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Depression and Anxiety in Pilots: A Qualitative Study of SSRI Usage in U.S. Aviation and Evaluation of FAA Standards and Practices Compared to ICAO States

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Before 2010, the Federal Aviation Administration (FAA) did not allow airmen to exercise the privileges of pilot in command (PIC) of an aircraft or obtain a medical certificate if one had been diagnosed with anxiety, depression, and/or taking an SSRI medication. Since 2010, the FAA relaxed its views and certification standards. However, this is not an issue unique to the U.S. The International Civil Aviation Organization (ICAO) and other ICAO States began evaluating airmen suffering from anxiety, depression, and/or taking an SSRI medication in early 2000. ICAO and most ICAO States have identified the need for further research regarding mood disorders and airmen. In addition, ICAO has issued guidance regarding certification standards, though each ICAO State has the authority to set its own standards. While the FAA and the other ICAO States have accepted mood disorders in aviation as a reality, additional work is needed to unify standards within the international aviation community. ICAO States with more stringent standards, may force airmen to seek alternative treatment options and not disclose crucial medical information or seek appropriate treatment options in fear of reprisal. In 2018, a qualitative study was conducted that evaluated FAA medical certification standards for airmen suffering from mood disorders and compared them against medical certification standards of other ICAO State agencies and ICAO recommended practices. This qualitative study also evaluated U.S. pilot perceptions of the certification process, as well as views from a non-aviation medical physician using interviews and survey questionnaires. Responses were compared to current practices and evaluated. Findings from this study concluded that while FAA certification standards may be comparable to other ICAO States, general views regarding agency acceptance of mental health disorders can vary widely across State agencies.

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Generalized anxiety disorder (GAD) and depression are among the most common mood disorders in the U.S. (Anxiety and Depression Association of America [ADAA], 2016). While there are several sub-categories of each disorder, approximately 6.7 million Americans suffer from GAD, and approximately 15 million are diagnosed with depression (ADAA, 2016). Events that trigger these disorders can be widespread, which can be affected by genetics, stress, social makeup, phobias, and traumatic experiences (ADAA, 2016). The Anxiety and Depression Association of America (ADAA) states that most adults will experience some form of anxiety or depression in their lives (ADAA, 2016).

Approximately 80% of individuals who suffer from one of these disorders never seek diagnosis, and some individuals who are diagnosed never seek treatment options (Healthline, 2017). Transport Canada has concluded that approximately 6% of the population suffers from some form of mood disorder, and this same ratio exists among the pilot population (Transport Canada, 2018). A standard treatment option for those suffering from anxiety or depression is to prescribe a selective serotonin reuptake inhibitor (SSRI) (ADAA, 2016). SSRIs work by altering the chemical makeup of the brain, which changes how serotonin interacts within the neurotransmitters and how messages are sent and received (ADAA, 2016). Approximately 80% to 90% of individuals who are prescribed an SSRI for mood disorders have positive results with the treatment and experience few side effects (ADAA, 2016).

The topic of pilots and mental health is a sensitive issue. Moreover, the Federal Aviation Administration (FAA) has maintained strict guidelines that prevented pilots from exercising the privileges of any license or obtaining a medical certificate for those suffering from, or diagnosed with, anxiety, depression, and/or taking a selective serotonin reuptake inhibitor. U.S. Federal Aviation Regulations regarding mental health in pilots and the use of SSRIs are maintained in Title 14 CFR Part 67: Medical Standards and Certification (GPO, n.d.). Since 2010, the FAA has relaxed some of its requirements allowing pilots to use certain SSRIs under the issuance of a medical waiver (FAA, 2010).

Background of the Study

Currently, the FAA approves four SSRI medications for pilot use: (1) Lexapro; (2) Prozac; (3) Celexa; and (4) Zoloft (FAA, 2017a). According to FAA policy (2017a), applicants are required to indicate on their medical application if they are taking an SSRI and whether one has been diagnosed with or has a history of anxiety or depression. An aviation medical examiner (AME) is instructed not to issue a medical certificate (in most cases) and submit the application to the FAA for further review (FAA, 2017a).

After submitting a medical application, the pilot must be monitored and re-evaluated by an appropriate mental health specialist (e.g., psychiatrist) after six months of a consistent single-dose usage of one of the four FAA approved medications (FAA, 2017a). After a six-month demonstration period, a pilot may request a re-evaluation from their psychiatric care physician; a

specialist from the FAA Aeromedical Division will evaluate the documentation and grant or deny the request for a medical waiver (FAA, 2017a).

While the certification process was initially lengthy, it has been shortened in recent years. Initially, the medical waiver process required pilots to demonstrate 12 months of consistent SSRI use along with appropriate documentation; however, even with a recent reduction to a six-month evaluation period, there is no guarantee that a medical waiver will be granted. Furthermore, while the FAA has allowed the use of some medications, they still prohibit most SSRIs and other mood-altering medications (FAA, 2017a).

Past and Current Problems

Previously, any pilot who had been diagnosed with or has symptoms of anxiety, depression, and/or taking an SSRI was prohibited from exercising the privileges of an airman certificate and obtaining any class of FAA medical (FAA, 2010). Pilots who had been prescribed an SSRI in the past were required to demonstrate successful discontinued use of the medication for at least 90 days before consideration of a medical certificate was granted (FAA, 2010). The International Civil Aviation Organization (ICAO) and many of its member States have a different approach to SSRI medications and airmen medical certification. Australia, for example, has conducted studies regarding mood disorders, SSRIs, and other treatment options as early as the 1980s and has since approved their pilots to take SSRI medications while continuing to fly (Werfelman, 2008). The Civil Aviation Safety Authority (CASA) of Australia has concluded that pilots taking an SSRI pose no significant safety threat when compared to individuals who do not suffer from a mood disorder (Nowak, 2007).

While the FAA has relaxed its certification standards regarding anxiety and depression, prevalent questions and potential problems remain. Some of these issues include: (1) pilot compliance with FAA standards; (2) pilots not seeking medical help when needed; (3) pilots seeking unauthorized treatment options; (4) how FAA views align with ICAO and other ICAO States; and (5) the SSRI medications currently approved by the FAA.

Pilots and Mental Health

It is estimated that between 10 and 20 million people in the U.S. suffer from some form of anxiety or depression (Stout, n.d.). Approximately one in ten men and one in four women will be affected by anxiety or depression at some point in their life (Stout, n.d.). These disorders have become so common that they are often referred to as the common cold of psychiatry, and it is no surprise that pilots are also affected by these mental disorders as well (Stout, n.d.).

Often anxiety is associated with intense bouts of fear, and these feelings or threats may be real or imaginary (Lott, & Stenson, n.d.). Often these fears may trigger a reactive response in the form of a panic attack which can be debilitating depending on the severity (Lott, & Stenson, n.d.). Some symptoms of anxiety include excessive worrying, trouble sleeping, headaches, stomach aches, and vomiting (Lott & Stenson, n.d.). These symptoms may cause an individual to avoid certain situations or develop phobias that may interfere with daily life, work, academics,

or other social settings (Lott, & Stenson, n.d.). In some cases, pilots have even developed a fear of flying (Bor, Field, & Scragg, 2002).

Depression, the second most common mood disorder, can become more detrimental to pilots due to its potentially debilitating effects (Flight Safety Foundation [FSF], 2001). Depression may be progressive throughout a person's day, and symptoms may become more prevalent (Stoutt, n.d.). Many symptoms of depression include periods of sadness, grief, fatigue, and loss of interest in usual activities (Stoutt, n.d.). A person may also experience loss of appetite, irritability, irrationalism, and even feelings of guilt (Stoutt, n.d.). Depression may also be classified as a form of bipolar disorder (often referred to as manic depression), and symptoms include alternating periods of mania and bouts of depression (FSF, 2001).

Not all mental health issues or psychological problems are easily detectable (Bor et al., 2002). Some symptoms may lay dormant in an individual for years (Bor et al., 2002). Moreover, some symptoms are difficult for mental health professionals to simulate during a professional assessment (Bor et al., 2002). Therefore, it is not reasonable to expect that flight crew members will always be self-aware of underlying problems, and they may often rely on a family member or coworker observations (Bor et al., 2002). Many mental health and personality disorders remain undiagnosed until the individual shows long-term and repeated behaviors that can make it challenging to work or cooperate with others (Bor et al., 2002). The U.S. airline industry, for example, requires pilots to be displaced from their home environment for extended periods (Bor et al., 2002). This may create a dissociation with close relationships that can further affect the pilot's overall mental performance (Bor et al., 2002). However, a stable and productive home life with strong personal relationships may act as a buffer between the added work-related stress (Bor et al., 2002).

In 2015, the case of Germanwings 9525 gained wide-spread international media coverage after the plane crashed due to what the French Bureau d'Enquêtes et d'Analyses (BEA) determined to be a, "Deliberate and planned action of the copilot, who decided to commit suicide while alone in the cockpit" (FSF, 2016, para 1). An investigation uncovered that the first officer had been taking unapproved prescription medication for mental health issues, and the medication had caused adverse side effects (FSF, 2016). The investigation also uncovered that a general care physician had recommended additional psychiatric evaluations and hospitalization for the first officer (FSF, 2016). Reports also indicated he had been previously diagnosed with psychosis (FSF, 2016).

U.S. General Aviation Accident Statistics

In 2007, a research study was conducted that evaluated SSRI usage in pilots and accident rates in the U.S. Between 1990 and 2001 there were 61 fatal aviation accidents where SSRIs were found in the pilot's blood system (Sen, Akin, Canfield, & Chaturvedi, 2007). Of the 61 cases studied, 59 of the pilots had medical records in the FAA's Medical Certification Database, while two of the pilots did not have medical records on file (Sen et al., 2007). Previous incidents of driving while under the influence were reported by 22 of the 59 pilots (Sen et al., 2007). Seven of the 61 pilots disclosed psychological problems on previous medical applications that

were subject for disqualification (Sen et al., 2007). Of those seven pilots, three reported using an SSRI (Sen et al., 2007).

