Journal of Depression and Anxiety
ISSN: 2167-1044

Lewis et al., J Depress Anxiety 2015, 4:2
DOI: 10.4172/2167-1044.1000177

Review Article Open Access

Aircraft-Assisted Pilot Suicides in the United States, 2003-2012

Russell J Lewis*, Estrella M Forster and James E Whinnery

Forensic Toxicology Laboratory, Civil Aerospace Medical Institute, Federal Aviation Administration, USA

***Corresponding author:** RJ Lewis Bioaeronautical Sciences Research Laboratory, Civil Aerospace Medical Institute, AAM-610, Forensic Toxicology Laboratory, Federal Aviation Administration 6500 S. MacArthur Blvd Oklahoma, USA, Tel: 405-954-6174; Fax: 405-954-3705; E-mail: russell.j.lewis@faa.gov

Rec Date: January 17, 2015; **Acc Date:** Feb 27, 2015; **Pub Date:** March 2, 2015

Abstract

This paper is a 10-year review (2003-2012) of aircraft-assisted pilot suicides and is a follow up to our previous 1993-2002 review. From 2003-2012, there were 2,758 fatal aviation accidents; 8 were aircraft-assisted suicides (intentional crashing of aircraft). This is half of what we found in our previous 10-year review. All pilots involved in these suicides were male (median age 46, range 21-68). The pilot was the sole occupant in 7 of the 8 suicide aircraft. Ethanol and/or drugs were detected in 6 of the 7 pilots tested. Based on the limited accidents conclusively attributed to suicide, death by the intentional crashing of an aircraft is an infrequent and uncommon event and has declined compared to the previous 20 years.

Keywords: Aviation-assisted suicide, Toxicology, Aircraft accident investigation

Introduction

Flying continues to be the safest mode of transportation in the United States [1] (ICAO Safety Report 2014 Edition). This can be attributed to safety oversight, aircraft maintenance, and the aviation medicine certification processes. Pilots have a special relationship with flight, and the aircraft is often felt as a simple extension of the pilot. With such a relationship, the mental well-being of a pilot is paramount to his/her flight safety. During times of excessive stress, pilots predisposed to self-destructive behaviors may display these behaviors during flight.

Aircraft-assisted suicides are tragic, intentional events that are hard to predict and difficult to prevent. Factors involved in aircraft-assisted suicide may be depression, social relationships, and financial difficulties, just to name a few. Suicide attempts almost always result in pilot fatality; they also have the unfortunate potential to cause collateral damage to property and life.

Our laboratory has long been interested in epidemiological and toxicological findings from aircraft-assisted pilot suicides. This study is a 10-year review (2003-2012) of aircraft-assisted pilot suicides and is a follow up to our previous (1993-2002) aircraft-assisted pilot suicide review [2].

Methods

Information pertaining to case history, accident information, and probable cause(s) of aviation accidents were available either through the National Transportation Safety Board (NTSB) or the Federal Aviation Administration (FAA). The NTSB's database can be accessed online at www.ntsb.gov/aviationquery/index.aspx. Our laboratory gathered medical and toxicological information on all civil aviation fatalities that were determined by the NTSB to result from aircraft-assisted pilot suicide. Other information related to the accident and the airmen's medical certification were obtained from the Document Imaging and Workflow System (DIWS) of the FAA's Civil Aerospace Medical Institute (CAMI), which records aeromedical information and flight experience, as reported by the pilot to the aviation medical examiner (AME) at the time of the medical examination, which is part of the medical certification process [3]. Postmortem specimens collected from pilots involved in civil aviation accidents are analyzed at the CAMI Forensic Toxicology Research Laboratory [4]. Toxicological information for each suicide case was obtained from CAMI's ToxFlo toxicology database [5].

Case Histories

A summary of events surrounding each aircraft-assisted suicide is presented below. No evidence of aircraft mechanical problems was found in any of the accidents.

