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CONFIDENTIAL

Demo Report

Report Issued 03/31/2020 08:17

To: **88888**
Forensic Example Report
Attn: Example Reports
200 Welsh Road
Horsham, PA 19044

Patient Name 8030SP-POS
Patient ID 8030SP-POS
Chain 20000456
Age Not Given **DOB** Not Given
Gender Not Given
Workorder 20000456

Positive Findings:

Compound	Result	Units	Matrix Source
Ethanol	**85**	**mg/dL**	**001 - Serum or Plasma**
Alprazolam	**50**	**ng/mL**	**001 - Serum or Plasma**
Delta-9 THC	**5.0**	**ng/mL**	**001 - Serum or Plasma**
Cocaine	**50**	**ng/mL**	**001 - Serum or Plasma**
Morphine - Free	**50**	**ng/mL**	**001 - Serum or Plasma**
6-MAM - Free	**50**	**ng/mL**	**001 - Serum or Plasma**
Fentanyl	**5.0**	**ng/mL**	**001 - Serum or Plasma**
MDMA	**50**	**ng/mL**	**001 - Serum or Plasma**

See Detailed Findings section for additional information

Testing Requested:

Analysis Code	Description
8030SP	Drug Facilitated Crime Panel, Serum/Plasma (Forensic)

Specimens Received:

ID	Tube/Container	Volume/ Mass	Collection Date/Time	Matrix Source	Miscellaneous Information
001	Clear vial	Not Given	Not Given	Serum or Plasma	

All sample volumes/weights are approximations.

Specimens received on 03/20/2020.

Detailed Findings:

Analysis and Comments	Result	Units	Rpt. Limit	Specimen Source	Analysis By
Ethanol	85	mg/dL	10	001 - Serum or Plasma	Headspace GC
Alprazolam	50	ng/mL	5.0	001 - Serum or Plasma	LC-MS/MS
Delta-9 THC	5.0	ng/mL	0.50	001 - Serum or Plasma	LC-MS/MS
Cocaine	50	ng/mL	20	001 - Serum or Plasma	GC/MS
Morphine - Free	50	ng/mL	5.0	001 - Serum or Plasma	LC-MS/MS
6-MAM - Free	50	ng/mL	1.0	001 - Serum or Plasma	LC-MS/MS
Ethanol	Confirmed	mg/dL	10	001 - Serum or Plasma	Headspace GC
Fentanyl	5.0	ng/mL	0.10	001 - Serum or Plasma	LC-MS/MS
MDMA	50	ng/mL	5.0	001 - Serum or Plasma	LC-MS/MS

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. 6-MAM - Free (6-Monoacetylmorphine; Heroin Metabolite) - Serum or Plasma:

   6-monoacetylmorphine (6-MAM) is the 6-monoacetylated form of morphine, which is pharmacologically active. When present, it is generally indicative of heroin (diacetylmorphine) use. 6-MAM has also been reported to occur as an artifact in samples with unusually high blood morphine concentrations.

   A healthy man administered 12 mg heroin intravenously achieved peak blood concentrations at two minutes post injection of 150 ng/mL of 6-MAM and 44 ng/mL of morphine, which declined with half-lives of 7 minutes and 33 minutes, respectively.

   Eight subjects who died within fifteen minutes of heroin administration had postmortem blood 6-MAM concentrations averaging 19 ng/mL with a range from less than 1.0 to 82 ng/mL. The blood to plasma ratio is unknown for this substance.

2. Alprazolam (Xanax®) - Serum or Plasma:

   Alprazolam is a DEA Schedule IV second-generation benzodiazepine, which is effective at very low doses. It shares the actions of other benzodiazepines in the management of anxiety disorders and short-term relief of anxiety associated with depressive symptoms. Alpha-hydroxyalprazolam is an active metabolite of alprazolam. Common CNS-depressant side effects of alprazolam include drowsiness and fatigue. For anxiety, daily doses of 0.8 to 4 mg are effective, whereas for phobic and panic disorders 6 to 9 mg daily is recommended.

   Reported therapeutic plasma concentrations of alprazolam are proportional to dose given: 3 mg/day produced steady-state levels of 30 ng/mL; 6 mg/day, 60 ng/mL; and 9 mg/day, 100 ng/mL.

   In reported cases involving driving under the influence, alprazolam concentrations ranged from 8 - 640 ng/mL. Alcohol greatly enhances the activity of benzodiazepines.

   Reported blood concentrations of alprazolam in alprazolam-related fatalities ranged from 100 - 400 ng/mL (mean, 200 ng/mL). In combination with other central nervous system depressants such as ethyl alcohol, alprazolam can become toxic at low concentrations.

