Substance use in Adolescence
Causes, prevention, and management

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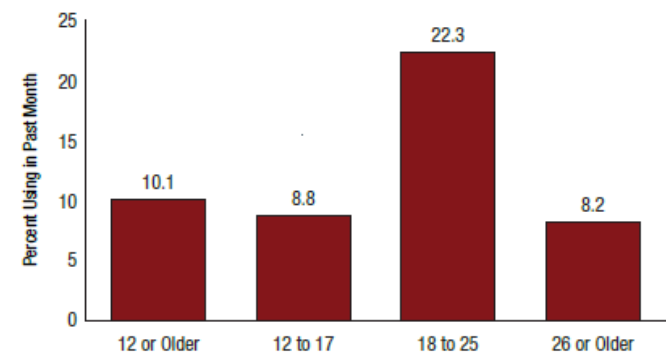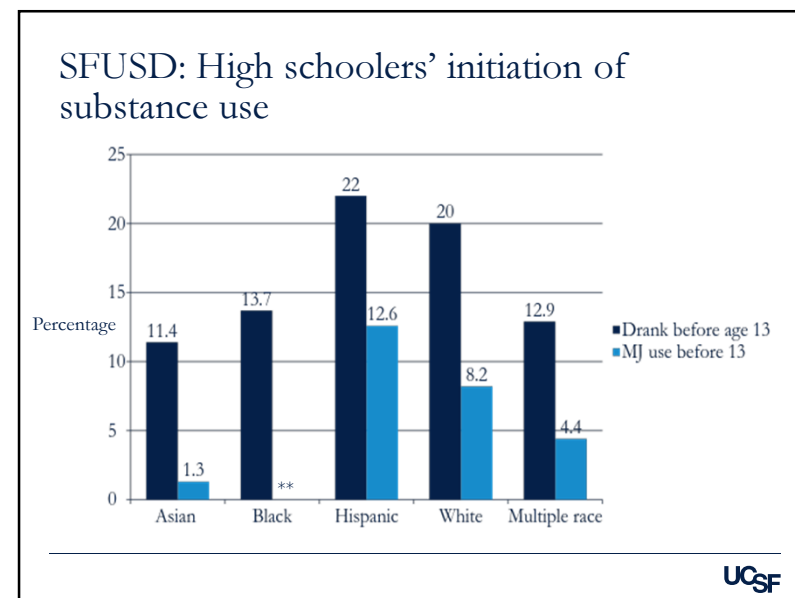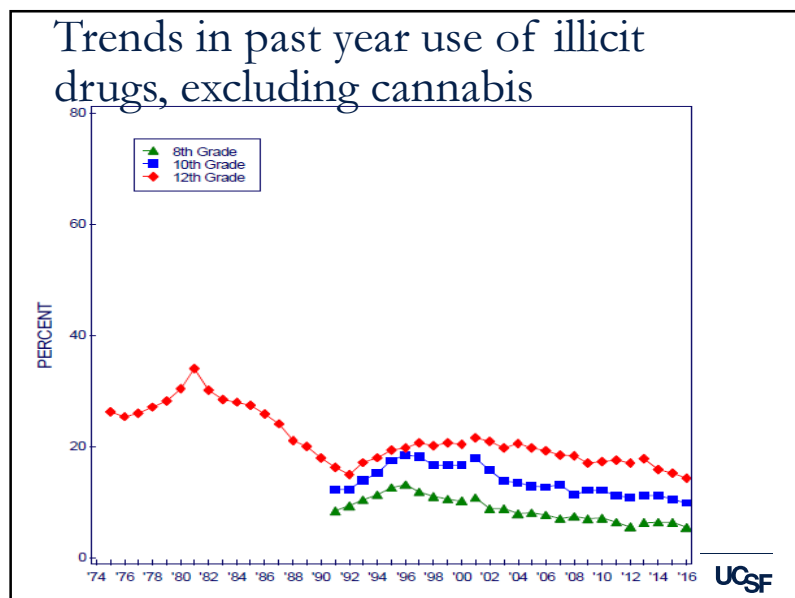University of California, San Francisco

