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Marijuana Daniel R. Neuspiel Pediatrics in Review 2007;28;156 DOI: 10.1542/pir.28-4-156

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# In Brief

## Marijuana

Daniel R. Neuspiel, MD, MPH Beth Israel Medical Center and Albert Einstein College of Medicine New York, NY

#### Author Disclosure

Drs Neuspiel and Serwint did not disclose any financial relationships relevant to this In Brief.

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Marijuana (cannabis), the illicit drug used most frequently in the United States, may be smoked in cigarettes (joints, nails, reefers), pipes (bongs, bowls), or cigars (blunts); mixed with food; or brewed as a tea. Hashish (hash), a potent resin of cannabis, also may be used as a sticky black liquid (hash oil). Other street terms are pot, herb, weed, grass, widow, and ganja.

Results from the 2005 *Monitoring the Future* study, which assesses substance use patterns in adolescents, revealed that the admitted lifetime marijuana use among 8th, 10th, and 12th graders in the United States was 16.5%, 34.1%, and 44.8%, respectively; daily use was 1.0%, 3.1%, and 5.0%, respectively. Trends in use have varied in recent decades.

The primary active chemical in marijuana is THC (delta-9-tetrahydrocannabinol). Recent increased cultivation of sinsemilla made from buds of female cannabis plants has raised THC content from 0.5% to 2.0% in the 1970s to 6% to 10% in 2000, with wide variability in dose.

After an individual smokes marijuana, THC rapidly passes from the lungs to the bloodstream and brain, where it binds to cannabinoid receptors. Euphoria and other brain effects occur within seconds of smoking, peak in 15 to 30 minutes, and taper over 2 to 3 hours. The onset of action after oral ingestion is 30 to 90 minutes, with peak effect in 2 to 3 hours and a duration of 4 to 12 hours. THC is highly lipidsoluble and has a serum half-life of approximately 19 hours.

Physiologic effects include transient tachycardia for up to 3 hours, increased sitting blood pressure with abnormal orthostatic responses, and peripheral vasodilation. Regular marijuana smoking may cause respiratory effects similar to those of tobacco smoking, including daily cough, more frequent lung infections, exacerbation of asthma, decreased pulmonary function, and increased risk of respiratory tract cancer. Marijuana smoke contains 50% to 70% more carcinogenic hydrocarbons than tobacco smoke, and marijuana users typically inhale more deeply and longer, increasing carcinogen exposure. Cannabis may reduce immune function, and heavy use causes reversible decreases in sperm count and motility in animals. Irregular ovulation also has been noted. Short-term behavioral effects include memory and learning deficits, distorted sensory and time perception, problemsolving difficulties, and impaired coordination. Heavy marijuana use may exacerbate depression, anxiety, and personality disorders. There may be negative effects on intellectual, employment, and social skills. Memory impairment may last up to 1 month after last use. In general, students using marijuana have lower grades and high school graduation rates than do nonusing peers.

Marijuana increases the risk of injury as well as unwanted and unprotected sex. Recreational doses impair driving as much as do blood alcohol concentrations of 0.07% to 0.1%. No deleterious effects of marijuana use on

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the fetus during pregnancy have been confirmed.

Long-term marijuana use may lead to addiction, with use continuing despite interference with family life, school, work, and recreation. Tolerance may occur after several days of regular use. Withdrawal symptoms following heavy use peak by day 4 and resolve by 2 weeks after last use. These symptoms include irritability, insomnia, malaise, drug craving, diaphoresis, night sweats, gastrointestinal disturbances, and agitation.

Screening for drug use and addictive symptoms is part of comprehensive adolescent care. Anticipatory guidance should include information about marijuana's addictive potential; injury risk; and possible impairment of learning, socialization, and sexual function. Parents should be encouraged to rehearse strategies to help teens avoid drugusing settings. Skills-based interventions in schools have helped increase drug knowledge, decision making, selfesteem, and peer pressure resistance and have led to reduced marijuana use. Interventions in nonschool settings, specific counseling ("motivational interviewing"), and some family interventions may help prevent marijuana use.

Marijuana and its metabolites are detectable in urine by enzyme-multiplied immunoassay technique (EMIT) starting 1 hour after smoking. The urine assay usually remains positive up to 10 days after infrequent use and up to 30 days in heavy users. Some urine tests may detect passive inhalation of secondhand marijuana smoke. False-positive results may occur from ingestion of nonsteroidal anti-inflammatory drugs, and false-negative results may follow urine dilution or adulteration. Various urine and saliva tests, as well as adulterants to modify the tests, are available to parents and teens over the Internet. Care must be taken to avoid contamination, dilution, or substitution when obtaining urine for testing.

The American Academy of Pediatrics (AAP) supports voluntary confidential drug testing to assure that adolescents seek care. Although parents may request drug screening without adolescent consent, the AAP states, "Testing adolescents requires their consent unless 1) a patient lacks decision-making capacity; or 2) there are strong medical indications or legal requirements to do so."

Comment: Because marijuana is the illicit drug used most widely by high school students, pediatricians need to be familiar with risk factors for use, potential symptoms, effective approaches for screening for substance abuse, and most importantly, anticipatory guidance to parents and adolescents for prevention. A 1995 AAP survey revealed that fewer than 50% of pediatricians screen adolescents for substance abuse, yet this is an area in which the therapeutic relationship between the pediatrician and the patient and family can lead to important communication strategies for this lifealtering issue. Although treatments are available, prevention is the key. It is imperative for pediatricians to encourage open dialogue between adolescents and their parents on the topic of drug avoidance and empower parents to rehearse strategies for adolescent drug refusal that can be effective in their children's social environments.

Janet R. Serwint, MD Consulting Editor

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