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A JSI White Paper

Adolescent Brain Development: The Importance of Parental Involvement

Prepared for:

**Office of Adolescent Pregnancy
Programs, Adolescent Family Life
Demonstration and Research Program**

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“Teenagers are capable of enormous intellectual and artistic accomplishments, but the basic part of the brain that gives us strategies and organizing and perhaps warns us of potential consequences is not fully on board yet.”

Dr. Jay Giedd¹

¹ See PBS Frontline program “Inside the Teenage Brain,” <http://www.frontline.org>.

Introduction

Oftentimes individuals working in the field of adolescent pregnancy prevention have an inclination to see teen pregnancy only in psychosocial and contextual terms. Aside from the period of time when teens experience puberty, physiological factors that influence behavior are often absent from adolescent pregnancy prevention interventions. However, recent studies have shown that important neurobiological developmental changes take place through teens’ adolescent years and into their mid-twenties. Even though these changes are taking place, it is important to remember that adolescents are not adults. They are on their way to adulthood, but are still “under construction.” Thus, efforts to understand and guide teens should be based on a deeper appreciation of adolescent neurobiology.² Additionally, neurobiological factors should be included as *part* of many factors that are considered when trying to understand teen sexual behavior, decision-making and pregnancy.

Groundbreaking studies have suggested that the connections between neurons affecting teens’ emotional, physical and mental abilities are not complete during adolescence. This could explain why some teens seem to be inconsistent in controlling their emotions, impulses, and judgments.³ The impulsive behavior once blamed on “raging hormones” is still being seen as a byproduct of

² Weinberger, DR; Elvevag, B; & Giedd, JN (2005). *The Adolescent Brain: A Work in Progress*. Washington, DC: The National Campaign to Prevent Teen Pregnancy.

³ Huebner, A (2000). *Adolescent Growth and Development*. www.ext.vt.edu/pubs/family/350-850/350-850.html

hormones, but it is also understood as a lack of cognitive controls needed for mature behavior.⁴

Problem Statement

Teens are, as one neuroscientist puts it, a “work-in-progress.”⁵ Recent scientific evidence shows that the adolescent brain is not fully developed. The debate surrounds the extent to which teens have conscious control, since making mistakes is part of how the brain optimally grows. What opportunities will be most effective in helping them develop the skills of judgment, planning and impulse control? What is the impact of parental involvement on this development process? For teen parents, what is the impact of brain development on their ability to be thriving parents?

Adolescent Brain Development

Adolescents frequently know the difference between right and wrong, but they have diminished capacities to understand and process information, to communicate, to abstract from mistakes and learn from experience, to engage in logical reasoning, to control impulses, and to understand others’ reactions. The psychological evidence suggests that immaturity of adolescent judgment is not under voluntary control.

New imaging studies reveal patterns of brain development that extend into and beyond the teenage years.^{6,7} Researchers

have been able to explore the profound workings of the brain through magnetic resonance imaging (MRI) technology. Their discoveries have implications for parents, educators, policy makers, and the medical community.

“The parts of the brain responsible for things like sensation seeking are getting turned on in a big way around the time of puberty. But the parts for exercising judgment are still maturing throughout the course of adolescence.

It’s like turning on the engine of a car without a skilled driver at the wheel.”

Dr. Laurence Steinberg⁸

During adolescence, the brain adopts a “use-it-or-lose-it” pruning system, resulting in a decreasing number of connections among brain cells while the speed of connections increases.⁹ This refinement of brain “wiring” proceeds in stages, from back to front. The prefrontal cortex (frontal lobe) is the last part of the brain to mature and does not reach

⁴ Wallis, C. (2004, June). What makes teens tick: Inside the adolescent brain *Time*.

⁵ Underwood, N (2006). The teenage brain. *The Walrus*. November 2006 issue.

⁶ Giedd, HJN, Snell, JW, Lange, N, Rajapakse, JC, Haysen, D, Vaituzis, AC, Vauss, YC, Hamburger, SD, Kozuch, PL & Rapoport, JL (1996). Quantitative magnetic resonance imaging of human brain development: Ages 14-18. *Cerebral Cortex*, 6: 551-560.

