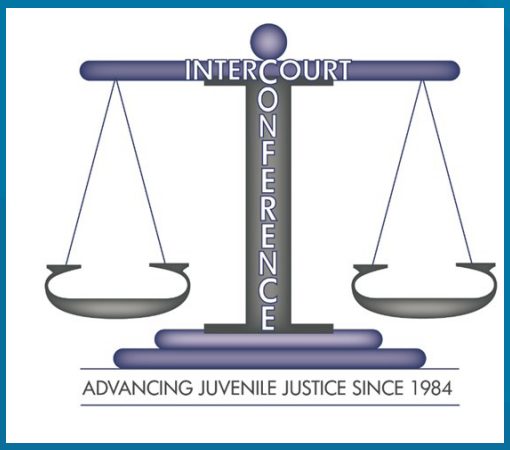
42nd Annual InterCourt Conference



Session 3D: Truth in the Tox: Decoding Toxicology Testing for Probation

March 12, 2026
Hilton Columbus at
Easton Town Center
Columbus, OH

FACULTY BIOGRAPHIES

AMY MILES is a Program Project Manager at the Wisconsin State Laboratory of Hygiene (WSLH) and serves as a Regional Toxicology Liaison for the Midwest, supporting MI, OH, IN, IL, WI, MN, SD, ND. Amy has over 25 years of experience in forensic toxicology. In addition to her work with the RTL program, Amy is involved in public health as it relates to forensic toxicology. She is the co-chair of the Association of Public Health Laboratories (APHL) Overdose Biosurveillance Task Force. Offering resources to public health laboratories performing non-fatal overdose surveillance testing. Amy partners with the University of Wisconsin on research projects focusing on impaired driving and drugs and human performance. Amy has given hundreds of presentations on the topic of drugs, alcohol and human performance, and public health at state and national conferences and in-service trainings and has contributed several articles to national publications. She is a member of several professional organizations and committees that pertain to alcohol, drugs and human performance, and public health. Amy is the Past President of the Society of Forensic Toxicologists and is a National Judicial College faculty member. In 2020, Amy received the IACP DRE Ambassador Award, and in 2023 the Association of Public Health Laboratories' Gold Standard Award, the Governor's Highway Safety Association's Kathryn JR Swanson Public Service Award, and the SOFT Teaching and Mentoring Award. In 2025, Amy received the Robert F. Borkenstein Award, conferred by the National Safety Council's Alcohol, Drugs and Impairment Division.

Truth in the Tox: Decoding Toxicology Testing for Probation

Amy Miles
Program Project Manager, Wisconsin State Laboratory of Hygiene
University of Wisconsin School of Medicine and Public Health

Forensic Toxicology Insights for Ohio Juvenile Court Staff

Key knowledge for juvenile justice professionals in Ohio

Mentimeter Poll

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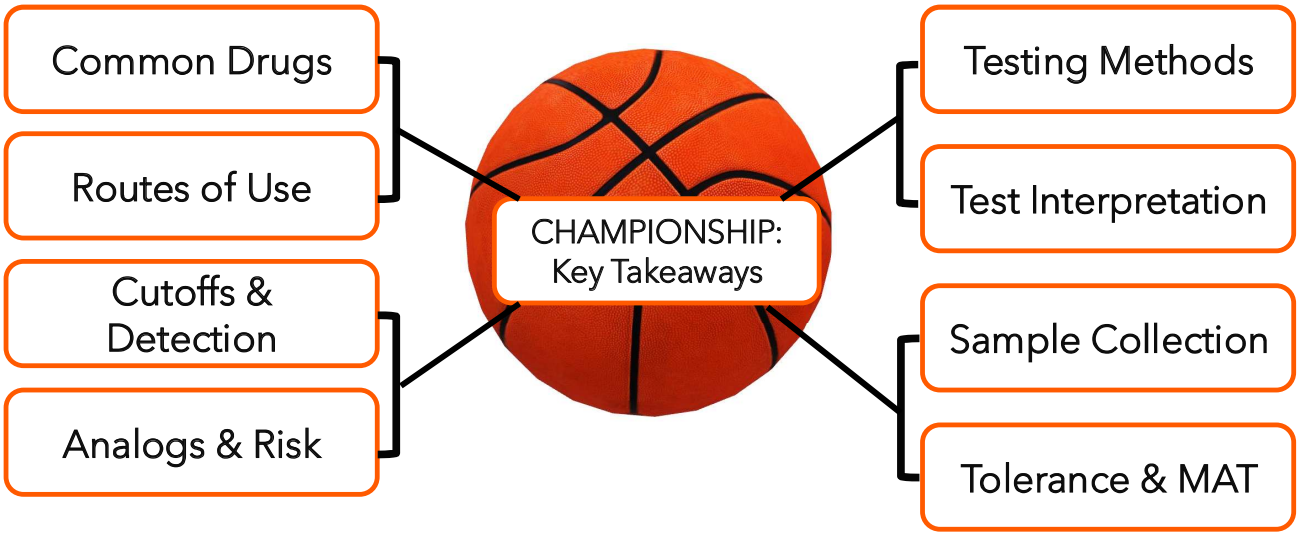
March Madness Agenda – Forensic Toxicology



