that information (A-00-6).

[34]http://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/pharm/dni_dnf/.

Easier Website Navigation: Navigation is the means by which users get from page to page on a website to find and access information effectively and efficiently. According to Usability.gov, a good practice related to navigability is to use a clickable list of contents, thus minimizing scrolling. The Pilot's Bill of Rights Notification and Terms of Service Agreement—which contains a statement advising the applicant that responses may be used as evidence against the applicant, a liability disclaimer, a statement of privacy, and a Paperwork Reduction Act statement among other statements—requires the user to scroll through what equates to nearly 10 pages of text (2,441 words over 417 lines of text), viewable through a small window that shows approximately 10 to 12 words across and four lines down at a time (see fig. 2).[35]

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[35]According to guidance provided by Usability.gov, short sentences and paragraphs are particularly important to optimize reading comprehension in the online environment.

Figure 2: Screenshot Showing Small Window through which the Reader Must Scroll Pages of Information
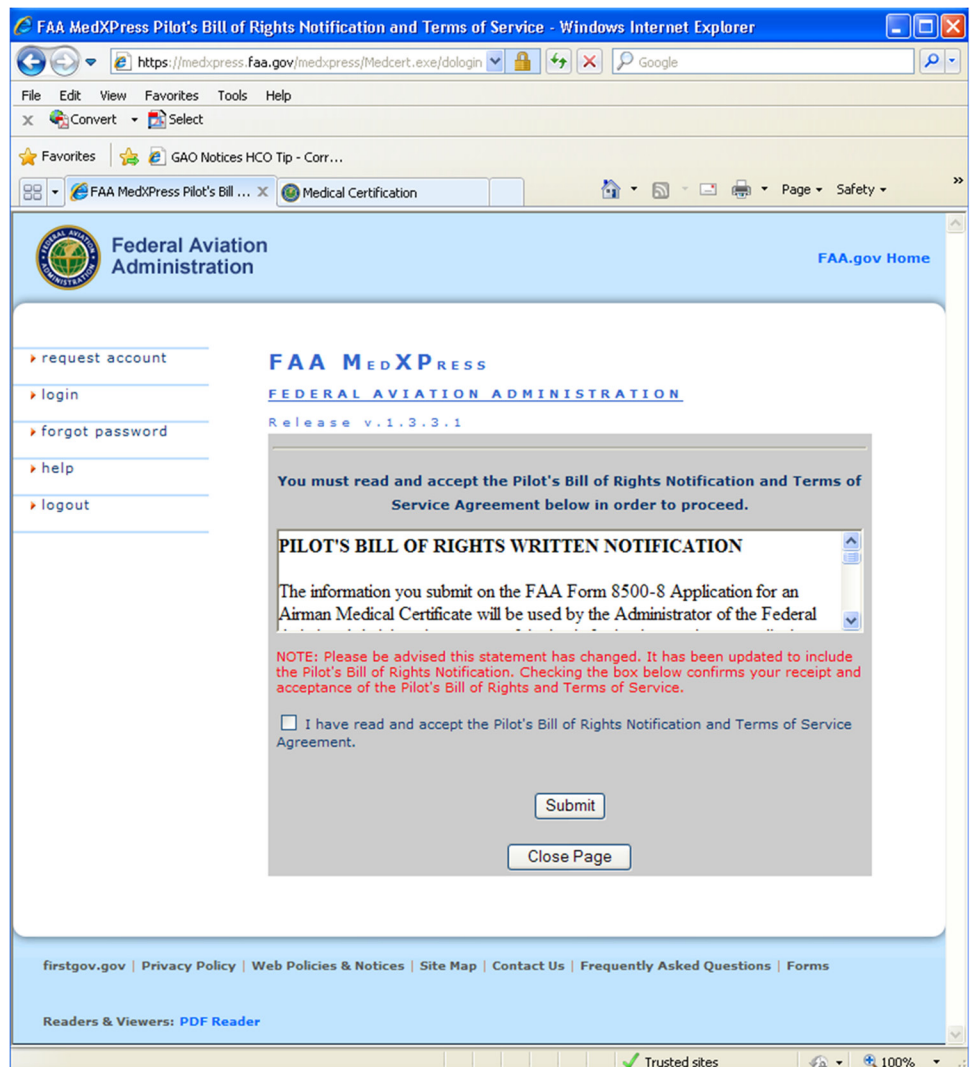
Source: FAA.

FAA might enhance the visibility of this information and help applicants better understand what they are agreeing to, if it created a larger window with hyperlinks to help the reader navigate through various sections of the notification and agreement. Similarly, the question and answer page for applicants could be enhanced by including clickable links between the questions and answers to allow readers to more easily find answers of interest to them.

