NMS LABS

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CONFIDENTIAL

Toxicology Report

Report Issued 10/21/2016 15:02

To: **40910**
Vermont State Police - Williston
Attn: Investigating Officer
2777 St. George Road
Williston, VT 05495

Patient Name BOURGOIN, STEVEN
Patient ID 16A105171
Chain 16313315
Age 36 Y **DOB** [redacted]
Gender Male
Workorder 16313315

Positive Findings:

Compound	Result	Units	Matrix Source
Midazolam	25 ±4	ng/mL	001 - Blood
11-Hydroxy Delta-9 THC	1.2 ±0.3	ng/mL	001 - Blood
Delta-9 Carboxy THC	120 ±20	ng/mL	001 - Blood
Delta-9 THC	10 ±2	ng/mL	001 - Blood
Fentanyl	1.2 ±0.2	ng/mL	001 - Blood
Norfentanyl	<0.20	ng/mL	001 - Blood

Quantitative results are reported as Result +/- Uncertainty of Measurement (UM). Ethanol results are reported at a coverage probability of 99.73%; all other analytes are reported at a coverage probability of 95.45%.

See Detailed Findings section for additional information

Testing Requested:

Analysis Code	Description
8150B	DUID/DRE Panel ProofPOSITIVE®, Blood (Forensic)
8152B	DUID/DRE Expanded Drug Screen Add-On ProofPOSITIVE®, Blood (Forensic)

Specimens Received:

ID	Tube/Container	Volume/ Mass	Collection Date/Time	Matrix Source	Miscellaneous Information
001	Gray Top Tube	9 mL	10/09/2016 05:45	Blood	

All sample volumes/weights are approximations.

Specimens received on 10/14/2016.

Detailed Findings:

Analysis and Comments	Result	Units	Rpt. Limit	Specimen Source	Analysis By
Midazolam	25	ng/mL	5.0	001 - Blood	LC-MS/MS
11-Hydroxy Delta-9 THC	1.2	ng/mL	1.0	001 - Blood	LC-MS/MS
Delta-9 Carboxy THC	120	ng/mL	5.0	001 - Blood	LC-MS/MS
Delta-9 THC	10	ng/mL	0.50	001 - Blood	LC-MS/MS
Fentanyl	1.2	ng/mL	0.10	001 - Blood	LC-MS/MS
Norfentanyl	<0.20	ng/mL	0.20	001 - Blood	LC-MS/MS

Uncertainty of measure could not be calculated for this result.

Other than the above findings, examination of the specimen(s) submitted did not reveal any positive findings of toxicological significance by procedures outlined in the accompanying Analysis Summary.

Reference Comments:

1. 11-Hydroxy Delta-9 THC (Active Metabolite) - Blood:

   11-Hydroxy Delta-9 THC is an active intermediate metabolite of tetrahydrocannabinol (THC) the active component of marijuana. THC (Tetrahydrocannabinol) is the active component of marijuana, and cannabis. THC is extensively metabolized to active 11-hydroxy-THC and inactive 9-carboxy-THC metabolites.

2. Delta-9 Carboxy THC (Inactive Metabolite) - Blood:

   Delta-9-carboxy-THC (THCC) is the inactive metabolite of THC (tetrahydrocannabinol) the major active component of marijuana, and cannabis. After smoking a user-preferred 300 mcg/kg dose average THC concentrations at 35 minutes were reported at 16.1 (range 4.7 - 30.9) ng/mL, and had declined to 1.5 (range 0.4 - 3.2) ng/mL after 190 minutes. Corresponding concentrations of THCC were 15.3 (range 4.2 - 39.6) at 35 minutes last use, and 10.0 (range 1.5 - 36.3) at 190 minutes. While THC disappears from the blood rapidly, THCC may persist for several hours, and in heavy chronic use may be present at low concentrations for several days. In a population of 3102 drivers arrested for driving under the influence, Carboxy-THC concentrations ranged from 1 - > 100 ng/mL, with a median of 18.0 ng/mL. Other drugs may also have been present.

