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Bridging the gap
between science
and service...



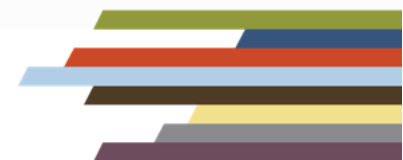
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UMass Chan
MEDICAL SCHOOL



Medication Misuse and Substance Misuse Disorders Among Adolescents

Laura K. Grubb MD MPH

Pediatrician and Adolescent Medicine Specialist

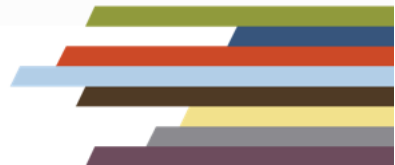
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Disclosures

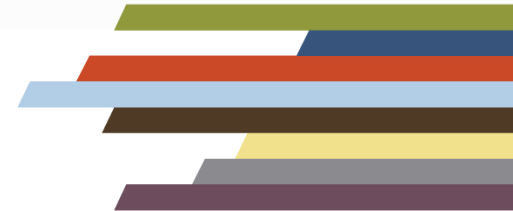
- The development of these training materials was supported by grant 7H79TI088149-01 (PI: R. Martin) from the Center for Substance Abuse Treatment, Substance Abuse and Mental Health Services Administration, United States Department of Health and Human Services. The views and opinions contained within this document do not necessarily reflect those of the US Department of Health and Human Services and should not be construed as such.



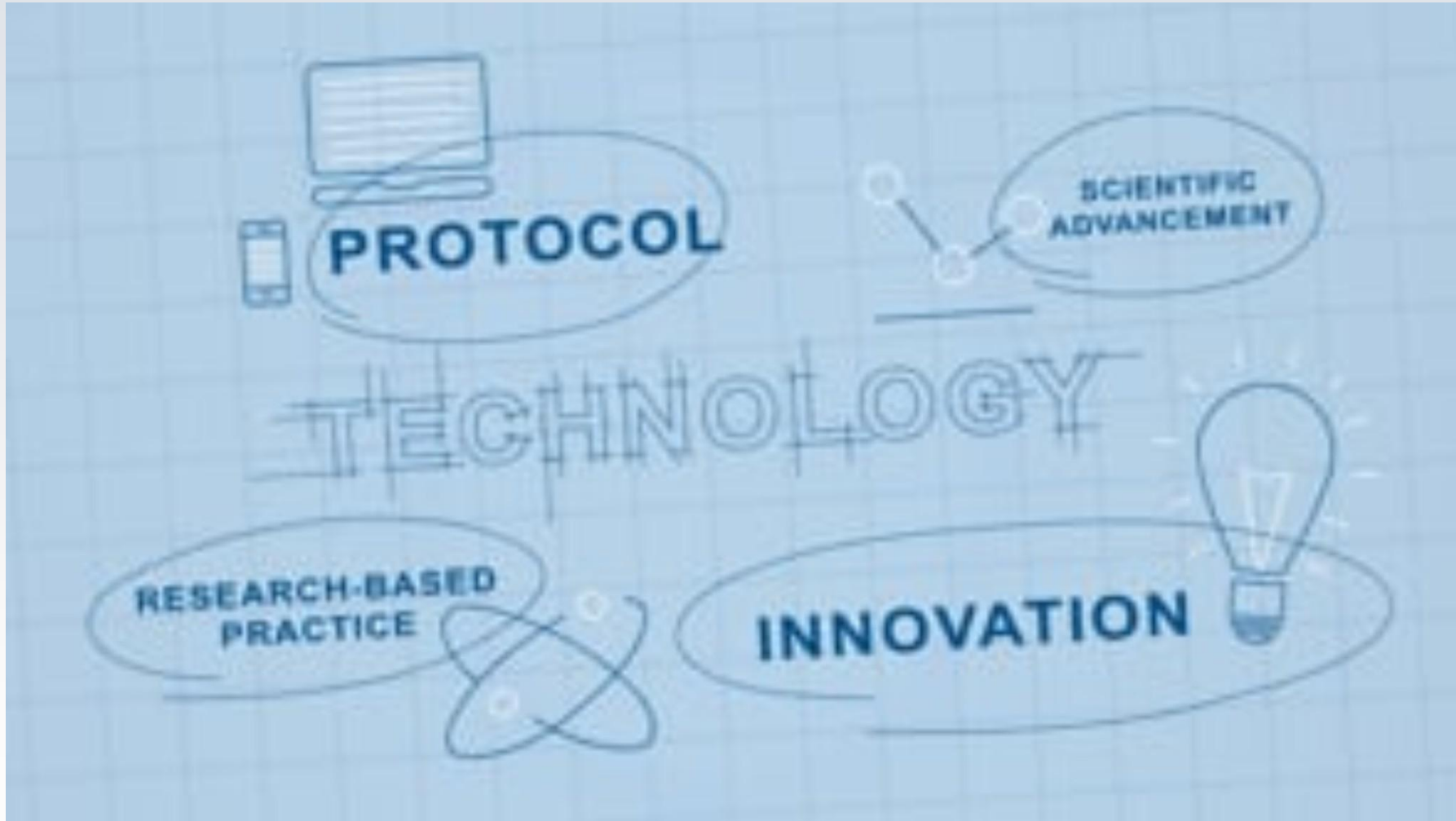
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ATTC Explainer Video



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Learning Objectives

- **Explain the epidemiology and developmental factors contributing to substance use and addiction among adolescents**, framing substance use as a pediatric public health issue.
- **Apply validated screening tools such as the CRAFFT questionnaire** to identify adolescents at risk for substance use disorders in primary care and emergency settings.
- **Recognize clinical signs and symptoms of misuse for various classes of substances** commonly used by adolescents, including cannabis, opioids, stimulants, benzodiazepines, inhalants, hallucinogens, and synthetic drugs.
- **Describe acute management strategies** for intoxication and overdose from different substance categories, including evidence-based medical and pharmacological interventions.
- **Identify resources to improve provider confidence, reduce stigma, and facilitate connection to addiction treatment services.**



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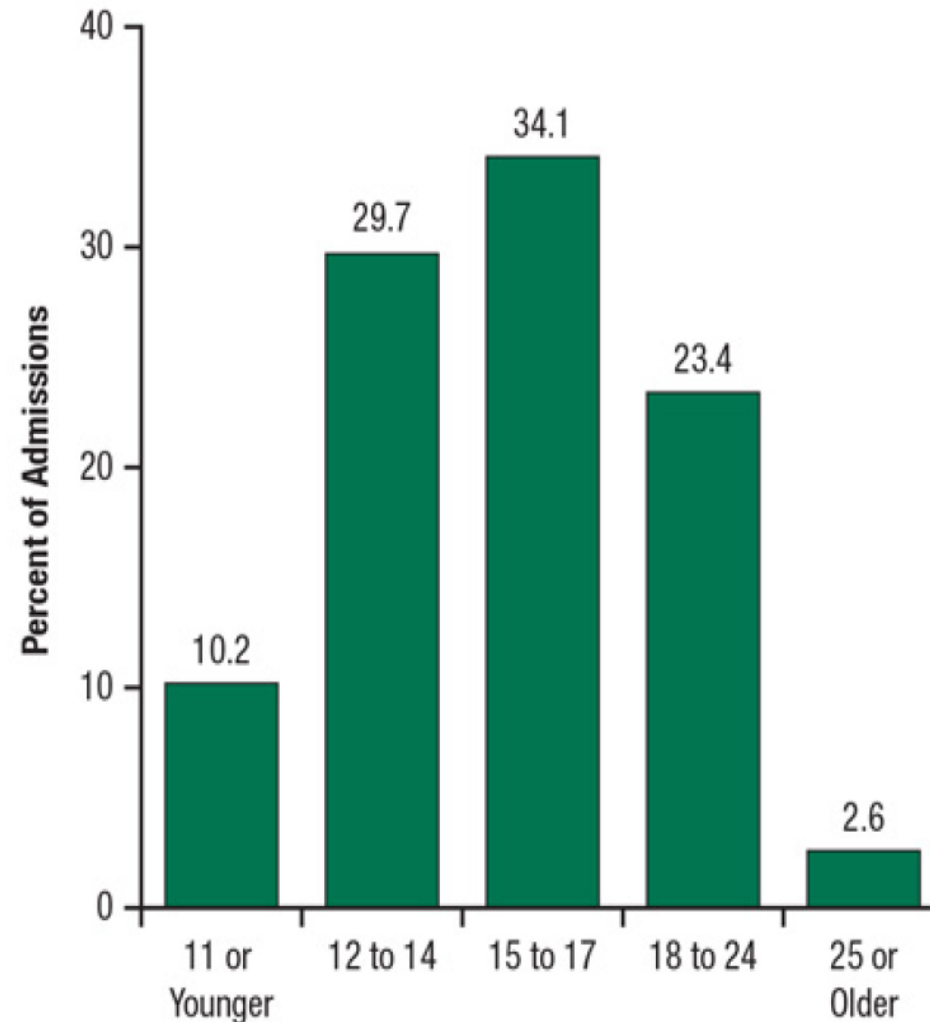
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Substance Use and Addiction are Pediatric Problems

Figure 1. Age of Substance Use Initiation among Treatment Admissions Aged 18 to 30: 2011



Source: SAMHSA Treatment Episode Data Set (TEDS), 2011.



