Drug Trends and AODA Prevention

Kayla Neuman
Forensic Toxicology
Wisconsin State Laboratory of Hygiene
The Hygiene Lab

20 Total Employees
- 1 Manager
- 2 Chemist Supervisors
- 13 Chemists
- 1 Lab Tech
- 3 Operations Program Associates

Process about 18,000 samples a year
- OWI and Medical Examiner testing

Receive over 3,400 subpoenas from 72 counties per year
- Testified in 281 trials in 2016
- Logged 37,446 miles in court travel in 2016
Laboratory Accreditation

ABFT

The American Board of Forensic Toxicology establishes voluntary standards for the practice of forensic toxicology and for the examination and recognition of laboratories providing forensic toxicology services.
WSLH Toxicology Customers

- Law Enforcement Agencies
  - Alcohol
  - Drug Screen and Quantitation
  - Interpretation
  - Testimony at trial
- Coroners / Medical Examiners
  - Alcohol
  - Drug Screen and Quantitation
  - Interpretation
  - Relevance to cause and manner of death
## Caseload

### Alcohol Testing

<table>
<thead>
<tr>
<th>Case Type</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death Investigation Cases</td>
<td>556</td>
<td>1151</td>
</tr>
<tr>
<td>Motor Vehicle Death Cases</td>
<td>293</td>
<td>370</td>
</tr>
<tr>
<td>Implied Consent Cases</td>
<td>16,853</td>
<td>17,936</td>
</tr>
</tbody>
</table>

### Drug Testing

<table>
<thead>
<tr>
<th>Case Type</th>
<th>2015</th>
<th>2016</th>
</tr>
</thead>
<tbody>
<tr>
<td>Death Investigation Cases</td>
<td>426</td>
<td>794</td>
</tr>
<tr>
<td>Motor Vehicle Death Cases</td>
<td>177</td>
<td>215</td>
</tr>
<tr>
<td>Implied Consent Cases</td>
<td>4,418</td>
<td>5,026</td>
</tr>
<tr>
<td>Drug</td>
<td>Count</td>
<td></td>
</tr>
<tr>
<td>-------------------------------</td>
<td>-------</td>
<td>---</td>
</tr>
<tr>
<td>Carboxy-THC (Delta-9-THC)</td>
<td>2,066</td>
<td>(1,817)</td>
</tr>
<tr>
<td>Alprazolam</td>
<td>308</td>
<td></td>
</tr>
<tr>
<td>Morphine</td>
<td>305</td>
<td></td>
</tr>
<tr>
<td>Benzoylecgonine (Cocaine)</td>
<td>239</td>
<td>(70)</td>
</tr>
<tr>
<td>Amphetamine</td>
<td>198</td>
<td></td>
</tr>
<tr>
<td>Methamphetamine</td>
<td>147</td>
<td></td>
</tr>
<tr>
<td>Clonazepam</td>
<td>140</td>
<td></td>
</tr>
<tr>
<td>Nordiazepam</td>
<td>119</td>
<td></td>
</tr>
<tr>
<td>Oxycodone</td>
<td>117</td>
<td></td>
</tr>
<tr>
<td>Diazepam</td>
<td>104</td>
<td></td>
</tr>
</tbody>
</table>
National Survey on Drug Use and Health - 2015

- Most common Prescription (Rx) pain relievers were hydrocodone products
  - Vicodin, Lortab, Norco, Zohydro ER, generic

- Most common Rx Tranquilizers were benzodiazepines: mostly alprazolam
  - Xanex, Ativan, Klonopin, Valium, Flexeril, Soma

Source of Data: Substance Abuse and Mental Health Services Administration
National Survey on Drug Use and Health - 2015

- Most common Rx Stimulants were amphetamine products
  - Adderall, Dexedrine, Vyvanse, generic

- Most common Rx Sedatives were zolpidem products
  - Ambien, Ambien CR, generic

Source of Data: Substance Abuse and Mental Health Services Administration
Main Reason for misuse of Rx drug:

- Pain Relievers: relieve pain (62.6%), get high (12.1%), relax (10.8%)
- Tranquilizers: relax or relieve tension (44.9%), help with sleep (20.4%), get high (12.3%)
- Stimulants: be alert/stay awake (26.8%), help concentrate (22.5%), help lose weight (5.7%)
- Sedatives: help with sleep (71.7%), relax (12%), get high (5.9%)

Source of Data: Substance Abuse and Mental Health Services Administration
DEA: Emerging Threat Report
Fourth Quarter 2016

- 31 Synthetic Cannabinoids identified
  - FUB-AMB = 58%
  - ID’d in many drivers in WI in Q4-2016
- 50% of opioid drugs ID’d contained Fentanyl
  - Furanyl Fentanyl (24%)
  - 2 new Fentanyl derivatives were reported for the first time in Q4-2016
- 30 Synthetic Cathinones ID’d
  - N-Ethylpentylole (47%)
Alcohol
# Stages of Acute Alcohol Intox.

