Traffic Safety Conference

The Effects of Drugs on Driving

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Tarrant County Medical Examiner’s Office

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Why Are We Here?

In 2013, an estimated 12% of persons aged 12 or older drove under the influence of alcohol at least once in the past year.

Results from the 2013 National Survey on Drug Use and Health: www.samsha.gov
Drug-Related DWIs

- The number of alcohol-only DWIs is decreasing as can be seen by the #’s from our lab:
  - 2011: 1113 DWI cases
    - ~80% positive for alcohol > 0.08 g/dL (222 cases below 0.08 g/dL)
  - 2015: 1614 DWI cases
    - ~65% positive for alcohol > 0.08 g/dL (565 cases below 0.08 g/dL)
Why Are We Here?

At a BAC of 0.02 g/dL the driver is 2x more likely to be in a fatal accident

At a BAC of 0.08 g/dL they are 13x more likely

At a BAC of 0.20 g/dL they are 60x more likely

Why Are We Here?
## Alcoholic Beverages

<table>
<thead>
<tr>
<th>Spirit</th>
<th>Alcohol Content</th>
<th>Proof</th>
</tr>
</thead>
<tbody>
<tr>
<td>Vodka</td>
<td>40-50%</td>
<td>80-100</td>
</tr>
<tr>
<td>Tequila</td>
<td>40-50%</td>
<td>80-100</td>
</tr>
<tr>
<td>Whiskey</td>
<td>40-75%</td>
<td>80-150</td>
</tr>
<tr>
<td>Gin</td>
<td>40-85%</td>
<td>40-170</td>
</tr>
<tr>
<td>Rum</td>
<td>40-95%</td>
<td>80-190</td>
</tr>
</tbody>
</table>
## Alcohol in Other Beverages

<table>
<thead>
<tr>
<th>Drink</th>
<th>Alcohol Content</th>
<th>Caffeine in 8 oz serving (mg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7-Up</td>
<td>0.08%</td>
<td>0</td>
</tr>
<tr>
<td>Red Bull</td>
<td>0.07%</td>
<td>69</td>
</tr>
<tr>
<td>Monster</td>
<td>0.15%</td>
<td>85</td>
</tr>
<tr>
<td>Rockstar</td>
<td>0.16%</td>
<td>65</td>
</tr>
<tr>
<td>180 Energy</td>
<td>0.23%</td>
<td>85</td>
</tr>
<tr>
<td>Bud Light</td>
<td>4.2%</td>
<td>0</td>
</tr>
<tr>
<td>4-Loco</td>
<td>12.0%</td>
<td>45</td>
</tr>
<tr>
<td>Liquor</td>
<td>40-95%</td>
<td>0</td>
</tr>
</tbody>
</table>
# Potency

<table>
<thead>
<tr>
<th>Drug</th>
<th>Oral LD50 (mg/kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethanol</td>
<td>10,000</td>
</tr>
<tr>
<td>NaCl</td>
<td>4,000</td>
</tr>
<tr>
<td>Morphine</td>
<td>70</td>
</tr>
<tr>
<td>Strychnine</td>
<td>2</td>
</tr>
<tr>
<td>Nicotine</td>
<td>1</td>
</tr>
<tr>
<td>Dioxin</td>
<td>0.001</td>
</tr>
</tbody>
</table>
Serving Sizes

The standard drink:

1.5 oz liquor, 40% abv
5 oz wine, 12% abv
12 oz beer, 5% abv
Why Drink?

- Enhance mood
- Social lubricant
- Dopamine release
- Get a “buzz”
- Accepted behavior
- Legal and cheap
No receptor in the brain is specific to ethanol
It acts on several:
  GABA
  Dopamine
  Glutamate
  Serotonin
GABA (γ-aminobutyric acid) is a major inhibitory neurotransmitter.

