

Pediatric Drugs of Abuse

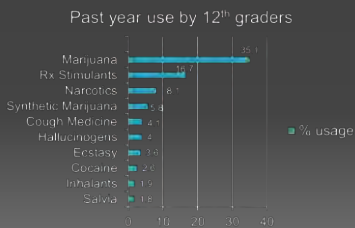
Lela Fung Hernandez, PharmD, BCPS

Objectives

- Review reported national statistics on pediatric drug abuse
- Discuss popular agents of abuse
- Describe toxidromes associated with agents
- Explore treatment approaches

Epidemiology

- 24 million Americans ≥ 12 years of age
- \$193 billion annually

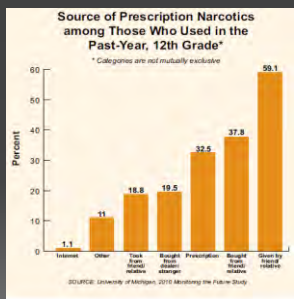


National Institute on Drug Abuse 2014.
Rehm MA, et al. Pharmacotherapy 2014.

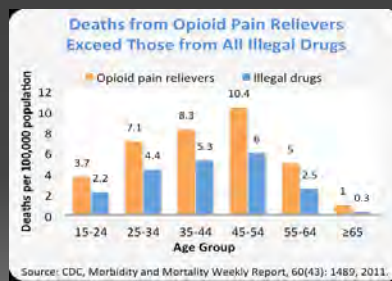
Epidemiology

- Prescription medications
 - 6,600 initiates daily
 - 3% of youth (aged 12 – 17 years) reported use within past month
 - Female > Male
- Alcohol, Marijuana, Tobacco most common in youth

Supply Source



Prescription Opioid Abuse



Opioids

- Substances: codeine, fentanyl, hydrocodone, hydromorphone, meperidine, methadone, morphine, oxycodone
- Receptors found in brain, spinal cord, GI tract
- ↓ intensity of pain signals reaching the brain
- Administration – oral, snorted, injected, smoked, rectal
- Desired effects – euphoria, pain relief
- Adverse effects – nausea, constipation, confusion, respiratory depression, withdrawal, death

National Institute on Drug Abuse 2014.
Volkow ND. NIDA Research Report Series 2014.

Kratom

- Active Ingredient: mitragynine
- Non – prescription herbal medication
- Opioid – like properties
 - Agonist of opioid, dopamine, serotonin receptors
- Administration – smoked, chewed, consumed as tea
- Desired effects
 - Low – moderate doses: mild stimulant effects
 - Moderate – heavy doses: opioid – like effects
- Adverse effects – nausea, vomiting, constipation, respiratory depression, itching, sweating, dry mouth, ↑ urination, palpitations, hallucinations, psychosis, seizures, agitation



Rech MA, et al. Pharmacotherapy 2014.

Kratom

- Addictive potential
- Tolerance
- Withdrawal
 - Less intense, more protracted than opioid withdrawal
 - Abdominal pain, diarrhea, sweating, irritability
- Overdose

Rech MA, et al. Pharmacotherapy 2014.

Krokodil

- Desomorphine
- Opioid analog similar to heroin
 - Synthetic derivative of morphine
 - Effects 10x > Morphine
 - More rapid onset of action, shorter duration of action
- Administration: injection
- Desired effects similar to opioids
- Adverse effects – tissue infection and necrosis at injection site

Rech MA, et al. Pharmacotherapy 2014.



<http://www.ama-assn.org/doc/1191321/krocodil>
<http://www.cbs2.com>
<http://www.questor.com/2013/11/doctors-confirm-use-of-fresh-eating-opioid-drug-krokodil-is-spreading-in-u-s/>

Salvia

- Salvinorin A
- Selectively acts on kappa opioid receptors
- Administration – chewed, smoked
- Desired effects – hallucinations, visual perceptions of psychedelic bright lights, vivid colors and shapes, body or object distortions, uncontrolled laughter, altered perception of self, overlapping realities
- Adverse effects – incoordination, dizziness, slurred speech



Rech MA et al. Pharmacotherapy 2014.
National Institute on Drug Abuse 2013.
Woo TM and Hanley JR. J Patient Health Care 2013.

