



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report **September 8, 2021**

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Medical Officer

A. ACCIDENT: CEN21FA177; Conifer, Colorado

Date/Time: April 3, 2021; 5:35 p.m. (CDT)
Aircraft: Magnus Fusion 212, N434MA
Injuries: 1 Fatal
Flight Conducted under Part 91 personal flight

B. GROUP IDENTIFICATION

No group was formed for the medical evaluation in this accident.

C. DETAILS OF INVESTIGATION

Purpose

This investigation was performed to evaluate the pilot for medical conditions, the use of medications/illicit drugs, and the presence of toxins.

Methods

The Federal Aviation Administration (FAA) medical case review and the pilot's autopsy and Forensic Sciences Laboratory toxicology¹ reports were reviewed. Other relevant medical and regulatory issues were reviewed.

FAA Medical Case Review

According to the FAA medical case review, there were no records of the 66-year-old male sport pilot having applied for a medical certificate.

Autopsy

According to the autopsy report from the forensic pathologist in Golden, Colorado, the pilot's death was caused by multiple blunt force injuries and the manner of death was accident. No significant natural disease was identified.

¹ See <https://jag.cami.jccbi.gov/toxicology/> for a complete list of tested-for substances.

Toxicology

FAA Forensic Sciences Laboratory toxicology testing detected the stimulant amphetamine in the pilot's iliac blood at 313 nanograms per milliliter (ng/mL) and his liver tissue. The metabolite of clonazepam, 7-amino-clonazepam, was detected in iliac blood at 11 ng/mL and liver tissue. Bupropion, its metabolite hydroxybupropion, citalopram, its metabolite n-desmethyleitalopram, and gabapentin were detected in his liver and muscle tissue.

Relevant Toxicological and Medical Information

Amphetamine is a prescription medication used for the treatment of attention deficit hyperactivity disorder (ADHD), narcolepsy, and obesity. In some preparations, the prescription drug is metabolized to amphetamine; commonly marketed names include Adderall, Dexedrine, and Vyvanse. Therapeutic concentrations of amphetamine range from 20 to 100 ng/mL; concentrations greater than 200 ng/mL represent abuse. The half-life is between 10 to 13 hours. It is a central nervous stimulant and widely used drug of abuse. Amphetamine carries a boxed warning about its potential for abuse and drug dependence. It also carries warnings about an increased risk of sudden death and the potential for mental health and behavioral changes. At lower doses, amphetamine has few effects on cognitive functioning; risk-taking increases at higher doses.^{2,3,4}

Clonazepam, commonly marketed as Klonopin, is indicated for use in treating seizure disorder and panic disorder. The therapeutic range for clonazepam is 5 to 70 ng/mL, and its half-life ranges from 19 to 60 hours. Clonazepam's inactive major metabolite is *7-aminoclonazepam*. Clonazepam carries the warning that use of the medication may impair the physical and mental ability to perform hazardous tasks.⁵

Bupropion is a medication prescribed as an antidepressant (commonly marketed as Wellbutrin) or for smoking cessation (commonly marketed as Zyban). *Hydroxybupropion* is the major active metabolite of bupropion. The treatment of depression would require FAA review before flying, and bupropion is not one of the drugs that FAA will permit use for depression. The use of bupropion for smoking cessation would require FAA approval unless the pilot was off the

² FAA. Updated 1/16/19. Forensic Toxicology's WebDrugs. Amphetamine.

<https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=11>

³ National Institutes of Health (NIH). U.S. National Library of Medicine (NLM). Updated 11/26/19. [DailyMed - AMPHETAMINE SULFATE- amphetamine tablet \(nih.gov\)](https://pubmed.ncbi.nlm.nih.gov/31111111/).

⁴ National Highway Traffic Safety Administration. April 2014. Drugs and Human Performance Fact Sheets. Methamphetamine (and Amphetamine). <https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/809725-drugshumanperformfs.pdf>

⁵ FAA. Updated 1/16/19. Forensic Toxicology's WebDrugs.

Clonazepam. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=258>

Amino-clonazepam (7-). <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=257>

medication for 30 days. According to the FAA, bupropion carries the warning that the medication may impair mental or physical ability required to perform hazardous tasks.^{6,7,8}

Citalopram is a prescription antidepressant medication marketed under the trade name Celexa. *N-desmethylcitalopram* is the active metabolite of citalopram. Both carry the warning that their use may impair mental or physical ability for performing hazardous tasks. The therapeutic range for citalopram is 50 to 110 ng/mL and its half-life is 25 to 35 hours.⁹ The FAA will consider a special issuance of a medical certificate for depression after six months of treatment if the applicant is clinically stable and using only one approved treatment medication. Citalopram is one of the FAA approved antidepressant medications.¹⁰

Gabapentin, commonly marketed as Neurontin, is an antiseizure medication that is also used to treat chronic nerve pain and postherpetic neuralgia (shingles). It carries a warning that it “may cause dizziness, somnolence and other symptoms and signs of central nervous system depression” and patients should be advised not to operate complex machinery “until they have gained sufficient experience on gabapentin to assess whether gabapentin impairs their ability to perform such tasks.” Gabapentin has a long half-life that ranges from 6.5 to 52 hours.^{11,12}

D. SUMMARY OF MEDICAL FINDINGS

The 66-year-old male pilot had never applied for an FAA medical certificate. According to the autopsy report, the pilot’s death was caused by multiple blunt force injuries and the manner of death was accident. No significant natural disease was identified.

Toxicology testing detected amphetamine in the pilot’s iliac blood at 313 ng/mL and liver tissue. The metabolite of clonazepam, 7-amino-clonazepam, was detected in iliac blood at 11 ng/mL and liver tissue. Bupropion, its metabolite hydroxybupropion, citalopram, its metabolite n-desmethylcitalopram, and gabapentin were detected in his liver and muscle tissue.

⁶ NIH. NLM. Updated 11/4/20. [DailyMed - BUPROPION HYDROCHLORIDE tablet \(nih.gov\)](https://pubmed.ncbi.nlm.nih.gov/32811111/)

⁷ FAA Last modified 2/28/18. Guide for Aviation Medical Examiners. Decision Considerations - Aerospace Medical Dispositions. Item 47. Psychiatric Conditions - Psychiatric Conditions Table of Medical Dispositions. https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/app_process/exam_tech/item_47/amd/table/

⁸ FAA. Updated 1/16/19. Forensic Toxicology’s WebDrugs. Bupropion. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=20>

⁹ FAA. Updated 1/16/19. Forensic Toxicology’s WebDrugs. Citalopram. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=208>
Desmethylcitalopram (N-). <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=178>

¹⁰ FAA. Last modified 7/23/18. Guide for Aviation Medical Examiners, Item 47. Psychiatric Conditions - Use of Antidepressant Medications. https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/app_process/exam_tech/item_47/amd/antidepressants/

¹¹ NIH. NLM. Updated 4/29/21. [DailyMed - GABAPENTIN capsule \(nih.gov\)](https://pubmed.ncbi.nlm.nih.gov/39111111/)

¹² FAA. Updated 1/16/19. Forensic Toxicology’s WebDrugs. Gabapentin. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=254>