At the time of the study, researchers noted that newer generation antidepressants were being developed that were more effective at treating anxiety and depression than older generation antidepressants (Sen et al., 2007). However, at the time of the study, the FAA did not approve SSRIs for use despite research findings (Sen et al., 2007). Out of the 61 cases studied, 12 pilots were found to have a medical history of SSRI usage with a previous diagnosis of psychological conditions or psychiatric disorders (Sen et al., 2007). In two of these cases, the conditions and disorders were reported to the Civil Aerospace Medical Institute (CAMI) (Sen et al., 2007).

Most of the pilots in this research study held a private pilot certificate with a third-class medical (Sen et al., 2007). Approximately 20% of the pilots in these cases were found to have been flying without a valid medical, and approximately 21% of the pilots were found to be medical professionals (Sen et al., 2007). A final analysis indicated that in 19 of the 61 cases, the pilot's SSRI use or psychological condition was the probable cause or contributing factor in the accident (Sen et al., 2007).

Treatment Options

Even though the FAA only approves four SSRI medications (FAA, 2017a), there are many other SSRIs on the market such as Paxil, norepinephrine-dopamine reuptake inhibitors (NDRIs) such as Wellbutrin, serotonin and norepinephrine reuptake inhibitors (SNRIs) such as Cymbalta, or next-generation medications such as Buspar that may work better for one pilot over another (L. Anderson, personal communication, July 16, 2018). While the FAA may slowly be aligning their views with ICAO and the international community, past and current views may cause a stagnation point and confusion for pilots regarding the appropriate course of action. Social stigmas may also alter a pilot's ability to make sound decisions regarding obtaining a medical diagnosis, exploring treatment options, and seeking other forms of help.

Social Stigmas

According to the Flight Safety Foundation's recommendation, pilots need an outlet to get the assistance they require without fear of reprisal from legislators, regulators, their employers, or the general public (FSF, 2016). In September of 2015, a study was conducted that examined public stigma before and after the Germanwings crash. Population surveys conducted in Germany between 1990 and 1991, and again after the Germanwings crash, indicated an increased stigma against people with a mental disorder than before the crash (Schomerus, Stolzenburg, & Angermeyer, 2015). In one study, respondents indicated they would have been more willing to sublet a room to someone with known schizophrenic tendencies than after the Germanwings crash (Schomerus et al., 2015). The results of the test indicated a change of respondent unwillingness by 24% (Schomerus et al., 2015).

While social stigma can be an issue, there are those that feel the public should be made aware when a flight crew member is taking any medications. A public comment posted on cbsnews.com stated:

Passengers should be informed several days before a flight if either pilot or copilot are taking any medication that has even the remotest [SIC] possibility of presenting a danger to passengers so they can make an informed decision whether to take that flight or to change to a flight conducted by healthy non-medicated pilots. (Jackson, 2010, p. 66)

The public appears to demand that all airline pilots are mentally healthy and non-medicated individuals (Jackson, 2010). However, it is not reasonable nor practical when the public has the assumption that pilots are not human beings (Jackson, 2010). This outlook does not make the skies safer (Jackson, 2010).

Pilot Compliance

Public views of pilot mental health may become a deciding factor regarding how aviation authorities choose to certify their pilots. Studies conducted in the U.S. between 1993 and 2012 concluded that pilot suicide rates were approximately 0.33% (Persaud, & Bruggen, 2015). Similar studies in the UK between 1956 and 1995 had almost identical results indicating rates at 0.3% (Persaud, & Bruggen, 2015). In addition, a German study concluded that between 1974 and 2007 the suicide rate among pilots was only 0.29% (Persaud, & Bruggen, 2015). Yet, many pilots are afraid to come forward even though symptoms of anxiety and depression are typically short-term, with minimal chances of reoccurrence after treatment (Persaud, & Bruggen, 2015). The FAA stated that inquiries to the Aviation Medicine Advisory services indicated that approximately 59% of airmen do, or would, refuse to use SSRI medication if they were prescribed one (Persaud, & Bruggen, 2015). Approximately 15% of airmen indicated they would take SSRI medication without notifying the FAA (Persaud, & Bruggen, 2015).

Between 1997 and 2001, the Airline Pilots Association (ALPA) stated that more than 1,200 pilots contacted their offices indicating a recent diagnosis of depression (Presenter, Evans, 2013). Approximately 60% of those who contacted the ALPA indicated they would continue flying without taking necessary medications (Presenter, Evans, 2013). Approximately 15% advised they would take the recommended medications without adequately notifying the FAA (Presenter, Evans, 2013). Approximately 25% indicated they would take the recommended medications and cease flying (Presenter, Evans, 2013).

Purpose and Significance of the Study

The purpose of this research study was two-fold. First, the findings from the study will help conclude whether the FAA's viewpoints regarding mood disorders and treatment options are too stringent or outdated when compared to recommendations by ICAO and the medical certification standards of other ICAO States. Second, the responses from the participating U.S. pilot group should help identify how familiar they are with FAA views regarding mood disorders and SSRI use in airmen, as well as indicate whether current FAA medical certification standards for mood disorders and SSRI use are beneficial to the U.S. pilot population.

This international research study will be significant because anxiety and depression are common mood disorders among the pilot population (Stoutt, n.d.; Transport Canada, 2018). Only a few studies regarding U.S. pilots and the use of SSRI medications have been conducted compared to the more significant number of SSRI research studies completed within the international community and their pilot populations. The findings from this study may assist in determining if current FAA certification standards are too stringent and how those standards affect pilots suffering from these disorders. The findings will provide additional information for both the FAA and the aviation community on the subject of pilots and SSRI medications that may not have been previously considered or publicly shared in the literature.

Research Questions

The following research questions were developed to align with the intent of this study:

- RQ1 - Are the FAA's certification standards for pilots suffering from anxiety and/or depressive disorders too stringent, limited, or outdated when compared to ICAO or other ICAO States?
- RQ2 - Are the FAA's certification standards for pilots taking SSRIs as a treatment option for anxiety and/or depressive disorders too stringent, limited, or outdated when compared to ICAO or other ICAO States?
- RQ3 - Can medical physicians outside the FAA provide additional support regarding the adequacy or inadequacy of pilot certification standards for those suffering from anxiety, depression, or who are using SSRIs?
- RQ4 - How does the U.S. pilot population view FAA certification standards on the subject of SSRIs, anxiety, and depressive disorders?

Limitations

Limitations of this study included:

1. The data gathered by the researchers was limited by the actual number of participants that volunteered to complete the research questionnaire and the personal interviews.
2. The amount of information the FAA, ICAO, and ICAO States were willing to share regarding the subject.
3. The FAA, ICAO, and ICAO State employees' professional knowledge on the subject matter.
4. The number of published research studies regarding pilot use of SSRI medications.
5. If participants answered the questionnaire or interview questions honestly and without any influence, actual or perceived.
6. Due to time constraints, some participants were unable to provide phone interviews but rather communicated in writing for convenience.
7. Due to time and availability, the number of non-aviation medical physicians able to participate in this study was limited.
8. A convenient sampling of participants was acquired via email and professional career forums.

Methodology

Selection of the Population

Three distinct population groups were invited to participate in this qualitative research study. Group I comprised of representatives from aviation governing agencies and their respective medical certification divisions. Group II comprised of U.S. certificated pilots. Group III comprised of a non-aviation medical physician.

Group I agencies invited to participate in this study included: (1) the Civil Aviation Authority of the UK (CAA); (2) the Civil Aviation Safety Authority (CASA) (Australia); (3) the Directorate General for Civil Aviation (DGAC) (France); (4) the Federal Aviation Administration (FAA) (United States); (5) the International Civil Aviation Organization (ICAO) (headquartered in Montreal); (6) the Luftfahrt-Bundesamt (LBA) (Germany); (7) the Swedish Transport Agency (STA); and (8) Transport Canada (TC).

Group I participants were selected by the researchers based on current research contributions related to the subject of anxiety, depression, and SSRI use in the pilot population. Transport Canada and CASA are pioneer ICAO States regarding research, acceptance, and certification procedures for airmen suffering from anxiety, depression, and/or taking an SSRI (ICAO, 2008). ICAO was asked to participate because the organization issues guidance on the subject for other ICAO States to consider when certifying their airmen. The FAA was selected for comparative purposes with ICAO and other ICAO States.

Group II was a convenient sampling of the U.S. pilot population. The researchers did not specify any participation requirements regarding levels or type of certificates held, nor experience. Participation was available to any U.S. certificated pilot age 18 or older.

Group III was a convenient sampling of a local general care facility. An email invitation was sent requesting participation from available non-aviation medical physicians at that facility who could provide a non-aviation medical interpretation of the FAA's responses to the survey questions. The purpose of the physician's opinion was to develop a comparison between two distinct medical standards: general medicine vs. aerospace medicine. Moreover, guidance from the non-aviation medical physician was sought to determine if any safety concerns are prevalent in those individuals prescribed an SSRI while operating an aircraft.

Data Collection & Analysis

Group I Data Collection. Participants in Group I received an email invitation from the researchers that outlined the scope and purpose of the study. The researchers developed a list of ten interview/survey questions and included these questions in email invitations. A request was made to each agency for an authorized medical expert with knowledge of administrative policies to participate in a brief telephone or Skype interview with the researchers. Due to time constraints, most of the aviation governing agencies willing to participate in this research study decided to provide written answers through email communication instead of verbal responses.