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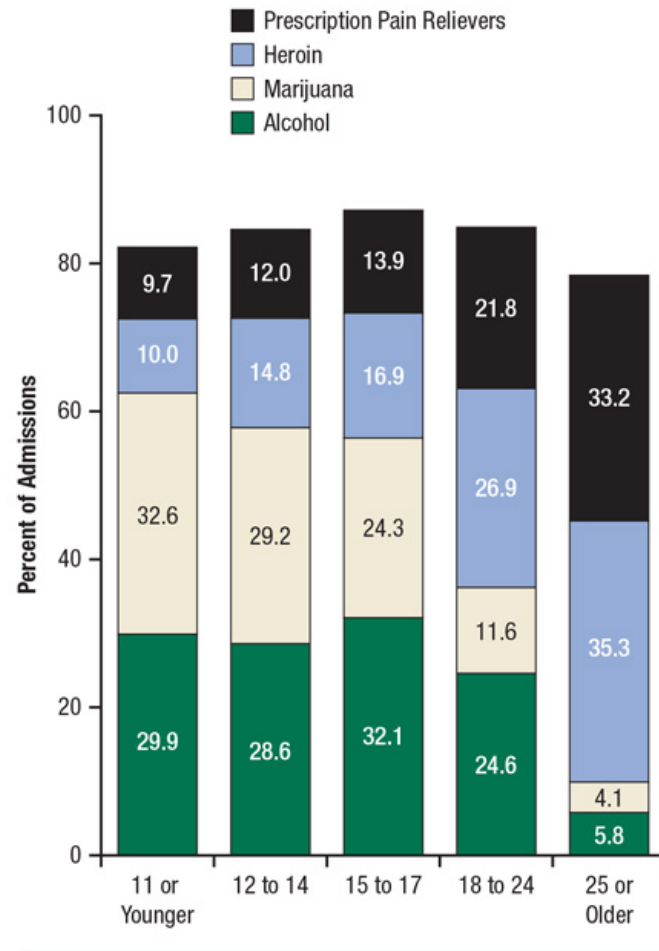
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Primary Substance Misuse by Age of Substance Use Initiation

Figure 4. Primary Substance of Abuse, by Age at Substance Use Initiation, among Treatment Admissions Aged 18 to 30: 2011



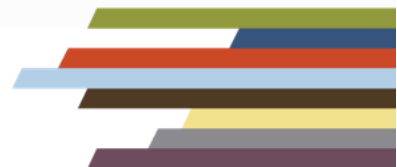
Source: SAMHSA Treatment Episode Data Set (TEDS), 2011.



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With Past-Year Initiation at Ages 12 to 21 Years^a

Table. Meta-analytic Summary Estimates of Mean Age at Drug Initiation Among Individuals With Past-Year Initiation at Ages 12 to 21 Years^a

Psychoactive Drug	Meta-analytic Summary, Age, Mean (95% CI), y	Annual Percentage Change, %	P Value
Alcohol			
2004-2014	16.5 (16.4-16.7)	0.4	<.001
2015-2017		0.1	.06
Cigar	17.0 (16.9-17.1)	0.3	<.001
Cocaine	18.0 (17.7-18.2)	0.5	<.001
Crack cocaine	18.0 (17.8-18.2)	0.3	.10
Ecstasy	17.6 (17.4-17.7)	0.3	.03
Hallucinogens	17.2 (17.0-17.3)	0.4	.004
Heroin	17.7 (17.4-18.0)	0.5	.02
Inhalants	15.4 (15.2-15.6)	0.4	.02
Lysergic acid diethylamide			
2004-2009	17.5 (17.3-17.7)	1.3	.03
2010-2019		-0.1	.70
Marijuana	16.4 (16.3-16.5)	0.2	<.001
Methamphetamines	17.0 (16.7-17.3)	0.4	.16
Opioids	16.6 (16.6-16.7)	0.1	.13
Phencyclohexyl piperidine	16.2 (15.8-16.5)	-0.2	.22
Sedatives	16.3 (16.0-16.6)	0.3	.37
Smokeless tobacco	16.7 (16.7-16.8)	0.1	.002
Stimulants	17.1 (17.0-17.3)	0.4	.008
Tobacco cigarettes	16.6 (16.4-16.8)	0.6	<.001
Tranquilizers	17.3 (17.2-17.4)	0.1	.19

^a Data from the National Survey on Drug Use and Health (N = 84 317 adolescents and young adults).

