Adolescents & Substance Use: New Challenges for Pediatricians

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Disclosure Statement

Dr. Knight reports no relationships with industry.

He will not be discussing any off-label use of unapproved devices or products.

This PowerPoint Presentation is very much still a "*Work-in-Progress*"; a lot of **new material**.

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Case 1, Part 1

- A 17-year-old girl suddenly lost consciousness at her high school's all-night, substance-free, after-graduation party. All students took breathalyzer at door, coats and bags searched.
- Brought to ED unresponsive
- Pupils dilated, sluggishly react to light
- Lips cyanotic, skin cold & clammy
- Temp 96^0, HR 50, RR 10 irregular, O_2 sat. 78%

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Case 1, Part 2

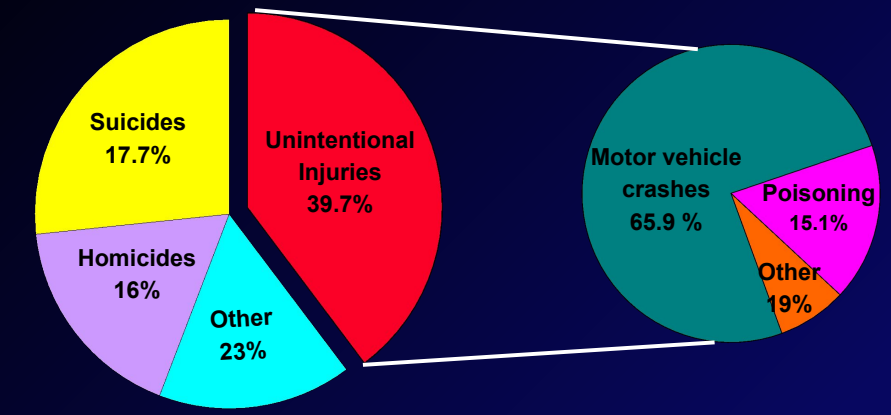
- Placed on O_2, IV fluids started, NG tube passed, but scant drainage
- When nurse attempts to pass Foley catheter, finds tampon that reeks of alcohol, removes it.
- BAC later comes back .37%
- 2nd student, brought home by mother intoxicated, reports they hid a vodka bottle in girls room before the event, brought tampons to "butt chug" vaginally.

Substance Use by 12th Graders (N>13,000), 2017

	Lifetime (%)	Past 30 days (%)
Alcohol (any)	61.5	33.2
Marijuana/Hashish	45.0	22.9
Cigarettes	26.6	9.7
Any illicit drug, non-MJ	19.5	6.3
Amphetamines	9.2	2.6
Inhalants	4.9	0.8
Ecstasy	4.9	0.9
Cocaine	4.2	0.9
Heroin	0.7	0.3
Any prescription drug	16.5	4.9
Other narcotics*	6.8	1.6

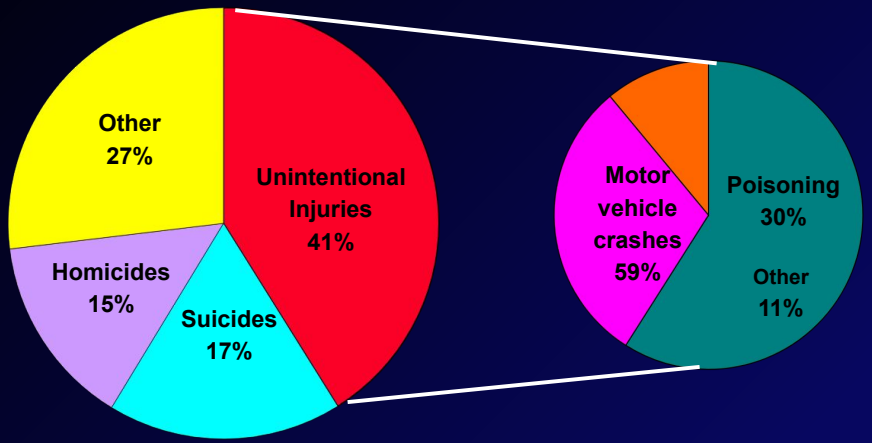
Source: Monitoring the Future, 2017. (http://www.monitoringthefuture.org/data/data.html)

Leading Causes of Death, U.S. Ages 15-19, 2012

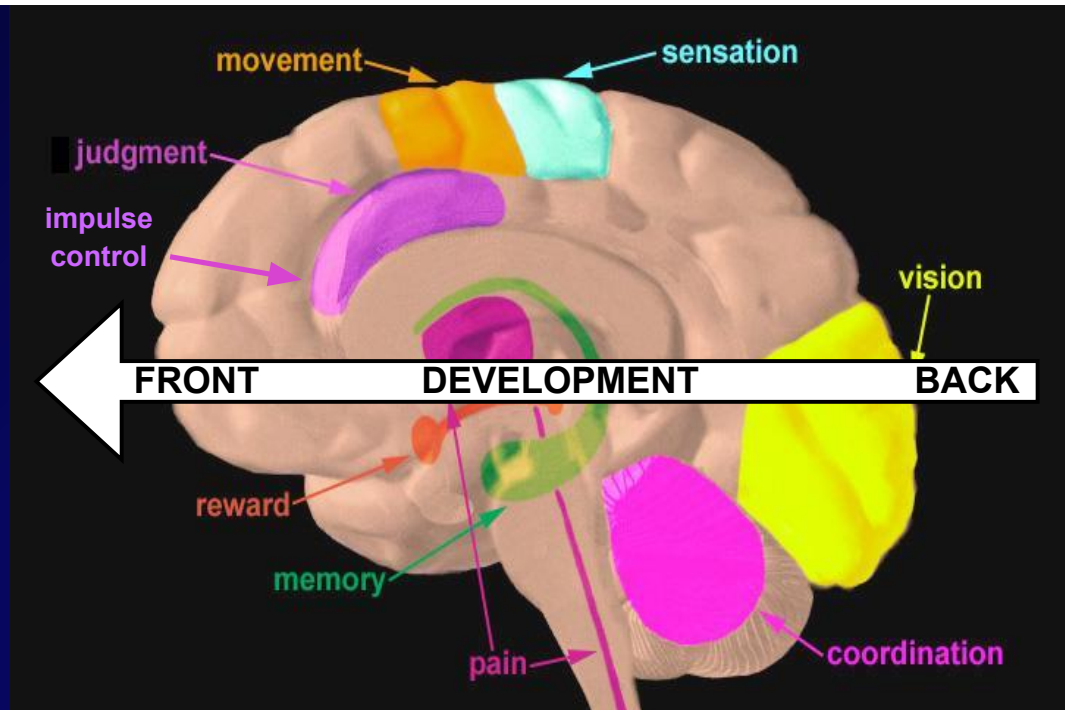


Source: **National Center for Health Statistics (NCHS), National Vital Statistics System.** Centers for Disease Control and Prevention, National Center for Injury Prevention and Control. Retrieved on January 15th, 2015 from http://webappa.cdc.gov/cgi-bin/broker.exe

Leading Causes of Death, U.S. Ages 10-24, 2016

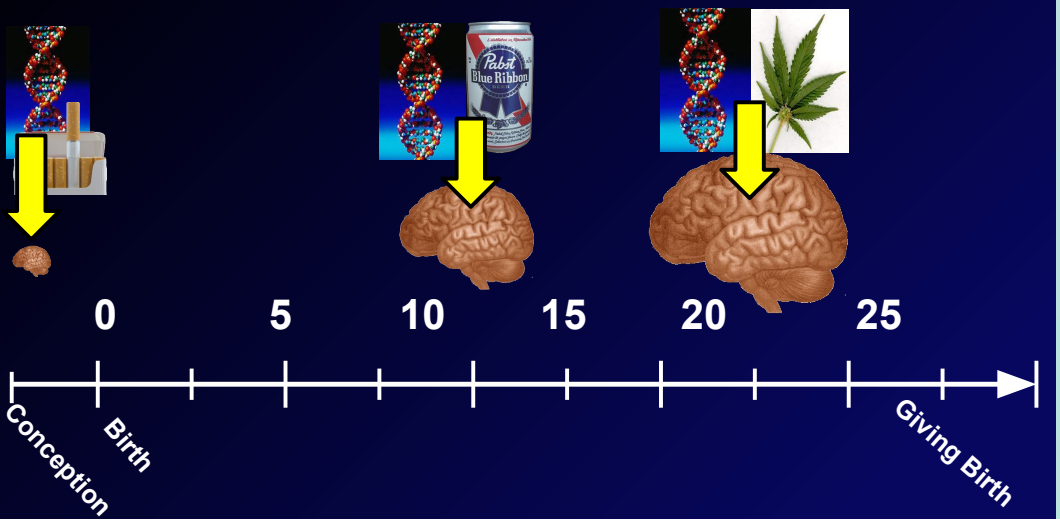


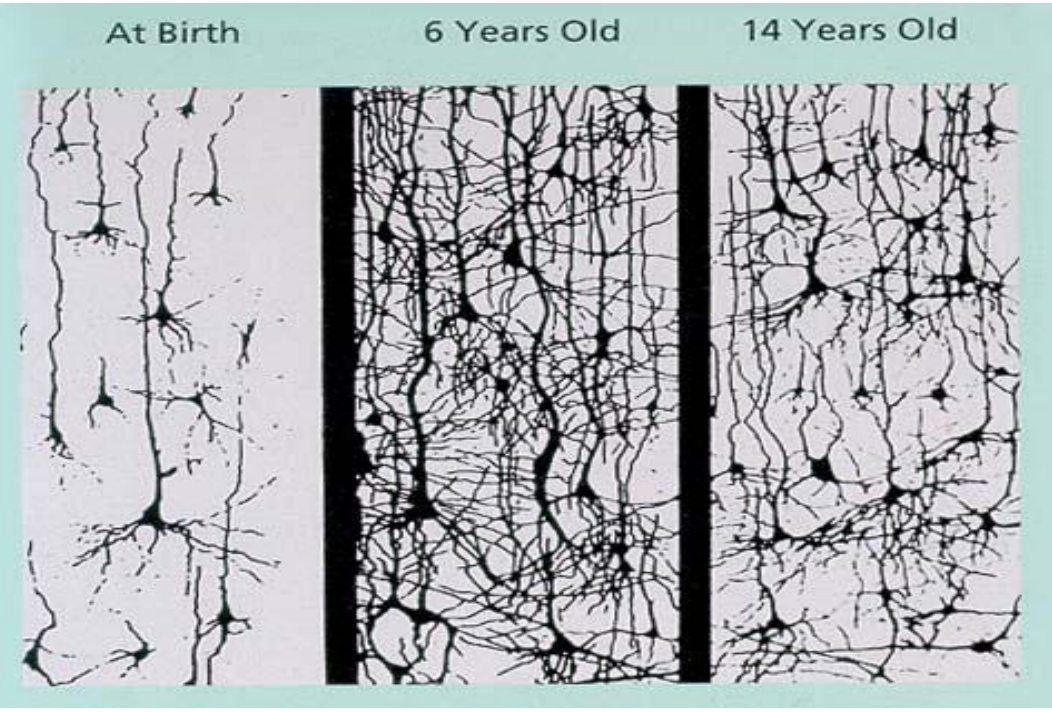
Source: Heron M. Deaths: Leading causes for 2016. National vital statistics reports; vol 67 no 6. Hyattsville, MD: National Center for Health Statistics. 2018



Human Brain Development

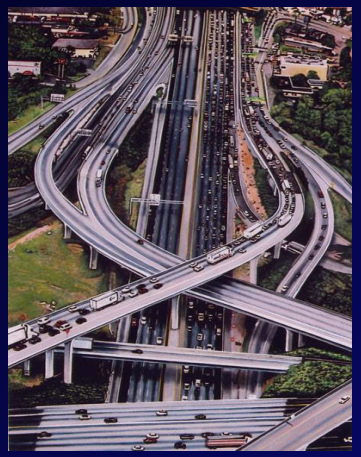
Brain Structure and Function determined by the Interaction of Genes and Environment at Critical Points in Time





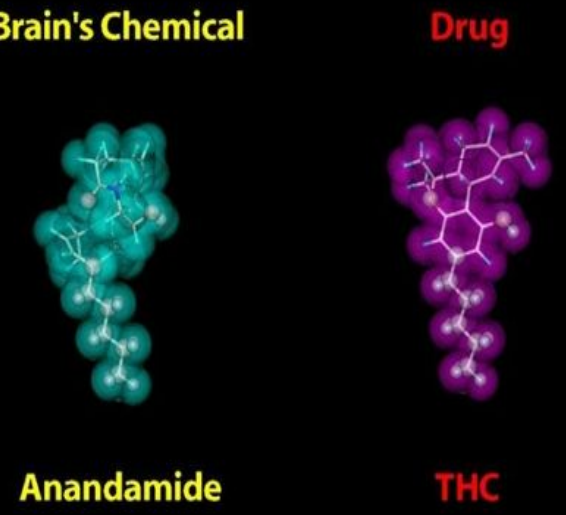
The Brain's Information Superhighway:

Myelinated axons = White Matter Tracts

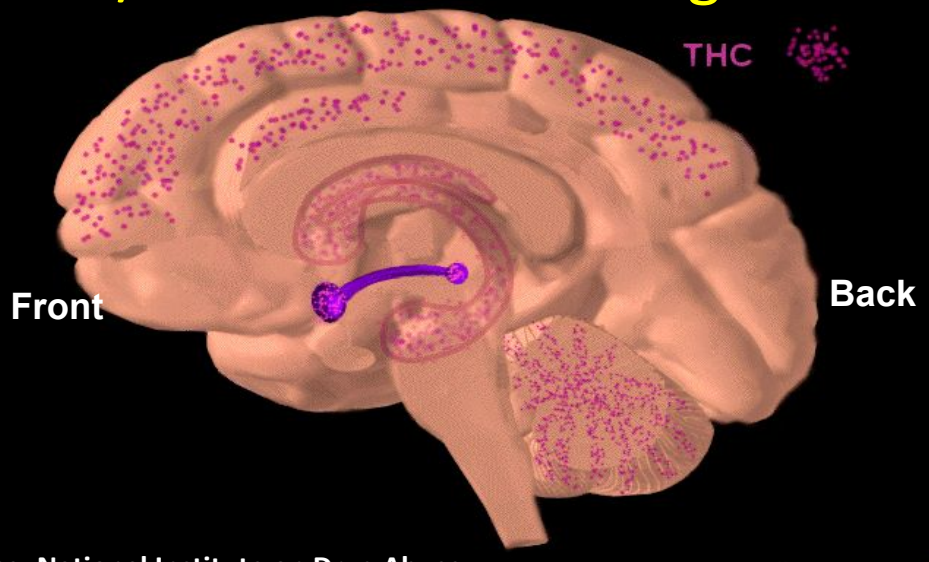


Source: Dr. Gordon J. Harris, MGH, 2008.

