

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



CEN23FA239

MEDICAL

Specialist's Factual Report

May 7, 2025

TABLE OF CONTENTS

A	ACCIDENT.....	3
B	MEDICAL SPECIALIST.....	3
C	DETAILS OF THE INVESTIGATION	3
1.0	PURPOSE	3
2.0	METHODS.....	3
D	FACTUAL INFORMATION.....	3
1.1	FAA Medical Case Review	3
1.2	Personal Medical Records	4
1.3	Autopsy	5
1.4	Toxicology	5
1.4.1	Autopsy Testing	5
1.4.2	FAA Laboratory Testing	5
1.4.3	Descriptions of Detected Substances	6
E	SUMMARY OF MEDICAL FACTS.....	9

A ACCIDENT

Location: Watertown, Wisconsin
Date: June 14, 2023
Time: About 9:03 AM Central Daylight Time

B MEDICAL SPECIALIST

Specialist JE Tuttle MD MHA FACS
National Transportation Safety Board
Washington, DC

C DETAILS OF THE INVESTIGATION

1.0 Purpose

This investigation was performed to evaluate the pilot for potentially impairing medical conditions and substances.

2.0 Methods

The Federal Aviation Administration (FAA) medical case review, the pilot's personal medical records, and autopsy and toxicology reports were reviewed. Selected relevant regulation, medical literature, and investigator reports were also reviewed.

D FACTUAL INFORMATION

1.1 FAA Medical Case Review

According to the FAA Medical Case Review, the 73-year-old male pilot's last aviation medical examination was September 18, 2016. At that time, he reported 1051 total civilian flight hours. He was 72 inches tall and weighed 192 pounds. He reported having high blood pressure and sleep apnea treated with a continuous positive airway pressure (CPAP) device. He reported taking lansoprazole, an over-the-counter medication commonly used to treat acid reflux and ulcer disease; valsartan/hydrochlorothiazide, a combination prescription medication commonly used to treat high blood pressure; tamsulosin, a prescription medication commonly used to improve urination in men with an enlarged prostate; aspirin, an over-the-counter non-steroidal anti-inflammatory medication commonly used to treat pain and inflammation and mitigate cardiovascular risk; fluticasone, an over-the-counter nasal spray commonly used to treat allergy symptoms; and a topical testosterone, a

prescription medication commonly used to treat low testosterone. The Aviation Medical Examiner (AME) noted glucose in the pilot's urine. After discussion with the FAA Regional Flight Surgeon, the AME re-tested the pilot's urine the next day and did not detect glucose. The AME then issued the pilot a third-class medical certificate via AME-Assisted Special Issuance (AASI) for sleep apnea and high blood pressure, with the limitations that the pilot must wear corrective lenses for distance and have glasses available for near vision.¹ The medical certificate was not valid after September 30, 2017. The pilot completed a BasicMed course and reported completing a Comprehensive Medical Examination Checklist (CMEC), both most recently in September 2021.²

1.2 Personal Medical Records

The pilot's personal medical records were reviewed from his primary care physician for three years prior to the accident. The pilot was seen by his physician in person for routine care twice per year and had regular tele-visits with his physician for blood pressure monitoring and management of his back pain. The pilot had a history of high blood pressure, osteoarthritis of multiple joints, chronic back pain, long term systemic steroid usage, low testosterone, and insomnia. Included in the medical records were comments from the physician regarding the pilot's use of CPAP to treat his sleep apnea such as "uses CPAP every night with good results." No further documentation regarding details of the CPAP or records of use were included. According to the pilot's family, the pilot used his CPAP machine regularly. NTSB reached out to the pilot's family to recover the CPAP device, but the device was not in their possession. The family presumed the device was in the aircraft at the time of the accident; it was not recovered from the wreckage.