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No Conflicts of Interest

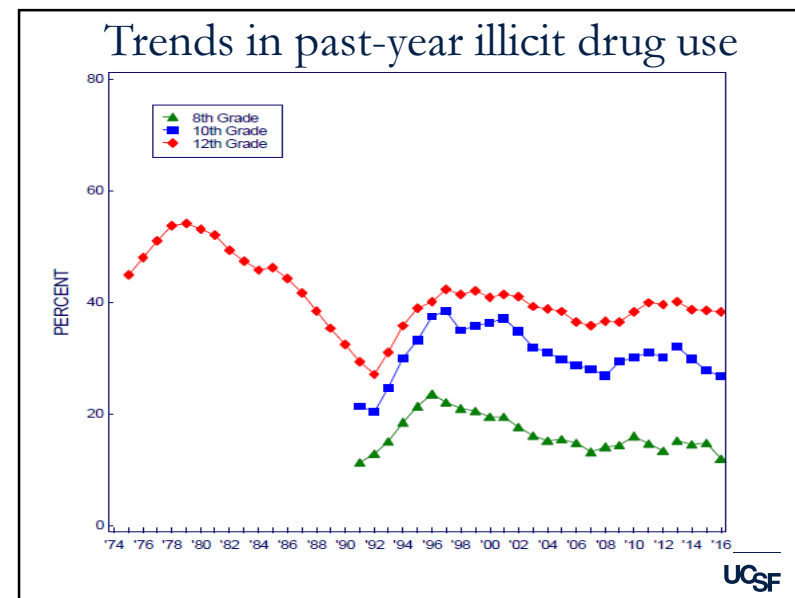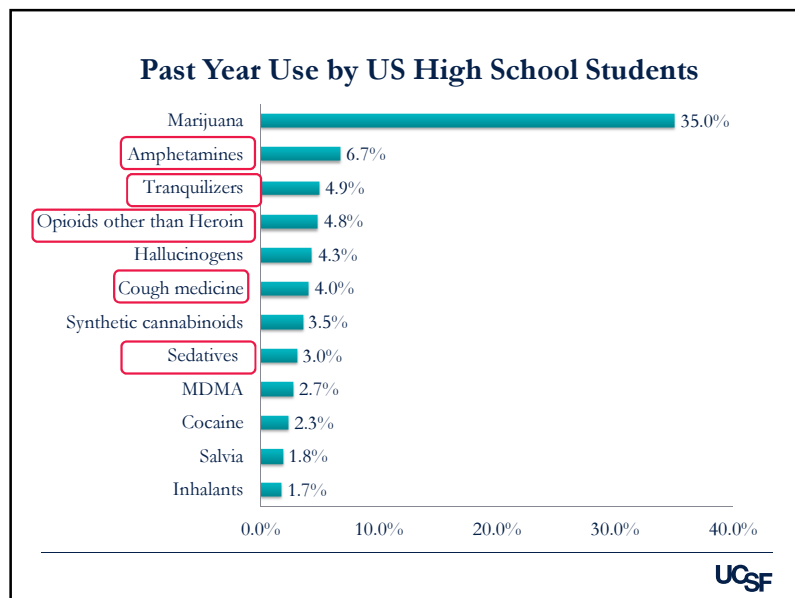
9 OUT OF 10
PEOPLE WITH SUBSTANCE PROBLEMS STARTED USING BY AGE 18

National Center for Addiction and Substance Abuse

Past month illicit drug use by age

Age group	Percent Using in Past Month
12 or Older	10.1
12 to 17	8.8
18 to 25	22.3
26 or Older	8.2