<table>
<thead>
<tr>
<th>BAC (g/100mL)</th>
<th>Stage of Impairment</th>
<th>Behavioral Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.01 - 0.05</td>
<td>No noticeable impairment</td>
<td>Almost normal behavior, impairment detected by specialized tests</td>
</tr>
<tr>
<td>0.03 - 0.12</td>
<td>Euphoric Effects</td>
<td>Slight euphoria, increased sociability, talkativeness, and self confidence; Slowed information processing; decreased judgement, attention, and control; sensory motor impairment begins</td>
</tr>
<tr>
<td>0.09 - 0.25</td>
<td>Excitation</td>
<td>Emotional instability, impaired memory, comprehension, and perception; critical judgement decreases; increased reaction times, decreased visual acuity, impaired balance, drowsiness</td>
</tr>
<tr>
<td>0.18 - 0.30</td>
<td>Confusion</td>
<td>Disorientation, confusion, dizziness, visual disturbances, increased pain threshold, staggering, slurred speech, apath, lethargy</td>
</tr>
<tr>
<td>0.25 - 0.40</td>
<td>Stupor</td>
<td>Diminished motor functions; decreased responsiveness and inability to stand or walk; vomiting, incontinence, sleep/stupor</td>
</tr>
<tr>
<td>0.35 - 0.50</td>
<td>Coma</td>
<td>Unconsciousness, coma, depressed reflexes, hypothermia, impaired circulation and respiration, possible death</td>
</tr>
<tr>
<td>+ 0.45</td>
<td>Death</td>
<td>Respiratory arrest</td>
</tr>
</tbody>
</table>
Signs of Alcohol Impairment

- Smell of alcohol on breath/clothing
- Slurred speech
- Disorientation
- Poor balance
- Droopy eyelids
- Slowed movements
- HGN
Marijuana

The “gateway drug”
“Mary-jane”
“MJ”
“Sticky Icky”
“Pot”
Signs of Marijuana Use

- Smell; burnt grass, “skunky” aroma
- Brown, burnt finger tips
- Green to brown leafy substance on person
- Red or bloodshot eyes
- Body tremors
- Increased appetite
- Confusion
Marijuana Impairment

• Lack of Convergence of eyes
• Dilated pupils
• Elevated pulse and blood pressure
• Distortion of time and space
• Disorientation
• Relaxed inhibitions
• Poor balance
• Inability to concentrate
Opioids

“H”
“Horse”
“Oxy”
Opioid Impairment

- Sedation – “On the nod”
- Constricted pupils
- Slow, slurred speech
- Raspy speech
- Poor coordination
- Decrease in pulse, BP, Body Temp
- Flaccid Muscles
Heroin
Heroin Tox Results

• Codeine ~ 5-10% morphine concentration
  • Indicates heroin use
  • Manufacturing process

• 6-Monoacetylmorphine (6-MAM) = heroin use
  • Rare to see in blood
  • RCS
Methadone

- Maintenance therapy
  - Supposed to satisfy cravings for opioids without the "high"
- Pain management
  - Very addictive – some doctors won’t prescribe
- >500 ng/mL can indicate abuse
Methadone Tolerance

- Over time, user may build up tolerance to the drug
  - Need more of the drug to feel effects

- When first starting prescription, doctors monitor dosage to find the appropriate dose
  - New prescription and/or dose – more potential for impairment
Methadone and Other Drugs

- Rare to find methadone-only use
  - Out of 415 methadone cases in WI from 2012-2016, 12 were methadone-only

- Combination with CNS depressants
  - Alprazolam (Xanax) (104 cases)
  - Increases impairment potential
    - Coordination
    - Respiratory depression
    - Heart rate
Buprenorphine