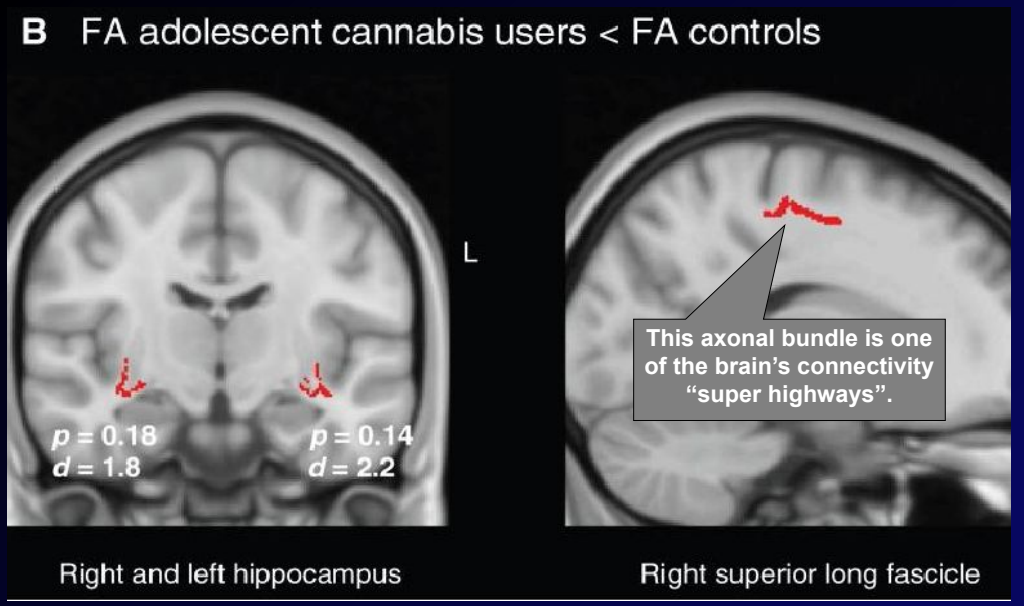
THC = Anandimide IMPOSTER



THC/Anandimide Binding Sites

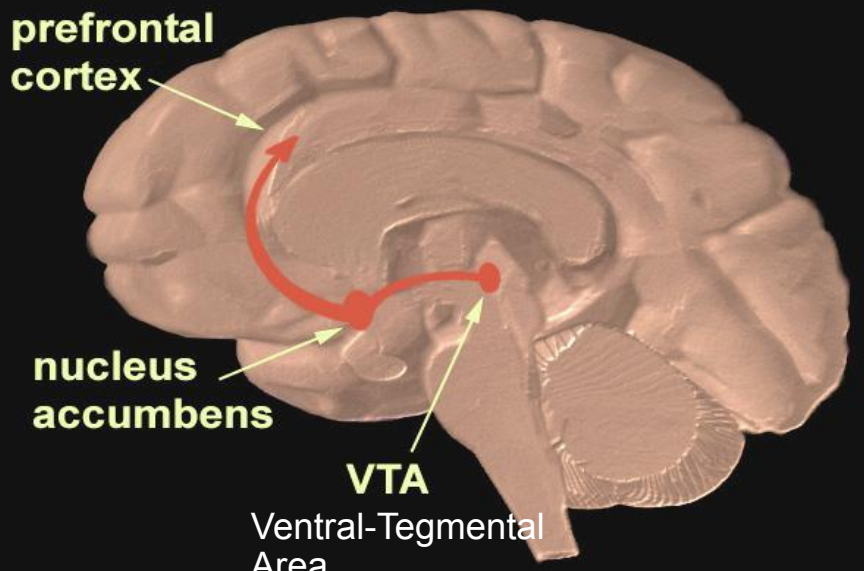


Source: National Institute on Drug Abuse



Source: Yücel M, Zalesky et al. White-matter abnormalities in adolescents with long-term inhalant and cannabis use: a diffusion magnetic resonance imaging study. J Psychiatry Neurosci. 2010 Nov;35(6):409-12.

The Reward Pathway



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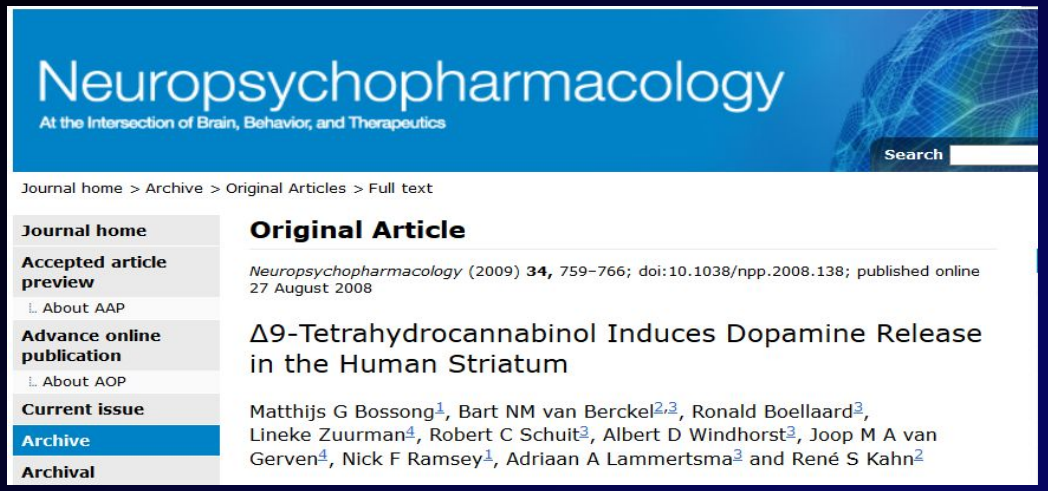
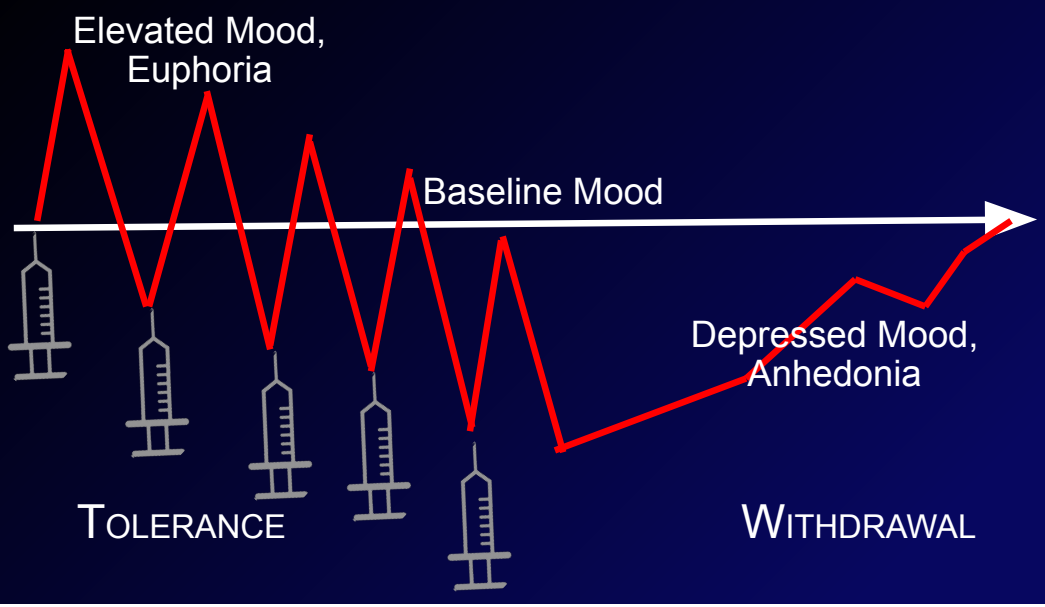
Marijuana is no exception…

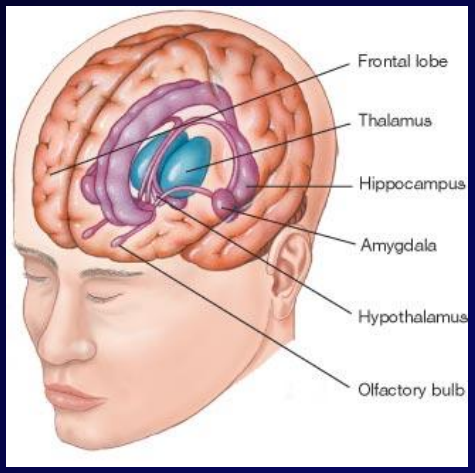


Dopamine Response to Drug Over Time



The Limbic System

- Food, sex, alc/drug memories stored in limbic system
- Responsible for powerful cravings
- Addiction is a "memory disease".

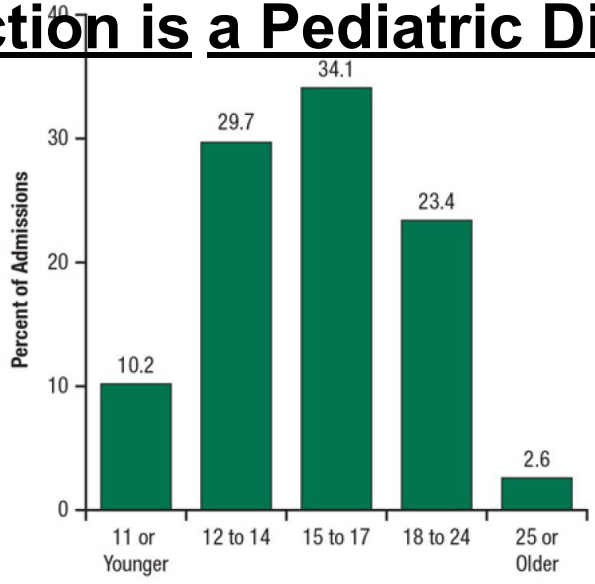


Age at First Drink vs. Lifetime Dx Alcohol Dependence

Source: Hingson et al., 2006

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

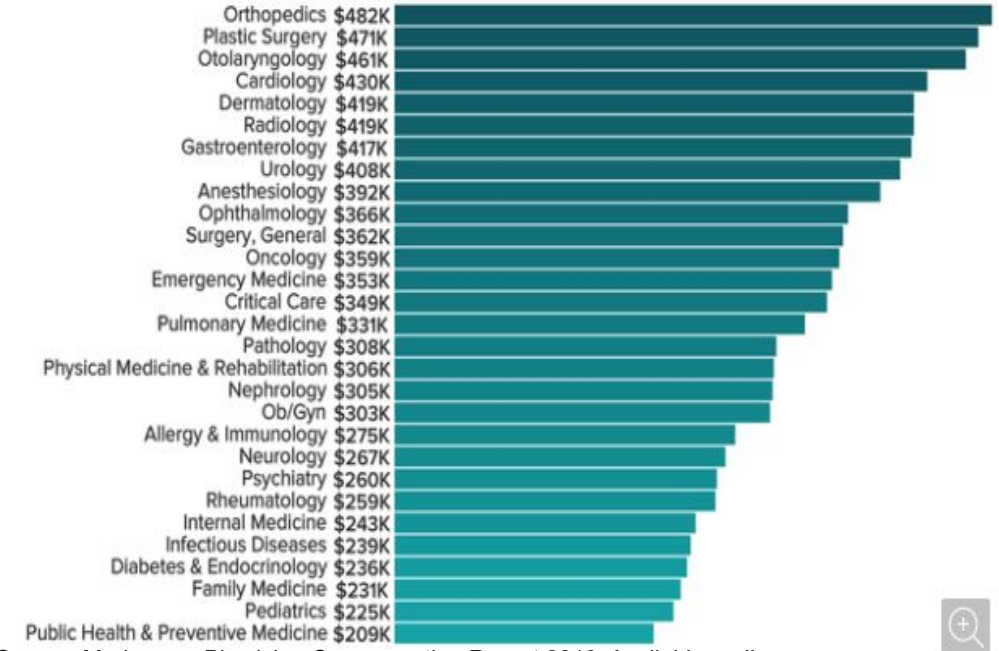
Addiction is a Pediatric Disease



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

Pediatricians

- Lowest pay of all clinical practice specialties
- Office overhead cost ≈ 50%
- Office flow critical, viability of practice depends on volume
- Adolescent visits: 20 minutes maximum
- Substance use screening, brief intervention, referral to treatment (SBIRT): 3-5 minutes maximum



Source: Medscape. Physician Compensation Report 2019. Available on-line: https://www.medscape.com/slideshow/2019-compensation-overview-6011286#28

Implementation Challenge

Sources: Belamarich PF, Gandica R, Stein RE, Racine AD. Drowning in a sea of advice: pediatricians and American Academy of Pediatrics policy statements. *Pediatrics.* Oct 2006;118(4):e964-978; Thomas JW, Grazier KL, Ward K. Economic profiling of primary care physicians: consistency among risk-adjusted measures. *Health Serv Res.* 2004;39(4 Pt 1):985-1003.