National Survey on Drug Use and Health, 2015

Past Year Use by US High School Students

Trends in past-year illicit drug use

Trends in past year use of illicit drugs, excluding cannabis

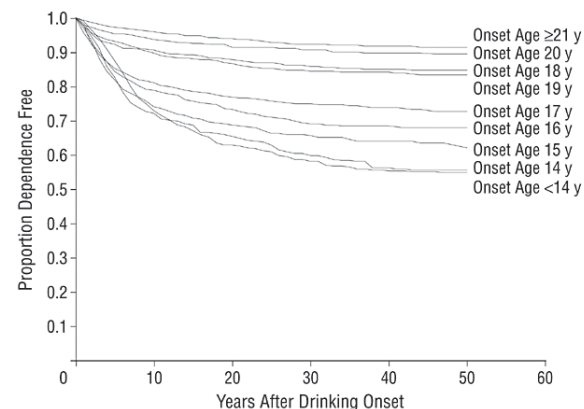SFUSD: High schoolers' initiation of substance use

Slide 1

1 IN 4

AMERICANS WHO FIRST
SMOKED, DRANK OR USED
OTHER DRUGS BEFORE AGE 18
HAS A SUBSTANCE PROBLEM

National Center for Addiction and Substance Abuse

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Slide 2

Risk of developing dependence is inversely related to age at onset

Onset Age ≥21 y
Onset Age 20 y
Onset Age 18 y
Onset Age 19 y
Onset Age 17 y
Onset Age 16 y
Onset Age 15 y
Onset Age 14 y
Onset Age <14 y

y-axis: Proportion Dependence Free (0.1 – 1.0)
x-axis: Years After Drinking Onset (0 – 60)

Hingson et al 2006

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Slide 3

Delayed onset of use is a key prevention target

- Risk of SUD drops 4% for each year that first use is delayed

Wait!

- Population level interventions are often aimed at delaying onset

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Slide 4

What puts someone at risk for early onset drug or alcohol use?

- Adverse Childhood Experiences (OR of adolescent alcohol use)
  - Physical (1.8), emotional (1.6) , or sexual (2.0) abuse
  - Emotional (1.9) or physical (1.1) neglect
  - Violence against mother (1.6)
  - Substance abuse in the household (2.4)
  - Household mental illness (1.7)
  - Parental separation or divorce (1.8)
  - Incarcerated household member (1.7)

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Adverse Childhood Experiences Have a Cumulative Effect

ACE Score	<14 years OR (95% CI)	15–17 years OR (95% CI)	18–20 years OR (95% CI)
0	1.0	1.0	1.0
1	1.5 (1.1–2.1)	1.2 (1.1–1.4)	1.1 (0.91–1.2)
2	2.4 (1.7–3.3)	1.6 (1.3–1.9)	1.1 (0.91–1.3)
3	3.9 (2.8–5.6)	2.0 (1.5–2.5)	1.1 (0.90–1.4)
≥ 4	6.2 (4.6–8.3)	2.0 (1.6–2.4)	1.2 (1.1–1.5)

- Alcohol and drug prevention are unlikely to be effective in patients with high ACE scores unless ACEs are specifically addressed

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Additional Risk Factors for Early Onset Use

- Parental substance use
- Lack of parental supervision
- Peer substance use
- Drug availability and cost
- Low perceived risk
- High perceived reward or normalcy
- Low SES
  - Probably partially mediated by access to "substance free enjoyable activities"
- Neighborhood residential instability
- White race or multiracial
- Male

Stone A et al 2012
Kilpatrick D et al 2000
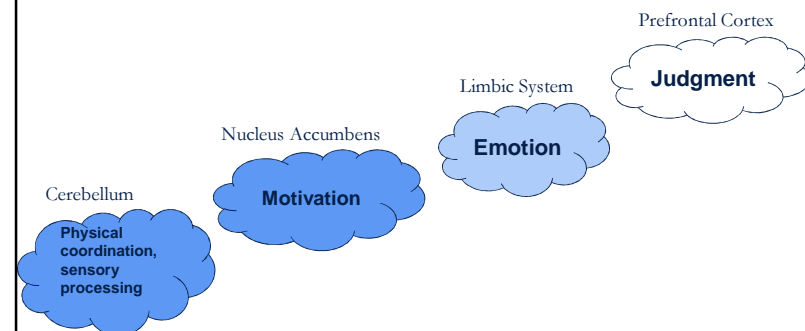Andrabi N et al 2017

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Risk factors for Developing SUD

