MARIJUANA USE IN ADOLESCENTS

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Marijuana Use in Adolescents

• No financial disclosures
• No conflicts of interest

Marijuana Use in Adolescents

• Objectives:
  – Provide data re current MJ use in adolescents
  – Review adolescent brain development and delineate specific concerns re MJ use
  – Review research re medical MJ
  – Review synthetic marijuana
Marijuana Use in Adolescents

- US Statistics
  - 38.6% of HS seniors report cannabis use in last year
  - 6-7% report daily cannabis use
  - 55 MM US adults currently use MJ
  - 52% of all millennials currently use MJ
  - 54% of current MJ users are parents
  - 1 in 6 adolescents with daily cannabis use develop cannabis use disorder
  - 3.5 MM adults have cannabis use disorder
Marijuana Use in Adolescents

• Cannabis Use Disorder – DSM-5 Criteria
  – 1. Cannabis use for >1 year with 2 of following symptoms and significant impairment of functioning and distress:
  – 2. More cannabis use over longer time than intended
  – 3. Repeated inability to discontinue/decrease use
  – 4. Inordinate time spent acquiring, using, or recovering from the effects of cannabis
  – 5. Cravings or desires to use cannabis
  – 6. Cannabis use in potentially dangerous situations

Marijuana Use in Adolescents

• Cannabis Use Disorder – DSM-5, cont.
  – 7. Continued use despite adverse consequences
  – 8. Important activities superseded by cannabis use
  – 9. Continued use despite awareness of physical or psychological problems
  – 10. Tolerance to cannabis
  – 11. Withdrawal symptoms

Marijuana Use in Adolescents: Iowa Statistics
Marijuana Use in Adolescents: Iowa Statistics

Current Youth Marijuana Use
Past 30 Days: U.S. vs. Iowa

- 12.7% of all teens (12-17 yrs) of all teens were current marijuana users
- 11.1% of Iowa 12th graders were current marijuana users

Marijuana Use in Adolescents: Iowa Statistics

Youth Marijuana Attitudes vs. Use Among U.S. 12th Graders

- College students daily marijuana use surpassed cigarette smoking for the 1st time in 2014.
- Perceived Risk of Government Marijuana Use

Marijuana Use in Adolescents: Iowa Statistics

Iowa Marijuana ER Visits
Cannabis Use as Cause or Contributing Factor

- Marijuana impacts numerous respiratory systems, heart rate, coordination, judgment, memory, problem-solving & mood. It contributes to auto crashes & can cause severe anxiety & psychosis.
Marijuana Use in Adolescents

• Implications of Legalized MJ
  – Pharmaceutical market: >$50B by 2027
    • 67% recreational marijuana
    • 33% medical marijuana
  – Adolescents increasingly **believe cannabis to be safe**
  – Adolescents have easier access to cannabis

Marijuana Use in Adolescents

• Implications of Legalized MJ
  – Increased potency of THC content
    – 1960s ~1-2% THC
    – 2010s – Average THC Concentration Increased
      • Dried seeds/flowers: 3-8%
      • Hybrids: 15-25%
      • Hashish oil: 20%
      • Wax/Dabs: up to 80-90%

Marijuana Use in Adolescents

• Implications of legalized MJ
  – More diverse formulations
    • Dried seeds/flowers/leaves
    • Liquid formulations in teas, mixed drinks, colas
    • Ingestibles in brownies, cookies, chocolate, peanut butters, restaurant menus
    • Oils for vaping/juuling
    • Waxes/Budders for dabbing
    • Mouth sprays
Marijuana Use in Adolescents

