Emerging Drugs of Abuse: Herbal Incense, Bath Salts & Purple Drank

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August 14, 2013 – The presentation will begin soon.

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I don’t think we’re in Kansas anymore
- Dorothy to Toto, “Wizard of Oz”

Our Agenda
- Synthetic cannabinoids (“K2” / “Spice”)
- Synthetic cathinones (“Bath Salts”)
- “Purple Drank”

Currently Available Legal Substances
- Herbal Incense
- “Bath Salts”
- Salvia

Herbal Incense
- Crushed, non-psychoactive herbal/plant matter treated with one or more synthetic cannabinoids
  - First Generation: “K2,” “Spice,” “Black Mamba,” “Red Dragon”

Section One
Current Legal Status of "First Generation" Herbal Incense

- 2011: Drug Enforcement Administration (DEA) emergency scheduling authority makes five chemicals (JWH-018, -073, -200, CP-47,497, and cannabicyclohexanol) now illegal for at least one year
- DEA and the U.S. Department of Health and Human Services (DHHS) to study whether these chemicals and products should be permanently controlled.
- August 2012: All synthetic cannabinoids placed in Schedule I

Banned Herbal Incense Brands

- Frequently marketed as "incense" under a variety of names:
  - K2
  - Spice/Spice Gold
  - Arctic Synergy
  - Black Mamba
  - Yucatan Fire
  - Red Dragon
  - Genie
  - Blaze
  - Red X
  - Dawn

Banned Herbal Incense Products
New Herbal Incense Brands

- K2
- K3
- Destiny
- Splice
- "House Blends"

Apocalypse Flavors

- Blueberry
- Strawberry
- Jungle Juice
- Cherry
- Cotton Candy
- Coconut
- Lemon
- Lime
- Spearmint
- Root Beer
- Banana
- Bubble Gum
- Orange
- Coca Cola
- "Joosy Fruit"
- Raspberry
- Peach
- Apple
- Chocolate
- Grape
- Watermelon
- Pineapple
- Mango
- Herbal Additive & Extreme Herbal De-CELERATOR
Herbal Incense Pharmacology

- Hundreds of synthetic cannabinoids (similar to both Δ9-THC and endogenous cannabinoids) have been created.
- Potency ranges from hundreds of times more potent than THC to over 1000x less potent.
- Most common psychoactive ingredients in herbal incense was “JWH-018” [1-pentyl-3-[1-naphthoyl]indole].
- Synthesized in 1995 by Dr. John W. Huffman at Clemson University.

Research supported by NIDA

- Two cannabinoid receptors in the human brain, CB₁ and CB₂.
- CB₂ affects inflammatory pain and was the focus of NIDA study.
- JWH-018 targets both receptors.
- Huffman: “JWH-018 easiest to make outside a lab, requiring only two steps involving commercial products.”
- Transferring the JWH to the botanical product involves using acetone.

A Historical Perspective

- All drugs currently illicit in the U.S. have started out as legal (uncontrolled) substances.
- Heroin
- Cocaine
- Marijuana
- MDMA (“ecstasy”)
- LSD
- Amphetamine
- Many of these “sat on the shelf” for years before becoming popular intoxicants.
- A mixture of rumor, myth and science have all contributed to changes in the legal status of these substances.

Herbal incense

- Street drugs
  - Psychoactive substances
  - Inconsistent ingredients
  - Unregulated manufacture
  - Multiple slang names
  - Often difficult to specify effects
  - Inflated prices
- Herbal incense has many of these characteristics.
Herbal Incense in the Popular Press

- Sales of "K2" products increased significantly in Chicago following news of its impending status as a controlled substance
- Following an August 2008 report on "herbal incense" in Germany, ER visits ↑ significantly
- How do we inform the public of new drugs without setting of an epidemic of use?

Herbal Incense Pharmacology: The Scientific Literature

At present, almost nothing is known about the pharmacology, toxicology and safety profile of such compounds in humans*, except the opinions of consumers in internet forums.

a/k/a “human guinea pigs”

* Mustata, C; Torrens, M; Pardo, B; Perez, C; Farre, M. (2009). a/k/a "human guinea pigs"

Herbal Incense: Typical Effects

- Cannabis-like intoxication
- Dreaminess
- Euphoria
- Introspective mood
- Hilarity
- Forgetfulness
- Heightened sensory perception

**THESE ARE THE EFFECTS MOST COMMONLY REPORTED BY USERS**

Calls to Poison Control Centers

Data from the American Association of Poison Control Centers’ “National Poison Data Center”

- 2010: 2,874 calls
- 2011: 6,659
- 2012 (first three months): 1,901 (7,604 if trends continued)

Herbal Incense: Other Possible Effects

- Severe anxiety (may persist after herbal incense use is discontinued)
- Panic attacks
- Dissociation (e.g., derealization)
- Racing thoughts
- Hallucinations
- Rapid pulse (tachycardia)
- Seizures