Another good practice, according to Usability.gov, is to design websites for popular operating systems and common browsers while also accounting for differences. According to a notification on the online application system's log-in screen, applicants are advised to use only Internet Explorer to access the system. The system functions inconsistently across other browsers such as Google Chrome, Mozilla Firefox, and Apple Safari. For example, links to from the medical application form to its instructions do not work for Firefox or Google Chrome; instead, they lead the applicant back to the log-in page, causing any unsaved information to be lost.

As described in the previous section, FAA officials at the medical certification division identified technological problems and potential solutions to enhance the online application system, but as of April 2014, no changes have been made. For example, the officials observed that some applicants enter the date in the wrong format, switching the order of day and month (DD/MM/YYYY, as opposed to MM/DD/YYYY), which can lead to problems when the AME imports the application. As a result, FAA officials proposed using drop-down boxes—with the name or abbreviation of each month, followed by the day, and the year—to collect date information. This proposed solution is consistent with a good practice— anticipates typical user errors—highlighted by Usability.gov. Additionally, the officials noted that it is not uncommon for an applicant to be logged out of their session due to inactivity, resulting in a loss of data entered during the session. To address this, FAA proposed that the online application system incorporate an auto-save feature that would be activated prior to the session expiring—consistent with Usability.gov guidelines—to warn users that a Web session may be expiring after inactivity to prevent users from losing information they entered into the online application system.

In addition to these enhancements, FAA collects some information from applicants and AMEs regarding their experience with the application process. For example, FAA operates a 24-hour call center to answer technical questions that applicants, and AMEs may have about the online application system throughout the application process. FAA also has surveyed AMEs and pilots to collect information about their experience with the medical certification process.

FAA Could Enhance Clarity of Its Medical Application Form

The Plain Writing Act of 2010 requires federal agencies, including FAA, to write specified types of new or substantially revised publications, forms, and publicly distributed documents in a "clear, concise, well-organized" manner.[36] Several years before the Plain Writing Act of 2010—in 2003—FAA issued *Writing Standards*[37] to improve the clarity of its communication. The *Writing Standards* include guidance for anyone who writes or reviews FAA documents intended for internal or external distribution. FAA has continued to make efforts in recent years to improve its employees' understanding of plain language and how to incorporate it in written documents. FAA's Plain Language Program in the Office of Communications trains employees and supports Plainlanguage.gov, a website devoted to improving communication from the Federal government to the public.[38]

Although plain writing is only required for new or substantially changed government documents, and is therefore not required for the current medical application form, the goal of plain writing is to help readers find the information they need, understand what they find, and use it to meet their needs. In regard to the medical certification process, this would include helping applicants understand each question and more accurately complete the application form in the way that FAA intended. In addition, stakeholders from two pilot associations were concerned that unclear questions on the medical application form could lead to incomplete or inaccurate responses, which they said could also lead to applicants' being accused of misrepresenting themselves or falsifying information on the application form—an offense punishable by a fine up to $250,000 and imprisonment up to 5 years and may also result in a suspension or revocation or all pilot and medical certificates.

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[36]Pub. L. No. 111-274, 124 Stat. 2861.

[37]FAA's *Writing Standards* include: (1) writing principles—whether the document is appropriate for its audience, its content is well organized, and it uses active voice, clear pronouns, and short sentences and paragraphs; and, (2) formatting principles—whether the document layout and use of headers and font styles, conform with best practices to clearly present information to the reader. For more information, see FAA Order 1000.36 *FAA Writing Standards* (Mar. 3, 2003).

[38]On its Plain Language website, http://www.faa.gov/about/initiatives/plain_language/, FAA provides links to best practices, standards, and guides. For example, the site contains a link to a basic plain language course, documents containing best practices for writing letters and writing for the Web, FAA, and federal government standards and guidelines, and general information on government plain language initiatives.

More specifically, FAA's Writing Standards also recommend using active voice and active verbs to emphasize the doer of the action. Our analysis of FAA's medical application form and instructions showed that in some cases, FAA used passive voice although active voice would make the statements clearer. According to FAA's writing standards, because the active voice emphasizes the doer of an action, it is usually briefer, clearer, and more emphatic than the passive voice. For example, on the medical application form the current statement, "Intentional falsification may result in federal criminal prosecution," may be clearer to the applicant if stated, "If you intentionally falsify your responses, you may be prosecuted for a federal crime," or a similar, more direct way of notifying the applicant. However, FAA officials noted that any re-wording of legal warnings or disclaimers must be approved by legal counsel.