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Marijuana Use in Adolescents
<table>
<thead>
<tr>
<th>Marijuana Use in Adolescents</th>
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<tbody>
<tr>
<td>• Implications of MJ Legalization</td>
<td></td>
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<tr>
<td>– Medical Research – General Consensus from a systematic review of medical cannabinoids in children and adolescents in November 2017 issue of <em>Pediatrics</em></td>
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<tr>
<td>• &quot;Evidence for benefit was strongest for chemotherapy-induced nausea and vomiting, with increasing evidence of benefit for epilepsy. At this time, there is insufficient evidence to support use for spasticity, neuropathic pain, posttraumatic stress disorder, and Tourette syndrome.&quot;</td>
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<table>
<thead>
<tr>
<th>Marijuana Use in Adolescents</th>
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<tr>
<td>• Promising EBM</td>
<td></td>
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<tr>
<td>– CBD for epilepsy (Dravet syndrome)</td>
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<tr>
<td>• Low-to-Moderate-Quality Evidence:</td>
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<tr>
<td>– Chronic pain (diabetic neuropathy/cancer)</td>
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<td>– Multiple sclerosis/Paraplegia</td>
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<tr>
<td>• Low-Quality Evidence:</td>
<td></td>
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<tr>
<td>– Nausea from chemotherapy</td>
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<td>– Irritable bowel disease</td>
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<table>
<thead>
<tr>
<th>Marijuana Use in Adolescents: Medical Marijuana EBM</th>
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<tbody>
<tr>
<td>• Very-low Quality Evidence:</td>
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<tr>
<td>– Depression/Anxiety</td>
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<td>– Sleep disorders</td>
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<td>• No Evidence:</td>
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<tr>
<td>– Glaucoma</td>
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<td>– AIDS-associated anorexia/cachexia/Wasting syndrome</td>
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<tr>
<td>– Oppositional defiant disorder/conduct disorder</td>
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</table>
Marijuana Use in Adolescents

• Implications of Legalized MJ
  – Medical Research
    • "At present, however, there are no convincing pre-clinical or clinical data showing efficacy and safety of cannabinoid treatment in ASD patients." Poleg, et al. *Prog NeuropsychopharmacolBiolPsychiatry.* 2018.

Marijuana Use in Adolescents

• Implications of MJ Legalization
  – Recreational Uses in Adolescents
    • "We cannot yet say whether there is or is not a specific amount of cannabis that youth can ‘safely’ consume, but it remains important for clinicians to keep in mind that youth who use cannabis on the whole represent an at-risk group for potential cognitive difficulties and psychiatric morbidity, including suicidality. The earlier the onset of use, and the more frequent the use, the higher the risk." Levine. *JAACAP.* 2017.

Marijuana Use in Adolescents

• Implications of legalized MJ
  – Synthetic cannabinoids constantly being developed
    • Not detectable in most UDS
    • Unknown chemical formulations
    • Illinois and Wisconsin 2018: 5 deaths and >200 cases of severe bleeding from synthetic cannabinoids mixed with rat poison
Marijuana Use in Adolescents

• Pharmacokinetics
  • Absorption faster with smoking/vaping
  • Tar, CO, NO, cyanide: 3-5x > tobacco smoker
  • Ammonia: >20 x > tobacco smoker
  • Absorption slower if eaten (Moiré et al. Chem Res Toxicol. 2008)

Marijuana Use in Adolescents

• 10% of MJ sales in Colorado (2017 - $107MM)
• Problems with edibles:
  – Tolerance from smoking doesn’t apply
  – Higher GI absorption than lung absorption
  – Delayed effect of 1-2 hours, so higher risk of toxicity
  – ASE: High heart rate, mouth dryness, paranoia
  – Marijuana Enforcement Division: Recommended serving size is 10 mg of THC (gummy bear or 1/10 of candy bar)

Marijuana Use in Adolescents: Pharmacokinetics

• Distribution
  – Half-life in blood and urine: 3-4 days
  – Average duration of positive drug testing
    – Dependent on frequency and intensity of use
    – Highly lipid soluble – deposits in fat cells
    – Heavy user can test positive for up to 60 days
  – Average results of UDS
    – Peak levels: 100-200 ng/mL (10-25 min after smoking)
    – After 3 hours: <5 ng/mL
Marijuana Use in Adolescents: Detection

<table>
<thead>
<tr>
<th>Estimated Detection Period (days)</th>
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<tbody>
<tr>
<td>Occasional Users</td>
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<td>Frequent Users</td>
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<td>Extreme Case</td>
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Marijuana Use in Adolescents

Adolescent Development

- Physiological Changes: Delayed sleep and awakening
- Pubertal Changes: Primary and secondary sex characteristics
- Cognitive Changes: Increased emotionality and risk taking, especially in early/middle adolescence
- Social Changes: Distancing from parents and increased time with peers

Marijuana Use in Adolescents: Adolescent Brain Development

- Adolescent Brain Processes:
  - 1. Proliferation
  - 2. Pruning
  - 3. Myelination

- Processes enable functional maturation of neural pathways in cortex and subcortical areas.

