NATIONAL TRANSPORTATION SAFETY BOARD

Office of Research and Engineering
Washington, DC

Medical Factual Report

September 21, 2021

Mary Pat McKay, MD, MPH
Chief Medical Officer

A. ACCIDENT: HWY20MH002: Mt Pleasant TWP, PA

Location:	Interstate 70/76 (I-70/76), Pennsylvania Turnpike at mile-marker 86.1 westbound, Mount Pleasant Township, in Westmoreland County, Pennsylvania
Vehicle #1:	2005 Van Hool 57-passenger motorcoach C2045
Operator #1:	58-year-old male (fatally injured)
Occupants:	59 passengers (2 fatalities, 57 various injuries)
Carrier:	Z&D Tour Inc., Rockaway, NJ
Vehicle #2:	2018 Freightliner Cascadia truck-tractor towing a 2019, 53-foot Hyundai Translead semitrailer
Operator #2:	35-year-old male (not injured)
Passenger:	35-year-old-male (minor injury)
Carrier:	Fed Ex Ground, Moon Township, PA
Vehicle #3:	2018 Freightliner Cascadia truck-tractor towing a 2018, 53-foot Stoughton semitrailer

Operator #3:	53-year-old male (fatally injured)
Passenger:	48-year-old male (fatally injured)
Carrier:	United Parcel Service, Harrisburg, PA
Vehicle #4:	2007 Mercedes Benz C280 sedan
Operator #4:	46-year-old male (not injured)
Passenger:	20-year-old-male (not injured)
Passenger:	20-year-old-male (not injured)
Vehicle #5:	2018 Freightliner Cascadia truck-tractor towing a 2020, 28.5-foot Stoughton semitrailer
Operator #5:	62-year-old male (not injured)
Passenger:	41-year-old male (not injured)
Carrier:	United Parcel Service, Willow Grove, PA
Date:	January 5, 2020
Time:	Approximately 3:30 a.m. local time

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 commercial drivers for medical conditions, the use of medications/illicit drugs, and the presence of toxins.

2. Methods

The autopsy reports, toxicology findings, and investigator's reports were reviewed. Relevant regulation and medical literature were reviewed as appropriate.

Vehicle 1: Motorcoach Driver (fatal)

Commercial Driver License Examination

The 58 year old male driver of the motorcoach had undergone a routine commercial driver medical examination May 31, 2019. At that time, he reported smoking cigarettes and having had an appendectomy as a child. He was recorded as 70 inches tall and 200 pounds (Body Mass Index (BMI) 28.7 kg/m^2 – indicating overweight).[1] No significant abnormalities were identified, and he was issued a medical certificate valid for 2 years.

Autopsy

According to the autopsy performed by Cyril H. Wecht and Pathology Associates, Inc. at the request of the Westmoreland County Coroner, the cause of death was blunt force trauma of the head. The autopsy also identified evidence of hypertensive and atherosclerotic heart disease with thickening of the left wall and septum of the heart to 1.8 cm (average for men is 1.3 cm^2) and two areas of 50 and 75% arterial stenosis in the coronary arteries. There was no visible evidence of any acute or previous ischemia.

Toxicology

1. Toxicology testing performed as required by statute by the Pennsylvania Department of Health Bureau of Laboratories tested heart blood obtained during the autopsy and did not identify any tested-for substances.[3]

2. Toxicology testing was performed by NMS Labs at the request of the pathologist on peripheral blood obtained during the autopsy identified caffeine.[4] Caffeine is the mild stimulant commonly found in coffee, tea, and some sodas.

3. Toxicology testing performed by the FAA's Forensic Sciences Laboratory did not identify any tested for substances in urine, or any alcohols in blood.[5]

Vehicle 2: Fed Ex Driver (uninjured)

Commercial Driver License Examination

The 35 year old male driver of the Fed Ex combination vehicle had undergone a routine commercial driver medical examination July 22, 2019. At that time, he reported using no medication but smoking cigarettes and having bipolar disease "cleared by doctor." The certified medical examiner noted, "Not diagnosed as bipolar, given medication for

temporary issue." He was noted to be 74 inches tall and weigh 225 pounds (BMI 28.9 kg/m^2 – indicating overweight).[1] No significant abnormalities were identified, and he was issued a medical certificate valid for 2 years.

DOT Postaccident Toxicology Testing

DOT mandated postaccident breath testing for alcohol and urine drug testing was negative for this 35 year old male commercial driver.[6]

Vehicle 3: UPS Driver #1 (fatal)

Commercial Driver License Examination

The 53 year old male driver of the first UPS combination vehicle had undergone a routine commercial driver medical examination October 25, 2019. At that time, he reported using prescription lisinopril to treat high blood pressure, having had emergency surgery to repair a traumatic injuries to his diaphragm and pelvis many years previously, and having had a kidney removed for cancer in 2018. He was recorded as being 74 inches tall and weighing 276 pounds (BMI 35.4 kg/m^2 – indicating obesity).[1] No significant abnormalities were identified, and he was issued a medical certificate valid for 1 year because of his high blood pressure.

