DRUGGED DRIVING PANEL – TZD 2018

October 24, 2018 – Mankato, MN

BUREAU OF CRIMINAL APPREHENSION
TOXICOLOGY LABORATORY

Donna Zittel, D-ABFT
Forensic Scientist 2
DETERMINATION OF DRUG IMPAIRED DRIVING DEPENDS ON EVIDENCE OF DRUG USE THROUGH LABORATORY TESTING


SAMPLE HANDLING

• Laboratory Analysis Request (LAR) generated and sent to submitting agency

• After generation of LAR, outer kit box resealed

• Kits transferred to the locked refrigerated vault within the secure Toxicology Laboratory – testing will start

• Bemidji & St. Cloud transfer kits to St. Paul
WHAT ARE TESTING DECISION POINTS?

TOXICOLOGY TESTING PROCESS

- Alcohol testing and reporting
- Toxicology requested?
  - Yes
  - No
- Alcohol/Inhalants requested?
  - Yes
  - No
- Presumptive positives?
  - Yes
  - No
- Confirmatory testing
- Report and Disposition
- Toxicology Screening
- No
  - Disposition
ASSESSMENT FOR TOXICOLOGY ANALYSIS

• Alcohol testing results
  – Alc is <0.08x, and Tox testing is requested on kit sheet → drug screening
  – Some drugs have a magnified effect when alcohol is present, ie. benzodiazepines, cocaine, THC.

• DWI only cases, and alcohol is >0.08x, generally no drug screening.
  – Factors that may influence this: uncertainty range, time between incident and collection
  – Case circumstances

WHAT ARE LABORATORY TESTING CAPABILITIES AND WHAT TYPE OF SAMPLE IS BEST?
BLOOD DRUG SCREENING: DRUG CLASSES

- Cannabinoids (THC)
- Cocaine
- Opiates
- Amphetamines
- PCP
- Barbiturates
- Benzodiazepines
- Methadone
- Zolpidem
- Carisoprodol

URINE DRUG SCREENING

- Liquid chromatography tandem mass spectrometry
- Urine = 88 drugs and/or metabolites
- Mass spectral technique indicates the specific drug not just a class
  - High specificity and sensitive
  - Confirmatory tests ordered for all positive analytes (except THCA)
TOXICOLOGY ANALYSIS

STEP 1

• **Screening** – all samples get screened for the same drug classes no matter what drug is written on kit sheet – based on **matrix** type

STEP 2

• **Confirmation** – based upon screening results and/or upon request

EXPANDED ANALYSIS REQUESTS

SEE BCA – TOXICOLOGY WEBSITE FOR ANALYSIS CAPABILITIES

• Currently screened for in urine (available upon request in blood)
  – Bath Salts – Fentanyl(s) – Ketamine – Trazodone – Phenytoin
  – Methylphenidate – Diphenhydramine – Cyclobenzaprine
  – Tramadol – Buprenorphine – Dextromethorphan – Meperidine

• Screened for in urine – (No blood test available)
  – Synthetic cannabinoids - limited menu
  – Psilocin

• Currently screened for in blood (available upon request in urine)
  – Barbiturates

• No screen - blood and urine test available upon request
  – GHB
BLOOD VS. URINE SAMPLE

• Blood Advantages
  – Recent use? Therapeutic?
  – Alcohol retrograde – only in blood (and breath)

• Urine Advantages
  – Synthetic cannabinoids
  – Scope of the screen contains more compounds
  – Easier collection
  – Drugs/metabolites present in larger amounts
  – Longer drug detection time

• Inhalants – get a blood or urine

• What drugs are suspected?
  – This should drive decision about which matrix to collect based on testing capabilities.

TOXICOLOGY REPORTS

“Interpretation”

• Drug amounts in blood **DO NOT** equal alcohol.
  – No per se amount for drugs = impairment
  – Tolerance and drug ½ life
  – Alcohol + some drugs = synergistic effect (1 +1 = 10)

  ![Margarita and pills] =

  – Poly drug use can also have additive/synergistic effect
  – Hysteresis

  * Effect of the drug at a given blood concentration may vary depending on the time of dosing.
**WHAT DRUGS ARE WE SEEING IN THE SUBMITTED BLOOD AND URINE SAMPLES?**

**TOXICOLOGY SECTION WORKLOAD**

<table>
<thead>
<tr>
<th>Year</th>
<th>Toxicology (DRUG) Samples</th>
<th>Alcohol Samples</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Blood</td>
<td>Urine</td>
</tr>
<tr>
<td>2013</td>
<td>1347</td>
<td>1044</td>
</tr>
<tr>
<td>2014</td>
<td>1795</td>
<td>1294</td>
</tr>
<tr>
<td>2015</td>
<td>1922</td>
<td>1527</td>
</tr>
<tr>
<td>2016</td>
<td>2841</td>
<td>944</td>
</tr>
<tr>
<td>2017</td>
<td>3765</td>
<td>1128</td>
</tr>
<tr>
<td>2018*</td>
<td>2704</td>
<td>988</td>
</tr>
</tbody>
</table>