Marijuana Use in Adolescents: Adolescent Brain Development

- Proliferation: Rapid growth of gray matter and formation of new connections
  - Maximal Frontal/Parietal Lobe Gray Matter Volume
    - 10-11 yrs in females, 12 yrs in males
  - Maximal Temporal Lobe Gray Matter Volume
    - 16.7 yrs in females, 16.5 yrs in males
  - Maximal Prefrontal Cortex Gray Matter Volume
    - Occurs in late adolescence (>21yrs)

Marijuana Use in Adolescents: Adolescent Brain Development

- Pruning: Gray matter maturation in which new synaptic connections are formed and others are eliminated
  - Inverted U-shaped developmental curve from childhood to adolescence to adulthood
  - Decreased gray matter volume, especially in PFC
  - Influenced by environmental experiences
Marijuana Use in Adolescents:
Adolescent Brain Development

• Myelination: Progressive enclosure of axons with myelin to speed communication among neurons and stabilize connections
  – Significantly increased cortical white matter from adolescence and into adulthood
  – Increased connectivity of subcortical regions (hippocampus, amygdala, areas with high sex steroid receptors)

Guerri. Alcohol. 2010.

Marijuana Use in Adolescents:
Adolescent Brain Development

• Brain development progresses from
  – Lower to higher brain centers
  – Brain stem to the cerebral cortex
  – Caudal to rostral direction
• In adolescence, “mismatch” occurs
  – “Bottom-up” thinking trumps “top-down” thinking
  – “Reward” areas of brain trump “decision-making” areas

Casey and Jones. JAACAP. 2010.
Marijuana Use in Adolescents: Adolescent Development

- What happens when a potentially vulnerable adolescent brain is exposed to substances?
- Research shows:
  - 1. Gateway Drug Theory
  - 2. Serious Biopsychosocial Consequences
  - 3. Disconnect between Adolescent Views and Parental/Guardian Views

Marijuana Use in Adolescents

- Gateway Theory: Use of a less dangerous drug leads to use of and dependence on other/harder drugs
- Marijuana has replaced nicotine as most prevalent drug choice in adolescents
- With long-term THC use, risk of addiction = 9% all users, 17% in adolescent users, 25-50% in daily users

FIGURE 2: Illustration of different developmental courses for sensation-seeking and impulsivity. Note: (A) Plot of sensation-seeking and impulsivity as a function of age (adapted from Steinberg et al.43). (B) Plot of patterns of activity in brain regions sensitive to reward outcomes during a cognitive control task across development (adapted from Galvan et al.6 and Galvan et al.16). fMRI functional magnetic resonance imaging.
Marijuana Use of Adolescents:
Gateway Theory

- Confounding Factors: Parental substance use/divorce; gender; abuse; psychiatric dx (ADHD/ODD/CD); socio-cultural influences
- Gateway Theory with MJ supported by research from twin studies in Australia, Netherlands, New Zealand

Marijuana Use in Adolescents

- Longitudinal Study: Results of infrequent/regular THC use
  - 8 x risk for initiation of initiation of nicotine use
  - 4 x risk for adult nicotine dependence
- Longitudinal & Cross-Sectional Studies:
  - Early adolescent THC use → Increased risk for substance use disorder
  - Cocaine, meth, heroin users overwhelmingly had early-onset THC use

Marijuana Use in Adolescents:
Biopsychosocial Consequences
Marijuana Use in Adolescents: Biopsychosocial Consequences

• Mental Consequences of Marijuana Intoxication:
  – Euphoria/Disinhibition
  – Anxiety/Agitation
  – Altered sense of time
  – Distorted perceptions/Derealization
  – Impaired coordination/reaction time
  – Difficulty with thinking/problem solving
  – Problems with learning/memory
  – Mistrust/Paranoid delusions/Hallucinations

• Physical Consequences from THC:
  – Altered development of HPA Axis
  – Cannabinoid Hyperemesis Syndrome
  – Tachycardia, arrhythmias, HTN
  – Deaths from cardiac/cerebral ischemia
  – Chronic bronchitis, COPD
  – Elevated visceral fat deposition/insulin resistance
  – Gingival proliferation
  – Nasopharyngeal tumors