3. Delta-9 THC (Active Ingredient of Marijuana) - Blood:

   Delta-9-THC is the principle psychoactive ingredient of marijuana (cannabis, hashish). It is also the active component of the prescription medication Marinol®. Whole blood THC concentrations are typically half those in a corresponding plasma sample. After smoking a user-preferred 300 mcg/kg dose average THC concentrations at 35 minutes were reported at 16.1 (range 4.7 - 30.9) ng/mL, and had declined to 1.5 (range 0.4 - 3.2) ng/mL after 190 minutes. Marijuana use causes relaxation, distorted perception, euphoria and feelings of well being, along with confusion, dizziness, somnolence, ataxia, speech difficulties, lethargy and muscular weakness. Effects of marijuana use on driving ability may include weaving, inattention, poor coordination and slowed reaction time with increased error rates in complex tasks. These effects worsen with increased THC concentrations. Peak effects typically last from 1-4 hours. THC concentrations in the blood decline rapidly after use, and may be undetectable within 1-3 hours following smoking. Numerous studies have associated marijuana use with impaired driving performance.

4. Fentanyl (Duragesic®; Sublimaze®) - Blood:

   Fentanyl is a DEA Schedule II synthetic morphine substitute anesthetic/analgesic. It is reported to be 80 to 200 times as potent as morphine and has a rapid onset of action as well as addictive properties.

   It is reported that patients lost consciousness at mean plasma levels of fentanyl of 34 ng/mL when infused with 75 mcg/Kg over a 15 min period; peak plasma levels averaged 50 ng/mL.

   After application of a fentanyl transdermal preparation (patch), serum fentanyl concentrations are reported to be in the following ranges within 24 hours:
   25 mcg/hour patch: 0.3 - 1.2 ng/mL
   50 mcg/hour patch: 0.6 - 1.8 ng/mL
   75 mcg/hour patch: 1.1 - 2.6 ng/mL
   100 mcg/hour patch: 1.9 - 3.8 ng/mL

Reference Comments:

Following removal of the patch, serum fentanyl concentrations are reported to decrease with a mean elimination half-life of 17 hours (range, 13 to 22 hours).

The mean peak plasma serum fentanyl concentration in adults given an 800 mcg oral transmucosal fentanyl preparation over 15 minutes is reported at 2.1 ng/mL (range, 1.4 - 3.0 ng/mL) at approximately 0.4 hours.

Signs associated with fentanyl toxicity include severe respiratory depression, seizures, hypotension, coma and death.

5. Midazolam (Versed®) - Blood:

Midazolam is a short acting benzodiazepine with sedative/hypnotic properties and is a strong central nervous system depressant. It is used for preoperative sedation, as a sedative hypnotic and as an agent for the induction of anesthesia. Alcohol greatly enhances the activity of benzodiazepines, and they have significant abuse potential. Common adverse effects of diazepam include drowsiness, fatigue, double vision, sedation, dizziness, weakness, unsteadiness and disorientation. Signs of CNS depression can include horizontal gaze nystagmus, lack of convergence of the eyes, normal pupil size with slow reaction to light, and reduced pulse and blood pressure. Oral doses of 10 mg midazolam given to 20 subjects produced average peak plasma concentrations (at 1 hr. post dose) for midazolam of 69 ng/mL in males and 53 ng/mL in females. Laboratory studies have indicated that midazolam can cause significant psychomotor impairment for up to eight hours following use. In 56 drivers arrested for driving under the influence, midazolam concentrations ranged from 5 - 1190 ng/mL, with a mean of 60 ng/mL. Other drugs may also have been present. Studies confirm that midazolam is capable of causing significant impairment in driving and psychomotor abilities.

6. Norfentanyl (Fentanyl Metabolite) - Blood:

Norfentanyl is the primary inactive metabolite of the synthetic narcotic analgesic fentanyl.

Unless alternate arrangements are made by you, the remainder of the submitted specimens will be discarded six (6) months from the date of this report; and generated data will be discarded five (5) years from the date the analyses were performed.

