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UNIVERSITY CENTER FOR EXCELLENCE IN DEVELOPMENTAL DISABILITIES EDUCATION, RESEARCH AND  
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*Supporting Professionals Who Support Children's Mental Health*

**NM-ABC**

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# Adolescent Substance Use

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# Disclosures

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The presenter has no financial disclosures

# Objectives

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- ❑ Discuss the ways in which substance use and misuse is one of the greatest issues adolescents face.
- ❑ Describe how adolescence is a unique time in the development of substance use issues.
- ❑ Discuss how substance use and misuse are highly co-morbid with other mental health issues in young people.

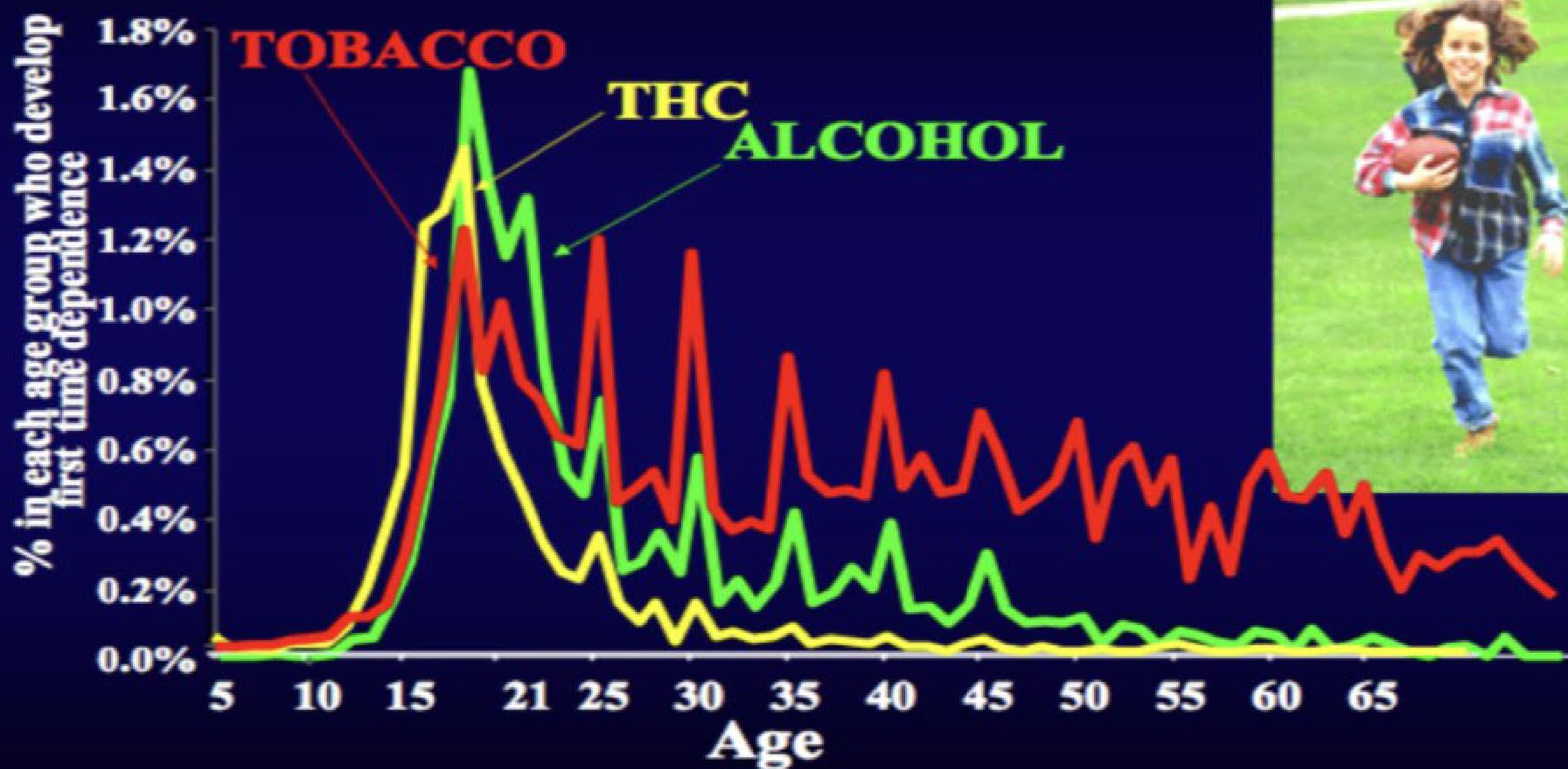
# Why We Care

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- 1) Substance use and misuse is one of the greatest issues adolescents face.
- 2) Youth is a unique time in the development of substance use issues.
- 3) Substance use and misuse are highly co-morbid with other mental health issues young people have.