Case 1

A 26-year-old pilot rented a Cessna172P, requested permission, and was cleared to taxi and takeoff. Following this communication, the pilot did not acknowledge any further air traffic controller communication. Shortly after takeoff, the pilot made approximately four 360-degree turns to the left. The airplane then descended and impacted a wooded area (at approximately 1751 hrs – daylight, 30 minutes before sunset). The dispatcher at the rental company said that the victim did not appear to display any abnormal behavior prior to the accident. Toxicological examination found no drugs in the pilot's system. The District Medical Examiner ruled the manner of death as a suicide. Otherwise, there was no supporting information concerning the suicide.

Case 2

A 45-year-old pilot departed the airport in a Piper PA-28-235. Shortly after takeoff, witnesses observed the plane fly straight into the ground (at approximately 0739 hrs– daylight, 1.5 hours after sunrise). The pilot had a long history of depression. He had been hospitalized twice for psychiatric problems. Three days prior to the accident he was hospitalized due to a suicide attempt. The day before the accident, he was released from the hospital. The pilot did not report any of the past

psychiatric issues to the FAA. Toxicological examination revealed the presence of antidepressants (citalopram and fluoxetine), diphenhydramine (a sedating antihistamine), and ethanol.

Case 3

A 69-year-old pilot with an intermittent history of drinking and threatening suicide by aircraft, was seen consuming alcoholic beverages at a restaurant at lunch that day. Later that evening he took his Beechcraft A36 out for a flight and collided with the side of a mountain (at approximately 1958 hrs – dusk, 20 min after sunset). Witnesses reported that the accident plane was circling a mountain and then flew directly towards the mountain. Radar indicated 5 counterclockwise circles, followed by a rapid descent into the mountain on the sixth circle. Toxicological examination identified ethanol in the brain and muscle.

Case 4

A 21-year-old pilot was celebrating his 21st birthday at the home of close acquaintances of the pilot. During his birthday party, he became aware that the couple's daughter did not want to pursue a relationship with him. Upset, he departed the party for the neighboring town, where he lived and was employed as a helicopter flight instructor. While his place of employment was closed, he procured a helicopter (Robinson R44) and flew back to the town where his birthday party was underway. He called his friends and said he was going to commit suicide. The helicopter crashed into an open field (at approximately 0015 hrs – dark). A suicide note was found in the pilot's apartment. Toxicological examination identified diphenhydramine and high levels of ethanol in the blood, vitreous, muscle, and brain.

Case 5

A 47-year-old student pilot was involved in a custody dispute over a minor child following a recent divorce. The student pilot and minor child departed the airport in a Cessna 150. After approximately 1.5 hrs of flight, the aircraft appeared to be returning to the airport. According to witnesses, just prior to the airport, the airplane entered a steep dive into the ground (at approximately 1035 hrs – daylight). The aircraft crashed into the pilot's ex-mother-in-law's house, killing both the student pilot and the minor passenger. Toxicology revealed no drugs in the pilot's system. According to FAA regulation 14 CFR Part 61.89 [6], a student pilot is prohibited from acting as pilot-in-command of an aircraft carrying passengers. The event was handled by the State Police as a murder/suicide homicide investigation.

Case 6

A 25-year-old pilot was distraught over the recent breakup with his girlfriend. Early one morning the pilot, sounding inebriated, told her that he was going to commit suicide in his aircraft. Shortly thereafter, the pilot took a Cessna P206 from his place of employment, where he worked as a pilot. Following an extended flight (approximately 5 hrs), the pilot crashed the aircraft (at approx. 1022 hrs–daylight). Visual meteorological conditions prevailed at the time of the accident. Toxicology testing revealed citalopram, clonazepam metabolite (antianxiety medication), and ethanol in his system.