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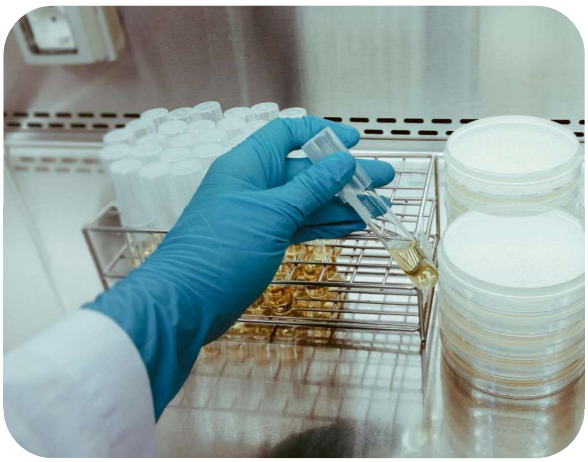
Sample Collection

Best Practices for Sample Collection



REGIONAL TOXICOLOGY LIAISONS

Observed Urine Collection

Observed urine collection minimizes adulteration and substitution, ensuring valid toxicology results.

Integrity and Chain of Custody

Strict chain of custody and sample integrity checks prevent tampering and maintain result credibility.

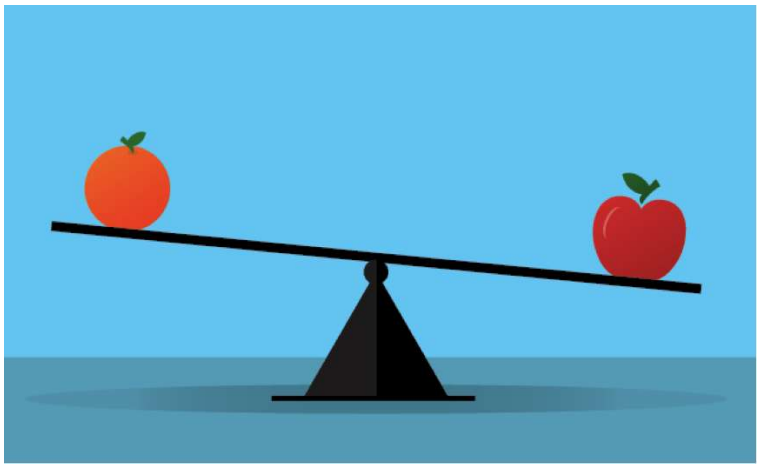
Detection of Adulteration

Using temperature checks, creatinine assessment, and adulterant strips detects sample tampering.

Respectful and Consistent Collection

Respectful, standardized procedures build trust and ensure fairness in sample collection.

BLOOD VERSUS URINE VERSUS ORAL FLUID



URINE

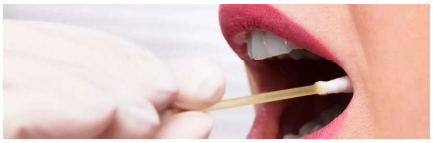
- Less invasive sample collection
- Some on-site testing capability
- Broad detection time window
- Targeting metabolites for detection
- No relationship to brain concentrations
- No relationship between urine concentration and effect
- Time delay for collection

BLOOD

- Closest relationship to brain concentrations
- Targeting parent drug for detection
- Large literature for comparative interpretation
- Somewhat invasive collection
- Limited detection window
- Time delay for collection
- Lack of quantitative effect relationship
- No on-site testing capability