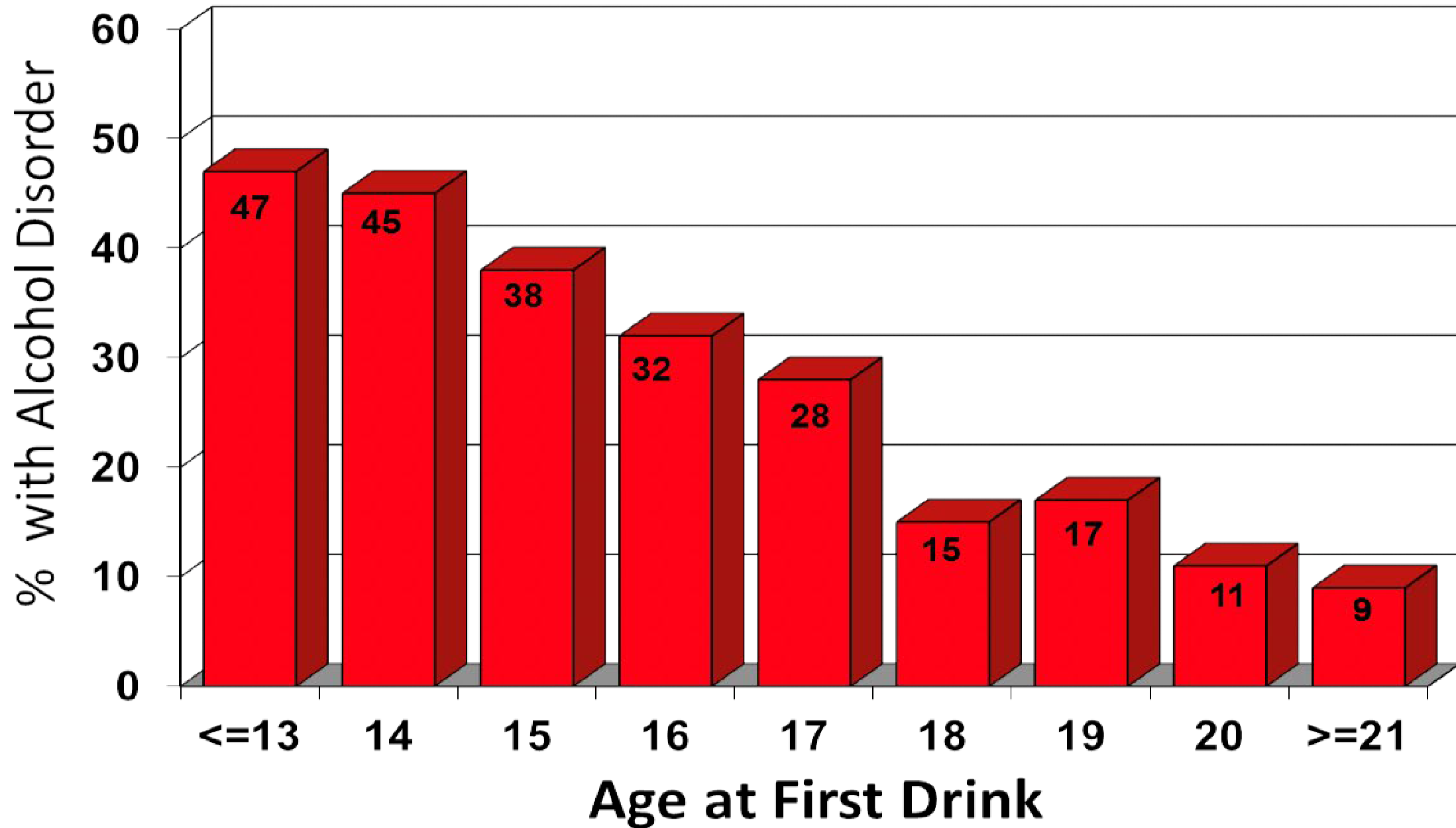
# ADDICTION IS A DEVELOPMENTAL DISEASE

*Usually starts in adolescence and childhood*



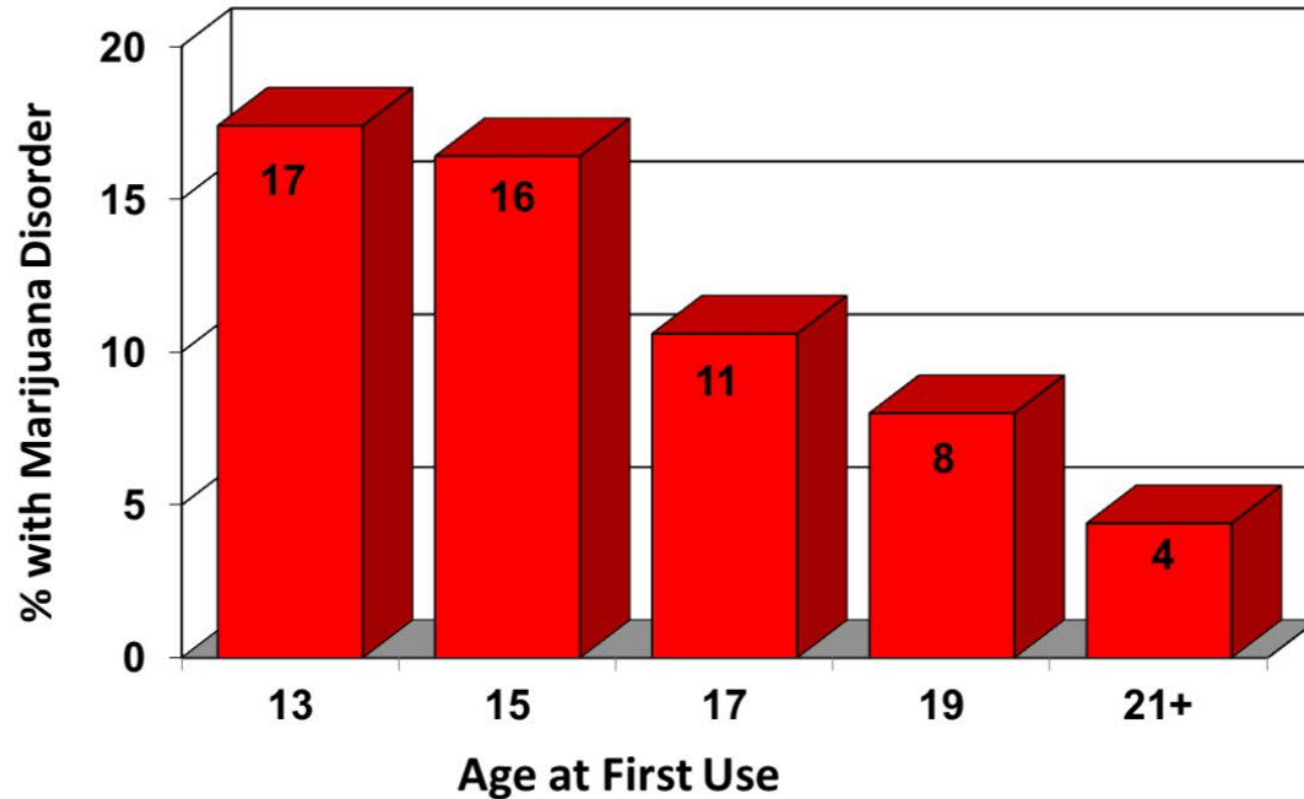
Age at **tobacco**, at **alcohol** and at **cannabis** dependence as per DSM IV

*NIAAA National Epidemiologic Survey on Alcohol and Related Conditions, 2003.*



Source: Hingson RW, Heeren T, Winter MR. Age at drinking onset and alcohol dependence. *Arch Pediatr Adolesc Med.* 2006;160:739-746.

# Age at First Use and Risk of Cannabis Use Disorder



Source: Substance Abuse and Mental Health Services Administration. (2010). Results from the 2009 National Survey on Drug Use and Health: Volume I. Summary of National Findings (Office of Applied Studies, NSDUH Series H-38A, HHS Publication No. SMA 10-4586Findings). Rockville, MD.



# Early Use

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Earlier Age of first use is related to risk for developing SUD

- At risk youth often experiment earlier (age 12-13)
- For youth who experiment with prescription drugs by age 13, 25% develop SUD
- For youth who experiment with alcohol by age 14, 25% develop SUD
- For those who wait to age 21 to try alcohol, only 2.1% develop SUD
- 13.2% of adults who first tried marijuana at the age of 14 or younger were classified with illicit drug dependence or abuse (6x higher than those who tried at 18 or older).