The interview questions focused on the agency's knowledge and opinion regarding the following topics:

1. The FAA's past and current certification process of airmen diagnosed with or suffering from, anxiety, depression, and/or taking an SSRI.
Why did a given agency, if applicable, choose to change its opinion and the certification process for airmen diagnosed with, or suffering from, anxiety, depression, and/or taking an SSRI?
What information does a given agency consider when making policy changes?
2. Are there other options available to airmen should a specific medication or treatment option not be a viable solution for a given individual?
3. Are there other factors for a given agency that may result in denial of a medical application even though that airmen met and complied with the application process?
4. Does a given agency have policies in place to ensure airmen compliance with new standards?
5. Does a given agency estimate how many airmen are, or are not, complying with the certification standards?
6. Evaluate a statement from the Australian Civil Aviation Safety Authority regarding individuals that take medication for anxiety and/or depressive disorders are no more dangerous than those who have not been diagnosed with, nor suffer from, one of these disorders.
7. Determine if the FAA's certification standards are more or less restrictive than ICAO's recommendations.
8. Any additional comments.

Group I Data Analysis. Data from Group I was evaluated based on interview or survey questionnaire responses and a given State's certification standards. Responses were evaluated and compared using descriptive statistical analysis. Comparisons were made between each agency that participated against similar questions from the other agencies. In addition, a comparison to current certification standards from ICAO and other ICAO States was used.

Group II Data Collection. Based on 2017 FAA statistics, there were 609,306 valid pilot certificates issued in the U.S. (FAA, 2017b). Using this reported population size of Group II, a confidence level of 95% that yields a Z-Score of 1.96, and an estimated margin of error with a value of 4, the researchers determined that a sample size of 600 participants would be required for this study. The Group II population was invited to participate through email communications, professional pilot forums, and personal contacts. Each certificated pilot represented in Group II was asked to complete a four-question survey, and participation was voluntary. To ensure the highest pilot response rate possible, closed-end survey questions were used which only required a yes or no response.

Group II participants were asked to respond to the following topics:

1. Whether the participant agreed to the adequacy of the FAA's policy regarding pilot medical certification standards for anxiety and depression before 2010;
2. Whether the participant agreed to the adequacy of the FAA's policy regarding pilot medical certification standards for anxiety and depression after 2010;
3. Whether the participant agreed to the adequacy of the FAA's policy regarding pilot medical certification standards for anxiety and depression in 2015; and
4. Whether participants agreed to and were aware of Australia's research, views, and pilot medical certification standards for anxiety and depression dating back to the 1980s.

Email invitations for Group II participation were sent to aviation students enrolled at four U.S. collegiate flight programs. The National Business Aviation Association's (NBAA) database was used by the researchers to identify corporate flight operators in each state. Lists for each state were randomized to maintain objectivity, and the first two flight departments generated from each state were sent email invitations inviting their employed certificated pilots to participate in the study. Lastly, invitations to participate in the study were posted on the following three professional pilot forums: (1) Airlinepilotcentral.com; (2) Jetcareers.com; and (3) Propilotworld.com. Approximately 1,570 Group II invitations were issued to participate in the survey. The researchers received 148 surveys from Group II participants over 45 days; however, only 125 surveys were completed.

Group II Data Analysis. SurveyMonkey was used for data collection and analysis of the pilot survey question results. In addition, an Excel spreadsheet was used to evaluate responses rates and identify percentages of yes and no responses to each survey question. Group II responses were then evaluated using descriptive statistical analysis and to compare Group II responses against FAA certification standards.

Group III Data Collection. A list of local general care facilities was created, and the list was randomized. The first group on the list was selected to represent Group III. An email invitation was sent requesting participation from available non-aviation medical physicians at that facility. A physician agreed to evaluate the collected data from the FAA's survey responses. In addition, the physician agreed to provide a professional opinion regarding current and past ICAO recommendations, and FAA as well as ICAO State certification standards for those suffering from anxiety, depression, and/or taking an SSRI. In addition, the participating physician volunteered to forward the interview questions to other non-aviation medical practitioners to obtain additional comments. Due to time constraints, only one physician responded. Although only one physician participated, responses may be an indication of how other physicians could respond in future research with greater samplings.

The survey questions for the Group III participant focused on the following topics:

1. Professional opinion regarding FAA policies regarding anxiety, depression, and SSRIs;
2. Professional opinion regarding FAA decision to only allow four SSRI medications to be prescribed to airmen;
3. Professional opinion regarding the benefits of the four approved medications vs. other treatment options or medications;
4. Professional opinion regarding whether FAA policy regarding pilot medical certification standards for anxiety and depression was adequate before 2010;
5. Professional opinion regarding whether FAA policy regarding pilot medical certification standards for anxiety and depression was adequate in 2010;
6. Professional opinion regarding whether FAA policy regarding pilot medical certification standards for anxiety and depression was adequate in 2015; and
7. Professional opinion when comparing ICAO and ICAO State certification standards to the FAA.

Group III Data Analysis. Group III responses were evaluated using descriptive statistical analysis. Physician responses were used as a comparison to medical standards and practices outside of aviation. In addition, the participating physician was asked to evaluate the FAA’s survey questionnaire responses and provide additional information to help compare the difference in medical practices.

Findings & Discussion

Group I: Analysis of Survey Data

The FAA. The Federal Aviation Administration (FAA) was asked to respond to questions regarding its certification process, evaluation standards set by ICAO, and certification standards used by other ICAO States. On behalf of the FAA, the Deputy Federal Air Surgeon provided the following responses to the ten survey questions (Table 1):

Table 1
FAA Responses to Survey Questions

FAA Survey Questions	FAA Responses (Deputy Federal Air Surgeon)
The FAA’s past and current certification process of airmen diagnosed with or suffering from, anxiety, depression, and/or taking an SSRI.	<i>“The basis for the determination was scoping in on the history of ‘mild depression’ and determining that no other medical or psychiatric conditions were present. And that current medication treatment was adequate. The time frame specified has been adequate. This interval of time provided more flexibility in less severe depression cases.”</i>
Why did a given agency, if applicable, choose to change its opinion and the certification process for airmen diagnosed with, or suffering from, anxiety, depression, and/or taking an SSRI?	<i>“The FAA medical officers and FAA psychiatrist determined, that based on case reports and personal clinical experience that the psychiatric condition and use of acceptable medications that had a low side-effect profile would not impact the safety of the National Airspace System.”</i>
What information does a given agency consider when making policy changes?	<i>“The FAA Aerospace Medicine program is science-based that relies upon evidence-based medical literature and clinical experience to make its medical/management decisions. We also</i>

	<i>rely upon consultant reviews and the national database of aircraft accidents to validate our medical determinations.”</i>
Are there other options available to airmen should a specific medication or treatment option not be a viable solution for a given individual?	<i>“The diagnosis and medications we determined could be used by aviators all are low risks conditions. And the medications approved have the lowest possible side-effect profile. We are not considering any other antidepressant medications at this time.”</i>
Are there other factors for a given agency that may result in denial of a medical application even though that airmen met and complied with the application process?	<i>“The essence of a denial of an FAA airman medical certificate is based upon clinical review of the psychiatric history. If the individual under consideration does not meet the FAA published requirements or the approved psychiatric medication was discontinued that is not clinically explained and other psychiatric conditions or medical conditions are present, then the applicant will be denied.”</i>
Does a given agency have policies in place to ensure airmen compliance with new standards?	<i>“There is an active program that is managed by FAA Aerospace Medicine SSRI program medical personnel. The underpinnings of the program include educating the FAA Aviation Medical Examiners who are the first representatives of the FAA that interact with aviators. The reporting requirement stipulated in the program are published and clear. The information is provided in real time and medical determinations are made in real time. The overall process is always under review using QMS/SMS processes.”</i>
Does a given agency estimate how many airmen are, or are not, complying with the certification standards?	<i>“We have no way of determining who is not complying with the program. However, after 7 years we have 500 aviators who have participated in the program. We acknowledge that this is a fraction of the aviator population who most likely are flying with the condition and medications without our knowledge.”</i>
Evaluate a statement from the Australian Civil Aviation Safety Authority regarding individuals that take medication for anxiety and/or depressive disorders are no more dangerous than those who have not been diagnosed with, nor suffer from, one of these disorders.	<i>“The FAA Aerospace Medicine managers do not agree with the Australian CAA. We would not be granting special issuance medical certificates if we did not believe that the risk was close to that of the unaffected population.”</i>
Determine if the FAA’s certification standards are more or less restrictive than ICAO’s recommendations.	<i>“We have not evaluated their process.”</i>
Any additional comments.	<i>“We have collaborated with the ICAO prior to adopting our current policy. This collaboration has led to ICAO adopting a recommended practice that is sufficiently flexible to allow case by case consideration of affected applicants.”</i>

Analysis of FAA responses. The FAA representative stated that the agency’s determination to change its standardization regarding anxiety, depression, and SSRI usage is not solely dependent on decisions made by other ICAO States, but rather in alignment with recommended standards and practices by ICAO. However, past research studies indicated that the FAA considered viewpoints of multiple agencies and organizations when evaluating whether to revise its standards (Diamond, 2018; FAA, 2010). While the FAA states they are unaware of how many airmen are complying with the current certification and reporting standards, past research indicates that approximately 59% of airmen are not complying with FAA standards and are hiding their medical information from the FAA (Persaud & Bruggen, 2015).