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?

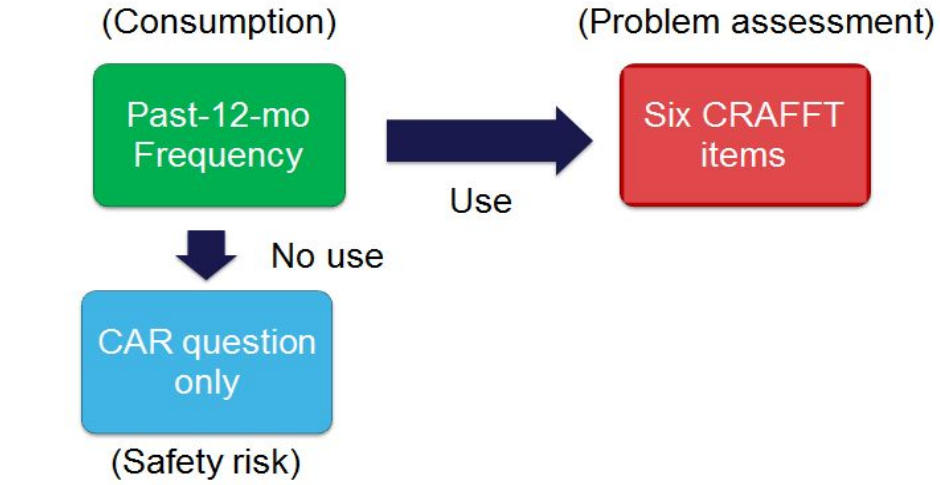
Source: Knight JR, Shrier LA, Bravender TD, Farrell M, Vander Bilt J, Shaffer HJ. A new brief screen for adolescent substance abuse. *Arch Pediatr Adolesc Med.* Jun 1999;153(6):591-596.

Validity of CRAFFT Score ≥ 2

	Sensitivity	Specificity	PPV	NPV
Problem Use, Abuse or Dependence	**.76**	**.94**	**.83**	**.91**
Abuse or Dependence	.80	.86	.53	.96
Dependence	.92	.80	.25	1.0

Knight JR, Sherritt L, Shrier LA, Harris SK, Chang G. Validity of the CRAFFT substance abuse screening test among general adolescent clinic patients. *Arch Pediatr Adolesc Med* 2002;156:607-614.

CRAFFT 2.0 Screening System



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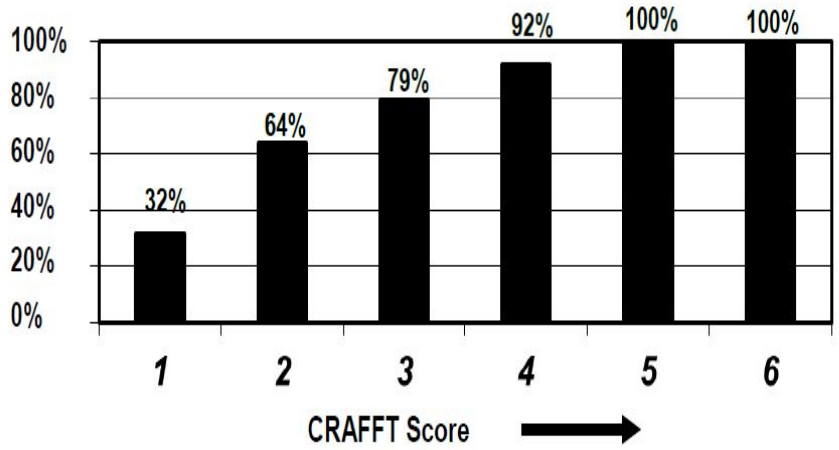
HARVARD MEDICAL SCHOOL TEACHING HOSPITAL

Percent with a DSM-5 Substance Use Disorder by CRAFFT score*



*Data source: Mitchell SG, Kelly SM, Gryczynski J, Myers CP, O'Grady KE, Kirk AS, & Schwartz RP. (2014). The CRAFFT cut-points and DSM-5 criteria for alcohol and other drugs: a reevaluation and reexamination. Substance Abuse, 35(4), 376–80.

Validity of CRAFFT

Study Safety Protocol

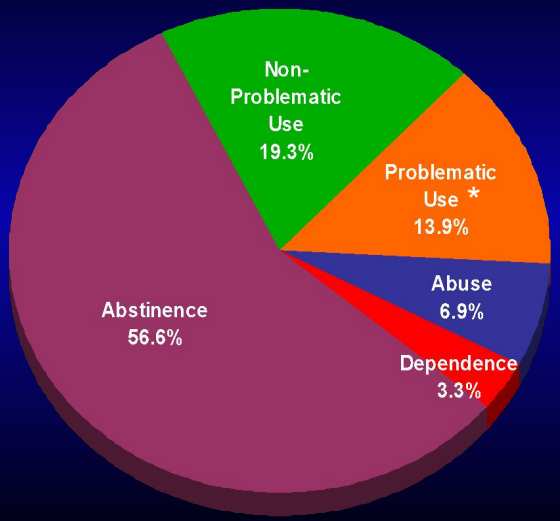
CRAFFT positive patients: RA notifies PCP, who refers teen to clinic social worker <2 wks.

	N
CRAFFT positive	75
Received SW appt	75
Kept SW appt	0

Lesson learned: Hand-offs won't work; try instead to bring hands together (real-time, live introduction).

Diagnostic Categories & Interventions

12- to 18-year-old PCP Patients (N=2133)



- Praise and encouragement
- Brief Advice (to Stop)
- Brief Advice/ Counseling
- Brief Office-based Counseling (MET)
- Referral to Treatment

*Problematic Use = two or more serious alcohol- or drug-related problems within the past year and no diagnosis of abuse or dependence as defined by DSM-IV diagnostic criteria

Source: Knight, J. R., S. K. Harris, et al. (2007). Prevalence of positive substance abuse screens among adolescent primary care patients. Arch Pediatr Adolesc Med 161(11): 1035-1041.

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Provider Follow-up Plans

Diagnostic Impression	Total (N=2034)	No Plan (N=369)	Periodic Screen (N=1557)	Notify Parents (N=13)	Return Visit (N=98)	Counseling (N=44)
No Use	75.9%	22.1%	77.4%	0.1%	0.6%	0.3%
Occasional Use	18.4%	7.5%	84.8%	1.3%	7.2%	3.7%
Problem Use	4.8%	0.0%	43.3%	6.2%	54.6%	22.7%
Abuse or Dependence	.01%	0.0%	15.8%	5.3%	42.1%	21.1%

P<.001 for all categories

Source: Hassan A, Harris SK, Sherritt L, Van Hook S, Brooks T, Carey P, Kossack R, Kulig J, Knight JR. Primary care follow-up plans for adolescents with substance use problems. Pediatrics 2009;124;144-150.

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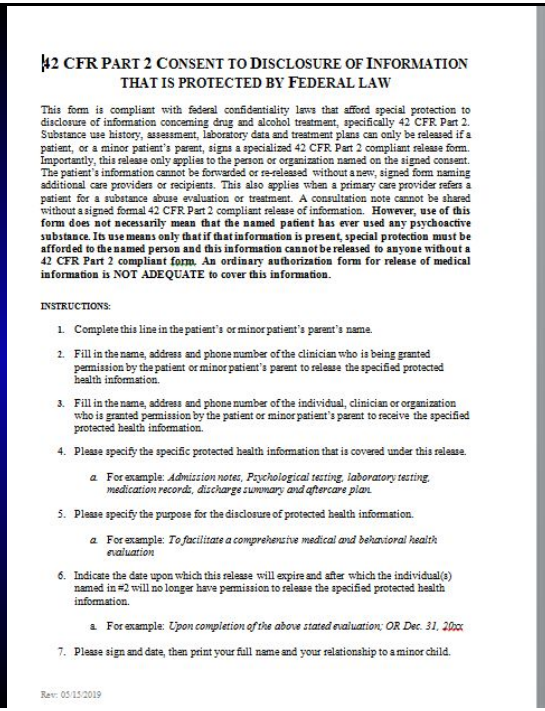
Communication

Pediatricians unfamiliar with 42 CFR Part 2

- **Problem**: experience referral to substance abuse treatment as “a black hole” (they refer; then never hear back)
- **Solution**: ask parent/patient to sign 42 CFR Part 2 authorization form at time of referral.
- **Problem**: may not protect confidentiality of information on patients with positive screens
- **Solution**: add language to EHR and work with HIM to ensure compliance



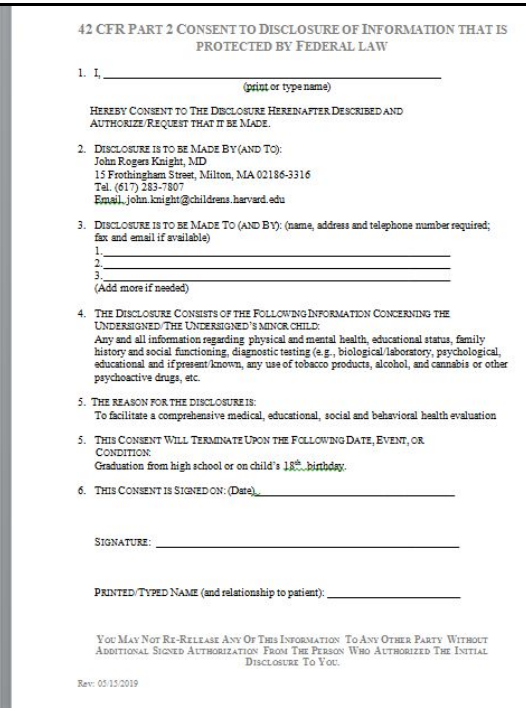
42 CFR PART 2 CONSENT TO DISCLOSURE OF INFORMATION THAT IS PROTECTED BY FEDERAL LAW

This form is compliant with federal confidentiality laws that afford special protection to disclosure of information concerning drug and alcohol treatment, specifically 42 CFR Part 2. Substance use history, assessment, laboratory data and treatment plans can only be released if a patient, or a minor patient's parent, signs a specialized 42 CFR Part 2 compliant release form. Importantly, this release only applies to the person or organization named on the signed consent. The patient's information cannot be forwarded or re-released without a new, signed form naming additional care providers or recipients. This also applies when a primary care provider refers a patient for a substance abuse evaluation or treatment. A consultation note cannot be shared without a signed formal 42 CFR Part 2 compliant release of information. **However, use of this form does not necessarily mean that the named patient has ever used any psychoactive substance. Its use means only that if that information is present, special protection must be afforded to the named person and this information cannot be released to anyone without a 42 CFR Part 2 compliant form. An ordinary authorization form for release of medical information is NOT ADEQUATE to cover this information.**

INSTRUCTIONS:

1. Complete this line in the patient's or minor patient's parent's name.
2. Fill in the name, address and phone number of the clinician who is being granted permission by the patient or minor patient's parent to release the specified protected health information.
3. Fill in the name, address and phone number of the individual, clinician or organization who is granted permission by the patient or minor patient's parent to receive the specified protected health information.
4. Please specify the specific protected health information that is covered under this release.
   a. For example: *Admission notes, Psychological testing, laboratory testing, medication records, discharge summary and aftercare plan.*
5. Please specify the purpose for the disclosure of protected health information.
   a. For example: *To facilitate a comprehensive medical and behavioral health evaluation*
6. Indicate the date upon which this release will expire and after which the individual(s) named in #2 will no longer have permission to release the specified protected health information.
   a. For example: *Upon completion of the above stated evaluation; OR Dec. 31, 20xx*
7. Please sign and date, then print your full name and your relationship to a minor child.

Rev: 05/15/2019



42 CFR PART 2 CONSENT TO DISCLOSURE OF INFORMATION THAT IS PROTECTED BY FEDERAL LAW

1. I, _____ (print or type name)

   HEREBY CONSENT TO THE DISCLOSURE HEREINAFTER DESCRIBED AND AUTHORIZE/REQUEST THAT IT BE MADE.

2. DISCLOSURE IS TO BE MADE BY (AND TO):
   John Rogers Knight, MD
   15 Frothingham Street, Milton, MA 02186-3316
   Tel. (617) 283-7807
   Email. john.knight@childrens.harvard.edu

3. DISCLOSURE IS TO BE MADE TO (AND BY): (name, address and telephone number required; fax and email if available)
   1. _____
   2. _____
   3. _____
   (Add more if needed)

4. THE DISCLOSURE CONSISTS OF THE FOLLOWING INFORMATION CONCERNING THE UNDERSIGNED/THE UNDERSIGNED'S MINOR CHILD:
   Any and all information regarding physical and mental health, educational status, family history and social functioning, diagnostic testing (e.g., biological/laboratory, psychological, educational and if present/known, any use of tobacco products, alcohol, and cannabis or other psychoactive drugs, etc.