User Report # 1

- This is the worst experience I’ve ever had
- The most anxiogenic substance I’ve ever used
- Nausea, vomiting, heart pounding like I’m going to have a heart attack
- Not sure whether I just said that, thought it or read it
- 2 hours later: Will never take this again
User Report #2: "Apocalypse"

- 3 individual “hits” from a small pipe
- “organic” taste/no chemical odor or taste
- 5 minutes: Feels like Cannabis
- 10 minutes: Like an intense cannabis high
- More than 3 puffs might be too much

Case Study 1

- 33-year-old man
- Imaging technician
- Stable 8 year marriage
- Previous drug use: marijuana, alcohol, tobacco
- Used herbal incense daily
- After 3 months of use suddenly experienced a panic attack
- Immediately discontinued all AOD use
- Repeated episodes of anxiety still occurring after 18 months of abstinence

Case Study 2

- 16-year-old female
- In treatment for alcohol dependency
- History of bipolar disorder
- Smoked 3 “hits” of herbal incense
- 10 minutes (8:00 P.M.) later experienced psychotic episode
- Following observation at hospital, returned to normal at 12:00 A.M.
- Next day no apparent after effects

Use among 8th, 10th and 12th Graders

- 8th grade: 4.4%
- 10th grade: 8.8%
- 12th grade: 11.4%
- 2nd most popular illicit drug after marijuana

Overview

- Most herbal incense contains a cannabinoid/cannabinoids closely related to THC/marijuana
- No quality control
- Manufacturing process may be associated with adverse effects
- Subjective effects most commonly resemble those of extremely powerful marijuana

Overview

- Other reported effects range from intense euphoria and pleasant hallucinations to abject terror and near-psychotic reactions
- Almost complete lack of scientific study
- 2012: Reports of seizure activity begin
- Street information is very inconsistent
Synthetic Cathinones

Section Two

Khat

- Native to the Horn of Africa and the south Arabian Peninsula
- Fresh leaves/tops chewed or consumed as tea
- Stimulation and euphoria
- Part of social culture in many countries (coffee, tea, coca or khat?)

Khat cultivation in Yemen

Khat C
Women in Somalia Selling Khat/Quat

2006: Bundles of khat seized by the DEA

Khat

- Coca------Cocaine
- Khat-------Cathinone (Schedule I)
- Cathinone: Structure similar to amphetamines
  - Euphoria
  - Anorexia
  - Stimulation
  - Dilated pupils

Bath Salts

- Contain Schedule I Substances as of October 2011

Audience Polling Question #1

Are you seeing “bath salts” drugs among your clients?

Typical Stimulant Effects

- CNS Stimulation
- Insomnia
- Decrease in appetite
- Euphoria
- Cardiovascular events
- Stroke
- Psychosis
“Bath Salts”

- Energizing Aromatherapy
- Down2Earth White Horse
- Kamikaze
- Ivory Wave
- Purple Wave
- Red Dove
- Blue Silk
- Vanilla Sky
- White Blizzard
- Fake Cocaine

“White Blizard”

Khat to Cathinone

- Khat
- Cathinone (Schedule I)
- Methcathinone (Schedule I)

Methcathinone (Schedule I)

When were they first synthesized?
- MDMA
- Amphetamine
- LSD
- Barbituric acid

First synthesized in 1928
- 1930s: Used in the Soviet Union as an anti-depressant
- 1960s: Began to be used as recreational drug in (former) Soviet Union
- More powerful than cathinone
- Effects similar to amphetamines/cocaine
- 1990s: Appeared in U.S. as “cat”
- Little current use
Possible Substances in “Bath Salts”

All related to cathinone/methcathinone

- 4 – Methylmethcathinone (Mephedrone, M-Cat, Meow, 4-MMC)
- 3,4 – Methyleneoxymethcathinone (Methylone, MDMC)
- 3,4 – Methyleneoxypyrovalerone (MDPV)
- Butylone
- Pentedrone
- Pentylone
- MPPP

Possible Substances in “Bath Salts”

All related to cathinone/methcathinone

- Alpha-pvp
- 6-apb
- Ethylene
- Buphedrone
- 4-MEC
- 3,4-DMMC
- Isopentadrone
- Pyrovalerone

Small Differences = Different Drugs

- Methamphetamine
- Methyleneoxymethylamphetamine
- Methcathinone
- Methyleneoxymethcathinone

MPTP: A Cautionary Tale

- Meperidine (Demerol®) is a synthetic opiate
- MPPP is a similar substance
- MPTP can be produced during manufacture of MPPP
- MPTP is converted into MPP⁺
- MPP⁺ destroys dopamine cells in the substantia nigra
- Leads to Parkinson-like symptoms
  - Tremor
  - Rigidity
  - Slow movements
  - Problems with walking and gait
  - (Paralysis)

M-CAT

- 4-Methylmethcathinone & Caffeine: MDMA, caffeine & 4-Methylmethcathinone
- 4-Methylmethcathinone & Caffeine
- 4-Methylmethcathinone & Methylone
Mephedrone

