



# NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering  
Washington, DC

## Medical Factual Report

May 8, 2020

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### **A. ACCIDENT: ANC19FA033; Ketchikan, AK**

On July 11, 2019, about 1419 Alaska daylight time, a Piper PA-24-180 airplane, N5840P, sustained substantial damage after impacting terrain during a visual approach about 4 miles south of Ketchikan International Airport, (KTN) Ketchikan, Alaska. The airline transport pilot sustained fatal injuries. The airplane was registered to the Law Offices of Michael P Nash PC and operated by the pilot, under the provisions of 14 *Code of Federal Regulations* Part 91 as a personal visual flight rules (VFR) flight. Marginal visual meteorological conditions prevailed at the destination and no flight plan had been filed. The flight departed Friday Harbor Airport (FHR), Friday Harbor, Washington, about 1010 Alaska daylight time.<sup>1</sup>

### **B. GROUP IDENTIFICATION**

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

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

#### **1. Purpose**

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

#### **2. Methods**

The Federal Aviation Administration (FAA) medical case review, autopsy and toxicology reports, and glucometer record from the day of the accident were reviewed. Investigator reports and relevant regulation and medical literature were also reviewed.

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<sup>1</sup> Summary taken from this accident's National Transportation Safety Board Aviation Accident Preliminary Report, originally published August 1, 2019.

### 3. Findings

#### a. FAA Medical Case Review

According to the FAA medical case review, the 68-year-old male pilot reported 12,580 total civil flight hours as of his last medical examination, dated June 4, 2019. At that time, he was 70 inches tall and weighed 257 pounds. He had previously reported high blood pressure and diabetes mellitus. He reported using aspirin/salicylate (an over-the-counter anti-inflammatory drug used to reduce cardiovascular risk and/or to treat pain/fever), lisinopril (a prescription drug used to treat high blood pressure), and multivitamins; none of those drugs is considered impairing.<sup>2,3</sup>

He also reported using the prescription diabetes medications metformin, liraglutide, insulin glargine (long-acting insulin), and insulin lispro (rapid-acting insulin).<sup>4,5,6,7</sup> He had previously been granted special issuance medical certification because of his diabetes.<sup>8</sup> At his last medical examination, the pilot reported no changes in his medication regimen, no side effects, and no concerns. The aviation medical examiner identified no issues, and deferred issuance of a new third-class medical certificate to the FAA.

The pilot's prior special issuance medical certificate expired June 30, 2019, and, as of the accident date, the pilot had not been issued a new medical certificate.

#### b. Glucometer Record

The pilot's family provided the investigator in charge with a photograph of readings that had reportedly been uploaded to an application from the pilot's glucometer on the day of the accident. Based on that photograph, the pilot had

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<sup>2</sup> National Institutes of Health National Library of Medicine. Bayer genuine aspirin. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=44a08904-68b9-4d06-a28d-21aae3d6140c>. Updated October 26, 2017. Accessed May 1, 2020.

<sup>3</sup> National Institutes of Health National Library of Medicine. Prinivil. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=f6f3c339-2c9d-4d07-14a1-6d6c7daf26c6>. Updated November 4, 2019. Accessed May 1, 2020.

<sup>4</sup> National Institutes of Health National Library of Medicine. Glucophage. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=4a0166c7-7097-4e4a-9036-6c9a60d08fc6>. Updated May 31, 2018. Accessed May 1, 2020.

<sup>5</sup> National Institutes of Health National Library of Medicine. Victoza. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=5a9ef4ea-c76a-4d34-a604-27c5b505f5a4>. Updated September 6, 2019. Accessed May 1, 2020.

<sup>6</sup> National Institutes of Health National Library of Medicine. Lantus. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=d5e07a0c-7e14-4756-9152-9fea485d654a>. Updated December 6, 2019. Accessed May 1, 2020.

<sup>7</sup> National Institutes of Health National Library of Medicine. Humalog. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=c8ecbd7a-0e22-4fc7-a503-faa58c1b6f3f>. Updated November 25, 2019. Accessed May 1, 2020.

