Drugs in the Workplace

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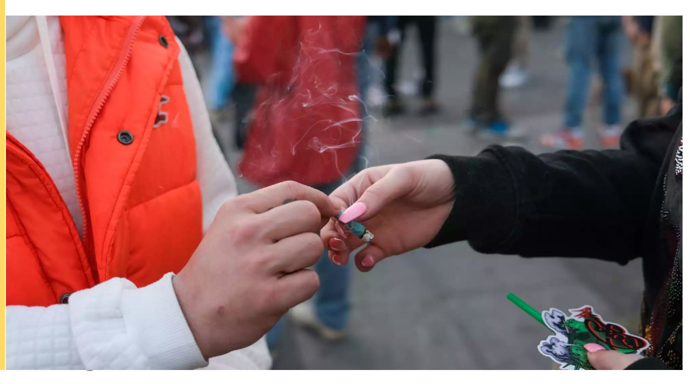
Cannabis in the News

Marijuana in Minnesota

Recreational cannabis is now legal in Minnesota. Here's what we know

MPR News Staff August 1, 2023 4:00 AM



A 3rd Native American tribe in Minnesota establishing adult-use cannabis sales

By **MJBizDaily Staff**

September 6, 2023 - Updated September 6, 2023

SHARE
Don't believe the hype. Get realistic market forecasts, state-by-state insights and benchmarks for all cannabis sectors. Get the 2023 Factbook.

The Leech Lake Band of Ojibwe has established a framework to launch an adult-use cannabis retail program on its tribal lands in rural Minnesota.

The Leech Lake Band business council recently approved an ordinance for the sale and consumption of cannabis products on its lands in the northern part of the state, according to MPR News.

Iowa Public Radio

Iowa is now surrounded on three sides by legal marijuana states

Minnesota became the 23rd state in the U.S. to legalize recreational marijuana on Aug. 1. It's the third of Iowa's neighboring states to...

The times they are a-changin'

Diagnostic and Statistical Manual - V (2013)

Substance Related Disorders

1. Alcohol
2. Caffeine
3. Cannabis
4. Hallucinogens
5. Inhalants
6. Opioids
7. Sedatives, Hypnotics, and Anxiolytics
8. Stimulants
9. Tobacco
10. Other/Unknown

Forest, not Trees

- Direct activation of brain reward pathways
- Reinforced Behaviors
- Substance use v. Substance induced disorders
    - Intoxication and Withdrawal
    - Psychotic, Depressive, Manic, Anxiety….disorders
    - “Addict” is stigmatizing and is falling out of favor

Substance Use Disorder

1. Often taken in larger amounts/longer period than intended
2. Persistent desire/unsuccessful effort to cut back
3. Great deal of time spent acquiring, using, recovering
4. Cravings
5. Use leads to failure of fulfilling obligations
6. Continued use despite persistent problems
7. Important responsibilities neglected as a result
8. Continued use, even in hazardous situations
9. Continued use even if knowledge of hazards
10. Tolerance
11. Withdrawal

Some Background

Cross-Reactivity Between Propylene Glycol and Butylene Glycol

Samuel F. Ekstein, Nicholas Battis, Dominick Dabrowski, and Anne B. Neeley

Published Online: 17 Aug 2023 | https://doi.org/10.1089/derm.2023.0143

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Abstract

Abstract: Background: Propylene glycol (PG) and butylene glycol (BG) are not known to be cross-reactors. However, no large-scale studies have assessed the cross-reactivity rate (CRR) between these 2 structurally and functionally similar compounds.

Objectives: The aim of this study was to determine whether PG and BG demonstrate cross-reactivity.

Methods: This is a retrospective chart review of 893 patients who underwent patch testing for both PG and BG from 2020 to 2022. The frequencies of positive reactions and concomitant reaction rates were calculated.

Results: In our cohort, 53 (5.94%) patients reacted to PG and 13 patients (1.46%) reacted to BG. Of the patients who reacted to PG, 6 reacted to BG representing a CRR of 11.3%, whereas the CRR to PG in BG-allergic patients was 46.2%.

Molecules are important

Propylene Glycol

Butylene Glycol

Drug Tests

1. Pre-placement
2. Random
3. “For Cause”

Urine Samples

- Clear to pale yellow (early morning)
- 4 minutes: 90-100 degree F
- pH 4.5 - 8
- Cr >20mg/dL
- Consider diuretics, veganism, hydration status
- Specific gravity 1.002-1.030
- Dilution
- Soaps, table salt, bleach, toilet bowl cleaner, eye drops

Table IV: Federal Workplace Cutoff Values.