- Alcohol activates GABA receptors causing:
  - Sedation
  - Relaxed muscle tone
  - Reduced anxiety

- Same pathway as Xanax, Valium, etc.
Ethanol Side Effects

- NMDA (N-Methyl-D-Aspartate)
- Alcohol inhibits NMDA receptors causing
  - Sedation
  - Learning and memory defects
  - Loss of motor skills
Signs and Symptoms

- Loud
- Flushed face
- Slurred speech
- Drowsy
- Can’t think clearly
- Uncoordinated
- Unsteady
- HGN
- Unconscious
Perceiving the Environment

• CNS depressants inhibit your ability to perceive

• Perception is the awareness of elements of the environment through physical sensation
  • Visual perception
  • Auditory perception

• The decreased ability to perceive slows reaction time
Reaction Time

• The amount of time it takes to respond to a stimulus

• Depressed brain function slows reaction time
  • Vision problems
    • Peripheral vision
    • HGN
    • Blurred vision
    • Double vision
  • Divided attention deficit
Cognition

- Thinking about what is happening around you
- Processing that information and reacting appropriately
  - Rate of information processing
  - Rate of judgment
  - Appropriateness of that judgment
Divided Attention

- Alcohol at concentrations as low as 0.02 g/100 mL inhibit performance on divided attention tasks
- This is particularly bad for driving
- A complicated divided attention task
Horizontal Gaze Nystagmus

- Eye supported by 6 muscle groups that control movement in every direction
- Moving the eye to the left or right requires simultaneous contraction of one muscle group and relaxation of another
- CNS depressants disrupt this movement and lead to irregular, jerky movements of the eye
HGN
Peripheral Vision

- Anything we see outside of the central vision of the eye. Outside of a 5° arc
- Alcohol inhibits peripheral vision
- Loss of visual clues that would normally prompt us to visualize an object leads to accidents
Blurred Vision

- Alcohol reduces vision that was 20/20 to 20/40
- Objects that are far away and were clear are now blurry
Double Vision

- The effects on the muscles that move the eye (HGN) also cause double vision.
- The eye “wants” to move quickly, but can’t. This delay and difficulty refocusing causes the brain to perceive some things twice.
Concentration Vs Effect

• In general, physical effects of alcohol are dependent on concentration
  • Low concentration - small effect
  • High concentration – large effect

• Effects are dependent on the individual
  • Person A can’t stand up at a 0.05 BAC
  • Person B looks completely sober at a 0.25 BAC
Concentration Vs Effect

- Outward appearance and physical effects are solely based on tolerance and familiarity with the drug.
- If the person at a 0.25 BAC looks fine on video it doesn’t mean it is safe for them to drive.
  - HGN
  - Loss of divided attention
  - Impaired perception
Concentration Vs Effect

- Reports exist of people with BACs as high as 0.54 g/dL walking into an ER “sober” complaining only of stomach pain
- 0.54 g/dL would kill most people

Urso, T., Gavalier, J.S. *Life Sciences.*, 28; 1053-56, 1981
Ethanol Elimination

- A zero-order process (constant rate) above BAC’s of ~0.02 g/100 mL
- Average rate for men: 0.015 g/dL/hr
- Average rate for women: 0.018 g/dL/hr
- Can be much higher in alcoholics (0.03 g/dL/hr)
- Can be much lower in certain ethnic groups
  - Asians, Native Americans, Eskimos
Elimination
Elimination
Figure 3.19 Examples of blood-ethanol profiles after 8 healthy men who drank 0.80 g ethanol/kg body weight in 30 min after an overnight (10 h) fast. The drink was made from ethanol solvent (96% v/v) diluted with orange juice to give a 15-20% v/v solution of ethanol.
The CDC has classified prescription drug abuse as an epidemic.

“While there has been a marked decrease in the use of some illegal drugs like cocaine, data from the National Survey on Drug Use and Health show that nearly 1/3 of people aged 12 and over who used drugs for the first time in 2009 began by using a prescription drug non-medically.”

http://www.whitehouse.gov/ondcp/prescription-drug-abuse
Figure 1. Rates of motor vehicle traffic and drug overdose deaths, United States, 1980-2010.

