

Alcohol

- Adult male 5 drinks to get to 100 mg%
- Elimination mg%/hr.
 - Men 15 mg%/hr; women 18 mg%/hr
 - Alcoholics 23 mg%/hr up to 36 mg%/hr
- Level of 250 mg% at midnight
 - 40 mg% to 145 mg% at 7:00 am
- Can not use urine to determine intoxication
- Breath = Blood concentration



Basic Terminology

- **Radio Immune Assay**
 - Initial screening test
 - Antigen-antibody reaction
- **Gas Chromatography Mass Spectrometry**
 - GC/MS - Gold Standard
- **Units of measurement**
 - nanograms per milliliter = ng/ml
 - 10^{-9} grams = parts per billion



Nine Panel Screen

- Amphetamines*
- Barbiturates
- Benzodiazepines
- Cocaine Metabolite*
- Marijuana Metabolite*
- Methadone
- Opiates*
- Phencyclidine*
- Propoxyphene

* = DOT 5



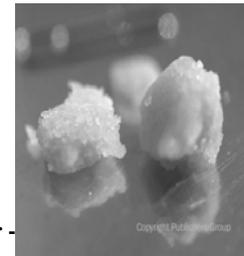
Amphetamine *

- **New Panel (Ecstasy)**
 - MDMA, MDA & MDEA
- **All phenethylamines**
- **MDPV “Bath Salts”**
- **Related to epinephrine (adrenaline)**
- **Stimulant and hallucinogenic properties**



Amphetamine *

- **Discovered 1920**
 - looking for synthetic ephedrine (-OH)
- **Legal and Illegal Uses**
 - Narcolepsy
 - ADHD
 - Performance enhancer - truckers
 - Weight loss



Amphetamine *

- **CNS Stimulant**
 - Anxiety, restlessness, agitation
 - Sweating, rapid heart rate
 - Increased blood pressure, dilated pupils
- **With repeated use**
 - Lethargy, exhaustion, mental confusion
- **Even with prescription may be a problem**
 - Behavioral problem, paranoia and psychosis



Amphetamine *

- **Effects last 3 - 6 hours**
- **Detect up to 7 days**
 - Initial 1000 ng/ml (old) 500 ng/ml (new)
 - GC/MS 500 ng/ml (old) 250 ng/ml (new)
 - Anticipate 30-40% increase in positives
- **Elimination dependent on pH of urine**
 - 1 - 4 days
 - Be suspicious - vinegar



Barbiturate

- Prescription drugs and OTC drugs
- Seizures, Sedatives and Headaches
- Donnagel, Primatene tabs, Bronkotabs,
- Major drug of abuse in 50's & 60's



Barbiturate

- **Depressants Effects**
 - Similar to alcohol
- **Withdrawal very serious**
 - Agitation, seizures, death
- **Effects last up to 8 hours**
- **Detect up to 2 - 7 days**



Benzodiazepine

- **Many prescription drugs**
 - All relatives of Valium
- **Most widely prescribed drugs in U. S. and Europe.**
- **Seizures, Anxiety, Sedatives**
- **DayPro cross reacts with immunoassay**

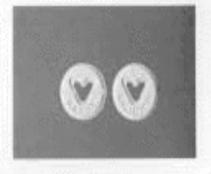


Drug	Nordiazepam	Oxazepam	Temazepam
Alprazolam (Xanax)			
Chlordiazepoxide (Librium)	Yes	Yes	
Clonazepam (Klonopin)			
Clorazepate (Tranzene)	Yes	Yes	
Diazepam (Valium)	Yes	Yes	Yes
Estazolam (ProSom)			
Flurazepam (Dalmane)			
Lorazepam (Ativan)			
Midazolam (Versed)			
Oxazepam (Serax)		Yes	
Prazepam (Centrax, Verstran)	Yes	Yes	
Temazepam (Restoril)		Yes	Yes
Triazolam (Halcion)			

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Benzodiazepine

- **Positives from relative, friend or stranger**
 - Muscle spasms
 - Sleeping medication
- **Sedation alcohol-like**
- **Effect up to 12 hours**
- **Detectable up to months**
 - After chronic use.



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Cocaine *

- **Evidence of use in 1500 BC**
- **Legal and Illegal uses**
 - ENT surgery
 - Wound closure
 - Nose bleeds
 - Dental
 - Current medical use is rare



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Cocaine *

- **CNS Stimulant**
 - Anxiety, restlessness, agitation
 - Sweating, rapid heart rate
 - Increased blood pressure, Dilated pupils
- **With repeated use**
 - Lethargy, exhaustion, mental confusion



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Cocaine *

- **Effects last 1 - 2 hours**
- **Test is for Benzoylcegonine**
 - No cross reactivity
 - Novocaine not = Cocaine
- **Detect up to 3 - 5 days**
 - Initial – 300 ng/ml (old) 150 ng/ml (new)
 - GC/MS - 150 ng/ml (old) 100 ng/ml (new)
 - Anticipate 30% increase in positives
- **Passive inhalation does not produce detectable levels**