ORAL FLUID

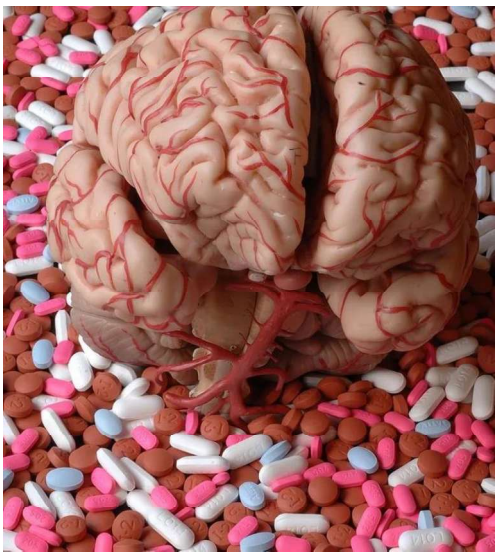
- Least invasive collection
- No time delay for collection
- Targeting parent drug for detection
- On-site testing capabilities
- Limited relationship to blood concentrations
- No relationship between concentrations and effect
- Limited detection window
- Limited specimen volume



BRAIN TISSUE

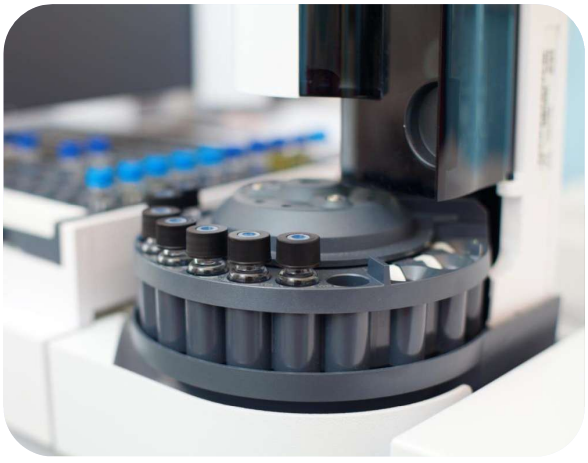
- Most invasive collection
- Difficult to collect

- Direct correlation to impairment
- Significantly reduce recidivism



Testing Methods

Types of Testing in Laboratories



Immunoassay Screening

Immunoassay screening quickly detects broad drug categories using antibody interactions but may produce false positives or negatives.

Confirmatory Testing

Confirmatory testing with GC/MS or LC-MS/MS provides specific, quantitative identification of drugs, distinguishing similar compounds accurately.

Specialized Drug Detection

Some substances like fentanyl and synthetic cannabinoids require specialized tests due to unique molecular structures.

Testing Implications

Understanding test limitations guides requests for confirmatory testing and aids informed decisions on treatment and risk assessment.

Non-laboratory Based Testing

Limitations in POC devices can cause false positive and mis-interpretation of results.

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What Toxicology Tests Can and Cannot Determine

Capabilities of Toxicology Tests

Tests can confirm the presence of drugs or metabolites above certain cutoffs, indicating exposure to substances.

Limitations of Timing and Dosage

Tests cannot determine exact timing, dosage, or behavioral impairment from detected substances.

False Positives and Negatives

Certain medications or supplements may cause false positives; high cutoffs or novel drugs may cause false negatives.

Importance of Confirmatory Testing

Confirmatory tests are essential for legal and clinical decisions, especially in contested or high-risk cases.

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Cutoffs & Detection

Cutoff Levels and Legal Standards

Definition of Cutoff Levels

Cutoff levels are minimum drug concentrations for reporting positive lab results, ensuring meaningful detection.

Federal Guidelines and Examples

Federal agencies like SAMHSA define cutoff levels balancing sensitivity and false positives for drugs like cannabinoids and cocaine.

Variability Across Drug Classes and Matrices

Cutoff levels vary by drug type and testing matrix, including urine, hair, saliva, affecting test interpretation.

Implications for Legal and Juvenile Justice

Understanding cutoff levels aids legal staff in interpreting results, ensuring fair, reliable youth court outcomes.

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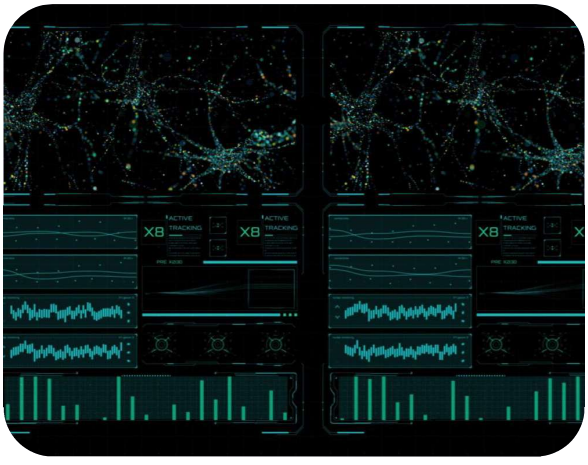
Drug Detection Windows



Variability in Detection Windows

Drug detection times vary by drug type, individual physiology, and usage patterns, affecting test outcomes.