Horner 2017

# DSM-5 Substance Use Disorder Criteria

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(Impaired control)

1. Use in larger amounts or longer than intended
2. Desire or unsuccessful effort to cut down
3. Great deal of time using or recovering
4. Craving or strong urge to use

(Social impairment)

5. Role obligation failure
6. Continued use despite social/interpersonal problems
7. Sacrificing activities to use or because of use

(Risky use)

8. Use in situations where it is hazardous
9. Continued use despite knowledge of having physical or psychological problem caused or exacerbated by use

(Neuroadaptive/physiologic)

10. Tolerance
11. Withdrawal

# DSM-5 Severity and Specifiers

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- Severity ranges from mild to severe based on the number of symptoms

Mild: two to three symptoms

Moderate: four to five

Severe: six or more

- Course specifiers
  - “In early remission”
  - “In sustained remission”
  - “On maintenance therapy”
  - “In a controlled environment”

# NSDUH DATA REVIEW

September 2016

## Authors

SAMHSA: Arthur Hughes, Matthew R. Williams, Rachel N. Lipari, and Jonaki Bose; RTI International: Elizabeth A. P. Copello and Larry A. Kroutil

## Abstract

**Background.** Misuse of prescription psychotherapeutic drugs is second only to marijuana as the nation's most prevalent illicit drug use issue. In 2015, the National Survey on Drug Use and Health (NSDUH) questionnaire was redesigned regarding the data collection regarding four categories of prescription psychotherapeutic drugs: pain relievers, tranquilizers, stimulants, and sedatives. For the first time, NSDUH respondents were asked to report about *any* past year use of prescription drugs, which includes the use of one's own prescription medication as directed by a doctor, as well as misuse. In addition, misuse was redefined in 2015 as use in any way not directed by a doctor, including use without a prescription of one's own; use in greater amounts, more often, or longer than told to take a drug; or use in any other way not directed by a doctor.

**Methods.** This report presents 2015 NSDUH findings for people aged 12 or older regarding the past year use or misuse of prescription psychotherapeutic drugs and related topics. Estimates for selected outcomes are presented by age, gender, race, Hispanic origin, and county type. Statistically significant differences are noted within selected subgroups.

**Results.** In 2015, an estimated 119.0 million Americans aged 12 or older used prescription psychotherapeutic drugs in the past year, representing 44.5 percent of the population. About 97.5 million people used pain relievers (36.4 percent), 39.3 million used tranquilizers (14.7 percent), 17.2 million used stimulants (6.4 percent), and 18.6 million used sedatives (6.9 percent). In 2015, 18.9 million people aged 12 or older (7.1 percent) misused prescription psychotherapeutic drugs in the past year. This number included 12.5 million people who misused pain relievers in the past year (4.7 percent), 6.1 million who misused tranquilizers (2.3 percent), 5.3 million who misused stimulants (2.0 percent), and 1.5 million who misused sedatives (0.6 percent). However, most people (84.1 percent) who used prescription drugs in the past year did not misuse them.

Past year users of other substances were more likely than people aged 12 or older to have misused prescription drugs. For example, 72.1 percent of past year heroin users and 5.9 percent of past year alcohol users misused pain relievers in the past year. Adults aged 18 or older who did not have mental illness in the past year were less likely than adults with mental illness to have misused prescription drugs in the past year.

In 2015, 2.1 million people aged 12 or older were recent initiates for pain reliever misuse (i.e., misused for the first time in the past year), 1.4 million were recent initiates for tranquilizer misuse, 1.3 million were recent initiates for stimulant misuse, and 425,000 were recent initiates for sedative misuse. On average, recent initiates aged 12 to 49 initiated the misuse of prescription drugs in their early to late 20s.

About 1.0 percent of people aged 12 or older (2.7 million) had a prescription drug use disorder in the past year, including 2.0 million people with a pain reliever use disorder, 688,000 with a tranquilizer use disorder, 426,000 with a stimulant use disorder, and 154,000 with a sedative use disorder. In 2015, as part of their most recent substance use treatment, 822,000 people received treatment for the misuse of pain relievers, 293,000 people received treatment for tranquilizer misuse, 139,000 received treatment for stimulant misuse, and 116,000 received treatment for sedative misuse.

Among people aged 12 or older who misused prescription pain relievers in the past year, the most commonly reported reason for their last misuse was to relieve physical pain (62.6 percent). Among past year misusers of tranquilizers, the most commonly reported reasons were to relax or relieve tension (44.9 percent) or to help with sleep (20.4 percent). Commonly reported reasons for misuse among stimulant misusers were to help be alert or stay awake, help concentrate, or help study (26.8, 26.5, and 22.5 percent, respectively). Among past year sedative misusers, the most common reason was to help with sleep (71.7 percent). Even if people misused prescription drugs for conditions for which these drugs are typically prescribed (e.g., for pain relief or to help with sleep), use without one's own prescription or use more often or at a higher dosage than prescribed nevertheless constitutes misuse.

Among people aged 12 or older who misused pain relievers in the past year, the most common source for the last pain reliever that was misused was from a friend or relative (53.7 percent), and about one third misused a prescription from one doctor. About 1 in 20 people who misused pain relievers bought the last pain reliever they misused from a drug dealer or stranger.

**Conclusions.** Compared with prior NSDUH data collection efforts, collecting more detailed information on the use and misuse of a comprehensive set of prescription drugs was determined to be more useful for policy and research purposes. The 2015 estimates provide a more nuanced understanding of prescription drug misuse in the United States.

# Alcohol

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## Alcohol Use Disorder (AUD)

**Youth Ages 12 to 17:** According to the 2019 NSDUH, an estimated 414,000 adolescents ages 12 to 17 (1.7 percent of this age group) had AUD. This number includes 163,000 males (1.3 percent of males in this age group) and 251,000 females<sup>7</sup> (2.1 percent of females in this age group).

SAMHSA, Center for Behavioral Health Statistics and Quality. 2019 National Survey on Drug Use and Health. Table 5.4B – Alcohol Use Disorder in Past Year among Persons Aged 12 or Older, by Age Group and Demographic Characteristics: Percentages, 2018 and 2019. <https://www.samhsa.gov/data/sites/default/files/reports/rpt29394/NSDUHD...> Accessed January 20, 2021.

# Alcohol (based on other studies)

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1 out of every 3 Americans will meet criteria for Alcohol Use Disorder sometime in their lives

Anywhere between 6-14% of Americans have Alcohol Use Disorder at any given time

# Substances Used by 12th Graders - 2020

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While experimentation with alcohol is common, only about 1/3 (33.6%) of 12th graders are current (past 30 days) drinkers. Some kids and adults may think that “all high school kids use marijuana,” but the truth is that less than half (43.7%) of seniors have ever tried marijuana and only 21.1% are current smokers

