ADOLESCENTS AND SUBSTANCE USE

2025 South Carolina Pediatrics Annual Meeting

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DISCLOSURES

- Member of the Addiction Medicine Board, American Board of Preventive Medicine

LEARNING OBJECTIVES

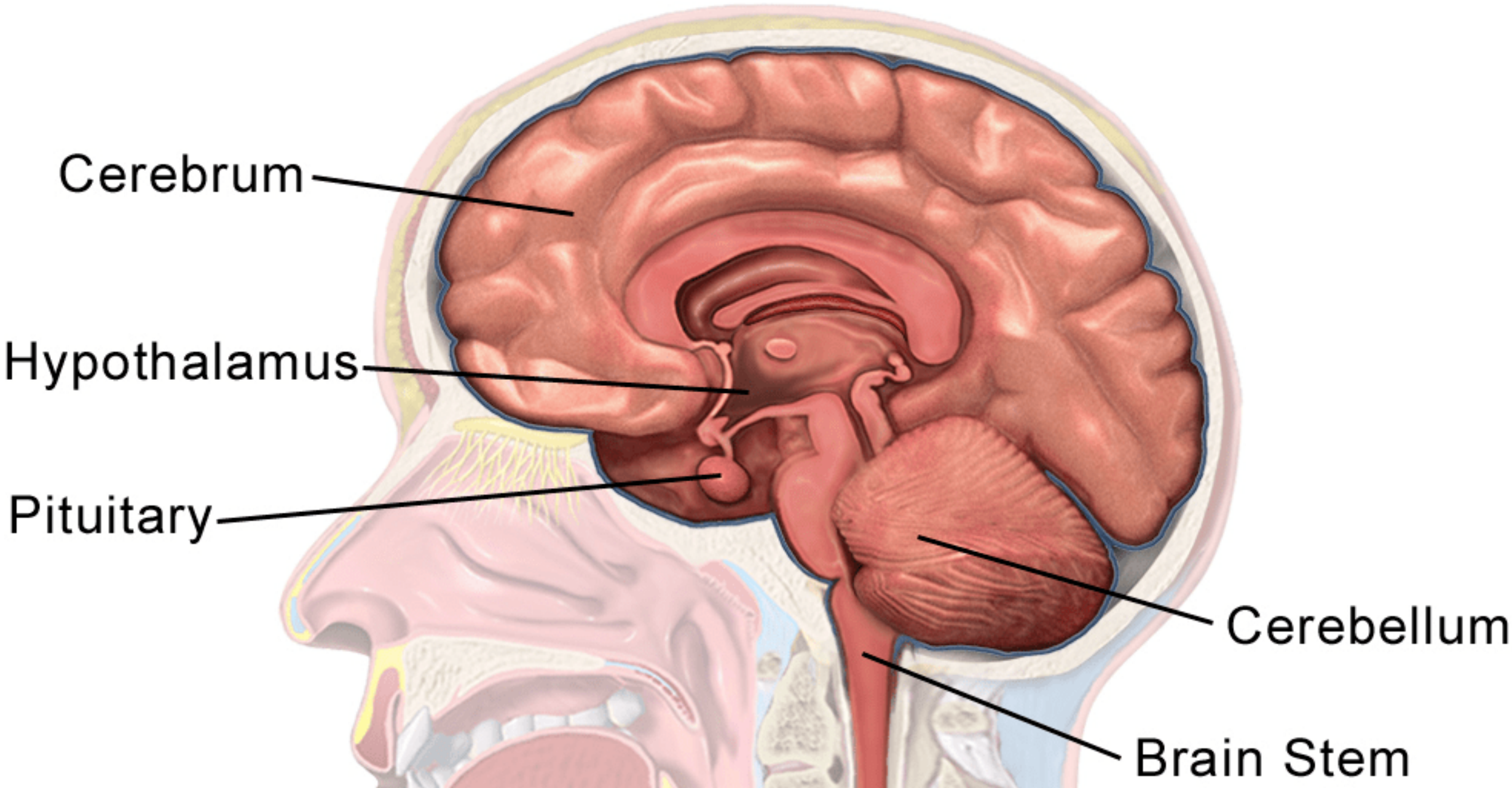
- Discuss substance use disorders as a spectrum of chronic disease
- Overview of the neuroanatomy of reward; differences in the adolescent
- Recognize signs of misuse or abuse of controlled substances by screening and talking with adolescents
- Outline the trend of fatal overdoses among adolescents and emerging adults
- Review the opioid medication adolescent treatment literature

MEDICAL DISEASE?

- Moral weakness ? Need to hit bottom?
- Individuals choose to use a psychoactive substance. Progression to a substance use disorder is not a choice.
  - Changes in brain cells, body physiology, and balance in the neurologic system in the body
  - "Light Side of Addiction'
    - Use for the effect/euphoria/relief → "use to feel normal"
  - Recruitment of hypothalamic/pituitary/adrenal axis/stress response intensifies withdrawal resulting in a cycle of use/withdrawal/use
  - Medication for withdrawal interrupts the "Dark Side of Addiction"

NEUROBIOLOGY OF ADDICTION

Brain



NEUROBIOLOGY OF ADDICTION

The cone represents the bones protecting the spinal cord

Scoops of ice cream represent sections of the brain

AREAS OF THE BRAIN=SCOOPS OF ICE CREAM

FROM PRIMITIVE TO ADVANCED FUNCTION

HYPOTHALAMUS/AMYGDALA: "FIGHT OR FLIGHT"

The Hypothalamus acts as the body's smart control coordinating center.

- Maintains stable state= homeostasis
- Acts via autonomic nervous system and hormones

The Amygdala is a major processing center for emotions.

- Links emotions to other brain areas
- Stores primitive memories, especially those linked to the senses

MIDBRAIN (REPTILE BRAIN)

PLEASURE!! GO GO GO…HIJACKED BY SUBSTANCES → ADDICTION

Primary reward system in the brain

- Procreation
- Food
- Water

This is where the signal of euphoria originates when good things happen

Loaded with messenger substances

- Dopamine
- Endorphins
- Endocannabinoids

FRONTAL LOBES (GORILLA BRAIN)

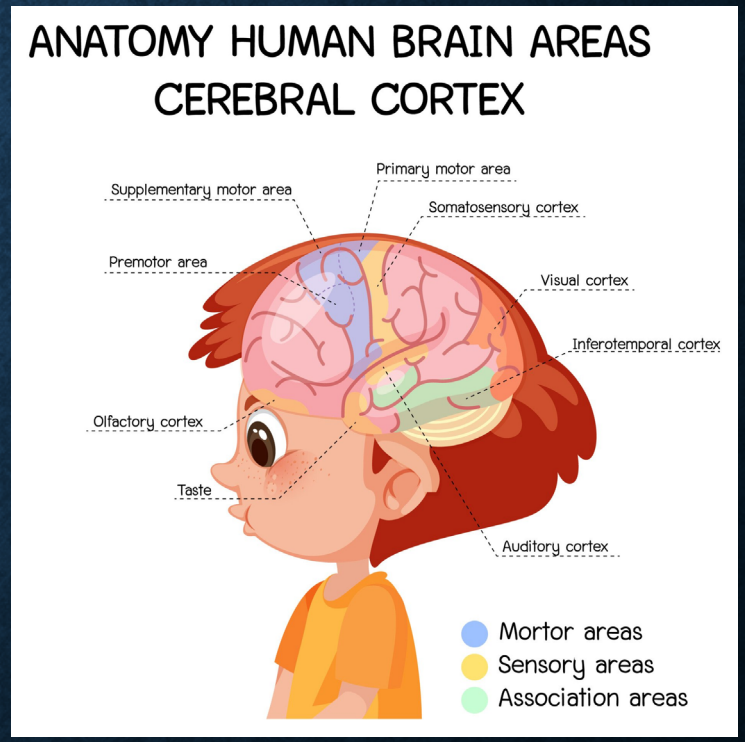
STOP AND THINK ABOUT IT….