It is the FAA’s opinion that the four currently approved medications are appropriate and offer the lowest chance of side effects for airmen. However, there are no provisions available for an airman who may not respond effectively to one of the four FAA-approved medications. In addition, the FAA does not agree with Australian findings in that those individuals who take medication for anxiety and/or depressive disorders are no more dangerous than those who have not been diagnosed with or suffer from a mood disorder. However, while the Civil Aviation Safety Authority (CASA) has made this determination, they too require applicants to apply for a special issuance medical (Werfelman, 2008). CASA certification standards are less restrictive than those of the FAA. In addition, the FAA does not appear to be aware whether its certification standards are more stringent than ICAO recommendations or other ICAO States certification standards. Furthermore, the FAA can deny a pilot applicant who successfully met initial certification requirements if the FAA believes the applicant’s past psychiatric history raises safety concerns.

The Civil Aviation Authority of the UK (CAA). The Civil Aviation Authority (CAA) of the UK was asked to respond to ten questions regarding its certification process, to evaluate standards set by ICAO, and evaluate certification standards used by other ICAO States. On behalf of the CAA, the Chief Medical Officer of the Safety and Airspace Regulation Group for the UK Civil Aviation Authority, provided the following responses (Table 2):

Table 2
CAA Responses to Survey Questions

CAA Survey Questions	CAA Responses (Chief Medical Officer of Safety and Airspace Regulation)
The FAA’s past and current certification process of airmen diagnosed with or suffering from, anxiety, depression, and taking an SSRI.	<i>“The UK CAA accepts Citalopram, Sertraline, Escitalopram as maintenance therapy for those pilots wishing to maintain their medical certification. This is in conjunction with psychiatric assessments, simulator checks and Medical Flight Tests dependent on the class of medical certification. An OML (Operational Multi Pilot) Limitation on the certificate is imposed until 6 months cessation of all treatment. The UK CAA does not make judgements [SIC] on other Aviation Authority certificatory decisions or their rationale behind their policy decisions.”</i>
Why did the CAA, if applicable, choose to change its opinion and the certification process for airmen diagnosed with, or suffering from, anxiety, depression, and/or taking an SSRI?	<i>“The UK CAA policy was amended 5 years ago when the EU Aircrew Regulation was implemented in the UK, permitting this policy.”</i>
What information does the CAA consider when making policy changes?	<i>“Any change in UK CAA policy regarding medical certification is undertaken following review of new evidence and research that may indicate a change is appropriate, in conjunction with expert medical opinion in the field. Full consideration is given to rationale behind the policy being reviewed and aviation safety implications.”</i>
Are there other options available to airmen should a specific medication or treatment option not be a viable solution for a given individual?	<i>“Current acceptable SSRI by the UK CAA are Citalopram, Sertraline and Escitalopram as maintenance therapy. No other psychotropic medication is permitted.”</i>
Are there other factors for the CAA that may result in denial of a medical application even	<i>“The guidance for medical certification can be found on the CAA website. If an applicant does not meet the requirements for</i>

though that airmen met and complied with the application process?	<i>initial/renewal or revalidation then a medical certificate cannot be granted.”</i>
Does the CAA have policies in place to ensure airmen compliance with new standards?	<i>“The CAA website provides the steps an applicant should follow to ensure compliance. The AMEs and CAA Psychiatrists are aware of this guidance and support the applicant in the steps to gain certification if appropriate.”</i>
Does the CAA estimate how many airmen are, or are not, complying with the certification standards?	<i>“It is for the applicant to notify their AME if there is any change in their medical fit status or medication regime. Any changes that are identified at a medical and have not been declared by the applicant are thoroughly investigated and action taken accordingly. Non-compliance estimates are not available.”</i>
The CAA was asked to evaluate a statement regarding individuals that take medication for anxiety and/or depressive disorders pose no significant safety risks.	<i>“The ICAO website states, ‘...In recent years, the use of SSRI (selective serotonin re-uptake inhibitors) has become widespread and there is indication that such treatment, aimed at preventing a new depressive episode, may be compatible with flying duties in carefully selected and monitored cases’. We agree with this statement.”</i>
The CAA was asked to evaluate whether, in their opinion, if CAA’s certification standards were more or less restrictive than ICAO’s recommendations.	<i>“The UK CAA adheres to EU regulations and cannot comment on the standards in other ICAO states”</i>
Any additional comments.	No additional comments were provided by the CAA of the UK.

Analysis of CAA responses. The CAA responses to the survey questionnaire demonstrate similarities as well as distinct differences in certification standards from those of the FAA. For example, while the CAA does not consider policy issued by other ICAO States in their decision-making process, they do review all current research and ICAO recommendations before implementing new policies; a policy the FAA stated they employ as well. The CAA is similar to the FAA in that they only allow certain approved medications to be used by certificated pilots. The CAA is not opposed to making changes in policy pending the information is supported by proven research. Therefore, while a provision does not exist for an applicant to use a non-approved medication, future research results may influence the CAA to change their current standards.

One specific area the CAA differs from the FAA is regarding how the CAA views ICAO’s statement that individuals who are treated for anxiety or depression, when properly medicated and monitored, pose no significant safety risks within the flight environment. The CAA agrees with ICAO’s statement which is also similar to the statement made by CASA. The FAA was asked to evaluate CASA’s statement and not ICAO’s. However, the FAA does not agree with these statements.

ICAO. The International Civil Aviation Organization was contacted by the researchers and asked to respond to five questions regarding the certification process for airmen suffering from, or diagnosed with, anxiety, depression, and/or taking an SSRI. The Chief of Aviation Medicine for ICAO explained the rulemaking process and ICAO opinions in the following response (Table 3):

Table 3
ICAO Responses to Interview Questions

ICAO Survey Questions	ICAO Responses (Chief of Aviation Medicine)
Does ICAO has an opinion regarding member State certification processes?	<i>“ICAO roles and responsibilities for a given topic may be both regulatory in nature as well as advisory. In addition, ICAO standards are compulsory, and ICAO States are required to comply with these standards. However, States have the authority to determine whether they will implement ICAO recommended practices, and each State may set their own guidelines There is no baseline for measuring mental health as there are with checking one’s blood pressure or cholesterol levels. Not every individual pilot will have similar positive results regarding treatment options.”</i>
How and when did ICAO decide to change the policy on the topic of mental health and pilots? In addition, what considerations does ICAO make before implementing new policies and guidance?	<i>“Before ICAO considers a topic such as mental health in aviation, ICAO may elect to evaluate a given subject on their own or take subjects under further consideration based on State recommendations. Once ICAO has evaluated research from other States, ICAO may elect to notify States of its intent to issue proposed rulemaking and guidance. However, any proposal requires a vote from all ICAO representative States.”</i>
Does ICAO offer guidance to States regarding what medications should be considered and approved?	<i>“ICAO is willing to defer much of the certification process and standards to the States when making a final determination regarding the airmen certification process. Some States have implemented additional requirements which are not ICAO recommendations. For example, some States require airmen to receive regular psychiatric evaluations and follow-up exams even with the successful demonstration of a prescribed medication. In addition, some States require either simulator or flight check to verify safety standards.”</i>
Does ICAO offer guidance to States for or require states to demonstrate pilot compliance with regulations?	<i>“ICAO does not offer guidance on which medications should be approved or recommended. Instead, ICAO defers to each State to conduct its own research and make the decision as to which medication it may be willing to approve for airmen use. ICAO advises each State that one must understand the underlying reason a given medication was prescribed to an airman. Each State’s primary concern should be aviation safety and whether a prescribed medication can interfere with or reduce safety margins within the flight environment.”</i>
Does ICAO maintain statistics pertaining to compliance for a given ICAO State?	<i>“Initially, ICAO did not enforce, or require States to demonstrate or provide percentages of compliance or treatment success rates of airmen. However, in 2016, ICAO asked States to begin tracking statistical data to identify how many accident and incidents occurred as a direct result of an airman’s mental health and SSRI use. ICAO intends to use this data to conduct further research on the subject and unify certification standards at some point in the future.”</i>

Analysis of ICAO responses. Lastly, the ICAO representative stated BasicMed has presented new challenges in the certification process. Europe, for example, now offers BasicMed which is similar to the certification program in the U.S. These programs have significant deficiencies in tracking and identifying pilots who have, or had, serious medical conditions. Currently, there is no adequate way to track these pilots, and additional ICAO States are expected to adopt similar BasicMed programs (A. Jordaan, personal communication, July 12, 2018).

Transport Canada. Transport Canada (TC) was asked to respond to questions regarding its certification process, evaluation standards set by ICAO, and certification standards used by other ICAO States. On behalf of Transport Canada, the Senior Consultant of Civil Aviation Medicine provided the following responses to the ten survey questions (Table 4):