- Monitoring The Future (MTF) 2020

# Substances Used by Youth - 2020

	8th Grade			10th Grade			12th Grade		
	Lower limit	Observed estimate	Upper limit	Lower limit	Observed estimate	Upper limit	Lower limit	Observed estimate	Upper limit
Any Illicit Drug <sup>a</sup>	17.7	21.3	24.9	33.5	37.3	41.0	42.2	46.6	50.9
Any Illicit Drug other than Marijuana <sup>a</sup>	9.6	12.5	15.5	11.7	13.2	14.7	15.3	17.5	19.6
Any Illicit Drug including									
Inhalants <sup>a,b</sup>	24.8	28.4	32.0	35.7	39.7	43.7	42.5	47.6	52.7
Marijuana/Hashish	12.1	14.8	17.6	29.4	33.3	37.1	39.2	43.7	48.2
Inhalants <sup>b,c</sup>	10.2	12.6	15.1	6.6	7.4	8.2	2.6	3.8	5.0
Hallucinogens <sup>l</sup>	2.0	3.0	4.1	4.1	4.8	5.6	5.4	7.5	9.6
LSD <sup>l</sup>	1.3	2.1	2.9	3.0	3.8	4.5	4.0	5.9	7.8
Hallucinogens other than LSD <sup>l</sup>	1.1	2.0	2.9	2.8	3.4	4.1	3.0	4.7	6.4
Ecstasy (MDMA) <sup>e,f</sup>	0.7	1.7	2.8	2.1	2.6	3.1	2.4	3.6	4.8
Cocaine	0.8	1.6	2.3	0.7	1.6	2.5	2.9	4.1	5.4
Crack	0.4	0.9	1.5	0.4	0.7	1.0	0.8	1.6	2.4
Cocaine other than Crack <sup>g</sup>	0.7	1.3	1.9	0.6	1.5	2.4	2.5	4.0	5.6
Heroin <sup>c</sup>	0.1	0.5	0.9	0.1	0.3	0.5	0.1	0.4	0.7
With a Needle <sup>b,c</sup>	0.0	0.3	0.5	0.0	0.2	0.3	0.0	0.2	0.5
Without a Needle <sup>b,c</sup>	0.0	0.4	0.8	0.1	0.2	0.4	0.0	0.1	0.3
Narcotics other than Heroin <sup>h</sup>	—	—	—	—	—	—	4.3	5.3	6.3
Amphetamines <sup>h</sup>	6.7	8.9	11.2	5.9	7.0	8.0	5.9	7.3	8.8
Methamphetamine <sup>l</sup>	0.0	1.1	2.4	0.1	0.8	1.5	0.2	1.7	3.2
Crystal Methamphetamine (Ice) <sup>f</sup>	—	—	—	—	—	—	0.0	0.2	0.4
Sedatives (Barbiturates) <sup>h</sup>	—	—	—	—	—	—	3.5	4.4	5.4
Tranquilizers <sup>h</sup>	2.3	3.9	5.4	4.2	4.9	5.6	5.5	7.0	8.6
Rohypnol <sup>d,j</sup>	§	§	§	§	§	§	—	—	—
Alcohol	21.4	25.6	29.8	40.0	46.4	52.7	55.4	61.5	67.6
Been Drunk <sup>f</sup>	7.7	10.1	12.4	22.9	28.8	34.7	34.3	41.7	49.1
Flavored Alcoholic Beverages <sup>d,i</sup>	14.2	18.3	22.4	28.2	36.4	44.5	§	§	§
Cigarettes	8.2	11.5	14.7	11.8	13.9	16.0	17.8	24.0	30.1
Smokeless Tobacco <sup>d,e</sup>	5.0	7.8	10.5	6.9	9.3	11.6	§	§	§
Any Vaping	19.7	24.1	28.6	35.4	41.0	46.6	40.3	47.2	54.2
Vaping Nicotine	18.1	22.7	27.3	33.2	38.7	44.2	36.9	44.3	51.6
Vaping Marijuana	8.1	10.2	12.4	19.1	22.7	26.3	24.0	27.9	31.9
Vaping Just Flavoring	14.6	17.8	21.1	23.4	27.7	31.9	25.3	29.8	34.2
Vaping Flavoring with no Nicotine Vaping	0.8	1.3	1.8	1.2	1.6	2.0	1.4	2.1	2.7



# Trends: Quick Summary

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Illicit drug use in general was highest in early 80's, lowest in early 90's, and increased again into late 90's and early/mid 2000's. Most drugs level or in decline since, especially past few years.

Except recent increases in marijuana, especially daily use for noncollege youth.

Use of illicit drugs and cigarettes generally lower for college students than non-college peers. But college students higher on amphetamine and alcohol use.

Despite college v. non-college level differences, patterns of historical trends similar.

Men use more than women (gap closing in 30 day alcohol, some illicit).

# 2017 Age Trends: Quick Summary

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Marijuana use peaked at ages 21-24: 40% annual use, 25% 30-day use, 9% daily use.

Use of illicit other than marijuana (OTM) peaked at ages 23-26: 23% annual use, 10% 30-day use.

Use of most individual illicit drugs tended to peak at ages 23-26, but amphetamine use peaked at ages 21-22.

Binge drinking peaked at ages 21-22 at 40%.

Age differences may also reflect cohort differences.

# Adolescent Sensitive Periods

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- Sensitive periods
  - Importance of developmentally distal experiences regarding future functioning.
  - Developmental windows that matter in the long run: i.e., not temporary diversions.
- 8th v. 10th grade effects.
  - 8th grade mental health difficulties matter more than 10th grade difficulties in predicting increased substance use through 12th grade (Maslowsky et al., 2014).

# Long-term Consequences: Necessary to Consider Shared Risk Factors

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In the context of risk factors, life circumstances and sociodemographics, consequences of teen substance use on adult substance use disorders (SUDs)

- When controlling for host of adolescent risk factors, including externalizing behaviors, teen substance use predicts adult SUDs (e.g., Hasin, 2018; NASEM, 2017; Odgers et al., 2009; Schulenberg et al., 2016; Volkow et al., 2014).
- Adult SUDs are 2- to 4-times more likely for teens who engage in non-medical use of opioids, stimulants, or sedatives, controlling for other substance use (not true for medical use only) (McCabe et al., 2016, 2017a, 2017b).

Using propensity score matching, providing stronger controls for selection effects:

- Frequent marijuana use (6+ times past 30 days) in late adolescence contributes to lower educational attainment compared to infrequent and no use (Maggs et al., 2015).

# Why We Care

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- 1) Substance use and misuse is one of the greatest issues adolescents face.
- 2) Youth is a unique time in the development of substance use issues.
- 3) Substance use and misuse are highly co-morbid with other mental health issues young people have.

# Adolescent Development

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Physical changes

New cognitive abilities (propositional logic, abstract thinking)

Social Development (diminishing of family relationships and of importance of peer relationships)

# Challenges With Adolescents

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Adolescents are the time with the biggest potential for change

One of the lowest times for behavioral motivation

One of the biggest times with perceived invincibility/invulnerability and limited insight