Reference Comments:

3. Cocaine - Serum or Plasma:

   Cocaine is a DEA Schedule II controlled central nervous stimulant drug. Effects following cocaine use can include euphoria, excitement, restlessness, risk taking, sleep disturbance, and aggression. A period of mental and physical fatigue and somnolence follow the use of cocaine after the excitant-stimulant effects wear off. Cocaine is metabolized to the inactive compounds benzoylecgonine, ecgonine methyl ester, and ecgonine. Benzoylecgonine and ecgonine methyl ester can form from cocaine breakdown after death and even after sample collection. The average blood cocaine concentration in 906 impaired drivers was 87 ng/mL (range 5 - 2390 ng/mL). Blood cocaine concentrations in patients admitted to an emergency room for cocaine related medical complaints were 260 ng/mL (SD = 500 ng/mL). Cocaine concentrations in plasma following oral administration of 2 g/day over 6 days, averaged 1260 ng/mL. The average blood cocaine concentration in 37 cocaine related fatalities was 4600 ng/mL (range 40 - 31000 ng/mL).

4. Delta-9 THC (Active Ingredient of Marijuana) - Serum or Plasma:

   Marijuana is a DEA Schedule I hallucinogen. Pharmacologically, it has depressant and reality distorting effects. Collectively, the chemical compounds that comprise marijuana are known as Cannabinoids.

   Delta-9-THC is the principle psychoactive ingredient of marijuana/hashish. It rapidly leaves the blood, even during smoking, falling to below detectable levels within several hours. Delta-9-carboxy-THC (THCC) is the inactive metabolite of THC and may be detected for up to one day or more in blood. Both delta-9-THC and THCC may be present substantially longer in chronic users.
   Usual peak levels in serum for 1.75% or 3.55% THC marijuana cigarettes: 50 - 270 ng/mL at 6 to 9 minutes after beginning smoking, decreasing to less than 5 ng/mL by 2 hrs.

5. Ethanol (Ethyl Alcohol) - Serum or Plasma:

   Ethyl alcohol (ethanol, drinking alcohol) is a central nervous system depressant and can cause effects such as impaired judgment, reduced alertness and impaired muscular coordination. Ethanol can also be a product of decomposition or degradation of biological samples.

6. Fentanyl (Duragesic®; Sublimaze®) - Serum or Plasma:

   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

   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. In fatalities from fentanyl, blood concentrations are variable and have been reported as low as 3 ng/mL.

   Substance(s) known to interfere with the identity and/or quantity of the reported result: 4-methylphenethyl acetyl fentanyl

Reference Comments:

7. MDMA (3,4-Methylenedioxymethamphetamine; Ecstasy) - Serum or Plasma:

   MDMA is a DEA Schedule I controlled substance and is a synthetic sympathomimetic compound with mixed stimulant, psychotropic, and hallucinogenic activities. It was used briefly as an adjunct to psychotherapy, but because of widespread abuse it has now been reclassified as a DEA Schedule I compound. It has been most commonly administered orally, in doses between 100 and 150 mg, as the hydrochloride salt.

   Users report that MDMA promotes empathy and feelings of love, or emotional closeness to others. Users also report visual and tactile hallucinations, confusion, agitation and coma. Acutely, users typically have elevated pulse and blood pressure and dilated pupils, with slow reaction to light.

   Peak plasma concentrations at 1.5 to 4 hrs following ingestion of 50 to 150 mg of MDMA were as follows (dose: mean concentration (SD) or range): 50 mg: 20 - 80 ng/mL; 75 mg: 130 ng/mL (40 ng/mL); 100 mg: 190 - 210 ng/mL; 125 mg: 240 ng/mL (0.06); 150 mg: 440 - 490 ng/mL. Plasma MDA (active metabolite) concentrations peaked later (4 to 6 hrs) and never exceeded 5% of the parent compound.

   An administration of 200 mg MDMA produced visual hallucinations, confusion agitation, coma, and hypotension. The MDMA serum concentration in the patient was reported to be 7000 ng/mL. In a second case, an administration of 150 mg of MDMA to a healthy 18 year-old female resulted in death from ventricular fibrillation. Postmortem toxicology findings were blood MDMA of 1000 ng/mL, and blood ethanol of 40 mg/dL.

   The blood to plasma ratio of MDMA is approximately 1.2 - 1.3.

8. Morphine - Free (Codeine Metabolite) - Serum or Plasma:

   Morphine is a DEA Schedule II narcotic analgesic. In analgesic therapy, it is usually encountered as the parent compound, however, it is also commonly found as the metabolite of codeine and heroin. In illicit preparations from which morphine may arise, codeine may be present as a contaminant. A large portion of the morphine is bound to the blood proteins or is conjugated; that which is not bound or conjugated is termed 'free morphine'. Hydromorphone is a reported metabolite of morphine.