Primary Executive Function

- Receives and integrates information

Carries out essential duties

- Memory
- Thinking
- Learning
- Reasoning
- Problem-solving
- Emotions
- Consciousness
- Sensory functions



NEURODEVELOPMENT AND ADOLESCENCE

Prominence of the Social-Emotional Network in teens

- Focused intense development of the dopamine pathways
- Redistribution of dopamine to areas of reward

Changes in system of reward and feedback PEAK in teens

- Relatively increased release of DA=risk taking is more rewarding
- Peer influences can be motivators for PRO social behavior
- Good communication with family/parents/caregivers can be protective

Too much GO in the young brain instead of STOP

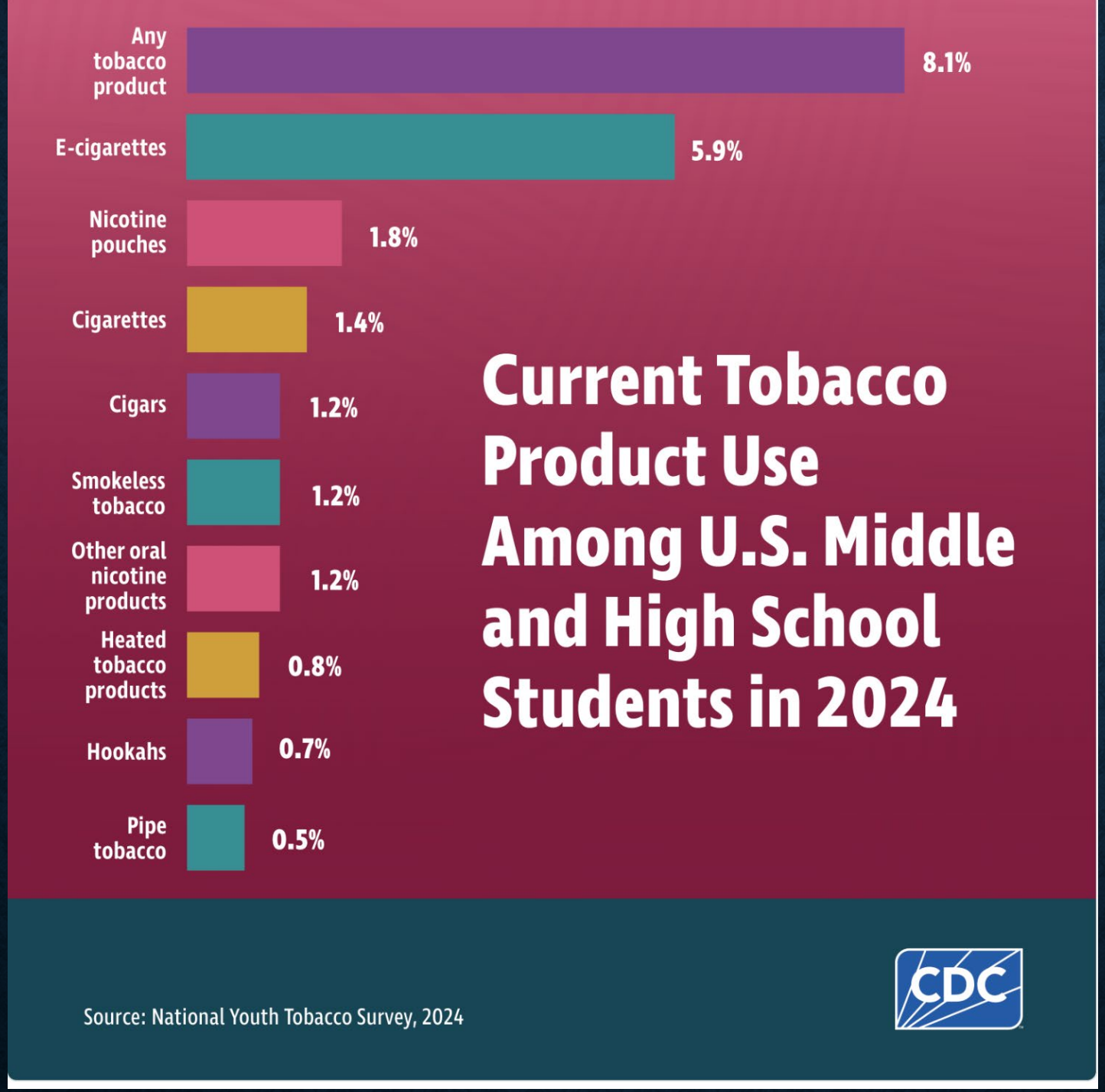
TALKING WITH TEENS ABOUT SUBSTANCES…..

Especially when there is a problem

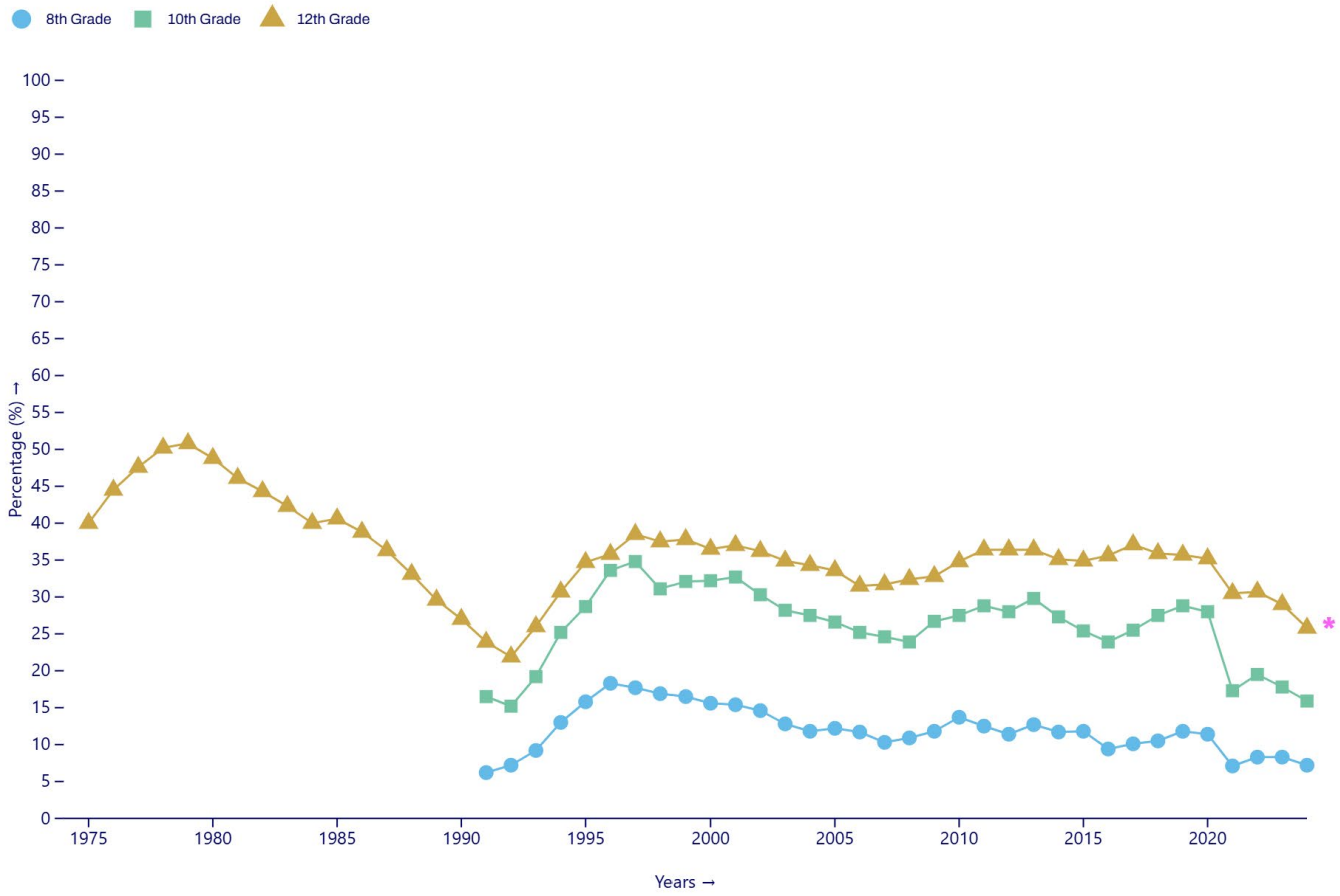
UNIVERSAL SCREENING: SUBSTANCE USE

Difficult due to time constraints and resources for referrals

- Begins around age 11-13 years depending on maturity
- Extension of psychosocial history from early childhood
- Confidentiality discussion & boundaries with parent and patient
- Use a validated Screening Tool
- Presumptive questions, non-judgmental, empathetic: "Since our last visit, on how many days did you drink alcohol?"