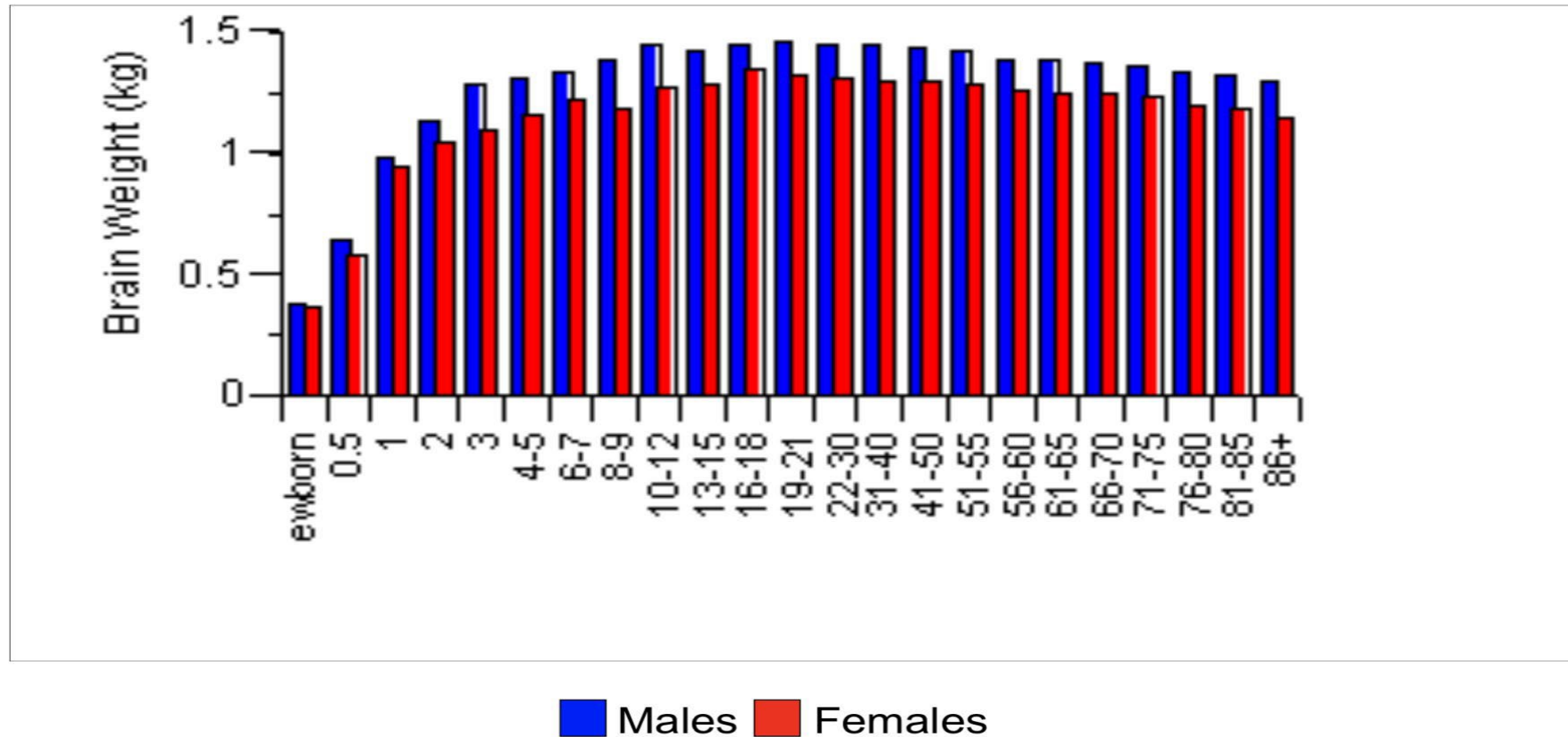
# Why is This Important to Know?

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Although adolescents feel, albeit more intensely like adults, they do not think and perceive like adults.

