National Transportation Safety Board
Office of Research and Engineering
Washington, DC 20594

Medical Factual Memorandum for Record
August 21, 2024

A. CASE

NTSB ID: WPR23FA007
Location: Jamul, California
Date: October 4, 2022, 12:38 PM local time

B. MEDICAL SPECIALIST

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

C. DETAILS

1.0 Description of Review

For purposes of evaluating the pilot for potentially impairing medical conditions and substances, 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) final medical case review
- Autopsy report (with death investigation report) – pilot
- Toxicology report – pilot

2.0 Summary of Medical Facts

2.1 Pilot

According to the FAA medical case review, the 57-year-old male pilot's last aviation medical examination was April 7, 2021. He reported a history of hay fever, with no medication use at that time. He was issued a third-class medical certificate limited by a requirement to wear corrective lenses.

The County of San Diego Department of the Medical Examiner performed the pilot's autopsy. According to the pilot's autopsy report, his cause of death was multiple blunt force injuries, and his manner of death was accident. Due to the extent of his injuries, his internal organs were unavailable for examination.

A death investigation report accompanying the autopsy report documented additional medical history information provided by the pilot's family and friends. According to this information, the pilot had a history of chronic lymphocytic leukemia (CLL) successfully treated with chemotherapy ten years prior to the crash. In the weeks prior to the crash, the pilot had been severely ill with a high fever and had lost weight. He had missed several days of work and did not attend several family events which was unusual for him according to his family. According to the investigative report, the pilot had been seen by his physician for the illness the day prior to the crash.

The Department of the Medical Examiner Forensic Toxicology Laboratory performed toxicological testing of the pilot's postmortem muscle tissue. No tested-for substances were detected.[1]

The FAA Forensic Sciences Laboratory also performed toxicology testing of the pilot's postmortem muscle tissue.[2] Ethanol was detected at 0.107 g/hg.[3] N-propanol and n-butanol were also detected. Zolpidem was detected at 16 ng/g. Cyclobenzaprine was detected, and its metabolite norcyclobenzaprine was detected at 43 ng/g. No blood was available for testing.

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,

[1] The toxicology report listed tested-for substances as: amphetamines, benzodiazepines, buprenorphine, cannabinoids, carisoprodol, cocaine metabolites, fentanyl, methadone, methamphetamine, opiates, oxycodone, phencyclidine, and zolpidem. No ethanol testing was performed.

[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.

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

and vigilance.[4] 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.[5] 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, increased time from death to autopsy, and environmental factors.[6]

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.[7]

Cyclobenzaprine is a prescription medication commonly used to treat acute muscle spasms. It generally carries a warning its use may impair the mental and physical abilities necessary to drive a vehicle or operate heavy machinery.[8] Its use with other central nervous system (CNS) depressants is discouraged.[8] The FAA considers cyclobenzaprine a "do not fly" medication. Norcyclobenzaprine is a metabolite of cyclobenzaprine.

Zolpidem is a prescription medication commonly used to treat short-term insomnia. It generally carries a warning that use may impair the ability to operate a motor vehicle or heavy machinery, including the next day after use. Drowsiness, prolonged reaction time, dizziness, blurred vision, and reduced alertness have been reported the next day after use in some patients. Use with other CNS depressants such as alcohol should be avoided as CNS depressant effects will be additive.[9] The FAA considers occasional or limited use of sleep aids, including zolpidem, allowable

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

[5] 14 Code of Federal Regulations §91.17. General operating and flight rules. https://www.ecfr.gov/current/title-14/chapter-I/subchapter-F/part-91. Updated May 7, 2024. Accessed May 16, 2024.

[6] 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.

[7] 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.

[8] National Institutes of Health National Library of Medicine. Cyclobenzaprine hydrochloride. DailyMed. https://dailymed.nlm.nih.gov/dailymed/lookup.cfm?setid=e9063c42-e71a-4cce-9cd9-9ed6a192c6bb. Updated April 23, 2010. Accessed July 9, 2024.

[9] National Institutes of Health National Library of Medicine. Zolpidem tartrate tablet. DailyMed. https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=021153ce-fe27-4ed1-8d88-b4157b0ed734. Updated November 16, 2023. Accessed June 27, 2024.

for pilots, provided they do not use the drug every day and they observe a sufficient waiting period for the drug to be cleared from circulation before flying.[10]

Submitted by:

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Medical Officer

[10] Federal Aviation Administration. Guide for Aviation Medical Examiners. Pharmaceuticals: Sleep Aids. https://www.faa.gov/ame_guide/pharm/sleepaids. Updated July 23, 2020. Accessed June 27, 2024.