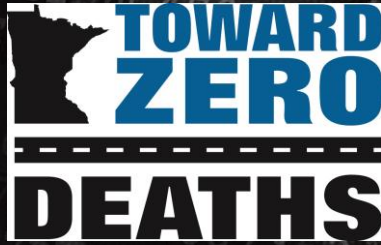


DRUGGED DRIVING PANEL – TZD 2018



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 TESTING¹

1: National Highway Traffic Safety
Administration: Drug-Impaired
Driving: Understanding the Problem
and Ways to Reduce It: A Report to
Congress.



SAMPLE HANDLING

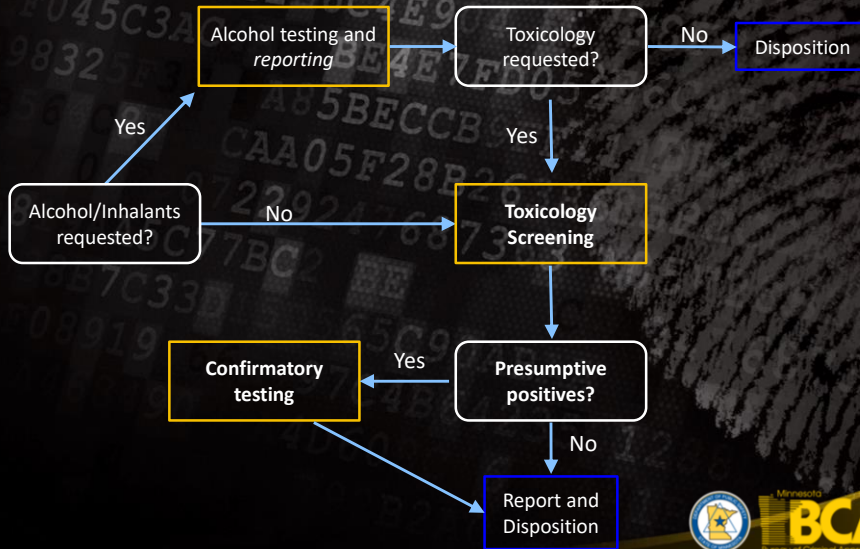
- Laboratory Analysis Request (LAR) generated and sent to submitting agency
- After generation of LAR, outer kit box resealed
- Kits transferred to the locked refrigerated vault within the secure Toxicology Laboratory – testing will start
- Bemidji & St. Cloud transfer kits to St. Paul



WHAT ARE TESTING DECISION POINTS?



TOXICOLOGY TESTING PROCESS



ASSESSMENT FOR TOXICOLOGY ANALYSIS

- Alcohol testing results
 - Alc is $<0.08x$, and Tox testing is requested on kit sheet \rightarrow 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
- Tecan Evo



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 $\frac{1}{2}$ life
 - Alcohol + some drugs = synergistic effect ($1 + 1 = 10$)



- 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

Year	Toxicology (DRUG) Samples			Alcohol Samples
	Blood	Urine	Total	Blood/Urine
2013	1347	1044	2391	5069
2014	1795	1294	3089	4781
2015	1922	1527	3449	4544
2016	2841	944	3785	2800
2017	3765	1128	4893	3030
2018*	2704	988	3692	2231

* Year to date as of October 5th



JUNE 2017 TO JUNE 2018 DRIVING CASES

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

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