At a regular physician visit in December of 2021, the pilot reported having had a cardiac catheterization in another facility. According to the pilot's verbal report to his physician documented in the record, the cardiac catheterization was normal. There was no other information available in the pilot's records including the reason for the cardiac catheterization, where it was performed, or a formal report. The pilot had several tele-visits prior to the date of the accident with his physician for worsening back pain which was treated with steroids, medications for muscle spasms, and narcotics. The last visit with the pilot's primary care physician was on May 19,

¹ AASI is a process by which an AME may issue a medical certificate under the provisions of an applicant's FAA Authorization for Special Issuance if the applicant provides specific required medical information from treating physician(s). AASI determinations are subject to review by the FAA. Additional information about the AASI process is available on the [FAA AME Guide website](#).

² BasicMed provisions allow pilots who meet certain requirements to fly without current medical certification. Among those requirements, a pilot must have completed a BasicMed training course within 24 calendar months and must have had a medical examination with a state-licensed physician using the CMEC within 48 months. Aircraft and operating restrictions also apply. For details, see 14 Code of Federal Regulations (CFR) Part 68, 14 CFR 61.113(3) and https://www.faa.gov/licenses_certificates/airmen_certification/basic_med/.

2023. The pilot's medication list at that time included acetaminophen with codeine, a prescription combination of non-opioid and opioid pain medication commonly used to treat mild to moderately severe pain; cyclobenzaprine, a prescription medication commonly used to treat muscle spasms; methocarbamol, a prescription medication commonly used to treat muscle spasms; gabapentin, a prescription medication commonly used to treat nerve-related pain and certain types of seizures; duloxetine, a prescription selective serotonin reuptake inhibitor commonly used to treat depression and anxiety; diclofenac gel, an over-the-counter non-steroidal anti-inflammatory medication commonly used for topical relief of arthritis pain; and prednisone, a prescription corticosteroid commonly used to decrease inflammation. The pilot's medication list also included lansoprazole, valsartan/ hydrochlorothiazide, aspirin, and topical testosterone, as reported at his last aviation medical examination.

1.3 Autopsy

At the request of the Dodge County Medical Examiner, the Fond du Lac County Chief Medical Examiner performed the pilot's autopsy. According to the pilot's autopsy report, his cause of death was multiple injuries. Due to the extent of the pilot's injuries, structural evaluation of brain, heart and lungs was impossible. Within these limitations, the autopsy did not identify significant natural disease.

1.4 Toxicology

1.4.1 Autopsy Testing

At the request of the Medical Examiner, NMS Labs performed toxicological testing of muscle tissue from the pilot.³ Caffeine and acetaminophen were presumptively positive.⁴ Codeine was detected at 220 ng/g. Ethanol was not detected in muscle tissue at a reporting threshold of 0.08 g/hg.⁵

1.4.2 FAA Laboratory Testing

The FAA Forensic Sciences Laboratory performed toxicological testing of postmortem specimens from the pilot.⁶ Ethanol was detected in lung tissue at 0.022 g/hg and in muscle tissue at 0.059 g/hg. Gabapentin was detected in lung tissue at

³ Information about tissue and blood testing procedures, including tested-for substances, is available on the NMS Labs website at Test Code [8052TI](#).

⁴ A presumptive positive indicates a substance is detected on a screening test without a second test to confirm presence or quantity of the detected substance.

⁵ In tissue, concentrations in g/hg are approximately equivalent to concentrations in g/dL.

⁶ 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.

5237 ng/g and in muscle tissue at 5028 ng/g. Codeine was detected in lung tissue at 403 ng/g and in muscle tissue at 139 ng/g. Hydrocodone was detected in lung tissue at 1 ng/g and was not detected in muscle tissue. Morphine was detected in lung tissue at 18 ng/g and in muscle tissue at 8 ng/g. Delta-8-tetrahydrocannabinol (delta-8-THC) was detected in lung tissue at 10.9 ng /g and in muscle tissue at 24 ng/g. Carboxy-delta-8-THC was detected in lung tissue at 34.4 ng/g and detected in muscle tissue at 9.8 ng/g. 11-hydroxy-tetrahydrocannabinol (11-hydroxy-THC) was detected in lung tissue and was not detected in muscle tissue. Acetaminophen, valsartan, hydrochlorothiazide, and diclofenac were detected in lung and muscle tissue.

