



NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report **June 27, 2022**

Michelle Watters, MD, PhD, MPH
Medical Officer

A. ACCIDENT: CEN22FA053 – Perry, Oklahoma

Date/Time: November 28, 2021; 4:58 p.m. (CST)
Aircraft: Bell 206B, N58900
Injuries: 1 fatal, 1 serious
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 pilot and 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, the pilot's autopsy and FAA Forensic Sciences Laboratory toxicology¹ reports, and the student pilot's FAA Forensic Sciences Laboratory toxicology report were reviewed. Other pertinent scientific and regulatory issues were reviewed.

Pilot

FAA Medical Case Review

According to the FAA medical case review, at the time of the accident, the 55-year-old male pilot held a second class medical certificate with the limitation that he must wear corrective lenses. At his most recent FAA medical examination on 5/15/21, he reported having 5,200 total flight hours and was 72 inches tall and weighed 210 pounds. He reported taking no medications and having no medical conditions. No significant medical concerns were identified.

¹ 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 as well as illicit drugs. <https://jag.cami.jccbi.gov/toxicology/>

Autopsy

According to the autopsy report from the Office of the Medical Examiner, Oklahoma City, Oklahoma, the cause of death of the pilot was multiple blunt force injuries and the manner of death was accident. The medical examiner reported the pilot had 90% stenosis of his left anterior descending and right coronary arteries.

Toxicology

Toxicological testing performed by the FAA's Forensic Sciences Laboratory identified the non-sedating pain reliever acetaminophen (commonly marketed as Tylenol) in the pilot's femoral blood and urine.²

Student pilot

FAA Medical Case Review

According to the FAA medical case review, at the time of the accident, the 25-year-old male student pilot held a second class medical certificate without limitation. At the time of the most recent FAA medical examination on 2/10/21, the student pilot was 69 inches tall and weighed 190 pounds. He reported having no flight hours. He reported no medications or medical conditions. No significant medical concerns were identified.

Toxicology

Toxicology testing performed by the FAA Forensic Sciences laboratory detected the primary psychoactive compound of cannabis, tetrahydrocannabinol (THC), in the student pilot's urine at 1.7 nanograms per milliliter (ng/mL); THC was not detected in his blood. THC's psychoactive metabolite 11-hydroxy-delta-9-THC (11-OH-THC) was detected but not quantified in his urine but was not detected in his blood. THC's inactive metabolite carboxy-delta-9-tetrahydrocannabinol (THC-COOH) was detected in the student pilot's hospital admission blood at 23.4 ng/mL and in his urine at 84.1 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.³

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. Concentrations of THC peak at the end of smoking and are often below 5 ng/mL at three hours. Peak concentrations are often 100 to 200 ng/mL. The primary metabolite, 11-OH-THC, is equally psychoactive, but is rapidly metabolized to the non-psychoactive metabolite

² FAA. Updated 1/16/19. Forensic Toxicology's WebDrugs. Acetaminophen.

<https://jag.camii.jccbi.gov/toxicology/DrugDetail.asp?did=2>

³ National Highway Traffic Safety Administration. April 2014 (revised). Drugs and Human Performance Fact Sheets. Cannabis/Marijuana. [809725-drugshumanperformfs.pdf \(nhtsa.gov\)](https://www.nhtsa.gov/sites/nhtsa-dug/documents/pdf/809725-drugshumanperformfs.pdf)

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 be used to prove that the user was experiencing effects of the drug at the time of testing.^{3,4}

D. SUMMARY OF MEDICAL FINDINGS

Pilot

The 55-year-old male pilot held a second class medical certificate with the limitation that he must wear corrective lenses. At his most recent FAA medical examination (5/15/21), he reported no medications or medical conditions. According to the autopsy report, the cause of death of the pilot was multiple blunt force injuries and the manner of death was accident. The medical examiner reported the pilot had 90% stenosis of his left anterior descending and right coronary arteries. Toxicological testing identified acetaminophen in the pilot's femoral blood and urine.

Student pilot

The 25-year-old male student pilot held a second class medical certificate without limitation. At his most recent FAA medical examination (2/10/21), he reported no medications or medical conditions. Toxicology testing detected tetrahydrocannabinol (THC) in the student pilot's urine at 1.7 nanograms per milliliter (ng/mL); 11-hydroxy-delta-9-THC (11-OH-THC) was detected but not quantified in his urine. Neither compound was detected in his blood. Carboxy-delta-9-tetrahydrocannabinol (THC-COOH) was detected in the student pilot's hospital admission blood at 23.4 ng/mL and in his urine at 84.1 ng/mL.

⁴ 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>