⁷ Giedd, JN Blumenthal, J., Jeffries, NO, Castellanos, FX, Liu, H, Zijdenbos, A, Paus, T, Evans AC, & Rapoport, JL (1999). Brain development during childhood and adolescence: A longitudinal MRI: study. *Nature Neuroscience*, 2: 861-863.

⁸ Wallis, C. (2004, June). What makes teens tick: Inside the adolescent brain *Time*.

⁹ Ramowski, SK & Nystrom, RJ (Spring/Summer 2007). The changing adolescent brain. *Northwest Public Health*.

maturity until the teens are in their 20's. This area is home to some of the brain's executive functions, including: planning, reasoning, setting priorities, organizing thoughts, suppressing impulses, and weighing the consequences of one's actions.

In other words, the last part of the brain to undergo development is one of the most important - it is the area that gives individuals the ability to make decisions. Unused branches are sloughed off, and other pathways are refined. At the same time, synapses that normally go through the frontal lobe are instead re-directed to the amygdale – the emotional center of the brain. When this happens, teens' responses to situations are rooted in emotion rather than rationality.

All these processes can alter teens' capacity to control their decision-making abilities making them more vulnerable to risk-taking and/or impulsive behavior. Parents may think their teen is over-reacting, but in actuality, those emotional responses are just a result of the developing brain in action. One would also conclude that these processes can impact a parenting teens' ability to make healthy parenting choices. However, minimal research has been conducted supporting this conclusion.

After realizing the adolescent brain is underdeveloped and therefore less mature than its completed adult counterpart, it is also important to understand the adolescent brain is most easily observed under conditions of emotional arousal or while in the presence of others. At this time, the brain is especially sensitive to dopamine, a chemical neurotransmitter that is activated by substance use, exposure to intensity, media, food, and sex.

Dopamine is associated with risky behaviors and novelty seeking characteristics during teen years.

Even though much is understood about the developing brain, there are always more opportunities for researchers to explore the “pruning” and “use-it-or-lose-it” processes that impact a teen's social and emotional development.¹⁰

Parental Involvement

Studies reaffirm the key role parents play in the development of their teens' lives, often at a time when parents and teens push each other away.^{11,12,13,14} It is important to help teens make up for what their brains still lack by providing structure, time management advice, guidance about making difficult decisions (even when they resist), and just generally showing teens patience and love.^{15,16}

¹⁰ Blakemore, SJ & Choudhury, S (2006). Development of the adolescent brain: Implications for executive function and social cognition. *Journal of Child Psychology and Psychiatry*. 47:4, 296-312.

¹¹ DiClemente, RJ, Wingood, GM, Crosby, R, Sinean, C, Cook, BK, Harrington, K, Davies, S, Hook, EW, & On, MK (2001). Parental monitoring: Association with adolescent risk behaviors. *Pediatrics*, 107, 1363.

¹² Spano, S (2003). Adolescent brain development. *Youth Studies of Australia*, 22(1): 36-38.

¹³ Steinberg, L (2002). Is decision-making the right framework for research on adolescent risk taking? In D Romer (Ed.), *Reducing Adolescent Risk*. Thousand Oaks, CA: Sage Publications. 18-24.

¹⁴ Wallis, C (2004, May 10). What makes teen tick? *Time*. 56-65.

¹⁵<http://www.drugfree.org/teenbrain/science/growth.html>.

¹⁶ Wallis, C. (2004, June). What makes teens tick: Inside the adolescent brain *Time*.