Case 7

A 53-year-old pilot was experiencing business and personal issues with the Internal Revenue Service (IRS) and other government agencies. Angry at the IRS, the pilot intentionally flew a Piper PA-28-236 into an office building (at approximately 1022 hrs – daylight), killing himself, an employee in the building, and injuring 13 other employees. A suicide note was published on the Internet. Toxicology testing revealed no drugs in the pilot's system.

Case 8

A 48-year-old pilot had been experiencing difficulties in his personal life and had expressed suicidal thoughts. The pilot ditched a Cessna 172B, which was substantially damaged following impact with the Atlantic Ocean (at approximately 0430 hrs – night). A suicide note was found inside the pilot's automobile which was parked in the aircraft's hangar. While part of the aircraft was recovered, the pilot's remains were not found.

Results and Discussion

The NTSB is responsible for investigating civil aviation accidents and for determining the probable cause(s). It may be difficult to differentiate between a suicidal and an unintentional aviation accident when considering that the circumstances surrounding such accidents can be virtually indistinguishable. In order for the NTSB to assign suicide as the probable cause of an aviation accident, it must have significant supporting evidence, such as a suicide note, a witness, or suicidal ideation. With this in mind, aircraft-assisted suicides are most likely under-reported and under-recognized; however, Bills et al. has found that aviation crashes caused by suicide differ from unintentional aviation accidents in pilot characteristics, crash circumstances, and outcomes [7]. For the purpose of this study, we examined only aviation fatalities that were reported by the NTSB as suicide.

It is uncertain wherefrom the term "suicide" originated; most records have attributed it to Sir Thomas Brown, who coined it in 1643, probably from the Latin sui – of oneself and caedere – to kill, as presented in the authorized publication of his work, Religio Medici [8,9]. There are numerous definitions of suicide, ranging from "the act of killing one's self" to the one latest proposed as "an act with fatal outcome, which the deceased, knowing or expecting a potentially fatal outcome, has initiated and carried out with the purpose of bringing about wanted changes" [10]. The World Health Organization defines a suicidal act "as the injury with varying degrees of lethal intent and suicide may be defined as a suicidal act with fatal outcome" [10]. Durkheim, one of the best known early researchers on suicide, defined suicide as "death resulting directly or indirectly from a positive or negative act of the victim himself, which he knows will produce this result" circa 1897 [10]. Lately, suicide has also been referred to as intentional self-harm and self-directed violence.

In 2010, there were 38,364 suicides in the United States, accounting for 1.6% of all deaths [10-11]. This number exceeded deaths from motor vehicles; 33,687 in 2010. From 2003-2012, there were 2,758 fatal aviation accidents, 8 of which were reported by the NTSB as being suicide as the probable cause. Therefore, aviation accidents resulting from intentional pilot crashing are not common and accounted for 0.29% of all fatal aviation aircraft accidents from 2003-2012. The suicide rate by aircraft is much lower than the overall suicide rate in the US. Ungs reported that aircraft-assisted suicide in the United States over the years 1979-1989 was 0.17% (10 out of 5,929) of all fatal

general aviation accidents [12]. Our previous study of aircraft-assisted suicides from 1993 – 2002 found that 0.44% (16 out of 3,648) of all fatal aviation accidents were conclusively attributed to suicide. The rate of aircraft-assisted suicides, compared to all fatal aviation accidents of 0.29% (for 2003-2012), is higher than the one found in Ungs' study [12], but lower than our previous 10-year study. With the suicide numbers being so low compared to the total number of fatal aviation accidents, just a few accidents determined not to be "conclusive" as suicide can make a large difference in the final percentage attributed to suicide. For example, 5 other aircraft accidents occurred during the 2003-2012 period were identified where the NTSB investigation process considered suicide as a potential cause of the accident, but the evidence was insufficient to assign it as such.

An interesting finding is the total number of aviation accidents have substantially decreased from 5,929 (11-year period: 1979-1989) to 3,648 (10 years: 1993-2002) to 2,758 (10 years: 2003-2012); a decrease of 32% between the first (10 year averaged) and second study, and a decrease of 24% between the second and current study.