Table 4
Transport Canada Responses to Survey Questions

Transport Canada Survey Questions	Transport Canada Responses (Senior Consultant - Civil Aviation Medicine)
The FAA’s past and current certification process of airmen diagnosed with or suffering from, anxiety, depression, and/or taking an SSRI.	<i>“Yes. Our guidelines state “initial applicants who are still on medications must be at a stable dose for at least 4 months without aeromedically significant symptoms/side effects before submitting a detailed report from their attending physician”.</i>
Why did Transport Canada, if applicable, choose to change its opinion and the certification process for airmen diagnosed with, or suffering from, anxiety, depression, and/or taking an SSRI?	<i>“Although TC guidelines were published online around 2010 we had considered and certificated some professional pilots (while taking an SSRI) for restricted flight (with an accompanying pilot) since at least 2004. One argument was that by then many pilots were already taking maintenance doses (sometimes for years after successful treatment of an acute depression) but not declaring this use since they would be grounded until the current policy was adopted.”</i>
What information does Transport Canada consider when making policy changes?	<i>“When TC changes a policy (such as treatment for anxiety and depression) prior to making a decision we consider our experience and convene workshops involving all of our aviation medical officers (who are aerospace medicine specialists) as well as relevant clinical practitioners. In addition, we review ICAO and international aviation medicine practice and guidance.”</i>
Are there other options available to airmen should a specific medication or treatment option not be a viable solution for a given individual?	<i>“When our guideline was published we were considering only Prozac (fluoxetine), Zoloft (sertraline), Wellbutrin (bupropion), Celexa (citalopram), and Ciprolex (escitalopram). Note that we never direct treatment but assess applicants ‘as they are’. We have since considered and approved some applicants using other medications (such as venlafaxine and duloxetine).”</i>
Are there other factors for Transport Canada that may result in denial of a medical application even though that airmen met and complied with the application process?	<i>“TC will assess and reassess as necessary when the clinical state changes (or when our policy evolves). If a pilot or ATC develops aeromedically significant symptoms (e.g. depression) or side effects of medication (e.g. drowsiness) then they are prohibited from exercising the privileges of any license until we have re-assessed their case.”</i>
Does Transport Canada have policies in place to ensure airmen compliance with new standards?	<i>“To ensure that all certificated pilots comply with the required regulations regarding anxiety, depression, and SSRIs, TC carefully monitors the physician reports, simulator ride or operational assessment reports and SSRI questionnaires that must be submitted in addition to the aviation Medical Examination Reports (MER) that are required annually in these cases.”</i>
Does Transport Canada estimate how many airmen are, or are not, complying with the certification standards?	<i>“Of the (approximately 100 current) pilots and ATC recently assessed in the SSRI program, a small number have been administratively suspended under when they have been delinquent in submitting required reports. Most of these have been reinstated once the requested documents have been provided. Fewer have been re-assessed as unfit because their condition has deteriorated. It is more difficult to estimate the number of aircrew who have</i>

	<i>failed to disclose relevant clinical information (including all medications taken) during their MERs. Sometimes these pilots/ATC may be reported by their own physicians as required when a medical condition is likely to constitute a hazard to aviation safety under the Aeronautics Act 6.5.”</i>
Transport Canada was asked to evaluate a statement from ICAO regarding individuals that take medication for anxiety and/or depressive disorders pose no significant safety risks.	<i>“TC would agree that some pilots taking medication for anxiety and/or depressive disorders pose no significant safety risks, depending on the medication/side-effects, psychiatric history (e.g. depression must be in stable remission after adequate treatment) and with careful (aviation) medical assessment.”</i>
Transport Canada was asked to evaluate whether, in their opinion, if Transport Canada’s certification standards were more or less restrictive than ICAO’s recommendations.	<i>“Since most ICAO states still ground most if not all aircrew using SSRIs for any reason TC is less restrictive in practice. TC does this by assessing each applicant individually and applying appropriate flexibility in accordance with ICAO standard (Personnel Licensing) and our own ‘flexibility’ regulation.”</i>
Any additional comments.	<i>“Canada was one of the first countries to permit antidepressant usage by professional pilots, and our experience supports continued use. Civil Aviation Medicine (CAM) will consider individual circumstances and apply flexibility to allow certain applicants using SSRI anti-depressants to exercise the privileges of licensure (such as flying with an accompanying pilot).”</i>

Analysis of Transport Canada responses. The responses from the consultant indicate that Transport Canada has a different approach than other ICAO States regarding pilots and mental health. While Transport Canada reviews recommendations by ICAO, they also consider medical research and practices from the international community as well. This differs from the FAA’s response in that the FAA only considers ICAO guidance and not policy or opinion from other ICAO states.

While exact numbers are not available, Transport Canada acknowledges that some of their airmen have successfully been taking medications and receiving treatment options without notifying Transport Canada due to fear of being grounded by the agency. In addition, some have received violations for not adhering to regulatory compliance requirements. However, the agency hopes that these pilots will eventually come forward with the adoption of new policies and certification standards. Transport Canada initially only approved Prozac, Zoloft, Wellbutrin, Celexa, and Cipralex for airmen use. The consultant also cautioned that the agency never directs treatment. Instead, they evaluate conditions and recommendations made by the appropriate medical physician. In some cases, medication outside of those currently approved by Transport Canada has been allowed within specific guidelines.

Transport Canada believes their certification standards and policies are often less stringent than those of other ICAO States. Several ICAO States still ground applicants for mood disorders and SSRI use even though those applicants may meet certification requirements. This is regardless of whether that applicant demonstrated a successful trial period of an approved medication. While Transport Canada does not entirely agree with ICAO’s statement of low-risk SSRI users, they do agree that some pilots pose a lower safety risk.

Swedish Transport Agency (STA). The Swedish Transport Agency (STA) was asked to respond to questions regarding its certification process, evaluation standards set by ICAO, and

certification standards used by other ICAO States. On behalf of the Swedish Transport Agency, the Medical Assessor & Deputy Head for Aviation Personnel provided the following responses to the ten survey questions (Table 5):

Table 5
The Swedish Transport Agency (STA) Responses to Survey Questions

STA Survey Questions	STA Responses (Medical Assessor & Deputy Head for Aviation Personnel)
The FAA’s past and current certification process of airmen diagnosed with or suffering from, anxiety, depression, and/or taking an SSRI.	<p><i>“I do not share your opinion that FAA is more stringent making aeromedical assessments. In Europe we work closely together with EASA and interact with ongoing rulemaking activities in this field (after the Germanwings catastrophe). Professional pilots in Sweden suffering from depression are all thoroughly evaluated on an individual basis, usually also reviewed by our own (authority) expert in psychiatry. We require a cognitive assessment before return to duty can be considered. In some cases approval with medication can be granted after simulator check and with limitation OML.”</i></p> <p><i>“You should look at both the consolidated implementing rules (Part-MED) and the AMC + GM. Psychiatry is MED.B.055 but will soon be renamed mental health. With this link you can find the EASA rules we work within Europe. We also use national guidelines (together with Norway) and frequently follow the UK CAA flow charts. We are quite restrictive with moderate depressions, especially if there is a history of repeated illness, and require complete resolution of symptoms (usually an observation time of 3-6 months for professional pilots) before considering a new assessment.”</i></p>
Why did the STA, if applicable, choose to change its opinion and the certification process for airmen diagnosed with, or suffering from, anxiety, depression, and/or taking an SSRI?	
What information does the STA consider when making policy changes?	
Are there other options available to airmen should a specific medication or treatment option not be a viable solution for a given individual?	
Are there other factors for the STA that may result in denial of a medical application even though that airmen met and complied with the application process?	
Does the STA compliance with new standards?	
Does the STA estimate how many airmen are, or are not, complying with the certification standards?	
The STA was asked to evaluate a statement from ICAO regarding individuals that take medication for anxiety and/or depressive disorders pose no significant safety risks.	
The STA was asked to evaluate whether, in their opinion, if Transport Canada’s certification standards were more or less restrictive than ICAO’s recommendations.	
Any additional comments.	

Analysis of STA responses. It was the opinion of STA Medical Assessor & Deputy Head for Aviation Personnel that the FAA’s certification standards were not more stringent than those of the ICAO or other ICAO States. The STA sets their certification protocol based on European (EASA) standards and follows medical guidance issued by the Civil Aviation Authority of the UK. STA applicants are evaluated on a case-by-case basis and are often re-evaluated by an STA

psychology expert. Should an applicant have moderate levels of depression, or a history of repeated illness; the STA is more restrictive in certifying that applicant. While the STA follows guidance issued by the CAA, their practices appear to be more restrictive than those of the FAA and other ICAO States who participated in this research study.

Group I: Common Themes Identified Across Agency Responses

Four out of eight agencies responded to the invitation to participate in this research study; however, the Swedish Transport Agency (STA) representative only offered a brief opinion rather than provide answers to each specific survey question. Of the three participating agencies, 66% stated they do not compare standards of other countries when making decisions to change policy. Only Transport Canada stated they consider both ICAO and other ICAO State opinions before making decisions. While the FAA indicated they do not consider other ICAO State information, research indicates that the FAA has considered Australia and other ICAO State opinions before making policy changes (FAA, 2010).

In addition, 66% of the participating agencies stated that no alternative options exist for an applicant should a particular SSRI treatment option not be effective. However, Transport Canada stated that while they use certain SSRIs that are approved for airmen, they would consider allowing an applicant to use another method of treatment with sufficient evidence supporting its safety and effectiveness. The FAA was not asked to evaluate ICAO's statement that airmen who take an SSRI will have no significant safety risk. However, they were asked to evaluate a Civil Aviation Safety Authority (CASA) opinion that individuals taking SSRIs are no more dangerous than those who have not been diagnosed or treated with a disorder. The FAA did not agree with this statement.

Agency participants were asked to evaluate ICAO's statement regarding SSRI medicated pilots and significant safety risks. Approximately 33% agreed that airmen prescribed an SSRI may no longer be considered a safety risk, while approximately 33% agreed with the statement only some of the time. Of the three participating agencies, 66% stated that they have policies in place that encourage airmen to comply with current certification standards. However, 66% of participants also stated that they have no effective means to ensure airmen compliance, and none of the agencies stated they have estimates of how many airmen are not complying with the standards.

ICAO defers final authority of airmen medical certification to the individual ICAO States, and ICAO provisions allow for each State to develop and implement more stringent standards. ICAO issues recommended standards and practices for each State to use as guidance when developing standards; however, ICAO does not offer guidance regarding medication for mood disorders. This includes the length of any potential demonstration period. Beginning in 2018 or 2019, ICAO will require States to share their statistical data with ICAO regarding airmen compliance and accident rates. The primary reason for sharing data with ICAO is to unify the certification process requirements for all ICAO States, and determine what regulatory changes are necessary for global harmonization of policies.

Group II: Analysis of Survey Data

Group II participants were asked to respond to four survey questions (yes or no answer).