<sup>8</sup> Authorization for special issuance was initially granted February 2, 2007, for diabetes controlled on oral medication. According to the FAA medical case review, the pilot's diabetes was stable on oral medication until 2014, when he started insulin; his medical certification was denied June 9, 2014. New authorization for special issuance was issued August 8, 2014, for diabetes controlled on insulin. According to the medical case review, followup reports were reportedly favorable through 2018.

checked his blood sugar at 0834, 0931, 1119, 1241, and 1414 on the day of the accident (all times Alaska daylight time). Measurements ranged from 107 to 157 milligrams per deciliter (mg/dL). His 1414 measurement was 128 mg/dL.<sup>9</sup>

c. Autopsy

The pilot's autopsy was performed by the Alaska State Medical Examiner's Office. According to the autopsy report, the cause of death was multiple blunt-impact injuries, and the manner of death was accidental. The autopsy examination of the pilot's heart identified a focus of calcified atherosclerotic stenosis of no more than 30%, involving the left main coronary artery. Visual (non-microscopic) examination of the heart was otherwise unremarkable for natural disease, and no other significant natural disease was identified on the remainder of the autopsy.

d. Toxicology

The Medical Examiner's Office performed dipstick urine screening for ketones (products of fat metabolism) and glucose (sugar); this was moderately positive for ketones and negative for glucose. At the request of the Medical Examiner's Office, NMS Labs performed toxicological screening of the pilot's femoral blood; this was negative for all tested-for substances (which did not include chlorpheniramine).<sup>10</sup>

The FAA's Forensic Sciences Laboratory identified chlorpheniramine in urine, and at 4 nanograms per milliliter (ng/mL) in heart blood.<sup>11</sup> Ibuprofen was also detected in heart blood and urine. Hemoglobin A1C (HbA1c) was measured at 7.2% in heart blood.<sup>12</sup> Vitreous and urine were tested for glucose with normal

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<sup>9</sup> Normal random blood sugar levels depend on the timing of measurement relative to caloric intake. Generally, blood sugars less than 70 mg/dL are considered low, and (in hospitalized patients) random blood sugars greater than 140 mg/dL are considered elevated. For many adults with diabetes, recommended pre-meal blood sugars are between 80 and 130 mg/dL, and recommended peak after-meal blood sugars are less than 180 mg/dL. [American Diabetes Association. Standards of medical care in diabetes – 2020. *Diabetes Care*. 2020;43(Suppl. 1):S1-S212. [http://care.diabetesjournals.org/content/43/Supplement\\_1](http://care.diabetesjournals.org/content/43/Supplement_1). Accessed April 22, 2020.]

<sup>10</sup> NMS Labs screened femoral blood for amphetamines, barbituates, benzodiazepines, buprenorphine/metabolite, cannabinoids, cocaine/metabolites, fentanyl/acetyl fentanyl, methadone/metabolite, methamphetamine/MDA, opiates, oxycodone/oxymorphone, phencyclidine, acetone, ethanol, isopropanol, and methanol.

<sup>11</sup> The FAA Forensic Sciences Laboratory tests specimens for over 1,300 compounds including toxins, prescription and over-the-counter medications, and illicit drugs; information about these compounds can be found at the Civil Aerospace Medical Institute WebDrugs website (<http://jag.cami.jccbi.gov/toxicology>).

<sup>12</sup> HbA1c is an indirect measure of a person's average blood glucose over the lifespan of that person's red blood cells, which is usually about 3 months. In general, HbA1c of 6.5% or higher diagnoses diabetes, and good control of diabetes is considered an HbA1c of less than 7%. Typically, HbA1c of 7.2% represents an estimated average glucose of 160 mg/dL over the 3 months before measurement. [American Diabetes Association. Standards of medical care in diabetes – 2020. *Diabetes Care*. 2020;43(Suppl. 1):S1-S212. [http://care.diabetesjournals.org/content/43/Supplement\\_1](http://care.diabetesjournals.org/content/43/Supplement_1). Accessed April 22, 2020.]