- 4-methylmethcathinone/4-methylephedrone
- 4-MMC/M-CAT
- Do not confuse with methadone or methylone
- Usually ingested or snorted

Onset:
- Oral: 15–45 minutes
- Insufflation (nasal/snorting): 5-10 minutes
- i.v. injection (rare): 30 seconds

Duration:
- Oral/Nasal: 2-3 hours
- Intravenous: 30 minutes

Mephedrone

Intended Effects: (Similar to MDMA/“ecstasy” or cocaine)
- Euphoria
- Enhanced music appreciation
- Decreased hostility
- Improved mental function
- Mild sexual stimulation

Unintended (Side) Effects:
- Dilated pupils
- Poor concentration
- Bruxism (teeth grinding)
- Problems focusing visually
- Poor short-term memory
- Hallucinations
- Delusions

Mephedrone Research

- UK Study:
  - Users w/ previous cocaine experience:
    - Better quality and longer lasting high
    - Less addictive
  - Malanga, et. al. (2012)
  - Dr. C.J. Malanga at University of North Carolina
  - Effect of mephedrone and cocaine on intracranial self-stimulation (ICSS)
**Intracranial Self-Stimulation**

- Animal is fitted with an electrode implanted in mesolimbic reward pathway (MRP)
- Animal allowed to stimulate MRP by bar pressing
- Results in brain stimulation reward (BSR)

**Cocaine and Intracranial Self-Stimulation**

- Allowing an animal already fitted for ICSS to self-administer cocaine decreases its ICSS
- Cocaine augments the pleasurable sensations produced by BSR and reduces the animal’s desire to engage in ICSS
- When cocaine is available, ICSS is less desirable

**Mephedrone and Intracranial Self-Stimulation**

- Animals allowed to self-administer mephedrone decrease their ICSS
- Like cocaine, mephedrone makes ICSS less desirable
- Consistent with user self-reports

**MDPV**

- Euphoria
- Increased alertness, awareness and arousal
- Increased energy and motivation
- Mental stimulation/increased concentration
- Increased sociability
- Sexual stimulation/aphrodisiac effects
- Mild empathogenic properties
- Diminished perception of the requirement for food and sleep

**MDPV Addiction Potential**

- August 2013 Journal *Neuropharmacology*
- Animal self-administration
- Found to be more rewarding than methamphetamine
**Drugs Sold as “Ecstasy” (2013)**

- **Location/Name**
  - Purple Lamborghini/Seattle
  - Angry Bird Pink/Las Vegas
  - Moon Rocks/Las Vegas
  - Blue Pacman Ghost/Los Angeles
  - Pink Gucci/Las Vegas
  - Speckled Pink/NY, NY
  - Capsule/San Jose
  - Molly
  - White Puma/SF

- **Drug**
  - MDMA
  - TFMPP/caffeine
  - MDMA/(3,4-methylenedioxymethyl)propional
  - MDMA/caffeine
  - MDMA/caffeine
  - None detected
  - 2-Methylthethacinone (?)
  - No drug detected
  - MDMA/methamphetamine

- **Used in medicine to kill parasites**
- Some have psychoactive properties and are often substituted for MDMA in “ecstasy”
  - **BZP** (Benzylpiperazne)
  - **TFMPP**

- **Others**: mCPP; pFPP; MeOPP; MBZP; MDBZP; 2-C-B-ZBP; DBZP

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**BZP (Benzylpiperazne)**

**Section Three**

**BZP Products**

“Charge”  “Extreme Jet”
### BZP Effects

**Later Effects:**
- Mild headache
- Nausea
- Hang-like symptoms (common with high doses)
- Fatigue
- Indigestion/heartburn
- ↑ hunger/thirst
- Insomnia
- Confusion
- Depression (more pronounced with frequent/long-term use)

### BZP Side Effects

- Headache
- Dizziness
- Anxiety
- Insomnia
- Vomiting
- Chest pain
- Hallucinations
- Paresthesia
- Tachycardia
- Hypertension
- Palpitations
- Hyperventilation
- Sweating
- Hyperthermia
- Psychosis or adverse psychiatric events
- Renal toxicity
- Respiratory failure
- Seizures

### 25I-NBOMe

- 2C-I-NBOMe
- “N-Bomb,” “Smiles,” “25I”
- Similar to LSD in potency (600-1,000 mcg) and effects
- May be sold as LSD or “fake mescaline.”
- Not active orally
- Taken sublingually, nasally, buccally
- May show up as “blotter”
- Disorientation, confusion, psychosis reported
- Medical reports of fatal seizures/unexplained deaths

### Audience Polling Question #2

*Have your clients reported using drugs with names such as “smiles,” “N-bomb” or 2C-1?*

### Other Drugs "On the Radar"

- Methoxetamine ("Mexxy")
- 4-MeO-PCP/Methoxydine
- mCPP
- Dimethocaine
- Piperazine Derivatives (e.g., BZP, TFMPP, "Plant food")
- Tryptamine substances

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