

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



Medical Factual Memorandum for Record

November 20, 2025

A. CASE

NTSB ID: ERA24FA077
Location: Marienville, Pennsylvania
Date: December 29, 2023

B. MEDICAL SPECIALIST

Specialist Turan Kayagil, MD, FACEP
National Transportation Safety Board
Washington, DC

C. DETAILS

1.0 Description of Review

For purposes of evaluating the pilot for potentially impairing substances and potentially impairing medical conditions, the above Medical Specialist reviewed the following sources of medical information, along with selected relevant regulation, medical literature, and National Transportation Safety Board (NTSB) investigator reports.

- Federal Aviation Administration (FAA) medical case review
- Pre-crash personal medical records
- Death certificate (and accompanying letter from Coroner) – pilot
- FAA Forensic Sciences Laboratory toxicology report – pilot

2.0 Summary of Medical Facts

2.1 Information from Reviewed Records

The 60-year-old male pilot's last aviation medical examination was January 31, 2023. At that time, he reported no medication use and no active medical conditions. He was issued a third-class medical certificate limited by a requirement to use corrective lenses to meet vision standards at all required distances.

Medical records from a hospital system where the pilot was known to have received care in 2020 were requested for a period of 3 years before the crash. The records did not indicate any pertinent medical history.

According to the pilot's death certificate, his cause of death was massive blunt force trauma, and his manner of death was accident. A letter from the Forest County Coroner indicated that, because of the extent of the pilot's injuries, an autopsy was not possible.

Postmortem toxicological testing by the FAA Forensic Sciences Laboratory detected methamphetamine at 11,262 ng/g in liver tissue and at 264 ng/g in muscle tissue. Amphetamine was detected at 89 ng/g in liver tissue and at 7 ng/g in muscle tissue. Phenylpropanolamine, ephedrine, modafinil, and modafinil acid were detected in liver and muscle tissue. Sildenafil and desmethylsildenafil were detected in liver tissue and were not detected in muscle tissue. No blood was available for testing.

2.2 Descriptions of Detected Substances

Methamphetamine is a central nervous system (CNS) stimulant drug. Amphetamine is a metabolite of methamphetamine, and also is a CNS stimulant. Both methamphetamine and amphetamine are available as federal Schedule II controlled substance prescription medications used to treat attention deficit hyperactivity disorder, narcolepsy, and occasionally obesity. As medicines, the drugs typically carry warnings that they may impair the ability to engage in potentially hazardous activities.^{1,2} The FAA considers methamphetamine and amphetamine to be "Do Not Issue/Do Not Fly" medications.³ In addition to being used medicinally,

¹ National Institutes of Health National Library of Medicine. Methamphetamine hydrochloride. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=f31f580f-1f08-4a0f-b078-0b9e3308f712>. Updated July 5, 2023. Accessed November 20, 2025.

² National Institutes of Health National Library of Medicine. Amphetamine sulfate. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=79b9db39-7cdc-5607-f0ce-ac2a2cfd59d5>. Updated June 8, 2023. Accessed November 20, 2025.

³ Federal Aviation Administration. Guide for aviation medical examiners: pharmaceuticals (therapeutic medications) do not issue - do not fly. Federal Aviation Administration website.

methamphetamine and amphetamine may be produced illicitly and abused recreationally. At low doses used as part of appropriate medical treatment, methamphetamine and amphetamine may improve reaction time, cognitive function, and fatigue, but may cause people to make higher-risk choices. At higher doses, the drugs may have a variety of impairing effects on psychomotor function, cognition, and perception. Impairment related to methamphetamine or amphetamine use can result from drug or withdrawal effects, with features of CNS stimulation or CNS depression. A measured drug level does not indicate whether a person is experiencing early- or late-phase effects.⁴

Phenylpropanolamine (also known as norephedrine) is a minor metabolite of amphetamine.⁵ Phenylpropanolamine also can be used in illicit drug production to make amphetamine.⁶ Phenylpropanolamine was previously available in the US as a nasal decongestant and weight loss ingredient in multiple over-the-counter and prescription products. In 2000, the US Food and Drug Administration requested that all drug companies discontinue marketing products with phenylpropanolamine for human use, due to a small increased risk of brain bleeding.⁷