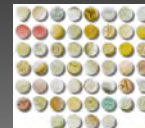
Cough suppressants

- Dextromethorphan
- Over – the – counter
- Acts on same receptors as hallucinogens
- Administration – oral (syrup, pill, capsules, powder)
- Desired effects – euphoria, hallucinations
- Adverse effects – restlessness, delayed reaction times, mania, panic, ataxia, sedation, GI upset
- Withdrawal – intense cravings, flashbacks, hallucinations, diarrhea, vomiting, rigors
- Overdose

Antoniou T and Juurink DN. CMAJ 2014.
Woo TM and Hanley JR. J Pediatr Health Care 2013.
National Institute on Drug Abuse 2014.

Ecstasy

- Methylenedioxymethamphetamine (MDMA)
- Structurally similar to other amphetamines
 - Release dopamine, norepinephrine, serotonin
- Administration – oral (tablets, powder, liquid)
- Desired effects – euphoria, ↑ sensitivity to touch, ↑ energy, ↑ sensual arousal, emotional warmth, need to be touched
- Adverse effects – anxiety, tachycardia, ↑ blood pressure



Woo TM and Hanley JR. J Pediatr Health Care 2013.
National Institute on Drug Abuse 2013.

Ecstasy

- Short – term effects
 - Tachycardia, hypertension, hyperthermia, dysrhythmias
 - Dehydration, hyponatremia
 - Rhabdomyolysis, acute renal failure, hepatotoxicity, SIADH, cerebral infarct or hemorrhage
- Long – term effects
 - Damage to serotonin receptors
 - Poor performance on cognitive and memory tasks
 - Depression



Woo TM and Hanley JR. J Pediatr Health Care 2013.
National Institute on Drug Abuse 2013.

Synthetic Cathinones

- Methcathinone ethylone, mephedrone, methedrone, methylenedioxypyrovalerone, Naphryonebutylone 4 – fluoromethcathinone, brephedrone pyrovalerone
- Structurally similar to amphetamines
 - ↑ dopamine, norepinephrine, serotonin
- Administration – Snorted, injected, oral, rectal, smoking, bombing, keying
- Desired effects – euphoria, ↑ energy, alertness, empathy, ↑ libido
- Adverse effects – agitation, irrationality, anxiety, paranoia, memory impairment, tremors, seizures, hallucinations, tachycardia, hypertension

Reich MA et al. Pharmacotherapy 2014.
Woo TM and Hanley JR. J Pediatr Health Care 2013.

Synthetic Cannabinoids

- JWH-015, JWH – 018, JWH – 073, HU – 210, CP – 47, CP – 497
- Bind to cannabinoid receptors
- Administration – inhaled, ingested, injection
- Desired effects – elevated mood, relaxation, altered perception
- Adverse effects – tachycardia, xerostomia, ↑ appetite, nausea, vomiting, severe agitation, muscle spasms, seizures, hypertension, chest pain, fever

Reich MA et al. Pharmacotherapy 2014.
Woo TM and Hanley JR. J Pediatr Health Care 2013.

Inhalants

- Spray paints, markers, glues, cleaning fluids
- Most depress central nervous system
- Administration - sniff/snort, spray, inhale
- Desired effects – euphoria, hallucinations, less inhibition, enhanced sexual pleasure
- Adverse effects – slurred speech, lack of coordination, drowsiness, headache, damage to kidneys, liver, bone marrow, myelin, death

National Institute on Drug Abuse 2012.

Inhalants

Chemicals	Products
Volatile solvents	Paint thinners, gasoline, lighter fluid, felt – tip markers, glue, correction fluids
Aerosols	Spray paint, hair spray, deodorant, fabric protector, computer cleaning products
Gases	Butane lighters, propane tanks, whipped cream aerosols, refrigerant gases, nitrous oxide
Nitrites	"video head cleaner", "room odorizer," "leather cleaner," "liquid aroma"

National Institute on Drug Abuse 2012.

Management

A	Airway
B	Breathing
C	Circulation
D	Decontamination
E	Enhanced Elimination
F	Focused therapy
G	Get Tox help

Reich MA et al. Pharmacotherapy 2014.

Summary

- Use of illicit and synthetic substances are increasing in American youth
- New substances are difficult to detect on laboratory tests
- Antidotes are not always available or routinely recommended in newer agents

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