

# National Transportation Safety Board

Office of Research and Engineering

Washington, DC 20594



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**MEDICAL**

Specialist's Factual Report

July 23, 2023

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## **A. ACCIDENT**

Location: Albany, Oregon  
Date: July 9, 2021

## **B. MEDICAL SPECIALIST**

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

### **1.0 Purpose**

This investigation was performed to evaluate the pilot for potentially impairing substances and potentially impairing medical conditions.

### **2.0 Methods**

The Federal Aviation Administration (FAA) medical case review and the pilot's autopsy and toxicology reports were reviewed. Selected investigator reports and relevant regulation and medical literature were also reviewed.

## **D. FACTUAL INFORMATION**

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

According to the FAA medical case review, the 57-year-old male uncertificated pilot's only aviation medical examination was on November 4, 1980. At that time, he reported 8 total civilian flight hours. He was 72 inches tall and weighed 175 pounds. He reported no medication use and no active medical conditions. No significant issues were identified, and he was issued a third-class medical certificate without limitation. That certificate was expired when the crash occurred.

### **2.0 Autopsy**

The Oregon State Medical Examiner's Office, Clackamas, Oregon, performed the pilot's autopsy at the request of the Linn County Medical Examiner, Albany, Oregon. According to the pilot's autopsy report, his cause of death was multiple blunt force traumatic injuries and his manner of death was accident. Structural evaluation of the brain was limited by the severity of injury. Within this limitation, the autopsy did not identify significant natural disease.

The death investigation report included in the autopsy report noted that the pilot had a history of hypothyroidism treated with levothyroxine (prescription thyroid hormone replacement).<sup>1</sup>

### **3.0 Toxicology**

#### **3.1 NMS Labs Toxicology Results**

At the request of the Oregon State Medical Examiner's Office, NMS Labs performed toxicological testing of postmortem urine and cavity blood specimens from the pilot.<sup>2</sup> In cavity blood, delta-9-THC was detected (at greater than 50 ng/mL), along with its metabolites 11-hydroxy-delta-9 THC (at 33 ng/mL) and carboxy-delta-9-THC (at greater than 500 ng/mL). Carboxy-delta-9-THC was also detected in urine (at greater than 500 ng/mL). Citalopram/escitalopram was detected in cavity blood (at 110 ng/mL; the test did not differentiate between citalopram and escitalopram). Caffeine was detected in cavity blood and urine (caffeine results were reported based on a single test in each specimen without a secondary confirmation test).

#### **3.2 FAA Toxicology Results**

The FAA Forensic Sciences laboratory also performed toxicological testing of postmortem specimens from the pilot.<sup>3</sup> Delta-9-THC was detected in urine at 6.4 ng/mL and in lung tissue at 74.9 ng/g. 11-hydroxy-delta-9-THC was detected in urine at 63.7 ng/mL and in lung tissue. Carboxy-delta-9-THC was detected in urine at 766.8 ng/mL and in lung tissue at 164.7 ng/mL. Citalopram and its metabolite n-desmethylcitalopram were detected in urine and liver tissue, as was ibuprofen. No blood was available for FAA testing.

#### **3.3 Descriptions of Detected Substances**

Delta-9-THC is the primary psychoactive chemical in marijuana and hashish, which are products derived from the cannabis plant. Delta-9-THC may be smoked or ingested recreationally by users seeking mind-altering effects. It may also be used medicinally to treat illness-associated nausea and appetite loss. Psychoactive effects of THC vary depending on the user, dose, and route of administration, and may impair motor coordination, reaction time, decision making, problem solving, and

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<sup>1</sup> A pilot who uses levothyroxine for hypothyroidism may qualify for FAA medical certification under [Conditions Aviation Medical Examiners Can Issue \(CACI\) criteria](#), provided the condition is stable, controlled, and without fatigue, mental status impairment, or pulmonary, cardiac, or visual symptoms.

<sup>2</sup> Testing was performed according to NMS Labs Test Codes [8052B](#) and [8062U](#).

<sup>3</sup> 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.

vigilance.<sup>4,5</sup> Delta-9-THC is a federally controlled substance, and the FAA considers it unsuitable for flying, regardless of state cannabis laws.<sup>6,7,8</sup> 11-hydroxy-delta-9-THC is a psychoactive metabolite of delta-9-THC, and carboxy-delta-9-THC is a non-psychoactive metabolite of 11-hydroxy-delta-9-THC.<sup>4</sup>

Citalopram is a prescription medication commonly used to treat depression.<sup>9</sup> Major depression can cause cognitive impairment, particularly of executive function.<sup>10</sup> By contrast, studies of citalopram have not established that it causes cognitive or psychomotor impairment.<sup>11,12</sup> However, citalopram carries a warning that any psychoactive drug may impair judgment, thinking, or motor skills, and that users should be cautioned about operating hazardous machinery, including automobiles, until they are reasonably certain that citalopram does not affect their ability to engage in such activities.<sup>9</sup> A pilot on citalopram may be considered for FAA medical certification via special issuance only, because detailed evaluation of the individual pilot's condition is required, including assessment of the pilot's cognitive function and response to medication.<sup>13</sup> N-desmethylocitalopram is a metabolite of citalopram.

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<sup>4</sup> Couper FJ, Logan BK. Drugs and Human Performance Fact Sheets. National Highway Traffic Safety Administration. DOT HS 809 725. April 2014 (Revised). <https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/809725-drugshumanperformfs.pdf>. Accessed July 23, 2023.

<sup>5</sup> Compton RP. Marijuana-Impaired Driving: A Report to Congress. National Highway Traffic Safety Administration. DOT HS 812 440. July 2017. <https://www.nhtsa.gov/sites/nhtsa.dot.gov/files/documents/812440-marijuana-impaired-driving-report-to-congress.pdf>. Accessed July 23, 2023.