Pilot survey: Question 1. Prior to 2010, FAA regulation stated that pilots diagnosed with anxiety and/or depressive disorders were prohibited from exercising the privileges of pilot in command and obtaining a medical certificate. This also applied to those who may be taking medication as a treatment option for this disorder. In your opinion was this regulation adequate?

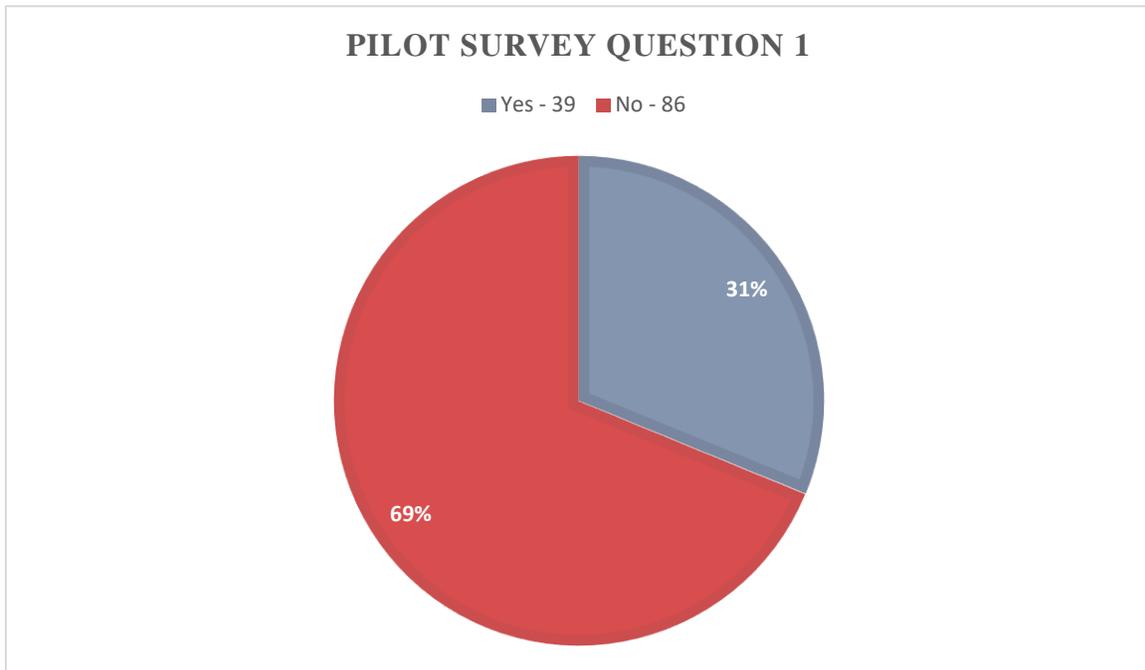


Figure 1. Pilot survey: Question 1 response results.

Analysis of pilot survey results: Question 1. Of the 148 respondents that participated in the survey, 125 completed survey question number one. Respondents were asked in their opinion if the FAA policy which prohibited individuals from flying and obtaining a medical certificate was adequate. Approximately 69% (86 participants) responded no that in their opinion the FAA's policies were not adequate, and those individuals did not agree with FAA views. Approximately 31% (39 participants) indicated that in their opinion FAA policy before 2010 was more than adequate. The results from survey question one may be an indicator that most of the U.S. pilot group, in total, would also agree with this statement, and find that the FAA policies were not adequate by prohibiting pilots from flying or obtaining a medical certificate due to suffering from a mood disorder.

Pilot survey: Question 2. In 2010, the FAA changed their certification standards regarding anxiety, depression, and treatment options. An applicant may be able to act as pilot in command and receive a medical waiver if one were to use an approved FAA medication. Certification required an applicant to show demonstrated use of the medication under the supervision of a psychiatric care physician for a period of twelve months. After twelve months an applicant may request a re-evaluation of their medical application by the FAA. An

application could be approved or denied. In your opinion, was this an adequate certification process?

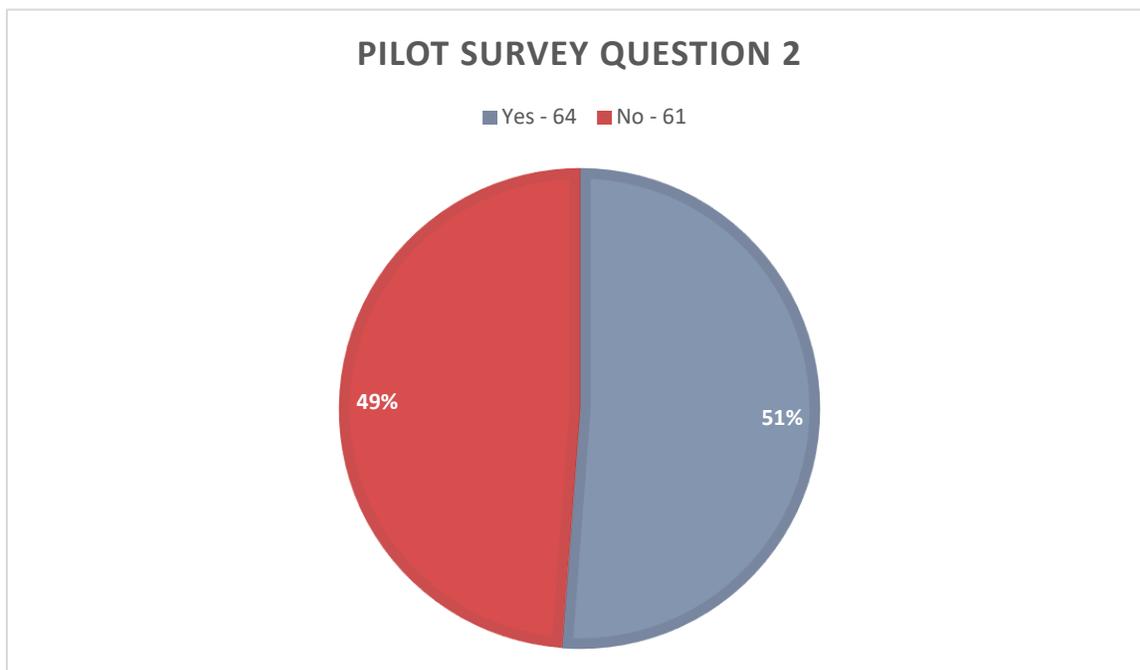


Figure 2. Pilot survey: Question 2 response results.

Analysis of pilot survey results: Question 2. Of the 148 respondents that attempted the survey, 125 completed question two. Respondents were asked that if in their opinion the FAA's policy, which prohibited individuals from flying and obtaining a medical certificate, was adequate after 2010. In many cases, an applicant was granted a medical certificate and could continue flying if certain conditions were met. Approximately 49% (61 participants) responded no that in their opinion FAA policies were not adequate, and those individuals did not agree with FAA views. Approximately 51% (64 participants) indicated that, in their opinion, FAA policy after 2010 was more than adequate. The results from survey question two may be an indicator that the U.S. pilot group, in total, could also be divided when evaluating this statement.

Pilot Survey: Question 3. In 2015, the FAA changed their certification standards regarding anxiety, depression, and treatment options. An applicant might be able to act as pilot in command and receive a medical waiver if one were to use an approved FAA medication. Certification required an applicant to show demonstrated use of the medication under the supervision of a psychiatric care physician. The demonstrated time frame was reduced from twelve to six months. After six months an applicant may request a re-evaluation of their medical application by the FAA. An application could be approved or denied. In your opinion, is this an adequate certification process?

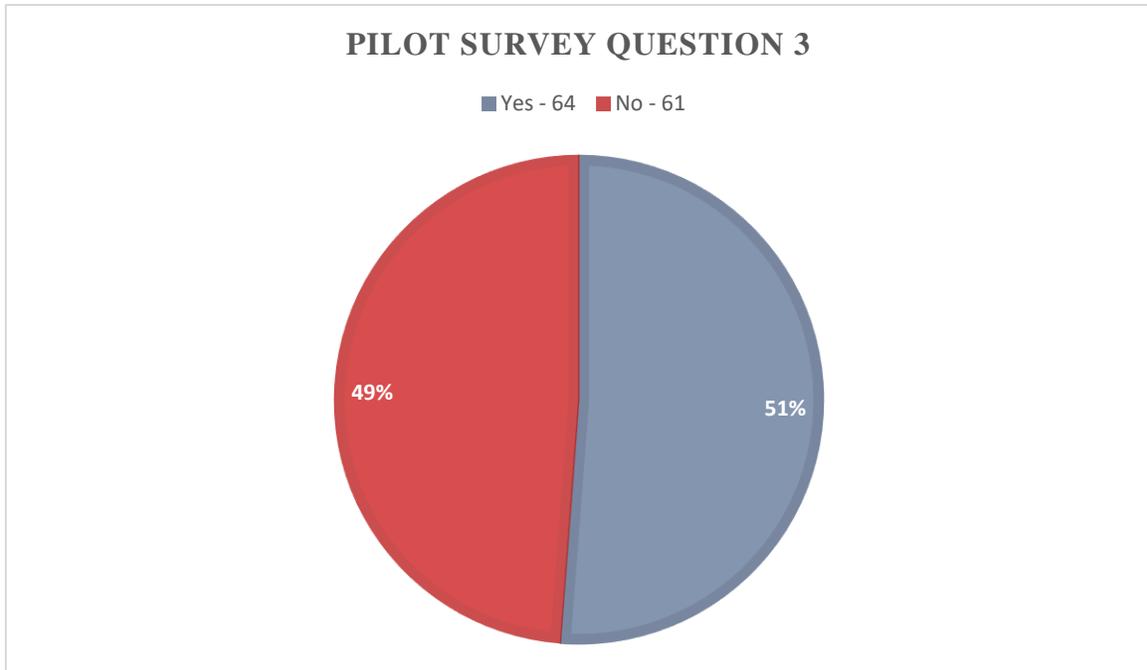


Figure 3. Pilot survey: Question 3 response results.