We also asked the medical experts to review the online application form. In response, many medical experts (12 of 20) we interviewed stated that certain questions can be confusing or too broad. For example, some experts have said that terms like "frequent," "abnormal," or "medication" aren't clearly defined and therefore certain questions could generate inaccurate responses. For example, many experts (15 of 20) said that question 17a, on medication use, was unclear because, among other reasons, the reader may not know whether supplements or herbal medicines should be included. Some medical experts (7 of 20) also suggested adding items to question 18, about medical history, for areas such as *cancer* and *sleep apnea*. In 2009, NTSB recommended that FAA modify its medical application form to elicit specific information about risk factors or any previous diagnosis of obstructive sleep apnea.[39] (See app. IV for a copy of the medical application form.)

Many of the medical experts we consulted further suggested simplifying one question on the form; this question has also been examined by FAA

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[39]According to NTSB, obstructive sleep apnea is associated with excessive daytime fatigue and leads to an increased risk of accidents and cognitive impairment. NTSB recommendations, A-09-61 and A-09-62, direct FAA to do more to identify pilots and applicants likely to have sleep apnea. NTSB also suggested that FAA use data it already collects, such as an applicant's height and weight, to screen for risk factors associated with obstructive sleep apnea, such as a high body mass index (BMI) value. In response to NTSB's recommendation, FAA agreed with NTSB that obstructive sleep apnea among pilots is a significant safety hazard—if unrecognized and untreated—and proposed addressing the issue by promoting awareness of sleep apnea in AMEs through the regular AME seminar education process, but the agency did not modify its medical application form.

officials. Specifically, the question on the form pertains to an applicant's arrests or convictions. For example, many experts (13 of 20) suggested simplifying the question. FAA's writing guidance suggests shortening sentence length to present information clearly or using bullets or active voice. In addition, FAA officials from the medical certification division used a computer program to analyze the readability of the question and discovered that an applicant would need more than 20 years of education to understand it.

According to FAA officials, the agency can make changes to the medical application form for various reasons, including, for example:

- a response to findings or a recommendation made in a report by NTSB or by the Department of Transportation Inspector General, or

- a change in medical practices, for example, resulting from advancements in medicine.

Since 1990, FAA revised the application form several times, to add or remove questions, change time frames related to the questions, or to clarify the questions, among other types of changes. When FAA announced in the Federal Register that it would replace its paper application form with an online application system, the agency said that the online application system would allow it to make and implement any needed or mandated changes to the application form in a timelier manner, resulting in a more dynamic form. However, agency officials noted that while they maintain a list of questions on the application form that pose problems for applicants, they do not make frequent changes, in part, because of the time and resources needed to complete a lengthy public comment and Office of Management and Budget (OMB) approval processes which, they say, can take up to two years.[40] FAA officials also said that the Office of Aerospace Medicine must balance "plain language"

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[40]Before requiring or requesting information from the public, the Paperwork Reduction Act, as amended (44 U.S.C. Chapter 35) requires Federal agencies to, among other things, (1) seek public comment on proposed collections and (2) submit proposed collections for review and approval by the Office of Management and Budget (OMB). OMB's Office of Information and Regulatory Affairs (OIRA) reviews agency information collection requests for approval or disapproval. According to FAA officials and guidance from the OMB, each time the medical application form is updated, the FAA publishes a 60-day notice in the Federal Register to solicit public comments on the proposed changes, followed by a 30-day notice in the Federal Register after the FAA has considered the public comments and has submitted the changes for OMB's concurrent review and approval.

with the requirements levied by FAA's General Counsel to make sure that the wording is legally correct and enforceable. While it will take time and resources to improve the clarity FAA's medical application form, if left unchanged, the accuracy and completeness of the medical information provided by applicants may not be improved.

Conclusions

Aerospace medical experts we interviewed generally agreed that FAA's current medical standards are appropriate and supported FAA's recent effort to authorize its AMEs to certify a greater number of applicants by using a data-driven approach to assessing risk through the CACI program. Expanding the CACI program, as some experts suggested, could reduce the time it takes for applicants with lower risk conditions to become medically certified and, more importantly, allow FAA to prioritize the use of its constrained resources for medical determinations for applicants with the highest-risk medical conditions.

FAA has identified approximately 50 potential technological enhancements to its computer systems that support its certification process, including adding new functionality to facilitate the process and provide applicants with more information about medical requirements. According to FAA officials, these enhancements would potentially reduce the workload at the medical certification division. Although FAA intends to eventually replace its current medical-certification computer systems with a new Aerospace Medicine Safety Information System (AMSIS), temporary enhancements are expected to help FAA reduce the delays and bottlenecks currently posing challenges to the agency. FAA has not established a timeline for implementing its broader set of 50 proposed technological enhancements, some of which may be less expensive than others. A timeline to guide the implementation of the highest-priority enhancements would help the agency take another step toward reducing the delays and bottlenecks related to FAA's technology limitations.

