

Overview of Mental Health Medications
for Children and Adolescents

Module 6
Medications and
Drugs of Abuse

1

Drugs of Choice

<u>1967</u>	<u>Now</u>
* Alcohol	* Alcohol
* Marijuana	* Marijuana
* Cocaine	* Cocaine
* Crank	* Methamphetamine
* LSD	* LSD
* Quaaludes	* Rohypnol/GHB
* Glue	* Inhalants
* Designer drugs	* Ecstasy
	* Prescription drugs

2

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

3

Drug Lingo Resources

*www.noslang.com

*www.teenchatterdecoder.com

4

Drug Use in Georgia

	2001	2003	2004	2008
Cocaine	967.6 kg	379.6 kg	1308.1 kg	1016.1 kg
Heroin	15.8 kg	60 kg	39.3 kg	3.3 kg
Meth	77.4 kg	88 kg	83.9 kg	65 kg
Meth Labs	51	226	261	78
Ecstasy Tablets		52951	8393	

5

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
6

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 (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

7

Drug Use in Georgia

- * 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)

8

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

9

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

10

Choices

11

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

12

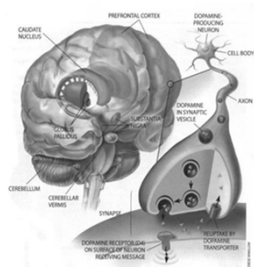
Adolescents and Chemical Dependency

- * 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)

13

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



14

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

15

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

16

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)


17

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

18

■ MARIJUANA:



16 y.o.
2 year history of daily abuse

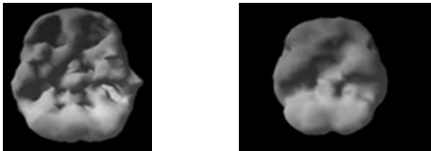
Normal

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

19

Neurogenic Denial

■ MARIJUANA:



18 y.o.
3 year history of 4x/week


Normal

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

20

Impact of Chemical Dependency

■ MARIJUANA & Memory:



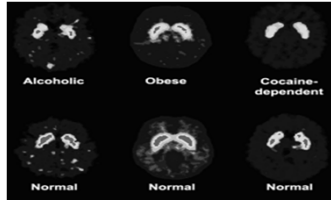
16 y.o.
2 year history of daily abuse

Amygdala
Hippocampus

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

21

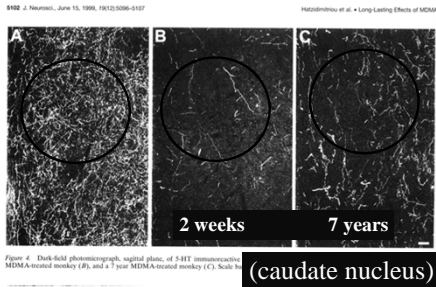
The Need to Deny Chemical Dependency



- The PET-scan images show the brain's response to the avalanche 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 they have.
- 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.

22

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

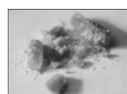
Figure 4. Dark-field photomicrograph, sagittal plane, of 5-HT immunoreactivity in the caudate nucleus of a control monkey (A), a 2-week MDMA-treated monkey (B), and a 7-year MDMA-treated monkey (C). Scale bar = 100 μm.

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

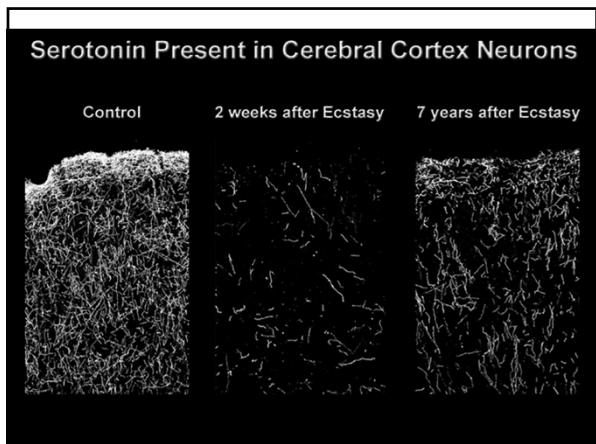
23

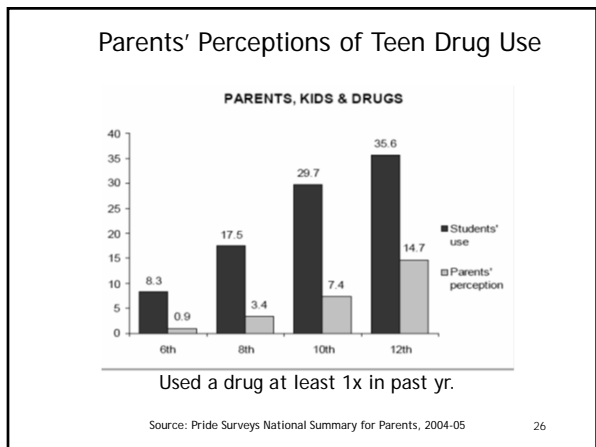
Strawberry 'Meth'

- * Called 'Strawberry quick'
- * Strawberry flavored and bright pink
- * Perception that the colored version is less harmful
- * Designed for the younger crowd



24





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



28

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

29

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

30

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

31

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

32

Inhalants

- * Includes various commercial products used as cleaners, cosmetics, solvents, glues, fuels, aerosol sprays
- * Can be liquid, gas or semi-liquid

33

Inhalants: Street Names and Products

Toluene	Xylene	Benzene
Naptha	Acetone	CCl ₄
Pam	Paints	Freon
Hair spray	Nitrites (amyl, butyl)	
Chloroform	Ether	
Nitrous oxide	Laughing gas	
Whippets	Poppers	Rush
Locker room	Climax	Bolt

34

Inhalants

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

35

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

36

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

37

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

38

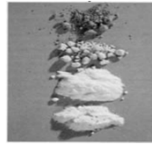
Inhalant Toxicity

- * 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

39

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



40

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

41

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

42

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

43

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

44

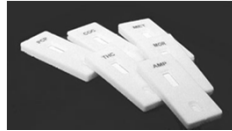
Potential Indications of Drug Abuse

- * 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

45

Types of Drug Tests

- * EMIT
- * RIA
- * TLC
- * GC/MS



46

Urine Collection

- * Observation
- * Color
- * Temperature
- * Volume



47

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)

48

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

49

Dilution Method

- * 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

50

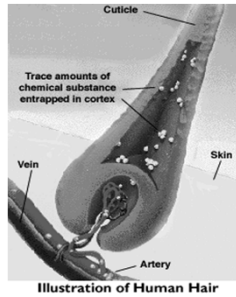
How Drug Tests Are Beat

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

51

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



52

Hand Sanitizers

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



53

"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



54

Salvia Divinorum

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



55

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



56

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.)



57

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

58

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



59

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

60

Medication Abuse

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

61