- Partial agonist
  - Less driving impairment on average than methadone
- 30 – 40x strength of morphine
- Suboxone
  - Buprenorphine + Naloxone
- Like other opioids – tolerance is possible
Brand Names

- Buprenex (HCl solution for acute pain in primary care settings)
- Buprex (capsules for pain)
- Butrans (transdermal patch for chronic pain)
- Subutex (buprenorphine)
- Transtec (transdermal buprenorphine patch)
- Temgesic (sublingual tablets or injection - pain)
- Suboxone (buprenorphine and naloxone in sublingual tablet or film)
- Zubsolv (buprenorphine and naloxone in sublingual tablet)
Buprenorphine

• Ceiling effect
  • Point at which increases in dose do not increase effect
  • Respiratory depression but not analgesia?
Buprenorphine Administration

- Sublingual
  - Mouth sores/reddening
- Injection
- Implant
  - Probuphine
  - Newly approved by FDA
  - Four one-inch rods in upper arm
  - Good for 6 months
What are Synthetic Opioids?

Synthetic opioids are synthetic (human-made) drugs chemically related to natural opiates like morphine.

They are used for their analgesic and relaxation properties.

Synthetic variants of morphine can be much stronger than the natural product (>15x) and, in some cases, very dangerous.

They appeared on the EU drug market in 2012. They are commonly purchased over the internet.
Emerging Synthetic Opiates

AH-7921
U47700
W-18 ➔ ➔ ➔
MT-45
Acetyl Fentanyl
“Krokodil” = Desomorphine
“Kratom” = Mitragynine
Furanylfentanyl
Routes of Administration

- Intravenous – onset quick
  - Comes in powder form
- Oral
- Insufflation - quick
- Intra-rectal
- Duration
- U47700 is short acting (2-3hrs)
Physiological Effects

- Effects similar to morphine
- CNS depression
  - Respiratory depression
- Relaxation
- Mild euphoria
- “Warming sensation”

- “On-the-nod”
- Adverse effects:
  - Nausea
  - Bilateral hearing loss
  - Itching
Facts about U-47700

- Effects:
  - Analgesia
  - Euphoria
  - Sedation
  - Itching

- Side effects:
  - Depressed respiration
  - Pinpoint pupils (miosis)
  - Constipation
  - Develops tolerance with long term use
  - Coma or Death with high doses

Source: U-47700 Fact Sheet; Scientific Institute of Public Health National Focal Point on Drugs
U-47700

- Synthetic opioid developed in 70's
- AH-7921 is parent compound
- Same effects as other opiates
  - Analgesia
  - Respiratory depression
  - Facial itching
  - Euphoria
  - Miosis
- Effects last ~60-90 minutes
U-47700

- Found in counterfeit “Norco” pills
  - Fentanyl and U-47700
  - Real Norco – hydrocodone
  - Seven patients treated in San Francisco Bay Area (mid-April 2016)

Counterfeit Norco - Courtesy of U.S. DEA

Real Norco – drugs.com
U-47700 Case Report

• Woman ingested 3 “Norco” tabs
  • Had “Watson” imprint
  • Were beige instead of white
  • Taken to hospital after overdosing
  • Toxicology reported Hydrocodone, Fentanyl, and U-47700
Other Opioids

- Fentanyl (Schedule II)
  - Synthetic opioid
  - Mixed with Heroin

- Fentanyl analogues
  - Acetylfentanyl
  - Butyryl fentanyl (Schedule I)
  - Carfentanil
  - Furanyl fentanyl (Schedule I)
Naloxone

- Narcan
- Opioid antagonist
- Counter effects of opiate OD
- Reverse CNS Depression, Respiratory Depression, Hypotension

- Used with drugs like buprenorphine to counteract opioid OD, if too much drug is taken
- Naloxone is also prescribed to people who take doses of drugs that are >100 mg of morphine equivalence per day
Kratom

- Mitragynine
- Tree native to Southeast Asia
- Used as an herbal drug
  - Low doses – stimulant
  - High doses – sedative
- Commonly used to self-treat opioid addiction
Kratom

- Administration
  - Chewing leaves
  - Tea
  - Powder
  - Smoking

- Side effects
  - Numb tongue
  - Nausea
  - Abdominal pain - “...I was forced to spend the rest of the day lying in severe pain” – Erowid user
## Kratom