- All of the above
- Genetic factors
  - Heritability for AUD 50-60%
  - Heritability for SUD 45-79%

Dick D, Agrawal A, 2008
Le Tendre et al 2017

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The Sensitive Period for Substance Use Initiation

Prefrontal Cortex — **Judgment**

Limbic System — **Emotion**

Nucleus Accumbens — **Motivation**

Cerebellum — **Physical coordination, sensory processing**
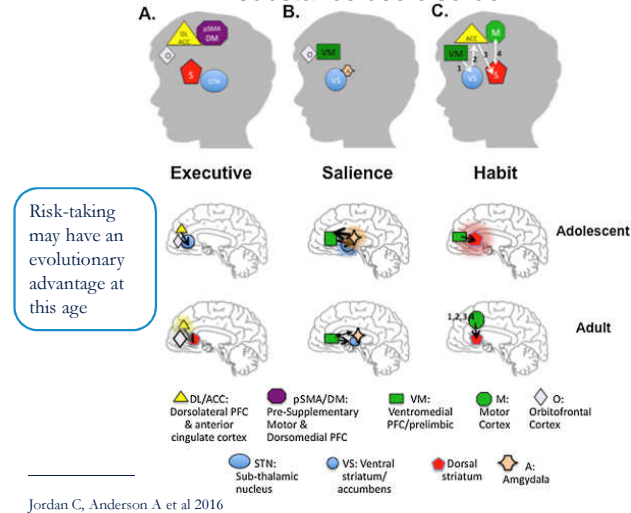
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The Adolescent Sensitive Period for SUD

- Children have sensitive periods for
  - Language acquisition
  - Musical skill acquisition
  - Physical skill acquisition
- Do they also have a sensitive period for SUD acquisition?

Neural circuitry underlying adolescent vulnerability to substance use disorder

Risk-taking may have an evolutionary advantage at this age

Jordan C, Anderson A et al 2016

Personal Risk Factors

- Hyperactivity
- Impulsivity
- Novelty seeking
- Early onset puberty

Adolescent Exposure to Alcohol and Drugs Changes the Adolescent Brain

- Reduced prefrontal cortex size and activity
- Reduced hippocampal size
- White matter changes
- Brain changes depend on state of maturation wen exposure occurs

- In animal studies, attenuation of prefrontal and hippocampal development seems to mediate SUD development
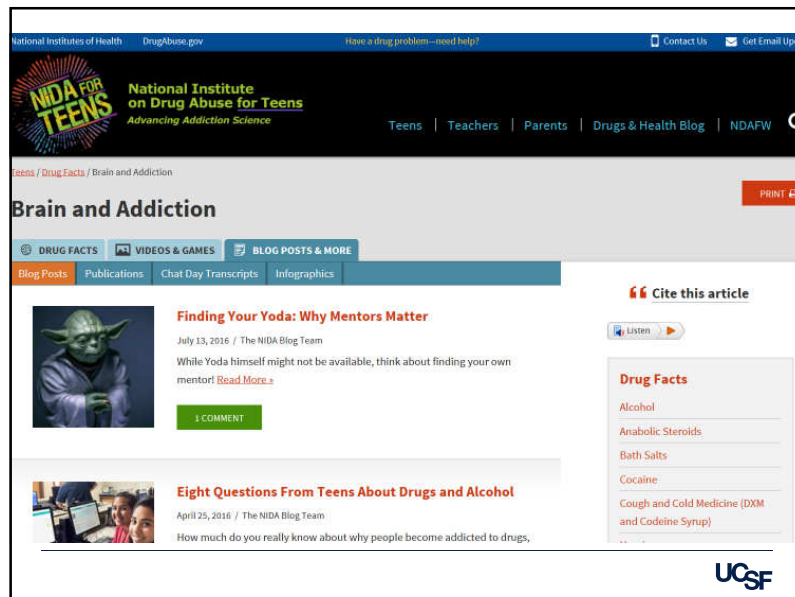
Jordan C, Anderson A et al 2016

Not all Adolescent Substance Use Leads to SUD

Protective factors

- Adult role model
- Parental involvement
- Parental discussion of risks
- Engagement in enriching activities
  • Participation in sports
  • Participation in clubs
- Academic achievement
- Sense of connectedness at home, school, or community


Reducing risk

- Identify adult role models
- Encourage parental involvement and discussion
- Identify and address ACE's
- Discuss and address impact of social contacts
- Engage in enriching activities
  • Sports
  • After school programs
- Enhance neighborhood cohesion
- Address parental psychopathology
- Reduce early onset puberty?