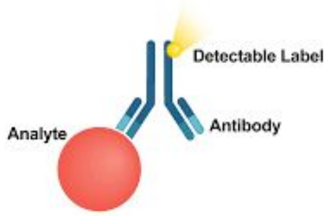
Substance	Initial drug test level (immunoassay ng/mL)	Confirmatory drug test level (GC-MS, ng/mL)
Marijuana metabolites	50	15
Cocaine metabolites	150	100
Opiate metabolites	2000	2000
Phencyclidine	25	25
Amphetamines	500	250

Data based on Reference 6. GC-MS is gas chromatography, mass spectrometry.

Drugs or drug metabolites	Cutoff level [nanograms (ng)/mL]
Marijuana metabolites	50
Cocaine metabolites	150
Opioids:	
Codeine/Morphine [1]	2000
Hydrocodone/Hydromorphone	300
Oxycodone/Oxymorphone	100
6–acetylmorphine (6–AM)	10
Phencyclidine (PCP)	25
Amphetamines: [2]	
AMP/MAMP [3]	500
MDMA [4]/MDA [5]	500

Immunoassays

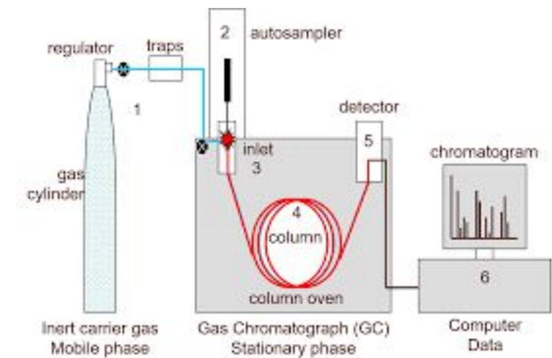
- Antibodies specifically designed to target the drug molecule in question
- Antibody + analyte = active enzyme that can be detected
- After reaching a certain threshold (cut-off), it will be deemed ‘positive’
- Advantage is that it they tend to be sensitive, turn around time is good, relatively inexpensive
- Disadvantage is that there can be a lack of specificity



Types of Immunoassays

1. Enzyme-Multiplied Immunoassay
2. Enzyme-linked Immunosorbent Assay
3. Fluorescence Polarization Immunoassay

Confirmatory Tests



- Presumed positive is taken
- Gas Chromatography - Mass Spectrometry
- Gas is vaporized and only certain compounds will remain
- Electron beams are used to further isolate compounds of interest
- Magnetized tube then analyzes mass:charge and molecular fingerprints can be identified
- Advantage: More specific, can analyze for metabolites too
- Disadvantage: Expensive and time consuming (and not always available)
- Alternative: Liquid Chromatography-Mass Spec

Federal Workplace Guidelines

1. Amphetamines
2. Cannabis
3. Cocaine
4. Opiates
5. Phencyclidine

- Benzodiazepines are a common add-on

Medical Professionals Encountered

- Medical Review Officer - Appropriate “chain of custody” of positive drug screen from employee to laboratory
- Employee Assistance Program - **non-putative** & supports all constituents
- Psychiatric Fitness of Duty

Opiates/Opioids

Audience question: What's the difference between an opioid and an opiate?

- Schedule II - except for Tramadol (IV), Hydrocodone (previously III)
- **Morphine is it!**
- Poor cross-reactivity with oxycodone, oxymorphone, hydrocodone, hydromorphone (FNs)
- Fentanyl, Methadone, Buprenorphine have different chemical structures
- Must order test for semi-synthetic/synthetics separately
- 2000 ng/mL is a high cut-off!
- #1 FN: incorrect test for specific opioid

Opioids (Continued)

- False Positives: Ofloxacin, Gatifloxacin, Rifampin, Rifampicin
- Heroin metabolized to 6-MAM, then morphine
- Methadone - used for treatment, long half life and high proportion unmetabolized elimination
  - Metabolite: EDDP not detected
  - Would be useful because patients may spike urine
  - FPs: Verapamil, Diphenhydramine, Doxylamine
- Fentanyl is impacted heavily by CYP3A4
- Tramadol is a pro-drug for O-desmethyltramadol

Benzodiazepines

- Over a dozen commercially available in the US
- #2 accidental and intentional OD drug
- Long half life (diazepam) or short (traizolam)
- Also indiscriminate of metabolites and high cut-off values (200-300ng/mL)
- Free/non-conjugated oxazepam/nordiazepam
  - Glucuronidated conjugates - lorazepam/alprazolam - beta-glucuronidase in lab
  - Clonazepam skips this pathway completely
- False positives: Sertraline, Oxaprozin, Efavirenz

