The Science of Addiction in Adolescents

Sharon Levy, MD, MPH

Director
Adolescent Substance use and Addiction Program (ASAP)
Boston Children's Hospital
Associate Professor of Pediatrics
Harvard Medical School

Disclosures

Sharon Levy has no financial relationships to disclose or Conflicts of Interest (COIs) to resolve.
Adolescents are developmentally primed to use drugs.

Most drug use starts in adolescence

Adolescents are developmentally vulnerable to develop substance use disorders

Nicotine Receptors in the CNS

When I first used I would get a buzz and my entire body would feel tingly. My eyes would water up. I would feel as if I had been spinning around and just stopped. It felt great. I don’t feel those things anymore.”

14 year old boy describing nicotine effects
Nicotine Toxicity

- Stomach pain
- Dizziness
- Headaches
- Decreased Concentration

Jack

- 14 year old boy, started using Juul® at age 13
- Caught by parents after 9 months; forced to quit over the summer
- Restarted in the Fall. Presents for SUD treatment asking for help, “all I can think about is nicotine”
- “I don’t feel right since I quit. I frequently “zone out” and have to pull myself back. This happens a lot, even when I am playing sports.”
- Meets criteria for severe NUD, no other substance use, no mental health disorders

Austin

- 16 year old boy; highly functioning through 8th grade
- Fall of 9th grade starts vaping
- Quickly increases to daily use, reports one pod per week plus hits from friend’s Juul® at school
- Functioning falls dramatically. Irritable at home. He reports new attention problems and asks if he has ADHD.
- Parents discover Juul® and insist he quit. DT’s negative for 2 weeks, appears to have withdrawal symptoms. Restarts after 2 weeks.
- SUD evaluation:
  - He endorses criteria for mild nicotine use disorder though parental observation suggests more severe NUD.
  - No other substance use reported by Austin or parents,
  - Does not meet criteria for any mental health disorder
- Parents transfer to boarding school for 10th grade to change milieu though use continues

Summary

- Adolescents are vulnerable to both drug use and addiction
- New vaping products are interesting to teens who are particularly attracted to tricks
- Vaping products deliver high doses of nicotine in short amounts of time. Many teens experience symptoms of nicotine toxicity
- The long term consequences of this exposure are unknown