

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



Medical Factual Memorandum for Record

August 21, 2024

A. CASE

NTSB ID: ANC23FA004
Location: Chickaloon, Alaska
Date: November 10, 2022

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.

- Final Federal Aviation Administration (FAA) medical case review
- Autopsy report (including NMS Labs toxicology report) – pilot
- FAA Forensic Sciences Laboratory toxicology report – pilot

2.0 Summary of Medical Facts

The 46-year-old male pilot's only aviation medical examination was October 8, 2021. At that time, he was 67 inches tall and weighed 173 pounds. He reported using the medications aspirin (an over-the-counter medication that can be used to lower cardiovascular risk or to treat pain and fever) and naproxen (an over-the-counter anti-

inflammatory medication commonly used to treat pain and fever). He reported no active medical conditions. He reported a history of a 2014 driving under the influence offense. He was issued a third-class medical certificate without limitation. In February 2022 he was sent a Letter of Eligibility addressing his alcohol-related offense.

The Alaska State Medical Examiner's Office performed the pilot's autopsy. According to the pilot's autopsy report, his cause of death was blunt and sharp force injuries and his manner of death was accident. The autopsy identified mild-to-moderate coronary artery disease with 50% narrowing of the left anterior descending coronary artery and 30% narrowing of the left circumflex coronary artery. The remainder of the autopsy examination, including visual and microscopic examination of the heart, did not identify other significant natural disease.

At the request of the Alaska State Medical Examiner's Office, NMS Labs performed postmortem toxicological testing of heart blood from the pilot; this testing detected delta-9-THC at 5.2 ng/mL.¹ Postmortem toxicological testing by the FAA Forensic Sciences Laboratory identified carboxy-delta-9-THC at 2 ng/mL in blood and at 3.9 ng/mL in urine.²

Delta-9-THC is the primary psychoactive chemical in cannabis, including marijuana and hashish. Delta-9-THC may be inhaled or ingested recreationally by users seeking mind-altering effects. It may also be used medicinally to treat illness-associated nausea and appetite loss. 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. A person's instantaneous blood concentration of delta-9-THC does not directly predict that person's impairment.^{3,4} Carboxy-delta-9-THC is a non-psychoactive metabolite of delta-9-THC.³ Delta-9-THC and its metabolites have modest potential for postmortem

¹ The NMS Labs report listed tested-for substances as: amphetamines, barbiturates, benzodiazepines, buprenorphine/metabolite, cannabinoids, cocaine/metabolites, fentanyl/acetyl fentanyl, methadone/metabolite, methamphetamine/MDMA, opiates, oxycodone/oxymorphone, phencyclidine, acetone, ethanol, isopropanol, and methanol. Cannabinoid confirmation testing was performed; the delta-9-THC metabolite 11-hydroxy-delta-9-THC was not detected at a reporting threshold of 1 ng/mL, and the delta-9-THC metabolite carboxy-delta-9-THC was not detected at a reporting limit of 5 ng/mL.

² 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. In this case, the reported carboxy-delta-9-THC results were from targeted testing performed in addition to routine screening.

³ Couper FJ, Logan BK. Drugs and Human Performance Fact Sheets. National Highway Traffic Safety Administration. DOT HS 809 725. April 2014 (Revised). <https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/809725-drugshumanperformfs.pdf>. Accessed August 21, 2024.

⁴ Compton RP. Marijuana-Impaired Driving: A Report to Congress. National Highway Traffic Safety Administration. DOT HS 812 440. July 2017. <https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/812440-marijuana-impaired-driving-report-to-congress.pdf>. Accessed August 21, 2024.

redistribution.^{5,6,7} Delta-9-THC is a federally controlled substance, and the FAA considers it unsuitable for flying, regardless of state cannabis laws.^{8,9,10}

Submitted by:

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Medical Officer

⁵ Hoffman MA, Trochta A, Gary RD, Fitzgerald RL, McIntyre IM. An evaluation of postmortem concentrations of Δ9-tetrahydrocannabinol (THC) and 11-nor-9-carboxy-Δ9-tetrahydrocannabinol (THCCOOH). *Forensic Sci Int.* 2020;315:110414. doi:10.1016/j.forsciint.2020.110414.

⁶ Holland MG, Schwoppe DM, Stoppacher R, Gillen SB, Huestis MA. Postmortem redistribution of Δ9-tetrahydrocannabinol (THC), 11-hydroxy-THC (11-OH-THC), and 11-nor-9-carboxy-THC (THCCOOH). *Forensic Sci Int.* 2011;212(1-3):247-251. doi:10.1016/j.forsciint.2011.06.028.

⁷ Lemos NP, Ingle EA. Cannabinoids in postmortem toxicology. *J Anal Toxicol.* 2011;35(7):394-401. doi:10.1093/anatox/35.7.394.

⁸ 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 August 21, 2024.

⁹ 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/19_phak_ch17.pdf. Accessed August 21, 2024.

¹⁰ 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 August 21, 2024.