Year	Aviation-assisted suicides	Fatal general aviation accidents*
2003	3	343
2004	0	304
2005	0	291
2006	1	276
2007	2	264
2008	0	258
2009	0	251
2010	1	260
2011	0	258
2012	1	253
Total	8	2,758
*Data obtained from ToxFlo toxicology database.		

Table 1: Comparison of aviation-assisted suicides versus total fatal aviation accidents per year (2003-2012)

The frequency of suicide by year from 2003 - 2012 is presented in Table 1. Three of the 8 (38%) aircraft-assisted suicides occurred in 2003, while no cases were identified in 2004, 2005, 2008, 2009, or 2011.

All suicide flights in this study were operated as general aviation, 14 CFR Part 91. All aircraft used in these suicides were predominantly single-engine, fixed-landing gear aircraft, and consisted of 4 Cessna, 2 Piper, 1 Beechcraft, and 1 Robinson helicopter. All of the pilots involved in these aircraft-assisted suicides were male, with a median age of 46 years (range 21-68, mean 42 ± 16 years). The pilot was the sole occupant in all but 1 of the aircraft. The findings of this study are similar to those found by Ungs [12] and our previous study [13]. Ungs reported that all of the aviation-assisted suicides were operated under general aviation flight rules, and that all the suicide victims were male, with a median age of 36 (range 29-87). Lewis et al. also found that all of the aviation-assisted suicide flights were operated under general aviation flight rules, and all the suicide victims were male, with a median age of 40 years (range 15-67).

Five of the 8 suicides occurred in the daylight hours (0739, 1022 (x2), 1035, and 1751 hrs) and 3 at night (0015, 0430, and 1958 hrs). The most frequent days for suicide were Monday or Tuesday (n=5). There did not appear to be a seasonal preference for the suicides, and the weather was unremarkable; visual meteorological conditions prevailed on all flights.

Six of the 8 airmen (75%) had thought of suicide, talked about suicide, attempted suicide before, and/or left a suicide note. Specifically, 5 had expressed recent thoughts of suicide (63%), 4 (50%) left a suicide note, and 1 had previously attempted suicide (13%). Also, 7 of the 8 victims (88%) had experienced domestic problems (88%), criminal issues (13%), and/or depression (25%) prior to their suicide. Table 2 summarizes these results.

All 8 airmen were medically certified for flight operations sometime in their flying career (range 4 months–31 years, mean=12 years; as measured by the length of time between their first medical certification to the date of the incident). All of the airmen had current medical certification and, therefore, were operating within the FAA's aeromedical certification regulations at the time of the accident. The time elapsed from their last aviation medical examiner (AME) exam to the date of the accident ranged from 3 to 15 months, with a mean of 7 months. One airman was carrying a passenger in violation of the rules governing his student pilot certificate. Each airman reported to be and appeared to be in good general health as of their last medical certification. Three of the 8 airmen were granted "clear" (unrestricted) certification. The other 5 "limited" certifications were due to the requirement of corrective lenses.

At the time of their flight certification medical examination, 5 of the airmen were overweight, with a body mass index (BMI) above 25 and an average of 27 ± 4, ranging from 22 to 35. Their average weight was 185 ± 35 lb, ranging from 144 to 257 lb; their height was 69 ± 3 inches, ranging from 64 to 72 inches. One airman had reported having "problems with hay fever/allergies." Two other airmen had reported high blood pressure treated with medications. Two airmen had reported orthopedic issues that had resolved. All airmen had presented with normal blood pressure and heart rate at the time of their last medical examination by the AME prior to the NTSB event.

None of the airmen had reported "Mental disorder of any sort, depression, anxiety, etc." or prior "Suicide attempt." None had reported the use of any anti-depressant medications, though toxicology testing identified selective serotonin reuptake inhibitor (SSRI) antidepressant medications in the tissues of two of the airmen.

