

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



Medical Factual Memorandum for Record

January 5, 2025

A. CASE

NTSB ID: ERA25MA106
Location: Philadelphia, Pennsylvania
Date: January 31, 2025

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-in-command (PIC) and second-in-command pilot (SIC) 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 National Transportation Safety Board (NTSB) investigator reports.

- Federal Aviation Administration (FAA) medical case review
- Autopsy report (with autopsy toxicology report) - PIC
- FAA Forensic Sciences Laboratory toxicology report - PIC
- Autopsy report (with autopsy toxicology report) - SIC
- FAA Forensic Sciences Laboratory toxicology report - SIC

According to the NTSB investigator in charge (IIC), the PIC and SIC were verified as having held active medical certificates from Mexico's Federal Civil Aviation Agency

(Agencia Federal de Aviación Civil, or AFAC), but NTSB requests for associated pilot medical certification records were otherwise unsuccessful.

2.0 Summary of Medical Facts

2.1 Pilot-In-Command (PIC)

2.1.1 Information From Reviewed Records

The 46-year-old male PIC had undergone an FAA medical examination in January 2021. At that time, he had not reported any medication use or active medical conditions, and had been issued a third-class medical certificate limited by a requirement to wear corrective lenses. That medical certificate subsequently had expired. According to the NTSB IIC, the PIC held a current AFAC medical certificate that met US requirements for the Title 14 Code of Federal Regulations (CFR) Part 129 air ambulance flight.¹

The City of Philadelphia Office of the Medical Examiner performed the PIC's autopsy. According to the PIC's autopsy report, his cause of death was blunt and sharp injuries, and his manner of death was accident. The extent of his injuries severely limited any autopsy evaluation for natural disease. Postmortem toxicological testing by the Office of the Medical Examiner did not identify any tested-for substances in muscle tissue from the PIC.

The FAA Forensic Sciences Laboratory also tested postmortem specimens from the PIC.² Ethanol was identified at 0.012 g/hg in kidney tissue and at 0.067 g/hg in pelvic muscle tissue; ethanol was not detected in foot muscle tissue.³ Acetone was detected in kidney tissue at a low level, was detected in pelvic muscle tissue at 0.008 g/hg, and was not detected in foot muscle tissue. Isopropanol was detected in kidney tissue and pelvic muscle tissue at low levels, and was not detected in foot muscle tissue. N-butanol was detected in pelvic muscle tissue at a low level, and was not detected in kidney tissue or foot muscle tissue. No blood, urine, or vitreous fluid was available for FAA testing.

¹ [14 CFR 129.5\(b\)](#) requires that each foreign air carrier conducting operations within the US conduct its operations in accordance with the Standards contained in Annex 1 to the Convention on International Civil Aviation. Annex 1 contains International Civil Aviation Organization (ICAO) Standards and Recommended Practices for personnel licensing, including medical provisions for pilot licensing.

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.

2.1.2 Descriptions of Detected Substances

Ethanol is the intoxicating alcohol in beer, wine, and liquor, and, if consumed, can impair judgment, psychomotor performance, cognition, and vigilance.⁴ FAA regulation imposes strict limits on flying after consuming ethanol, including a prohibition on piloting a civil aircraft while having a blood ethanol level of 0.04 g/dL or greater.⁵ When absorbed into circulation after alcohol consumption, ethanol distributes relatively evenly throughout the body along with water. Alcohol consumption is not the only possible source of ethanol in postmortem specimens. Ethanol sometimes may be produced by microbes in a person's body tissues and fluids after death. Postmortem ethanol production is made more likely by extensive traumatic injury, which can spread microbes. Specimen types better protected from microbial contamination (such as vitreous fluid) typically are less susceptible to postmortem ethanol production.^{6,7}

Acetone is volatile organic compound that is used industrially and occurs naturally, including as a byproduct of fat metabolism by living cells. Isopropanol, sometimes known as rubbing alcohol, is a volatile alcohol that also occurs naturally and has a variety of industrial uses. Acetone and isopropanol are interrelated metabolites in the human body, and their presence in postmortem specimens may be attributable to antemortem or postmortem sources, including postmortem microbial activity.^{6,8,9} N-butanol is another volatile alcohol that can be produced by microbes in a person's body tissues and fluids after death.^{6,8}

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

⁵ [14 Code of Federal Regulations § 91.17](#).

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 Oshaug K, Kronstrand R, Kugelberg FC, Kristoffersen L, Mørland J, Høiseth G. Frequency of postmortem ethanol formation in blood, urine and vitreous humor - improving diagnostic accuracy with the use of ethylsulphate and putrefactive alcohols. *Forensic Sci Int*. 2022;331:111152. doi:10.1016/j.forsciint.2021.111152.

⁸ 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.

⁹ Molina DK. A characterization of sources of isopropanol detected on postmortem toxicologic analysis. *J Forensic Sci*. 2010;55(4):998-1002. doi:10.1111/j.1556-4029.2010.01386.x.

2.2 Second-In-Command Pilot (SIC)

2.2.1 Information From Reviewed Records

The 43-year-old male SIC had never applied for an FAA medical certificate. According to the NTSB IIC, the SIC held a current AFAC medical certificate that met US requirements for the Title 14 CFR Part 129 air ambulance flight.¹

The City of Philadelphia Office of the Medical Examiner performed the SIC's autopsy. According to the SIC's autopsy report, his cause of death was blunt and sharp injuries, and his manner of death was accident. The extent of his injuries severely limited any autopsy evaluation for natural disease. Postmortem toxicological testing by the Office of the Medical Examiner did not identify any tested-for substances in muscle tissue from the SIC.

The FAA Forensic Sciences Laboratory also tested postmortem specimens from the SIC.² Ethanol was identified at 0.049 g/hg in muscle tissue, and was not detected in vitreous fluid.³ Methanol was identified at 0.012 g/dL in vitreous fluid, and was not detected in muscle tissue. No blood or urine was available for FAA testing.

2.2.2 Descriptions of Detected Substances

Ethanol is described in Section C.2.1.2 above.

Methanol, sometimes known as wood alcohol, is a volatile alcohol that is present at low levels in some foods and drinks and has a variety of industrial uses.¹⁰ There is some evidence that methanol detected in a postmortem specimen may be more likely to be due to dietary sources (such as alcoholic beverage consumption) or contamination rather than postmortem microbial production, although postmortem methanol production has been reported.^{6,8,11}

Submitted by:

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Chief Medical Officer

¹⁰ Centers for Disease Control and Prevention. Methanol: systemic agent. The National Institute for Occupational Safety and Health Emergency Response Safety and Health Database. https://www.cdc.gov/niosh/ershdb/emergencypersoncard_29750029.html. Updated May 12, 2011. Accessed January 5, 2026.

¹¹ Statheropoulos M, Spiliopoulou C, Agapiou A. A study of volatile organic compounds evolved from the decaying human body. *Forensic Sci Int*. 2005;153(2-3):147-55. doi:10.1016/j.forsciint.2004.08.015.