   In general, free morphine is the active biologic agent. Morphine has diverse effects that may include analgesia, drowsiness, nausea and respiratory depression. 6-monoacetylmorphine (6-MAM) is the 6-monoacetylated form of morphine, which is pharmacologically active. It is commonly found as the result of heroin use.

   Peak serum concentrations occur within 10 to 20 minutes of a 10 mg/70 kg intramuscular dose, with an average concentration of 60 ng/mL 30 minutes following administration. IV administration of the same dose resulted in an average concentration of 80 ng/mL after 30 minutes. Chronic pain patients receiving an average of 90 mg (range 20 - 1460) daily oral morphine had average serum concentrations of 73 ng/mL (range 13 - 710) morphine. In 15 cases where cause of death was attributed to opiate toxicity (heroin, morphine or both), free morphine concentrations were 0 - 3700 ng/mL (mean = 420 +/- 940). In comparison, in cases where COD was unrelated to opiates (n=20) free morphine was 0 - 850 ng/mL (mean = 90 +/- 200). The ratio of whole blood concentration to serum or plasma concentration is approximately one.

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 50012SP - Benzodiazepines Confirmation, Serum/Plasma

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

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

Analysis Summary and Reporting Limits:

Compound	Rpt. Limit	Compound	Rpt. Limit
Hydroxyethylflurazepam	5.0 ng/mL	Nordiazepam	20 ng/mL
Hydroxytriazolam	5.0 ng/mL	Oxazepam	20 ng/mL
Lorazepam	5.0 ng/mL	Temazepam	20 ng/mL
Midazolam	5.0 ng/mL	Triazolam	2.0 ng/mL

Acode 50013SP - Cannabinoids Confirmation, Serum/Plasma

-Analysis by High Performance Liquid Chromatography/ Tandem Mass 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 50014SP - Cocaine and Metabolites Confirmation, Serum/Plasma

-Analysis by Gas Chromatography/Mass Spectrometry (GC/MS) for:

Compound	Rpt. Limit	Compound	Rpt. Limit
Benzoylecgonine	50 ng/mL	Cocaine	20 ng/mL
Cocaethylene	20 ng/mL		

Acode 50016SP - Opiates - Free (Unconjugated) Confirmation, Serum/Plasma

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

Compound	Rpt. Limit	Compound	Rpt. Limit
6-MAM - Free	1.0 ng/mL	Hydromorphone - Free	1.0 ng/mL
Codeine - Free	5.0 ng/mL	Morphine - Free	5.0 ng/mL
Dihydrocodeine / Hydrocodol - Free	5.0 ng/mL	Oxycodone - Free	5.0 ng/mL
Hydrocodone - Free	5.0 ng/mL	Oxymorphone - Free	1.0 ng/mL

Acode 52250SP - Alcohols and Acetone Confirmation, Serum/Plasma

-Analysis by Headspace Gas Chromatography (GC) for:

Compound	Rpt. Limit	Compound	Rpt. Limit
Acetone	5.0 mg/dL	Isopropanol	5.0 mg/dL
Ethanol	10 mg/dL	Methanol	5.0 mg/dL

Acode 52484SP - Fentanyl and Acetyl Fentanyl Confirmation, Serum/Plasma

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

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

Acode 52491SP - Amphetamines Confirmation, Serum/Plasma

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

Compound	Rpt. Limit	Compound	Rpt. Limit
Amphetamine	5.0 ng/mL	MDMA	5.0 ng/mL
MDA	5.0 ng/mL	Methamphetamine	5.0 ng/mL

Acode 8030SP - Drug Facilitated Crime Panel, Serum/Plasma (Forensic)

Analysis Summary and Reporting Limits:

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

Compound	Rpt. Limit	Compound	Rpt. Limit
Barbiturates	0.040 mcg/mL	Cannabinoids	10 ng/mL

-Analysis by Gas Chromatography/Mass Spectrometry (GC/MS) for:

Compound	Rpt. Limit	Compound	Rpt. Limit
Gamma-Hydroxybutyric Acid	5.0 mcg/mL		

-Analysis by Headspace Gas Chromatography (GC) for:

Compound	Rpt. Limit	Compound	Rpt. Limit
Acetone	5.0 mg/dL	Isopropanol	5.0 mg/dL
Ethanol	10 mg/dL	Methanol	5.0 mg/dL

-Analysis by High Performance Liquid Chromatography/Time of Flight-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.