Two of the airmen were private pilots. Five airmen were commercial pilots. There was 1 student pilot. Flight experience, i.e., total flight hours and flight hours in the last 90 days, is presented in Table 3.

Four of the 8 airmen were positive for disqualifying substances. Positive toxicological findings included 4 ethanol positives, 1 positive for benzodiazepines, and 2 positive for antidepressants. Only 1 of these airmen had been identified as having a problem with 1 of these substances (ethanol) during their medical certification process. Two airmen undergoing depression therapy had not reported it to their AME. Table 4 describes these results. All but 1 of the 4 ethanol-positive values were above the FAA cutoff of 40 mg/dL. In fact, 2 of the pilots tested positive for significantly impairing levels of ethanol, 290 mg/dL blood and 270 mg/dL blood. The benzodiazepine identified in 1 case was 7-amino-clonazepam, the main metabolite of clonazepam. Two victims had antidepressants – both had citalopram and

metabolite, and 1 also had fluoxetine and metabolite. Additionally, 2 were positive for diphenhydramine, a sedating H-1 antihistamine. Diphenhydramine is the active drug in Benadryl. Each of the compounds found in these 4 aviation accident victims have the potential to impair both judgment and physical ability. These substances are disqualifying and may have contributed to the events that led to these fatal accidents.

Case	Domestic Stress/ difficulties	Criminal stress/trouble	Depression	Prior talk/ thoughts of suicide	Prior attempt at suicide	Left suicide message	NTSB event	Summary of events leading to suicide
1	–	–	–	–	–	–	Inflight collision with object (trees) – Descent	Undetermined
2	Y	–	Y	Y	Y	–	Inflight collision with terrain - Descent	History of depression with hospitalizations; shortly before the event, he was in hospital for attempted suicide
3	Y	–	–	Y	–		Inflight collision with terrain – Descent; Impairment (alcohol)	History of drinking and suicide threats; Alcohol consumption prior to accident
4	Y	–	–	Y	–	Y	Inflight collision with terrain – Descent; Stolen aircraft; Impairment (alcohol)	Distraught over relationship with friend; Alcohol consumption prior to accident; beer recovered at accident site
5	Y	–	–	–	–	–	Inflight collision with terrain (house)-Maneuvering	Bitter child custody dispute
6	Y	-	Y	Y	–	Y	Inflight collision with terrain – Maneuvering; Impairment (alcohol)	Distraught over breakup with girlfriend; alcohol and medication consumption prior to accident
7	Y	Y	–	–	–	Y	Collision with terrain (building) non-CFIT	Personal and business trouble with government agencies
8	Y	–	–	Y	–	Y	CFIT - Maneuvering	Difficulties in personal life; joked about suicide
Total	7	1	2	5	1	4		

Note: CFIT- Controlled Flight Into Terrain

Table 2: Suicide pilot's state of mind prior to the accident

The successful management of suicide risk of any particular pilot under an aeromedical setting is not viable given these circumstances. Further, critical evaluation elements such as the pilot's sleep pattern, interests, mood, level of energy, concentration, and appetite may not be specifically addressed during an AME's examination, given that such examinations can ranges from every 6 months (for first-class pilots) to every 5 years (for third-class pilots). Indeed, a pilot seeking to be medically certified will typically present as a content and healthy individual, especially to the physician he/she believes whose job is to restrict flying activities if found otherwise. As a result, the pilot applicant is not likely to volunteer information or present behavior that would jeopardize his/her privilege to fly [13].

In contrast, the physician-patient relationship in clinical practice does not pose this "threat;" it foments a more personal relationship that is exercised more often and it is inspired by a mutual interest in resolving existing health issues and/or implementing preventive measures to maintain wellness.

