JOHNS HOPKINS BLOOMBERG SCHOOL of PUBLIC HEALTH

THE TEEN YEARS EXPLAINED

A Guide to Healthy Adolescent Development

CENTER for ADOLESCENT HEALTH

INSIDE THIS ISSUE

Effects of Tobacco, Alcohol and Drugs on the Developing Adolescent Brain

Risk-taking may be based in biology, but that does not diminish the possible unhealthy consequences of alcohol and other drugs and tobacco on the developing teen brain.

Recent brain research with magnetic resonance imaging suggests that alcohol impacts adolescents differently than it does adults. Young people are more vulnerable to the negative effects of alcohol on the hippocampus—the part of the brain that regulates working memory and learning. Consequently, heavy use of alcohol and other drugs during the teen years can result in lower scores on tests of memory and attention in one's early to mid-20s.

People who begin drinking before age 15 are four times more likely to become alcohol-dependent than those who wait until they are 21. Teens also tend to be less sensitive than adults to alcohol's sedative qualities. Sedation in response to alcohol is one of the ways the body protects itself, since it is impossible to keep drinking once asleep or passed out. Teenagers are able to stay awake longer with higher blood alcohol levels than older drinkers can. This biological difference allows teens to drink more, thereby exposing themselves to greater cognitive impairment and perhaps brain damage from alcohol poisoning.

There are also striking differences in the way nicotine affects adolescent and adult smokers. Nicotine results in cell damage and loss throughout the brain at any age, but in teenagers the damage is worse in the hippocampus, the mind's memory bank. Compared to adults, teen smokers experience more episodes of depression and cardiac irregularities, and are more apt to become quickly and persistently nicotine-dependent.

Drugs such as cocaine and amphetamines target dopamine receptor neurons in the brain, and damage to these neurons may affect adolescent brain development for life in the areas of impulse control and ability to experience reward.

Other effects of substance abuse in adolescents include delays in developing executive functions (judgment, planning and completing tasks, meeting goals) and overblown and immature emotional responses to situations.



If you would like to know more about the effects of tobacco, alcohol and drugs on the developing adolescent brain, please refer to *The Teen Years Explained: A Guide to Healthy Adolescence,* and the following resources.

Drugs and Alcohol

Centers for Disease Control. Alcohol and Drug Use—http://www.cdc.gov/HealthyYouth/alcoholdrug/index.htm

The Nemours Foundation. Drugs and Alcohol—http://teenshealth.org/teen/drug_alcohol/

American Academy of Child and Adolescent Psychiatry. Teens: Alcohol and Other Drugs
http://www.aacap.org/cs/root/facts_for_families/teens_alcohol_and_other_drugs

Department of Health and Human Services. Drugs, Alcohol, and Smoking—http://www.4girls.gov/substance/alcohol/index.cfm

Effects of Drugs, Alcohol, and Tobacco on the Teen Brain

Bandy, T., & Moore, K.A. (2008). *What works for preventing and stopping substance abuse in adolescents: Lessons from experimental evaluations of programs and interventions*. Washington, DC: Child Trends.

Epstein, J. A., Griffin, K. W., & Botvin, G. J. (2000). Role of general and specific competence skills in protecting inner-city adolescents from alcohol use [Electronic version]. *Journal of Studies on Alcohol, 61*, 379-386.

Goldberg, J. H., Halpern-Felsher, B. L., Millstein, S. G. (2002). Beyond invulnerability: The importance of benefits in adolescents' decision to drink alcohol. *Health Psychology, 21*, 477-484.

Grant, B. F., & Dawson. D. (1997). Age of onset of alcohol use and its association with DSM-IV alcohol abuse and dependence: Results from the National Longitudinal Alcohol Epidemiologic Survey. *Journal of Substance Abuse, 9*,103-110.

Hingson, R. W. (2006). *Early drinking linked to risk for alcohol dependence*. Retrieved April 19, 2007 from http://pubs.ama-assn.org/media/2006a/0703.dtl

Slotkin, T. (2002). Nicotine and the adolescent brain: Insights from an animal model. *Neurotoxicology and Teratology, 24*, 369-384.

Spear, L. P. (2002). *The adolescent brain and the college drinker*. Retrieved August 6, 2008 from http://www.jsad.com/jsad/article/The_Adolescent_Brain_and_the_College_Drinker_Biological_Basis_of_Propensit/1466.html

For additional resources, please refer to *The Teen Years Explained: A Guide to Healthy Adolescent Development*. Science-based and accessible, this guide is a practical and essential resource for parents and all people who work with young people.

"Add this book to the 'must-read' list."
—Karen Pittman, Forum for Youth Investment

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ACKNOWLEDGEMENTS

This publication is an excerpt from *The Teen Years Explained: A Guide to Healthy Adolescent Development* [Authors: Clea McNeely, MA, DrPH and Jayne Blanchard]. The Guide was made possible by funding from the Centers for Disease Control and Prevention (CDC) to the Center for Adolescent Health at the Johns Hopkins Bloomberg School of Public Health, a member of the Prevention Research Centers Program (CDC cooperative agreement 1-U48-DP-000040). We would also like to thank the Charles Crane Family Foundation and the Shapiro Family Foundation for their support for the Guide.