• Consequences of Early-Onset (<16yo) THC Use
  – Deficits in cognition, learning, and memory
  – Decreased motivation
  – Poor educational outcome with increased likelihood of dropping out of school/job
  – Lower IQ among frequent users in adolescence
  – Increased prevalence of mood/psychotic disorders/suicidality
  – Persistent anxiety, even after discontinuation
Marijuana Use in Adolescents: Biopsychosocial Consequences

• Brain Imaging Studies:
  – Structural Abnormalities Specific to Adolescent THC Use:
    • Decreased white matter volume
    • Decreased white matter integrity
    • Increased cortical activity during cognitive tasks
    • Poorer reaction time
    • More errors on executive functioning tasks


Marijuana Use in Adolescents: Biopsychosocial Consequences

• Molecular Changes in Animal Studies:
  – Decreased CREB (cAMP response element-binding protein) activity
  – Decreased CB1 receptor density
  – Decreased G-protein coupling in nucleus accumbens
  – Increased CREB activity in hippocampus/PFC

• These changes are consistent with decreased motivation/anhedonia

Marijuana Use in Adolescents: Biopsychosocial Consequences

• Marijuana and Driving in Adolescence
  • 2/3 of US trauma center admissions: MVAs with 60% of patients positive for drugs and/or alcohol
  • DUI with marijuana surpassed rates of DUI with alcohol within past 5 years
  • One joint/blunt equivalent to BAC of 0.5
  • Driving features most impacted by MJ: Reaction time/Divided-attention tasks/Lane-positioning
  • Increased fatalities when ETOH + THC combined


Marijuana Use in Adolescents: Biopsychosocial Consequences

- Marijuana and Driving:
  - CO statistics
    - Legal limit for impaired driving with MJ: 5ng/ml
    - Positive cannabinoid screens: Increased from 28% in 2011 to 71% in 2014

Marijuana Use in Adolescents: Colorado Statistics

Marijuana use and driving (p.141)

- Marijuana use and driving with concurrent substance use
  - Marijuana and driving

Colorado Dept of Public Health & Environment - Monitoring Health

Marijuana use and neurological, cognitive, mental health effects (p.183)

- Substantial
  - Cognitive effects: Impaired memory for at least 7 days (daily or near-daily users)
  - Mental health effects: Acute psychotic symptoms during intoxication, Psychotic disorder in adulthood (daily or near-daily users)
  - Substance use and addiction: Can develop marijuana addiction

- Moderate
  - Daily or near-daily users may experience withdrawal symptoms
  - Treatment of marijuana addiction: can reduce use and dependence

Colorado Dept of Public Health & Environment - Monitoring Health
Marijuana Use in Adolescents: Biopsychosocial Consequences

- Marijuana and Driving:
  - WA statistics
    - 2009-2013: Number of positive THC/carboxy-THC screens increased from 19-28% to 25-40%
    - 56% of positive results were >5ng/ml

Marijuana Use in Adolescents: Biopsychosocial Consequences

Colorado Statistics

<table>
<thead>
<tr>
<th>Marijuana use among adolescents and young adults (%)</th>
<th>Cognitive and academic</th>
<th>Substance use and addiction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less high school graduation</td>
<td>Required cognitive abilities and academic performance after 10 doses/attendance</td>
<td></td>
</tr>
<tr>
<td>Psychotic symptoms in adolescents</td>
<td>Psychotic disorder in adolescents (daily or near-daily users)</td>
<td></td>
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<tr>
<td>Can develop marijuana addiction</td>
<td>Increased marijuana use and addiction after adolescence</td>
<td></td>
</tr>
<tr>
<td>Other illicit drug use and addiction after adolescence</td>
<td>Alcohol or tobacco use and addiction after adolescence</td>
<td></td>
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</tbody>
</table>

Abuse of quitting
- Tolerance for nicotine addiction can reduce use and dependence
- Increased nicotine use: risk of respiratory and mental health effects
Marijuana Use in Adolescents: Biopsychosocial Consequences

- Connection between THC and Psychosis
  - Psychosis during acute intoxication – 75% develop life-long psychotic disorder
  - Earlier onset and more frequent use increase psychosis risk
  - CB1-R gene mediates cannabis intoxication and variants increase risk of schizophrenia
  - Early-onset THC and COMT genes with Val/Met or Val/Val variants: Higher risk for psychosis

Marijuana Use in Adolescents: Biopsychosocial Consequences

- Connection between THC and Psychosis, cont.
  - Studies from multiple nations support increased risk of psychosis with early-onset THC use
  - Adults with Psychosis and History of early-onset THC use
    - Poorer prognosis for psychotic illness
    - Great risk for More frequent psychotic relapses
    - Worse treatment adherence
    - Increased hospitalizations

Marijuana Use in Adolescents: Cannabis and Psychosis

- Meta-Analysis Conclusions:
  - “The evidence is consistent with the view that cannabis increases risk of psychotic outcomes independently of confounding and transient intoxication effects...We conclude that there is now sufficient evidence to warn young people that using cannabis could increase their risk of developing a psychotic illness later in life.”