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Addressing Adolescent Substance Use in the Clinic Setting

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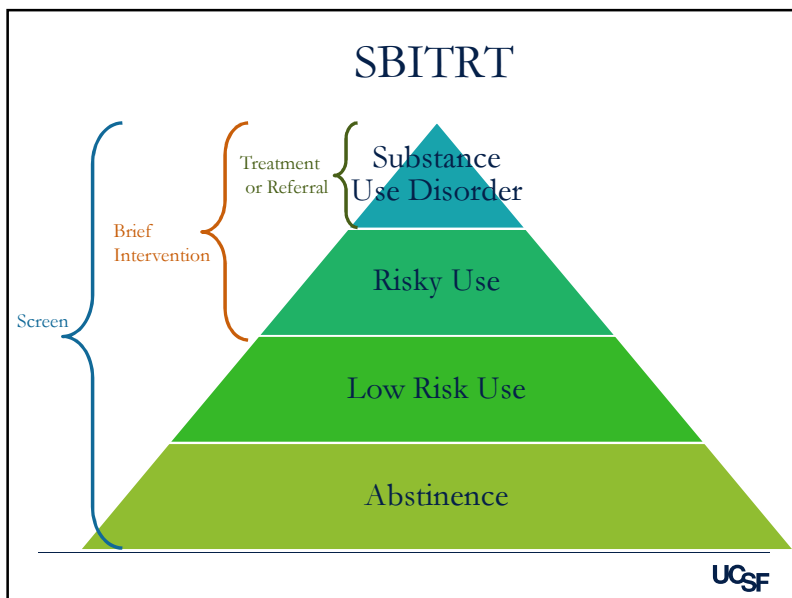## The Spectrum of Substance Use

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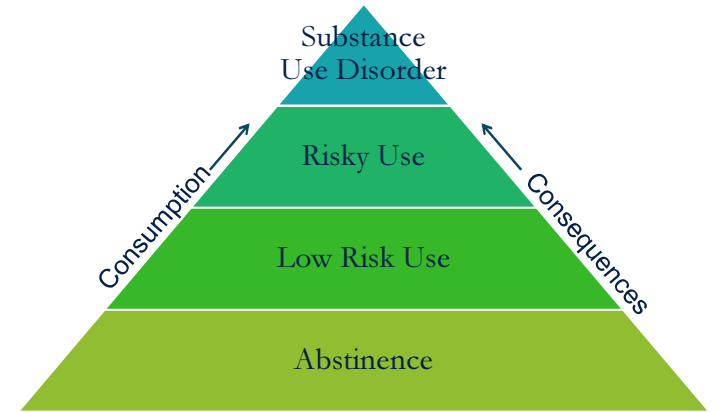
SBIRT