1.4.3 Descriptions of Detected Substances

Ethanol is a type of alcohol. It is the intoxicating alcohol in beer, wine, and liquor, and, if consumed, can impair judgment, psychomotor performance, cognition, and vigilance.⁷ FAA regulation imposes strict limits on flying after consuming ethanol, including prohibiting pilots from flying with a blood ethanol level of 0.04 g/dL or greater.⁸ Alcohol consumption is not the only possible source of ethanol in postmortem specimens. Ethanol can sometimes be produced by microbes in a person's body after death. Postmortem ethanol production is made more likely by extensive traumatic injury.⁹

Gabapentin is a prescription medication that can be used to treat nerve pain, certain types of seizures, restless legs syndrome, and other conditions. Gabapentin generally carries a warning that use may cause drowsiness, dizziness, blurred vision, and general central nervous system (CNS) depression. Precautions are advised when driving a vehicle or operating heavy machinery until the user can assess the impact of dosing on alertness and motor activities.¹¹ Gabapentin use in adults over the age of 65 may increase the risk of decline of executive function, information processing, and motor skills.¹⁰ The use of opioids with gabapentin is not advised due to increased risk

⁷ Cook CCH. Alcohol and aviation. *Addiction*. 1997;92(5):539-555.

⁸ 14 Code of Federal Regulations §91.17.

⁹ Kugelberg FC, Jones AW. Interpreting results of ethanol analysis in postmortem specimens: a review of the literature. *Forensic Sci Int*. 2007;165(1):10-29. doi:10.1016/j.forsciint.2006.05.004.

¹⁰ Oh G, Moga DC, Fardo DW, Abner EL. The association of gabapentin initiation and neurocognitive changes in older adults with normal cognition. *Front Pharmacol*. 2022;13:910719. Published 2022 Nov 25. doi:10.3389/fphar.2022.910719.

of CNS side effects, especially in the elderly.^{11, 12} The FAA considers gabapentin a “do not issue/do not fly” medication.¹³

Codeine, morphine, and hydrocodone are opioid drugs. These drugs can be individual prescription medications, or metabolites of other opioid drugs. Because morphine and hydrocodone are metabolites of codeine, use of codeine alone can cause a person to test positive for codeine, morphine, and hydrocodone.¹⁴ Codeine commonly is used to treat moderate to severe pain. Codeine also commonly is used in prescription cough medications to relieve shortness of breath, and cough.^{14, 15} Codeine carries a warning that use may impair the mental or physical ability needed to perform potentially hazardous activities such as driving a car or operating dangerous machinery. Use of opioids with other CNS depressants increases the risk of sedation.^{16, 17} Codeine also can be used illicitly. An open prescription for codeine generally is disqualifying for FAA medical certification, although certification may be granted by the FAA in certain cases of infrequent use for acceptable medical conditions. Regardless, the FAA states that a pilot should not fly after using an opioid like codeine until adequate time has elapsed for the drug to be eliminated from circulation.¹³

Delta-8-THC is a psychoactive cannabinoid chemical. Although delta-8-THC is similar to the primary psychoactive chemical in cannabis (delta-9-THC), very little

¹¹ National Institutes of Health National Library of Medicine. Neurontin-gabapentin capsule. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=f2d9c3de-4749-4265-a26e-50026ab46ee4>. Updated August 19, 2023. Accessed April 9, 2025.

¹² American Geriatrics Society. American geriatrics society 2019 updated AGS beers criteria for potentially inappropriate medication use in older adults. *Journal of the American Geriatrics Society*. 2019;67(4):674-694. doi:<https://doi.org/10.1111/jgs.15767>.

¹³ 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/go/dni>. Updated November 23, 2022. Accessed April 11, 2025.

¹⁴ Smith HS. Opioid Metabolism. *Mayo Clin Proc*. 2009;84(7):613-624. doi:10.1016/S0025-6196(11)60750-7.

¹⁵ National Institutes of Health National Library of Medicine. Hysingla ER. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=b7d23ac2-e776-9f62-3290-c64c2d6eb353>. Updated December 18, 2023. Accessed April 11, 2025.