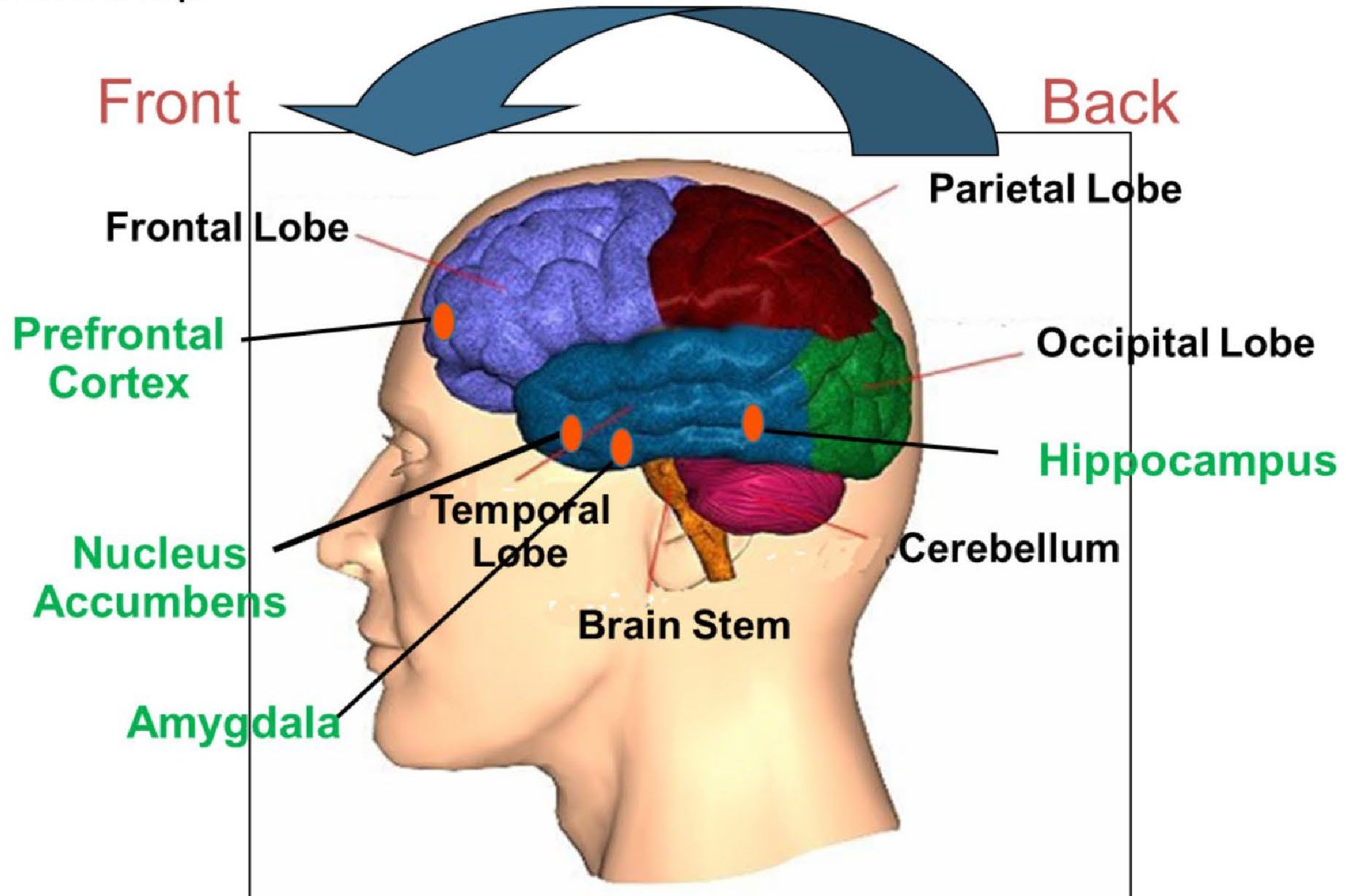


# Brain Weight by Age

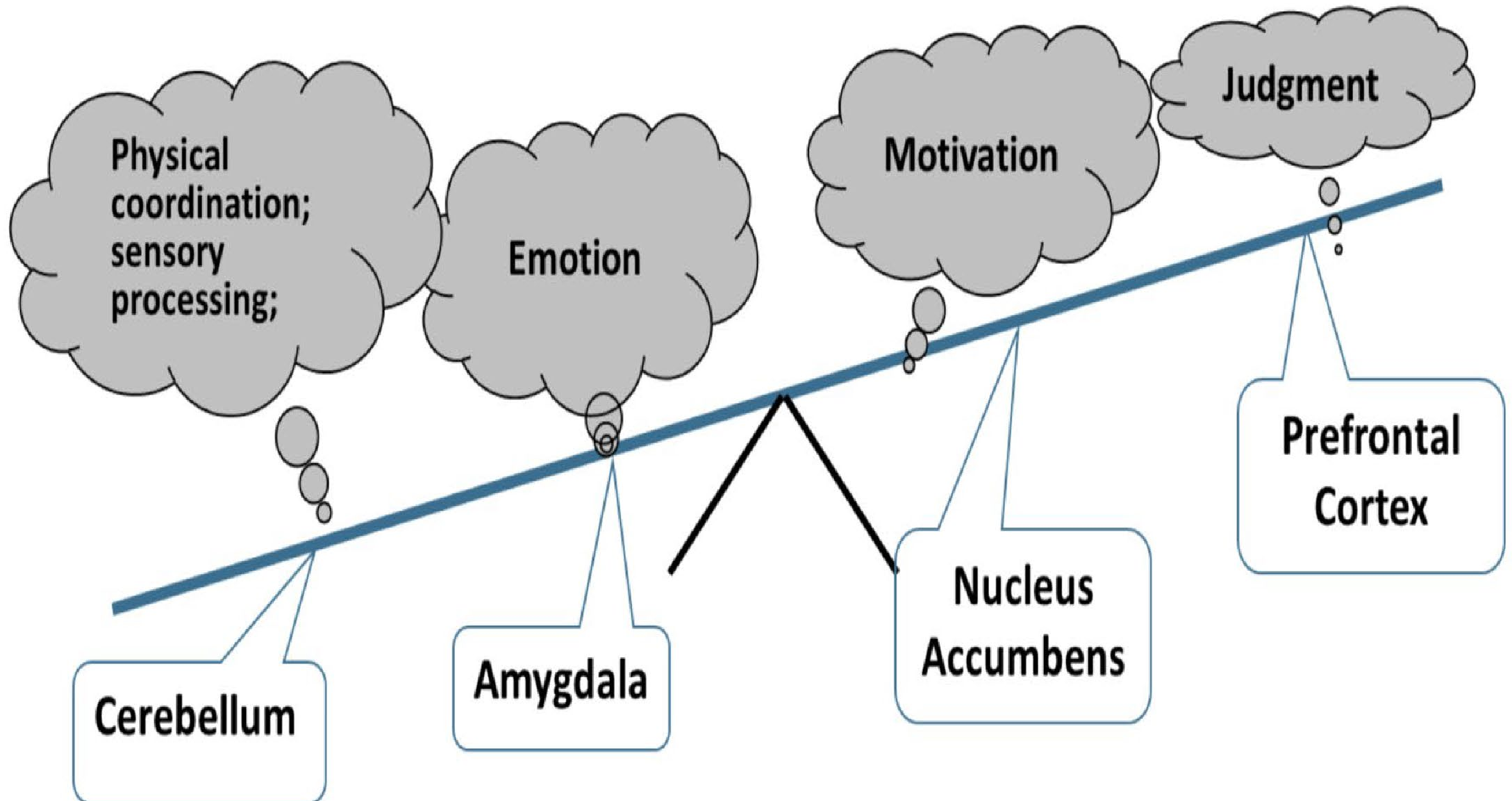


■ Males ■ Females

## How the Brain Develops

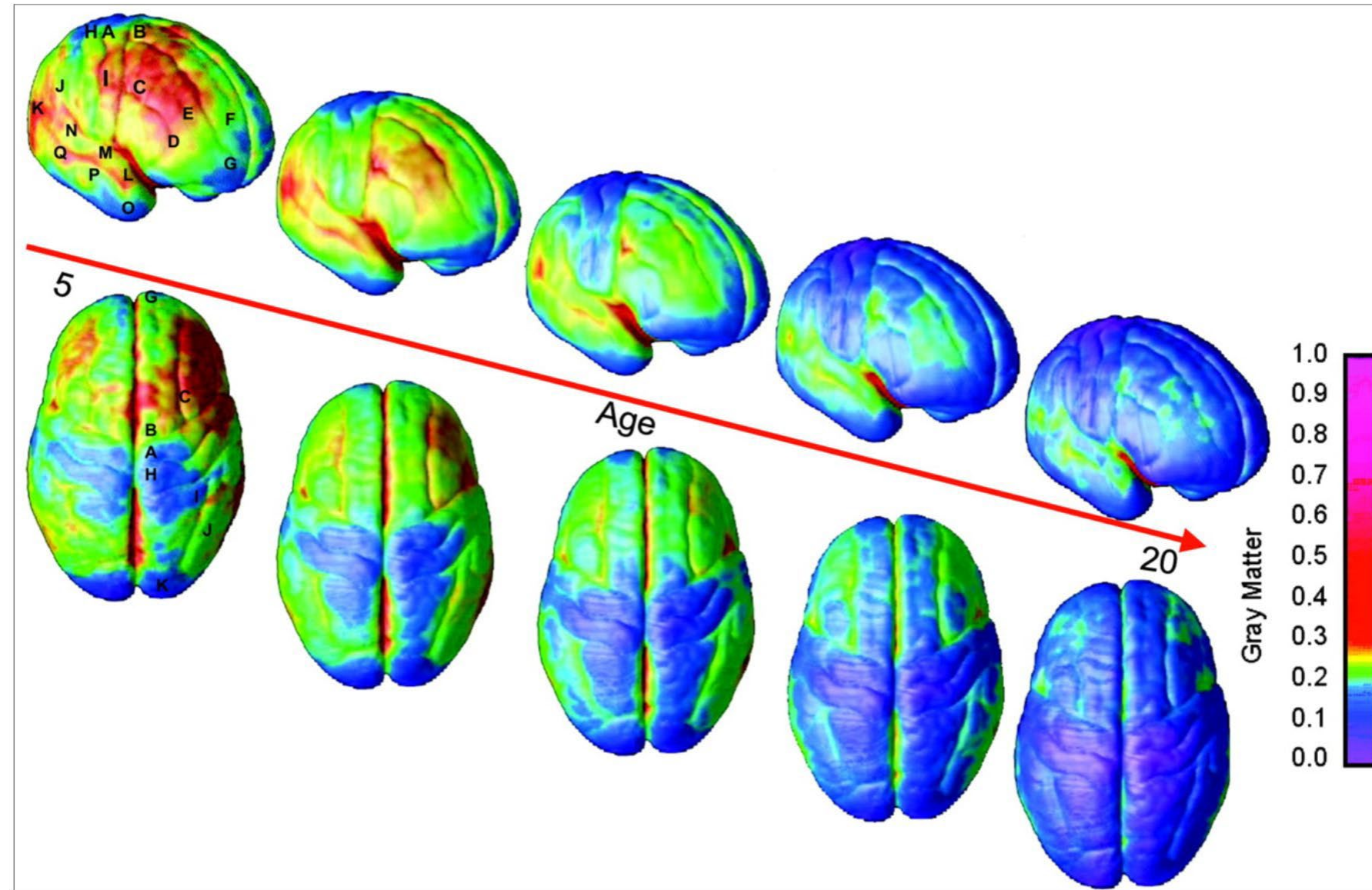


Maturation Occurs in Stages, From the Back of the Brain (Left) to the Front (Right)