Cannabis Detection Complexity

Cannabis metabolites may persist from days to over a month, especially in heavy users due to fat storage.

Testing Methods and Detection

Hair testing shows long-term drug use while oral fluid testing detects very recent exposure.

Implications for Interpretation

Understanding detection windows aids accurate interpretation and informed supervision decisions.

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Routes of Use

Routes of Drug Ingestion

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Smoking and Vaping

Smoking or vaping causes rapid drug onset through pulmonary absorption with fewer metabolites detectable than oral ingestion.

Oral Ingestion

Oral ingestion leads to slower onset but longer effects due to gastrointestinal absorption and liver metabolism.

Intranasal Use

Snorting drugs causes fast absorption through nasal mucosa and may cause nasal tissue damage with repeated use.

Injection and Rectal Routes

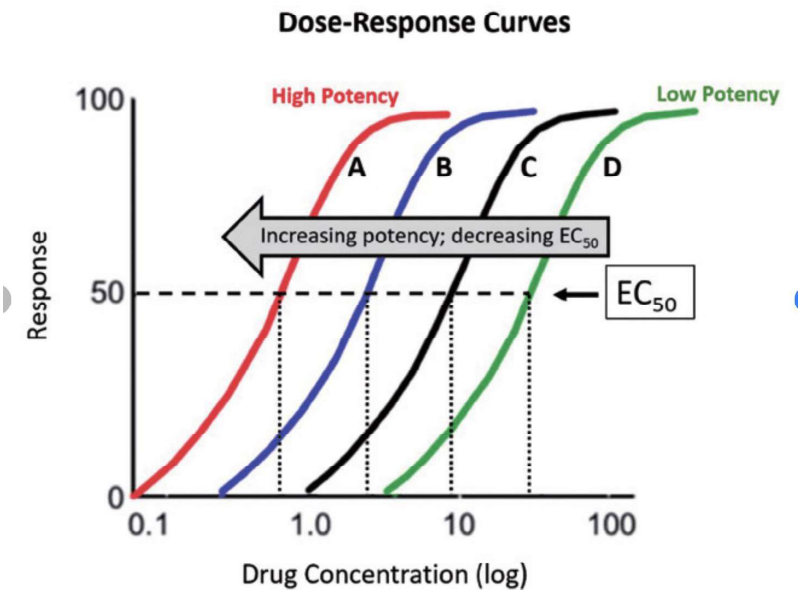
Injection provides immediate systemic circulation with high overdose risk; rectal use offers rapid absorption similar to snorting.

Test Interpretation

DEFINITIONS

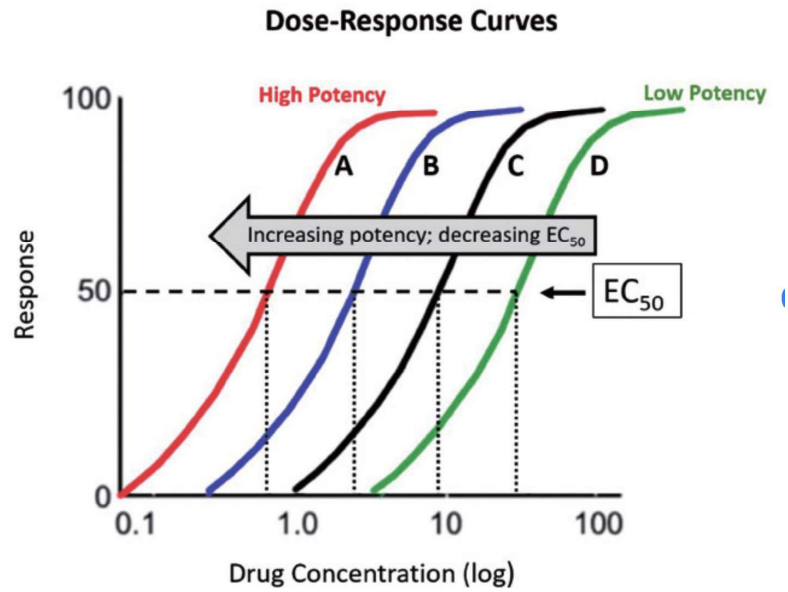
Dose – a specific amount of drug taken at one specific time