5. THE REASON FOR THE DISCLOSURE IS:
   To facilitate a comprehensive medical, educational, social and behavioral health evaluation

5. THIS CONSENT WILL TERMINATE UPON THE FOLLOWING DATE, EVENT, OR CONDITION:
   Graduation from high school or on child's 18th. birthday.

6. THIS CONSENT IS SIGNED ON: (Date)_____

   SIGNATURE: _____

   PRINTED/TYPED NAME (and relationship to patient): _____

YOU MAY NOT RE-RELEASE ANY OF THIS INFORMATION TO ANY OTHER PARTY WITHOUT ADDITIONAL SIGNED AUTHORIZATION FROM THE PERSON WHO AUTHORIZED THE INITIAL DISCLOSURE TO YOU.

Rev: 05/15/2019

Development of the cSBA System

- Iterative process of focus groups, prototype development, user testing w/feedback and revision
- Computerized CRAFFT, self-administered before the medical encounter
- Personalized feedback on score & level of risk, 10 pages of information on substance-related risks
- Provider receives report w/score, risk-level, "talking points" for brief MI, recommended f/u plan

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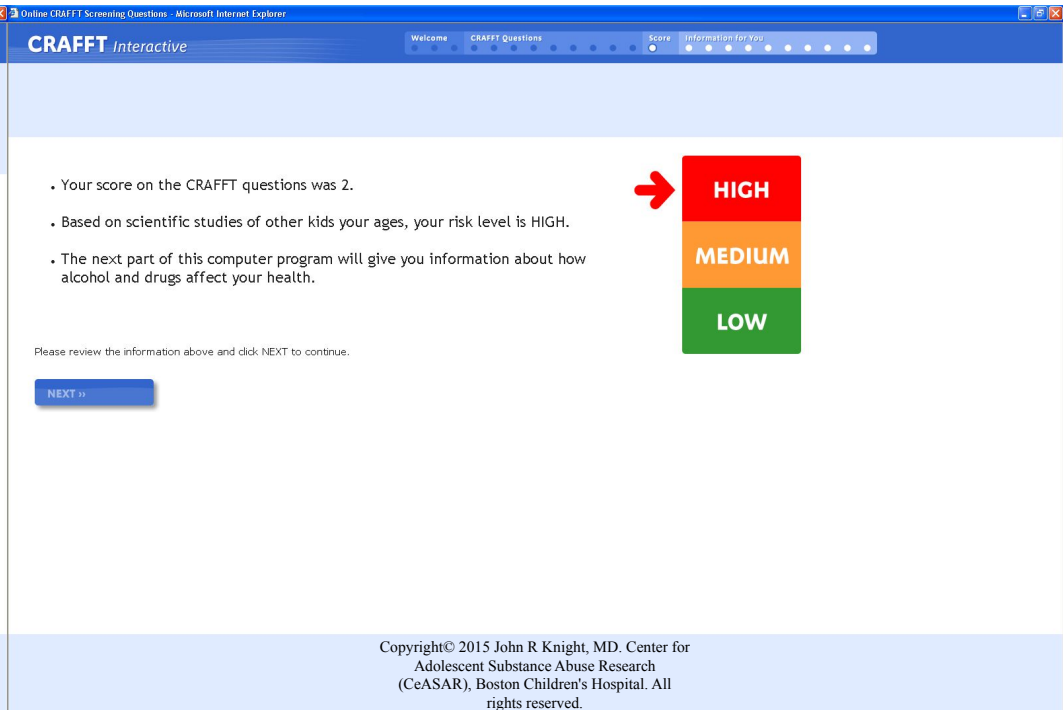
Focus Groups with Adolescents: *What kind of information?*

1. **Science**
   - "Don't tell us what to do. Just give us the facts, and trust us to make the right decisions."
2. **Stories**
   - "Put a human face on it to drive the message home."



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Online CRAFFT Screening Questions - Microsoft Internet Explorer

CRAFFT *Interactive*

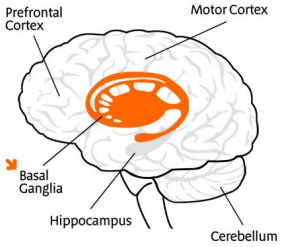
Welcome | CRAFFT Questions | Score | Information for You

Drugs and alcohol affect your brain and can damage it for life.

Drugs and alcohol can affect memory, coordination, decision making, learning, and cause depression.

Roll over the text below and see what happens to the picture.

Area of Brain	Drug Effect
Prefrontal Cortex	Leads to trouble making wise decisions.
Basil Ganglia	Impairs coordination, slows reflexes.
Hippocampus	Causes short-term memory loss.
Cerebellum	Affects balance and coordination.
Motor Cortex	Increases risk of stroke among young alcohol drinkers and drug users.



NEXT ››

[1]Eldreth DA, Matochik JA, Cadet JL, Bolla KI. Abnormal brain activity in prefrontal brain regions in abstinent marijuana users. Neuroimage. Nov 2004;23(3):914-920.

[2]Moselhy HF, Georgiou G, Kahn A. Frontal lobe changes in alcoholism: a review of the literature. Alcohol Alcohol. Sep-Oct 2001;36(5):357-368.

[3]Daumann J, Fischermann T, et al. Memory-related hippocampal dysfunction in poly-drug ecstasy (3,4-methylenedioxymethamphetamine) users. Psychopharmacology (Berl). Aug 2005;180(4):607-611.

[4]National Institute on Drug Abuse. Research Report Series.

Online CRAFFT Screening Questions - Microsoft Internet Explorer

CRAFFT *Interactive*

Welcome | CRAFFT Questions | Score | Information for You

Take your prescriptions exactly as your doctor says.

Never share your medicine or take someone else's medicine.

- Prescription drugs, like pain-killers, stimulants, and tranquilizers are safe when used as directed by your doctor.
- Perscription drugs are now the second most commonly abused drug among teens, after marijuana.
- When **abused:**
  - Pain killers like OxyContin® (OC's) or Vicodin® can cause addiction, brain damage, and **sudden death.**
  - Stimulant medications like Ritalin®, Adderall®, and Dexedrine® can cause addiction, seizures, rapid heart beat, and **sudden death.**
  - Tranquillizers like Klonopin® or Valium® can cause addiction, drowsiness, accidents, and **death from respiratory depression.**

This is a picture of Julie Z. at her junior prom. Julie was an outstanding student, skier, snowboarder, tennis player, and musician - beloved daughter, sister, and friend. Julie took oxycodone to get high and became addicted. Her family tried to help her get treatment. Before it could work Julie died from an accidental overdose of oxycodone. Her parents, brothers, and little sister will always miss her. The people who loved her will never completely get over her senseless death.

NEXT ››

[1]Hertz JA, Knight JR. Prescription drug misuse: a growing national problem. Adolesc Med Clin. Oct 2006;17(3):751-769; abstract xiii.

[2]Joranson DE, Ryan KM, et al. Trends in medical use and abuse of opioid analgesics. JAMA. Apr 5 2000;283(13):1710-1714.

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Before/After Comparative Effectiveness Trial

Months

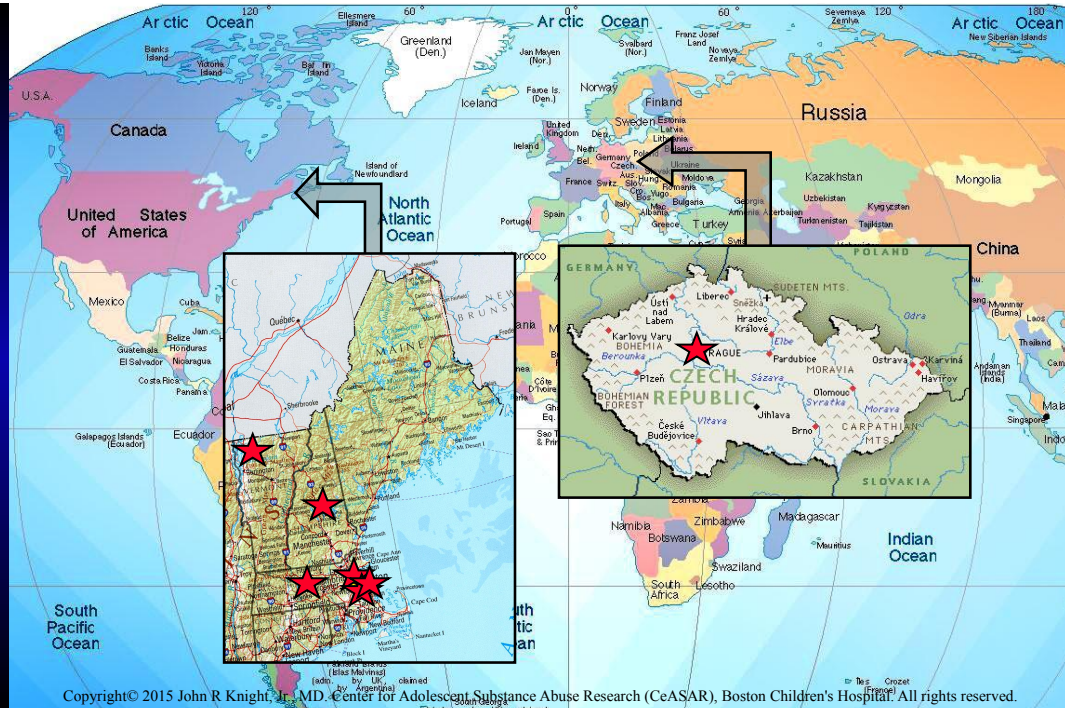
1 — 18 — 36

PCP's instructed: "Do what you usually do."

Recruit/test TAU

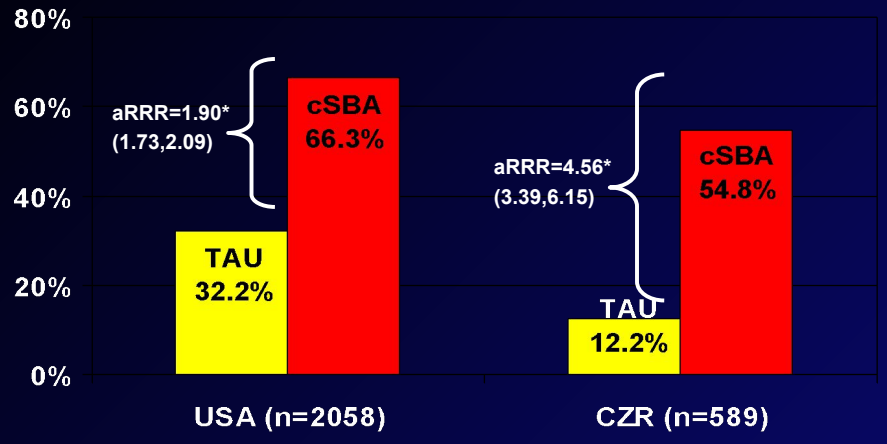
1° PCP training; Computer system initiated at all sites

Recruit/test cSBA



% PCPs Addressed SU Health Risks

% 12- to 18-year-old patients who report PCP discussed health risks of substance use
Computerized Screening, Brief Intervention, and Referral to Treatment (cSBA) vs. Treatment as Usual (TAU)



aRRR=adjusted Relative Risk Ratio (95% Confidence Interval); *p<.0001
Adjusted for age, gender, race/ethnicity, visit type and SES in USA and age, gender, and SES in Czech Republic.