The brain cells and neural connections that get used the least get pruned away and die off; whereas those that get used the most become stronger. This neuroanatomical evidence suggests that teens who undergo learning and positive experiences help build complex, adaptive brains. Thus, parents should encourage teens to have healthy lifestyles and provide meaningful opportunities for teens to exercise brain functions that require analytical, decision-making, and valuing skills. Adolescent brains and bodies are bursting with energy, even if it is not readily apparent. Parents should guide this energy by urging their teen to take healthy risks. Taking such risks will help to develop a stronger frontal lobe, effectively giving the teen more valuable life skills. Parents' involvements should not be overprotective; but instead they should allow their child to make mistakes so that they can learn from those mistakes.

It is important that parents communicate with their teens frequently and effectively.¹⁷ Seeking parent advice, having open and respectful communication, and maintaining positive relationships become more significant to the adolescent in the later years of development. The sense a teen has that he or she is connected to family has been linked to fewer feelings of loneliness, fewer thoughts of self harm, less likelihood of depression, more social support from friends, more positive connections to school, less stress and anxiety, and lower teen pregnancy.^{18, 19} Research shows that

¹⁷ Wallis, C. (2004, June). What makes teens tick: Inside the adolescent brain *Time*.

¹⁸ The Governor's Prevention Partnership (June 10, 2008). From 'This is Your Brain on Drugs' to 'This is Your Teenager's Brain on Fire'.

when teens talk with a parent or other significant adult about sex and protection, they are less likely to engage in early and/or unprotected sex than teens who have not talked with an adult about these issues. Teens also say that their parents are their preferred source of information on these subjects.

Summary

Parents often fall into the common belief that by the time children have become teenagers, there is nothing more they can do to influence their behaviors. However, developmental research has proven that this is one of the most important times in a child's life, as their brain has still not finished developing. There are biologic differences between teen and adult brains and these differences may result in different thinking patterns that impact certain parameters surrounding youth reasoning. New studies are showing remarkable changes that occur in the brain during the teen years, confirming that the teenage brain is a complicated and dynamic terrain that is not easily understood.

Brain development, as an isolated issue, should be just one of several factors considered when designing programs and policies about youth development. Though teens generally are more likely to be impulsive and make inappropriate decisions, that tendency varies widely, making it unlikely that the developing frontal lobe is the only culprit. Knowing the limitations of the adolescent brain does not excuse bad behavior, but it does

Connecticut Alliance of the Partnership for Drug Free America. Press Release.

¹⁹ Huberman, B & Alford S (2005). *Are You an Askable Parent?* From Research to Practice Report. Washington, DC: Advocates for Youth.

reinforce the need for parents to provide their teen with persistent support and guidance. Successful brain development relies on exercising the brain and, more than ever, teens need their parents.

It is up to adults working with teens, and especially parents, to use the information about adolescent brain development effectively in order to better understand and help meet adolescent needs and, in some cases, become successful parents.

Resources

Below you will find resources that are useful in researching more about adolescent brain development and parental involvement.

Research and Studies

Adolescent Brain Development

- Giedd, HJN, Snell, JW, Lange, N, Rajapakse, JC, Haysen, D. Vaituzis, AC, Vauss, YC, Hamburger, SD, Kozuch, PL & Rapoport, JL (1996). Quantitative magnetic resonance imaging of human brain development: Ages 14-18. *Cerebral Cortex*, 6: 551-560.
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- Families Matter: A Research Synthesis of Family Influences on Adolescent Pregnancy. Miller, Brent, C. Ph.D. (April 1998). National Campaign to Prevent Teen Pregnancy.

Parent Involvement

- Putting What Works to Work: A National Campaign Project. Science Says: Parental Influence and Teen Pregnancy. No. 8, February 2004.
- Putting What Works to Work: A National Campaign Project. Science Says: American Opinion on Teen Pregnancy and Related Issues 2003. No. 7, February, 2004.
- ReCAPP – Resource Center for Adolescent Pregnancy Prevention. *Major Findings about Parent-Child Connectedness*
<http://www.etr.org/recapp/column/column200401MajorFindings.htm>.