Marijuana Use in Adolescents:
Drug Interactions

• Cannabis Drug Interactions
  – THC + Uppers (amphetaminees/cocaine): ↑heart rate/blood pressure, possible heart damage
  – THC + Downers (BZD/BBT/EtOH/Opioids/Muscle relaxants/CNS depressants/Analgesics): ↑sedation and CNS depression
  – THC + EtOH: Significantly ↑ rate of fatal MVAs

Marijuana Use in Adolescents

• Possible Cannabis Drug Interactions
  – THC + SSRI: Mania
  – THC + TCA: ↑HR, delirium
  – THC + Lithium: ↑lithium concentration
  – THC + Antabuse: Hypomania
  – THC + AIDS drugs: ↓effectiveness
  – THC + Viagra: Myocardial infarction

Marijuana Use in Adolescents

Synthetic Drugs
Marijuana Use in Adolescents: Synthetic Cannabinoids

**Test Your Knowledge On Drugs and Drug Abuse By Taking The: 2017 National Drug & Alcohol IQ Challenge**

Get to know drugs and your options for help for an online interactive version.

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**Marijuana Use in Adolescents: Synthetic Cannabinoids**

6. Synthetic cannabinoids are also called what? Check all that apply:
   A. Bath salts
   B. Medical marijuana
   C. K2
   D. Cannabis

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**Marijuana Use in Adolescents: Synthetic Cannabinoids**

6. Synthetic cannabinoids, also called K2, spice, or sometimes herbal incense, refer to a growing number of non-herb, mind-altering chemicals that are either sprayed or dried, shredded plant material so they can be smoked or sold as liquids to be vaporized and inhaled in e-cigarettes and other devices. Because they often act on the same brain cell receptors as marijuana, some people call synthetic cannabinoids "fake weed," but they affect the brain more powerfully and differently than marijuana. You can learn more about synthetic cannabinoids at drugabuse.gov/publications/droguefacts/synthetic-cannabinoids.
Marijuana Use in Adolescents: Synthetic Cannabinoids

- Synthetic Cannabinoids
  - A growing number of man-made mind-altering chemical sprayed on dried, shredded plant material or vaporized to get high
  - Effects can be unpredictable and severe or even life-threatening.
  - ASE: Seizures, psychosis, death

- Synthetic Cannabinoids (SCB)
  - Originally developed as potential therapeutic drugs
  - Synthesized from 2000s in clandestine labs
  - Marketed to vulnerable populations as “safe and legal alternatives to marijuana”
  - Act atypically
  - Result in tolerance, addiction, withdrawal
Marijuana Use in Adolescents:
Synthetic Cannabinoids - Spice
• Users' reports:
  – Common: Elevated mood, relaxation, altered perception
  – Other experiences: Extreme anxiety, paranoia, hallucinations
• Poison Control Centers reports:
  – Rapid heart rate, vomiting, agitation, confusion, hallucinations
  – Elevated blood pressure, myocardial ischemia, rare myocardial infarctions
  
Marijuana Use in Adolescents:
Synthetic Cannabinoids - Bath Salts
• Synthetic chemicals related to cathinone
• Abused orally, snorted or injected
• Contain 3,4-methylenedioxyxymethamphetamine (MDPV), mephedrone, methylene and/or other compounds
  – Chemically similar to amphetamines/MDMA (Ecstasy)
  – Raise levels of dopamine in brain similar to cocaine
  – BUT >10 times more potent
  