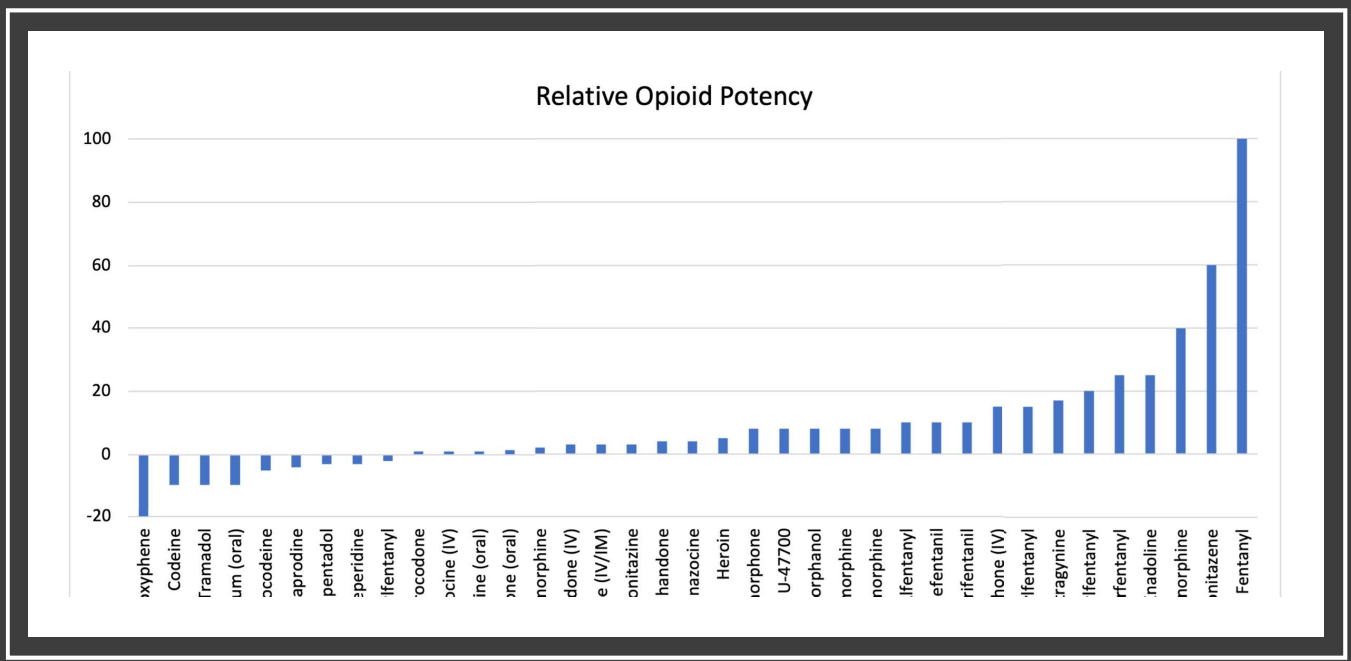
Dosage – how to take medication (includes doses over time)