Ephedrine is a common starting chemical for illicit methamphetamine production.⁸ Ephedrine also a medication that may be used to help relieve wheezing and nasal congestion, and is a component of some asthma medications.⁹ In the US, medications containing ephedrine may be sold “behind the counter” with no requirement for a prescription.¹⁰ Ephedrine is not typically impairing at the low levels associated with appropriate medicinal use.

https://www.faa.gov/ame_guide/pharm/dni_dnf. Updated July 10, 2023. Accessed November 20, 2025

⁴ Couper F, Huestis M, Fulford J, et al. Drugs and Human Performance Fact Sheets: 2024. National Highway Traffic Safety Administration. DOT HS 813 650. December 2024 (Revised). <https://rosap.nhtl.bts.gov/view/dot/78924>. Accessed November 20, 2025.

⁵ Baselt RC. *Disposition of Toxic Drugs and Chemicals in Man*. 11th ed. Biomedical Publications; 2017.

⁶ Drug Enforcement Administration. Notice - phenylpropanolamine can be used in illicit amphetamine manufacture. Diversion Control Division. https://www.deadiversion.usdoj.gov/chem_prog/advisories/ppa.html. Accessed November 20, 2025.

⁷ Food and Drug Administration. Phenylpropanolamine (PPA) information page. Food and Drug Administration website. <https://www.fda.gov/drugs/information-drug-class/phenylpropanolamine-ppa-information-page>. Updated October 14, 2016. Accessed November 20, 2025.

⁸ Vearrier D, Greenberg MI, Miller SN, Okaneku JT, Haggerty DA. Methamphetamine: history, pathophysiology, adverse health effects, current trends, and hazards associated with the clandestine manufacture of methamphetamine. *Dis Mon*. 2012;58(2):38-89. doi:10.1016/j.disamonth.2011.09.004.

⁹ National Institutes of Health National Library of Medicine. Ephedrine hydrochloride. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=bc81dc1-d854-30c0-e053-2a95a90a9fc7>. Updated December 14, 2023. Accessed November 20, 2025.

¹⁰ Food and Drug Administration. Legal requirements for the sale and purchase of drug products containing pseudoephedrine, ephedrine, and phenylpropanolamine. Food and Drug Administration website.

Modafinil is a prescription CNS stimulant medication that may be used for a variety of reasons, including to treat excessive daytime sleepiness or narcolepsy. Modafinil acid is a metabolite of modafinil. Modafinil is a federal schedule IV controlled substance. Although modafinil used as part of appropriate medical treatment has not been established to have typical impairing effects on psychomotor performance, the drug may carry a warning that any drug affecting the CNS may alter judgment, thinking or motor skills, and that users should be cautioned about operating an automobile or other hazardous machinery until it is reasonably certain that modafinil will not adversely affect their ability to engage in such activities.^{11,12} According to the FAA medical case review for this accident, modafinil use is unacceptable for pilot medical certification.

Sildenafil is a prescription medication commonly used to treat erectile dysfunction, as a sexual enhancement aid, or in the treatment of certain other conditions, including pulmonary hypertension. Desmethylsildenafil is a metabolite of sildenafil. Sildenafil is not typically impairing, although the FAA states that pilots should wait 8 hours after using it before flying, to monitor for side effects.¹³

Submitted by:

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Chief Medical Officer

<https://www.fda.gov/drugs/information-drug-class/legal-requirements-sale-and-purchase-drug-products-containing-pseudoephedrine-ephedrine-and>. Updated July 12, 2024. Accessed November 20, 2025.

¹¹ Baselt RC. *Drug Effects on Psychomotor Performance*. Biomedical Publications; 2001.

¹² National Institutes of Health National Library of Medicine. Modafinil. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=41f9ddbd-5228-4f0c-b0aa-2056af79a21e>. Updated October 1, 2021. Accessed November 20, 2025.

¹³ Federal Aviation Administration. Pharmaceuticals (therapeutic medications) erectile dysfunction and benign prostatic hyperplasia medications. Guide for Aviation Medical Examiners. https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/pharm/ed/. Updated August 25, 2017. Accessed November 20, 2025.