The online-application system and form that FAA uses to communicate directly to applicants contain confusing questions and instructions that do not meet FAA's own plain language guidance. In addition, broken links and other navigability issues make the website difficult to follow. Efforts to provide applicants with useful and relevant information and improve the clarity of the questions and instructions contained in the online application system and form could allow FAA to more clearly communicate medical requirements to applicants. These improvements could not only aid an applicant's understanding of the medical standards and requirements, but

also may result in more accurate and complete information provided by applicants to better inform FAA's certification decisions.

Recommendations for Executive Action

To improve the applicants' understanding of the medical standards and the information required to complete FAA's medical certification process, the Secretary of Transportation should direct the Administrator of FAA to
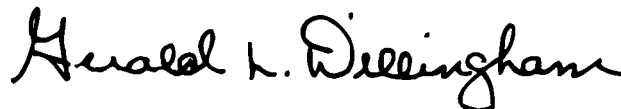
1. develop a timeline for implementing the highest-priority technological improvements to the internal-computer systems that support the medical-certification process, and

2. enhance the online medical-application system by clarifying instructions and questions on the medical application form and providing useful information to applicants.

Agency Comments

We provided the Department of Transportation with a draft of this report for review and comment. DOT provided technical comments, which we incorporated into the report as appropriate, and DOT agreed to consider the recommendations.

We are sending copies of this report to the Department of Transportation, the appropriate congressional committees, and other interested parties. In addition, the report will be available at no charge on the GAO website at http://www.gao.gov.

If you or your staff members have any questions about this report, please contact me at (202) 512-2834 or dillinghamg@gao.gov. Contact points for our Offices of Congressional Relations and Public Affairs may be found on the last page of this report. Contact information and major contributors to this report are listed in appendix V.

Gerald L. Dillingham, Ph.D.
Director, Physical Infrastructure Issues

Appendix I: Objectives, Scope, and Methodology

The objectives of this report are to provide information on (1) FAA's medical standards and policies and certification processes, along with medical experts' views on them,[1] and (2) steps that could be taken to promote private pilot applicants' understanding of FAA's medical requirements, including potential revisions to the medical application form.

To meet these objectives, we reviewed pertinent statutes, regulations, and FAA documents regarding its pilot medical certification process, standards and application form. We also reviewed academic, trade and industry articles, government reports, and other relevant literature. We interviewed officials from FAA and the National Transportation Safety Board (NTSB), and other stakeholders in the pilot medical certification process, including officials representing government advocacy, medical and legal issues within the Aircraft Owners and Pilots Association (AOPA) and the Experimental Aircraft Association (EAA), the Aeromedical Advisor to the Air Line Pilots Association (ALPA), attorneys who assist pilots through the medical certification process, and representatives from the American Diabetes Association.[2] In addition, we received written responses from the President and representatives from three member airlines of the Regional Airline Association, the Executive Director of the Aerospace Medical Association (AsMA), and the President and physician members of the Civil Aviation Medical Association (CAMA). We also visited the Civil Aerospace Medical Institute (CAMI) in Oklahoma City to interview representatives of FAA's Aerospace Medical Certification Division (AMCD), and we attended a training seminar for Aviation Medical Examiners (AME). To obtain expert opinions on FAA's medical standards, we collaborated with the National Academies' Institute of Medicine to identify aviation medical experts. We provided the Institute of Medicine with criteria and considerations for identifying experts, including (1) type and depth of experience, including recognition in the aerospace medicine professional community and relevance of any published work, (2) employment history and professional affiliations, including any potential conflicts of interest, and (3) other relevant experts' recommendations.

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[1]Private pilots hold third-class medical certifications. Airline transport pilots who serve as pilots in command of scheduled air carrier operations must hold first-class medical certificates. Pilots who fly for compensation or hire or serve as flight engineers or flight navigators generally hold second-class medical certificates.

[2]We also contacted the American College of Cardiology and the American Academy of Neurology to solicit their views but they did not reply for an interview.

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From the list of 24 experts identified by the National Academies, we
added 3 experts recommended to us and omitted 7 due to their
unavailability, their concern that they may not have the expertise to
respond to our questions, or their stated conflicts of interest. We ended
up with a total of 20 aviation medical experts who represented private,
public, and academic institutions. Fourteen of the experts are board
certified by at least one of the American Board of Medical Specialties
member boards, including 9 who are board certified in aerospace
medicine. Eight of the 20 medical experts we interviewed are AMEs for
the FAA, and 16 are pilots or have had pilot experience in the past. Two
experts are from aviation authorities in Australia and New Zealand, and a
third expert was from the United Kingdom.