<table>
<thead>
<tr>
<th>Dosage (Kratom leaves, not extracts)</th>
<th>Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-6 grams</td>
<td>Mild - stimulant</td>
</tr>
<tr>
<td>7-15 grams</td>
<td>Stimulant, crossing over to sedative/euphoric/analgesic</td>
</tr>
<tr>
<td>16-25 grams</td>
<td>Sedation and euphoria (“too strong for highly sensitive people”)</td>
</tr>
<tr>
<td>26-50 grams</td>
<td>Strong sedation and euphoria (“TOO STRONG FOR MOST PEOPLE”)</td>
</tr>
</tbody>
</table>
Kratom on Display
Packages Recovered

Mitragyna Speciosa

Premium Plantation Maeng Da

Origin: Thailand – Net Weight: 10.5g

Lot # PPMDG0671401144

Disclaimer: This product is sold as a bulk botanical without directions or claims. Keep away from children!

2204 Cortland Place, Nampa, ID 83687 USA
WWW.HERBAL-SALVATION.COM
Synthetic Cannabinoids

“Fake Pot”
“K2”
“Spice”
What are Synthetic Cannabinoids?

“Synthetic cannabinoids refer to a growing number of man-made mind-altering chemicals that are either sprayed on dried, shredded plant material so they can be smoked (herbal incense) or sold as liquids to be vaporized and inhaled in e-cigarettes and other devices (liquid incense).”

-NIDA, Nov. 2015
Why Use Synthetic Drugs?

• Lack of legislation and toxicology
  • Prosecution challenges
  • Law Enforcement training
  • Analytical testing capabilities
• Making a “good” thing GREAT
  • Slight chemical modifications of compounds
  • Reduce unwanted side effects
• Ease of availability
  • Internet
  • Headshops
Self-Reported Reasons for Using Synthetic Cannabinoids
(N=150 Adult Residential Substance Use Disorder Treatment Patients Reporting Lifetime Synthetic Cannabinoid Use)

<table>
<thead>
<tr>
<th>Reason</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curiosity</td>
<td>91%</td>
</tr>
<tr>
<td>To Feel Good or Get High</td>
<td>89%</td>
</tr>
<tr>
<td>To Relax or Relieve Tension</td>
<td>71%</td>
</tr>
<tr>
<td>To Get High Without Having a Positive Drug Test</td>
<td>71%</td>
</tr>
<tr>
<td>Liked the Effects</td>
<td>63%</td>
</tr>
<tr>
<td>Boredom</td>
<td>59%</td>
</tr>
<tr>
<td>To Have a Good Time with Friends or to Fit In</td>
<td>59%</td>
</tr>
<tr>
<td>Anger or Frustration; To Get Away from Problems or Troubles</td>
<td>48%</td>
</tr>
<tr>
<td>To Help Deal with Pain</td>
<td>39%</td>
</tr>
<tr>
<td>To Increase or Decrease the Effects of Some Other Drugs</td>
<td>32%</td>
</tr>
<tr>
<td>Because It Is Safer Than Other Drugs</td>
<td>30%</td>
</tr>
</tbody>
</table>
NOT FOR HUMAN CONSUMPTION
WIF IS SOLD AS POTPOURRI. STROKE THE FURRY BAG
THIS POTPOURRI DOES NOT CONTAIN AM 2201, JWH-081, JWH-019, JWH-018, JWH-073, HU-211, JWH-015, JWH-200, JWH-250, HU-210, CP47, 497 ALONG WITH STIMULANT BZP AND TFMP.
NOT FOR CONSUMPTION. NOT FDA APPROVED.
Evolution of Synthetic Cannabinoids in Wisconsin 2010 - Present

Year

Percentage

2010

FUB-AKB-48

2011

FUB-AMB

2012

5F-ADB

2013

AB-FUBINACA

2014

MDMB-FUBINACA

2015

ADB-CHMINACA

2016

5F-AB-PINACA

Year

2010

2011

2012

2013

2014

2015

2016

FUB-AKB-48

FUB-AMB

5F-ADB

AB-FUBINACA

MDMB-FUBINACA

ADB-CHMINACA

5F-AB-PINACA

AB-CHMINACA

AB-PINACA

XLR-11

AM-22012

JWH-210

JWH-022

RCS-4

AM-2201

JWH-250

JWH-122

JWH-019

JWH-018

0%

10%

20%

30%

40%

50%

60%

70%

80%

90%

100%
Route of Administration

- Smoked
  - Onset of Effects
    - Within minutes of first inhalation
    - Duration is generally longer than THC
  - Plant material
  - Powder
- Vaping
- Oral Ingestion
  - Baked goods, tea
SC-Police Contact