Autopsy

According to the autopsy performed by Cyril H. Wecht and Pathology Associates, Inc. at the request of the Westmoreland County Coroner, the cause of death was blunt force. In addition, moderate atherosclerotic stenosis (75%) of left anterior descending coronary artery was identified. The aortic valve was stenotic. The pathologist reported the presence of hypertensive cardiovascular disease based on septal and left ventricular wall thickness of 2.2 cm. (Average for a male of similar size is 1.3 cm.[7]) The left kidney was surgically absent.

Personal Medical Records

Records from the UPS driver's primary care provider for the three years preceding the accident were obtained and reviewed. The driver had longstanding high blood pressure most recently controlled with lisinopril. He had had his left kidney removed for kidney cancer in 2018. He had early functional kidney disease in his remaining kidney. Beginning in February 2019, he complained of chronic aching in his bones and was prescribed duloxetine to treat it (see below for a description of this drug). He reported to his providers that it worked well to control his symptoms.

Toxicology

1. Toxicology testing performed as required by statute by the Pennsylvania Department of Health Bureau of Laboratories tested heart blood obtained during the autopsy and identified ethanol at 0.017 gm/dl; methamphetamine at 222 ng/ml and its primary active metabolite, amphetamine, at >500 ng/ml.[2]

Because of inconsistencies with methamphetamine/amphetamine results from the other two toxicology labs (see below) the Pennsylvania Department of Health Bureau of Laboratories tested the second tube of heart blood they had initially received and obtained nearly identical results for methamphetamine and amphetamine. Neither specimen was tested for duloxetine.

2. Toxicology testing was performed by NMS Labs at the request of the pathologist on pooled blood obtained during the autopsy identified ethanol at 0.013 gm/dl, caffeine, and duloxetine at 130 ng/ml. No methamphetamine or amphetamine was identified (reporting cutoff 10 ng/ml for each).[3]

3. Toxicology testing performed by the FAA's Forensic Sciences Laboratory identified ethanol at 0.012 gm/dl along with N-propanol in cavity blood but no ethanol in vitreous. They identified duloxetine in two separate specimens of cavity blood (at 166 ng/ml and 242 ng/ml) as well as in liver. Specific testing for methamphetamine and amphetamine in these samples were negative (reporting cutoff 5 ng/ml for each).[4]

The presence of high levels of methamphetamine and amphetamine in the specimens received by the Pennsylvania Department of Health Bureau of Laboratories is inconsistent with the absence of any of either substance in any of the other specimens, using methods capable of detecting low levels of those substances. These results indicate the specimens did not come from the same individual. The presence of the driver's prescribed medication, duloxetine, in two sets of samples indicate the samples tested by NMS Labs and the FAA Forensic Sciences Laboratory belonged to UPS Driver #1 and the specimens containing methamphetamine did not.

Reports of this inconsistency have been made to the Westmoreland County Coroner, the individual pathologist and the pathology LLC who performed the autopsy, PA Department of Health Bureau of Laboratories. All are further researching the issue.

Substance Descriptions

Duloxetine is a prescription medication that works in the brain. It is indicated for the treatment of depression, anxiety, nerve pain, and chronic musculoskeletal pain. There is limited information about whether or how much duloxetine may impair users' cognition or psychomotor functioning. This is the instruction given to prescribers, "Although in controlled studies duloxetine ... has not been shown to impair psychomotor performance, cognitive function, or memory, it may be associated with sedation and dizziness. Therefore, caution patients about operating hazardous machinery including automobiles, until they are reasonably certain that

duloxetine ... therapy does not affect their ability to engage in such activities."[8]

Ethanol is the intoxicant commonly found in beer, wine, and liquor. It is also produced after death by microbial activity but the vitreous and urine are less susceptible to this production. It acts as a central nervous system depressant. After ingestion, at low doses, it impairs judgment, psychomotor functioning, and vigilance; at higher doses, it can cause coma and death.[9] However, ethanol can also be produced by microbial activity in postmortem tissues; results in postmortem tests may not indicate antemortem ingestion.[10]