results.<sup>13</sup> NMS Labs performed additional vitreous chemistry at the request of the FAA; this was unremarkable.<sup>14</sup>

e. Descriptions of Detected Substances

Chlorpheniramine is a sedating antihistamine medication that is available over the counter in a variety of cold and allergy products, and is also sometimes used as a sleep aid. Its intended effects generally occur at blood levels ranging from about 10 to 40 ng/mL.<sup>15</sup> Chlorpheniramine typically carries a warning that it may cause drowsiness, and that users should exercise caution when driving a motor vehicle or operating machinery.<sup>16</sup> The FAA considers chlorpheniramine a “do not fly” medication.<sup>17</sup>

Ibuprofen is an anti-inflammatory medication that is available over the counter. It is commonly used to treat pain and/or fever, and sometimes for arthritis and gout.<sup>18</sup> It is not considered impairing.

## D. SUMMARY OF MEDICAL FINDINGS

To the Federal Aviation Administration (FAA), the pilot had reported having high blood pressure and diabetes, and using aspirin/salicylate (an over-the-counter anti-inflammatory medication), lisinopril (a prescription blood pressure medication), multivitamins, and the prescription diabetes medications metformin, liraglutide, and insulin. These drugs are not generally considered impairing. The pilot’s medical certificate was expired as of the beginning of the month of the accident; he had applied for a new medical certificate, but it had been deferred.

According to his glucometer record, the pilot checked his blood sugar five times over the course of the day of the accident, with results from 107 to 157 mg/dL. A blood sugar of 128 mg/dL was recorded at 1414 Alaska daylight time.

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<sup>13</sup> Defined in the report as vitreous glucose 125 mg/dL or less and urine glucose 100 mg/dL or less.

<sup>14</sup> NMS Labs measured vitreous creatinine, sodium, potassium, chloride, and urea nitrogen.

<sup>15</sup> Federal Aviation Administration Civil Aerospace Medical Institute. Chlorpheniramine. Forensic Toxicology’s WebDrugs. <http://jag.cami.jccbi.gov/toxicology/DrugDetail.asp?did=29>. Updated January 16, 2019. Accessed May 1, 2020.

<sup>16</sup> National Institutes of Health National Library of Medicine. Chlorpheniramine. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=8ffa168c-fe8a-4cd0-978d-c23678171e3f>. Updated April 23, 2019. Accessed May 1, 2020.

<sup>17</sup> A pilot may not fly while using any drug that affects the pilot’s faculties in any way contrary to safety. After taking a sedating antihistamine like chlorpheniramine, a pilot may fly only after an appropriate wait time has elapsed. [Office of the Federal Register. 14 CFR 91.17. Electronic Code of Federal Regulations. [https://www.ecfr.gov/cgi-bin/text-idx?node=se14.2.91\\_117](https://www.ecfr.gov/cgi-bin/text-idx?node=se14.2.91_117). Updated April 29, 2020. Accessed May 1, 2020.] [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/go/dni>. Updated February 21, 2019. Accessed May 1, 2020.]

<sup>18</sup> National Institutes of Health United States National Library of Medicine. Advil. DailyMed. <https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=5be198b8-396e-4b44-8819-e2e3b5d2ad0e>. Updated June 6, 2019. Accessed May 1, 2020.

According to the autopsy performed by the Alaska State Medical Examiner's Office, the pilot's cause of death was multiple blunt-impact injuries. Examination of his heart identified a focus of calcified atherosclerotic stenosis of no more than 30%, involving the left main coronary artery. There were no other autopsy findings of significant natural disease.

Toxicology identified the sedating antihistamine medication chlorpheniramine at 4 ng/mL in the pilot's heart blood; it was also found in urine. The non-impairing medication ibuprofen was detected in heart blood and urine. Hemoglobin A1C was 7.2% in heart blood. Vitreous chemistry was unremarkable. Two urine tests found no abnormal glucose; one found moderate ketones (products of fat metabolism).