- 1999: Opioids (alone or in combination) were involved in 30% of OD
- 2010: Opioids (alone or in combination) were involved in 60% of OD
Emergency Department Visits

Increased 114% between 2004 and 2011 (1.4 Million ED Visits)

420,000 Involved Opioids

425,000 Involved Benzodiazepines
The Spectrum of Prescription Drug Abuse

- Taking someone else’s prescription to self-medicate
- Taking a prescription medication in a way other than prescribed
- Taking a medication to get high
Of all the classes of drugs abused, the following three are the most commonly abused prescription drugs:

- Narcotic Pain Killers
- Opioids
- Central Nervous System Depressants
- Stimulants
### Why Are These Drugs Abused?

<table>
<thead>
<tr>
<th>Type of Drug</th>
<th>Therapeutic Use</th>
<th>Common Drug Names</th>
<th>Consequences of Abuse</th>
</tr>
</thead>
<tbody>
<tr>
<td>Opioids or Narcotic Analgesics</td>
<td>Pain</td>
<td>Hydrocodone (e.g., Vicodin, Lortab, Lorcan), Oxycodone (e.g., OxyContin, Percocet), Methadone, Hydromorphone (e.g., Dilaudid)</td>
<td>Addiction, constipation, drowsiness, lethargy, withdrawal (withdrawal symptoms may include anxiety, insomnia, gastrointestinal distress, muscle spasms, muscle and bone pains)</td>
</tr>
<tr>
<td>Central Nervous System (CNS) Depressants</td>
<td>Insomnia, Anxiety, Panic Attacks</td>
<td>Barbiturates, Benzodiazepines (e.g., Valium, Xanax, Klonopin, Halcion, Nembutal)</td>
<td>Addiction, drowsiness, and withdrawal symptoms (some withdrawal symptoms such as seizures, may be life-threatening). These drugs are very dangerous when combined with other CNS depressants such as alcohol or certain cold medicines.</td>
</tr>
<tr>
<td>Stimulants</td>
<td>Attention Deficit Disorder (ADD), Narcolepsy</td>
<td>Ritalin, Adderall, Dexadrine, Benzadrine, Concerta</td>
<td>Addiction, anxiety, irritability, paranoia, seizures, irregular heartbeat, and withdrawal symptoms which may include depression, lethargy, and insomnia.</td>
</tr>
</tbody>
</table>
Overdose Deaths by Year

National Overdose Deaths
Number of Deaths from Prescription Drugs

Source: National Center for Health Statistics, CDC Wonder
Prescription Drug Monitoring

State Prescription Monitoring Programs

[Map showing states with prescription monitoring programs, including Missouri highlighted in yellow.]
Benzodiazepines

1955 1st “Benzo” Chlordiazepoxide discovered

1963 Diazepam (aka Valium) was introduced

Common location of Side chains which gives Different benzodiazepines Their unique properties
# Benzodiazepines

<table>
<thead>
<tr>
<th>COMMON BRAND NAME</th>
<th>GENERIC NAME</th>
</tr>
</thead>
<tbody>
<tr>
<td>Xanax</td>
<td>Alprazolam</td>
</tr>
<tr>
<td>Klonopin</td>
<td>Clonazepam</td>
</tr>
<tr>
<td>Valium</td>
<td>Diazepam</td>
</tr>
<tr>
<td>Ativan</td>
<td>Lorazepam</td>
</tr>
</tbody>
</table>
The pharmaceutical industry spends a lot of money marketing their newest psychiatric drugs to Americans. And we take a lot of them. In fact, in 2009 alone, U.S. doctors wrote more psychiatric prescriptions than there are people in this country. This is a look at 2009’s 10 most prescribed psychiatric drugs. Don’t worry, there’s a pill for that.