Each expert verified that they had no conflicts of interest in participating in
our study. We conducted semi-structured interviews by telephone with the
experts in August and September 2013 to solicit their views on FAA's
medical standards and qualification policies, the medical application form,
and FAA's communication with AMEs and pilot applicants. We also asked
general questions about aviation medical policies, followed by specific
questions about private pilots, where applicable. We provided all medical
experts with relevant background information prior to our interview, and
we provided the option to bypass questions if they believed they were
unqualified to respond in a professional capacity. Prior to conducting the
interviews, we pretested the interview questions with three aviation
medical experts (two were AMEs and one was also a pilot). We
conducted pretests to make sure that the questions were clear and
unbiased and that they did not place an undue burden on respondents.
We made appropriate revisions to the content and format of the
questionnaire after the pretests.

Each of the 20 interviews was administered by one analyst and notes
were taken by another. Those interview summaries were then evaluated
to identify similar responses among the experts and to develop our
findings. The analysis was conducted in two steps. In the first step, two
analysts developed a code book to guide how they will analyze the expert
responses. In the second step, one analyst coded each transcript of
expert responses, and then a second analyst verified those codes. Any
coding discrepancies were resolved by both analysts agreeing on what
the codes should be. We examined responses to determine if there were
systematic differences in responses between experts who were and were
not pilots and between experts who were and were not AMEs. Because
we found no significant differences between the pilot and AME groups,

we reported the results for the experts as a whole rather than by the pilot or AME subgroups.

We used indefinite quantifiers throughout the report—"few" (2-3 experts); "some" (4-9 experts); "half" (10); "many" (11-15 experts); and, "most" (16-19 experts)—to inform the reader of the approximate quantity of medical experts that agreed with a particular statement. We only reported on issues raised by at least two experts. We interviewed individuals with broad aerospace-medicine expertise to provide their expert opinion on FAA's medical standards and qualification policies. While the experts provided their opinions on some specific standards, we do not believe that these opinions alone provide sufficient evidence to recommend any specific changes to FAA medical standards and policies. Rather, the information from these interviews provides us with an overall expert assessment of FAA's medical standards, policies, and practices. The results of our interviews represent opinions among the experts we interviewed but cannot be generalized to the larger population of aviation medical experts. See table 2, below, for a list of medical experts we interviewed.

Table 2: List of Medical Experts

Name	Organization	FAA-designated AME
Brent Blue, M.D.	Emerg+A+Care Family Physician,St. John's Medical Center	FAA Aviation Medical Examiner
Tarah L. Castleberry, DO, MPH.	Assistant Professor Clinical Preventive Medicine Aerospace Medicine Residency University of Texas Medical Branch, Galveston, TX	Senior FAA Aviation Medical Examiner
Mary "Missy" Cummings, Ph.D.	Associate Professor of Aeronautics and Astronautics Massachusetts Institute of Technology	
Peter Demitry, M.D.	President, 4D Enterprises	
David Gradwell, M.D., Ph.D.	Professor, Aerospace Medicine Kings College London, UK	
Bernard Harris, M.D., M.B.A.	CEO and Managing Director of Vesalius Ventures	
Richard T. Jennings, M.D.	Professor, Preventive Medicine and Community Health University of Texas Medical Branch, Galveston, TX	
Warren Jensen, M.D.	Professor, Department of Aviation Director of Aeromedical Research University of North Dakota Odegard School of Aerospace Sciences	Senior FAA Aviation Medical Examiner

Name	Organization	FAA-designated AME
Kris Lehnhardt, M.D.	Assistant Professor George Washington University School of Medicine and Health Sciences	
Daniel Masys, M.D.	Affiliate Professor, Biomedical and Health Informatics University of Washington	
Pooshan Navathe, MBBS, M.D.	Principal Medical Officer Civilian Aviation Safety Authority Australia	
Robert R. Orford, M.D., M.P.H.	Assistant Professor of Medicine Division of Preventive, Occupational, and Aerospace Medicine Mayo Clinic, Arizona	Senior FAA Aviation Medical Examiner
Scott E. Parazynski, M.D.	Chief Medical Officer Director, Center for Polar Medical Operations University of Texas Medical Branch, Galveston, TX	
Russell Rayman, M.D.	Former Director, Aerospace Medical Association	
Dennis Sager, M.D.	Associate Clinical Professor of Health Care Sciences George Washington University, Private Practice	Senior FAA Aviation Medical Examiner
Warren S. Silberman, D.O., MPH	Contractor for Aircraft Owners and Pilots Association Former Program Manager, FAA Aerospace Medical Certification	Senior FAA Aviation Medical Examiner
Quay Snyder, M.D., MSPH	ALPA Aeromedical Advisor	
Jan Stepanek, M.D., M.P.H.	Associate Professor of Medicine Mayo Clinic College of Medicine Director, Aerospace Medicine Program	Senior FAA Aviation Medical Examiner
Dougal Watson MB, BS, BScMed	Principal Medical Officer New Zealand Civil Aviation Authority	
Richard Williams, M.D.	Chief Health and Medical Officer National Aeronautics and Space Administration	Senior FAA Aviation Medical Examiner

Source: GAO, based on information provided by selected medical experts.