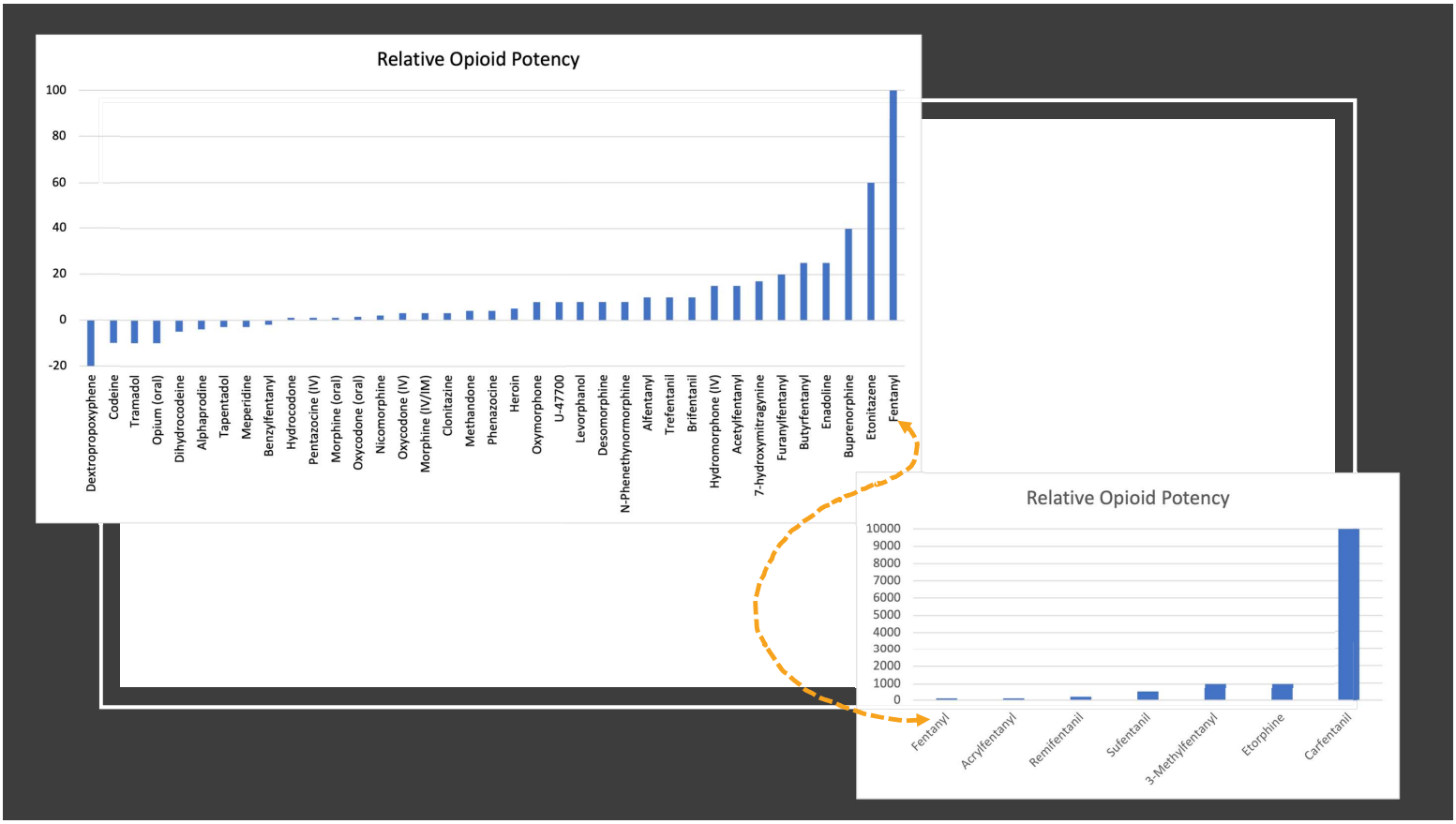


DEFINITIONS

Potency – a measure of a drugs biological activity in terms of the dose required to produce a pharmacological effect of a given intensity