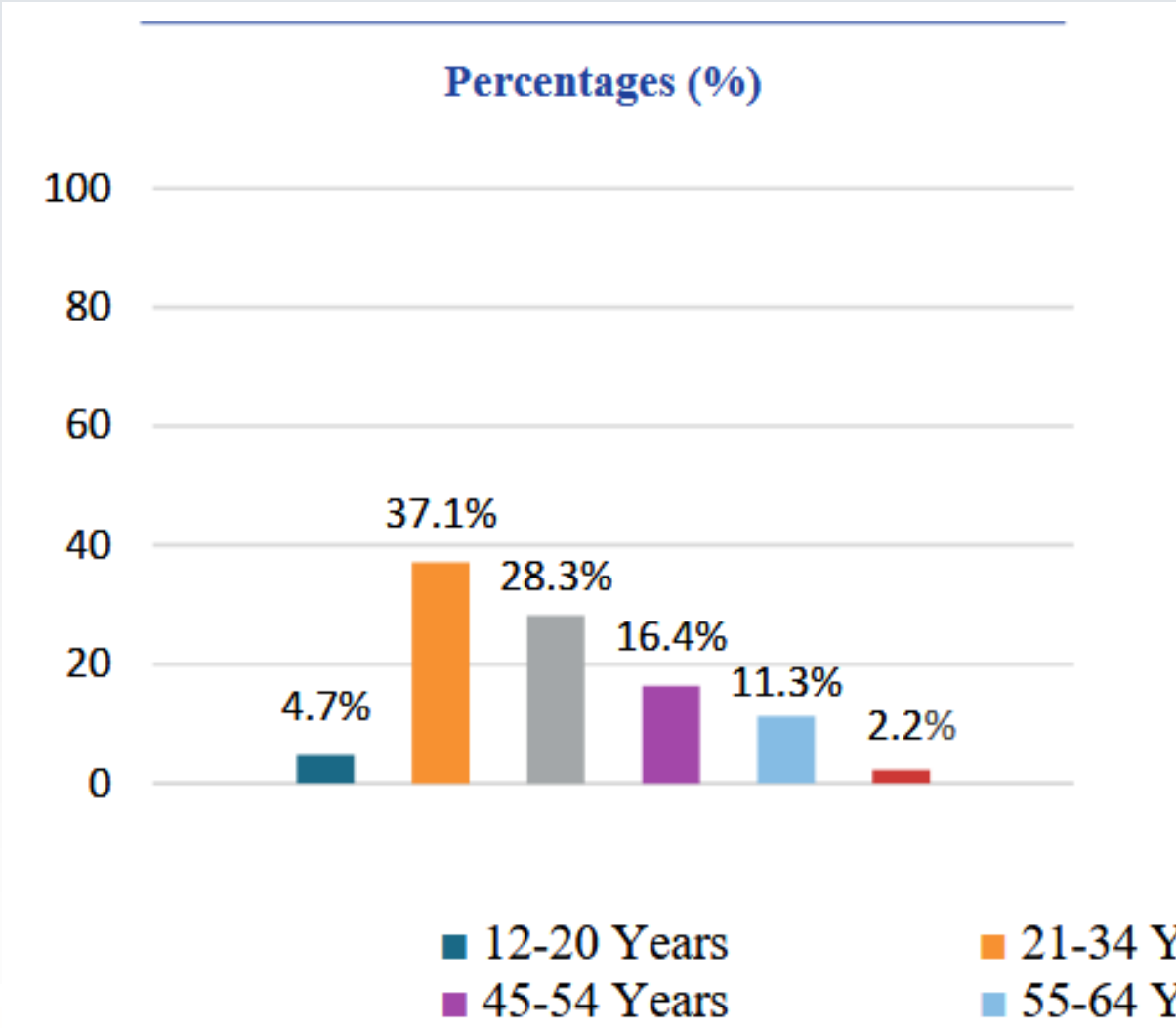


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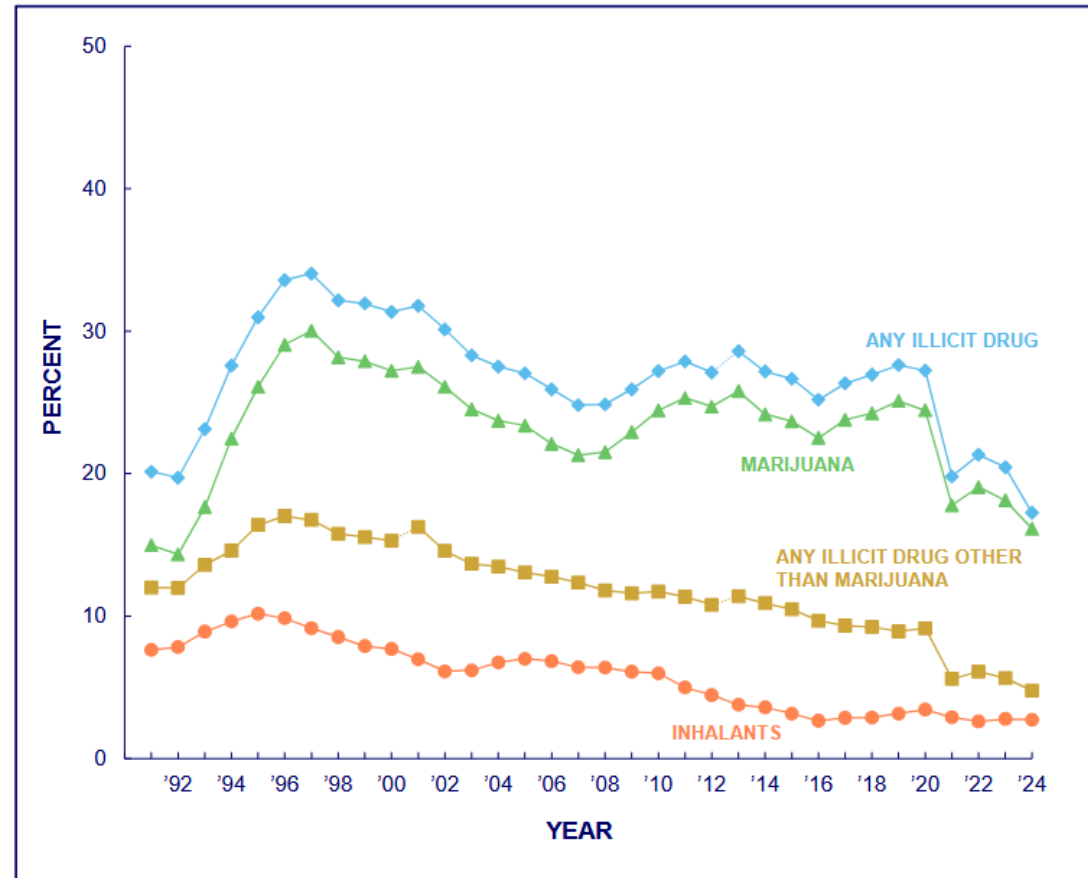
Characteristics of Admissions to Substance Use Treatment Services, 2022



Substance Use Grades 8, 10, 12

ANY ILLICIT DRUG, MARIJUANA, AND INHALANTS

Trends in Annual Prevalence
for Grades 8, 10, and 12 Combined



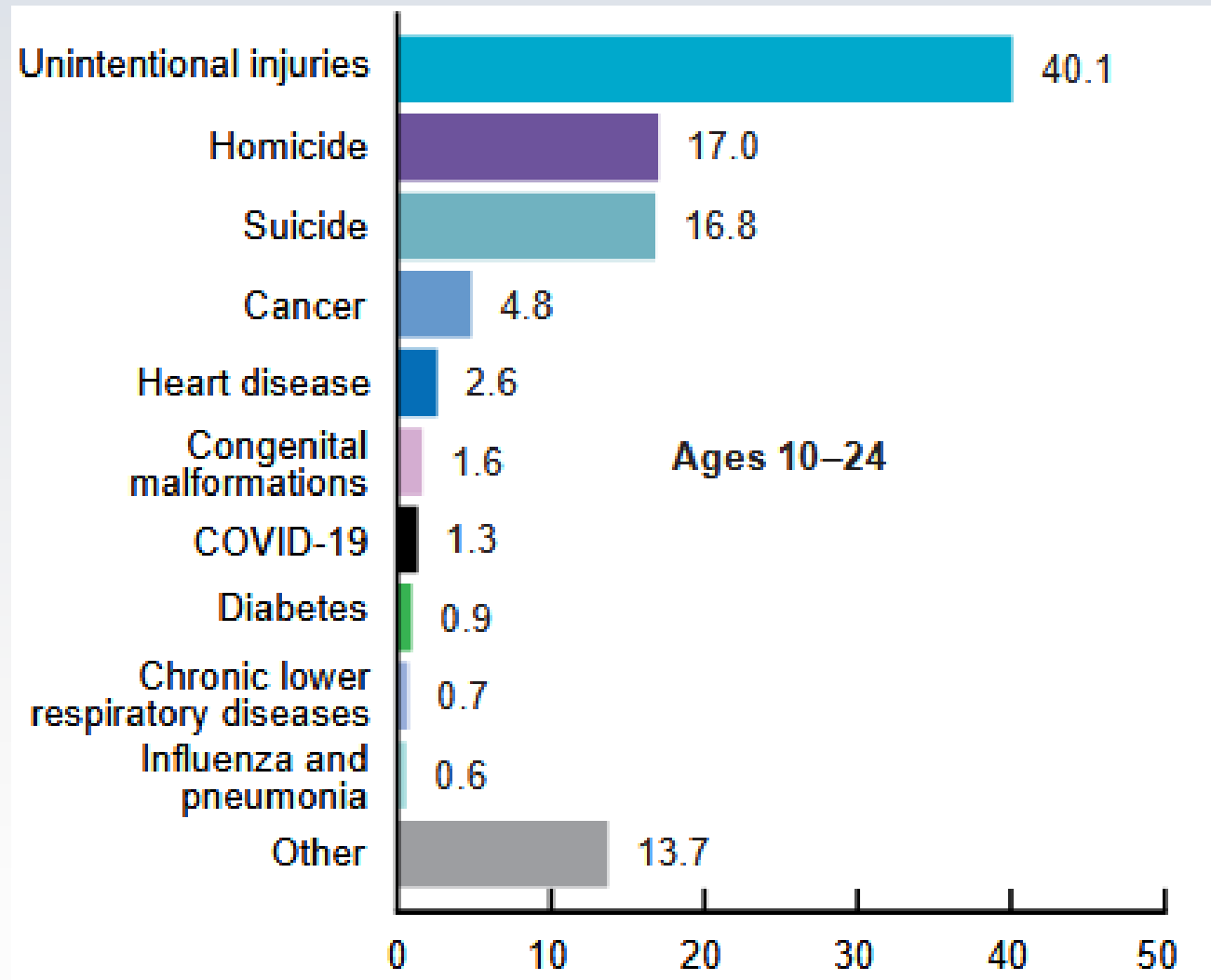
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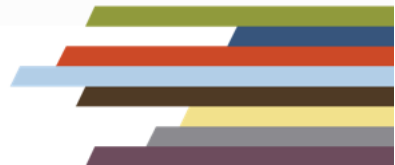
10 Leading Causes of Death, United States Ages 10 to 24 years (2022)