In addition to asking medical experts and other stakeholders about their
view of FAA's communication of its medical certification requirements, we
reviewed MedXPress.faa.gov (online application system) used by pilots to
obtain a medical certificate. We reviewed the Pilots Bill of Rights
Notification and Terms of Service Agreement, Form 8500-8 (medical
application form) and instructions, and links within the online application
system, evaluating that information against federal government website-
usability guidelines and against FAA's plain language guidelines. We
evaluated the online application system based on the following criteria (1)
content—whether the website contained relevant and appropriate
information users need—and (2) navigation—how easily users can find

and access information on the site and move from one webpage to another, focusing on, for example, the clickable links within a website and limited reliance on scrolling. In addition, we reviewed various other website usability resources and criteria, including Usability.gov, to understand the key practices for making websites easy to use and helpful. We evaluated the medical application form and its instructions based on criteria established by FAA's Office of Communications, including its *Plain Language Tool Kit* and its *Writing Standards*. These criteria include (1) writing principles—for example, whether the document is appropriate for its audience, its content is well organized, and it uses active voice, clear pronouns, and short sentences and paragraphs—and, (2) formatting principles—for example, whether the document layout and use of headers and blank space conform with best practices to clearly present information to the reader.

We conducted this performance audit from January 2013 through April 2014, in accordance with generally accepted government auditing standards. Those standards require that we plan and perform the audit to obtain sufficient, appropriate evidence to provide a reasonable basis for our findings and conclusions based on our audit objectives. We believe that the evidence obtained provides a reasonable basis for our findings and conclusions based on our audit objectives.

Appendix II: Summary of Selected FAA Medical Standards

Medical Certificate Pilot Type	First-Class Airline Transport Pilot	Second-Class Commercial Pilot	Third-Class Private Pilot
Frequency of medical requirement	Every 6 months if > 40 years old. Every year if < 40 years old.	Every year, regardless of age.	Every 2 years if > 40 years old. Every 5 years if < 40 years old.
DISTANT VISION	20/20 or better in each eye separately, with or without correction.		20/40 or better in each eye separately, with or without correction.
NEAR VISION	20/40 or better in each eye separately (Snellen equivalent), with or without correction, as measured at 16 inches.		
INTERMEDIATE VISION	20/40 or better in each eye separately (Snellen equivalent), with or without correction at age 50 and over, as measured at 32 inches.		No requirement.
COLOR VISION	Ability to perceive those colors necessary for safe performance of airman duties.		
HEARING	Demonstrate hearing of an average conversational voice in a quiet room, using both ears at 6 feet, with the back turned to the examiner **or** pass one of the audiometric tests below.		
AUDIOLOGY	Audiometric speech discrimination test: Score at least 70% reception in one ear. Pure tone audiometric test. Unaided, with thresholds no worse than:		
	500 Hz	1,000 Hz	2,000 Hz	3,000 Hz
Better Ear	35 Db	30 dB	30 dB	40 dB
Worst Ear	35 dB	50 dB	50 dB	60 dB
ENT	No ear disease or condition manifested by, or that may reasonably be expected to be maintained by, vertigo or a disturbance of speech or equilibrium.		
PULSE	Not disqualifying per se. Used to determine cardiac system status and responsiveness.		
BLOOD PRESSURE	No specified values stated in the standards. The current guideline maximum value is 155/95.		
ELECTRO-CARDIOGRAM (ECG)	At age 35 and annually after age 40	Not routinely required.	
MENTAL	No diagnosis of psychosis, or bipolar disorder, or severe personality disorders.		
SUBSTANCE DEPENDENCE AND SUBSTANCE ABUSE	A diagnosis or medical history of "substance dependence" is disqualifying unless there is established clinical evidence, satisfactory to the Federal Air Surgeon, of recovery, including sustained total abstinence from the substance(s) for not less than the preceding 2 years. A history of "substance abuse" within the preceding 2 years is disqualifying. "Substance" includes alcohol and other drugs (i.e., PCP, sedatives and hynoptics, anxiolytics, marijuana, cocaine, opioids, amphetamines, hallucinogens, and other psychoactive drugs or chemicals).		
DISQUALIFYING CONDITIONS	Unless otherwise directed by the FAA, the Examiner must deny or defer if the applicant has a history of (1) diabetes mellitus requiring hypoglycemic medication; (2) Angina pectoris; (3) Coronary heart disease that has been treated or, if untreated, that has been symptomatic or clinically significant; (4) Myocardial infarction; (5) Cardiac valve replacement; (6) Permanent cardiac pacemaker; (7) Heart replacement; (8) Psychosis; (9) Bipolar disorder; (10) Personality disorder that is severe enough to have repeatedly manifested itself by overt acts; (11) Substance dependence; (12) Substance abuse; (13) Epilepsy; (14) Disturbance of consciousness and without satisfactory explanation of cause, and (15) Transient loss of control of nervous system function(s) without satisfactory explanation of cause.		