- Parent-Child Connectedness: Implications for Research, Interventions, and Positive Impacts on Adolescent Health. Lezin, Nicole, Rolleri, Lori A., Bean, Steve, Taylor, Julie. ETR Associates (2004).
- Parents and Caregivers As Sexuality Educators. SIECUS Report. December 2000/January 2001.
- Effects of a Parent-Child Communications Intervention on Young Adolescents' Risk for Early Onset of Sexual Intercourse. Blake, Susan, M.; Simkin, Linda; Ledsky, Rebecca; Perkins, Cheryl; and Calabrese, Joseph M. *Family Planning Perspectives*. (2001). 33(2):52-61.

Print Resources/Fact Sheets

- A Parent's Guide to School Involvement. NEA – National Education Association. <http://www.nea.org>.
- Ten Tips for Raising Kids With A Healthy Body Image. Advocates For Youth. Kelly, Maureen. <http://www.advocatesforyouth.org/parents/experts/kelly.htm>.
- The FACTS - Parent-Child Communication: Promoting Sexually Healthy Youth. Advocates For Youth Fact Sheet. <http://www.advocatesforyouth.org>.
- As parents and caregivers, you are the primary sexuality educators of your children. 10 simple tips. SIECUS. <http://www.siecus.org>.
- Parents' Sex Ed Center: Attitudes and Beliefs. Activity. Advocates for Youth. <http://www.advocatesforyouth.org>.
- Parents' Sex Ed Center: Ten Tips for Talking about the Facts of Life. Advocates for Youth. <http://www.advocatesforyouth.org>.
- Recommendations for Effective Practice of Parental and community Involvement. http://www.stemnet.nf.ca/Community/TQL_LP/modles/reppci.htm.
- Become an Askable Parent. Parent's Guide. <http://www.iwannknow.org>.
- Parents Matter: Tips for Raising Teenagers. Booklet prepared for the White House Conference on Teenagers. May 2, 2000.
- Parent Power: What Parents Need to Know and Do to Help Prevent Teen Pregnancy. National Campaign.

News Articles/TV Programs

- Wallis, C. (2004, June). What makes teens tick: Inside the adolescent brain *Time*.
- The New York Times. *That Parent-Child Conversation Is Becoming Instant, and Online*. Schwartz, John. January 3, 2004.
- Talking with Your Child's Teacher About a Sexuality Issue. Roper, Martha R. Advocates For Youth. <http://www.advocatesforyouth.org>
- Why Sex Education Also Belongs in the Home. Gordon, Sol, Ph.D. Advocates For Youth. <http://www.advocatesforyouth.org>
- What to Do When They Just Won't Talk! Boyer, Maggi Ruth P. Advocates For Youth. <http://www.advocatesforyouth.org>
- Alcohol and Sexual Risk Taking: What Parents Need to Know. Blake, Jeanne. Advocates For Youth. <http://www.advocatesforyouth.org>
- Parents and Their Children's Learning about Sexuality. Carrera, Michael A. Advocates For Youth. <http://www.advocatesforyouth.org>
- Why Sex Education Belongs in the Home. Gordon, Sol.N. Harsh Parental Discipline Increases Dating Violence Risk. Join Together Online. <http://www.jointogether.org>
- Kaiser Daily Reproductive Report. *Parents Most Influential on Teens' Decisions About Sex, National Campaign To Prevent Teen Pregnancy*
- Kaiser Daily Reproductive Report. *NPR's 'Morning Edition' Reports on Importance of Parent-Child communication in Sex Lives of Teenagers*.
- *Thursday, May 22, 2003*. <http://www.kaisernetwork.org>
- MSN Money. *Your kid's troubles can cost you a bundle*. Solomon, Christopher. <http://moneycentral.msn.com/content/CollegeandFamily/Raisekids/P68513.asp?>
- Families Are Talking. *Teens Talk about TV, Sex, and Real Life*.
- SIECUS Report Supplement. Vol. 1, No. 2, 2001. PBS Frontline program "Inside the Teenage Brain," <http://www.frontline.org>.

"Parents have become so convinced educators know what is best for children that they forget that they themselves are really the experts."

Marion Wright Edelman