**AMERICA’S MOST PRESCRIBED PSYCHIATRIC DRUGS** in both their brand-name and generic forms

<table>
<thead>
<tr>
<th>DRUG</th>
<th>Xanax</th>
<th>Lexapro</th>
<th>Ativan</th>
<th>Zoloft</th>
<th>Prozac</th>
<th>Desyrel</th>
<th>Cymbalta</th>
<th>Seroquel</th>
<th>Effexor XR</th>
<th>Valium</th>
</tr>
</thead>
<tbody>
<tr>
<td>SYMPTOMS</td>
<td>A</td>
<td>AD</td>
<td>AP</td>
<td>ADOT</td>
<td>AD</td>
<td>ADF</td>
<td>BD</td>
<td>ADP</td>
<td>ADP</td>
<td>AP</td>
</tr>
<tr>
<td>ONE PILL = ONE MILLION PRESCRIPTIONS</td>
<td>44</td>
<td>27.7</td>
<td>25.9</td>
<td>19.5</td>
<td>19.5</td>
<td>18.9</td>
<td>16.6</td>
<td>15.8</td>
<td>15</td>
<td>14</td>
</tr>
</tbody>
</table>

**CHANGE IN RANK FOR TOTAL FILLED U.S. PRESCRIPTIONS**

<table>
<thead>
<tr>
<th>2009</th>
<th>2008</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>5</td>
</tr>
<tr>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>NA</td>
</tr>
<tr>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>7</td>
<td>13</td>
</tr>
<tr>
<td>8</td>
<td>6</td>
</tr>
<tr>
<td>9</td>
<td>9</td>
</tr>
</tbody>
</table>

**TOTAL DOLLARS SPENT ON PHARMACEUTICAL ADS IN 2009**

$4.5 BILLION

A collaboration between GOOD and Stanford Kay

SOURCE: IMS Health
Medical Uses

- Sedative
- Anticonvulsant
- Muscle Relaxant
- Amnesic
- Hypnotic
- Anxiolytic
Indications

- Panic/Panic Disorder
- Agitation
- Insomnia
- Alcohol Dependence/Withdrawal
- Seizures
- Generalized Anxiety Disorder
Side Effects

Cognitive Impairment

Psychomotor Impairment

Memory Impairment

Long term use/misuse can cause or worsen cognitive deficits, depression and anxiety
Side Effects

- Effects are identical to alcohol
  - Drowsiness
  - Dizziness
  - Confusion
  - HGN
Therapeutic Concentration

• Prescribed drugs have a range of concentration that is expected to be in the blood if used properly (as prescribed)
  • Alprazolam (Xanax): 2-70 ng/mL
  • Diazepam (Valium): 20-4000 ng/mL
  • Clonazepam (Klonopin): 4-80 ng/mL
  • Lorazepam (Ativan): 10-200 ng/mL
Alcohol Vs Other Drugs

- There is no therapeutic concentration for alcohol
- Unlike alcohol the amount of a drug listed on a lab result gives little information about impairment
Therapeutic Concentration

• Someone with a therapeutic concentration of alprazolam (10 ng/mL) can exhibit all, some, or none of the side effects listed for this drug.

• Another person with a “toxic” level of alprazolam in their system can show no side effects.
  • Tolerance
Benzodiazepines + Alcohol

- Multiplies the side effects of each
- Increases the likelihood of a negative outcome
Opiates

Morphine: isolated in 1804, most abundant opioid in the poppy, highly addictive
The history of opium use is long...

http://www.pbs.org/wgbh/pages/frontline/shows/heroin/etc/history.html
Natural Opioids

Morphine
- Acute & chronic pain

Codeine
- Mild to moderate pain, cough
Semi-Synthetic Opioids

- **Hydrocodone**: Used alone or in combination with acetaminophen to treat moderate to severe pain.

- **Hydromorphone**: Moderate to severe pain.