Case No.	Age (yr)‡	Effective class* class issued limitations	Pilot license	Airplane ratings	Total flight time (h)	Flight time, last 90 days (h)	Medical history Height (in)/weight (lb) BMI
1	26.63	Class 1	Commercial, Private	Airplane Single Engine Land and Helicopter. Instrument: Airplane and Helicopter	536	–	Unremarkable
		Class 1					71/173
		None (Clear)					24
2	44.8	Class 3	Private	Airplane Single Engine Land. Instrument: Airplane	658	7	Allergies
		Class 3					72/257
		MWCL†					35
3	68.43	Class 3	Commercial	Airplane Single Engine Land. Instrument: Airplane	< 6,000	–	Hypertension
		Class 2					67/169
		MWCL					27
4	20.72	Class 1	Commercial, Flight Instructor	Helicopter. Instrument: Helicopter	1,369	260	None
		Class 1					64/144
		None (Clear)					24
5	46.47	Class 3	Student	None	16	6	Resolved orthopedic issues
		Class 3					71/209
		MWCL					29
6	25.36	Class 1	Commercial	Airplane Multiengine and Single Engine Land. Instrument: Airplane	441	–	Resolved orthopedic issues
		Class 1					72/162
		None (Clear)					22
7	52.73	Class 3	Private	Airplane Multiengine	2,000	–	Hypertension
		Class 3		and Single Engine Land.			66/169
		MWCL		Instrument: Airplane			27
8	48.06	Class 3	Commercial, Flight Instructor	Airplane Multi-engine Land, Single-engine Land, and Single-engine Sea; Helicopter. Instrument: Airplane and Helicopter	1,039	–	None
		Class 3					72/196
		MWCL					27

^Date of accident

*Effective Class: Indicates the class of medical certificate once and if the original issued by the FAA lapses.

† MWCL = Must Wear Corrective Lenses

‡ Age at the time of the NTSB event

BMI= Body Mass Index; anthropometry at the time of the last FAA medical exam.

Table 3: Flight experience and aeromedical history of suicide pilots

The information gathered on the 8 suicide victims during the medical certification process revealed that the airmen did not alert their AME or the FAA's Office of Aerospace Medicine of their depression or suicidal ideation. Meanwhile, risk factors such as previous history of psychiatric diagnosis (such as depression or comorbid health problems) are not sufficient to assess suicide risk; the pilot's current state (of mind and body) must be taken into account, so that warning signs are identified and in a timely manner [14,15]. This approach is not facilitated by the medical certification process, as the relationship between the applicant pilot and the AME, the latter a representative of the FAA, is regulatory in nature, where the aim of the medical examination is to ensure public safety [16].

Case # [T1/T2]	Self report†	Discovered‡	Toxicological analysis/ disqualifying substance present	Substance Amount
1 [11, 2]	None	None	None	N/A
2 [3, 18]	None	Fluoxetine Escitalopram	Fluoxetine and metabolite	Detected, liver and kidney
			Citalopram and metabolite	Detected, liver and kidney
		Zolpidem (sedative – 3 days earlier)	Diphenhydramine	Detected, liver
			Ethanol	23 mg/dL, brain 14 mg/dL, muscle
3 [16, 31]	Pravastatin (cholesterol) Candesartan Cilexetil (blood pressure)	None	Ethanol	79 mg/hg, brain 101 mg/hg, muscle
4 [6, 3]	None	None	Ethanol	290 mg/dL, blood 192 mg/dL, vitreous 230 mg/hg, brain 175 mg/hg, muscle
			Diphenhydramine	Detected, blood and liver
5 [4, 0.3]	None	None	None	N/A
6 [4, 7]	None	None	Ethanol	270 mg/dL, blood 315 mg/dL, urine 227 mg/hg, brain 250 mg/hg, muscle
			Citalopram and metabolite	Detected, blood and urine
			7-Amino-Clonazepam	87 ng/mL, blood; 78 ng/mL, urine
7 [9, 14]	Olmesartan (blood pressure) Pravastatin	None	None	N/A
8 [5, 21]	None	N/A	N/A	N/A

Note: † Reported by the pilot during the FAA medical certification process (AME exam). T1 indicates the time elapsed in months from the pilot's last FAA medical exam to his suicide (NTSB event). T2 indicates the time elapsed in years since the pilot's first FAA medical exam to the NTSB event.