Source: 2014 Guide For Aviation Medical Examiners and 14 C.F.R. § 61.23(d).

Appendix III: Selected FAA Training Programs for AMEs and Pilots in Aerospace Medicine and Communication Tools

AME Training Program/ Communication tool	Description
Clinical Aerospace Physiology Review for Aviation Medical Examiners (CAPAME) course Medical Certification Standards and Procedures Training (MCSPT)	Prospective AMEs must complete these online courses as a prerequisite to becoming an AME.
Basic AME Seminar	Prospective AMEs generally must attend this one-week seminar to be designated as an AME.
AME Refresher Seminars or Multimedia Aviation Medical Examiner Refresher Course (MAMERC)	Practicing AMEs must complete refresher training every three years to maintain their designation as an AME. AMEs generally fulfill this requirement by either attending an AME Refresher Seminar; or, completing the online MAMERC course in lieu of attending an AME theme seminar. This course can be used as a substitute for a theme seminar on alternate 3-year cycles, which extends the time between theme seminar attendance to six years.
AME Proficiency Requirement	In addition to the AME training and continued professional refresher courses, AMEs generally maintain a proficiency requirement of at least 10 exams per year.
Guide for Aviation Medical Examiners	According to the Federal Air Surgeon, FAA policies go into effect when they are updated in the *Guide for Aviation Medical Examiners*, available online.
Federal Air Surgeon's Medical Bulletin	Published quarterly for aviation medical examiners and others interested in aviation safety and aviation medicine. The Bulletin is prepared by the FAA's Civil Aerospace Medical Institute, with policy guidance and support from the Office of Aerospace Medicine.
Aerospace Medical Certification Subsystem (AMCS)	E-mail notifications are sent to AMEs and their staff through AMCS. AMCS support is available by phone, (405) 954-3238, or e-mail, 9-amc-aam-certification@faa.gov.
Pilot Training Program/ Communication tool	
FAA TV and Social Media	FAA TV, http://www.faa.gov/tv, is a central repository for FAA videos related to pilot medical requirements, among other topics. For example, FAA has produced two MedXPress videos: http://www.faa.gov/tv/?mediaId=554 or http://www.faa.gov/tv/?mediaId=634 FAA also posts videos on its YouTube page http://www.youtube.com/user/FAAnews/videos FAA also uses Facebook and Twitter to communicate directly with pilots and others who choose to follow FAA through social media.
FAA Safety Briefings	Bimonthly publications promote aviation safety by discussing current technical, regulatory, and procedural aspects affecting the safe operation and maintenance of aircraft.
FAA's Medical Certification web page	FAA's medical certification webpage contains information for AMEs and pilots, including information about MedXPress, Health and Fitness, and FAA's Industry Drug and Alcohol Testing Program. http://www.faa.gov/licenses_certificates/medical_certification/

Pilot Training Program/ Communication tool	
FAA Pilot Safety Brochures	FAA pilot safety brochures provide essential information to pilots regarding potential physiological challenges of the aviation environment so pilots may manage the challenges to ensure flight safety. Brochure topics include: Alcohol and Flying, Medications, Spatial Disorientation, Hearing and Noise, Hypoxia, Pilot Vision, Seat Belts and Shoulder Harnesses, Sleep Apnea, Smoke, Sunglasses for Pilots, Deep Vein Thrombosis and Travel, and Carbon Monoxide, among other topics.
MedXPress	MedXPress support is available for pilots by phone, (877) 287-6731, or e-mail, 9-natl-avs-it-servicedesk@faa.gov, 24 hours each day.

Source: FAA.