Workorder 16313315 was electronically signed on 10/21/2016 14:27 by:

Matthew M. McMullin, M.S., F-ABFT, TC (NRCC)
Forensic Toxicologist

Analysis Summary and Reporting Limits:

All of the following tests were performed for this case. For each test, the compounds listed were included in the scope. The Reporting Limit listed for each compound represents the lowest concentration of the compound that will be reported as being positive. If the compound is listed as None Detected, it is not present above the Reporting Limit. Please refer to the Positive Findings section of the report for those compounds that were identified as being present.

Acode 54002B - Benzodiazepines Confirmation (DUID/DRE), Blood (Forensic)

-Analysis by High Performance Liquid Chromatography/ TandemMass Spectrometry (LC-MS/MS) for:

Compound	Rpt. Limit	Compound	Rpt. Limit
7-Amino Clonazepam	5.0 ng/mL	Diazepam	20 ng/mL
Alpha-Hydroxyalprazolam	5.0 ng/mL	Estazolam	5.0 ng/mL
Alprazolam	5.0 ng/mL	Flurazepam	2.0 ng/mL
Chlordiazepoxide	20 ng/mL	Hydroxyethylflurazepam	5.0 ng/mL
Clobazam	20 ng/mL	Hydroxytriazolam	5.0 ng/mL
Clonazepam	2.0 ng/mL	Lorazepam	5.0 ng/mL
Desalkylflurazepam	5.0 ng/mL	Midazolam	5.0 ng/mL

Analysis Summary and Reporting Limits:

Compound	Rpt. Limit	Compound	Rpt. Limit
Nordiazepam	20 ng/mL	Temazepam	20 ng/mL
Oxazepam	20 ng/mL	Triazolam	2.0 ng/mL

Acode 54003B - Cannabinoids Confirmation (DUID/DRE), Blood (Forensic)

-Analysis by High Performance Liquid Chromatography/ TandemMass Spectrometry (LC-MS/MS) for:

Compound	Rpt. Limit	Compound	Rpt. Limit
11-Hydroxy Delta-9 THC	1.0 ng/mL	Delta-9 THC	0.50 ng/mL
Delta-9 Carboxy THC	5.0 ng/mL		

Acode 54142B - Fentanyl and Metabolite Confirmation (DUID/DRE), Blood (Forensic)

-Analysis by High Performance Liquid Chromatography/ TandemMass Spectrometry (LC-MS/MS) for:

Compound	Rpt. Limit	Compound	Rpt. Limit
Fentanyl	0.10 ng/mL	Norfentanyl	0.20 ng/mL

Acode 8150B - DUID/DRE Panel ProofPOSITIVE®, Blood (Forensic)

-Analysis by Enzyme-Linked Immunosorbent Assay (ELISA) for:

Compound	Rpt. Limit	Compound	Rpt. Limit
Amphetamines	20 ng/mL	Methadone / Metabolite	25 ng/mL
Barbiturates	0.040 mcg/mL	Methamphetamine / MDMA	20 ng/mL
Benzodiazepines	20 ng/mL	Opiates	20 ng/mL
Cannabinoids	10 ng/mL	Oxycodone / Oxymorphone	10 ng/mL
Carisoprodol / Metabolite	500 ng/mL	Phencyclidine	10 ng/mL
Cocaine / Metabolites	20 ng/mL	Zolpidem	5.0 ng/mL

Acode 8152B - DUID/DRE Expanded Drug Screen Add-On ProofPOSITIVE®, Blood (Forensic)

-Analysis by High Performance Liquid Chromatography/ Time ofFlight-Mass Spectrometry (LC/TOF-MS) for: The following is a general list of compound classes included in this screen. The detection of any specific analyte is concentration-dependent. Note, not all known analytes in each specified compound class are included. Some specific analytes outside these classes are also included. For a detailed list of all analytes and reporting limits, please contact NMS Labs.
Amphetamines, Anticonvulsants, Antidepressants, Antihistamines, Antipsychotic Agents, Benzodiazepines, CNS Stimulants, Cocaine and Metabolites, Hallucinogens, Hypnosedatives, Hypoglycemics, Muscle Relaxants, Non-Steroidal Anti-Inflammatory Agents,Opiates and Opioids.