- **Oxycodone**: Moderate to severe pain.

- **Oxymorphone**: Moderate to severe pain.
Opiate Prescriptions by Year

No. of Rx's (millions)

Total
Hydrocodone
Oxycodone

1991: 76
1992: 79
1993: 82
1994: 85
1995: 87
1996: 94
1997: 97
1998: 105
1999: 116
2000: 126
2001: 138
2002: 142
2003: 149
2004: 155
2005: 163
2006: 174
2007: 184
2008: 196
2009: 202
2010: 210
2011: 239
2012: 217
2013: 207
1 out of 12 high school seniors surveyed reported nonmedical prescription opioid use in the past year.

Past-Year Nonmedical Use of Prescription Opioids by High School Seniors:
- 15.8% 6-9 times
- 24.2% 10 or more times
- 21.7% 3-5 times
- 38.2% 1-2 times
Opiate-Related Deaths

Narcotic pain relievers now cause or contribute to nearly 3 OUT OF 4 Prescription Drug overdoses and about 15,500 DEATHS - Centers for Disease Control and Prevention
Short Term Effects

Skin
- Warm/Flushing

Eyes
- Pinpoint Pupils

Respiratory
- Slowed Breathing

Central
- Drowsiness, Dizziness
- Muscle weakness

Mouth
- Dryness
Marijuana

Tetrahydrocannabinol (THC): Isolated in 1964, most abundant psychoactive compound in marijuana
Marijuana

- There has never been a documented overdose on THC
- It can’t kill you but chronic users display long-term cognitive effects
  - Memory deficits
  - Decreased ability to learn
- However, numerous studies disagree
THC Content in Marijuana

• THC concentrations in marijuana are increasing
  • 1979: Average of 0.93% THC
  • 2009: Average of 9.75% THC
• More potent marijuana = more driving issues

Metabolism

THC → 11-OH-THC → THC-COOH

Psychoactive → Psychoactive → Inactive
THC and Driving

Whole Blood

THC

0 2 4 6 8
Short Term Effects

Central
- Excessive sedation
- Cognitive impairment
- Hallucinations
- Altered time perception
- Psychosis

Eyes
- Bloodshot
- Watery

Cardiac
- Tachycardia
- Hypertension
THC and Driving

• Like alcohol, THC affects driving in a dose-related fashion
• THC effects vary more than alcohol due to:
  • Tolerance
  • Smoking technique
  • Variations in absorption
• Experienced THC users compensate for driving deficiencies better than experienced drinkers
THC and Driving

- Washington has set a *per se* limit of 5 ng/mL for THC in blood
- Nearly all toxicologists agree that this value is too high
- Any concentration can be impairing depending on the experience of the user
Drug Combinations

• Combining 2 drugs with the same side effects multiplies the side effects of each drug
• Alcohol + any other drug, *bad*
• Opiates + Benzos very common
• THC + prescription meds very common
Drugs synthesized to avoid detection or prosecution
Since 2005, the EU’s drug monitoring Center has registered 450 new substances
101 unknown substances were registered in 2014 alone.
The NPS Problem

Figure 1: Number and categories of novel psychoactive substances that are reported annually to the EU’s early warning system, based on a figure in the organisation’s report (1). Reprinted with permission from the European Monitoring Centre for Drugs and Drug Addictions (EMCDDA).
Synthetic Cannabinoids

