Overview of Mental Health Medications for Children and Adolescents

Module 6
Medications and Drugs of Abuse

Drugs of Choice

<table>
<thead>
<tr>
<th>1967</th>
<th>Now</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td>Alcohol</td>
</tr>
<tr>
<td>Marijuana</td>
<td>Marijuana</td>
</tr>
<tr>
<td>Cocaine</td>
<td>Cocaine</td>
</tr>
<tr>
<td>Crank</td>
<td>Methamphetamine</td>
</tr>
<tr>
<td>LSD</td>
<td>LSD</td>
</tr>
<tr>
<td>Quaaludes</td>
<td>Rohypnol/GHB</td>
</tr>
<tr>
<td>Glue</td>
<td>Inhalants</td>
</tr>
<tr>
<td>Designer drugs</td>
<td>Ecstasy</td>
</tr>
<tr>
<td></td>
<td>Prescription drugs</td>
</tr>
</tbody>
</table>

ADHD: Substance Abuse

* Children with untreated ADHD are twice as likely to develop substance abuse by age 18-20 than those who were treated
* Treatment with stimulants in adolescents with ADHD and comorbid substance abuse improves the ADHD and does not worsen the substance abuse disorder
Drug Lingo Resources

*www.noslang.com
*www.teenchatterdecoder.com

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Drug Use in Georgia

<table>
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<th>2001</th>
<th>2003</th>
<th>2004</th>
<th>2008</th>
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<tbody>
<tr>
<td>Cocaine</td>
<td>967.6 kg</td>
<td>379.6 kg</td>
<td>1308.1 kg</td>
<td>1016.1 kg</td>
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<tr>
<td>Heroin</td>
<td>15.8 kg</td>
<td>60 kg</td>
<td>39.3 kg</td>
<td>3.3 kg</td>
</tr>
<tr>
<td>Meth</td>
<td>77.4 kg</td>
<td>88 kg</td>
<td>83.9 kg</td>
<td>65 kg</td>
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<tr>
<td>Meth Labs</td>
<td>51</td>
<td>226</td>
<td>261</td>
<td>78</td>
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<td>Ecstasy Tablets</td>
<td>52951</td>
<td>8393</td>
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Drug Use in Georgia

* Cocaine
  * Bulk cocaine transported into state – crack made locally
  * Primary sources – Texas and California
* Heroin
  * Sources of supply – Chicago, New York and Southwest
  * Purity in GA ranges between 52-65%
* Greater Hispanic involvement

www.dea.gov
Drug Use in Georgia

- Methamphetamine
- Atlanta, Dalton, Gainesville showing increases as well as southwest and eastern counties
- Increased availability of ICE in Atlanta area
- Club drugs
- MDMA, GHB and ketamine readily available at gyms, college campuses and associated 'hang outs'
- LSD usually around school settings - imported from West Coast by US postal service or express mail
- Emerging trend - 'candy tripping' - combining LSD and MDMA

[www.dea.gov](http://www.dea.gov)

Marijuana

- Readily available throughout State
- Imported from Mexico and Southwest border
- Excellent growing conditions in GA
- Diverted pharmaceuticals
  - Xanax (alprazolam)
  - Valium (diazepam)
  - Dilaudid (hydromorphone)
  - Demerol (meperidine)
  - Percodan (oxycodone)

Psychological Dependence

- Behavioral dependence
- Related to:
  - Amount of effort in drug-seeking behavior
  - Frequency or regularity of drug-taking
  - Stated craving for drug
- Drugs with reinforcing properties have the greatest potential for producing psychological dependence
Physical Dependence

- Requires drug to function normally
- Also referred to as physiological dependence
- Withdrawal occurs if drug is removed or level drops below a minimal level

Choices

- Profession
- Friends
- Money
- Family
- Spirituality
- Freedom
- Honor

Learning Addiction

- Addiction uses dopaminergic pathways for learning
- Repeated substance abuse permanently reshapes the dopaminergic pathways
  - Adolescent rats are more likely to become addicted than adult rats
  - The earlier drug use starts the more likely addiction can occur
  - Those who started drinking or using drugs regularly before the age of 15 were more likely to fail in school, be convicted of a crime or have substance abuse problems as an adult
Adolescents and Chemical Dependency