- **SCREENING** quickly assesses substance use severity

- **BRIEF INTERVENTION** focuses on increasing patient motivation to change

- **REFERRAL TO TREATMENT** provides connections to specialty care

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SBITRT

- **SCREENING** quickly assesses substance use severity

- **BRIEF INTERVENTION** focuses on increasing patient motivation to change

- **TREATMENT** provides treatment for SUD

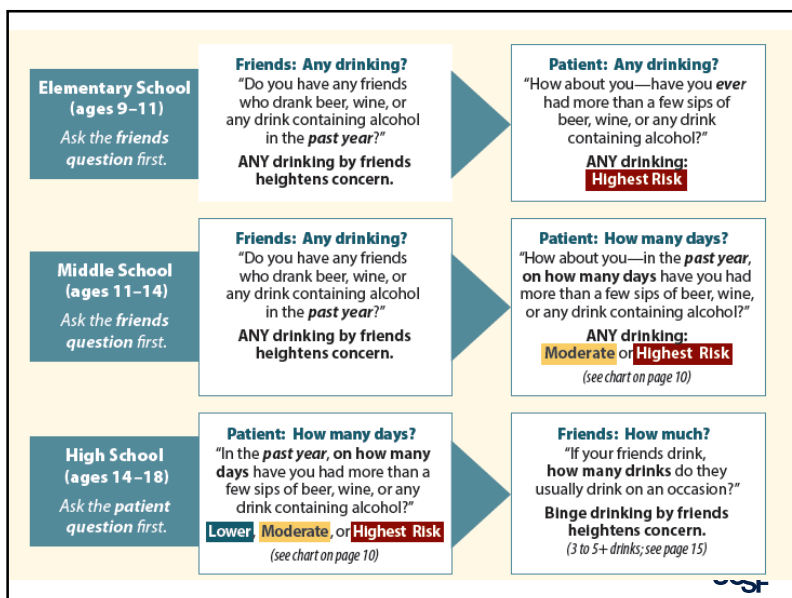- **REFERRAL TO TREATMENT** provides connections to specialty care

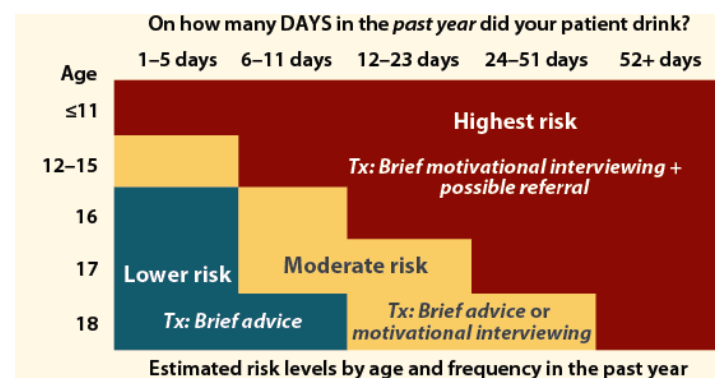## SBITRT

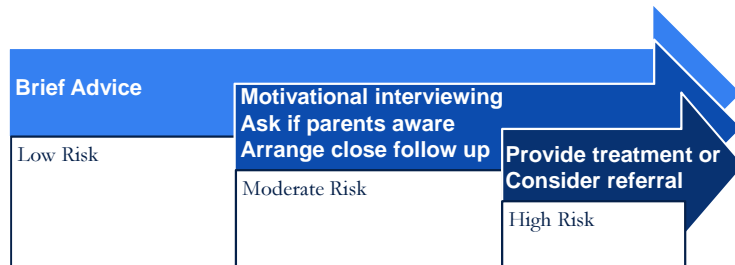## Screening in Adolescence: NIAAA guidelines

- https://pubs.niaaa.nih.gov/publications/Practitioner/YouthGuide/YouthGuide.pdf

Assessing Risk

[ADD PRESENTATION TITLE: INSERT TAB > HEADER & FOOTER > NOTES AND HANDOUTS]

Brief Intervention for Adolescent Alcohol Use

Brief Advice	Motivational interviewing Ask if parents aware Arrange close follow up	Provide treatment or Consider referral
Low Risk	Moderate Risk	High Risk

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Drug Use Screening: S2BI Algorithm
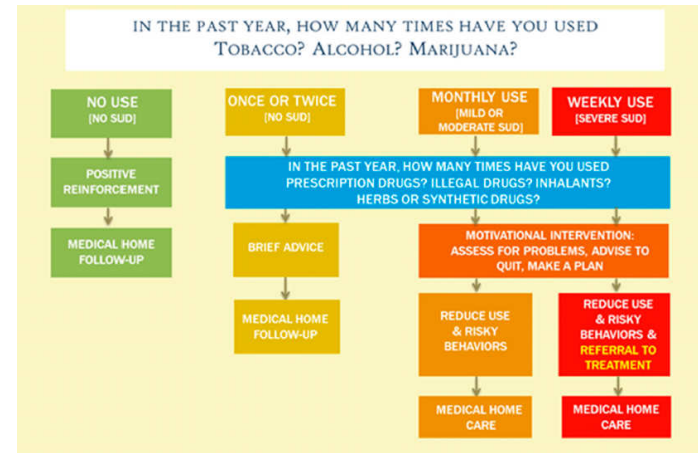
S2BI Algorithmg. Copyright Boston Children's Hospital 2014. Licensed under Creative Commons Attriution-NonCommercial 4.0