Summary: 12-Month Outcomes

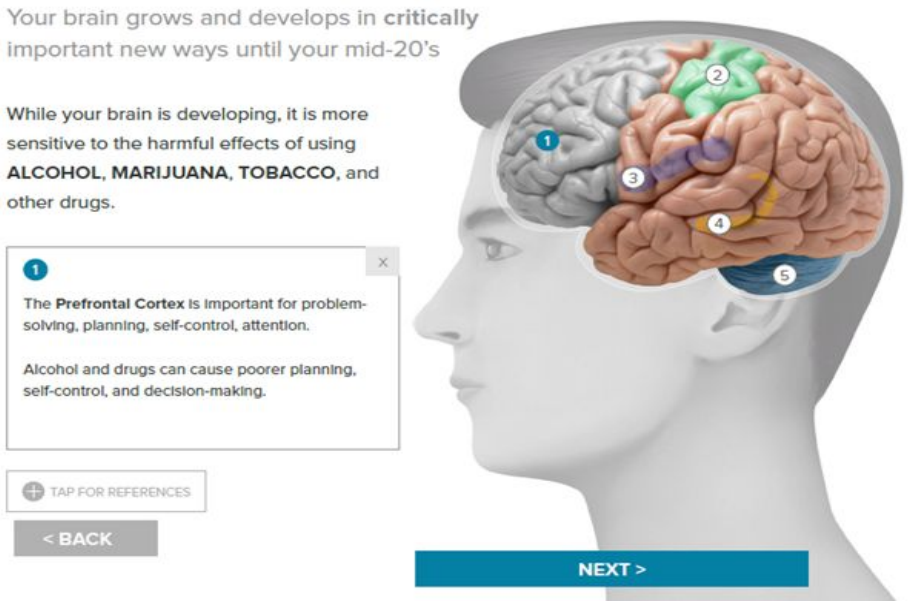
(adjusted Relative Risk Ratio with 95% confidence interval Computerized Screening, Brief Intervention, and Referral to Treatment (cSBA) vs. Treatment as Usual (TAU)

	USA	CZR
ALCOHOL		
Initiation	**.66** (.47-.93)	.76 (.53-1.08)
Cessation	1.50 (.93-2.42)	1.18 (.37-3.73)
CANNABIS		
Initiation	.81 (.54-1.21)	**.47** (.29-.76)
Cessation	1.01 (.57-1.78)	**2.53** (1.06-6.05)

Study Design 2015-2017

- Multi-site *patient*-randomized controlled trial
- Patients within each practice randomized by computer to cSBI or UC (2:1 ratio)
- Setting: 5 large pediatric practices in Boston area
- Providers all trained in using cSBI system and brief counseling using motivational interviewing
- Psychoeducational pages & Contract for Life updated, parents given information card on www.Teen-Safe.org

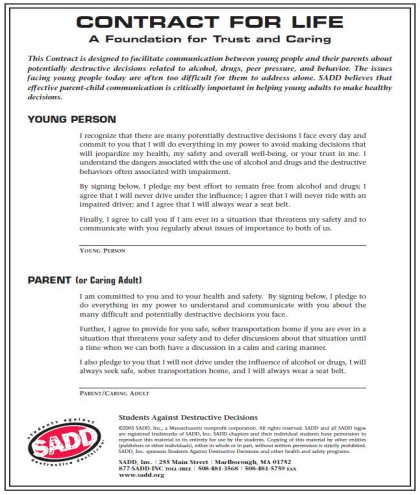
Psychoeducation: Science Page Example



Contract/Pledge for Life

Brief counseling tool to address riding/driving risk

Age < 18 yrs



CONTRACT FOR LIFE

A Foundation for Trust and Caring

This Contract is designed to facilitate communication between young people and their parents about potentially destructive decisions related to alcohol, drugs, peer pressure, and behavior. The issues facing young people today are often too difficult for them to address alone. SADD believes that effective parent-child communication is critically important in helping young adults to make healthy decisions.

YOUNG PERSON

I recognize that there are many potentially destructive decisions I face every day and commit to you that I will do everything in my power to avoid making decisions that will jeopardize my health, my safety and overall well-being, or your trust in me. I understand the dangers associated with the use of alcohol and drugs and the destructive behaviors often associated with impairment.

By signing below, I pledge my best effort to remain free from alcohol and drugs; I agree that I will never drive under the influence; I agree that I will never ride with an impaired driver; and I agree that I will always wear a seat belt.

Finally, I agree to call you if I am ever in a situation that threatens my safety and to communicate with you regularly about issues of importance to both of us.

Young Person

PARENT (or Caring Adult)

I am committed to you and to your health and safety. By signing below, I pledge to do everything in my power to understand and communicate with you about the many difficult and potentially destructive decisions you face.

Further, I agree to provide for you safe, sober transportation home if you are ever in a situation that threatens your safety and to defer discussions about that situation until a time when we can both have a discussion in a calm and caring manner.

I also pledge to you that I will not drive under the influence of alcohol or drugs, I will always seek safe, sober transportation home, and I will always wear a seat belt.

Parent/Caring Adult

Students Against Destructive Decisions

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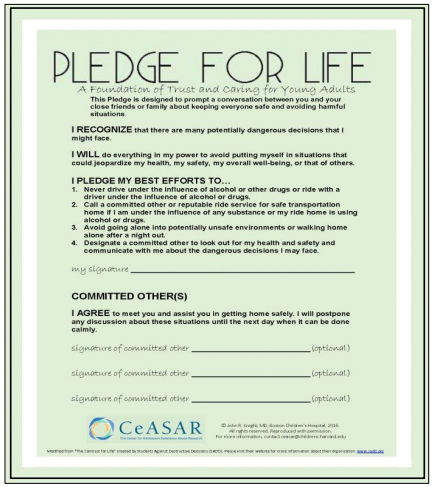
877.SADD.INC toll-free | 508-481-3568 | 508-481-5759 fax
www.sadd.org

Age ≥ 18 yrs



PLEDGE FOR LIFE

A Foundation of Trust and Caring for Young Adults

This Pledge is designed to prompt a conversation between you and your close friends or family about keeping everyone safe and avoiding harmful situations.

I RECOGNIZE that there are many potentially dangerous decisions that I might face.

I WILL do everything in my power to avoid putting myself in situations that could jeopardize my health, my safety, my overall well-being, or that of others.

I PLEDGE MY BEST EFFORTS TO...

1. Never drive under the influence of alcohol or other drugs or ride with a driver under the influence of alcohol or drugs.
2. Call a committed other or reputable ride service for safe transportation home if I am under the influence of any substance or my ride home is using alcohol or drugs.
3. Avoid going alone into potentially unsafe environments or walking home alone after a night out.
4. Designate a committed other to look out for my health and safety and communicate with me about the dangerous decisions I may face.

my signature _____

COMMITTED OTHER(S)

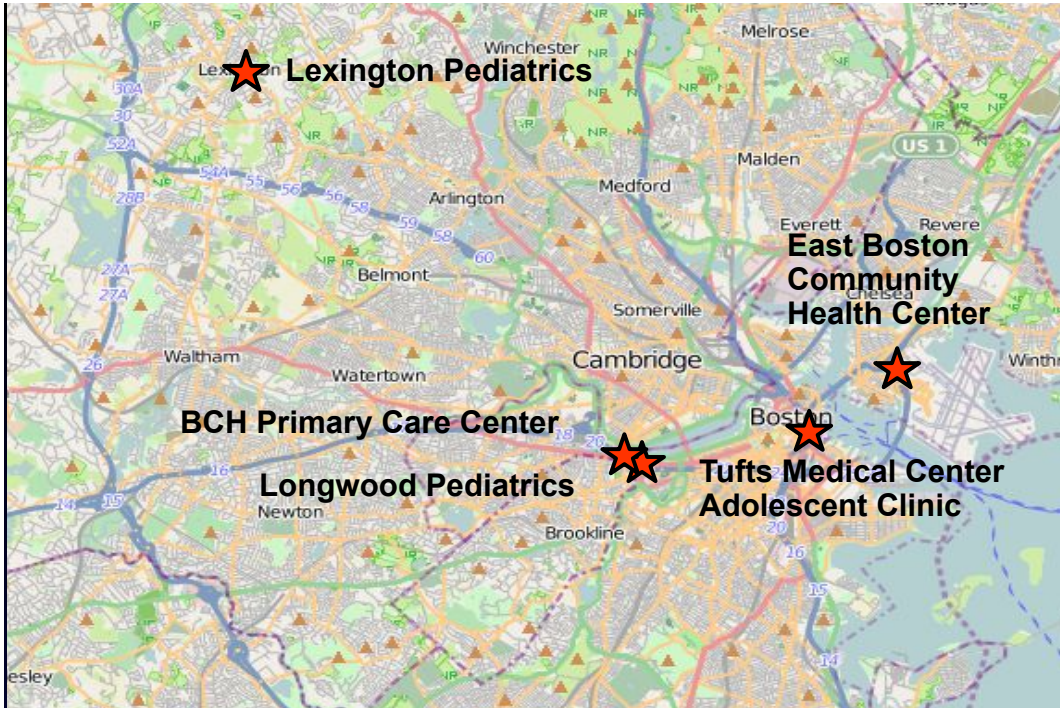
I AGREE to meet you and assist you in getting home safely. I will postpone any discussion about these situations until the next day when it can be done calmly.

signature of committed other _____ (optional)

signature of committed other _____ (optional)

signature of committed other _____ (optional)

CeASAR

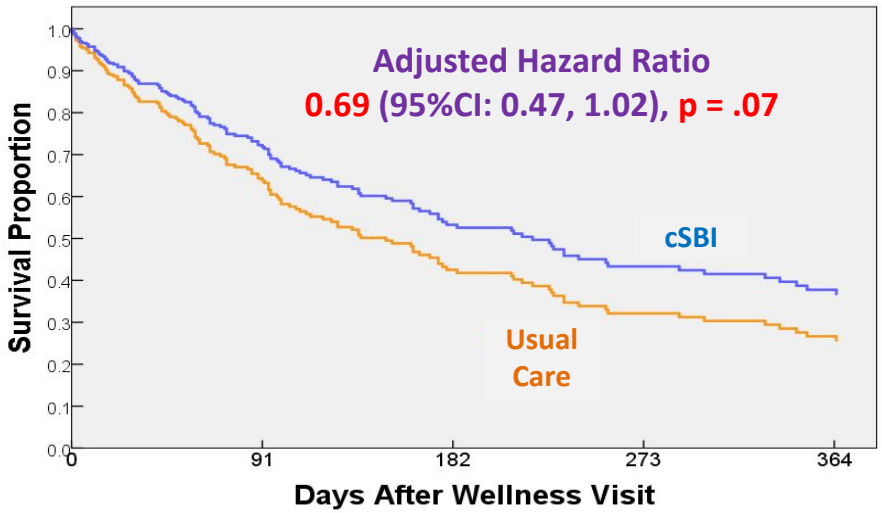


Clinician Brief Counseling: "The 5 R's"

1. Review: Screening results
2. Recommend: Not to use
3. Riding/ Driving: Risk counseling
4. Response: Elicit self-motivational statements
5. Reinforce: Self-efficacy

Time to First Alcohol Use After Visit (N=160)

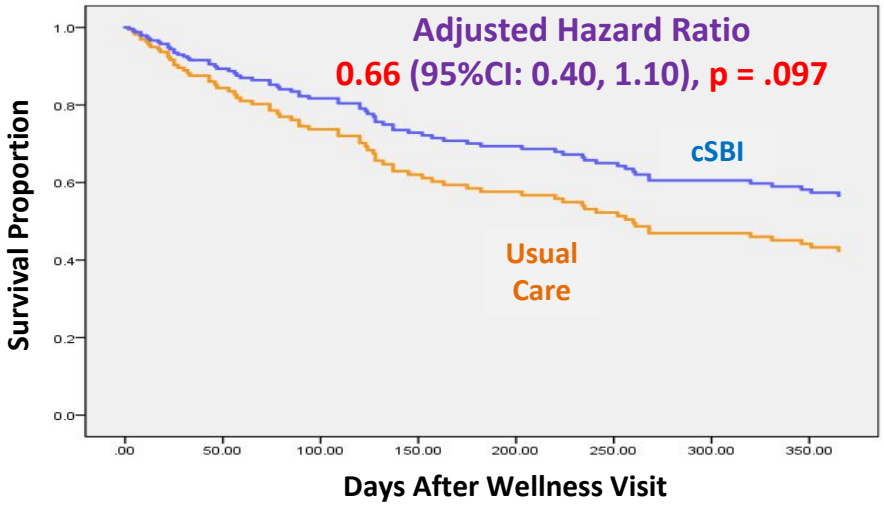
Group: Past-12-month Alcohol Use at Baseline



* Adjusted for past-12-month days of alcohol use reported at baseline

Time to First Heavy Episodic Drinking After Visit (N=160)

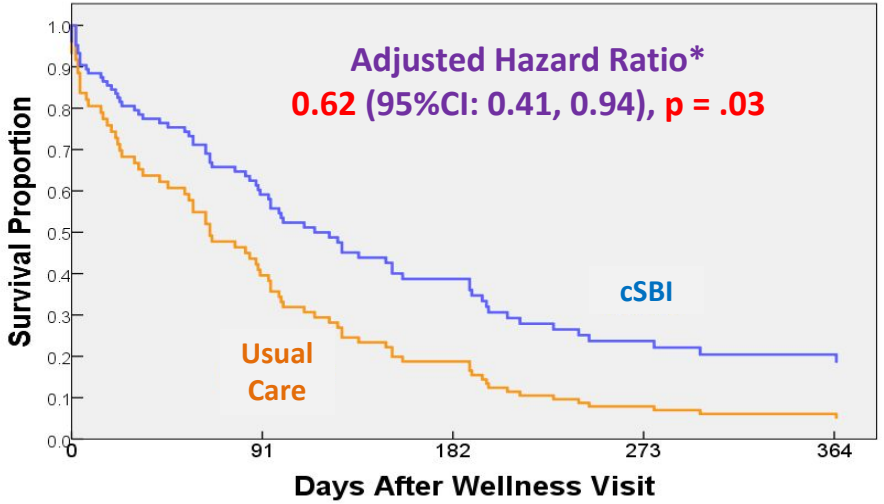
Group: Past-12-month Alcohol Use at Baseline



* Adjusted for past-12-month days of alcohol use reported at baseline

Time to First Cannabis Use After Visit (N=85)