- Adolescent brain is susceptible to chemical dependency
- Increased receptor numbers of some transmitters
  - 50% more nicotine receptors
- Decreased DA in reward pathway
  - Stress can reduce DA receptors further
- Poor impulse control (Prefrontal cortex not developed)
- Lower susceptibility to negative side effects (sedation, motor impairment, hangovers)

Drugs Hijack the Brain

- Drugs immediately cause an increase in DA
- Continued drug use reduces DA production
- Brain is fooled into thinking that the drug is necessary for survival
- Drug seeking behaviors occur

Consequences from Alcohol

- Teens suffer longer-lasting consequences from alcohol
- Dampens learning by blocking synapses from sending signals
- In excess, more brain cells are killed than in adults
- Teens have a lower threshold for brain injury
Are Adolescents More Susceptible to Alcohol?

- Alcohol relieves hyperexcitability (temporarily)
- Continued use to relieve hyperexcitability reinforces use of alcohol
- Reduced sensitivity to intoxication
- Increased sensitivity to social disinhibitions
- Greater adverse effects to cognitive functioning

THE ANSWER IS YES

Adolescents and Alcohol

Extensive use of alcohol by adolescents results in:

- Decreased hippocampus (up to 50% reduction)
  - Hippocampus converts information to memory
- Decreased brain activity during memory tasks
- Increased activation of brain when shown images associated with alcohol use (potential cues for relapse)

Teens and Marijuana

- Marijuana’s negative effects are more long lasting
- THC blocks learning at the cellular level at multiple points - in the very early and later stages of making lasting memories
MARIJUANA:

- **16 y.o.**
  - 2 year history of daily abuse

  underside surface view of prefrontal and temporal lobe activity
  © 2006 Amen Clinics Inc

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**Neurogenic Denial**

- **MARIJUANA:**
  
  - **18 y.o.**
    - 3 year history of 4x/week

  underside surface view of prefrontal and temporal lobe activity
  © 2006 Amen Clinics Inc

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**Impact of Chemical Dependency**

- **MARIJUANA & Memory:**

  - **16 y.o.**
    - 2 year history of daily abuse

  underside surface view of prefrontal and temporal lobe activity
  © 2006 Amen Clinics Inc
The Need to Deny Chemical Dependency

- The PET scan images show the brain's response to the release of dopamine in the nucleus accumbens of people with dependencies. To relieve the chronic stimulation of its neurons, the nucleus accumbens simply reduces the number of dopamine receptors that it has.
- In these images of the brain, the red areas indicate large numbers of dopamine receptors. These images show that people who are alcoholic, obese, or cocaine-dependent have fewer dopamine receptors than normal people do.

5-HT levels in monkey after MDMA (two 5 mg/kg daily for 4 days)

- Result:
  - long-term loss of 5HT fibers in monkeys
  - some recovery

(Hatzidimitriou et al., J. Neurosci. 19 [1999] 5092)

Strawberry 'Meth'

- Called 'Strawberry quick'
- Strawberry flavored and bright pink
- Perception that the colored version is less harmful
- Designed for the younger crowd
Parents' Perceptions of Teen Drug Use

Used a drug at least 1x in past yr.

Source: Pride Survey National Summary for Parents, 2004-05

Brain images of a person who has never used methamphetamine (left) and of a methamphetamine user after 1 month of abstinence (center). Lighter colors show distribution of dopamine transporters (DAT) in the striatum. DAT distribution is reduced in striatum of methamphetamine user. Brain image of a methamphetamine user after 14 months' abstinence (right) shows substantial recovery of DAT in striatum. Low levels of DAT in methamphetamine users were associated with poorer performance on tests of memory and motor skills, which did not improve with DAT after lengthy abstinence.
Purple Drank

- Cough syr (codeine based) + promethazine + Lemon-lime soda + ice + hard candies
- Effects
  - Profound CNS depression and sedation

Purple Drank

- Uses promethazine + codeine cough syrups
- Usually diverted Schedule III cough syrup
- Street value approximately $250-400
- Plain codeine syrup can be used but not preferred
- Candies and lemon lime soda offset taste
- Believed to be best when served in foam cups
- Often referred to as Lean