- **Poor Driving**
  - Witnesses call 911
  - Police observed
- **Unresponsive behind wheel**
  - Sit through traffic lights
- **Traffic Crash**
  - Property damage
  - Multi-vehicle
- **Traffic Violation**
  - Run stop sign, suspended license

- **Equipment Violation**
  - Head lamp out
  - Parked in vehicle
  - Using drug in car
- **Non-driving**
  - Got out of car (gas station)
  - Witness called in
- **Stopped in traffic**
  - Responsive but disoriented
Pharmacology & Clinical Symptoms

- SC act on the cannabinoid receptors
  - CB1 – CNS
  - CB2 – peripheral NS
- THC is a **partial** agonist of both receptors
- Most SC are **full** agonists of both receptors
  - More potent than THC
  - Last longer than THC

- Elevated heart rate
- Normal to elevated blood pressure
- Normal body temperature
- Normal muscle tone
- Pupils – normal to dilated
SC Physiological Symptoms

- Bloodshot, red, glassy, watery eyes
- Droopy eyelids
- Slow, Slurred speech
- Rancid breath (Halitosis)
- Poor coordination
- Cooperative & Confused
- Sweating/Flushed face
- Leg tremors
- Body sway 1” – 4”

- Normal body temperatures
  DRE range 97.7 – 100.2 mean = 98.7
- Blood pressure & heart rate: normal to up
- HGN: Lack of Smooth Pursuit,
- Lack of Convergence present
- Internal clock: normal to slowed
Synthetic Cathinones

“Synthetic cathinones, more commonly known as "bath salts," are synthetic (human-made) drugs chemically related to cathinone, a stimulant found in the khat plant. Khat is a shrub grown in East Africa and southern Arabia, and people sometimes chew its leaves for their mild stimulant effects. Synthetic variants of cathinone can be much stronger than the natural product and, in some cases, very dangerous (Baumann, 2014)” –NIDA, Jan 2016
Synthetic Cathinones

Khat
Synthetic Cathinones

- Marketed as cheap substitutes for methamphetamine and cocaine
  - Molly, bath salts, research chemicals, legal highs
- Labeled as “not for human consumption”, “plant food”, “jewelry cleaner”, “phone screen cleaner”
- “Flakka” - α-PVP
- Made to look like candy
- White crystals
Route of Administration

Snorting – onset quick
Oral - onset 15 – 45 min
Injection
Smoking – onset quick

Effects 6+hrs
• Not sure of correlation between route of administration and duration of effects.
Physiological Effects

- Emotional openness
- Euphoria
- Increased vigilance & energy
  - Increase conc. of neurotransmitters
- Agitation
- Aggression
- Confusion
- Numbness
- Reduced vision

- Mydriasis (pupil dilation)
- Bruxism
- Headache
- Hyperthermia
- Hypertension
- Tachycardia
- Insomnia
- Anxiety
- Hallucinations
- Seizures
- Psychosis
Case Study: Synthetic Cathinones

- 20 y.o. male
- Hx of drug abuse
- Consumed substances purchased via internet with vodka
- Sudden psychomotor agitation – unintentional and purposeless movements
- Ambulance called – arrived ½ hour after ingestion
- Given Diazepam and Midazolam at hospital
- Very agitated; no verbal contact – shouted and struggled
- Uncooperative
- Max. heart rate was 170/min
- BP 150/90
- Cardiac arrest occurred
- Death occurred less than 4hrs after ingestion
- Death related to use of a combination of alcohol, 3-MMC, and 5-APB

Methamphetamine 4mmc crystal
MDMA
MDPV
A-PVP
All AM Series
All JWH Series
5-MeO-Dmt
Dmt
TFMPPP
4-FMC
a-PVP
2C-E, 2C-I, 2C-P, 2C-B, 2C-T, 2C-D
DOC
DOI
Methylenedioxy (MDMA)
Testosterone
Bromo Dragonfly
Ephedrine HCl Powder
Amphetamines
ZZ-1
4-MEC
URB-754
RCS-4
MDao
MKAT
Cocaine
Heron
Oxyconting
Mescaline
Naphyrone
Oxycotin
Bromo Dragon Fly
Lsd Opium
Morphine
Phenazepam
Methadone
Benzofury
5-iai
4-FA
4-FMA
Ketamine
Bath Salts

Others are supplied upon request.