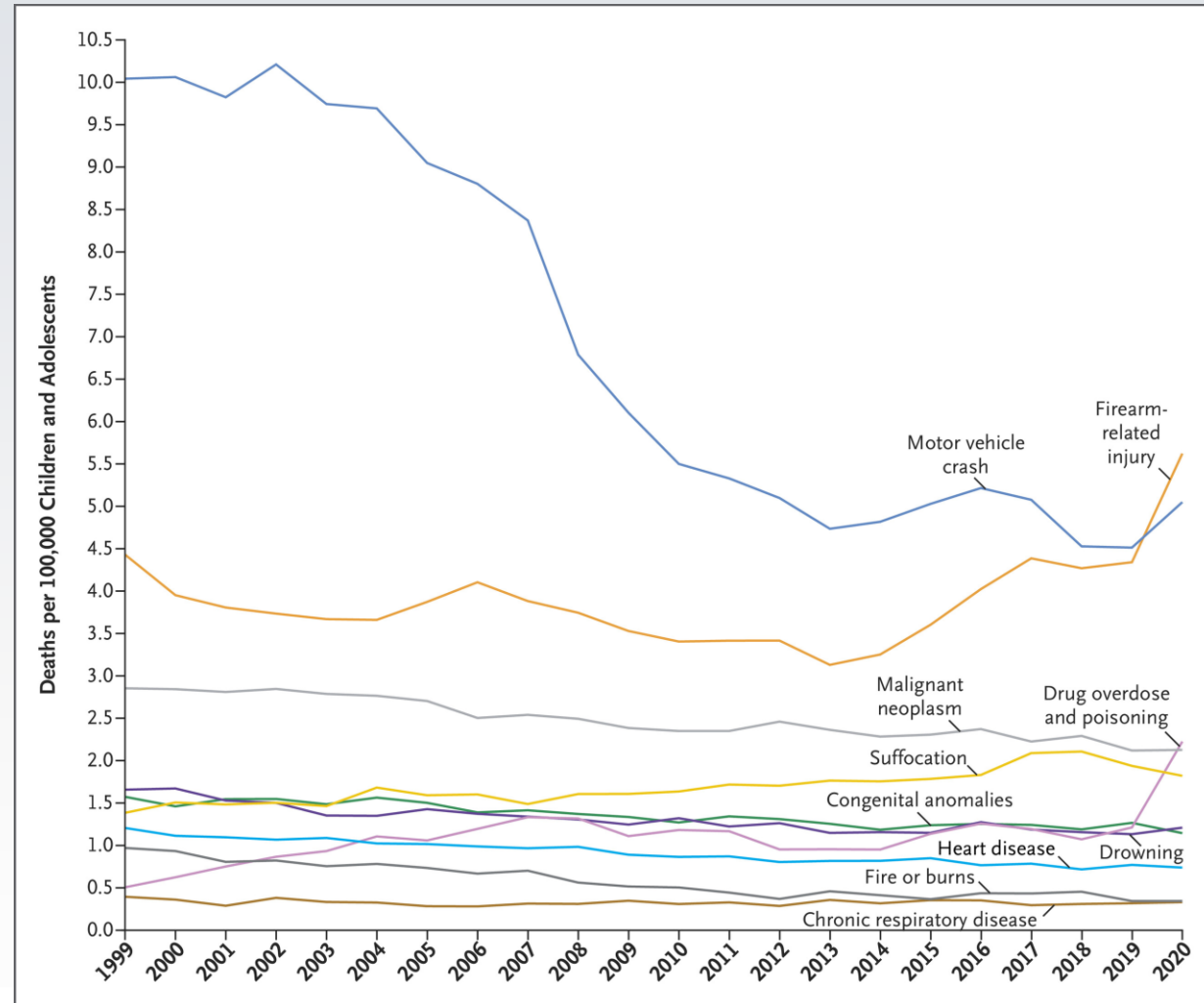
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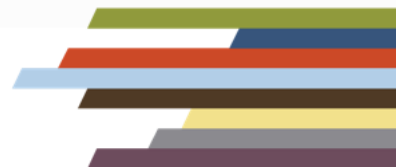
Leading Causes of Death among Children and Adolescents in the United States, 1999 through 2020.



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Alcohol and Adolescent Mortality

Postmortem studies show that 35% - 40% of adolescent victims of violent death had been drinking alcohol before their death.

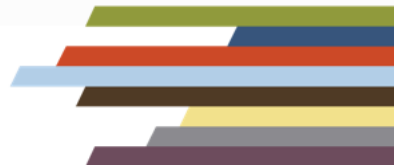
- Motor vehicle crashes: driver, passenger, pedestrian, motorcycle, ATV, PWC, snowmobiles
- Unintentional injury: drowning, fires, falls
- Homicide
- Suicide



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Development of A New Screen

ARCHIVES OF
PEDIATRICS
& ADOLESCENT MEDICINE

ARTICLE

A New Brief Screen for Adolescent Substance Abuse

*John R. Knight, MD; Lydia A. Shrier, MD, MPH; Terrill D. Bravender, MD;
Michelle Farrell; Joni Vander Bilt, MPH; Howard J. Shaffer, PhD*



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CRAFFT Questions

- C** Have you ever ridden in a CAR driven by someone (including yourself) who was “high” or had been using alcohol or drugs?
- R** Do you ever use alcohol or drugs to RELAX, feel better about yourself, or fit in?
- A** Do you ever use alcohol/drugs while you are by yourself, ALONE?
- F** Do you ever FORGET things you did while using alcohol or drugs?
- F** Do your FAMILY or FRIENDS ever tell you that you should cut down on your drinking or drug use?
- T** Have you ever gotten into TROUBLE while you were using alcohol or drugs?



The CRAFFT Interview (version 2.0)

To be orally administered by the clinician

Begin: "I'm going to ask you a few questions that I ask all my patients. Please be honest. I will keep your answers confidential."

Part A

During the PAST 12 MONTHS, on how many days did you:

- | | |
|--|-----------------------------------|
| 1. Drink more than a few sips of beer, wine, or any drink containing alcohol? Say "0" if none. | <input type="text"/>
of days |
| 2. Use any marijuana (pot, weed, hash, or in foods) or "synthetic marijuana" (like "K2" or "Spice")? Say "0" if none. | <input type="text"/>
of days |
| 3. Use anything else to get high (like other illegal drugs, prescription or over-the-counter medications, and things that you sniff or "huff")? Say "0" if none. | <input type="text"/>
of days |

Did the patient answer "0" for all questions in Part A?

Yes

No



Ask CAR question only, then stop

Ask all six CRAFFT* questions below

Part B

- | | No | Yes |
|--|--------------------------|--------------------------|
| C Have you ever ridden in a CAR driven by someone (including yourself) who was "high" or had been using alcohol or drugs? | <input type="checkbox"/> | <input type="checkbox"/> |
| R Do you ever use alcohol or drugs to RELAX, feel better about yourself, or fit in? | <input type="checkbox"/> | <input type="checkbox"/> |
| A Do you ever use alcohol or drugs while you are by yourself, or ALONE? | <input type="checkbox"/> | <input type="checkbox"/> |
| F Do you ever FORGET things you did while using alcohol or drugs? | <input type="checkbox"/> | <input type="checkbox"/> |
| F Do your FAMILY or FRIENDS ever tell you that you should cut down on your drinking or drug use? | <input type="checkbox"/> | <input type="checkbox"/> |
| T Have you ever gotten into TROUBLE while you were using alcohol or drugs? | <input type="checkbox"/> | <input type="checkbox"/> |

*Two or more YES answers suggest a serious problem and need for further assessment. See back for further instructions →

NOTICE TO CLINIC STAFF AND MEDICAL RECORDS:

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The CRAFFT Questionnaire (version 2.0)

To be completed by patient

Please answer all questions honestly; your answers will be kept confidential.

During the PAST 12 MONTHS, on how many days did you:

1. Drink more than a few sips of beer, wine, or any drink containing alcohol? Put "0" if none. # of days
2. Use any marijuana (pot, weed, hash, or in foods) or "synthetic marijuana" (like "K2" or "Spice")? Put "0" if none. # of days
3. Use anything else to get high (like other illegal drugs, prescription or over-the-counter medications, and things that you sniff or "huff")? Put "0" if none. # of days

READ THESE INSTRUCTIONS BEFORE CONTINUING:

- If you put "0" in ALL of the boxes above, ANSWER QUESTION 4, THEN STOP.
- If you put "1" or higher in ANY of the boxes above, ANSWER QUESTIONS 4-9.

