

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



Medical Factual Memorandum for Record

July 31, 2025

A. CASE

NTSB ID: CEN23FA412
Location: New Rockford, North Dakota
Date: September 19, 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 investigator reports.

- Federal Aviation Administration (FAA) medical case review
- Autopsy report (external examination, with toxicology report from Milwaukee County Medical Examiner's Office) - pilot
- FAA Forensic Sciences Laboratory toxicology report - pilot

2.0 Summary of Medical Facts

The 63-year-old male pilot's last aviation medical examination was July 5, 2023. At that time, he reported no medication use and no active medical conditions. He was issued a second-class medical certificate without limitation.

The University of North Dakota Forensic Pathology Office performed the pilot's autopsy, as authorized by the Eddy County Coroner. At the discretion of the Forensic Pathology Office, no internal examination was performed; examination was limited to an external examination plus X-ray imaging and collection of toxicological specimens. According to the pilot's external examination report, his cause of death was blunt force injuries of the head and chest, and his manner of death was accident.

At the request of the Forensic Pathology Office, toxicology testing of postmortem specimens from the pilot was performed by the Forensic Toxicology Laboratory, Milwaukee County Medical Examiner's Office, Milwaukee, Wisconsin. This testing detected methamphetamine at 16 ng/mL and amphetamine at 12 ng/mL in subclavian blood.

The FAA Forensic Sciences Laboratory also performed toxicological testing of postmortem specimens from the pilot.¹ This testing detected methamphetamine at 26 ng/mL in aortic blood and at 27 ng/g in liver tissue, as well as amphetamine at 22 ng/mL in aortic blood and at 25 ng/g in liver tissue. Carboxy-delta-9-THC was detected at 5.8 ng/mL in liver tissue and was not detected in aortic blood.

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.^{2,3} The FAA considers methamphetamine and amphetamine to be "Do Not Issue/Do Not Fly" medications.⁵ In addition to being used medicinally, 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

¹ The FAA Forensic Sciences Laboratory has the capability to test for around a thousand substances including toxins, prescription and over-the-counter medications, and illicit drugs.

² 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 May 28, 2025.

³ 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 May 28, 2025.

experiencing early- or late-phase effects. In living people, blood methamphetamine levels of 20 ng/mL to 50 ng/mL are typical with medicinal use, while levels of 10 ng/mL to 2,500 ng/mL are typical with recreational use.⁴

Carboxy-delta-9-THC is a non-psychoactive metabolite of delta-9-THC (which was not detected in this case). Delta-9-THC is the primary psychoactive chemical in cannabis, including marijuana, hashish, and cannabis edibles. Delta-9-THC may be inhaled or ingested recreationally by users seeking mind-altering effects. It also sometimes is used to treat symptoms of medical conditions. Psychoactive effects of delta-9-THC vary depending on the user, dose, and route of administration, and may impair motor coordination, reaction time, decision making, problem solving, and vigilance. Carboxy-delta-9-THC may be detected in blood for a prolonged time (days or weeks) after last cannabis use – well beyond the typical duration of acute psychoactive cannabis effects.⁴ Marijuana is a federal Schedule I controlled substance, and the FAA considers its use by pilots unacceptable, regardless of state laws.^{5,6,7}

Submitted by:

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Chief Medical Officer

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 July 31, 2025.

⁵ Federal Aviation Administration. Guide for aviation medical examiners: pharmaceuticals (therapeutic medications) do not issue - do not fly. Federal Aviation Administration website. https://www.faa.gov/ame_guide/pharm/dni_dnf. Updated July 10, 2023. Accessed July 31, 2025.

⁶ Federal Aviation Administration. Aeromedical factors. In: *Pilot's Handbook of Aeronautical Knowledge*. FAA-H-8083-25C. Oklahoma City: United States Department of Transportation, Federal Aviation Administration, Airman Testing Standards Branch, AFS-630; 2023. https://www.faa.gov/sites/faa.gov/files/19_phak_ch17.pdf. Accessed July 31, 2025.

⁷ Federal Aviation Administration. Controlled substances and CBD products. Guide for Aviation Medical Examiners. https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/media/Controlled_Substances_and_CBD_Products.pdf. Updated May 25, 2022. Accessed July 31, 2025.