Our products are of High purity (99.98%).
Other Designer Drugs

• Benzodiazepines
  • Clonazolam
  • Etizolam - seen
  • Flubromazepam
• NBOMe
  • See a couple analogs
  • No cases yet

• Synthetic Opioids
  • U-47700
  • No IC cases yet
  • Fentanyl
    • As mentioned
Products Recovered From Scene
Prescription Drugs
Hyperactivity Disorder Drugs

- Ritalin, Concerta (methylphenidate)
- Adderall (amphetamine)
- Vyvanse (Lisdexamfetamine)

- Abused as stimulant drug
- Similar effects to cocaine in large enough doses
Impairment by CNS Stimulants

- Dilated pupils
- Increased HR & BP
- Increased body temp
  - Sweating
- Agitation/ Anxiety
- Quick, jerky movements – rigid muscles
- Restlessness – Insomnia
- Grinding teeth
- Redness to nasal area
Pain Killers

- Oxycontin (Oxycodone)
- Percocet (Acetaminophen/Oxycodone)
- Vicodin (Acetaminophen/Hydrocodone)
- Tramadol
- Fentanyl
Abuse of Opioid Drugs

- Abuse of RX pain killers can lead to heroin use
- Heroin is cheaper and easier to obtain than Rx pills
- Pain relievers are #1 misused drug
Oxycontin Old v. New

Old

New
CNS Depressants

- Xanex (Alprazolam)
- Valium (Diazepam)
- Klonopin (Clonazepam)
- Ativan (Lorazepam)
- Barbiturates: butalbital
- Soma (Carisoprodol)
Signs of Impairment: CNS Depressants

- Alcohol-like impairment – no scent of alcohol
- Disorientation
- Droopy eyelids
- Drowsiness
- Slowed movements
- Slurred speech
- Poor balance/uncoordination
Dextromethorphan

DXM
Skittling
Robotripping
CCC
Dissociatives: DXM

- Major use as an antitussive
- Over 100 cold meds contain DXM: Coricidin Cold & Cough, Robitussin DM, Sucrets Cough Control, Romilar, etc
- Therapeutic dosing
  - Maximum of 120 mg per day = <5 ng/mL plasma concentration
  - Fatal overdose blood concentrations starting at 1100 ng/mL
Dissociatives: DXM

- Commonly abused formulations
  - Coricidin Cough and Cold
    - 30 mg DXM, 4 mg Chlorpheniramine
  - Robitussin-DM
    - 10 mg DXM, 100 mg Guaifenesin
  - Nyquil (various formulations)
    - 15 mg DXM, 6.25 mg Doxylamine, 500 mg Acetaminophen
    - 15 mg DXM, 6.25 mg Doxylamine
    - 15 mg DXM only (Dayquil)
  - Street names: Candy, C-C-C, Dex, DM, Red Devils, Robo, Robotripping, Robodosing, Poor man’s PCP, Skittles
Dissociative Anesthetics: An Overview

Glutamate:
- Neurotransmitter – responsible for passing chemical messages from one nerve cell to another
  - Glutamate is the most common neurotransmitter in the brain
- Crucial for brain functions such as learning, memory, pain sensory and body response to external stimuli
- Excitatory properties
DXM to DXO

- Major metabolite of DXM is dextrorphan (DXO)
- High doses of DXO = PCP like effects
- Small percentage of Caucasian population are poor metabolizers, altering DXM:DXO
Dissociatives: DXM

- Impairment at low recreational dose (~100 mg)
  - Similar to THC

- Higher recreational dose (~500 + mg)
  - Will produce dissociative effects, hallucinations and delusions

- The Four Plateaus
The Four Plateaus

1st Plateau (~80 – 100 mg DXM)
- Drunk/Stoned feeling
- Music Euphoria
- No hallucinations

2nd Plateau (~200 mg DXM)
- Closed eye hallucinations
  - Nausea
  - Physical coord. Impaired
  - Double vision
  - Pleasant “body high”

3rd Plateau (~500 mg DXM)
- Hallucinations
- Delusions
- Altered state of consciousness
- No logical thinking
- “Bad Trips” often occur
- Trip sitter is recommended