Analysis of pilot survey results: Question 3. Of the 148 respondents that attempted the survey, 125 completed question three. Respondents were asked, in their opinion, if the FAA policy which prohibited individuals from flying and obtaining a medical certificate was adequate after 2015. In many cases, an applicant was granted a medical certificate and could continue flying if certain conditions were met. Approximately 49% (61 participants) responded that in their opinion FAA policy was not adequate and indicated that those individuals did not agree with FAA views. Approximately 51% (64 participants) indicated that in their opinion FAA policy after 2015 was more than adequate. The results from survey question three may be an indicator that the U.S. pilot group, in total, could also be divided when evaluating this statement.

Pilot Survey: Question 4. As early as the 1980s, some ICAO States have allowed their pilots to use various medications to treat anxiety and/or depressive disorders. Australia, for example, is one of these States. Australia has a certification process that takes no more than thirty days. Moreover, the Australian Aviation Authority has concluded that individuals taking medication for anxiety and/or depressive disorders are no more dangerous than those who have not been diagnosed with, nor suffer from, anxiety and/or depression. Other ICAO States share a similar opinion with Australia regarding the certification process. Based on this information, when comparing it to how the FAA certifies U.S. pilots, do you find these certification standards are more reasonable than the FAA standards?

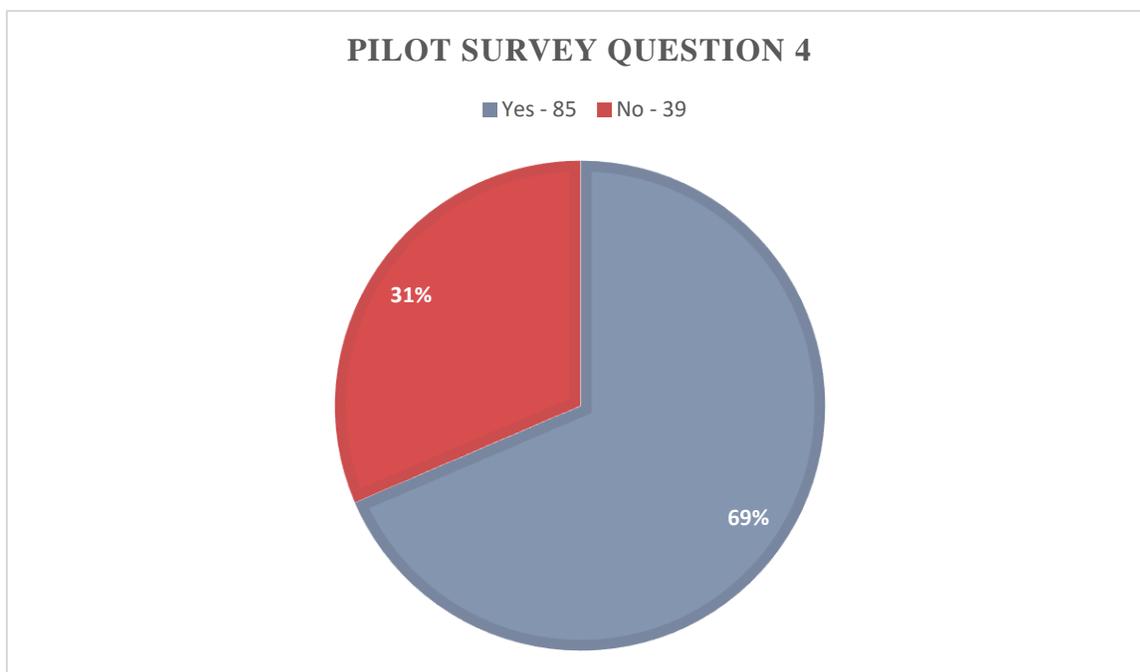


Figure 4. Pilot survey: Question 4 response results.

Analysis of pilot survey results: Question 4. Of the 148 respondents that attempted the survey, 124 completed question four. Respondents were asked to evaluate a statement made by the Civil Aviation Safety Authority (CASA) of Australia regarding the safety of airmen suffering from anxiety, depression, or taking medication. CASA research studies have indicated that those individuals being treated for a disorder are no more dangerous than individuals who do not suffer from or have been diagnosed with any disorders. ICAO and other ICAO States agree with the statement. In addition, participants were asked to compare this statement to the previous three questions regarding the FAA views on the subject before and after 2010. Participants were asked that, after reading this statement, if they found the FAA's current policy to be less reasonable than those of the international community. Approximately 69% (85 participants) agreed after reading the statement that in their opinion FAA policy was less reasonable and most likely not in line with international views on the subject. Approximately 31% (39 participants) indicated that current FAA policy was not more restrictive and more likely comparable to the international consensus on the subject. The results from survey question four may be an indicator that the U.S. pilot group, in total, could also agree with this statement

Group II participant mean responses. Survey results from Question 1 and Question 4 indicated that the majority of the sample group agreed that FAA policy and views before 2010 were inadequate when certifying airmen suffering from a mood disorder. In addition, when reviewing Australian and ICAO statements regarding the safety of airmen diagnosed with and/or seeking treatment options for anxiety and/or depression, a majority of the sample group found FAA views to be less reasonable when compared to the international community. In both cases, approximately 69% of the sample population found the FAA policies and views to be inadequate. Respondents were asked to evaluate FAA policy changes before and after 2010. In both instances, results were almost evenly split with approximately 51% of the group agreeing that FAA policy and views during this time were adequate, while approximately 49% disagreed.

Group III: Analysis of Survey Data

Non-aviation medical physician. Group III was comprised of one non-aviation medical physician who was asked to participate evaluate the FAA’s responses to questions asked in this research study. After reviewing FAA responses, the participating medical physician (family practice) was asked to answer eight questions and provide a medical opinion regarding the FAA’s certification process of airmen who suffer from, or have been diagnosed with, anxiety, depression, and/or taking an SSRI. The participant was asked to compare non-aviation medical standards and compare those standards to FAA responses when diagnosing patients. The survey questions and the physician’s responses are represented in Table 6.

Table 6
Non-Aviation Medical Physician Responses to Survey Questions

Non-Aviation Medical Survey Questions	Responses (Non-Aviation Medical Physician)
Do you agree with the FAA responses?	<i>“I agree that the shortened 6 month time frame is plenty of time to assess whether a medication has improved anxiety and depressive symptoms.”</i>
Can you provide an answer to why the FAA only allows four specific SSRIs for airmen?	<i>“I believe there is some basis to approving the four SSRIs approved. The four they have approved have a lower risk of sleepiness and fatigue. However, I believe this list could be expanded to add others to the approved list. There are some newer medications as well that should be safe.”</i>
Are there benefits to only prescribing the four types of FAA-approved SSRIs?	<i>“The four SSRIs approved are all very safe and widely used. I agree that these medications have a low side effect profile and generally work very well. I think the list could be expanded” to add other SSRIs as well as SNRIs and Wellbutrin.”</i>
Would the type of vehicle, equipment, or machinery influence the decision to prescribe a particular SSRI?	<i>“My decision to prescribe anxiety or depression medications would not be affected by someone operating heavy equipment, a motor vehicle, or anything larger than a passenger vehicle. However, I do warn people of the side effects of medication inducing sedation.”</i>
Before 2010, was the FAA correct in prohibiting airmen from flying with a mood disorder and/or taking medication?	<i>“Prior to 2010, pilots were unlikely to seek medication for anxiety or depression, because they might lose their license to fly. They often asked me about herbal supplements instead, such as Sr. John’s Wart (which has a potentially worse safety profile than SSRIs). I understand the need to regulate medications that might cause adverse effects to pilots, but I feel that pilots with uncontrolled depression or anxiety are a much riskier proposition. Also, because anxiety and depression are often felt short-term (6 months or less) and are often situational due to life stressors such as death, illness, or divorce, the FAA regulation prior to 2010 seemed unrealistic and unfair. Medication would often get symptoms under control in 4-6 weeks instead of waiting 6 months or so for symptoms to resolve on their own.”</i>
After 2010, was the FAA correct in requiring a 12-month demonstration period before certifying an airman suffering from a mood disorder and/or taking medication?	<i>“I believe the certification process to approve a pilot to act as Pilot in Command is more than adequate with a 12-month psychiatry follow up. I would not recommend the need for more than 12 months or care.”</i>

<p>After 2015, was the FAA correct in reducing demonstration periods from twelve to six months prior to certifying an airman suffering from a mood disorder and/or taking medication?</p>	<p><i>"I agree with the decision to reduce the time from 12 to 6 months for continued care. 6 months is more than adequate time to determine whether a medication is effective and to determine if adverse side effects are present."</i></p>
<p>Participants were asked to evaluate the 30-day demonstration period Australia requires for its pilots regarding certification after diagnosis and treatment for a mood disorder. Participants were also asked to evaluate Australia's statements that pilots being treated for a mood disorder were no more dangerous than those who did not suffer from, nor have been diagnosed with anxiety and/or depression. In addition, participants were asked to evaluate whether, in their opinion, if the FAA's certification standards were more or less restrictive than ICAO's recommendations.</p>	<p><i>"I think the FAA's more stringent guidelines for pilots should be relaxed somewhat. I think more medications should be considered safe to be used by pilots. The time frame could also be shortened to 3-6 months of treatment for mild depressive symptoms. I think that 30 days may be an inadequate amount of time to determine if therapy is working, so I think that more time should be given to determine efficacy."</i></p>

Analysis of physician responses. In evaluating the physician's responses, it seems they moderately agree with current practices in the aviation community. For example, the physician agreed that not all medications work for all patients, and a single medication cannot be considered a viable treatment option with every diagnosis. In addition, the physician agreed that the FAA reduction in demonstration time, implemented after 2010, was more appropriate for airmen. While the physician agreed that follow-up care is necessary, they did indicate that care beyond 12 months was not necessary. The physician's statement supported prior research, which indicated many mood disorders are often short-term, and the need for long-term treatment options are often unnecessary (Persaud & Bruggen, 2015).