Methamphetamine is central nervous system stimulant available by prescription as a Schedule II controlled substance. Because of its high potential for abuse, when used as a prescription medication for attention deficit hyperactivity disorder and narcolepsy, use is recommended to be limited.[11] It is also available as an illicit drug. Oral doses used as a medication typically produce blood levels in the range of 20-50 ng/ml. Recreational users seeking the intense euphoria produced by higher levels snort, smoke, or inject the drug and may reach levels above 2000 ng/ml. Its primary effects when smoked, snorted, or injected are euphoria, excitation, and increased energy. However, these effects wear off quickly and lead to exhaustion and withdrawal. All of these phases are potentially impairing. Methamphetamine's primary metabolite is amphetamine.[12]

Vehicle 5: UPS Driver #2 (uninjured)

Commercial Driver License Examination

The 62 year old male driver of the second UPS combination vehicle had undergone a routine commercial driver medical examination September 2, 2019. At that time, he reported no use of medications and no medical conditions. However, the certified medical examiner noted he had high blood pressure treated with hydrochlorothiazide and lisinopril, high cholesterol treated with atorvastatin, and had undergone a removal of his prostate gland in June, 2019 with a well healed incision. The driver was recorded as 68 inches tall and weighing 182 pounds and as having a BMI of 28. No significant abnormalities were identified and the driver was issued a medical certificate valid for 1 year because of his high blood pressure.

DOT Postaccident Toxicology Testing

DOT mandated postaccident breath testing for alcohol and urine drug testing was negative for this 62 year old male driver.[5]

D. SUMMARY OF MEDICAL FINDINGS

Vehicle 1: Motorcoach Driver

The 58 year old male driver of the motorcoach had undergone a routine commercial driver medical examination May 31, 2019. He was noted to be a smoker and be overweight. He was issued a medical certificate valid for 2 years.

According to the autopsy performed by Cyril H. Wecht and Pathology Associates, Inc. at the request of the Westmoreland County Coroner, the cause of death was blunt force trauma of the head. The autopsy also identified evidence of hypertensive and atherosclerotic heart disease with thickening of the left wall and septum of the heart to 1.8 cm and two areas of 50 and 75% arterial stenosis in the coronary arteries. There was no visible evidence of any acute or previous ischemia.

1. Toxicology testing performed as required by statute by the Pennsylvania Department of Health Bureau of Laboratories tested heart blood obtained during the autopsy and did not identify any tested-for substances.

2. Toxicology testing was performed by NMS Labs at the request of the pathologist on peripheral blood obtained during the autopsy identified caffeine. Caffeine is the mild stimulant commonly found in coffee, tea, and some sodas.

3. Toxicology testing performed by the FAA's Forensic Sciences Laboratory did not identify any tested for substances in urine, or any alcohols in blood.

Vehicle 2: Fed Ex Driver

The 35 year old male driver of the Fed Ex combination vehicle had undergone a routine commercial driver medical examination July 22, 2019. At that time, he reported using no medication but smoking cigarettes and having bipolar disease "cleared by doctor." The certified medical examiner noted, "Not diagnosed as bipolar, given medication for temporary issue." He was noted to be overweight. No significant abnormalities were identified, and he was issued a medical certificate valid for 2 years.

The 35 year old male commercial Fed Ex driver underwent DOT mandated postaccident breath testing for alcohol and urine drug testing, which was negative.

Vehicle 3: UPS Driver #1

The 53 year old male driver of the first UPS combination vehicle had undergone a routine commercial driver medical examination October 25, 2019. At that time, he reported using prescription lisinopril to treat high blood pressure, having had emergency surgery to repair a traumatic injuries to his diaphragm and pelvis many years previously, and having had a kidney removed for cancer in 2018. He was noted to be obese. No significant abnormalities were identified, and he was issued a medical certificate valid for 1 year because of his high blood pressure.

According to the autopsy performed by Cyril H. Wecht and Pathology Associates, Inc. at the request of the Westmoreland County Coroner, the cause of death was blunt force. In

addition, moderate atherosclerotic stenosis (75%) of left anterior descending coronary artery was identified. The aortic valve was stenotic. The pathologist reported the presence of hypertensive cardiovascular disease based on septal and left ventricular wall thickness of 2.2 cm. The left kidney was surgically absent.

Records from the UPS driver's primary care provider for the three years preceding the accident were obtained and reviewed. The driver had longstanding high blood pressure most recently controlled with lisinopril. He had had his left kidney removed for kidney cancer in 2018. He had early functional kidney disease in his remaining kidney. Beginning in February 2019, he complained of chronic aching in his bones and was prescribed duloxetine to treat it (see below for a description of this drug). He reported to his providers that it worked well to control his symptoms.

1. Toxicology testing performed as required by statute by the Pennsylvania Department of Health Bureau of Laboratories tested heart blood obtained during the autopsy and identified ethanol at 0.017 gm/dl; methamphetamine at 222 ng/ml and its primary active metabolite, amphetamine, at >500 ng/ml.