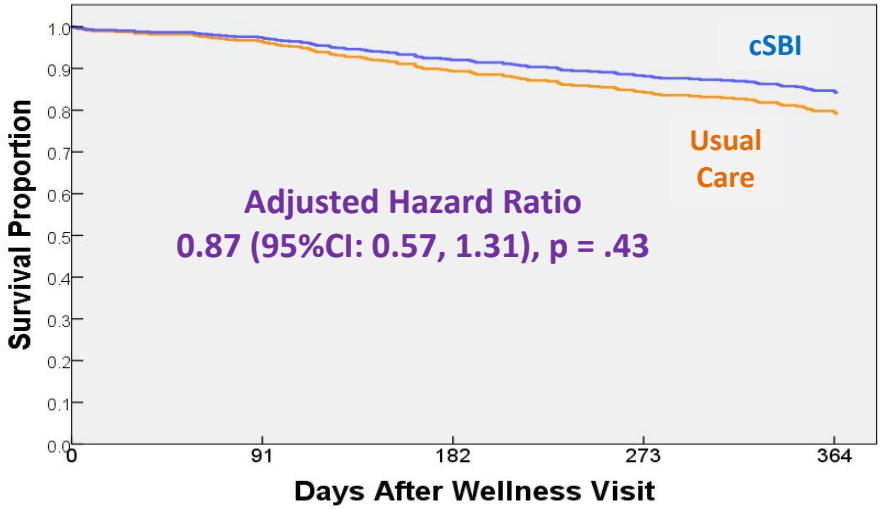
Group: Past-12-month Cannabis Use at Baseline



* Adjusted for patient's age

Time to First Alcohol Use After Visit (N=624)

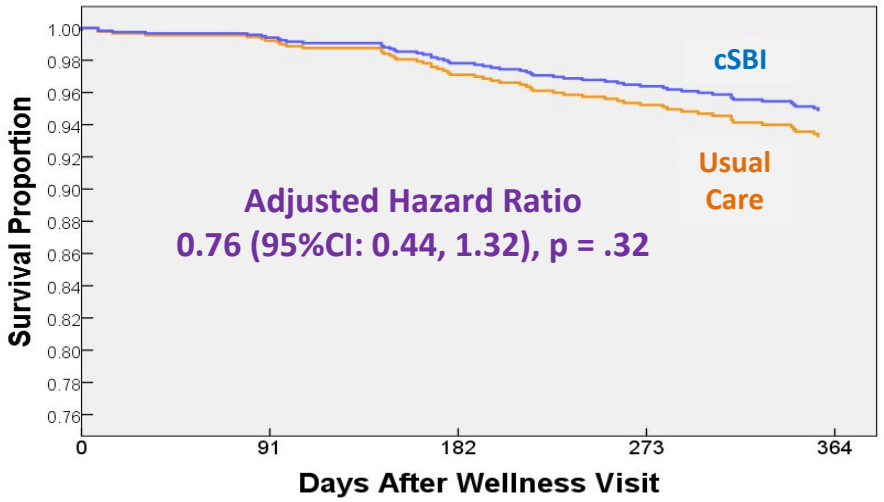
Group: No Past-12-month Alcohol Use at Baseline



* Adjusted for patient's age

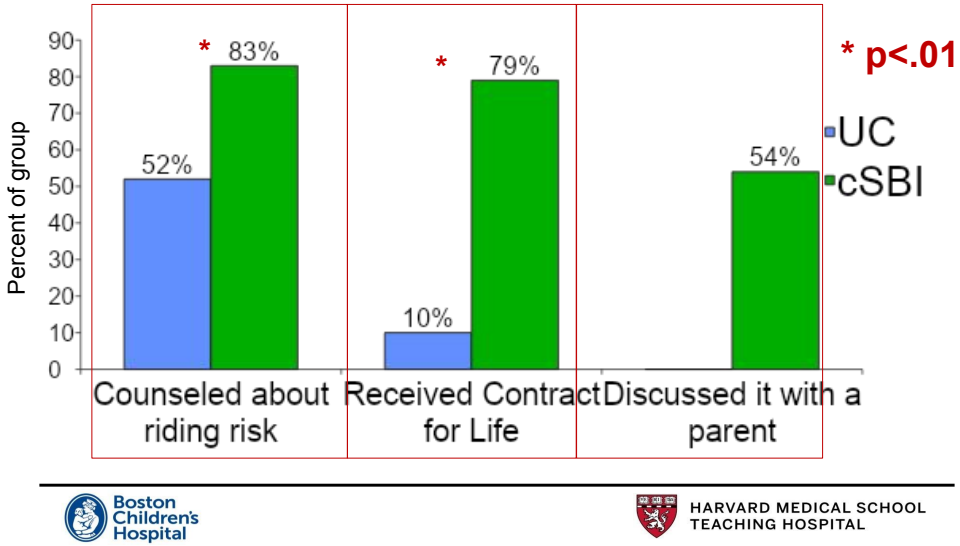
Time to First Cannabis Use After Visit (N=699)

Group: No Past-12-month Cannabis Use at Baseline



* Adjusted for patient's age

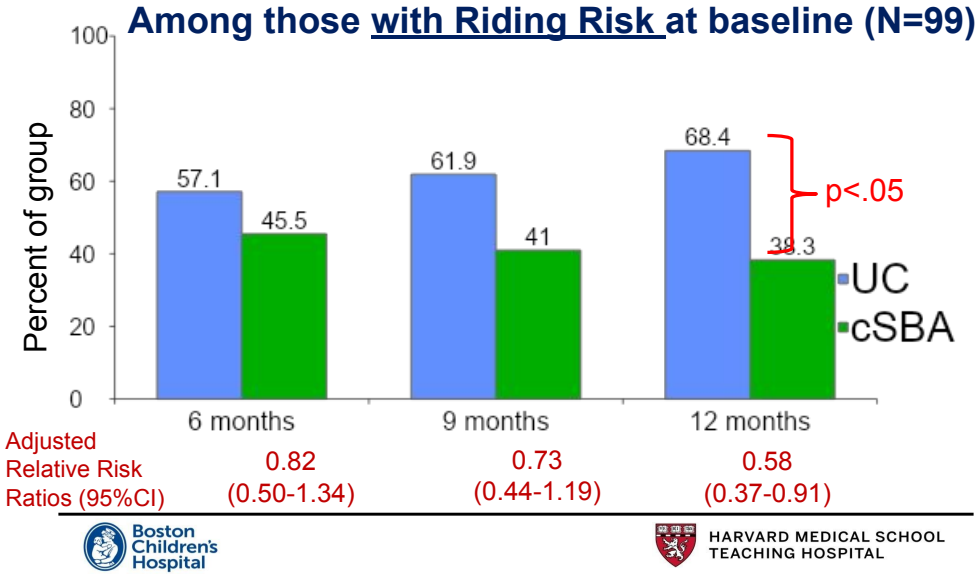
Contract for Life: Feasibility/Acceptability



Boston Children's Hospital

HARVARD MEDICAL SCHOOL TEACHING HOSPITAL

Riding Risk Rates during Follow-up



Boston Children's Hospital

HARVARD MEDICAL SCHOOL TEACHING HOSPITAL

iPad only: Apple App Store

Search: Juno Health

Basic Principles of MI

1.	Express Empathy
2.	Develop Discrepancy
3.	Roll with Resistance
4.	Support Self-Efficacy

Source: Miller WR, Rollnick S. Motivational Interviewing: Helping People Change, third edition. New York, NY: The Guilford Press; 2012.

When all else fails:

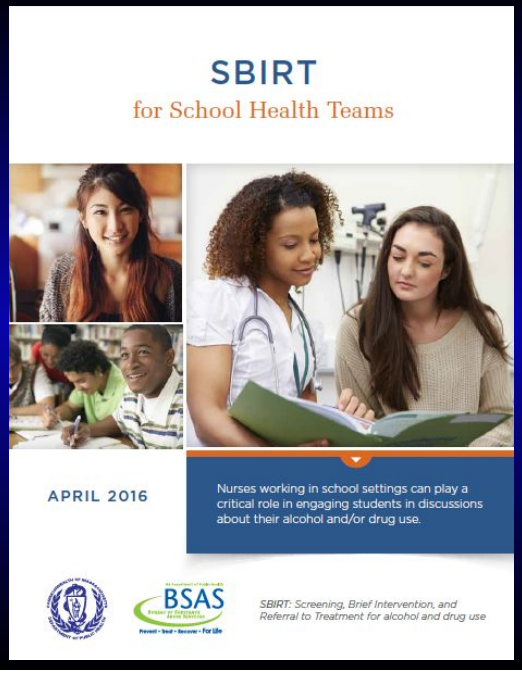
I care about you (and your health).

I am very concerned about you.

I will be here for you.

www.Teen-Safe.org

- 2010 pilot study: Milton High School
  - Principal linked parents' completion to graduation/check-out
  - >95% completion, high parental ratings, no alc/drug-related problems at prom or graduation
  - Parents viewed second time with their teenagers
- 20-30 Additional High Schools
  - Works well when linked to parent requirements either at beginning or end of academic year
- Freely available to all
  - Subscription available ($200) for school-wide tracking data



Resources:

Free download of CRAFFT questionnaires and interview forms:

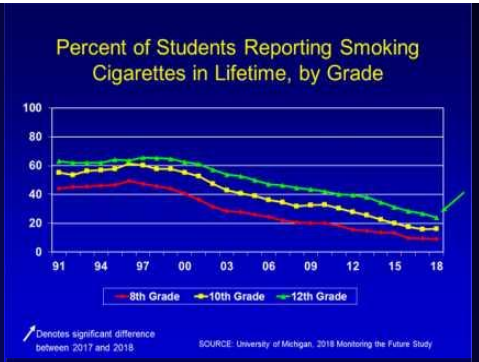
http://CRAFFT.org

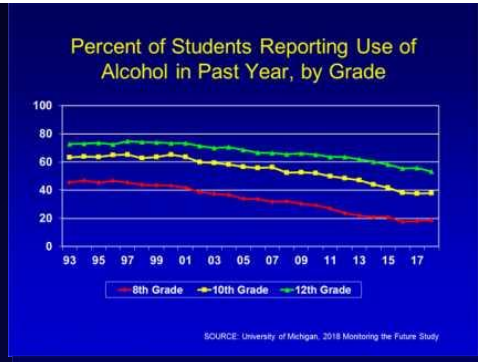
Step by step tutorial on CRAFFT screening and brief intervention:

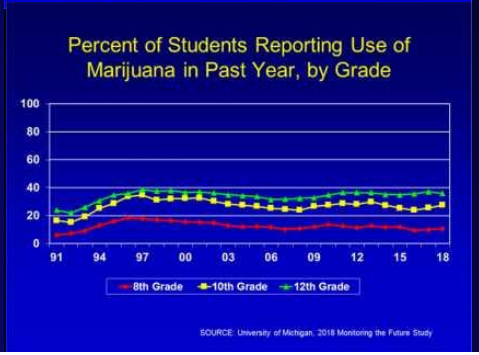
https://youtu.be/hrnldU75HOc

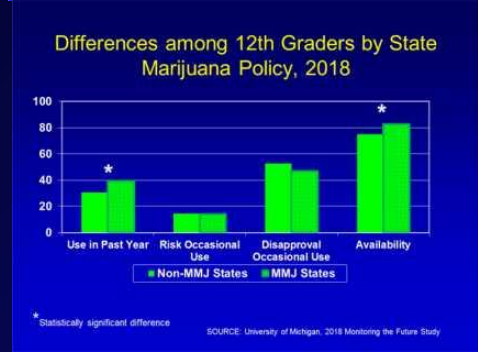
New Challenges for Pediatricians

Recent trends in use of tobacco, alcohol and other drugs among U.S. youth



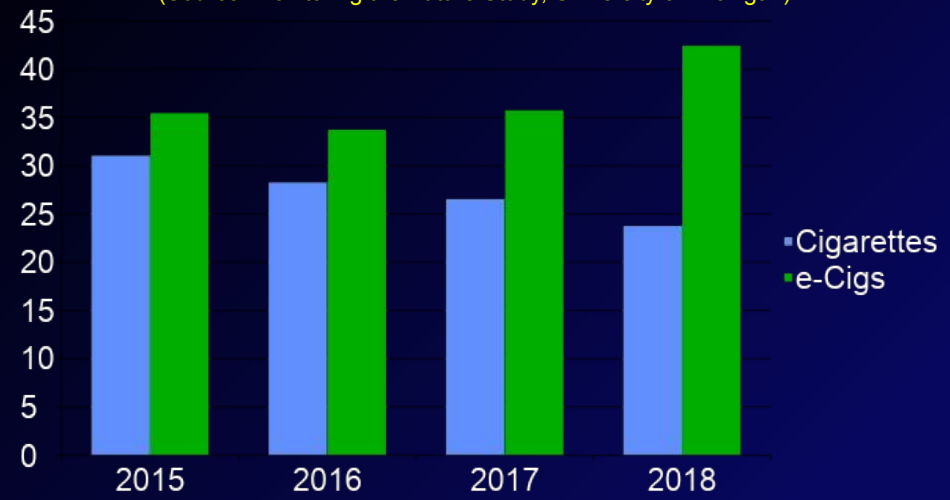


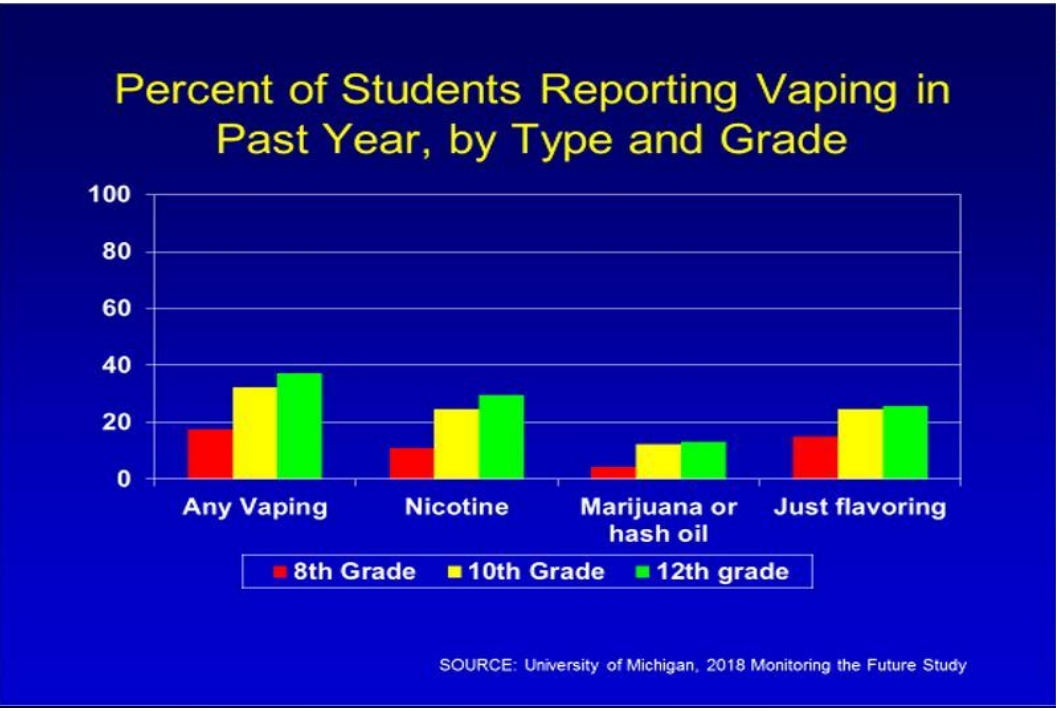




Lifetime Use of Cigarettes and e-Cigs among 12-graders 2015-2018

(Source: Monitoring the Future Study, University of Michigan)