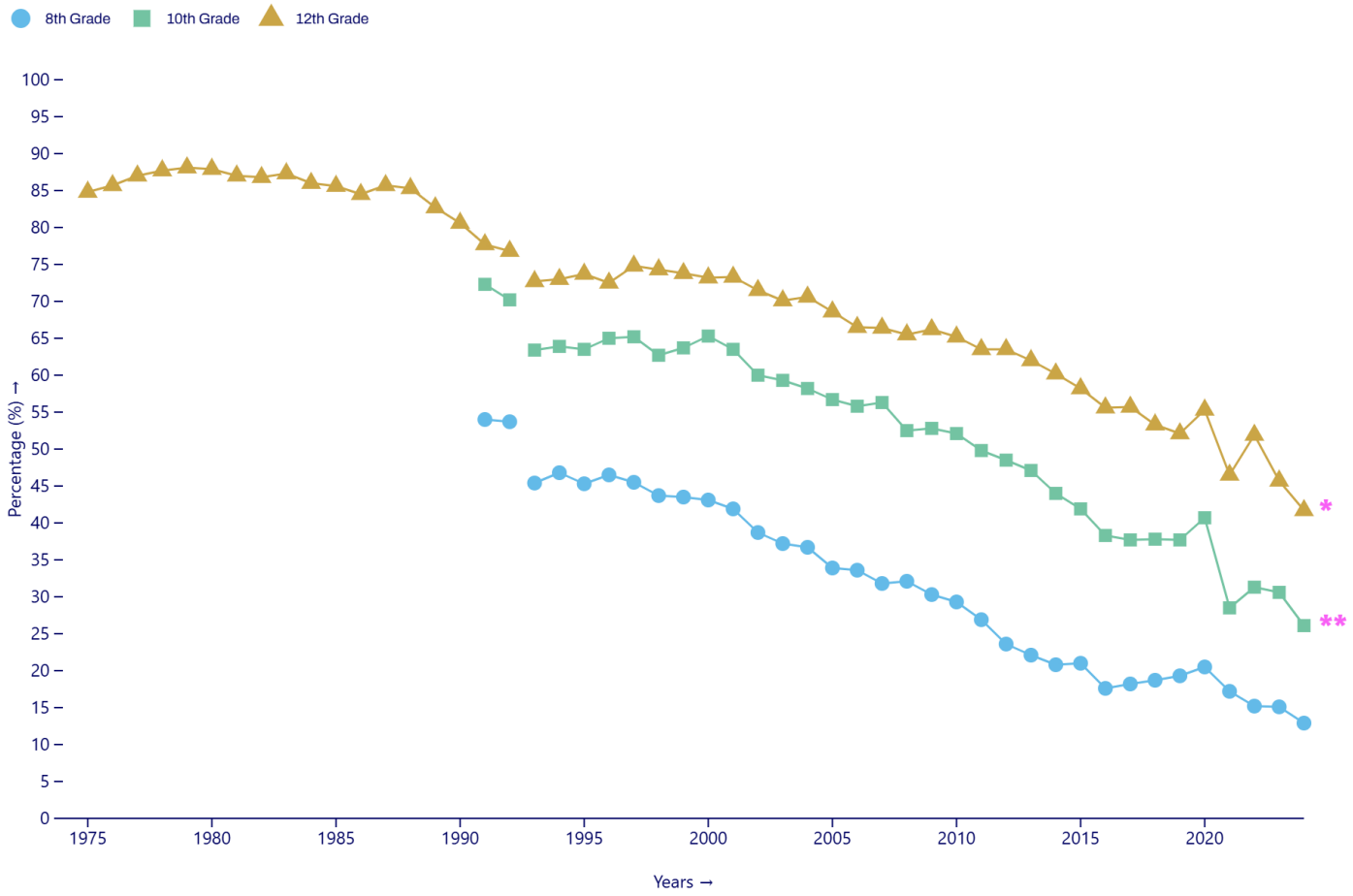

Any tobacco product
8.1%
E-cigarettes
5.9%
Nicotine pouches
1.8%
Cigarettes
1.4%
Cigars
1.2%
Smokeless tobacco
1.2%
Other oral nicotine products
1.2%
Heated tobacco products
0.8%
Hookahs
0.7%
Pipe tobacco
0.5%
Current Tobacco Product Use Among U.S. Middle and High School Students in 2024
Source: National Youth Tobacco Survey, 2024
CDC

MARIJUANA (CANNABIS): Trends in 12 Month Prevalence of Use in 8th, 10th, and 12th Grade



Miech, R. A., Johnston, L. D., Patrick, M. E., & O'Malley, P. M. (2025). Monitoring the Future national survey results on drug use, 1975–2024: Overview and detailed results for secondary school students. Monitoring the Future Monograph Series. Ann Arbor, MI: Institute for Social Research, University of Michigan. Available at https://monitoringthefuture.org/results/annual-reports/

ALCOHOL: Trends in 12 Month Prevalence of Use in 8th, 10th, and 12th Grade



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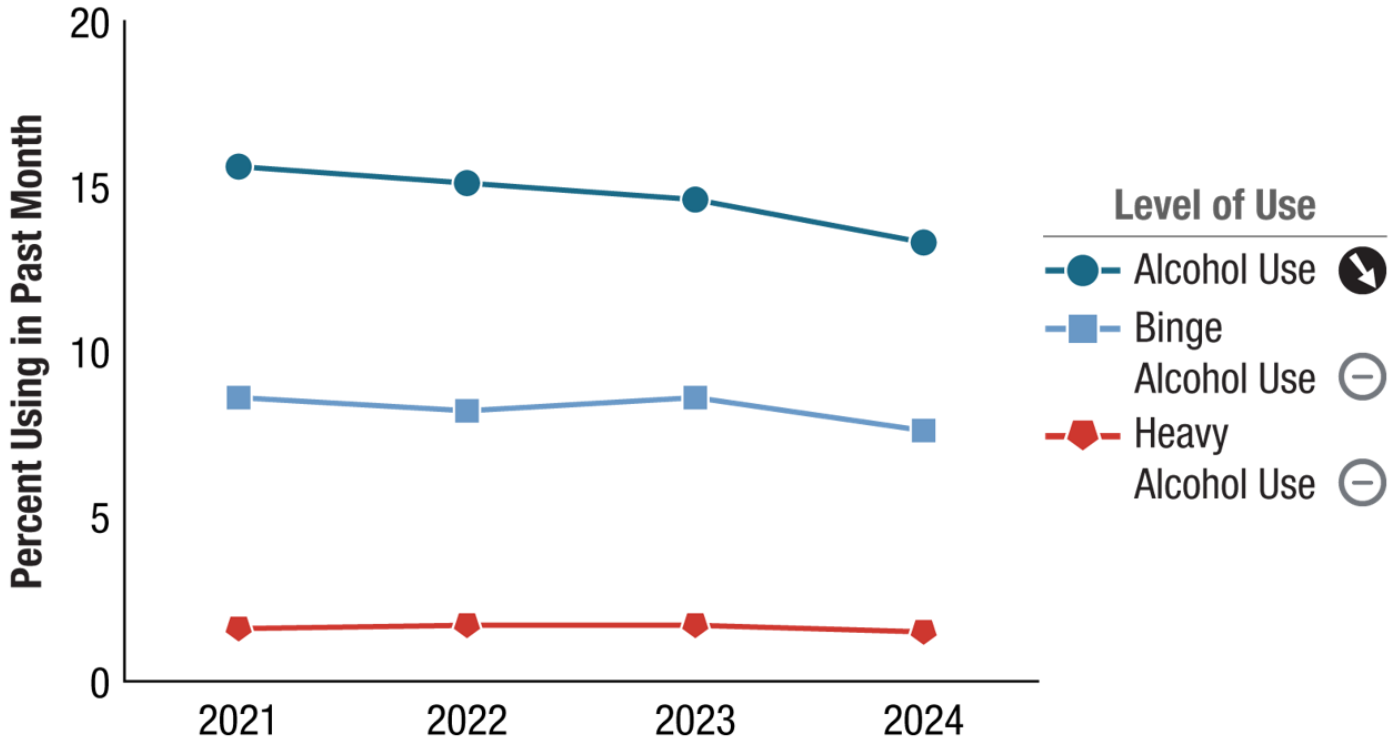
Underage Alcohol Use, Binge Alcohol Use, or Heavy Alcohol Use in the Past Month: Among People Aged 12 to 20; 2021-2024



Level of Use	2021	2022	2023	2024	Trend
Alcohol Use	15.6	15.1	14.6	13.3	Decreased
Binge Alcohol Use	8.6	8.2	8.6	7.6	No Change
Heavy Alcohol Use	1.6	1.7	1.7	1.5	No Change

Note: Binge Alcohol Use is defined as drinking five or more drinks (for males) or four or more drinks (for females) on the same occasion on at least 1 day in the past 30 days. Heavy Alcohol Use is defined as binge drinking on the same occasion on 5 or more days in the past 30 days; all heavy alcohol users are also binge alcohol users.

Note: Estimates for 2021 may differ from previously published estimates because the 2021 analysis weights were updated to facilitate between-year comparisons.