¹⁶ National Institutes of Health National Library of Medicine. CODEINE SULFATE tablet. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=010905f9-3bcb-4b50-9fe8-a3ad0010f14c>. Updated December 15, 2023. Accessed April 11, 2025.

¹⁷ Federal Drug Administration. FDA updates for prescribing information for all opioid pain medicines to provide additional guidance for safe use. <https://www.fda.gov/drugs/drug-safety-and-availability/fda-updates-prescribing-information-all-opioid-pain-medicines-provide-additional-guidance-safe-use>. Published online April 26, 2023; Accessed April 11, 2025.

¹⁸ Bradley EK, Hoots B, Bradley E, Roehler DR. Unintentional ingestion of putative delta-8 tetrahydrocannabinol by two youth requiring critical care: a case report. *J Cannabis Res* 2023;5(1). doi:<https://doi.org/10.1186/s42238-023-00176-x>.

delta-8-THC is present in the cannabis plant. Delta-8-THC used in consumer products typically is chemically manufactured from cannabidiol (CBD), another chemical in the cannabis plant. Delta-8-THC products are often marketed as “hemp” products, which consumers may not associate with psychoactive effects. Delta-8-THC is available in a variety of over-the-counter products for oral consumption, smoking, and inhalation.¹⁸ Delta-8-THC has psychoactive and intoxicating effects that can impair motor coordination, reaction time, decision making, problem solving, and vigilance.^{19,20} The potency of delta-8-THC varies widely in consumer products. Delta-8-THC products may also contain impurities including delta-9-THC. Delta-8 THC products have not been evaluated or approved by the FDA for safe use in any context.^{21,22} Carboxy-delta-8-THC is a non-psychoactive metabolite of delta-8-THC. 11-hydroxy THC is a psychoactive metabolite of both delta-8-THC and delta-9-THC (the FAA Forensic Sciences Laboratory does not distinguish between 11-hydroxy-delta-8-THC and 11-hydroxy-delta-9-THC).

Valsartan and hydrochlorothiazide are prescription medications commonly used to control high blood pressure.^{23,24} Diclofenac is a non-steroidal anti-inflammatory drug commonly used to relieve pain from arthritis.²⁵ Acetaminophen is

¹⁸ Bradley EK, Hoots B, Bradley E, Roehler DR. Unintentional ingestion of putative delta-8 tetrahydrocannabinol by two youth requiring critical care: a case report. *J Cannabis Res* 2023;5(1). doi:<https://doi.org/10.1186/s42238-023-00176-x>.

¹⁹ Testai FD, Gorelick PB, Aparicio HJ, et al. Use of Marijuana: Effect on Brain Health: A Scientific Statement from the American Heart Association. *Stroke*. . 2022;53(4):e176-e187. doi:10.1161/STR.0000000000000396, 10.1161/STR.0000000000000396.

²⁰ Wurz GT, Montoya E, DeGregorio MW. Examining impairment and kinetic patterns associated with recent use of hemp-derived Δ8-tetrahydrocannabinol: case studies. *Journal of Cannabis Research*. 2022;4(1). doi:<https://doi.org/10.1186/s42238-022-00146->

²¹ US Federal Drug Administration: 5 Things to Know about Delta-8 Tetrahydrocannabinol – Delta-8 THC. FDA. Published online September 16, 2021. <https://www.fda.gov/consumers/consumer-updates/5-things-know-about-delta-8-tetrahydrocannabinol-delta-8-thc>. Accessed April 10, 2025.

²² Leas EC. The Hemp Loophole: A Need to Clarify the Legality of Delta-8-THC and Other Hemp-Derived Tetrahydrocannabinol Compounds. *Am J of Pub Health*. 2021;111(11):1927-1931. doi:<https://doi.org/10.2105/ajph.2021.306499>.

²³ National Library of Medicine. National Institutes of Health. Valsartan tablet. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=ab5e0e5a-5bdf-4cfc-9d18-57ea4d642f65>. Updated January 11, 2024. Accessed April 10, 2025.

