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The Essence of Adolescence: Examining Addiction in the Teenage Brain

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When **[Marisa M. Silveri, PhD](/profile/marisa-silveri)** (</profile/marisa-silveri>), director of McLean Hospital's Neurodevelopmental Laboratory on Addictions and Mental Health, gives community presentations on the effects of alcohol and drug use on the adolescent brain, she refers to herself as a "neuroscience interpreter."

Speaking to hundreds of students, parents, educators, mental health workers, law enforcement officers, and policymakers each year, her mission, she said, is to help them understand what science tells us so they can use the information in a tangible way.

“Age of first alcohol use is a strong predictor of an alcohol abuse problem later in life. If you’re 13 when you start drinking, you have a 47% chance of having a problem as an adult. If you wait until 21, you still have a 9% chance that you’ll have a problem later on, but there’s a clear pattern—the longer you can delay onset of use, the more you can protect your brain,” she said.

With the brain still being developed—including vital areas related to decision-making—Silveri’s take home message to teens is to avoid alcohol in order to give their brains more time to develop.



Marisa M. Silveri, PhD, director of the Neurodevelopmental Laboratory on Addictions and Mental Health

In her role as a researcher she focuses on the consequences of substance abuse and the manifestation of addictions and psychiatric illness in teens and young adults, measured using magnetic resonance imaging techniques. She explained, “MRI is a noninvasive imaging technology that gives us a window into the brain without exposure to anything harmful.”

McLean was one of the first sites in the country to use magnetic resonance spectroscopy, a type of MRI used to examine neurochemistry in substance abuse and mental illness, which is what drew Silveri to do her post-doctoral work at the hospital 15 years ago.

Since then, she said, “there’s been a dramatic increase in the number of researchers wanting to look at the adolescent brain, especially in psychiatry, and the reason is that this is the typical age range associated with initiation of substance use and psychiatric symptoms.

“What is innovative about our work is that we combine multiple types of imaging that allow us to look at brain structure, function, and chemistry,” she said. “Along with clinical and cognitive assessments, this provides a robust multimodal approach. We’re not just looking at one endpoint—we conduct our research to make the results more thorough, comprehensive, and specific. This gives us increased precision to better understand neurobiology.”

According to Silveri, teens often binge drink because they are less sensitive to some of the impairing effects of alcohol, which in adults serve as internal cues as to when they’ve had enough.

This year, one of the research projects her lab is conducting involves recruitment of 200 teens ages 13 to 14 who have not yet used alcohol or drugs. They will be followed sequentially over the next two years, allowing

investigation into how the brain changes as they initiate drug or alcohol use, as well as how anxiety or depression symptoms emerge.

“My hope,” Silveri said, “is to make a difference using science in a way that resonates with teens and young adults and ultimately helps ensure a healthy transition to adulthood.”

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