SAMHSA
Substance Abuse and Mental Health Services Administration

SCREENING TO BRIEF INTERVENTION S2BI*

*90-100% Sensitivity and 94% Specificity for substance being used

SCREENING TO BRIEF INTERVENTION (S2BI)

1. In the past year, how many times have you used
   - Tobacco?
   - Alcohol?
   - Marijuana/Cannabis?
2. In the past year how many times have you used

- Prescription drugs that were not prescribed to you (pain medications or Adderall)
- Illegal drugs (cocaine or ectasy)
- Inhalants (nitrous oxide, spray paint)
- Herbs or synthetic drugs (K2, salvia, bath salts)

"NEVER"….BRIEF ADVICE

- The screening is complete. STOP
  - Give positive reinforcement and permission to talk about this topic at any visit.
  - Provide simple MEDICAL feedback "kids who use alcohol sometimes end up in risky or scary situations"
  - Customize message "I'm so glad you aren't using tobacco. It isn't a good for your asthma and you might need more medicine."

"A COUPLE OF TIMES"

Ask the 2nd S2BI Question

In the past year, how many times have you used…

- Prescription drugs that were not prescribed to you (pain medications or Adderall)
- Illegal drugs (cocaine or ectasy)
- Inhalants (nitrous oxide, spray paint)
- Herbs or synthetic drugs (K2, salvia, bath salts)

ADVISE TO QUIT

Patient is unlikely to meet criteria for a substance use disorder

- "I would recommend for the *sake of your health* that you do not use alcohol. "
- Focus on goals and consequences and tailor the message to what's going on in that teen's life.
  - "I know that staying on your soccer team—especially as captain--is really important to you. Being a leader ready to work out and clear-headed is your goal. Using cannabis can interfere with all of that."
- Personalize the message as much as possible.
  - "Smoking or vaping can interfere with healing your leg you broke this year."

Weitzman ER, Minegishi M, Dedeoglu F, et al. Disease-Tailored Brief Intervention for Alcohol Use Among Youths With Chronic Medical Conditions: A Secondary Analysis of a Randomized Clinical Trial. *JAMA Netw Open*. 2024;7(7):e2419858. doi:10.1001/jamanetworkopen.2024.19858

MONTHLY TO WEEKLY USE: REQUIRES FURTHER ACTION

Higher risk to meet a diagnosis of substance use disorder

- Concerning if accompanied by decreased function in academic, social or family function.

Encourage involvement of family/care takers (Options)

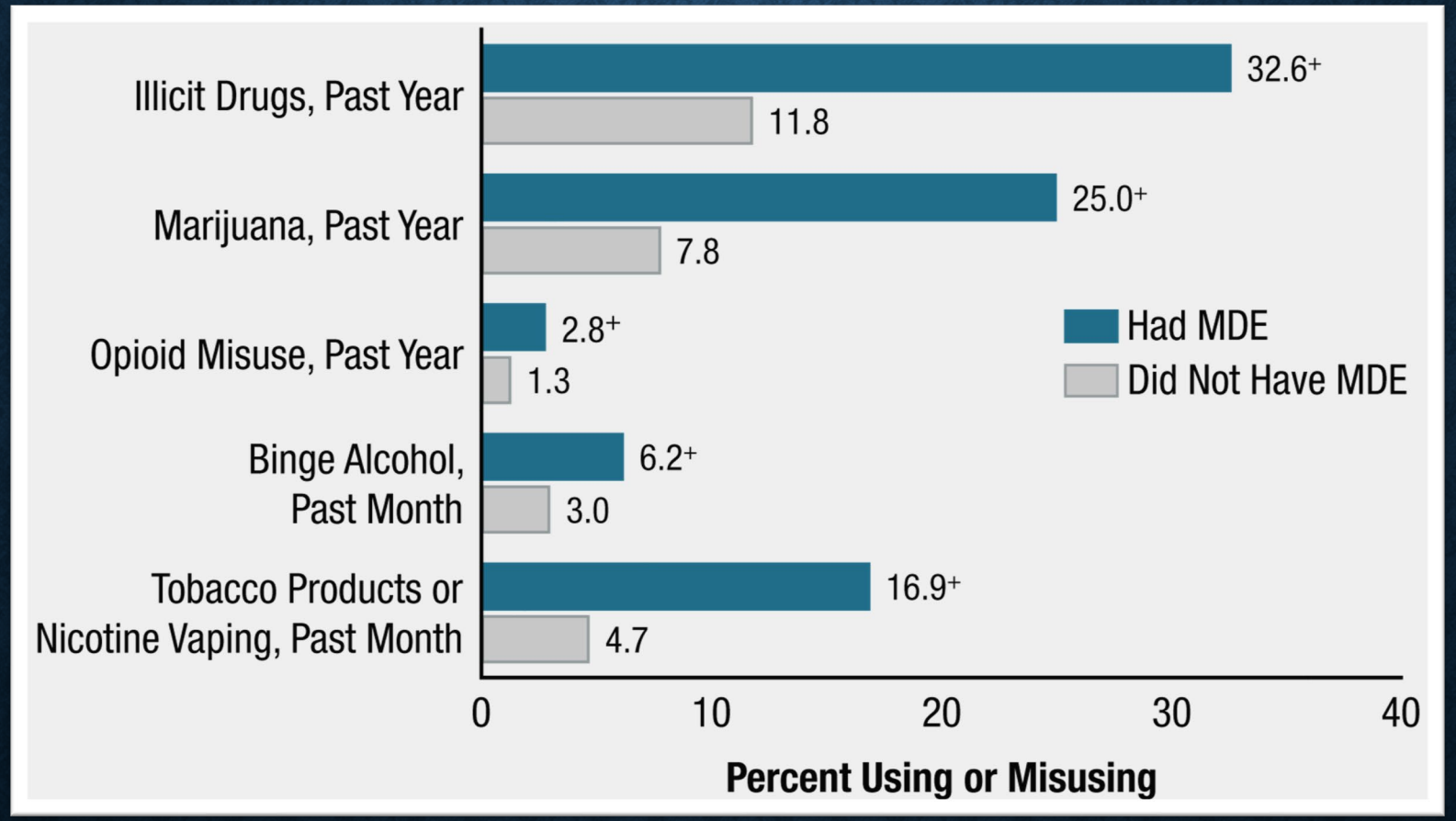
Advise to reduce use and risky behaviors

- Motivational Interviewing
- OARS (O = Open Questions A = Affirmations R = Reflective Listening S = Summarizing)

Referral for Further Assessment

- Co-occurring diagnoses
- Specialty assessment and treatment

PAST YEAR OR PAST MONTH SUBSTANCE USE: AMONG ADOLESCENTS AGED 12 TO 17; BY PAST YEAR MAJOR DEPRESSIVE EPISODE (MDE) STATUS, 2024



+ Difference between this estimate and the estimate for adolescents without MDE is statistically significant at the .05 level.

Note: Adolescent respondents with unknown MDE data were excluded.

NSDUH 2024

GOAL WITH TEENS:
INITIATE A THERAPEUTIC RELATIONSHIP

Adults want….

- Successful treatment
- Return teen to function (social, family, school)
- Abstinence from all substances
- “Recovery” or “Remission”

Youngster wants….

- Comfortable physically
- Access to “better drugs”
- Continue partying
- Get relief from adults nagging him/her about use

WHY COME FOR EVALUATION NOW?

- Several versions…..
  - Referring entity (physician, therapist, juvenile justice, school)
  - Family
  - Patient/Teen
- Adults often say "I'm sick and tired of being sick and tired…"
- Teens cannot fathom why someone thinks there is a problem????

TEENS ARE OFTEN "PRE" PRE-CONTEMPLATION

Tips and Tools to Communicate

- Non-judgmental/Non-Confrontational
- Actively seek to understand the youngster's perspective yet do not imply you "approve"
- Ask about Peer group
  - Do you know other kids who have had trouble because of substance use?
  - What would have to happen for you to be worried you had a problem?