- | | No | Yes |
|--|--------------------------|--------------------------|
| 4. Have you ever ridden in a CAR driven by someone (including yourself) who was "high" or had been using alcohol or drugs? | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Do you ever use alcohol or drugs to RELAX, feel better about yourself, or fit in? | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Do you ever use alcohol or drugs while you are by yourself, or ALONE? | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Do you ever FORGET things you did while using alcohol or drugs? | <input type="checkbox"/> | <input type="checkbox"/> |
| 8. Do your FAMILY or FRIENDS ever tell you that you should cut down on your drinking or drug use? | <input type="checkbox"/> | <input type="checkbox"/> |
| 9. Have you ever gotten into TROUBLE while you were using alcohol or drugs? | <input type="checkbox"/> | <input type="checkbox"/> |

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So, when you are considering substance use...

- What's the most important question to answer in the acute setting?



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A mother brings her 17-year-old son to clinic. She is concerned because he seems to have lost interest in most activities and acts apathetic most of the time. His speech is slow, and eyes mildly dilated.

What did he take?

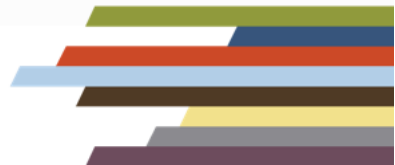
How do you manage him?



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Marijuana or Cannabis

- Aunt Mary, BC Bud, Blunts, Boom, Chronic, Dope, Gangster, Ganja, Grass, Hash, Herb, Hydro, Indo, Joint, Kif, Mary Jane, Mota, Pot, Reefer, Sinsemilla, Skunk, Smoke, Weed, and Yerba
- Derived from Cannabis sativa plant, D9-tetrahydrocannabinol (THC) is the active ingredient
- It is the most common drug used in America
- Inhibits the release of acetylcholine, L-glutamate, g-aminobutyric acid, noradrenaline, dopamine, and 5-hydroxytryptamine, producing **relaxation**
- Smoked or ingested
- Duration 4 to 6 hours



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Physical Effects of Marijuana

- Sedation
- Bloodshot eyes
- Increased heart rate
- Coughing from lung irritation
- Increased appetite
- Increased blood pressure
(although prolonged use may cause a decrease in blood pressure)

Bodily effects of Cannabis

Eyes:

- Reddening
- Decreased intra-ocular pressure

Mouth:

- Dryness

Skin:

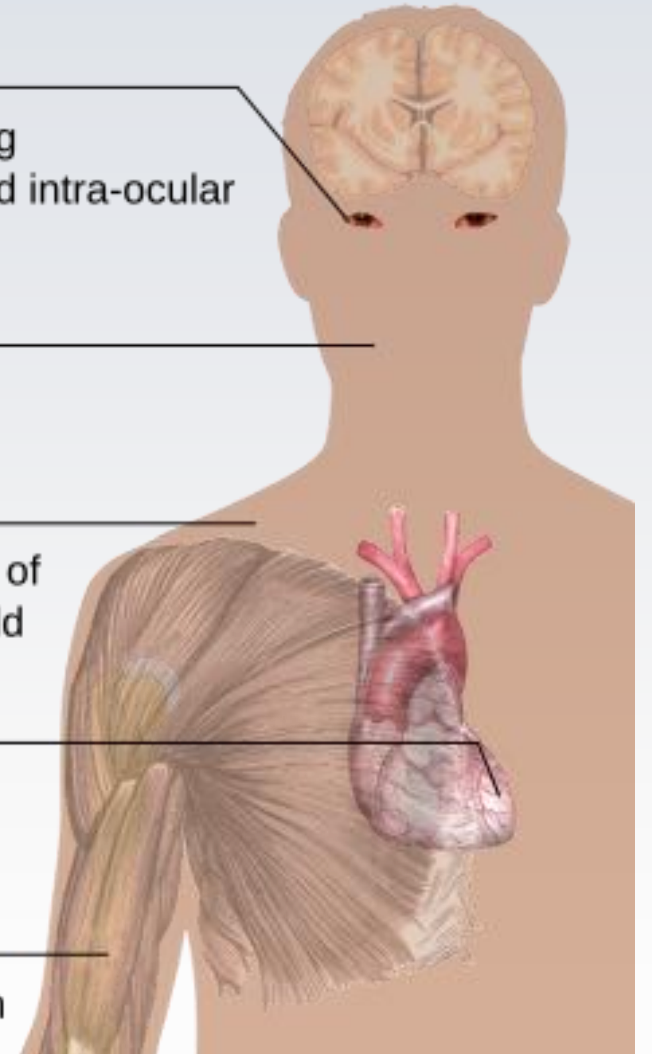
- Sensation of heat or cold

Heart:

- Increased heart rate

Muscles:

- Relaxation



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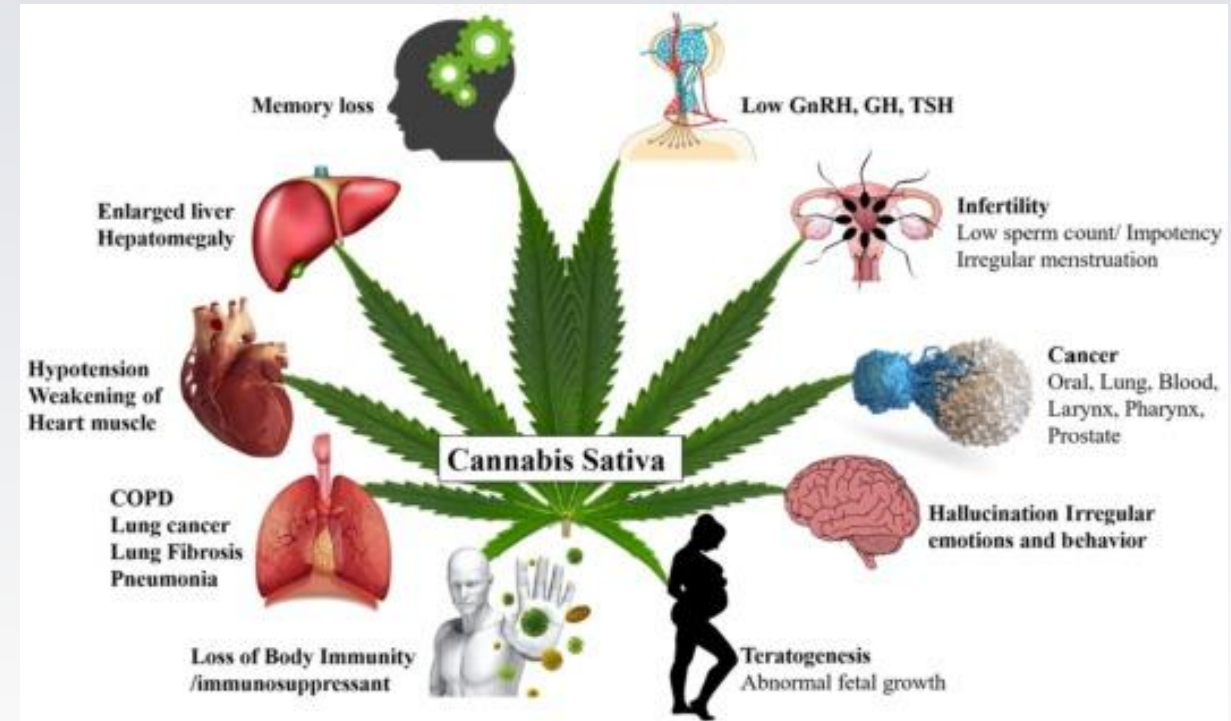
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Long Term Effects of Marijuana

- Physical dependence and withdrawal
- Psychological addiction or dependence
- Apathy
- Cannabis hyperemesis syndrome



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A 15-year-old female is found wandering the streets. She is brought in by EMS to the ED. She is tremulous, confused, & hyperactive. Her pupils are dilated, equal & reactive, there is tachycardia & mild hypertension. She has no nystagmus (abnormal eye movements).

What did she take?

How do you manage her?