- JWH-018 was one of the first sold as a “legal high”
- Thought to be more than 600 possible compounds
- ~150 have been detected in seized material
- Compounds included in products change as the law changes
| 4-HTMPIPO | ADB-FUBINACA | CP-55,940 | JWH-182 | MN-24 |
| 5C-MN-24 | ADB-PINACA | EG-018 | JWH-193 | MN-25 |
| 5F-AB-PINACA | ADBICA (ADB-PICA) | FAB-144 | JWH-198 | Nabilone |
| 5F-ADB | AM-1220 | FDU-PB-22 | JWH-200 | NESS-0327 |
| 5F-AEB | AM-1221 | FU-AEB | JWH-200 | NESS-040C5 |
| 5F-AMB | AM-1235 | FUB-144 | JWH-203 | NM-2201 |
| 5F-APINACA | FUB-AMB | JWH-210 | Org-28611 | PX-1 |
| 5F-JWH-122 | FUB-APINACA | JWH-249 | PX-2 | PX- |
| 5F-JWH-210 | FUB-PB-22 | JWH-250 | BB-22 | PB-22 |
| 5F-MN-18 | FUBIMINA | JWH-251 | RCS-4 | RCS-8 |
| 5F-MN-24 | AM-2201 | JWH-302 | RCS-8 CAS | RCS-8 CAS |
| 5F-PCN | AM-2232 | JWH-320 | SDB-005 | SDB-006 |
| 5F-QUPIC | AM-2233 | JWH-398 | STS-135 | THJ-018 |
| 5F-SDB-005 | AM-630 | JWH-424 | THJ-2201 | UR-144 |
| 5F-SDB-006 | AM-679 | LY-2183240 | MAM-2201 | WIN-48,098 |
| A-796,260 | AM-694 | MDA-19 | SDB-005 | WIN-55,225 |
| A-834,735 | AMB | JTE-907 | MDA-19 | XLR-11 |
| A-836,339 | APICA (SDB-001, 2NE1) | JTE7-31 | MMB-CHMICA | |
| AB-001 | APINACA | JWH-007 | MMB-CHMINACA | |
| AB-002 | APP-FUBINACA | JWH-015 | MDMB-CHMINACA | |
| AB-005 | AZ-037 | JWH-018 | MDMB-CHMINACA | |
| AB-CHFUPYCA | BIM-018 | JWH-019 | MDMB-CHMINACA | |
| AB-CHMINACA | CB-13 | JWH-073 | MDMB-CHMINACA | |
| AB-FUBINACA | CP 47,497 | JWH-081 | MDMB-CHMINACA | |
| AB-PINACA | CP 55,940 | JWH-098 | MDMB-FUBINACA | |
| ADB-CHMINACA | CP-47,497 | JWH-116 | MEMPIRAPIM | |
|            |        | JWH-122 | MMB-2201 | |
|            |        | JWH-149 | MN-18 | |
|            |        | JWH-167 |        | |
Synthetic Cannabinoids

- Side effects include:
  - psychotic episodes
  - paranoia, increased anxiety and hallucinations – typically much more severe than after smoking marijuana
  - increased heart rate
  - agitation
  - vomiting
  - seizures
  - uncontrollable body movements
  - death
9:00 - We pack my bowl out with around 25 mg and he takes it all in and holds it for 30 seconds, then I quickly repack it and do the same.

9:02 – We both look at each other feeling an intense high come on, we lose perception of time instantly. We are glued to our chairs.

9:15 – Intense visual distortion. J can't stand up, I hold onto his arm while listening to music and assure him we're gonna get through it. I tell him we need to do it together and that I can't do it alone. My body feels like a demon is ripping my soul out. I am losing hope that J will snap out of it, he is barely responding to me. I am panicking and telling myself over and over that this isn't happening. I ask him if we should go to the hospital and he tells me no.

9:30 – J awakens and starts screaming and flailing uncontrollably. My mother and I struggle to hold him down as he lets out blood curdling screams with each breath, his bulging eyes and agonizing facial expression will forever be ingrained in my mind.

9:45 – I've been sitting on my couch tripping balls as dozens of familiar faces walk in and out of my house.

10:10 – I arrive at the hospital, I feel okay and the lingering feeling of dying has dissipated. I rode in the ambulance and watched J vomit and scream while they sedated him.