Because of inconsistencies with methamphetamine/amphetamine results from the other two toxicology labs (see below) the Pennsylvania Department of Health Bureau of Laboratories tested the second tube of heart blood they had initially received and obtained nearly identical results for methamphetamine and amphetamine. Neither specimen was tested for duloxetine.

2. Toxicology testing was performed by NMS Labs at the request of the pathologist on pooled blood obtained during the autopsy identified ethanol at 0.013 gm/dl, caffeine, and duloxetine at 130 ng/ml. No methamphetamine or amphetamine was identified (reporting cutoff 10 ng/ml for each).

3. Toxicology testing performed by the FAA's Forensic Sciences Laboratory identified ethanol at 0.012 gm/dl along with N-propanol in cavity blood but no ethanol in vitreous. They identified duloxetine in two separate specimens of cavity blood (at 166 ng/ml and 242 ng/ml) as well as in liver. Specific testing for methamphetamine and amphetamine in these samples were negative (reporting cutoff 5 ng/ml for each).

<u>Vehicle 5: UPS Driver #2</u>
The 62 year old male driver of the second UPS combination vehicle had undergone a routine commercial driver medical examination September 2, 2019. At that time, he reported no use of medications and no medical conditions. However, the certified medical examiner noted he had high blood pressure treated with hydrochlorothiazide and lisinopril, high cholesterol treated with atorvastatin, and had undergone a removal of his prostate gland in June, 2019 with a well healed incision. He was noted to be overweight. The driver was issued a medical certificate valid for 1 year because of his high blood pressure.

The 62 year old male driver underwent DOT mandated postaccident breath testing for alcohol and urine drug testing which was negative.

References

[1] NIH. National Heart Lung, and Blood Institute. Calculated Your Body Mass Index. https://www.nhlbi.nih.gov/health/educational/lose_wt/BMI/bmicalc.htm Accessed 1/28/2021.
[2] Kitzman DW, Scholz DG, Hagen PT, Ilstrup DM, Edwards WD. Age-related changes in normal human hearts during the first 10 decades of life. Part II (Maturity): A quantitative anatomic study of 765 specimens from subjects 20 to 99 years old. Mayo Clinic Proc., 1988. 63(2): 137-46.
[3] The Pennsylvania Department of Health Bureau of Laboratories tests for ethanol, amphetamine, barbiturate, benzodiazepine, benzoylecgonine, buprenorphine, MDMA, methadone, methamphetamine, opiates, PCP, THC, and tricyclic antidepressants.
[4] NMS Labs Test Code 8052B; Test Name Postmortem, Expanded, Blood (Forensic). Analytes https://www.nmslabs.com/tests/8052B#analytes Accessed 6/3/2020.
[5] The FAA Forensic Sciences Laboratory tests for more than 1300 substances. See http://jag.cami.jccbi.gov/toxicology/default.asp?offset=0 Accessed 8/4/2020.
[6] DOT urine drug testing is limited to identifying urinary metabolites of amphetamine, methamphetamine, cocaine, codeine, morphine, heroin, phencyclidine (PCP), methylenedioxymethamphetamine (MDMA), methylenedioxyamphetamine (MDA), methylenedioxyethylamphetamine (MDEA), tetrahydrocannabinol (THC), oxycodone, oxymorphone, hydrocodone, and hydromorphone.
[7] Kitzman DW, Scholz DG, Hagen PT, Ilstrup DM, Edwards WD. Agre-Related Changed in Normal Human Hears During the First 10 Decase of Life. Part II (Maturitey): A Quantiative Anatomic Study of 765 Specimens from Subjects 20 to 99 Years Old. Mayo Clinic Proceedings. 1988; 63:137-146.
[8] National Institutes of Health, US National Library of Medicine. DailyMed. Duloxetine. https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=0a541d20-5466-433b-a104-40a7b2296076 Accessed 8/7/2020.
[9] Centers for Disease Control and Prevention, Blood Alcohol Concentration Effects https://www.cdc.gov/motorvehiclesafety/pdf/bac-a.pdf Accessed 8/6/2020.
[10] Russell J Lewis, Robert D Johnson, Mike K Angier, Nicole T Vu. Ethanol formation in unadulterated postmortem tissues. Forensic Sci Int. . 2004;146(1):17-24.
[11] National Institutes of Health. US National Library of Medicine. DailyMed. Methamphetamine. https://dailymed.nlm.nih.gov/dailymed/drugInfo.cfm?setid=f31f580f-1f08-4a0f-b078-0b9e3308f712 Accessed 8/5/2020.
[12] National Highway Traffic Safety Administration. Drug Safety Facts. https://www.wsp.wa.gov/breathtest/docs/webdms/DRE_Forms/Publications/drug/Human_Performance_Drug_Fact_Sheets-NHTSA.pdf Accessed 8/5/2020.