4th Plateau (~1000 mg DXM)
- Hallucinations
- Delusions
- Mind and body dissociation
- Unable to respond or move to external stimuli
- Trip sitter required
Inhalants
Inhalants

- 1,1-difluoroethane (DFE)
  - Dust-off
- Nitrous Oxide
  - “Whippets”
- Amyl Nitrate
- Toluene
Inhalant Impairment

- Inhalant - C$_2$H$_4$F$_2$
- Readily available, inexpensive
- Mainly used in computer cleaning products
  - Also found in body sprays, hair sprays
- Very short acting – may not see impairment
  - ½ life is minutes
Symptoms of DFE Abuse

- Flushed face
- Slurred speech
- Dizziness and numbness
- Hallucinations
- Intense headaches

- Light-headed feeling
- Distorted space and time perception
- Lack of muscle coordination
- Sedation
- Confusion
Drug Recognition Experts
Drug Recognition Experts (DRE)

“A drug recognition expert or drug recognition evaluator (DRE) is a police officer trained to recognize impairment in drivers under the influence of drugs other than, or in addition to, alcohol.”

– International Drug Evaluation & Classification Program Website www.decp.org
Brief History of DRE Program

1970’s- DRE program was developed by the LAPD
  - Officers noticed impaired drivers had very low or zero blood alcohol levels

Two sergeants from the LAPD met with medical professionals to develop the first protocol for recognizing drug influence and impairment
  - Today, is a 12 step process

1980’s - NHTSA and LAPD developed a standardized protocol— led to Drug Evaluation and Classification (DEC) Program
Brief History of DRE Program

1987 – Pilot programs initiated in 4 states
1988 – 3 more states added (UT, CA, IN)
1989 – spread across the country
Currently in all 50 states, D.C., Canada, and other countries
Psychomotor impairment
- Balance
- Coordination
Cognitive impairment
- Divided attention task
Romberg Test

Sway
- Side to side
- Front to back

Internal clock
- Fast
- Slow

Balance

Eyelid tremors

BALANCED EYES CLOSED

INTERNAL CLOCK:
Estimated at 30 sec.
Walk and Turn Test

Balance
Coordination
Ability to follow directions/attention
One Leg Stand

Balance
Ability to follow directions
Attention span
Sway
Leg tremors
Horizontal Gaze Nystagmus

Involuntary jerkiness of the eyes that can be caused by some types of drugs or medical condition

<table>
<thead>
<tr>
<th>HGN:</th>
<th>Left Eye:</th>
<th>Right Eye:</th>
<th>Vertical Nystagmus?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lack of Smooth Pursuit</td>
<td></td>
<td></td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td>Max Deviation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Angle of Onset</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Vertical Gaze Nystagmus

Can see with high doses of depressants, dissociatives, & inhalants
Clinical Indicators

Pulse (60-90 BPM)
Blood Pressure (120-140/70-90)
Body Temperature (98.6° F +/- 1° F)
Internal Clock (30 sec+/- 5 sec)
Muscle Tone (normal)
Pupil Size (2.5 mm - 5.0 mm)
Pupil Reaction to light (normal)
Lack of Convergence (eyes converge)
## Drug Category Matrix

<table>
<thead>
<tr>
<th></th>
<th>CNS Depressants</th>
<th>CNS Stimulants</th>
<th>Hallucinogens</th>
<th>Dissociative Anesthetic</th>
<th>Narcotic Analgesics</th>
<th>Inhalants</th>
<th>Cannabis</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>HoriZ Gaze Nystagmus</strong></td>
<td>Present</td>
<td>None</td>
<td>None</td>
<td>Present</td>
<td>None</td>
<td>Present</td>
<td>None</td>
</tr>
<tr>
<td><strong>VertiC Nystagmus</strong></td>
<td>(High Dose)*</td>
<td>None</td>
<td>None</td>
<td>Present</td>
<td>None</td>
<td>(High Dose)*</td>
<td>None</td>
</tr>
<tr>
<td><strong>Lack of Convergence</strong></td>
<td>Present</td>
<td>None</td>
<td>None</td>
<td>Present</td>
<td>None</td>
<td>Present</td>
<td>Present</td>
</tr>
<tr>
<td><strong>Pupil Size</strong></td>
<td>Normal</td>
<td>Dilated</td>
<td>Dilated</td>
<td>Normal</td>
<td>Constricted</td>
<td>(4) Normal</td>
<td>(6) Dilated</td>
</tr>
<tr>
<td><strong>Reaction to Light</strong></td>
<td>Slow</td>
<td>Slow</td>
<td>(3) Normal</td>
<td>Little or None Visible</td>
<td>Slow</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td><strong>Pulse</strong></td>
<td>(2) Down</td>
<td>Up</td>
<td>Up</td>
<td>(5) Up/Down</td>
<td>Up</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td><strong>Blood Pressure</strong></td>
<td>Down</td>
<td>Up</td>
<td>Up</td>
<td>Up</td>
<td>Down</td>
<td>Up</td>
<td></td>
</tr>
<tr>
<td><strong>Body Temperature</strong></td>
<td>Normal</td>
<td>Up</td>
<td>Up</td>
<td>Up</td>
<td>Down</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td><strong>Muscle Tone</strong></td>
<td>Flaccid</td>
<td>Rigid</td>
<td>Rigid</td>
<td>Rigid</td>
<td>Flaccid</td>
<td>Normal</td>
<td></td>
</tr>
</tbody>
</table>