Lastly, the physician did not agree with Australia's shortened demonstration period of four weeks. In their opinion, a three to four-month period is more than adequate to make proper dosage adjustments, change medications, and evaluate the potential for unwanted side effects. Nevertheless, prior research indicated that aviation medicine is specialized, and often non-aviation medical physicians are not aware of additional safety risks, or how a given medication may affect an individual when flying an aircraft (Ross, Griffiths, Dear, Emonson, & Lambeth, 2007; Stouff, n.d.).

Conclusion

Differences in Research and Certification Standards

An important issue discovered during this research study identified the lack of unification between ICAO States and certification standards. In an interview with the Chief of Aviation Medicine for ICAO, the representative indicated that each ICAO State has the flexibility to create its own certification standards based on their research and local laws. States are encouraged, but not required, to review other State research and certification standards before developing their own. States are also encouraged to review ICAO recommendations and guidance in addition to reviewing industry research and recommendations. Because of differences across the international community, some State's may elect to use programs like BasicMed which stray away from normal medical certification standards for a given state. Furthermore, State demonstration periods, preferred or allowed medications, or the use of flight

or simulator evaluations may vary significantly from one region to another (A. Jordaan, personal communication, July 12, 2018).

A concerning discovery during this research study was the discontinuity in FAA views. In 2010, the FAA issued a press release which stated they considered views from industry leaders such as ICAO, the Aerospace Medical Association (AsMA), the Airline Owners & Pilots Association (AOPA), and other ICAO States prior making policy changes (FAA, 2010). The FAA issued guidance for special issuance of medical certificates for airmen and SSRI use during the same month as the press release. In the guidance, the FAA stated they reviewed procedures and views of the U.S. Army, Transport Canada, ICAO, Australia (CASA), the ALPA, and others in making their decision to change policy (FAA, 2010). Recently, the AOPA published an article also citing that the FAA considers research and recommendations from AsMA, Transport Canada, Australia (CASA), ICAO, the AOPA, the ALPA, and the U.S. Army (Diamond, 2018). However, despite these publications, the FAA indicated in this research study they do not consider other recommendations before making policy decisions.

Interpretation of Research Questions

- RQ1 - Are the FAA's certification standards for pilots suffering from anxiety and/or depressive disorders too stringent, limited, or outdated when compared to ICAO or other ICAO States?
- RQ2 - Are the FAA's certification standards for pilots taking SSRIs as a treatment option for anxiety and/or depressive disorders too stringent, limited, or outdated when compared to ICAO or other ICAO States?
- RQ3 - Can medical physicians outside the FAA provide additional support regarding the adequacy or inadequacy of pilot certification standards for those suffering from anxiety, depression, or who are using SSRIs?
- RQ4 - How does the U.S. pilot population view FAA certification standards on the subject of SSRIs, anxiety, and depressive disorders?

Research questions 1 & 2. Regarding RQ1, the researchers conclude that based on comparisons with ICAO and other ICAO States, the FAA was not more restrictive in its certification standards before 2010. In addition, the researchers conclude that the FAA is not more restrictive in its current certification standards when compared to ICAO and other ICAO States. Regarding RQ2, the researchers conclude based on comparisons with ICAO and most ICAO States that the FAA has similar viewpoints to those who participated in this research study. However, when comparing these standards with one of the participating ICAO State, Transport Canada, the researchers conclude that the FAA is limited in not allowing, or considering, alternative treatment options for those who may not benefit from one of the approved FAA medications.

Research question 3. The data results from research question three (RQ3) indicated that non-aviation medical physicians may not entirely agree with earlier FAA guidelines for airmen medical certification standards; however, non-aviation physicians may favor the FAA's recent policy revision that reduced the certification period to six months. The physician participating in this study did not indicate in their responses if the six-month certification time was excessive.

However, they did state that the new and revised timeframe was more reasonable. The physician also indicated that three to four months was an appropriate timeframe to identify any potential problems regarding the treatment of airmen. This timeframe is similar to the UK and Canadian certification standards (Presenter, Hutchinson, 2013; Transport Canada, 2018).

The researchers concluded that non-aviation medical physicians may not have agreed with earlier FAA medical certification standards. However, non-aviation medical doctors may agree with the certification standards revised after 2010. Yet, non-aviation medical physicians may not agree with the FAA's limited views regarding the approval of only four SSRI medications. While these medications are known for their effectiveness and low risk of side effects, they may not be effective for every pilot diagnosed with a mood disorder. Therefore, the FAA should be more willing to consider additional medications or alternative treatment options.

Research question 4. The responses to RQ4 indicated that most of the participating pilots agreed that FAA medical certification standards were too stringent; especially after evaluating Australian and ICAO statements regarding airmen, mood disorders, and SSRI use. While the results of the pilot survey regarding FAA views during and after 2010 varied, it is unknown to the researchers how many participating pilots: (1) were taking an SSRI; (2) have been denied a medical certificate; (3) have successfully obtained a medical waiver; (4) were taking non-approved medications; and/or (5) suffered from a mood disorder but elected not to seek treatment options. This research study did not evaluate these variables to determine whether one or more of them may have been a factor in a pilot's responses. However, based on the data collected for this study, the researchers conclude that the majority of the participants agree that FAA certification standards were too stringent before 2010. Most participants believed FAA certification standards revised in 2010, and after, were sufficient and reasonable.

Recommendations

Recommendation 1. Based on the findings of this study, the researchers recommend the FAA implement an improved tracking procedure regarding compliance, accident rates, and the effectiveness of treatment among airmen. This recommendation will be more in-line with ICAO recommendations and requirements to track medical information better.

Recommendation 2. Prior research has indicated that in order to make more informed decisions, multiple disciplines need to work collaboratively to develop conclusions and recommendations when addressing aviation safety and psychological medications (Nicholson, 2003). Aerospace and conventional medical practices are significantly different. Those who practice aerospace medicine focus on the general safety and health of those operating in the flight environment, whereas general and psychiatric care practitioners may not understand the effects of medication and human physiology in flight (A. Jordaan, personal communication, July 12, 2018). The researchers recommend future studies and contributions across multiple disciplines to achieve a safe and viable solution for treatment options. While studies have been conducted regarding SSRI use and aviation safety, there has not been a significant amount of research conducted across multiple disciplines to demonstrate a definitive link whether SSRI use in airmen has any detrimental effects on aviation safety (Ross et al., 2007).

Recommendation 3. Programs such as BasicMed are currently being used by a few countries and have known loopholes in the system regarding tracking medical history and identifying potential problems in pilots. ICAO has concerns that airmen certified with BasicMed are not being adequately tracked, and governing authorities may not understand the breadth of the medical condition for a given airman (A. Jordaan, personal communication, July 12, 2018). Therefore, the researchers recommend that ICAO thoroughly review State alternative medical certification programs such as BasicMed. ICAO should develop recommended standards, practices, and policies that States can or should follow when implementing alternative certification and treatment programs. This should also include plans for implementing an acceptable tracking system for these programs.

Recommendation 4. The researchers recommend the FAA consider additional medications or treatment options for applicants. In addition, the FAA should consider modeling a program similar to that of Transport Canada. For additional medications to be considered and accepted by the FAA, more research will be required. ICAO does not offer guidance or make recommendations to other ICAO States regarding medications. Therefore, the researchers recommend that ICAO consider issuing further guidance for States that focuses on approving medications and viable treatment options. The researchers also recommend ICAO emphasize the importance of States reviewing research conducted by industry organizations such as AsMA, and other State research initiatives.

Recommendation 5. The researchers recommend that collaboration across multi-state agencies and ICAO is necessary to devise an acceptable data tracking system to help evaluate accident rates and pilot compliance with medical certification and reporting standards. System unification should be required, and this data will also assist in further research initiatives and the administration of policy. Results from this research study have indicated that understanding the breadth of non-compliance among pilots as an issue. Furthermore, ICAO has valid concerns regarding programs such as BasicMed which lack a tracking system or a governing body's ability to be made aware of certain medical conditions.

Future Research & Concluding Remarks

It may take several years to develop viable solutions to many of the issues and concerns presented in this research study. For future success, it is the researchers' opinion that the FAA will need to demonstrate more openness not only with internal changes but in recommended practices from ICAO and other ICAO States. Pilots have a fear of potentially losing medical and flight privileges, which could bring an end to a career. Thus, it is understandable that apprehension causes individuals to contemplate non-disclosure of medical information.

This research study has identified the need for continued research regarding mood disorders in aviation. This research study also identified the need for expanded population samples as well. For example, roughly 21% of the preferred sample pilot population participated in this study. Furthermore, due to time and availability, only one non-aviation medical physician was able to participate. Future research will assist in identifying whether the results of this study can be observed across a broader spectrum of participants.

The FAA, ICAO, and other ICAO States have always made the concerted effort to improve safety in the aviation industry. These agencies continue to encourage pilots to come forward with known medical issues including mood disorders. However, there has to be greater assurances that the agencies are not solely interested in punishing individuals for suffering from any medical condition. As noted by Dr. Anthony Evans and Dr. Sally Evans, creating policies aimed at effective treatment and monitoring those taking antidepressants is far better than those which penalize and ground pilots for seeking or requiring treatments (Werfelman, 2008).

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