* Year to date as of October 5th
JUNE 2017 TO JUNE 2018 DRIVING CASES

<table>
<thead>
<tr>
<th>Drug Class</th>
<th>Blood</th>
<th>Urine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphetamines</td>
<td>1684</td>
<td>481</td>
</tr>
<tr>
<td>Cannabinoids</td>
<td>1763</td>
<td>189</td>
</tr>
<tr>
<td>Benzodiazepines</td>
<td>901</td>
<td>136</td>
</tr>
<tr>
<td>Opiates</td>
<td>521</td>
<td>147</td>
</tr>
<tr>
<td>Cocaine</td>
<td>253</td>
<td>64</td>
</tr>
<tr>
<td>Methadone</td>
<td>126</td>
<td>16</td>
</tr>
<tr>
<td>Zolpidem</td>
<td>80</td>
<td>4</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>ns</td>
<td>51</td>
</tr>
<tr>
<td>PCP</td>
<td>28</td>
<td>7</td>
</tr>
<tr>
<td>Diphenhydramine</td>
<td>ns</td>
<td>33</td>
</tr>
<tr>
<td>Tramadol</td>
<td>ns</td>
<td>31</td>
</tr>
<tr>
<td>Carisoprodol</td>
<td>23</td>
<td>2</td>
</tr>
<tr>
<td>Cyclobenzaprine</td>
<td>ns</td>
<td>22</td>
</tr>
<tr>
<td>Synthetic Cannabinoids</td>
<td>ns</td>
<td>10</td>
</tr>
<tr>
<td>Barbiturates</td>
<td>10</td>
<td>ns</td>
</tr>
<tr>
<td>Trazodone</td>
<td>ns</td>
<td>9</td>
</tr>
<tr>
<td>Dextromethorphan</td>
<td>ns</td>
<td>6</td>
</tr>
<tr>
<td>Methylphenidate</td>
<td>ns</td>
<td>4</td>
</tr>
<tr>
<td>Buprenorphine</td>
<td>ns</td>
<td>3</td>
</tr>
<tr>
<td>Ketamine</td>
<td>ns</td>
<td>2</td>
</tr>
</tbody>
</table>

Positive screen results for ~3500 cases
Approximately 6x more blood than urine
(ns= no screen)

WHAT CAN SCIENTISTS SAY IN COURT REGARDING RESULTS AND HOW THEY RELATE TO DRUGGED DRIVING COURT CASES?
CONFER WITH THE FORENSIC SCIENTIST
(WELL IN ADVANCE)

• The scientist who performed the confirmation of the drug will have had training on:
  – Pharmacodynamics
    • What the drug does to the body: general effects/symptoms
  – Pharmacokinetics
    • What the body does to the drug: absorption/metabolism

• Information or reference articles
  – General effects of the drugs
  – Which of the drugs can be metabolites of another drug
    • The metabolites that are psycho-active
  – General detection periods in blood and urine

ADDITIONAL HELP FROM YOUR FRIENDLY FORENSIC SCIENTIST

• Aid with drug schedules
  – MN Board of Pharmacy sets the schedules

• Review prescription lists
  – Correlate list to drugs found

• Assist with the Toxicology findings
  – Questions about the statement on report “No further toxicology testing will be performed”

• Discovery requests
• General therapeutic ranges
THERAPEUTIC RANGES

Caution on utilizing therapeutic ranges:
- Tolerance to their medication = amount measured may not necessarily be an abnormal or overdose amount
- Regular tablets vs. extended release for drug
- Amount prescribed and the dose relative to the time of the blood draw
- Drugs break down at different rates in the body
  - Half life of drugs within body need to be considered
- Impairment within the therapeutic range
  - Sleep aids for example
  - New or change in dose/medication

TOXICOLOGY COURT PREPARATION

- Contact the Scientist well in advance
  - Numerous subpoenas = availability??????
- Scientist may have general foundation questions
- Scientist will have Curriculum Vitae
- Scientist’s training
  - Conferences and workshops
  - Drugs and their effect on human performance
  - Prior work experience
  - Certifications
- Understand the limitations of the testimony
HELPFUL HINTS FOR LAW ENFORCEMENT

- Take a picture of pill bottle(s)
- Take a picture of the cans if inhalants suspected
- Count pills vs. fill date for each bottle – document
- Assorted pills in bottle or all the same