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Amphetamines, Methamphetamines and Phenylephrine

- Crank, billy, bennies, copilots, tina, gutter ball, speed, black beauties, ice, speed, and uppers



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Amphetamines

Legally prescribed stimulants used to treat ADHD, narcolepsy, weight loss

Adderall, Ritalin, Concerta, Dexadrine, Vyvanse, Procentra

Often taken illegally as illicit drugs

Methamphetamine & phenylephrine

Illicit version, can be manufactured in small and large batches from pseudoephedrine

Manufacturing is highly dangerous as it is volatile and flammable and often results in explosions or fires

Can be snorted, injected, smoked and inserted rectally

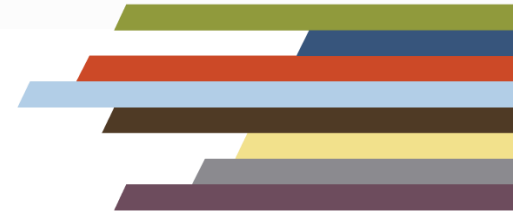
Highly addictive



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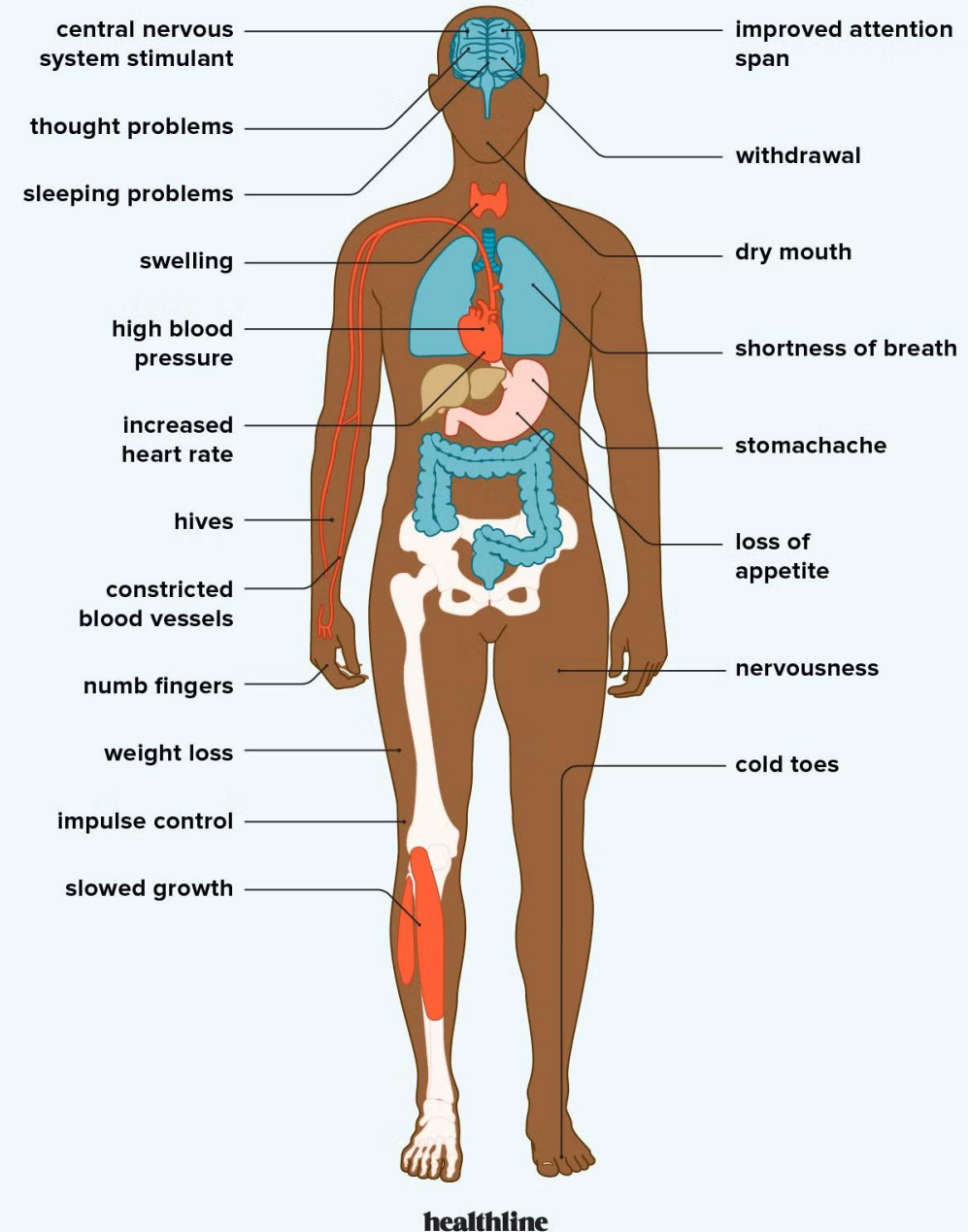
Physical Effects

- Produces increased wakefulness, alertness, decreased fatigue/insomnia, and appetite suppression, agitation, convulsions, hallucinations
- Amphetamines modulate dopamine, serotonin and norepinephrine

Long term effects include:

- psychosis that resembles schizophrenia
- Paranoia
- Picking at the skin
- Preoccupation with one's own thoughts, and auditory and visual hallucinations.
- Violent and erratic behavior is frequently seen among chronic users of amphetamines.

Effects of Adderall on the Body



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Medical Management of Amphetamine Toxicity

- ABCs
- Calming measures
- Benzodiazepine, barbiturates or propofol for seizures
- Haloperidol or droperidol for agitation
- α -Adrenergic receptor antagonist (phentolamine) or vasodilator (nitroprusside, nitroglycerin) for hypertension



A 15-year-old boy is brought to the emergency room after he is found unconscious in the school locker room. He is unresponsive except to painful stimuli. Exam shows pinpoint pupils (reactive), cyanosis and shallow respirations.

What did he take?

How do you medically manage him?



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Opioids

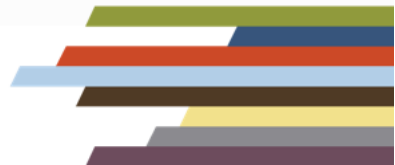
Rush, speedball, chasing the dragon, lollipop,
hillbilly heroin (pills)



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Opioid Use

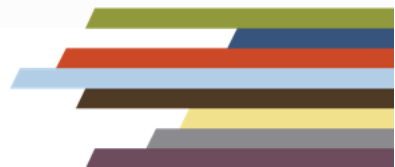
- Dried extract of the poppy plant, *papaver somniferum*, synthetic, or semi-synthetic
- Street versions of opioids commonly adulterated with caffeine, barbiturates, scopolamine, amphetamines, hallucinogenics, or cocaine
- Second most commonly abused prescription drug



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Natural Compounds

- Opioids/Heroin
- Morphine
- Codeine
- Thebaine

Synthetics and Semi-Synthetics

- Fentanyl, hydrocodone, oxycodone are FDA approved medications
- Illicit opioids and derivatives
- 7-hydroxymitragynine (also known as 7-OH) – Kratom plant
- Carfentanil
- Tramadol
- Methadone
- Benzimidazole–Nitazenes



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Opioid Use

Commonly inhaled, injected, ingested or smoked

Used for relief of acute or chronic pain, treatment of diarrhea & cough suppression

Bind to opioid receptors (there are a variety) and modulate effects of neurotransmitter release (dopamine, etc.) producing relaxation, analgesia, euphoria, etc.)

Opioid assays are specifically for morphine and have poor detection of semi-synthetic and synthetic opioids

Oxycodone, hydrocodone, and other common morphine derivatives have variable detectability by different opioid screens

Individuals may appear opioid toxic and have a negative drug screening



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Physical Effects of Opioids

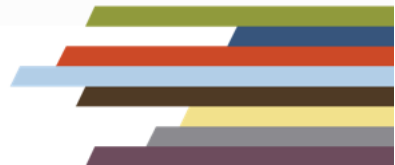
- Relaxation, euphoria, pain relief, sedation, confusion, drowsiness, dizziness, nausea and vomiting, urinary retention, pupillary constriction (pinpoints), low heart rate, low blood pressure, and respiratory depression
- **Long term effects:** abdominal pain, constipation, depression, physical and psychological dependence, acute withdrawal (agitation), hormonal dysregulation, pain amplification, suppressed breathing, tolerance



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Opioid Overdose Management

ABCs

Respiratory depression and apnea are often the most critical problems

High index of suspicion for assisted ventilation or intubation with assisted ventilation

Naloxone can reverse the effects of opioids, but caution is advised

If a patient is opioid dependent, agitation, hypertension, emesis and tachycardia can result

These symptoms may be life-threatening, especially emesis if they are not able to protect their airway

Start with the lowest dose possible

Fluid resuscitation, blood pressure support

Benzodiazepines for seizures and post-naloxone agitation

Consider concomitant acetaminophen toxicity

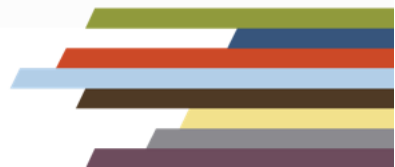
Long term treatment includes medication for addiction treatment and mental health supports



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A 17-year-old female comes to the ED after experiencing a seizure. She had been living on the streets and was arrested yesterday and placed in the detention center. She appears postictal.