This was the single most insane hour of my life. I saw, felt, and did things I never thought I would. I am thankful I didn't OD too, god knows what would have happened. I will probably never do JWH again.
Designer Opioids

- Opioids (Can the good old drugs be made “better”?)
  - Hydrocodone
  - Codeine
  - Morphine
  - Oxycodone
  - Methadone
  - Tramadol
  - Hydromorphone
  - Oxymorphone
  - Fentanyl

![Morphine](image1)

![Fentanyl](image2)
Desomorphine (AKA Krokodil)

- 8 to 10 times more potent than morphine
- Ultra fast acting
- One-pot synthesis like methamphetamine
- Highly addictive
- Causes the following nasty issues……..
Fentanyl Analogues

• Acetylfentanyl
  • Between five to fifteen times more potent than heroin
  • 80 times more potent than morphine
  • Not licensed for medical use and only sold illegally as a designer drug

• 3-Methylfentanyl
  • Between 3,000 and 6,000 times stronger than morphine (depends on the isomer)
  • Resulted in many deaths among recreational opioid users
Fentanyl Analogues

- 2,5-Dimethylfentanyl
- 3-Allylfentanyl
- 3-Methylbutyrfentanyl
- 3-Methylfentanyl
- 3-Methylthiofentanyl
- 4-Fluorobutyrfentanyl
- 4-Fluorofentanyl
- 4-Phenylfentanyl
- 4-Methoxybutyrfentanyl
- Acrylfentanyl
- α-Methylacetylfentanyl
- α-Methylthiofentanyl
- Acetylfentanyl
- Alfentanyl
- Benzylfentanyl
- β-Hydroxyfentanyl
- β-Hydroxythiofentanyl
- β-Methylfentanyl
- Butyrfentanyl
- Brifentanyl
- Carfentanyl
- Furanylftentanly
- Lofentanyl
- N-Methylcarfentanyl
- Mirfentanyl
- Ocfentanyl
- Ohmefentanyl
- R-30490
- Remifentanyl
- Sufentanyl
- Thiofentanyl
- Trefentanyl
- Valerylfentanyl
Other Designer Opioids

- **MT-45**
  - Equipotent to morphine
  - Recreational use of MT-45 has been associated with hearing loss and death

- **U-47700**
  - 8 times more potent than morphine
  - Multiple deaths reported
  - TCME has had 1 overdose

- **W-18**
  - An unregulated alternative to other opiates
  - No potency information currently available
  - Numerous deaths in the Northeast
Designer Benzodiazepines

- Benzos (Can the good old drugs be made “better”?)
  - Diazepam
  - Alprazolam
  - Lorazepam
  - Clonazepam
  - Oxazepam
  - Temazepam
  - Phenazepam
  - Etizolam
Of Course They Can

- Diclazepam
- Flubromazepam
- Pyrazolam
- Clonazolam
- Deschloroetizolam
- Flubromazolam
- Nifoxipam
- Meclonazepam
Designer Benzodiazepines

- **Clonazolam**
  - Highly potent
  - Strong sedation and amnesia at oral doses of 0.5 mg

- **Flubromazolam**
  - Life-threatening adverse reactions have been observed at doses of 3 mg
Designer PCP

- **3-MeO-PCP**
  - Sold online as a research chemical
  - Equipotent to PCP

- **4-MeO-PCP**
  - Sold online as a research chemical
  - 80% as potent as PCP
Where Can I Get Some?

research chemicals for sale

ChingLabs - Research Chemicals For Sale
https://chinglabs.com/
Buy fine quality research chemicals online from Chinglabs.com Discreet shipping in USA, AU, EU.

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Drug-related DWI cases

• Never decided by the result on a lab report
• Tox results must be used in conjunction with observed behavior
  • Poor driving
  • SFST results
  • Observations of the officer
Drug-related DWI cases

• “Negative” cases may contain a novel drug
• Can’t analyze for many “research chemicals” or synthetic cannabinoids
• Alcohol is still common, but more frequently seen in combination with other drugs
Questions
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