

National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



WPR22FA266

MEDICAL

Specialist's Factual Report

December 20, 2022

A. ACCIDENT

Location: Tryon, Nebraska
Date: 7/25/22
Time: 08:39 Local
Airplane: Vans RV-9A; N192MH

B. MEDICAL SPECIALIST

Specialist Michelle Watters, MD, PhD, MPH
National Transportation Safety Board, RE-1
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C. DETAILS OF THE INVESTIGATION

Purpose

This investigation was performed to evaluate the pilot and student pilot-rated passenger 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 pilot's and the student pilot-rated passenger's autopsy and FAA Forensic Sciences Laboratory toxicology reports¹ were reviewed. Other relevant medical and regulatory issues were reviewed.

D. FACTUAL INFORMATION

1.0 Pilot

1.1 FAA Medical Case Review

According to the FAA medical case review, at the time of the accident, the 80-year-old male pilot was on BasicMed (10/1/21). His third class medical certificate with special authorization and with the limitation that he must wear corrective lenses expired on 2/28/18. His most recent FAA medical certification examination was on 2/23/17 where he reported 1,050 total flight hours and was 73 inches tall and weighed 180 pounds. He reported taking lisinopril to treat high blood pressure and atorvastatin to treat high cholesterol. He had a history of coronary artery disease with

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, and illicit drugs. <https://jag.cami.jccbi.gov/toxicology/>

stenting of his left anterior descending (LAD) and right coronary (RCA) arteries and chronic lymphocytic leukemia in remission, both for which he had previously received special authorization.

1.2 Autopsy

According to the autopsy report prepared for the Ex-officio County Coroner, McPherson County, Curtis, Nebraska, the cause of death of the pilot was extensive blunt force injuries of the head, neck, torso, and extremities. The examination was limited by the extensive trauma, no brain was available for examination. The pilot was reported to have 75-90% atherosclerotic occlusion of his LAD and stents in his LAD and RCA.

1.3 Toxicology

Toxicology testing performed for the Ex-officio County Coroner was negative for ethanol and tested-for drugs (except caffeine) in a blood clot obtained from the pilot. Toxicology testing performed by the FAA Forensic Sciences Laboratory detected ethanol in the pilot's muscle tissue at 0.010 grams per hectogram (gm/hg),² but not in his liver tissue. The high blood pressure medication chlorthalidone and the high cholesterol medication rosuvastatin were detected in his liver and muscle tissues; these substances are generally considered non-impairing.³

Ethanol is a social drug commonly consumed by drinking beer, wine, or liquor. It acts as a central nervous system depressant; it impairs judgment, psychomotor functioning, and vigilance. Ethanol is water soluble, and after absorption it quickly and uniformly distributes throughout the body's tissues and fluids. The distribution pattern parallels water content and blood supply of the tissue. A small amount of ethanol can be produced after death by microbial activity.⁴ Extensive trauma increases the spread of bacteria and raises the risk of ethanol production after death.⁵

² Grams per hectogram in tissue samples are directly comparable to grams per deciliter in liquid samples.

³ FAA. Updated 1/16/19. Forensic Toxicology's WebDrugs.

Chlorthalidone. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=342>

Rosuvastatin. <https://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=318>

⁴ Federal Aviation Administration. Updated 1/16/19. Forensic Toxicology Drug Information. Ethanol. <http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=60>

⁵ Kugelberg, FC and AW Jones. 2007. Interpreting results of ethanol analysis in postmortem specimens: a review of the literature. *Forensic Science International* 165(1):10-29.

2.0 Student Pilot-rated Passenger

2.1 FAA Medical Case Review

According to the FAA medical case review, at the time of the accident, the 58-year-old male student pilot-rated passenger held a third class medical certificate with the limitation that he must wear corrective lenses. At the time of his most recent and only FAA medical certification examination on 7/22/19, he reported zero flying hours and was 71 inches tall and weighed 169 pounds. He reported taking no medications or having any medical conditions.

2.2 Autopsy

According to the autopsy report prepared for the Ex-officio County Coroner, McPherson County, Curtis, Nebraska, the cause of death of the student pilot-rated passenger was extensive blunt force injuries of the head, neck, torso, and extremities. The examination was limited by the extensive trauma, the entire brain was not available for examination. No significant natural disease was identified by the pathologist.

2.3 Toxicology

Toxicology testing performed for the Ex-officio County Coroner was negative for ethanol and tested-for drugs (except caffeine) in a blood clot obtained from the student pilot-rated passenger. Toxicology testing was also negative for tested-for drugs in his urine. Toxicology testing performed by the FAA Forensic Sciences Laboratory detected the primary major psychoactive compound of cannabis, delta-9-tetrahydrocannabinol (THC), in the student pilot-rated passenger's lung tissue at 22.2 nanograms per gram (ng/gm), but not in his urine. THC's inactive metabolite, carboxy-delta-9-tetrahydrocannabinol (THC-COOH), was detected in his urine at 33.4 nanograms per milliliter (ng/mL) and in his lung tissue at 4.1 ng/gm.

Cannabis

The marijuana plant (*Cannabis species*) contains chemicals called cannabinoids; delta-9-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. Peak concentrations are often 100 to 200 ng/mL.⁶

⁶ 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>

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 often are below 5 ng/mL in blood at three hours. The primary metabolite of THC 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 be used to prove that the user was experiencing effects of the drug at the time of testing.⁷

E. SUMMARY OF MEDICAL FACTS

The 80-year-old male pilot was on BasicMed (10/1/21). His third class medical certificate with special authorization for coronary artery disease with stenting of his left anterior descending (LAD) and right coronary (RCA) arteries and chronic lymphocytic leukemia expired on 2/28/18. At his most recent FAA medical certification examination on 2/23/17, he also reported being treated for high blood pressure and high cholesterol. According to the autopsy report, the cause of death of the pilot was extensive blunt force injuries of the head, neck, torso, and extremities. The examination was limited by the extensive trauma, no brain was available for examination. The pilot was reported to have 75-90% atherosclerotic occlusion of his LAD and stents in his LAD and RCA. Toxicology testing detected ethanol in his muscle tissue at 0.010 gm/hg, but not in his liver tissue. The non-impairing medications chlorthalidone and rosuvastatin were detected in his liver and muscle tissues.

The 58-year-old male student pilot-rated passenger held a third class medical certificate with the limitation that he must wear corrective lenses. At the time of his most recent and only FAA medical certification examination on 7/22/19, he reported taking no medications or having any medical conditions. According to the autopsy report, the cause of death of the student pilot-rated passenger was extensive blunt force injuries of the head, neck, torso, and extremities. The examination was limited by the extensive trauma, the entire brain was not available for examination. No significant natural disease was identified by the pathologist. Toxicology testing detected delta-9-tetrahydrocannabinol (THC) in the student pilot-rated passenger's lung tissue at 22.2 ng/gm, but not in his urine. THC's inactive metabolite, carboxy-

⁷ 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>

delta-9-tetrahydrocannabinol (THC-COOH), was detected in his urine at 33.4 ng/mL and in his lung tissue at 4.1 ng/gm.

Submitted by:

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