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Treatment

- Treatment works
- Every $1 invested in treatment yields $12 return in healthcare and crime related costs

Belendiuk et al 2014

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Consent to Treatment in California

	Non-pharmacologic treatment	Pharmacologic treatment	Parental consent can override patient dissent
<12 years	Yes	Yes	Yes
12-18 years	No	Yes	Yes
>18 years	No	No	No

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Principles of Treatment

- Treat co-occuring psychiatric disorder
  - Therapy
  - Pharmacotherapy
- Duration of treatment should match need
- Type of treatment should match
  - Need
  - Resources
  - Patient preference

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Treatment options: non-pharmacologic

- Family Based Therapies
  - Multidimensional Family Therapy, Functional Family Therapy, Adolescent Community Enhancement Approach
  - Focus on improving:
    - Adolescent functioning in family and social contexts
    - Parental monitoring and functioning in adult role
    - Communication between family and social systems
- Mutual support programs
  - 12-step
  - SMART recovery
  - Rational recovery

Belendiuk et al 2014

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Treatment options: non-pharmacologic

- Cognitive Behavioral Therapy
  - Group or individual
  - Focus on
    - Adolescent's coping , decision making, and problem solving
    - Skills development for coping with cravings and triggers
    - Risky behavior reduction
- Contingency Management
  - Usually used adjunctively
  - Provide reward for targeted behavior, e.g. movie tickets for negative urine drug screen

Belendiuk et al 2014

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Treatment setting

- Outpatient low intensity
- Outpatient high intensity
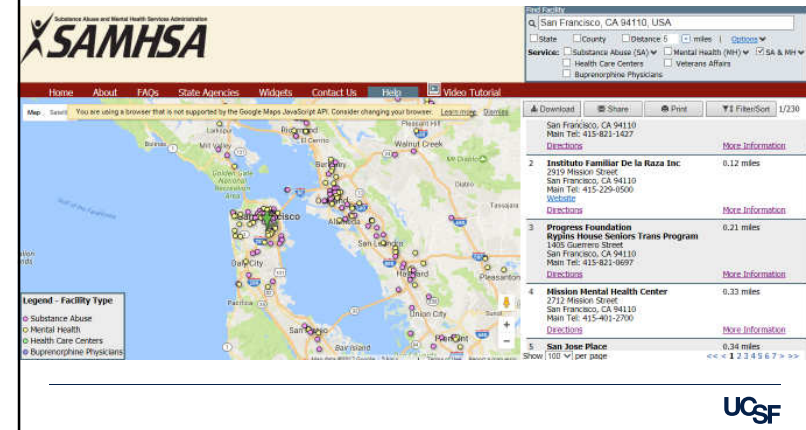- Residential

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Pharmacotherapy with at least 1 RCT in adolescents

- Nicotine replacement
- Buprenorphine/naloxone for opioid use disorder
  - Two trials
  - Reduced opioid use and injection rates
  - Also reduced cocaine, marijuana
  - 4 of 83 patients had HCV conversion in 12 weeks
  - FDA approved for age 16 and older

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Making a Referral

- https://findtreatment.samhsa.gov/

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Making a Referral

https://www.drugabuse.gov/publications/principles-adolescent-substance-use-disorder-treatment-research-based-guide/treatment-referral-resources

Summary

- It is natural and healthy for adolescents to explore novelty and take risks
- Adolescents are particularly vulnerable to developing SUDs
- Population level and individual interventions can reduce that vulnerability
- Screening, Brief Intervention, and Treatment are effective

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