‡ Discovered through other avenues during the NTSB investigation (family interviews, hospital records, etc.)

Table 4: Medications and postmortem toxicology findings

Still, to develop potential suicide mitigation/prevention strategies in aerospace medicine practice, it is necessary to understand and recognize the factors contributing to a person taking his/her own life. These factors include: (a) current ideation, intent, plan, access to means; (b) previous suicide attempt or attempts; (c) alcohol/substance abuse; (d) previous history of psychiatric diagnosis; (e) impulsivity and poor self-control; (f) hopelessness – presence, duration, severity; (g) recent losses – physical, financial, personal; (h) recent discharge from an inpatient unit; (i) family history of suicide; (j) history of abuse (physical, sexual or emotional); (k) co-morbid health problems, especially a newly diagnosed problem or worsening symptoms; (l) age, gender, race (elderly or young adult, unmarried, white, male, living alone); and (m) same-sex sexual orientation. Positive factors that may mitigate suicide risk are: (a) positive social support; (b) spirituality; (c) sense of responsibility to family; (d) children in the home, pregnancy; (e) life satisfaction; (f) reality testing ability; (g) positive coping skills; (h) positive problem-solving skills; and (i) positive therapeutic relationship [15].

A treatment for depression is the use of SSRIs. Their effects on cognitive and psychomotor performance have been examined by the aeromedical community relative to the safety of SSRI use during aerospace operations [4,17-24]. On 4/15/2010, the FAA modified its medical certification policy on depression and began to issue

certificates to airmen diagnosed with depression who were being treated with a single SSRI - fluoxetine (Prozac), sertraline (Zoloft), citalopram (Celexa), or escitalopram (Lexapro). The conditions for issuance of a medical certificate include that for a minimum of 12 continuous months prior, the applicant must have been clinically stable as well as on a stable dose of medication without any aeromedically significant side effects and/or an increase in symptoms [24-27].

Conclusion

While pilot-assisted suicides do occur, they are uncommon, accounting for less than one-half of 1 percent of all fatal general aviation accidents. Aircraft-assisted pilot suicide is a tragic but rare occurrence in aircraft crash events. Suicides accounted for only 8 events of the 2,758 fatal aviation accidents from 2003 through 2012. All of the suicides involved general aviation operations. Most of the suicide-pilots were experiencing significant stressors in their lives at the time of their demise. Toxicological data indicate that 50% (4 out of 8) of all aviation-assisted suicide-pilots involve at least 1, if not more, disqualifying substances, and 38% (3 of 8) had impairing levels of such substances in their system. No information provided during the medical certification process identified suicidal ideation or evidence of depression. The suicides presented here were likely precipitated by events occurring after the medical certification process had been conducted, reviewed, and completed.