DEVELOPING THE THERAPEUTIC RELATIONSHIP

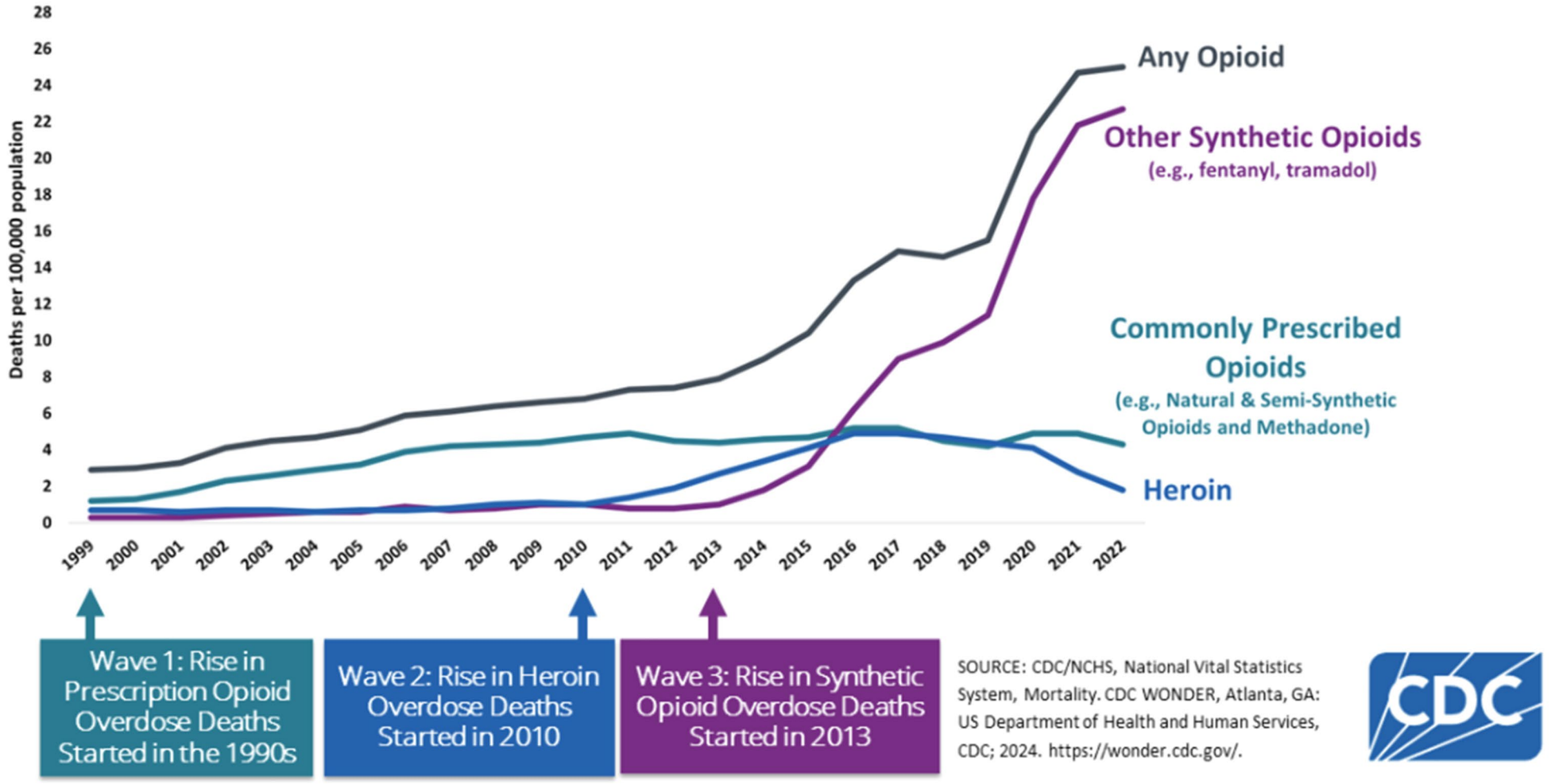
- Ask about Family/friends
  - Do you know why your family/probation officer etc thinks your use is a problem?
  - Why do you think I am concerned?
- Explore ambivalence very gently
  - What are the good and not so good things about using XX?
  - Are you willing to stop for a short time to see what that is like?
- Will you come back and see me again?

UNIQUE ISSUES: SUD TREATMENT IN TEENS

Few Youth receive treatment and many return to use

- Treatment based on solid research and evidence is **scant**
- Treatment strategies may be adopted from adult programs
  - What works for adults ≠ effective in adolescents
  - Motivational interviewing may be less robust with teens
- Neurodevelopmental change render teens more vulnerable
- Teens have different socio-economic concerns and foci than adults
- Teens often follow different trajectories and have different goals in treatment

YOUTH
FATAL OVERDOSE



SOURCE: CDC/NCHS, National Vital Statistics System, Mortality. CDC WONDER, Atlanta, GA: US Department of Health and Human Services, CDC; 2024. https://wonder.cdc.gov/.

CDC

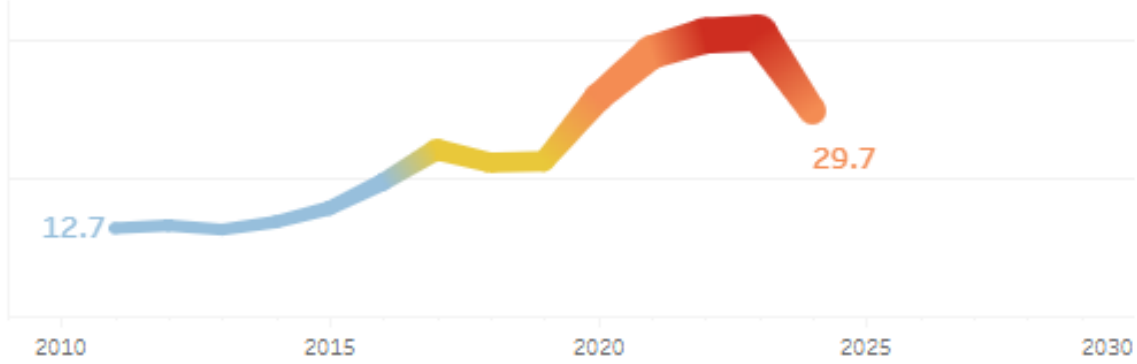
The rise in opioid overdose deaths is shown in three waves.

North Carolina Overdose Epidemic Data

Overdose Deaths

The **estimated Overdose Death** rate in **NC** is **29.7** out of 100,000 residents in **2024**, representing (projected) **3,213** people who died of an overdose.

Partial year: n=1,071 at 4/12 months



NCDHHS
Division of Public Health

Morbidity and Mortality Weekly Report (*MMWR*)

Drug Overdose Deaths Among Persons Aged 10–19 Years — United States, July 2019–December 2021

Weekly / December 16, 2022 / 71(50);1576–1582

Lauren J. Tanz, ScD[1]; Amanda T. Dinwiddie, MPH[1]; Christine L. Mattson, PhD[1]; Julie O'Donnell, PhD[1]; Nicole L. Davis, PhD[1] (VIEW AUTHOR AFFILIATIONS)

- Median monthly overdose deaths **increased 109%** from July–December 2019 to July–December 2021
- Deaths involving illicitly manufactured fentanyls (IMFs) increased 182%.
- Approximately 90% of deaths involved opioids and 84% involved IMFs.
- Counterfeit pills were present in nearly 25% of deaths.
- Two thirds of decedents: 1 + bystanders present…most provided no overdose response.
- 41% of decedents had evidence of mental health conditions or treatment.

The Overdose Crisis among U.S. Adolescents

Joseph Friedman, Ph.D., M.P.H., and Scott E. Hadland, M.D., M.P.H.