²⁴ National Library of Medicine. National Institutes of Health. Hydrochlorothiazide tablet. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=7b38ac8a-4540-4eb2-aedd-9aa966d22190>. Updated March 27, 2007. Accessed April 10, 2025.

²⁵ National Library of Medicine. National Institutes of Health. Diclofenac gel. 1%. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=1084e0c3-6d75-4090-84dc-02a18e0299b9>. Updated December 29, 2023. Accessed April 10, 2025.

an over-the-counter medication used for pain relief and fever reduction. It can also be used in a prescription combination with opioids such as codeine to relieve mild to moderately severe pain.^{26,27} Valsartan, hydrochlorothiazide, diclofenac, and acetaminophen are not generally considered impairing.

E SUMMARY OF MEDICAL FACTS

According to the FAA Medical Case Review, the 73-year-old male pilot's last aviation medical examination was September 18, 2016. At that time, he reported having high blood pressure and sleep apnea treated with a continuous positive airway pressure (CPAP) device. He reported taking the medications lansoprazole, valsartan/hydrochlorothiazide, tamsulosin, aspirin, fluticasone, and topical testosterone. The Aviation Medical Examiner (AME) noted glucose in the pilot's urine. After discussion with the FAA Regional Flight Surgeon, the AME re-tested the pilot's urine the next day and did not detect glucose. The AME then issued the pilot a third-class medical certificate via AME-Assisted Special Issuance (AASI) for sleep apnea and high blood pressure, with the limitations that the pilot must wear corrective lenses for distance and have glasses available for near vision. The medical certificate was not valid after September 30, 2017. The pilot completed a BasicMed course and reported completing a Comprehensive Medical Examination Checklist (CMEC), both most recently in September 2021.

Reviewed medical records indicated that the pilot was being treated for high blood pressure, arthritis, back pain, insomnia, OSA and low testosterone. He also had extensive systemic steroid use for back pain and was prescribed muscle relaxants and narcotics and his OSA was being treated with a CPAP device. There was no information regarding the pilot's CPAP usage and the machine was not recovered. No formal report was available for the results of the cardiac catheterization.

According to the pilot's autopsy report, his cause of death was multiple injuries. Due to the extent of the pilot's injuries, structural evaluation of brain, heart, and lungs was impossible. Within these severe limitations, the autopsy did not identify significant natural disease.

NMS Labs performed toxicological testing of muscle tissue of the pilot. Caffeine and acetaminophen were presumptively positive. Codeine was detected at 220 ng/g. Ethanol was not detected at a reporting threshold of 0.08g/hg.

²⁶ National Library of Medicine. National Institutes of Health . Acetaminophen tablet. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=2e595ec2-b27e-172a-e063-6394a90add26>. Updated January 1, 2023. Accessed April 10, 2025.

²⁷ National Library of Medicine. National Institutes of Health. Acetaminophen/codeine. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=160cd55a-a8ed-43f2-baf7-046d3c3b317f>. Updated January 11, 2015. Accessed April 10, 2025.

The FAA Forensic Sciences Laboratory performed toxicological testing of postmortem specimens from the pilot. Ethanol was detected in lung tissue at 0.022 g/hg, and in muscle tissue at 0.059 g/hg. Gabapentin was detected in lung tissue at 5237 ng/g and in muscle tissue at 5028 ng/g. Codeine was detected in lung tissue at 403 ng/g and in muscle tissue at 139 ng/g. Hydrocodone was detected in lung tissue at 1 ng/g and was not detected in muscle tissue. Morphine was detected in lung tissue at 18 ng/g and in muscle tissue at 8 ng/g. Delta-8-THC was detected in lung tissue at 10.9 ng/g and in muscle tissue at 24 ng/g. Carboxy-delta-8-THC was detected in lung tissue at 34.4 ng/g and in muscle tissue at 9.8 ng/g. 11-hydroxy-THC was detected in lung tissue and was not detected in muscle tissue. Acetaminophen, valsartan, hydrochlorothiazide, and diclofenac were detected in lung and muscle tissue.

Submitted by:

JE Tuttle MD MHA FACS
Medical Officer