Effects of Purple Drank

- Constricted pupils, react poorly to light
- Droopy eyelids
- Raspy voice
- Slow speech, slurred speech (at higher doses)
- Nystagmus
- Slow heart rate (>60 bpm)
- Drowsiness
- Loss of balance and coordination at high doses
- Pale skin
**Purple Drank**

- Effects last 3-6 hrs but usual high is 3 hrs
- Drug testing - positive for codeine
- Promethazine can be tested but lab needs to know
- Codeine detected for up to 72 hrs

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**Drank**

- Sparkling can beverage
- Contains herbs and vitamins
- Reported to produce relaxation and restful sleep
- “Slow your roll”
- Will not trigger a drug test unless spiked

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**Inhalants**

- Includes various commercial products used as cleaners, cosmetics, solvents, glues, fuels, aerosol sprays
- Can be liquid, gas or semi-liquid
Inhalants: Street Names and Products

- Toluene
- Xylene
- Benzene
- Naptha
- Acetone
- CCl₄
- Pam
- Paints
- Freon
- Hair spray
- Nitrites (amyl, butyl)
- Chloroform
- Ether
- Nitrous oxide
- Laughing gas
- Whippets
- Poppers
- Rush
- Locker room
- Climax
- Bolt

Inhalants

- Vapors alter senses
- Rapid high occurs which subsides in 1-2 hrs
- Hangover is less unpleasant than alcohol

Inhalant Intoxication

- Resembles that of sedative hypnotics
- More pronounced than that of alcohol
- Slurred speech, unsteady gait, drowsiness
- May produce short-term distortions of sensory perception with numbness, weightlessness and depersonalization
Inhalant Intoxication

- Users experience reduction of inhibitions and may become impulsive, belligerent, assaultive
- May experience time and visual distortions
- Visual and auditory hallucinations
- Toluene/butane may elevate mood and produce delusions of the ability to fly

Inhalant Intoxication

- May cause brief delusions of invincibility leading to risky behavior
- Impulsivity and violence can occur
- Personality changes
- Tactile hallucinations can occur with toluene
- Person can become sexually impulsive

Inhalant Toxicity

- Severe depression
- Suffocation
- Arrhythmias
- Damage to lungs and bronchioles
- Freon can freeze tissues
- Permanent brain, liver, renal damage
- Aplastic anemia
- Danger of explosion and burns
Heroin

- White to dark brown powder or liquid the consistency of tar
- Street names
  - Smack
  - Horse
  - Brown sugar
  - Junk
  - Mud
  - Tootsie roll
  - Big H
  - Black tar

Starter Heroin (Cheese)

- Popular in middle and high schools
- Tylenol PM (Tylenol + Diphenhydramine) + heroin
- Typically ground up and folded in notebook paper or baggies
- $2/hit or $5/0.25 gram
- Samples have contained about 8%
- Usually snorted

Potential Indications of Drug Abuse

Note: These symptoms do not prove substance abuse!!!!

- Eyes
  - Bloodshot, watery
  - Dilated or constricted pupils
- Bad body and/or breath odor
- Skin
  - Needle tracks
  - Skin boils and sores
  - Injection sites become infected and scarred
Potential Indications of Drug Abuse

- Unusual emotional extremes
  - Hysterical crying or laughter
  - Often anti-authoritarian

- Unusual disposition extremes
  - Over-stimulated or constantly sleepy

- Appetite extremes
  - None or very little
  - Huge—especially for sweets or liquids

Potential Indications of Drug Abuse

- Paranoia
  - Fear complex
  - Very suspicious
  - Convinced someone is after them

- Physical health
  - Deterioration in body tone, skin color, stance and weight

Potential Indications of Drug Abuse

- Mental health
  - Paranoid behavior, emotional extremes
  - Loss of interest in former goals
  - Dull, unresponsive with bad grades
  - Personality changes

- Moral health
  - Former values destroyed
  - Abnormal ideas and ideals adopted
Types of Drug Tests

- EMIT
- RIA
- TLC
- GC/MS

Urine Collection

- Observation
- Color
- Temperature
- Volume

How Drug Tests Are Beat

Note: Applies to initial screening tests

- Dilution method
  - Consume large quantities of fluids
  - Avoid morning urines for testing
  - Diuretics
  - Take vitamin B2 to add yellow color to urine
- Substitution of clean urine
  - Doping
  - Powdered urine (from Internet supplier)
Dilution Method