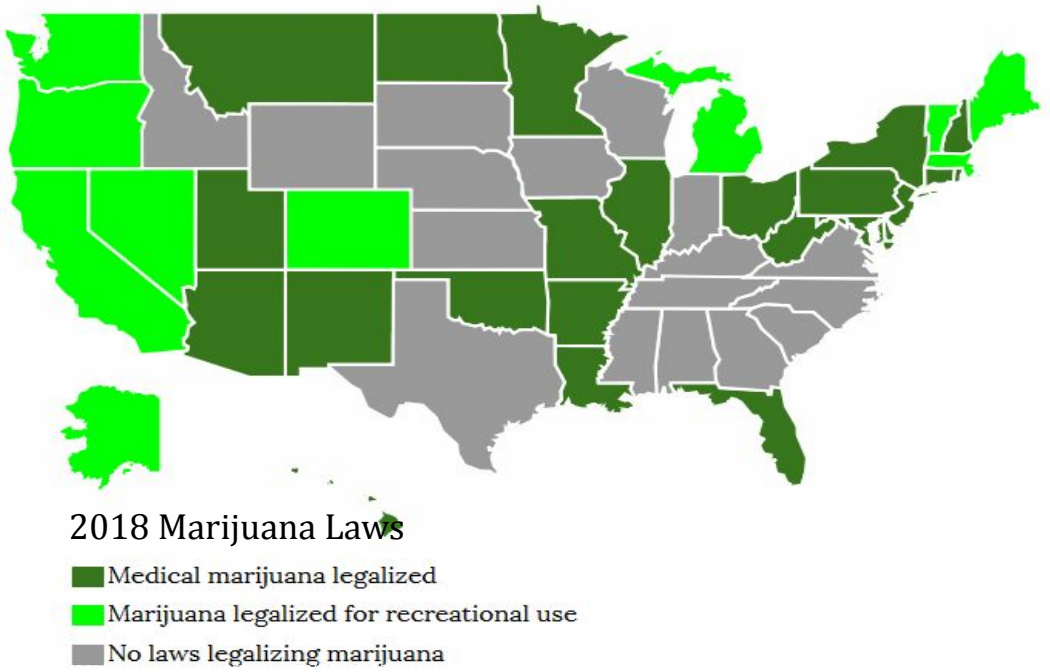
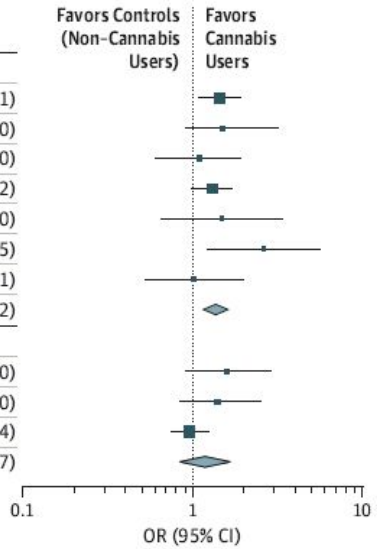


Figure 2. Forest Plot Showing Adjusted Odds Ratio (OR) and 95% CIs for Depression and Anxiety in Young Adulthood According to Cannabis Use in Individual Studies

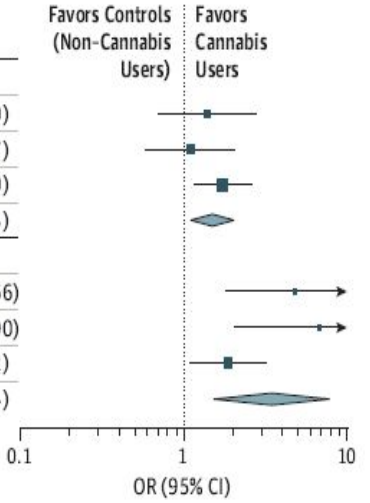
Study	OR (95% CI)
Depression in young adulthood	
Brook et al,[34] 2002, United States	1.44 (1.08 to 1.91)
Brook et al,[16] 2011, United States and Puerto Rico	1.50 (0.90 to 3.20)
Degenhardt et al,[38] 2013, Australia	1.10 (0.60 to 1.90)
Gage et al,[44] 2015, United Kingdom	1.30 (0.98 to 1.72)
Georgiades and Boyle,[45] 2007, Canada	1.48 (0.65 to 3.40)
Marmorstein and Iacono,[46] 2011, USA	2.62 (1.22 to 5.65)
Silins et al,[10] 2014, Australia and New Zealand	1.02 (0.52 to 2.01)
Pooled OR for all studies: $Q = 3.26$, $df = 6$ ($P = .62$); $I^2 = 0\%$	1.37 (1.16 to 1.62)
Anxiety in young adulthood	
Brook et al,[16] 2011, United States and Puerto Rico	1.60 (0.90 to 2.90)
Degenhardt et al,[38] 2013, Australia	1.40 (0.84 to 2.50)
Gage et al,[44] 2015, United Kingdom	0.96 (0.75 to 1.24)
Pooled OR for all studies: $Q = 3.26$, $df = 2$ ($P = .20$); $I^2 = 42\%$	1.18 (0.84 to 1.67)



Source: Gobbi G, Atkin T, Zytynski T, Wang S, Askari S, Boruff J, Ware M, Marmorstein N, Cipriani A, Dendukuri N, Mayo N. Association of cannabis use in adolescence and risk of depression, anxiety, and suicidality in young adulthood: A systematic review and meta-analysis. JAMA Psychiatry. 2019;76(4):426-434.

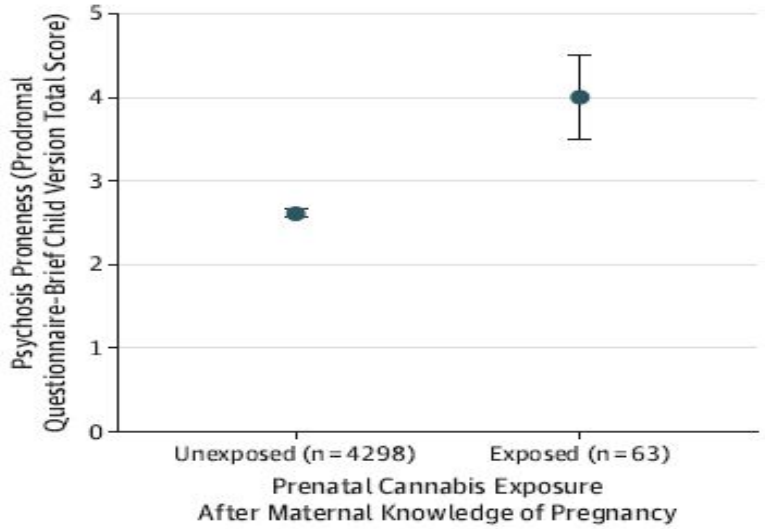
Figure 3. Forest Plot Showing Adjusted Odds Ratio (OR) and 95% CIs for Suicidal Ideations and Attempts According to Cannabis Use in Individual Studies

Study	OR (95% CI)
Suicide ideations	
Fergusson et al,[41] 1996, New Zealand	1.40 (0.70 to 2.80)
McGee et al,[47] 2005, New Zealand	1.10 (0.58 to 2.07)
Weeks and Colman,[57] 2016, Canada	1.74 (1.16 to 2.60)
Pooled OR for all studies: $Q = 1.49$, $df = 2$ ($P = .48$); $I^2 = 0\%$	1.50 (1.11 to 2.03)
Suicide attempts	
Roberts et al,[54] 2010, United States	4.81 (1.82 to 12.66)
Silins et al,[10] 2014, Australia and New Zealand	6.83 (2.04 to 22.90)
Weeks and Colman,[57] 2016, Canada	1.87 (1.09 to 3.22)
Pooled OR for all studies: $Q = 5.38$, $df = 2$ ($P = .07$); $I^2 = 61.3\%$	3.46 (1.53 to 7.84)

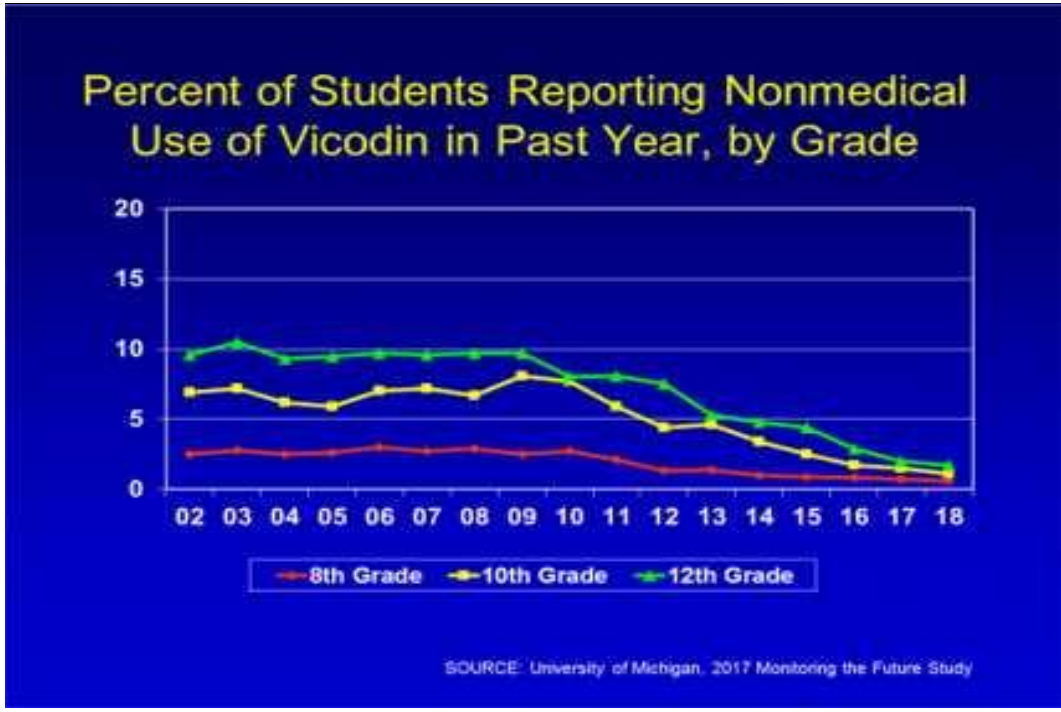


Source: Gobbi G, Atkin T, Zytynski T, Wang S, Askari S, Boruff J, Ware M, Marmorstein N, Cipriani A, Dendukuri N, Mayo N. Association of cannabis use in adolescence and risk of depression, anxiety, and suicidality in young adulthood: A systematic review and meta-analysis. JAMA Psychiatry. 2019;76(4):426-434.

Figure. Association of Prenatal Cannabis Exposure After Maternal Knowledge of Pregnancy With Psychosis Proneness During Childhood



Source: Fine JD, Moreau AL, Karcher NR, Agrawal A, Rogers CE, Barch DM, Bogdan R. Association of prenatal cannabis exposure with psychosis proneness among children in the Adolescent Brain Cognitive Development (ABCD) study (Research Letter). Published on-line March 27, 2019. Available: https://jamanetwork.com/journals/jamapsychiatry/article-abstract/2729440. Accessed May 4, 2019. JAMA Psychiatry. 2019.

