

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



CEN23FA201

MEDICAL

Specialist's Factual Report

April 9, 2025

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A ACCIDENT

Location: Grand Isle, Louisiana
Date: May 24, 2023
Time: About 11:10 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 and the pilot's 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 33-year-old male pilot's last aviation medical examination was April 12, 2023. At that time, he reported 8105 total civilian flight hours. He was 72 inches tall and weighed 258 pounds. He reported no active medical issues and no medication use. He was issued a second-class medical certificate with no limitation.

1.2 Autopsy

The Jefferson Parish Forensic Center performed the pilot's autopsy. According to the pilot's autopsy report, his cause of death was multiple blunt force injuries and drowning, and his manner of death was accident. The autopsy did not identify significant natural disease.

1.3 Toxicology

1.3.1 Autopsy Testing

At the request of the Jefferson Parish Forensic Center, NMS Labs performed toxicological testing of chest cavity blood, vitreous fluid, and liver tissue of the pilot.¹ Caffeine and cotinine were presumptively detected in chest cavity blood.² Ethanol was detected in chest cavity blood at 0.254 g/dL, in vitreous fluid at 0.194 g/dL, and in liver tissue at 0.120 g/hg.³

1.3.2 FAA Laboratory Testing

The FAA Forensic Sciences Laboratory performed toxicological testing of postmortem specimens from the pilot.⁴ Ethanol was detected in cavity blood at 0.278 g/dL, in vitreous fluid at 0.245 g/dL, in muscle tissue at 0.249 g/hg, and in brain tissue at 0.283 g/hg. N-propanol was detected in cavity blood and brain tissue and was not detected in vitreous fluid or muscle tissue. N-butanol was detected in cavity blood, and was not detected in vitreous fluid, muscle tissue, or brain tissue.

1.3.3 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, cognition, and vigilance.⁵ Performance impairing effects can include worsening of judgement and reaction times, alterations in perception of the environment, poor coordination and changes in behavior and mood. Performance-impairing effects worsen as blood levels of ethanol increase.⁶ Once consumed ethanol is absorbed into circulation, and rapidly distributes into total body water, resulting in relatively similar ethanol levels in various

¹ Information about tissue and blood testing procedures, including tested-for substances, is available on the NMS Labs website at Test Codes 0171TI, and 8042B.

² A presumptive positive indicates a substance is present on a screening test without confirmation by a second testing method.

³ In tissue, concentrations in g/hg are approximately equivalent to concentrations in g/dL.

⁴ 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.

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

⁷ Jones AW. Alcohol, its absorption, distribution, metabolism, and excretion in the body and pharmacokinetic calculations. *Wiley Interdisciplinary Reviews: Forensic Science*. 2019;1(5). doi: <https://doi.org/10.1002/wfs2.1340>.

body tissues.^{7,8} 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 Vitreous fluid generally is better protected from postmortem microbial spread and therefore is less susceptible to postmortem ethanol production than are other specimen types.^{10,11} FAA regulations impose strict limits on flying after consuming ethanol, including prohibiting pilots from flying with a blood ethanol level of 0.04 g/dL or greater.¹²

N-propanol and n-butanol are other alcohols that can be produced by microbes in a person's body after death. Their presence in a postmortem specimen is potentially indicative of postmortem microbial activity in the specimen but does not reliably indicate that postmortem ethanol production occurred.^{13,14}

Caffeine is a central nervous system stimulant that is commonly ingested, including in coffee, tea, soft drinks, and chocolate, and is also an ingredient in certain anti-drowsiness medications and headache medications.¹⁵ Cotinine is a metabolite of nicotine, which is a chemical that is found in tobacco products, electronic cigarette liquid, and certain smoking cessation aids. Caffeine and cotinine are not generally considered impairing.

⁷ Jones AW. Alcohol, its absorption, distribution, metabolism, and excretion in the body and pharmacokinetic calculations. *Wiley Interdisciplinary Reviews: Forensic Science*. 2019;1(5). doi: <https://doi.org/10.1002/wfs2.1340>.

⁸ Cook CCH. Alcohol and aviation. *Addiction*. 1997;92(5):539-555.

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 Federal Aviation Administration. Forensic Toxicology Drug Information. Ethanol. <http://jag.camii.jccbi.gov/toxicology/DrugDetail.asp?did=60>. Accessed March 14, 2025.

¹¹ Savini F, Tartaglia A, Coccia L, et al. Ethanol Determination in Post-Mortem Samples: Correlation between Blood and Vitreous Humor Concentration. *Molecules*. 2020;25(12):2724. Published 2020 Jun 12. doi:10.3390/molecules25122724.

¹² Federal Aviation Administration. Alcohol and drug use in civil aviation. Federal Register :14 Code of Federal Regulations §91.17. <https://www.ecfr.gov/current/title-14/chapter-I/subchapter-F/part-91/subpart-A/section-91.17>. Accessed March 7, 2024.

¹³ Boumba VA, Exadactylou P, Velivasi G, Ziavrou KS, Fragkouli K, Kovatsi L. The frequency of ethanol, higher alcohols, and other low molecular weight volatiles in postmortem blood samples from unnatural deaths. *Forensic Sci Int*. 2022; 341:111503. doi: 10.1016/j.forsciint.2022.111503.

¹⁴ Gubala W. n-Butanol in blood as the indicator of how long a dead body lay in water. *Forensic Science International*. 1990;46(1-2):127-128. doi: [https://doi.org/10.1016/0379-0738\(90\)90149-s](https://doi.org/10.1016/0379-0738(90)90149-s).

¹⁵ National Institutes of Health National Library of Medicine. Caffeine. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=6d9b3926-7198-5e00-e053-2a91aa0a9580>. Updated September 23, 2020. Accessed January 11, 2024.

E SUMMARY OF MEDICAL FACTS

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Submitted by:

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