DOSE

Alcohol (ethanol) – 14

Gabapentin – up to 3600

Marijuana – 10

Fentanyl – 12 – 100

DOSE

Alcohol – 14 G/drink

Gabapentin – up to 3600 mg/day

Marijuana – 10 mg in edibles

Fentanyl – 12 – 100 ug for pain

DOSE

Alcohol – 14 G/drink

Gabapentin – up to 3600 mg/day

Marijuana – 10 mg in edibles

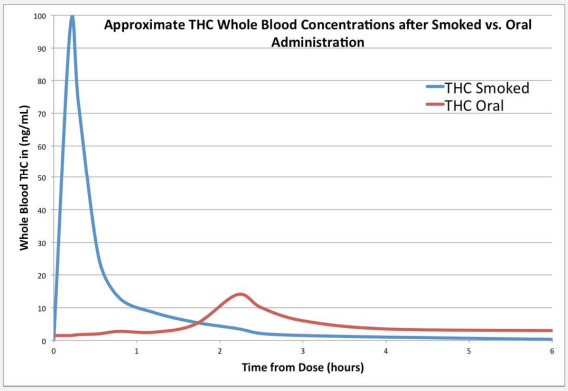
Fentanyl – 12 – 100 ug for pain

1 G = 1000 mg

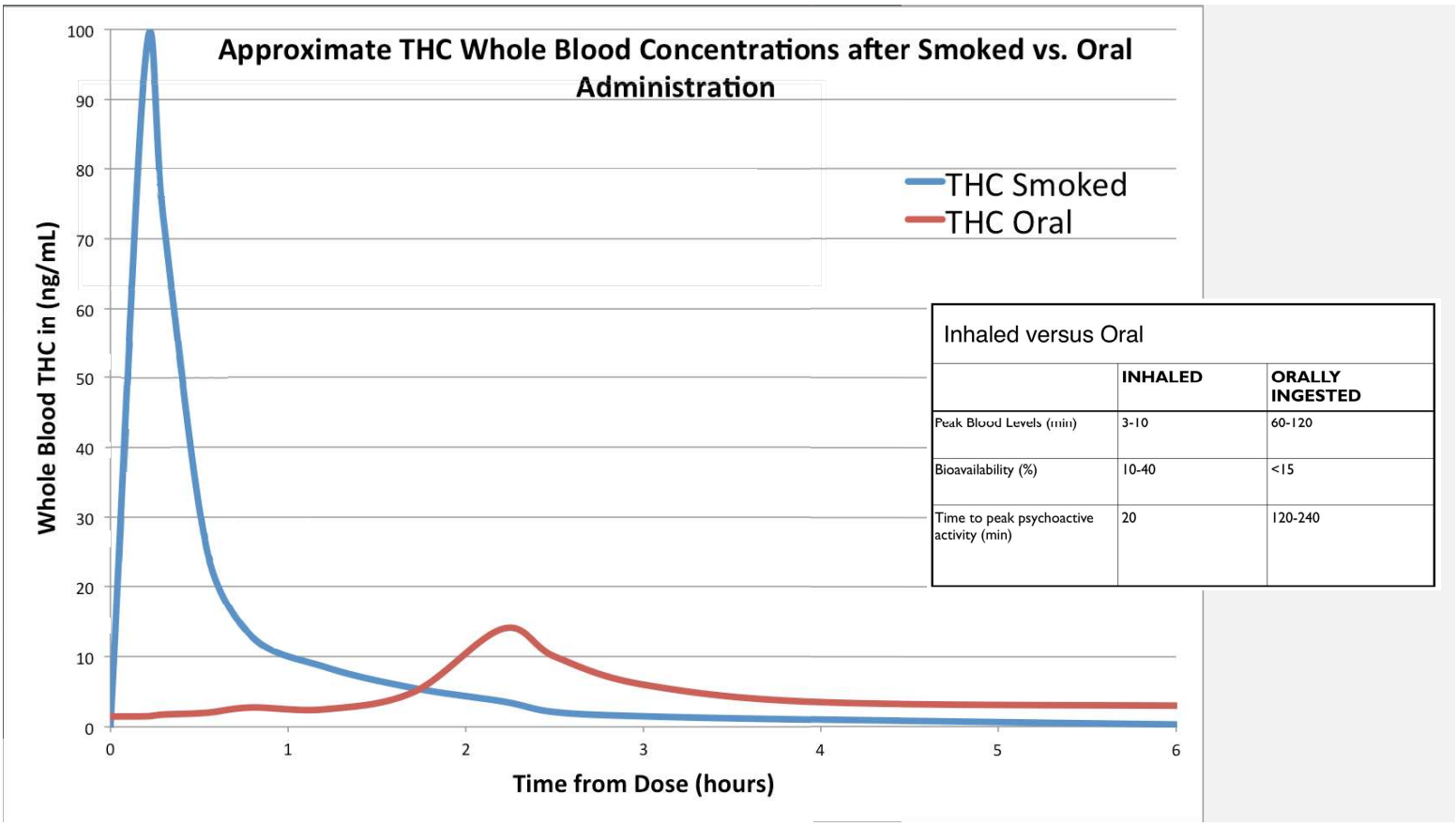
1 mg = 1000 ug

ROUTE OF ADMINISTRATION

- Oral
- IV
- Smoked
- All the others



Inhaled versus Oral		
	INHALED	**ORALLY INGESTED**
Peak Blood Levels (min)	3-10	60-120
Bioavailability (%)	10-40	<15
Time to peak psychoactive activity (min)	20	120-240



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INTERPRETATION OF DRUG RESULTS

- So….. how do we interpret drug results?
- Carefully

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Common Drugs

Common Drugs Used by Justice-Involved Youth

Cannabis and Vaping
Cannabis is the most widely used drug among youth, with vaping THC oils altering detection and metabolite patterns.

Stimulants and Polysubstance Use
Stimulants like cocaine and methamphetamine are prevalent, often combined with opioids complicating toxicology results.

Opioids and Fentanyl Risks
Opioids including heroin and fentanyl pose high risks; fentanyl analogs vary in potency and detection challenges.

Synthetic Cannabinoids and Benzodiazepines
Synthetic cannabinoids change chemically often, complicating detection; benzodiazepines are used to modulate drug effects.

Hallucinogens
Psilocybin cycling back into popularity as well as Ecstasy/MDMA/Molly, LSD, Pink Cocaine/TUSI (MDMA and Ketamine)

Alcohol and Inhalants
Alcohol misuse and inhalant use are common, with inhalants evading routine tests but causing serious neurotoxic effects.

