



## NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering  
Washington, DC

### **Medical Factual Report** **May 18, 2022**

Michelle Watters, MD, PhD, MPH  
Medical Officer

#### **A. ACCIDENT: CEN22FA067 – Houston, Texas**

Date/Time: December 8, 2021; 7:57 p.m. (CST)  
Aircraft: Piper PA-28-140, N3865K  
Injuries: 2 Fatal  
Flight Conducted under Part 91 personal flight.

#### **B. GROUP IDENTIFICATION**

No group was formed for the medical evaluation in this accident.

#### **C. DETAILS OF INVESTIGATION**

##### **Purpose**

This investigation was performed to evaluate the student pilot for medical conditions, the use of medications/illicit drugs, and the presence of toxins.

##### **Methods**

The Federal Aviation Administration (FAA) medical case review and the student pilot's autopsy and Forensic Sciences Laboratory toxicology<sup>1</sup> reports were reviewed. Other pertinent scientific and regulatory issues were reviewed.

##### **FAA Medical Case Review**

According to the FAA medical case review, at the time of the accident, the 23-year-old male student pilot held a third class medical certificate without limitations. At the time of the most recent exam (12/28/20), the student pilot was 67 inches tall and weighed 148 pounds. He reported having 8 civil flight hours. He reported taking no medications and no medical conditions. No significant medical concerns were identified.

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<sup>1</sup> The FAA Forensic Sciences Laboratory has the capability to test for more than 1,300 substances including toxins, common prescription and over-the-counter medications, and illicit drugs. <https://jag.cami.jccbi.gov/toxicology/>

### Autopsy

According to the Harris County Institute of Forensic Sciences autopsy report, the cause of death of the student pilot was multiple blunt force injuries and the manner of death was accident. No significant natural disease was identified by the medical examiner.

### Toxicology

Toxicology testing performed by the FAA Forensic Sciences laboratory detected the primary psychoactive compound of cannabis, tetrahydrocannabinol (THC), in the student pilot's heart blood at 1.4 nanograms per milliliter (ng/mL); THC was not detected in his urine. THC's primary metabolite 11-hydroxy-delta-9-THC (11-OH-THC) was detected in the student pilot's urine at 11 ng/mL but not in his heart blood. THC's inactive metabolite carboxy-delta-9-tetrahydrocannabinol (THC-COOH) was detected in the student pilot's heart blood at 2.7 ng/mL and his urine at 26.5 ng/mL.

### Cannabis

The marijuana plant (*Cannabis species*) contains chemicals called cannabinoids; tetrahydrocannabinol (THC) is the primary psychoactive cannabinoid compound. THC's mood-altering effects include euphoria and relaxation. In addition, marijuana causes alterations in motor behavior, time and space perception, and cognition. Significant performance impairments are usually observed for at least 1-2 hours following marijuana use, and residual effects have been reported up to 24 hours.<sup>2</sup>

THC is rapidly metabolized but the rate of metabolism is not linear and depends on the means of ingestion (smoking, oil, and edibles), potency of the product, frequency of use, and user characteristics. The primary metabolite, 11-OH-THC, is equally psychoactive, but is rapidly metabolized to the non-psychoactive metabolite THC-COOH. THC is fat soluble, so is stored in fatty tissues and can be released back into the blood long after consumption. So, while the psychoactive effects may last a few hours, THC can be detected in the body for days or weeks. Very little THC is excreted in urine. Instead, THC-COOH can be found in urine days to weeks after the last use of the drug. Thus, both blood and urine test results do not necessarily reflect recent use and cannot always be used to prove that the user was under the influence of the drug at the time of testing.<sup>3</sup>

## **D. SUMMARY OF MEDICAL FINDINGS**

The 23-year-old male pilot held a third class medical certificate without limitations. At the time of the most recent exam (12/28/20), he reported no medical conditions or medications. According to the autopsy, the cause of the pilot's death was multiple blunt force injuries and the manner of death was accident. No significant natural disease was identified by the medical examiner.

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<sup>2</sup> National Highway Traffic Safety Administration. April 2014 (revised). Drugs and Human Performance Fact Sheets. Cannabis/Marijuana. <https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/809725-drugshumanperformfs.pdf>

<sup>3</sup> Compton, R. July 2017. Marijuana-Impaired Driving - A Report to Congress. (DOT HS 812 440). Washington, DC: National Highway Traffic Safety Administration. <https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/812440-marijuana-impaired-driving-report-to-congress.pdf>

Toxicology testing detected THC in the student pilot's heart blood at 1.4 ng/mL but not in his urine; 11-OH-THC was detected in the student pilot's urine at 11 ng/mL but not in his heart blood. THC-COOH was detected in the student pilot's heart blood at 2.7 ng/mL and his urine at 26.5 ng/mL.