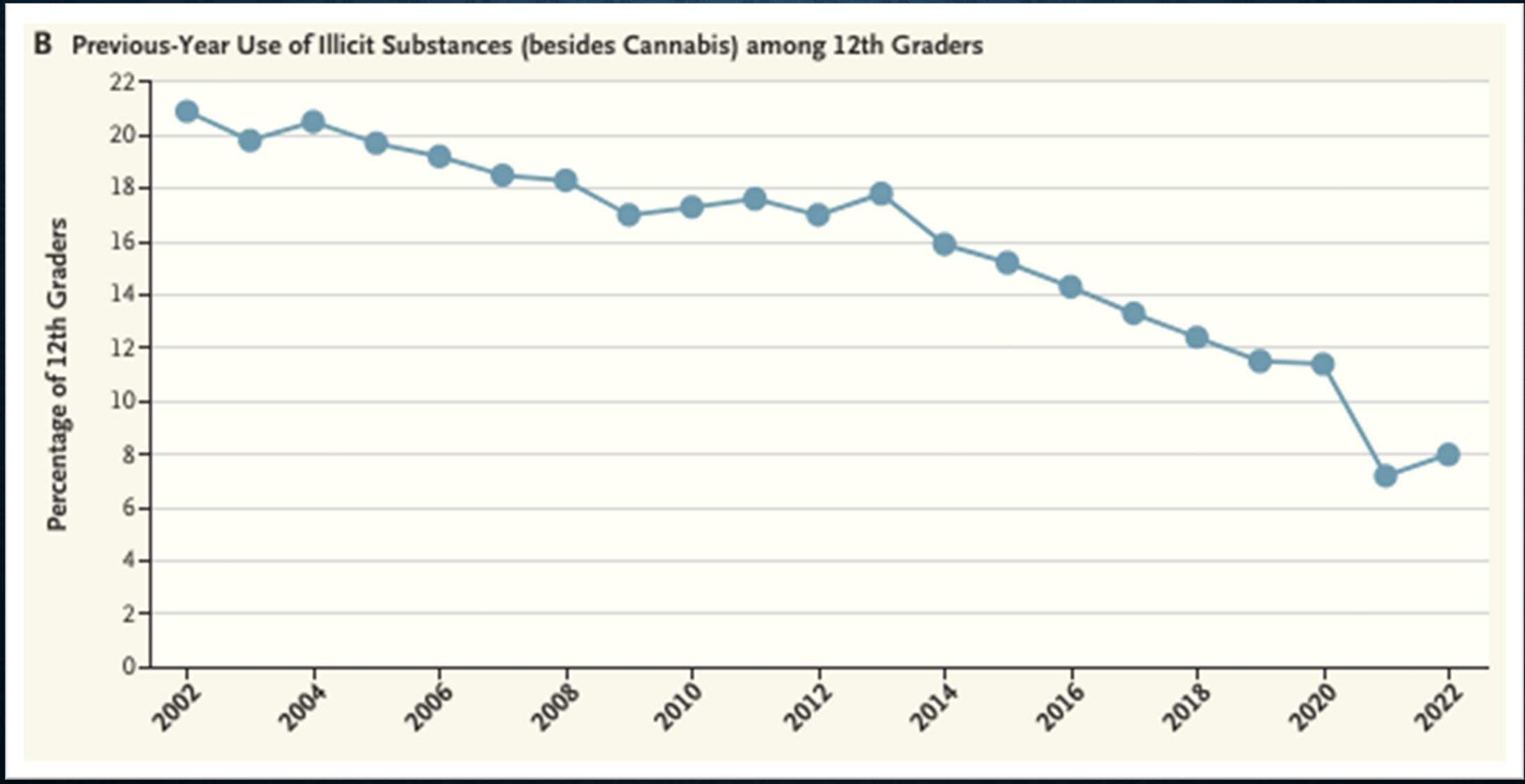
Perspective
JANUARY 11, 2024

In 2022, for example, 0.3% of 12th graders reported previous-year heroin use, whereas 5.0% reported nonmedical use of prescription drugs. Many adolescents may be unaware of the proliferation of counterfeit pills.

While use of illicit substances (other than cannabis) has decreased among High School Seniors, according to the CDC the incidence of fatal overdose has increased dramatically

Drug Overdoses and poisonings are now the third leading cause of pediatric deaths behind firearm related injuries and motor vehicle crashes

Drug-Overdose Mortality and Previous-Year Illicit-Drug Use among High-School–Aged Adolescents in the United States.



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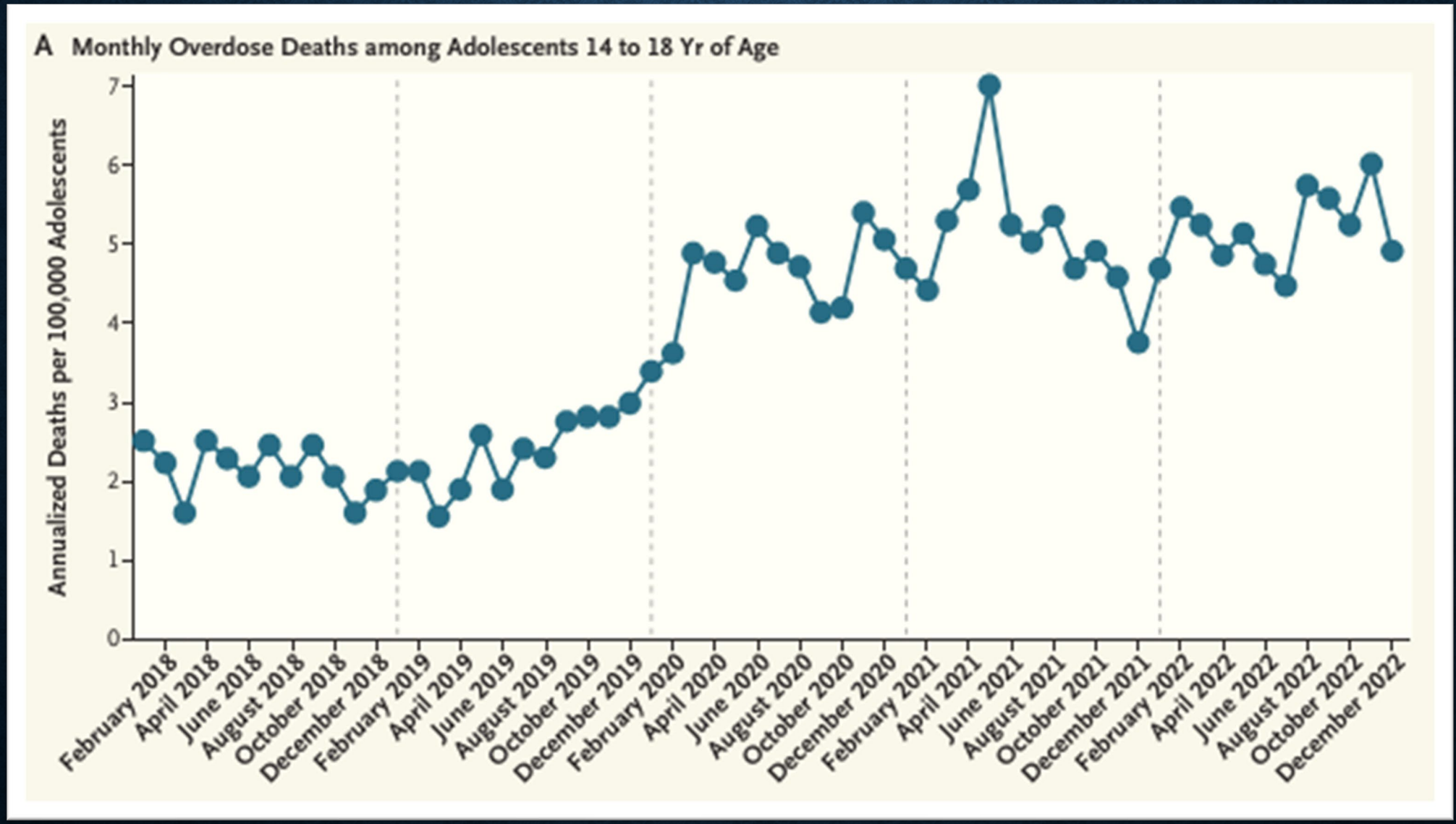
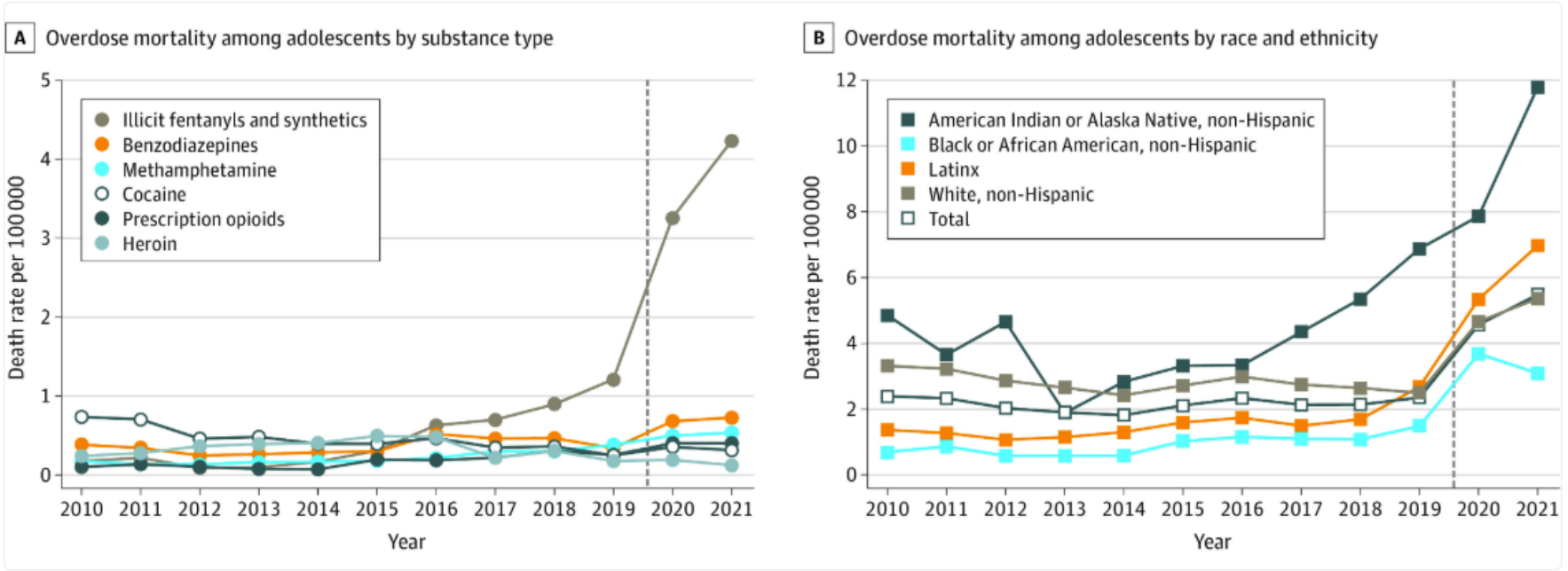


Overdose Deaths of 14-18 year olds: substance and race/ethnicity

Figure. Adolescent Overdose Deaths, 2010-2021.