## Brain Maturation



Note that the brain engages synaptic pruning from back to front, with the prefrontal cortex, which is responsible for executive functioning, the last area to develop

# Brain Growth

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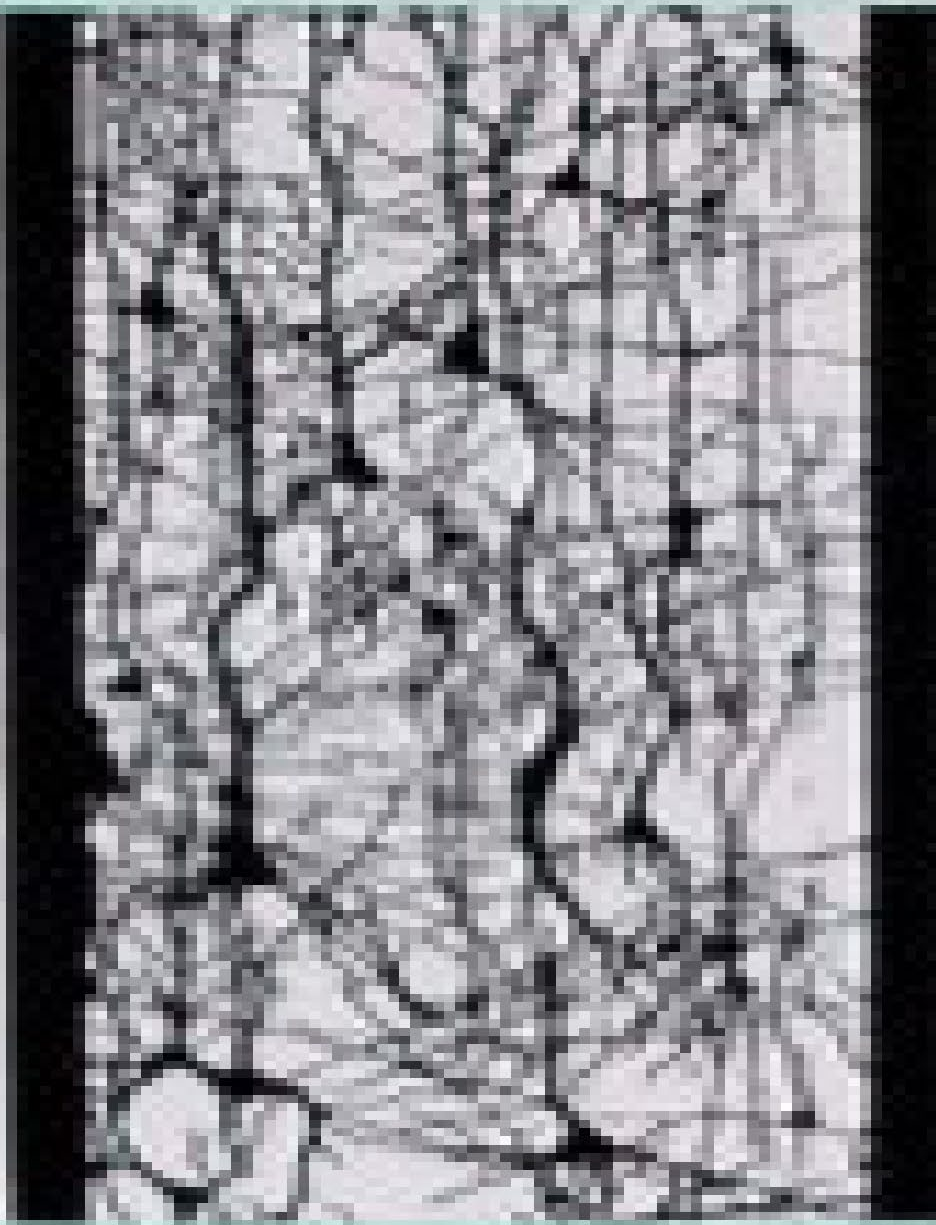
During childhood brain growth occurs through blossoming until the age of 10-12

In adolescence, pruning occurs and the amount of gray matter decreases, myelination forms white matter tracts through thickening that conduct nerve impulses faster and certain neurons go through apoptosis and pruning

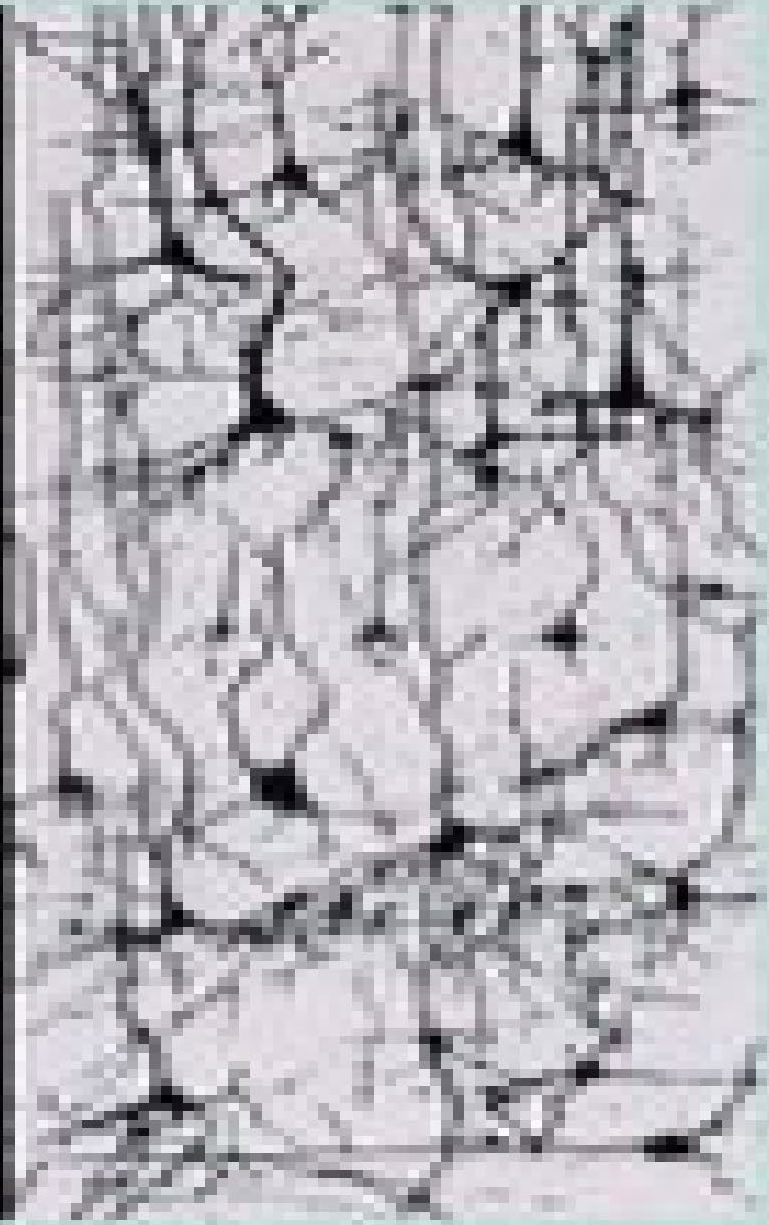
At Birth



6 Years Old



14 Years Old



# Adolescence and Young Adulthood

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Up until the age of 25, unnecessary neural wiring is pruned whereas certain circuits are strengthened which allow for better emotional regulation, insight, judgment, and planning.