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Drug Tracking Resources

National Resources

DEA NFLIS

CFSRE NPS Discovery

NDEWS – Weekly Briefings

Local Resources

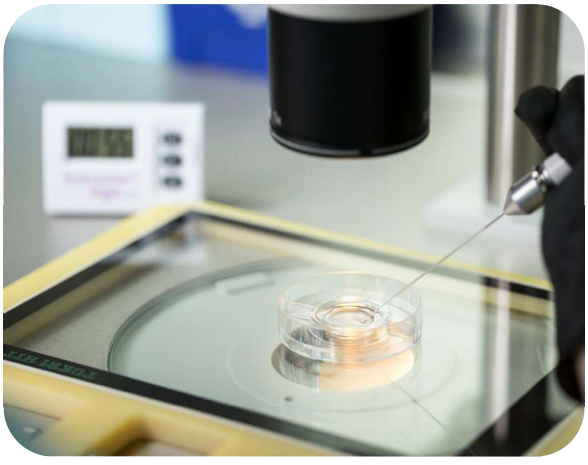
Ohio DOH, Injury Surveillance and Data

Ohio Poison Control Center

Ohio Narcotics Intelligence Center

Analogs & Risk

Testing Challenges with Drug Analogs



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Evolving Molecular Structures

Drug analogs frequently change molecular structures to evade detection by standard toxicology tests.

Specialized Testing Requirements

Specialized, targeted tests with reference standards are needed to detect newly emerging drug analogs.

Limitations of Toxicology Tests

Toxicology tests detect molecules but cannot determine intent, and negative results may miss analog exposure.

Health and Supervision Risks

Missing potent analogs poses serious health risks and challenges for supervision and treatment strategies.

Common Novel Psychoactive Substances (NPS)

Fentanyl analogs

Novel benzodiazepines

Mitragynine (Kratom) / 7-hydroxymitragynine

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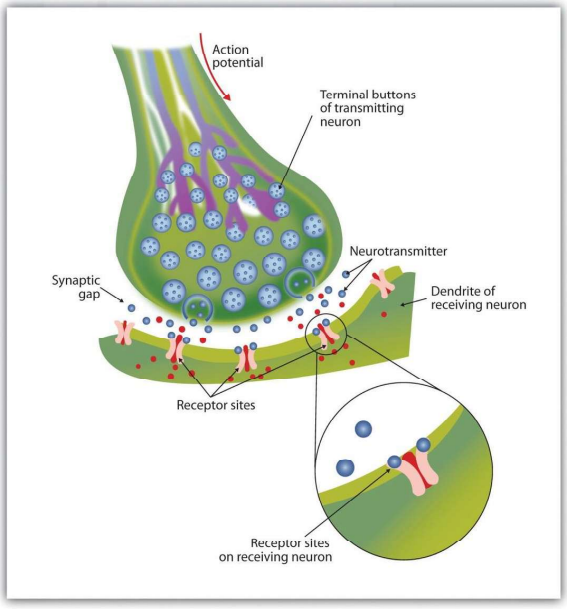
Tolerance & MAT

TOLERANCE

- A person's diminished response to a drug, which occurs when the drug is used repeatedly and the body adapts to the continued presence of the drug.
  - Tolerance does not mean abuse or addiction
  - However, abuse and addiction lead to tolerance.

TOLERANCE

- Receptor desensitization
- Reduction in receptor density
- Changes in action potential firing rate
- Alterations in protein transcription
- Adaptations in behavior
  - Learning to actively overcome drug-induced impairment through practice



TOLERANCE

- Opioids – start with hydrocodone and work up with chronic pain
- Fentanyl - wow
  - Therapeutic is 1-3 ng/ml
  - Death around 5-6 ng/ml
- Societal Tolerance

TOLERANCE

- Is not permanent
  - Will lose tolerance with cessation of use
  - This may be quick in some cases

Medication-Assisted Treatment (MAT) Considerations

Medications in MAT

Buprenorphine, methadone, and naltrexone are common medications used in Medication-Assisted Treatment for opioid and alcohol disorders.

Toxicology Testing Challenges

MAT medications require specific toxicology tests as standard opioid panels may not detect all substances accurately.

Interpreting Test Results

Understanding dosing, metabolite profiles, and confirmatory tests is critical for accurate toxicology result interpretation.

Supporting Recovery and Reducing Stigma

MAT lowers overdose risk and improves recovery; awareness helps reduce stigma and encourage treatment engagement.

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