Marijuana Use in Adolescents:
Synthetic Cannabinoids-Bath Salts
• Users Reports:
  – Euphoria, Increased sociability, Increased sex drive
  – If severe Intoxication – Paranoia, agitation, psychosis
• Poison Control Centers Reports:
  – CV changes (racing heart, elevated blood pressure, chest pain); Paranoia, hallucinations; Violent behavior; Panic
  – If “Excited delirium” – Dehydration, Breakdown of skeletal muscle tissue, Kidney failure, Death
Marijuana Use in Adolescents: Synthetic Cannabinoids - Bath Salts

- High Abuse and Addiction Potential
  - Rats: Escalation of drug intake similar to methamphetamine addiction
  - Bath salts users report intense cravings
  - Frequent use: tolerance, dependence, and strong withdrawal symptoms  

Marijuana Use in Adolescents: Adolescent vs Parental Views

- Adolescent Views:
  - Adolescents generally over-estimate parental approval of EtOH and THC use
  - >68% of adolescents do NOT believe daily drinking or binge drinking represents “great risk” for harm
  - 52.5% of adolescents do NOT perceive great risk in smoking THC once or twice a week
Marijuana Use in Adolescents: Adolescent vs Parental Views

• Adolescent Views:
  – 65% of 8th graders / 84% of 10th graders rate “very easy” or “fairly easy” access to EtOH
  – 48.6% of 12-17 yo rate easy access to THC
  – 19.0% of 12-17 yo rate easy access to cocaine
  – 12.9% of 12-17 yo rate easy access to LSD
  – 11.6% of 12-17 yo rate easy access to heroin

Marijuana Use in Adolescents: Adolescent vs Parental Views

• Adolescent Views:
  – 89.6% believe parents would strongly disapprove of trying MJ or hashish 1-2 times
    • 4.4% who perceive strong parental disapproval use THC
    • 32.8% who do NOT perceive strong parental disapproval use THC

Marijuana Use in Adolescents: Adolescent vs Parental Views

• High-school/College Athletes:
  – Greater acceptance of EtOH abuse by peers
  – More binge/heavy drinking than nonathletes
  – More drinks provided to them, both at home and in the community
  – Male college athletes: 75-93% use EtOH
  – Female college athletes: 71-93% use EtOH

Marijuana Use in Adolescents: Adolescent vs Parental Views

• High-school/College Athletes:
  – Swimming, tennis associated with low substance abuse
  – Rare "stimulant stacking" and steroids to enhance performance (cycling, track and field, baseball, gymnastics)
  – Higher risks for later abuse/dependence of alcohol and opioids (football, soccer, rugby)

• >50% of parents are unaware when children are abusing substances
• UM Mott Children’s Hospital National Poll questions:
  – 1. Nationally, what % of 10th graders do you think have used alcohol in the past 12 months (in quintiles)?
  – 2. Nationally what % of 10th graders do you think have used marijuana in the past 12 months?
  – 3. Did your [x-yo] drink alcohol in the last 12 mo?
  – 4. Did your [x-yo] use marijuana in the last 12 mo?
Marijuana Use in Adolescents: Adolescent vs Parental Views

• Parental Views:
  – Parents underestimate their own influence
    • Century Council - 2012 Report: 83% of youth cite parents as leading influence in decision to not drink or only drink occasionally, up from 55% in 2003
  – Parents seek information about teens’ substance use and social norms from other parents

Marijuana Use in Adolescents: Adolescent vs Parental Views

<table>
<thead>
<tr>
<th>Parental Style</th>
<th>Authoritative Parenting</th>
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<tbody>
<tr>
<td>Demanding</td>
<td>Relationship is reciprocal, responsive; high in bidirectional communication</td>
<td>Relationship is controlling, power assertive; high in unidirectional communication</td>
</tr>
<tr>
<td>Undemanding</td>
<td>Relationship is indulgent, low in control attempts</td>
<td>Relationship is rejecting or neglecting, uninvolved</td>
</tr>
</tbody>
</table>

Supportive Parenting
Parent is accepting and child-centered

Unsupportive Parenting
Parent is rejecting and child-centered
Marijuana Use in Adolescents

• Cannabis Use Disorder Treatment
  – Acute Intoxication: Nabiximols/Sativex (27mg THC:25 mg CBD)
  – Gabapentin
  – New research on N-acetylcysteine/zolpidem, anticonvulsants, mood stability
  – CBT / TF-CBT
  – Motivational enhancement therapy

Marijuana Use in Adolescents: Realistic Expectations

• Valid, reliable information provided to children, adolescents, parents and the community can make a change!
Questions???