- **B.A.C.** = 50 minus angle of onset
- (1) Snort, Quaaludes & some antidepressants usually dilate.
- (2) Quaaludes, alcohol & some antidepressants may elevate.
- (3) Certain psychedelic amphetamines may cause slowing.
- (4) Normal but may be dilated.
- (5) Down with anesthetic gases - up with volatile solvents & aerosols.
- (6) Possibly normal.
- *High dose for that individual
DREs and Prosecution

Specially trained to:

• identify persons under the influence of drugs
• Correlate impairment with a specific category or categories of drugs

Able to testify to:

• a person’s judgment, information processing ability, coordination and various other characteristics
• their opinion

Opinion is backed up by toxicology
DREs

Use DRE for cases other than driving cases

- Domestic
- SRO
- Child welfare
- AODA Prevention
Testing for Drugs
Presumptive Tests

- Sirchie: Nark II reagent pouches
- Test product
  - Powder or plant material
- Cost is around $20/10 pc.
Blood of user:
AB-PINACA
Urine Presumptive Tests

These types of tests do not see synthetic cannabinoids, synthetic cathinones, synthetic opiates, & kratom. Might cause cross-reaction with other categories.
Urine Testing

• Some labs now offer urine screening for Synthetic cannabinoids and kratom.
• Depends on what metabolites have been identified by researchers.
  • Usually only metabolites in urine.
• Check websites
Oral Fluid Testing

- Evaluate utility of mobile, oral fluid (OF) testing device
- Prevalence of alcohol + drugs in drivers
- Compare OF presumptive screen to evidentiary blood results
- Evaluate WSLH *Lab Cancellation Policy* (LCP)
  - Concentration of alcohol
    - > 0.10 g/100 mL
ALERE DRUG DETECTION SYSTEM (DDS®2)

Rapid screening
Results storage capacity
Results can be printed
## Alere DDS 2 vs. EIA (cutoff, ng)

<table>
<thead>
<tr>
<th>Oral Fluid</th>
<th>Blood</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cannabis (25)</td>
<td>THC (10)</td>
</tr>
<tr>
<td>Cocaine (30)</td>
<td>Cocaine (50)</td>
</tr>
<tr>
<td>Benzodiazepines (20)</td>
<td>Benzodiazepines (40)</td>
</tr>
<tr>
<td>Opiates (40)</td>
<td>Opiates (40)</td>
</tr>
<tr>
<td>Methamphetamine (50)</td>
<td>Barbiturate (100)</td>
</tr>
<tr>
<td>Amphetamine (50)</td>
<td>Buprenorphine (1)</td>
</tr>
</tbody>
</table>
Positive Results in Oral Fluid by Category

- THC: 14 positives
- COC: 1 positive
- OP: 6 positives
- BZ: 7 positives
- MAMP: 5 positives
- AMP: 1 positive

# of Positives:
- 38% = 1
- 12% = 2
- 5% = 3
Positive Drug Screening Results: Oral Fluid vs. Blood

- THC
- COC
- OP
- BZ
- MAMP
- AMP
Blood Testing

• Blood is the best matrix for drug testing
• Gives accurate concentrations of numerous drugs – can help determine compliance and impairment
Special Thanks...

- Stephanie Weber
- Lorrine Edwards
- Diane Kalschuer
- Amy Miles
Questions??

Dear God! This parachute is a knapsack!
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