Cocaine

- Main metabolite: Benzoylecgonine
- Minimal FPs: amoxicillin and topical use
  - Safe alternatives: benzocaine, lidocaine, procaine, tetracaine

Amphetamines

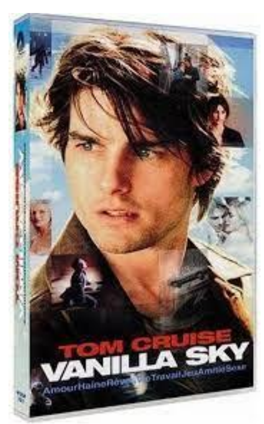
- **Most commonly associated with False Positives!**
    - D- and L- isomers partially to blame
- FP: pseudoephedrine, ephedrine, bupropion, labetalol, ranitidine, selegiline, Vick's, vyvanse
- Dimethylamine - exercise supplement
    - Pop quiz: DoD study found DMAA in what % of FP amphetamine screens?

Synthetic Cannabinoids

- Full CB1/CB2 receptor agonists
- **JWH-018**, JWH-073, JWH-200, JWH-250
- #2 most abused drug of adolescents after cannabis
- Synthetic Drug Abuse Prevention Act (2012) - Schedule I
    - K2
    - MDPV/Methylone
    - 2C-C, D, E, I, H, N, P, T2
- Assays: JWH-018/073
- sparse parent compound and no agreed upon cut-off
- FP: maybe lamotrigine

Synthetic Cathinones

- "Bath salts"
    - Mephedrone
    - Methylone
    - Methylendioxyprovalrenone (MDPV)
- "Not for human consumption"
- Bliss, Cloud 9, Vanilla Sky, Zoom
- Many Analogues!
- Elimination half-life usually around 12 hours
- 2011: DEA adds to Schedule I



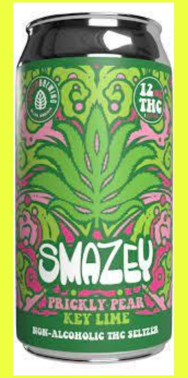
Phencyclidine

- Less common, but often sprayed onto cannabis (rocket fuel)
- FPs: tramadol, D-methorphan, diphenhydramine, Special K *
- Venlafaxine and Lamotrigine as well
- Bath salts! Specifically MDPV

Cannabis

- Schedule I-ish
- Delta-9-Tetrahydrocannabinol
  - 11-nor-delta-9-tetrahydrocannabinol-9-carboxylic acid (IA and GC-MS)
- Hash oil + food
- DDx if unexplained neurological sx or food borne illness
- Long term detection = political controversy!
  - Blood level detection poor
- Dronabinol/Nabilone (does anyone know what these are?)
- FPs: PPIs (pantoprazole), NSAIDs (ibuprofen/naproxen), Efavirenz (EFV-8-ether-glucuronide)
- Secondhand FPs? - only with poor ventilation

What about this stuff?

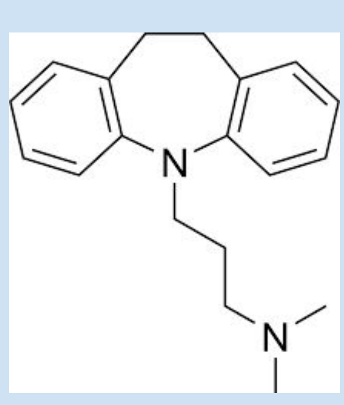


Alcohol

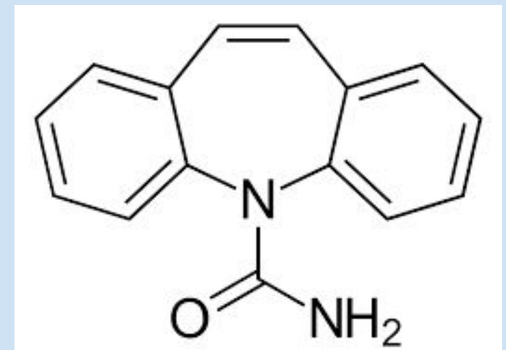
- Metabolized to Ethylglucoronide (2-5 days) and Ethyl Sulfate
    - Using ratio of metabolites can be useful for incidental exposures

Tricyclic Antidepressants

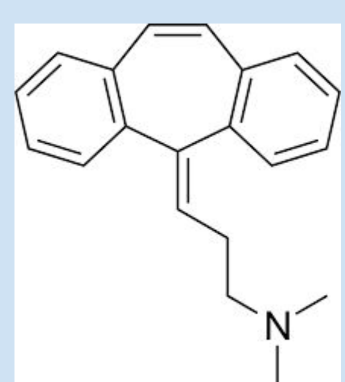
Imipramine



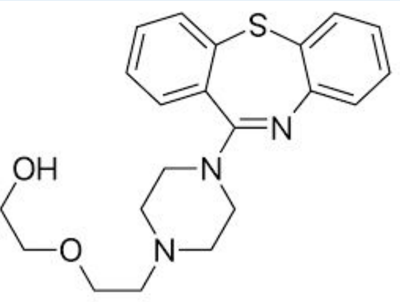
Carbamazepine



Cyclobenzaprine



Quetiapine



Lots of talking. But what to do?