Appendix IV: FAA Form 8500-8 (Medical Application Form)

(continued from previous)

Medical History	Description	Medical History	Description
a. ○ Yes ○ No	Frequent or severe headaches	m. ○ Yes ○ No	Mental disorders of any sort: depression, anxiety, etc.
b. ○ Yes ○ No	Dizziness or fainting spell	n. ○ Yes ○ No	Substance dependence or failed a drug test ever; or substance abuse or use of illegal substance in the last 2 years.
c. ○ Yes ○ No	Unconsciousness for any reason	o. ○ Yes ○ No	Alcohol dependence or abuse
d. ○ Yes ○ No	Eye or vision trouble except glasses	p. ○ Yes ○ No	Suicide attempt
e. ○ Yes ○ No	Hay fever or allergy	q. ○ Yes ○ No	Motion sickness requiring medication
f. ○ Yes ○ No	Asthma or lung disease	r. ○ Yes ○ No	Military medical discharge
g. ○ Yes ○ No	Heart or vascular trouble	s. ○ Yes ○ No	Medical rejection by military service
h. ○ Yes ○ No	High or low blood pressure	t. ○ Yes ○ No	Rejection for life or health insurance
i. ○ Yes ○ No	Stomach, liver, or intestinal trouble	u. ○ Yes ○ No	Admission to hospital
j. ○ Yes ○ No	Kidney stone or blood in urine	x. ○ Yes ○ No	Other illness, disability, or surgery
k. ○ Yes ○ No	Diabetes	y. ○ Yes ○ No	Medical disability benefits
l. ○ Yes ○ No	Neurological disorders: epilepsy, seizures, stroke, paralysis, etc.		

Arrest and/or Conviction and/or Administrative Action History

v. ○ Yes ○ No History of (1) any arrest(s) and/or conviction(s) involving driving while intoxicated by, while impaired by, or while under the influence of alcohol or a drug; or (2) history of any arrest(s), and/or conviction(s), and/or administrative action(s) involving an offense(s) which resulted in the denial, suspension, cancellation, or revocation of driving privileges or which resulted in attendance at an educational or a rehabilitation program.

w. ○ Yes ○ No History of nontraffic conviction(s) (misdemeanors or felonies).

[Add Comments]

? 19. Have you visited any health professionals within the last 3 years?: ○ Yes ○ No

To add a Medical Visit, enter information in the spaces provided and click the Add button.
Note: You must click the add button for each visit entered.

Date of Visit (MM/YYYY): ___ Name: ___ Street: ___
City: ___ State: ___ Zip Code: ___ Country: ___
Type Professional: ___ Reason: ___

[Add]

Date	Name	Number/Street	City	State	Zip Code	Country	Type Professional	Reason		

? **20. Applicant's National Driver Register and Certifying Declarations:**
I hereby authorize the National Driver Register (NDR), through a designated State Department of Motor Vehicles, to furnish to the FAA information pertaining to my driving record. This consent constitutes authorization for a single access to the information contained in the NDR to verify information provided in this application. Upon my request, the FAA shall make the information received from the NDR, if any, available for my review and written comment. Authority: 23 U.S. Code 401, Note.

NOTE: ALL persons using this form must sign it. NDR consent, however, does not apply unless this form is used as an application for Medical Certificate or Medical Certificate and Student Pilot Certificate.

I hereby certify that all statements and answers provided by me on this application form are complete and true to the best of my knowledge, and I agree that they are to be considered part of the basis for issuance of any FAA certificate to me. I have also read and understand the Privacy Act statement that accompanies this form.

○ Yes ○ No

– NOTICE –
Whoever in any matter within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals or covers up by any trick, scheme, or device a material fact, or who makes any false, fictitious or fraudulent statements or representations, or entry, may be fined up to $250,000 or imprisoned not more than 5 years, or both. (18 U.S. Code Secs. 1001; 3571).

(continued)

(continued from previous)

Your application is not complete until you enter your password and press the "Submit" button at the bottom of this page.

I'm not done yet. Save my application so I can finish it later. | Save

Show me any errors I have made on my application. | Show Validation Errors

I understand that by entering my password, I certify that I agree with the National Driver Register and Certifying Declarations. I further understand that I will not be able to change my application after I submit the information (only your AME will be able to change the application at the time of the physical exam).

I'm done. Send my application to the FAA. Password: [   ] | Submit

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Source: FAA (medxpress.faa.gov, accessed Nov. 20, 2013).

Appendix V: GAO Contact and Staff Acknowledgments

GAO Contact	Gerald L. Dillingham, Ph.D., (202) 512-2834, or dillinghamg@gao.gov
Staff Acknowledgments	In addition to the contact named above, the following individuals also made important contributions to this report: Susan Zimmerman, Assistant Director; Colin Fallon; Geoffrey Hamilton; John Healey; Linda Kohn; Jill Lacey; Maren McAvoy; and Sara Ann Moessbauer.