New Directions in Substance Use Prevention

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Addiction Involves *Multiple Factors*

- **Biology/Genes**
- **Environment**
- **Brain Mechanisms**
- **Addiction**

**DRUG**
Role Of Genetics On Brain Development

- Highest heritability in evolutionarily novel regions (temporal poles, inferior parietal lobes, and superior and dorsolateral frontal cortices)

- Heritability increased through late childhood and adolescence.

Adverse Childhood Experiences (ACE) and Illicit Drug Use (n = 8603)

• Abuse
  Emotional, Physical, Sexual

• Neglect
  Emotional, Physical

• Household dysfunction
  Battered mother
  Parental separation or divorce
  Mental illness in household
  Household substance use
  Incarcerated household member

ACE account for one-half to two-thirds of serious problems with drug use.
Early Substance Use
Early Aggressive Behavior
Poor Social Skills
Lack of Parental Supervision
Drug Use in Family
Drug Availability
Poverty

Self Control
Parental Monitoring & Support
Positive Relationships
Academic Competence
Anti-Drug Use Policies
Strong Neighborhood
Adolescent Brain Cognitive Development (ABCD) Study

A longitudinal study of about 10,000 children from ages 9-10 through early adulthood to assess factors that influence individual brain development trajectories and functional outcomes.
Impact Of Poverty On Cognition and Brain Structure In USA Children: ABCD Study (N=7784)

Effects of family income (FI) on cortical volume and thickness

Tomasi and Volkow, unpublished.
HEALthy Brain and Child Development Study

Longitudinal study (n=7500), of brain developmental and behavioral trajectories from infancy through childhood (ages 9-10) with emphasis on understanding in utero substance exposures and effects of adverse social environments.

- **Pregnancy History**
- **Substance and other risk and protective factor exposures**
- **MRI for structural, DWI, RSFC, and MRS**
- **EEG for baseline, auditory EVP, visual EVP, and face-object ERP**
- **Biospecimens for substance use, genomic, epigenomics, nutrition, toxins, and COVID-19**
- **Wearable biosensors for heart rate (HR), HRV, sleep/wake and physical activity**
- **Behavioral, observational, and neurocognitive assessments**
- **Environment**