- Occupational Medicine is in a unique position to help steward this political social change

Harm Reduction

Alt, “harm minimization” is a set of practices designed to decrease negative social and physical consequences of behaviors

Physical and emotional safety are stressed; Motivational Interviewing is popular

Includes: reduced use, abstinence, “meeting drug user where they are”, etc

Most popular in Addiction Medicine circles, but quickly spreading

Attractive philosophy because non-putative and acknowledges complexity of patients

People Who Use Drugs (PWUD)

It Takes a Village

- +/- Detoxification and Brief Hospitalization (CBC and BMP)
- Outpatient Substance Abuse Treatment
- Aftercare
- Pharmacotherapy for comorbid conditions
- Substance Education
- Cognitive Behavioral Therapy
- Motivational Interviewing
- Stress and Relationships Management
- 12 step group (AA/NA) for patient and support system (Al-Anon/Nar-Anon)

12 Step groups

1. We admitted we were powerless over ____ that our lives had become unmanageable
2. Came to believe that a Power greater than ourselves could restore us to sanity
3. Made a decision to turn our will and our lives over to the care of ____ as we understood Him.
4. Made a searching and fearless moral inventory of ourselves.
5. Admitted to ____, to ourselves, and to another human being the exact nature of our wrongs.
6. Were entirely ready to have ___ remove all these defects of character.
7. Humbly asked Him to remove our shortcomings.
8. Made a list of all persons we had harmed, and became willing to make amends to them all.
9. Made direct amends to such people wherever possible, except when to do so would injure them or others.
10. Continued to take personal inventory and when we were wrong promptly admitted it.
11. Sought through prayer and meditation to improve our conscious contact with ___ as we understood Him, praying only for knowledge of His will for us and the power to carry that out.
12. Having had a spiritual awakening as the result of these Steps, we tried to carry this message to ____, and to practice these principles in all our affairs.

AL-ANON

NAR-ANON FAMILY
GROUPS
TM

BAR & GRILL
THE 13TH STEP
BAR & GRILL

12 Traditions

1. Our common welfare should come first; personal progress for the greatest number depends on unity.
2. For our group purposes there is but one authority — a loving ___
3. The relatives of addicts, when gathered for mutual aid, may call themselves a family
4. Each group should be autonomous except in matters affecting other family groups
5. Each ___ Family Group has but one purpose; to help families of addicts.
6. Our Family Groups ought never to endorse, finance or lend our name to any outside enterprise, lest problems of money, property and prestige divert us from our primary spiritual aim
7. Every group ought to be fully self-supporting, declining outside contributions
8. Twelfth Step work should remain forever non-professional
9. Our groups, as such ought never to be organized, but we may create service boards
10. The ____ Family Groups have no opinion on outside issues; hence our name ought never be drawn into public controversy.
11. Our public relations policy is based on attraction rather than promotion; we need always maintain personal anonymity at the level of press, radio, films…
12. Anonymity is the spiritual foundation of all our traditions, ever reminding us to place principles above personalities.

New Policy

Modernizing Opioid Treatment Access Act (MOTAA)

- S.644/H.R.1359
- Markey/Paul; Bacon/Norcross
- Access to methadone via pharmacies
- Temporarily expanded during Pandemic
- Supported by American Society of Addiction Medicine

A word toward the future

“Occupational health hazards certainly include substance associated risks that need to be prevented or detected as early as possible. We routinely screen persons for drug and alcohol use…

Substance Use Disorder employees are especially vulnerable to workplace injuries… we don't view the workplace as entirely distinct from the clinic. The blurring of that line offers a unique avenue for addressing and treating issues surrounding dependence

Addiction is not cured, but must be diligently managed…. In the context of routine, purpose and life satisfaction, I would argue that utilizing occupation as intervention might be the next frontier of dependency treatment.

Belonging to a supportive community is vital to treating issues of dependence. This traditionally includes family, friends, recreation and common interests. Occupation provides a sense of belonging as well as a means to focus energy and interest. There is an element of identity in where and how one works that should not be overlooked. This ought to be addressed when treating SUD

Treat those ravaged by society's most devastating illness and use the workplace as an additional source for community support”

Some jerk standing on stage right now