What did she use?

How do you medically manage her?



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Benzodiazepines

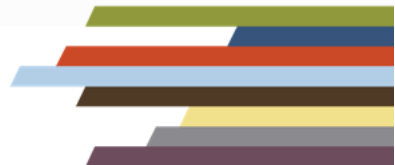
Bars, handlebars,
footballs, scubas, benzos,
downers



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Benzodiazepine Use

- Prescribed medications that are being used or traded inappropriately
- Most common is Xanax, then diazepam and lorazepam
- Includes **Rohypnol**
- BZs produce nervous system depression by enhancing the function of GABA-mediated chloride channels
- Produces relaxation, drowsiness, induces sleep
- Most are ingested and absorbed through the GI tract
- Tolerance is built easily
- Often used to “come down” from other drugs



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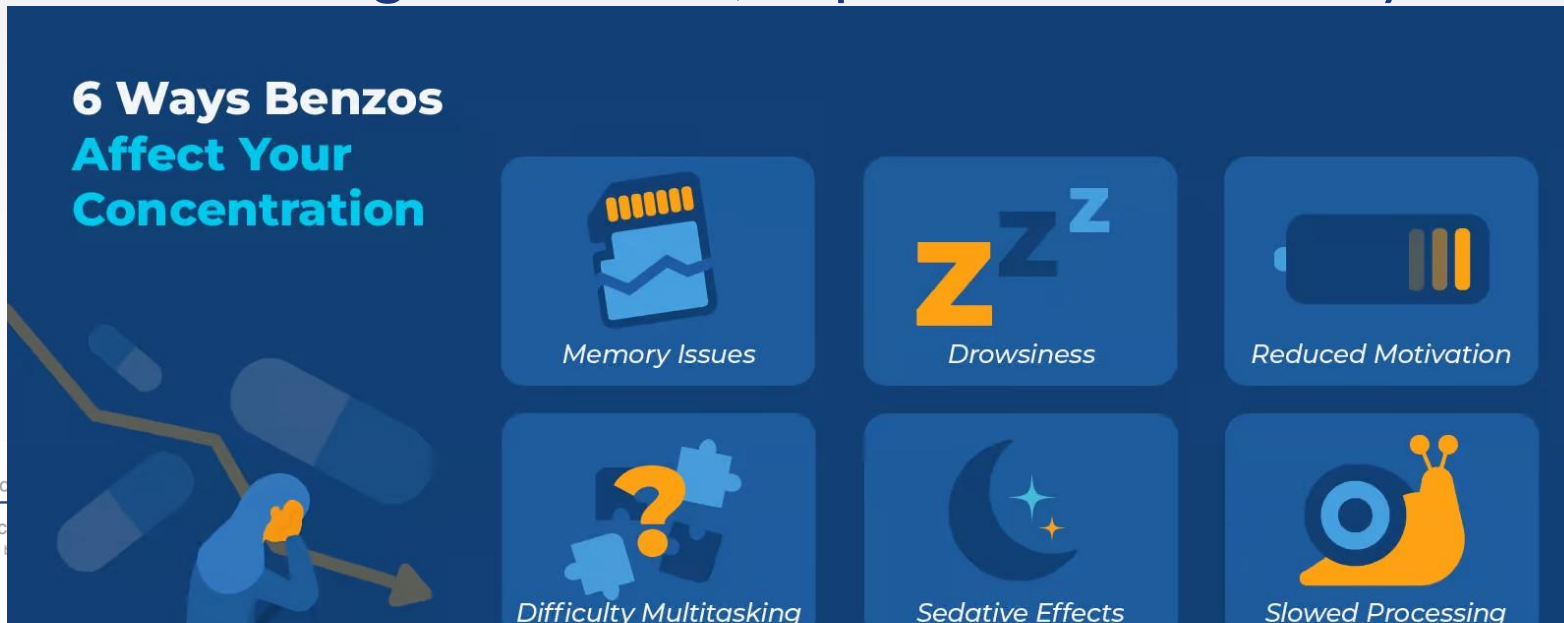
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Physical Effects of Benzodiazepines

- Central nervous system depression
- Sleepiness and relaxed mood
- Respiratory depression
- Decreased heart rate and blood pressure
- Confusion, impaired coordination

Long term effects: physical and psychological dependence, tolerance, cognitive impairment, life-threatening withdrawal, depression and anxiety



Overdose Management of Benzodiazepines

- ABCs, especially respiratory support
- Volume support for hemodynamic instability
- For cardiac dysrhythmias, judicious use of β -adrenergic antagonists
- Use extreme caution with flumazenil, if there is BZ dependence, patient may suffer withdrawal seizure



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A 16-year-old male is brought to the ER by his friends because he is experiencing chest pain. He is tachycardic, hypertensive and his pupils are dilated.

What did he take?

How do you manage him?



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Cocaine/Crack cocaine

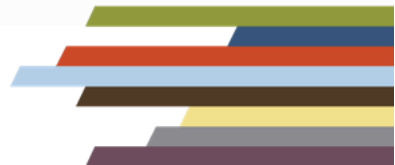
Blow, Charlie, coke, devil's dandruff, French fries, girl, marching powder, soft, Coca, Coke, Crack, Flake, Snow, and Soda Cot



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Cocaine Use

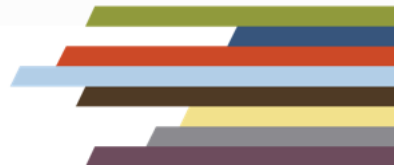
- Natural alkaloid contained in the leaves of *Erythroxylum coca*
- Crack is an adulterated smokable form of cocaine
- Snorted, injected, or smoked and is rapidly available
- Increased serotonin, epinephrine, norepinephrine and dopamine
- Powerful nervous system stimulant, effects last 15-30 minutes.
- Increases alertness, feelings of well-being and euphoria, energy and motor activity, feelings of competence and sexuality.



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Physical Effects of Cocaine

- Increased blood pressure and heart rate
- Dilated pupils
- Insomnia
- Loss of appetite
- Irregular heartbeat, ischemic heart conditions, sudden cardiac arrest, convulsions, & strokes

Long term effects:

- Respiratory problems: lung, pneumothorax, aspiration pneumonia and eosinophilic pneumonia
- Crack lung is an acute pulmonary syndrome consisting of diffuse alveolar damage and hemorrhagic alveolitis that occurs within 48 h of smoking crack cocaine
- Naval septum erosion, nosebleeds



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Overdose Management of Cocaine



- ABCs
- High risk from hyperthermia: need to sedate and cool
- Fluid resuscitation
- Rapid acting benzodiazepines are preferred for sedation, cooling, seizures and control of hypertension
- β -adrenergic antagonist or a mixed α - and β -adrenergic antagonist is absolutely contraindicated
- A direct-acting vasodilator like nitroglycerin or nitroprusside or an α -adrenergic antagonist (such as phentolamine) may be considered



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Take Home Points

- Substance Use is a pediatric issue
- SCREEN, SCREEN, SCREEN
- Talk with your patients
- Be familiar with common substances
- Refer for help