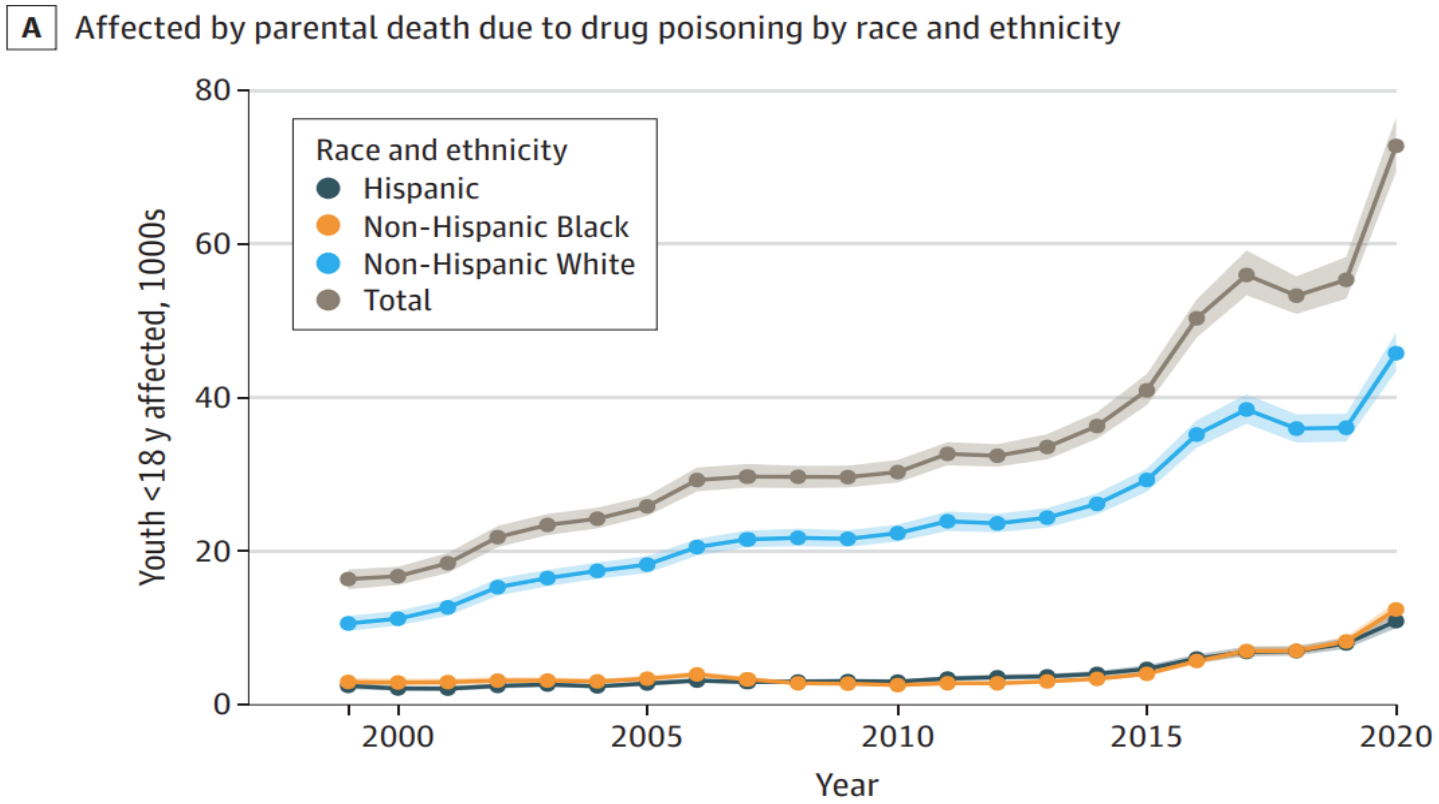


Drug overdose rates per 100 000 adolescents are shown by (A) substance involved and (B) race and ethnicity. The year 2021 refers to January to June 2021, and rates have been annualized. The vertical dashed lines delineate the prepandemic and pandemic periods of observed data.

Friedman et al, Jama, 2022

ESTIMATED NUMBER OF YOUTH AFFECTED BY PARENTAL DEATH DUE TO DRUG POISONING

Figure 1. Estimated Number of Youth Affected by Parental Death Due to Drug Poisoning



Schlüter B, Alburez-Gutierrez D, Bibbins-Domingo K, Alexander MJ, Kiang MV. Youth Experiencing Parental Death Due to Drug Poisoning and Firearm Violence in the US, 1999-2020. *JAMA.* 2024;331(20):1741–1747. doi:10.1001/jama.2024.8391

WHAT ABOUT MEDICATION?

Buprenorphine, Methadone, Naltrexone

NALOXONE…..

- Why should every household have a dose handy?
- Prescribe to teens about whom you are concerned
- Demonstrate the use of naloxone to the teen AND parent
- Encourage availability in schools
- One pill can be fatal
  - For the opioid naïve
  - For those with concurring mental health challenges
  - For the teen with a diagnosis of opioid use disorder

JAMA Pediatrics
View Article

JAMA Pediatr. 2017 Aug; 171(8): 747–755.

Trends in Receipt of Buprenorphine and Naltrexone for Opioid Use Disorder Among Adolescents and Young Adults, 2001-2014

Scott E. Hadland, MD, MPH, MS,[1,2,3,4] J. Frank Wharam, MB, BCh, BAO, MPH,[5,6] Mark A. Schuster, MD, PhD,[4,7] Fang Zhang, PhD,[5,6] Jeffrey H. Samet, MD, MA, MPH,[8] and Marc R. Larochelle, MD, MPH[8]

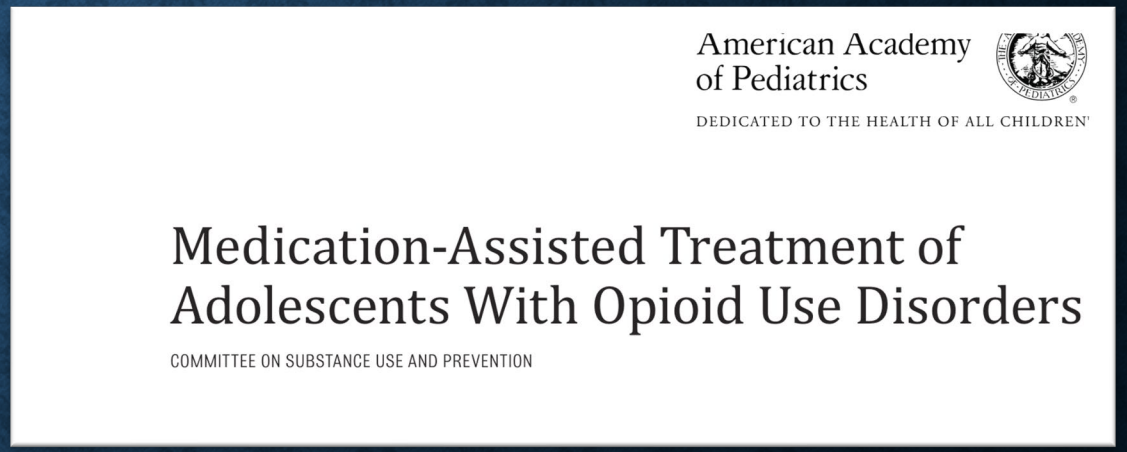
Results

In this large, national retrospective cohort of 20 822 youth aged 13 to 25 years with opioid use disorder, medication receipt increased from 2001 to 2014, but only 1 in 4 individuals received buprenorphine or naltrexone. Younger individuals, females, and black and Hispanic youth were less likely to receive a medication.

RECOMMENDATIONS

1. Opioid addiction is a chronic relapsing neurologic disorder. Although rates of spontaneous recovery are low, outcomes can be improved with medication-assisted treatment. The American Academy of Pediatrics (AAP) advocates for increasing resources to improve access to medication-assisted treatment of opioid-addicted adolescents and young adults. This recommendation includes both increasing resources for medication-assisted treatment within primary care and access to developmentally appropriate substance use disorder counseling in community settings.