- Start raising creatinine levels 2-3 days prior to test
- Eat red meat
- Creatine supplement
- Creatine level must be at least 20 mg/dl
- Take 4 aspirin 4-12 hrs before test. Can repeat every 4-6 hrs up until 4 hrs prior to test
- Start drinking two 8 oz glasses of water, soda, cranberry juice, tea, or Gatorade
- Over the next hr drink 8 oz every 15 min
- Should start voiding clear urine in about 1-2 hrs.
- Should be voiding every 15-20 min. Replace lost fluid with 3-4 oz of fluid
- Take 4 aspirin 4-12 hrs before test. Can repeat every 4-6 hrs up until 4 hrs prior to test
- Start drinking two 8 oz glasses of water, soda, cranberry juice, tea, or Gatorade
- Over the next hr drink 8 oz every 15 min
- Should start voiding clear urine in about 1-2 hrs.
- Should be voiding every 15-20 min. Replace lost fluid with 3-4 oz of fluid
- Take 10x the recommended dose of vitamin B
- If time released, crush
- Can also take 2x vitamin B dose with each glass of fluid
- Be sure to void 3-4 times before taking test
- Go to lab when it first opens – personnel are usually busy and not as tedious
- Dress nicely – good appearance

How Drug Tests Are Beat

- Adulterants
  - Bleach
  - Detergents
  - Urinal (does not work on RIA tests)
- Niacin and golden seal
- Drinking vinegar or visine
- Interference with chain of custody
Hair Analysis

- Non-invasive
- Requires about 60 hairs (thickness of pencil)
- Can evaluate drug use for roughly 90 days
- More expensive
- Cannot determine recent use
- Not sensitive for low dosage use

Hand Sanitizers

- Ingredients include isopropyl alcohol (70%)
- Target abusers
  - Inmates
  - Teenagers

“Eyeballing”

- Originated in England
- Vodka poured directly in eye
- Believed that the vodka is absorbed faster across the mucous membranes in eye and the blood vessels in eye
- Faster absorption does not occur
- Damage to eye can occur
**Salvia Divinorum**

*Street Names:*
- Salvia
- Sally-D
- Magic Mint
- Diviner’s Sage
- Mexican Mint
- Maria Pastora
- Sage of the Seers
- Leaves of the Shepherdess

**Salvia Divinorum**

*Hallucinogenic herb closely related to the sage and mint families*
*Indigenous to the State of Oaxaca in Mexico*
*One of several “vision-inducing” plants employed by the Mazatec Indians living in northeastern Oaxaca*

**Salvia Divinorum**

*Internet Sales*
- Advertised as a legal alternative to other controlled hallucinogens
- Sold As:
  - Seeds
  - Fresh Leaves
  - Dried Leaves
  - Whole Plants
  - Cuttings
  - Extracts (5x, 10x, 15x, 20x, 80x, etc.)
Salvia Divinorum

Effects - Short term (30 minutes maximum)

- Start in
  - 15 to 30 seconds after smoking
  - 4 to 10 minutes after chewing and holding in cheek
  - 20 to 30 minutes after oral ingestion

- Psychoactive
  - Similar to LSD
  - Visual hallucinations with bright lights, vivid colors and distortion of real images

- Physical
  - Lack of coordination
  - Dizziness
  - Slurred speech

Salvia Divinorum

Use and Abuse

- In 2008, it was estimated that 1.8 million people aged 12 or older had tried Salvia
- Use is most common in 18 to 25 year old males
- Some studies indicate an even greater percentage of users belong to fraternities

Salvia Divinorum

Conclusions:

- Salvia divinorum is a psychoactive plant
- Legal in many states, including Georgia
- Sold in tobacco and head shops
- Sold on the Internet in a variety of forms
- Usually smoked
- Short term effects
- Effects similar to LSD and PCP
Medication Abuse

- Stimulants
- Methylphenidate
- Adderal
- Provigil
- Benzodiazepines
- Xanax
- Valium
- Clonazepam
- Narcotics (loratab)