References

1. ICAO Safety Report 2014 Edition
2. Lewis RJ, Johnson RD, Whinnery JE, Forster EM (2007) Aircraft-assisted pilot suicides in the United States, 1993-2002. Arch Suicide Res 11: 149-161.
3. FAA Guide for Aviation Medical Examiners - Decision Considerations - Aerospece Medical Dispositions. Item 47. Psychiatric Conditions - use of Antidepressant Medications.
4. Akin A, Chaturvedi AK (2003) Prevalence of selective serotonin reuptake inhibitors in pilot fatalities of civil aviation accidents, 1990-2001. Federal Aviation Administration.
5. Federal Register 14CFR Part 61.89
6. Bills CB, Grabowski JG, Li G (2005) Suicide by aircraft: a comparative analysis. Aviat Space Environ Med 76: 715-719.
7. Browe T (2001). Religio Medici. New York, P.F. Collier & Sons. III: 1909-1914.
8. Krug EG, Mercy JA, Dahlberg LL, Zwi AB (2002) The world report on violence and health. The lancet 360: 1083-1088
9. De Leo D, Burgis S, Bertolote JM, Kerkhof AJ, Bille-Brahe U (2006) Definitions of suicidal behavior: lessons learned from the WHo/EURO multicentre Study. Crisis 27: 4-15.
10. Murphy SL, Xu J, Kochanek KD (2013) National Vital Statisctics Report: Vital Statistics Cooperative Program: 61-64.
11. Ungs TJ (1994) Suicide by use of aircraft in the United States, 1979-1989. Aviat Space Environ Med 65: 953-956.
12. Canfield DV, Salazar GJ, Lewis RJ, Whinnery JE (2006) Pilot medical history and medications found in post mortem specimens from aviation accidents. Aviat Space Environ Med 77: 1171-1173.
13. Gump BB, Matthews KA, Eberly LE, Chang YF, MRFIT Research Group (2005) Depressive symptoms and mortality in men: results from the Multiple Risk Factor Intervention Trial. Stroke 36: 98-102.
14. Rudd MD, Berman AL, Joiner TE Jr, Nock MK, Silverman MM, et al. (2006) Warning signs for suicide: theory, research, and clinical applications. Suicide Life Threat Behav 36: 255-262.
15. Norwood GK (1971) The Phylosophy and Limitations of FAA Aeromedicat Standards, Policies, and Procedures. Office of Aerospace Medicine, Federal Aviation Administration.
16. Nemeroff CB (2001) Progress in the battle with the black dog: advances in the treatment of depression. Am J Psychiatry 158: 1555-1557.
17. Paul MA, Gray G, Lange M (2002) The impact of sertraline on psychomotor performance. Aviat Space Environ Med 73: 964-970.
18. Nicholson AN (2003) Anti-depressant use by aircrew: modulation of higher nervous function and the sleep-wake continuum. Aviat Space Environ Med 74: 1205-1206.
19. Jones DR, Ireland RR (2004) Aeromedical regulation of aviators using selective serotonin reuptake inhibitors for depressive disorders. Aviat Space Environ Med 75: 461-470.
20. Kautz MA, Thomas ML, Caldwell JL (2007) Considerations of pharmacology on fitness for duty in the operational environment. Aviat Space Environ Med 78: B107-112.
21. Federal Register 14CFR Part 67. http://edocket.access.gpo.gov/2010/pdf/2010-7527.pdf.
22. Jones RA (1986) Emile Durkheim, An Introduction to Four Major Works. Sage Publications, Inc. Beverly Hills, CA, USA.
23. Aviation Safety Research Act of 1988 (1988) Public Law 100-591 [H.R. 4686]. 100th U.S. Cong., 2nd Sess. 102 Stat.
24. Armstrong C (2011) American Psychiatric Association Guidelines on treatment of patients with major depressive disorders. Am Fam Physician 15: 1219-1227
25. Chaturvedi AK, Smith DR, Soper JW, Chanfield DV, Whinnery JE (2002) Characteristics and toxicological processing of postmortem pilot specimens from fatal civil aviation accidents. Aviation, space, and environmental medicine 74: 252-259.
26. Mortimer RG, Scott WE (2004) Suicide by general aviation aircraft: is public safety at risk? Proceeding of the Human Factors and Ergonomics Society 48th Annual Meeting, New Orleans, Louisiana
27. Sen A, Akin A, Canfield DV, Chaturvedi AK (2007) Medical histories of 61 aviation accident pilots with postmortem SSRI antidepressant residues. Aviat Space Environ Med 78: 1055-1059.