2016



Medication for Adolescents and Young Adults with Opioid Use Disorder

Scott E. Hadland, MD, MPH, MS,[1,2] Matthew C. Aalsma, PhD,[3] Sinem Akgül, MD, PhD,[4] Rachel H. Alinsky, MD, MPH,[5] Ann Bruner, MD,[6] Nicholas Chadi, MD, MPH, FRCPC, FAAP,[7] Preeti M Galagali, MD, PGDAP, FIAP,[8] Ellen C. Kreida, LICSW, MPH,[9] Camille A. Robinson, MD, MPH,[5] and J. Deanna Wilson, MD, MPH[10]

Positions and Recommendations

Go to:

1. All adolescents and young adults with opioid use disorder should be offered medication for opioid use disorder as a critical component of an integrated treatment approach that includes pharmacologic and non-pharmacologic strategies.

Clinical trial and high-quality observational data strongly support the use of MOUD. Treatment with buprenorphine or methadone, which are opioid agonists, or with naltrexone, an opioid antagonist, is associated with fewer opioid cravings, withdrawal, and relapses, and enhanced recovery and retention in addiction care [5–13]. Furthermore, retention in buprenorphine or methadone treatment is associated with reduced mortality [5].

J Adolesc Health. 2021 Mar; 68(3): 632–636.

Addiction Science & Clinical Practice

BMC

Attitudes and training related to substance use in pediatric emergency departments

Ariel M. Hoch,[1] Samantha F. Schoenberger,[2] Tehnaz P. Boyle,[1] Scott E. Hadland,[5] Mam Jarra Gai,[2] and Sarah M. Bagley[2,3,4]

- 177 Respondents from Pediatric EDs across the US
  - 3 out of 4 managed substance-related visits monthly
  - 52% lacked comfort in managing withdrawal symptoms
  - 73.1% were NOT INTERESTED in prescribing buprenorphine

Addict Sci Clin Pract. 2022; 17: 59.

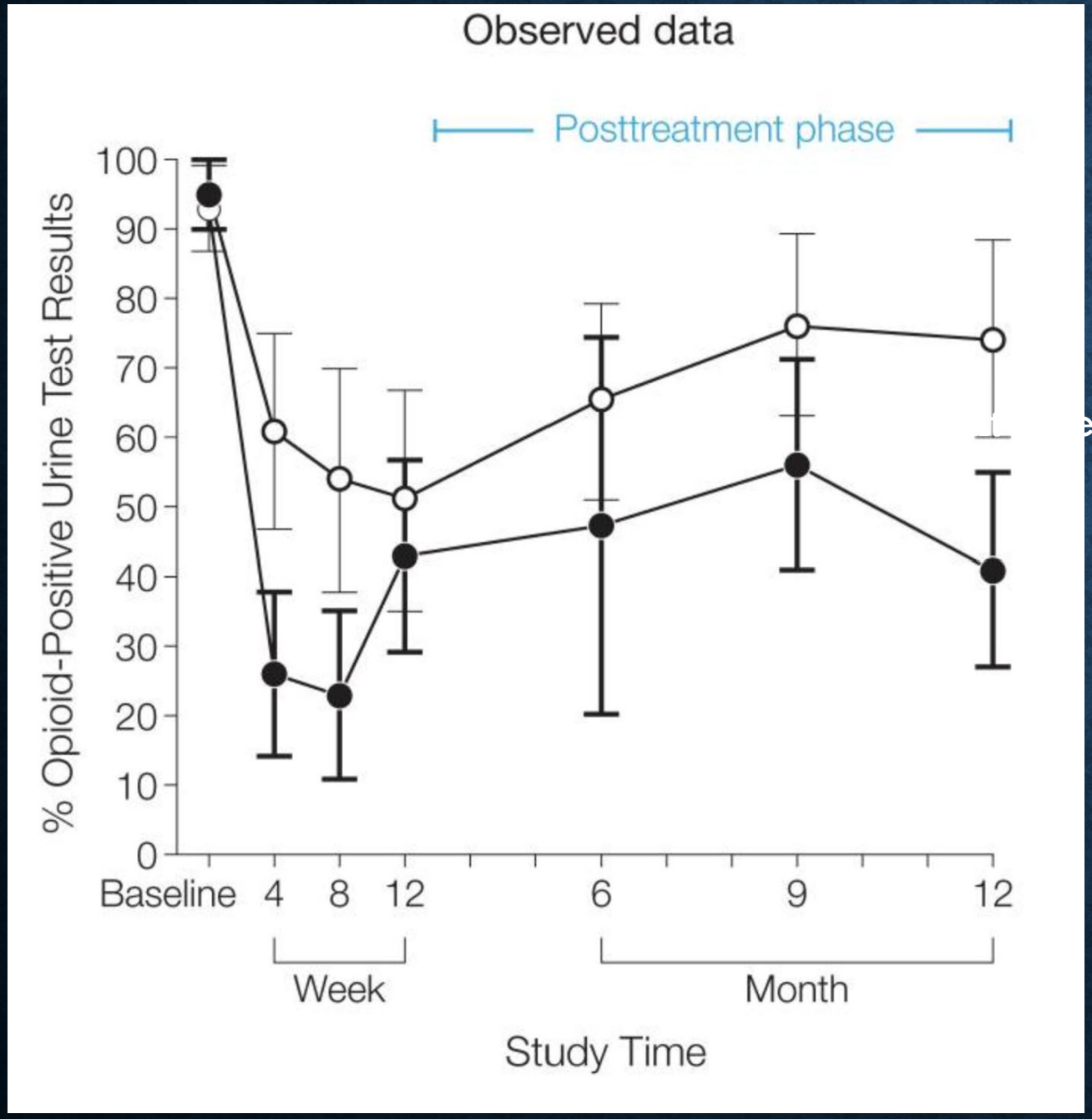
JAMA. 2008 Nov 5; 300(17): 2003–2011.
doi: 10.1001/jama.2008.574
PMID: 18984887

Extended vs Short-term Buprenorphine-Naloxone for Treatment of Opioid-Addicted Youth

A Randomized Trial

George E. Woody, MD, Sabrina A. Poole, MS, Geetha Subramaniam, MD, Karen Dugosh, PhD, Michael Bogenschutz, MD, Patrick Abbott, MD, Ashwin Patkar, MD, Mark Publicker, MD, Karen McCain, MSN, FNP, Jennifer Sharpe Potter, PhD, MPH, Robert Forman, PhD, Victoria Vetter, MD, Laura McNicholas, MD, PhD, Jack Blaine, MD, Kevin G. Lynch, PhD, and Paul Fudala, PhD

Characteristic	Detoxification Group (n = 78)	12-Week Buprenorphine-Naloxone Group (n = 74)
Male sex	48 (61.5)	42 (56.8)
Age, mean (SD), y	19.2 (1.6)	19.14 (1.4)
< 18 y	14 (18)	12 (16)
Race/ethnicity		
White	56 (71.8)	56 (75.7)
African American	2 (2.6)	1 (1.4)



Primary Outcome:

Opioid Positive Urine Drug Tests

Secondary Outcomes:

Dropout, self-reported use, injecting, enrollment in addiction treatment elsewhere other drug use, and adverse events

- Among 78 detox patients, 16 (20.5%) completed
- Among 74 in the 12-week buprenorphine-naloxone group, 52 (70%) completed

Buprenorphine treatment for adolescents and young adults with opioid use disorders: a narrative review

Jacob T. Borodovsky, BA,[1,2] Sharon Levy, M.D., MPH,[3,4] Marc Fishman, M.D,[5,6] and Lisa A. Marsch, PhD[1]

J Addict Med. 2018 May-Jun; 12(3): 170–183.

	Marsch et al. 2005		Woody et al. 2008		Marsch et al. 2016	
	Trial Location: Burlington Vermont Duration of study participation: 28 days		**Trial Location: Multiple U.S. Sites Duration of study participation: 84 days**		**Trial Location: New York City Duration of study participation: 63 days**	
	Arm 1	**Arm 2**	**Arm 1**	**Arm 2**	**Arm 1**	**Arm 2**
STUDY CHARACTERISTICS						
Intervention	28-day clonidine detoxification	28-day BUP detoxification	2-week B/N detoxification	8-week stable B/N & 4-week BUP taper	28-day B/N detoxification	56-day B/N detoxification
Arm sample size (n)	18	18	78	74	28	25
DEMOGRAPHICS						
Average age	17.4	17.3	19.2	19.14	21	19.9

THANK YOU

QUESTIONS?

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