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Take Home Points

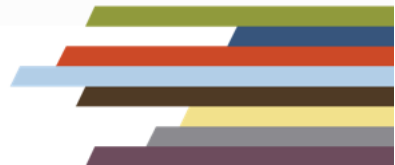
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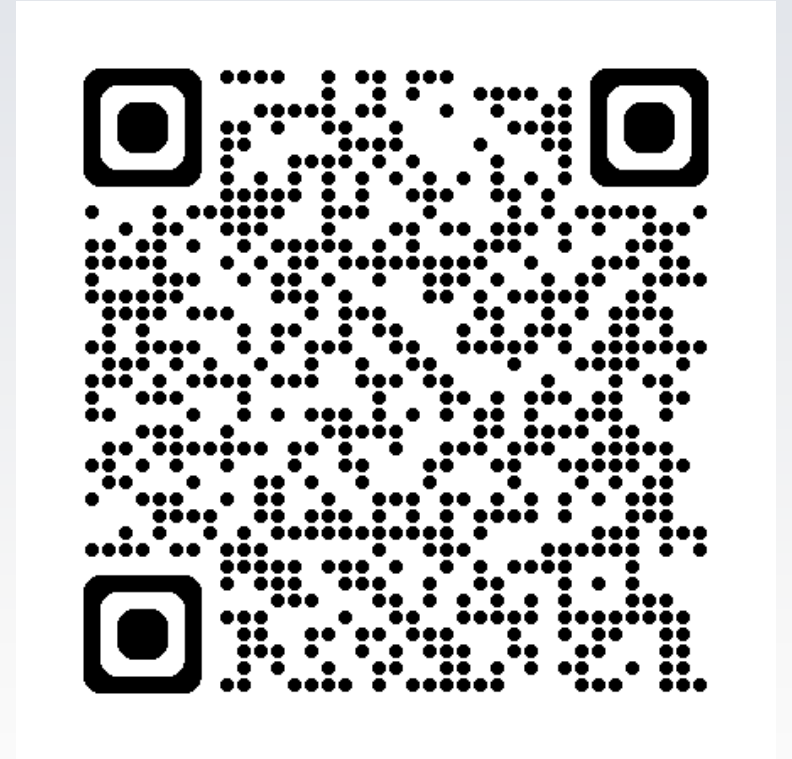
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SAMHSA's National Helpline at 1-800-662-HELP (4357)

- Free, confidential, 24/7, 365-day-a-year treatment referral and information service (in English and Spanish) for individuals and families facing mental and/or substance use disorders.
- Home - FindTreatment.gov offers additional resources.
- <https://www.samhsa.gov/substance-use/treatment>



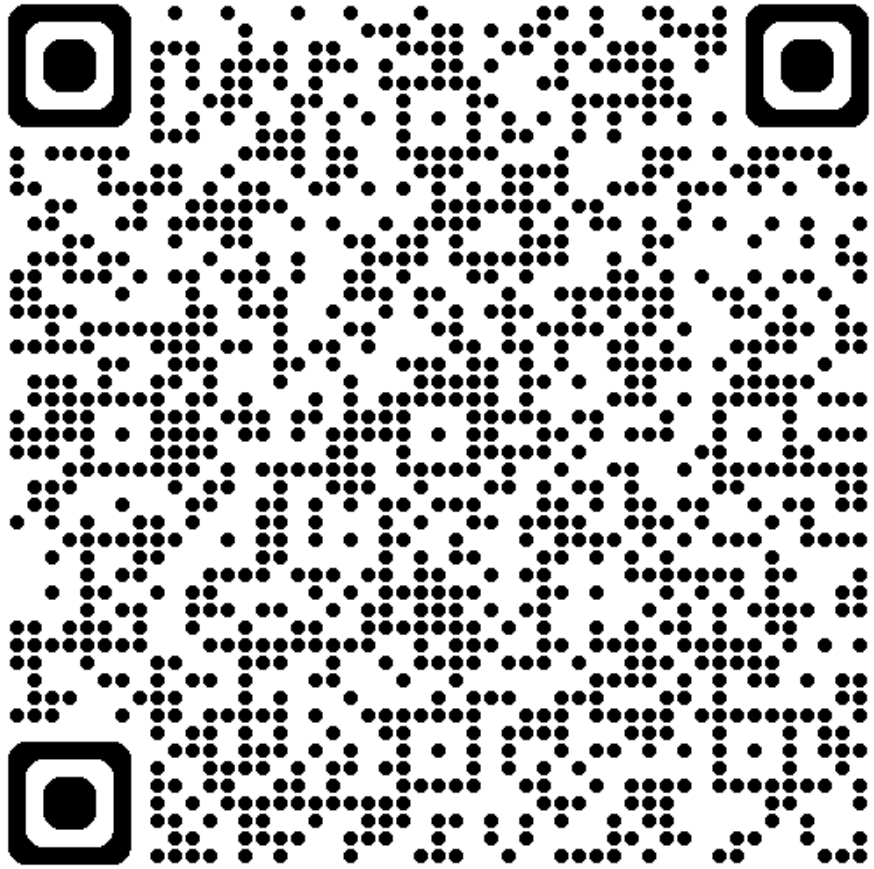
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American Academy of Pediatrics Substance Use and Prevention



Resources to Address the Opioid Epidemic

Access a collection of resources from the AAP related to the prevention, intervention and treatment of opioid use disorder in adolescents and young adults.

Substance Use, Brief Intervention and Referral to Treatment

Resources for incorporating substance use screening, brief intervention and referral to treatment (SBIRT) approaches into the practice setting.

Training to Treat Opioid Use Disorder

Access online and live options at no cost.

Nicotine and Tobacco Resources

Research, education, policy and advocacy initiatives related to nicotine and tobacco.

Mental Health Initiatives

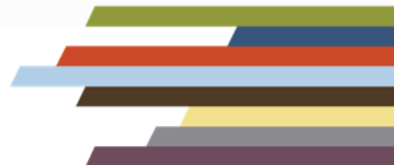
Information and guidance to support healthy mental development of children, adolescents and families.



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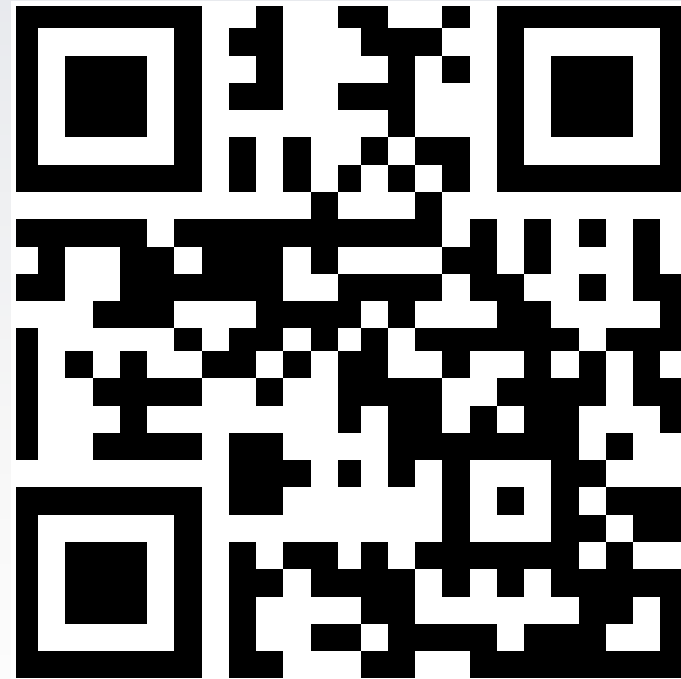
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Please complete the evaluation for ATTC....

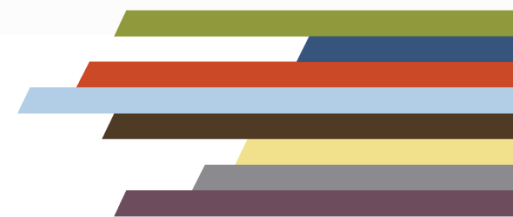
<https://ttc-gpra.org/P?s=623276>



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Stay Connected!

Learn more about us at [New England ATTC - Addiction Technology Transfer Center \(ATTC\) Network](#)

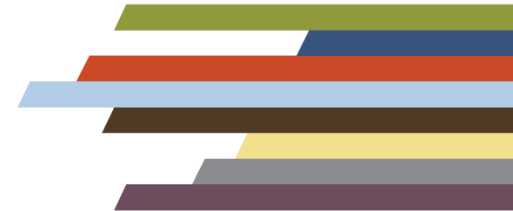
NewEnglandATTC@umassmed.edu



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YOUR VOICE MATTERS

Help New England ATTC continue to support professional educational events and address the needs of our region by completing a brief evaluation



Scan me!



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