However drugs of abuse alter this development by impacting the way certain areas of the brain are developing by mimicking neurotransmitters

# Brain Maturation

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Limbic System (including the hippocampus and amygdala)

- Emotional memory
- Fear response
- Pleasure response
- Fight or Flight

Prefrontal cortex

- Impulse control
- Decision-making
- Organizing and planning
- Abstract thought, rational thinking
- Attention, focus
- Working memory



# Nucleus Accumbens-the area of reward

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– Pleasure center which plays a part in addiction develops prior to the inhibition of the prefrontal cortex

During adolescence, you are often more likely to be engaged in risk taking behavior without thinking of consequences

# Special Features of Adolescents

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- Brain still developing
  - Parent/guardian still assumes responsibility; need more structure than adults
  - May be entering treatment relatively earlier in course than adult patients
  - Peers slowly take on more of an influence over adults
  - This is the development of identity versus role confusion through the development of abstract thinking (Erickson)

# to Abuse Drugs?

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- One direct result of the developing brain is that teens subjectively report greater feelings of social disinhibition when drinking alcohol compared to adults
  - Can create a more pleasurable social experience (i.e. feeling less shy) while drinking alcohol compared to adults
  - All of the effects of the developing brain may contribute to an initial decision to use drugs and make the experience rewarding enough to repeat it

# Implications for Teen Behavior

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- Activities with high reward and low effort are preferred

Heightened interest in new stimuli (experimentation)

Strong emotions with difficulty modulating them

Less able to inhibit impulses coming out of other parts of the brain

Harder to think ahead about consequences of actions

More risk-taking

More belief in being special or unique

More belief of performing in front of an invisible audience

# Leading Causes of Mortality, Students Grades 9-12

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Motor vehicle crashes	32%
Other unintentional injuries	12%
Homicides	15%
Suicides	12%
<b>TOTAL</b>	<b>71%</b>

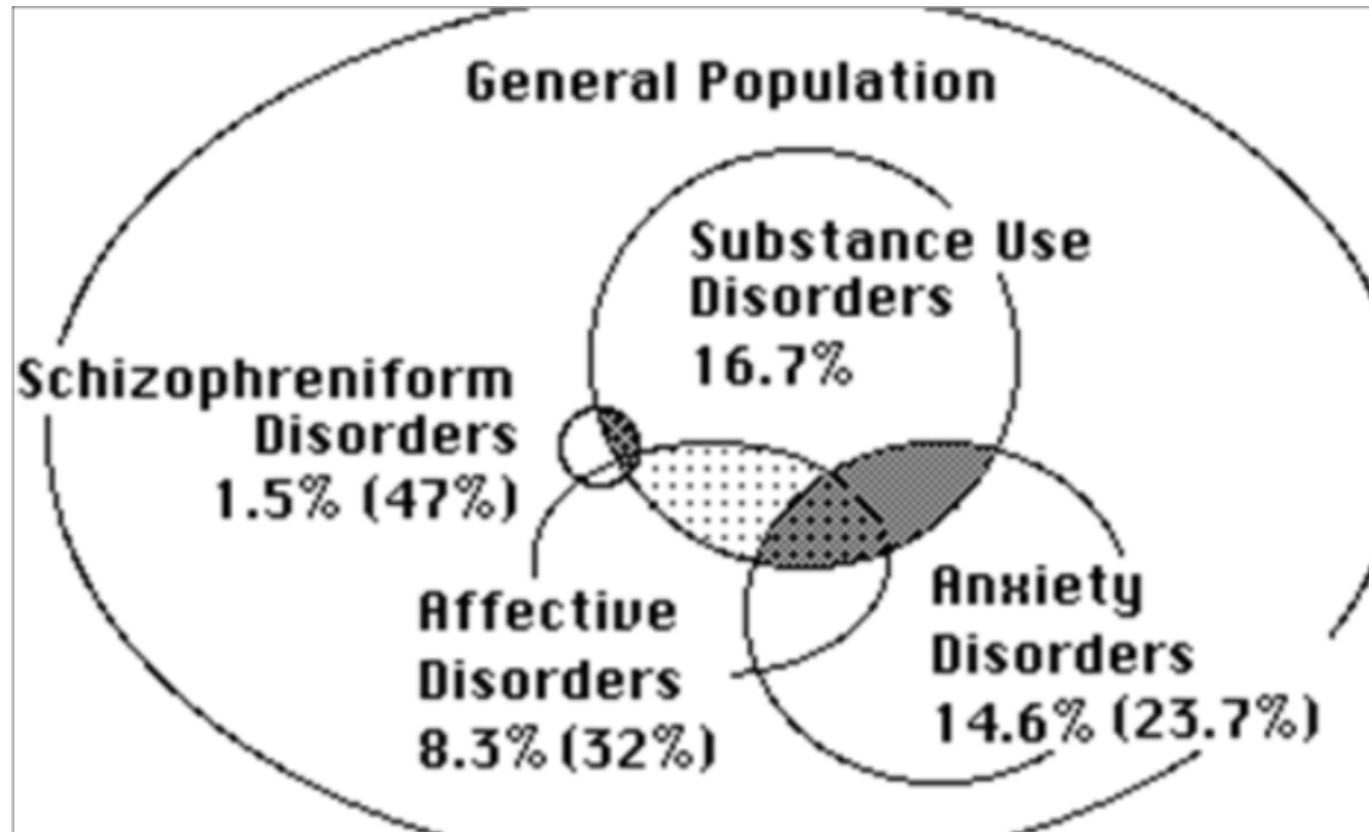
Source: Youth Risk Behavior Surveillance System Survey Summary, 2003.

# Why We Care

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- 1) Substance use and misuse is one of the greatest issues adolescents face.
- 2) Youth is a unique time in the development of substance use issues.
- 3) Substance use and misuse are highly co-morbid with other mental health issues young people have.

# Concurrent Disorders



# Unique Considerations in Psychopharmacology

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Cannabis (NAC, Chantix, Seroquel?)

Tobacco (Chantix, Wellbutrin, NRT)

Alcohol (Disulfiram, Naltrexone, Ondansetron)

Opioids (Buprenorphine, Vivitrol, Methadone)

Cocaine (Desimpramine?)



# Questions?

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