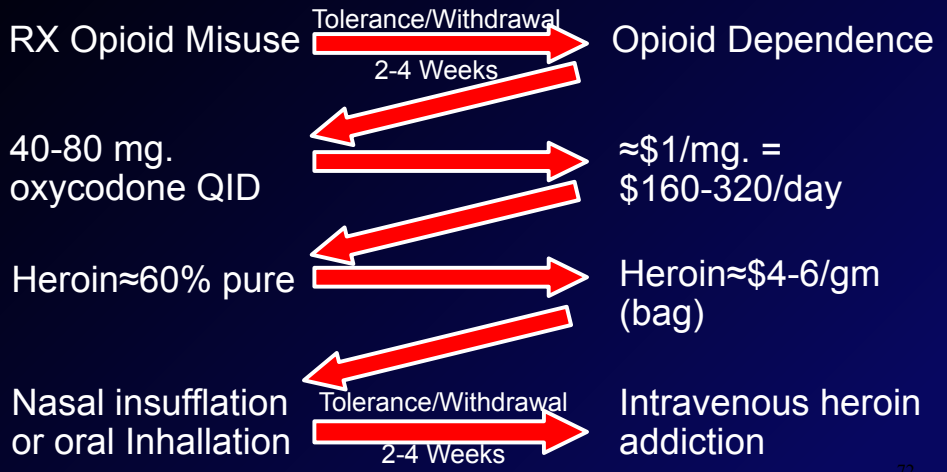


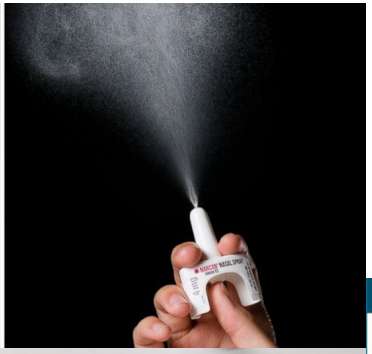
Likelihood of subsequent abuse of prescription opioids: 18–25 year olds, 2006–2008 (N = 55,215)

	Full model		Men (n = 26,381)		Women (n = 28,834)	
Characteristic	AOR	95% CI	AOR	95% CI	AOR	95% CI
Male	Ref					
Female	.78	.73–.84				
Race						
White	2.12	1.88–2.39	2.44	2.04–2.92	1.81	1.46–2.24
Black	Ref		Ref		Ref	
Hispanic	1.19	.98–1.45	1.34	1.02–1.75	1.06	.80–1.40
Other	1.23	1.01–1.49	1.43	1.05–1.95	1.03	.79–1.35
Age (years)						
18–19	1.26	1.11–1.43	1.25	1.06–1.46	1.29	1.10–1.51
20–21	1.27	1.11–1.46	1.21	1.02–1.43	1.35	1.14–1.61
22–23	1.16	1.03–1.30	1.19	1.00–1.41	1.12	.96–1.30
24–25	Ref		Ref		Ref	
Previous alcohol use	1.23	1.11–1.36	1.29	1.14–1.47	1.16	1.00–1.33
Previous cigarette use	1.25	1.16–1.36	1.21	1.06–1.37	1.33	1.17–1.51
Previous marijuana use	**2.44**	**2.22–2.67**	**2.52**	**2.22–2.85**	**2.34**	**2.07–2.66**

Source: Fiellin LE, Tetrault JM, Becker WC, Fiellin DA, Hoff RA. Previous use of alcohol, cigarettes, and marijuana and subsequent abuse of prescription opioids in young adults. J Adolesc Health. Feb 2013;52(2):158-163.

Natural History of Youth Opioid Use Disorders





The NEW ENGLAND JOURNAL of MEDICINE

The Rising Price of Naloxone — Risks to Efforts to Stem Overdose Deaths

Ravi Gupta, B.S., Nilay D. Shah, Ph.D., and Joseph S. Ross, M.D., M.H.S.

Recent and Current Prices for Naloxone.*

Naloxone Product	Manufacturer	Previous Available Price (yr)	Current Price (2016)
Injectable or intranasal, 1 mg-per-milliliter vial (2 ml) (mucosal atomizer device separate)	Amphastar	$20.34 (2009)	$39.60
Injectable			
0.4 mg-per-milliliter vial (10 ml)	Hospira	$62.29 (2012)	$142.49
0.4 mg-per-milliliter vial (1 ml)	Mylan	$23.72 (2014)	$23.72
0.4 mg-per-milliliter vial (1 ml)	West-Ward	$20.40 (2015)	$20.40
Auto-injector, two-pack of single-use prefilled auto-injectors (Evzio)	Kaleo (approved 2014)	$690.00 (2014)	$4,500.00
Nasal spray, two-pack of single-use intranasal devices (Narcan)	Adapt (approved 2015)	$150.00 (2015)	$150.00

* Price information was obtained from Medi-Span Price Rx (Wolters Kluwer Clinical Drug Information).

Gupta R et al. N Engl J Med 2016;375:2213-2215.

Drug Addiction Treatment Act of 2000

- Physicians who complete 8-hrs of training may apply for a DEA "Waiver" to prescribe buprenorphine.
- DEA awards second number beginning with "X".
- Initial limits to 30 patients have been expanded to 100.

Buprenorphine

- μ opioid receptor partial agonist
- Primarily antagonistic actions on κ opioid and δopioid receptors
- Half-life c. 24-60 hours
- Formulations:
  - Mono product (Subutex)
  - With naloxone (Suboxone) – 4:1 ratio to prevent injection
  - 2mg and 8mg sublingual tablets or film strips

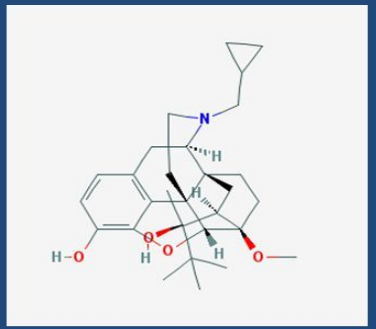
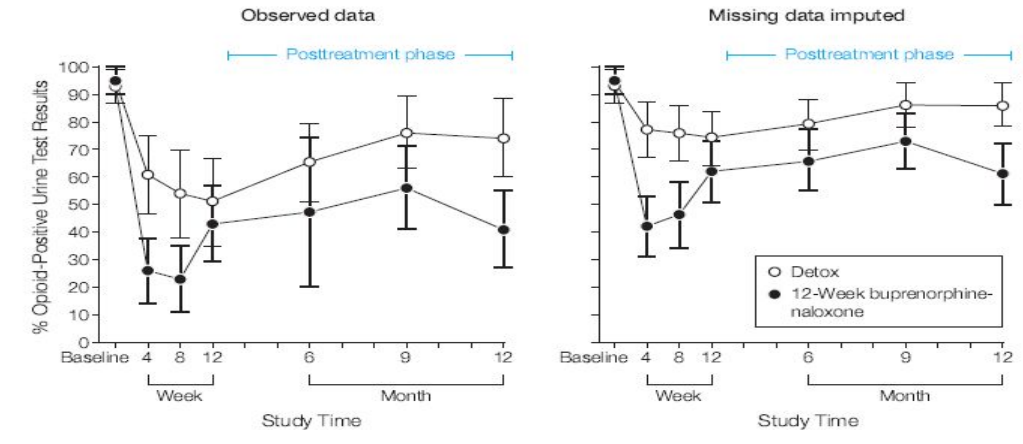


Figure 2. Percentage of Opioid-Positive Urine Test Results at Baseline and Weeks 4, 8, and 12 and Follow-up Months 6, 9, and 12



Detox indicates detoxification group. Error bars indicate 95% confidence intervals.
[a]12-Week buprenorphine-naloxone group.

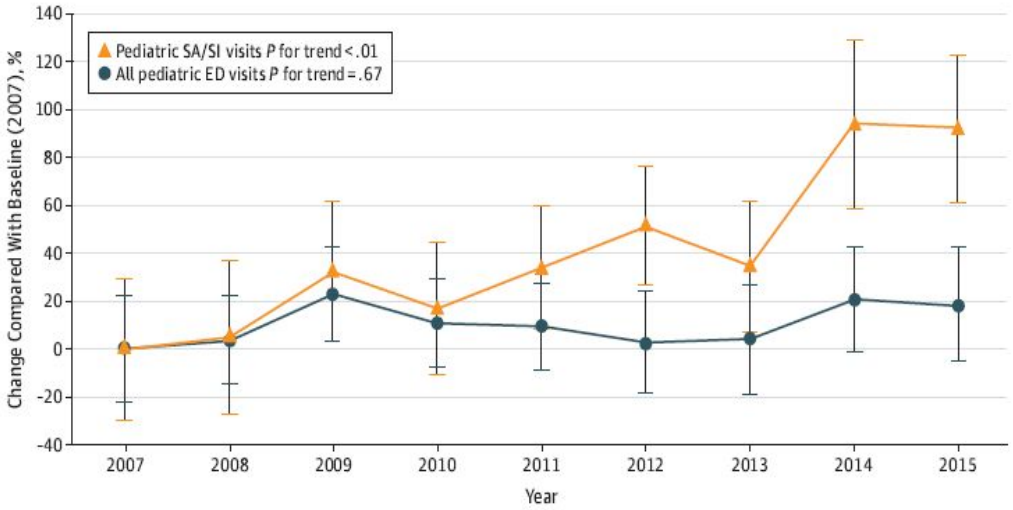
Source: Woody GE, Poole SA, Subramaniam G, Dugosh K, Bogenschutz M, Abbott P, Patkar A, Publicker M, McCain K, Potter JS, Forman R, Vetter V, McNicholas L, Blaine J, Lynch KG, Fudala P. Extended vs short-term buprenorphine-naloxone for treatment of opioid-addicted youth: A randomized trial. JAMA. 2008;300(17);2003-2011.

Do Youth Receive Addiction Treatment Following Opioid Overdose?

- 4,039,260 Medicaid-enrolled youth aged 13-22 years during 2009-2015
- 3,835 youth experienced overdose, 58.8% were female (21% pregnant) and 65.9% were non-Hispanic white
- 1142 youth (31.3%) received ***any*** addiction treatment within 30 days after overdose;
- 1,075 (29.5%) received only behavioral health services
- ***Only 67 (1.8%) received medication***

Source: Alinsky R, Zima B, Bagley S, Rodean J, Matson P, Adger H, Hadland SE. 32. Receipt of Addiction Treatment Following Opioid-Related Overdose Among Medicaid-Enrolled Youth (Research Abstract). Journal of Adolescent Health. 2019;64(2):S17.

Figure. Associated Changes in Pediatric Emergency Department (ED) Visits for Suicide Attempts (SA) and Suicidal Ideation (SI)



Source: Burstein B, Agostino H, Greenfield B. Suicidal attempts and ideation among children and adolescents in US emergency departments, 2007-2015 (Research Letter). Published on-line April 8, 2019. Available: https://jamanetwork.com/journals/jamapediatrics/fullarticle/2730063. Accessed May 4, 2019. JAMA Pediatrics. 2019.

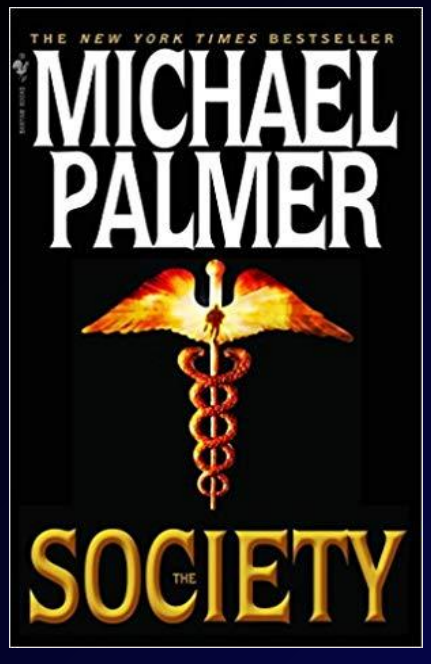
Risk Factors for Suicide

- Major Depressive Disorder
- Bipolar Disorder
- Substance Use Disorder
- Conduct Disorder
- Suicidal Ideation
- **Previous Suicide Attempt***

Source: Brent DA, Perper JA, Moritz G, Allman C, Friend A, Roth C, Schweers J, Balach L, Baugher M. Psychiatric Risk Factors for Adolescent Suicide: A Case-Control Study. J Am Acad Child Adolesc Psychiatry. 1993;32(3):521-529.

Critical Elements in Suicide Risk Assessment

- Wish to get away from it all?
- Wish to be dead or go to sleep, never wake up?
- Wish to kill self (without plan)?
- Made plan to kill self (without preparation)?
- Prepared to kill self (e.g., has pills, firearm)?
- Made attempt to kill self?



- When in doubt, err on the side of safety.
- Acute suicidality requires close observation, ideally in acute residential or hospital setting.
- In many areas, acute beds are scarce; waits are long.
- What's a pediatrician to do?

Expert Panel

Greg Marley, LCSW • Clinical Director, National Alliance on Mental Illness (NAMI) Maine • Expertise in suicide prevention, substance abuse prevention, mental health & prevention systems integration	**Emily Moores** • Tobacco Prevention and Control Manager, Maine Center for Disease Control and Prevention • Expertise in implementation of programs for prevention of youth tobacco use and e-cig/vaping
Alane O'Connor, DNP • Maine Dartmouth Family Medicine Residency Program, MaineGeneral Medical Center • Expertise in managing opioid use disorders using buprenorphine among pregnant women; research on newborn outcomes	**Robyn Ostrander, MD** • Child & Adolescent Psychiatrist at MaineHealth • Expertise in demystifying psychiatric disorders for children and families; serving as "tour guide" for the mental health treatment system