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Marijuana*

- Legal use - cancer nausea, pain, appetite
- Euphoric then Depressant
 - Slurred speech
 - Impaired motor response
 - Memory and concentration
 - Blood shot eyes
 - Increased heart rate



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Marijuana*

- Effects last 1-2 hours
- Impaired 4 - 6 hours after use.
- Can not determine intoxication by urine.
- Detect 7 - 30 days at cutoff of 50 ng/ml
- Detect 7 - 77 days at cutoff of 20 ng/ml
- Passive inhalation does not produce detectable levels

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Marijuana*

- Creatinine normalization
 - Creatinine is a muscle protein
 - New versus old exposure
 - Urine cannabinoids ÷ Urine creatinine
 - Example CB's 200, Cr 100 ratio = 2
 - CB's 300, Cr 200 ratio = 1.5
 - If ratio is decreasing no new use

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Synthetic Cannabinoids



Synthetic Cannabinoids

- First synthesized in the 1980's
- Sprayed onto dried plant leaves and smoked
- Rapidly cleared < 1 ng/ml in 3 hr
- Unregulated in most states
- Investigational for appetite, blood pressure and nausea

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K2 Blends - Drug Content

	JWH-018 (mg/g)	JWH-073 (mg/g)	CP47,497 (nM) (mg/g)	JWH-250 (mg/g)
K2 Blonde	12	.3	-	-
K2 Standard	9	9	-	-
K2 Citron	10	.0	-	-
K2* (Unknown)	-	-	6	-
K2 Summit	11	9	-	-
K2 Blue	15	-	-	-
K2 Pink	11	-	-	-
K2 Latte	16	0.29	-	14
K2 Mint	19	0.33	-	-
K2 Silver	8	-	-	16
Spike Gold	20	.1	-	-
Spike Maxx	17	-	-	19
Spike Diamond	17	0.07	-	-
Spike Silver	9	.6	-	-
Space	10	-	-	-
Herbal blends*	2.6 - 35.9	-	1.1 - 16.2	-

(* Uchiyama et al, 2010)



Synthetic Cannabinoids

- 13 different drugs varying potency for CB receptors
- JWH-018 most common
- Effect profile very similar to marijuana
- Not detected on a drug screen for MJ
- Rimonabant: CB1 receptor antagonist
- Sativex - THC & Cannabidiol: receptor agonist



Methadone

- Classified as narcotic – does not show positive on opiate screen
- Heroin withdrawal and pain control
- May disqualify in safety sensitive position
 - ADA issue



Methadone

- In 2004 methadone was the leading drug killer in the state of Florida.
- Shift from Oxycotin to Methadone for pain.
- Very long half life of elimination 24 hours (15 – 60), but duration of analgesic effect only 6 – 8 hours (genetic variability).
- Increased respiratory depression with Bnz's



Methaqualone

- Quaalude
- Removed from market in 1983
 - Sexual disinhibition
- Sold as powder now dirty drug
- Sedative - like alcohol



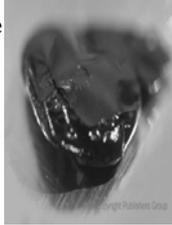
Opiates*

- Heroin, Morphine, Codeine
 - Not most synthetic opiates
 - High conc. - hydrocodone
- 1806 Morphine isolated
 - Morpheus Greek god of dreams
 - Heroin -synthesized by Bayer
- One of the most beneficial drugs
 - Relief of Pain



Opiates*

- Poppy seeds use to cause false positive.
- “The MRO must find clinical signs of opiate abuse (or unauthorized use).”
- Current cutoff 2000 ng/ml
- No signs if > 15,000ng/ml
- New 6 – AM specific for Heroin



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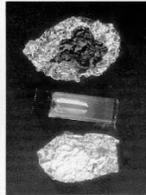
Opiates*

- CNS depressant
- Pin point pupils
- May not see either in tolerant abuser
- Withdrawal
- Effects last 2 - 4 hours
- Detect up to 2 - 4 days

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Phencyclidine*

- 1957 Serynl - general anesthetic
 - Nightmares, dissociative and psychotic reactions
- PCP or Angel dust
 - PeaCe Pill
 - PhenylCyclohexyl Piperidine
- Sold as or mixed with LSD, THC, Cocaine, Amphetamine



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Phencyclidine*

- Excitability, agitation, psychosis
- Nystagmus, ataxia, decreased sensation, tremor, muscle rigidity, hallucinations
- Effects last 8 hours or more, detect up to 2 weeks
- Irreversible memory loss, personality changes and thought disorders.
- Relative immunity to pain
- False positives on instant tests

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Propoxyphene

- Removed from market in December 2010
- Narcotic - does not show on opiate screen
- Most positives had prescription
- High doses required for sedative effects
 - Alcohol - like
- Effects 2-4 hours
- Detect up to 2 - 6 days



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Drug Free Workplace



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