<sup>6</sup> Federal Aviation Administration. Guide for aviation medical examiners: pharmaceuticals (therapeutic medications) do not issue - do not fly. Federal Aviation Administration website. [https://www.faa.gov/ame\\_guide/pharm/dni\\_dnf](https://www.faa.gov/ame_guide/pharm/dni_dnf). Updated July 10, 2023. Accessed July 23, 2023.

<sup>7</sup> Federal Aviation Administration. Aeromedical factors. In: *Pilot's Handbook of Aeronautical Knowledge*. FAA-H-8083-25C. Oklahoma City: United States Department of Transportation, Federal Aviation Administration, Airman Testing Standards Branch, AFS-630; 2023. [https://www.faa.gov/regulations\\_policies/handbooks\\_manuals/aviation/phak/media/19\\_phak\\_ch17.pdf](https://www.faa.gov/regulations_policies/handbooks_manuals/aviation/phak/media/19_phak_ch17.pdf). Accessed July 23, 2023.

<sup>8</sup> Federal Aviation Administration. Controlled substances and CBD products. Guide for Aviation Medical Examiners. [https://www.faa.gov/about/office\\_org/headquarters\\_offices/avs/offices/aam/ame/guide/media/Controlled\\_Substances\\_and\\_CBD\\_Products.pdf](https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/media/Controlled_Substances_and_CBD_Products.pdf). Updated May 25, 2022. Accessed July 23, 2023.

<sup>9</sup> National Institutes of Health National Library of Medicine. Celexa. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=4259d9b1-de34-43a4-85a8-41dd214e9177>. Updated February 28, 2022. Accessed July 23, 2023.

<sup>10</sup> Snyder HR. Major depressive disorder is associated with broad impairments on neuropsychological measures of executive function: a meta-analysis and review. *Psychol Bull.* 2013;139(1):81-132. doi:10.1037/a0028727.

<sup>11</sup> Fairweather DB, Pozzo CD, Kerr JS, Lafferty SV, Hindmarch I. Citalopram compared to dothiepin and placebo: effects on cognitive function and psychomotor performance. *Hum Psychopharmacol.* 1997;12(2):119-126.

<sup>12</sup> Paul MA, Gray QW, Love RJ, Lange M. SSRI effects on psychomotor performance: assessment of citalopram and escitalopram on normal subjects. *Aviat Space Environ Med.* 2007;78(7):693-697.

<sup>13</sup> Federal Aviation Administration. Guide for aviation medical examiners: decision considerations - aerospace medical dispositions, item 47, psychiatric conditions - use of antidepressant medications. Federal Aviation

Escitalopram is a component of citalopram (one of two mirror-image molecules of citalopram) and is also sold as a prescription medication.<sup>14</sup>

Caffeine is a central nervous system stimulant that is commonly ingested, including in coffee, tea, soft drinks, and chocolate, and is also an ingredient in certain anti-drowsiness medications and headache medications.<sup>15,16</sup> Ibuprofen is an anti-inflammatory medication that is available over the counter and is commonly used to treat pain and fever.<sup>17</sup> Caffeine and ibuprofen are not generally considered impairing.

## **E. SUMMARY OF MEDICAL FACTS**

The 57-year-old male uncertificated pilot's only aviation medical examination was on November 4, 1980. At that time, he reported no medication use and no active medical conditions. He was issued a third-class medical certificate without limitation. That certificate was expired when the crash occurred.

According to the pilot's autopsy report, his cause of death was multiple blunt force traumatic injuries and his manner of death was accident. Structural evaluation of the brain was limited by the severity of injury. Within this limitation, the autopsy did not identify significant natural disease. The death investigation report included in the autopsy report noted that the pilot had a history of hypothyroidism treated with levothyroxine.

The pilot's postmortem toxicological testing detected the primary psychoactive component of cannabis, delta-9-THC, as well as its metabolites 11-hydroxy-delta-9-THC and carboxy-delta-9-THC, in cavity blood, urine, and lung tissue specimens. The antidepressant medication citalopram and its metabolite n-desmethylcitalopram were detected in urine and liver tissue; citalopram (or its component escitalopram) was also detected in cavity blood. The pilot's postmortem

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Administration website. [https://www.faa.gov/about/office\\_org/headquarters\\_offices/avs/offices/aam/ame/guide/app\\_process/exam\\_tech/item47/amd/antidepressants](https://www.faa.gov/about/office_org/headquarters_offices/avs/offices/aam/ame/guide/app_process/exam_tech/item47/amd/antidepressants). Updated June 28, 2023. Accessed July 23, 2023.

<sup>14</sup> National Institutes of Health National Library of Medicine. Lexapro. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=13bb8267-1cab-43e5-acae-55a4d957630a>. Updated May 12, 2023. Accessed July 23, 2023.

<sup>15</sup> National Institutes of Health National Library of Medicine. NoDoz Alertness Aid. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=e700e809-29b5-799e-e053-2a95a90a235c>. Updated October 11, 2022. Accessed July 23, 2023.

<sup>16</sup> National Institutes of Health National Library of Medicine. Fioricet. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=c018be7d-f7b8-45e2-97b8-8e7a71740657>. Updated January 1, 2021. Accessed July 23, 2023.

<sup>17</sup> National Institutes of Health National Library of Medicine. Advil. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=5be198b8-396e-4b44-8819-e2e3b5d2ad0e>. Updated October 18, 2022. Accessed July 23, 2023.

toxicological testing did not identify any other substances likely to have impairing effects.

Submitted by:

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