What should we be teaching fellows about adolescent substance use?

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Assistant Professor of Pediatrics
Harvard Medical School
Immature Brain

Synaptic Density
Blossoming

Synaptic Density
Synaptic Pruning
Myelination

Brain Maturation

Adolescent milestones: impulse control

Planning, Organizing, Impulse control

Prefrontal cortex

School age milestones: achievement

motivation

Nucleus Accumbens

Preschool milestones: emotional regulation

emotion

Amygdala

Toddler milestones: balance, walking, coordination

Physical coordination, Sensory processing

Cerebellum

Slide adapted from Ken Winters, PhD.
Children ages 7-11  Teens ages 13-17  Adults ages 23-29

Leading Causes of Mortality Ages 10-24, United States, 2013

<table>
<thead>
<tr>
<th>Cause</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Motor Vehicle Crashes</td>
<td>22.1%</td>
</tr>
<tr>
<td>Other Unintentional Injuries</td>
<td>17.4%</td>
</tr>
<tr>
<td>Homicides</td>
<td>16.8%</td>
</tr>
<tr>
<td>Suicides</td>
<td>14.3%</td>
</tr>
<tr>
<td>Other</td>
<td>29.4%</td>
</tr>
</tbody>
</table>

The 4 leading causes of death are all associated with alcohol consumption.

Percentages calculated using data from National Center for Health Statistics (NCHS) Vital Statistics System
At all levels of blood alcohol concentration (BAC), the risk of involvement in a motor vehicle crash is greater for teens than for older drivers.
Activation of the reward pathway by addictive drugs

Source: NIDA
Age at First Use and Later Risk

**Alcohol**

- % with Alcohol Disorder:
  - <=13: 47
  - 14: 45
  - 15: 38
  - 16: 32
  - 17: 28
  - 18: 15
  - 19: 17
  - 20: 11
  - >=21: 9

**Marijuana**

- % with Marijuana Disorder:
  - 13: 17
  - 15: 16
  - 17: 11
  - 19: 8
  - 21+: 4


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As my children, and my friends’ children, are getting older, a question that comes up again and again from friends is this: Which would I rather my children use — alcohol or marijuana?
“Taken together, we found no significant substitution effect between alcohol and marijuana. Rather, an uptick in availability seems to increase the prevalence of concurrent use of alcohol and marijuana.”

-Guohua Li, MD, PhD
Mailman School professor of Epidemiology


“Addiction is a developmental disease and both risky use and addiction can be prevented and effectively treated and managed. Despite these facts, primary care providers are not equipped with the knowledge or skills to address these health conditions.”

— American Board of Addiction Medicine Foundation, Recommended Action in Medical Practice for Prevention of and Early Intervention for Substance Use among Adolescents and Young Adults
ABAM Advisory Meeting
July 16, 2015; Yale University, New Haven, CT

Develop consistent messaging
Identify curricular materials
Identify mechanisms for moving this content into medicine.
Screening in Primary Care
Pediatrician self-report of annual alcohol screening

Pediatrician self report of use of validated screening tool

- **Validated Tool**
  - 2007: 34%
  - 2014: 23%

- **No Tool**
  - 2007: 66%
  - 2014: 77%

“There hasn’t been agreement among the physicians in my practice about the need for a screening tool on adolescent drug and alcohol use.”
## Detecting Adolescent Substance Use Problems: Provider Impressions vs. Diagnostic Interview

<table>
<thead>
<tr>
<th></th>
<th>Medical Provider Impressions</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Sensitivity</td>
<td>Specificity</td>
</tr>
<tr>
<td>Any use</td>
<td>.63 (.58, .69 CI)</td>
<td>.81 (.76, .85 CI)</td>
</tr>
<tr>
<td>Any problem</td>
<td>.14 (.10, .20 CI)</td>
<td>1.0 (.99, 1.0 CI)</td>
</tr>
<tr>
<td>Any disorder</td>
<td>.10 (.04, .17 CI)</td>
<td>1.0 (.99, 1.0 CI)</td>
</tr>
<tr>
<td>Dependence</td>
<td>0.0</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Practicing physician
“It’s a very small city...I wouldn't think that the kids are really using drugs and alcohol”
Practicing physician

“if [patients] are drinking, it's like stupid high school kids who go out and have a couple beers on a weekend here and there...it's not like chronic alcohol problems”.
In the past year, how many times have you used:

- Tobacco?
- Alcohol?
- Marijuana?

**STOP if all “Never.” Otherwise, CONTINUE.**

- Prescription drugs that were not prescribed for you (such as pain medication or Adderall)?
- Illegal drugs (such as cocaine or Ecstasy)?
- Inhalants (such as nitrous oxide)?
- Herbs or synthetic drugs (such as salvia, "K2", or bath salts)?
## Sensitivity/Specificity of S2BI

CIDI-SAM interview vs. screen frequency item for detecting a substance use disorder; N=215.

<table>
<thead>
<tr>
<th>Criterion Standard Dx</th>
<th>Screen Frequency</th>
<th>Sensitivity</th>
<th>Specificity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Any SUD</td>
<td>≥ Monthly use</td>
<td>90%</td>
<td>94%</td>
</tr>
<tr>
<td>Severe SUD</td>
<td>≥ Weekly use</td>
<td>100%</td>
<td>94%</td>
</tr>
</tbody>
</table>

BRIEF INTERVENTIONS
How many times in the past year have you used:
1) Tobacco? Alcohol? Marijuana?
2) Prescription drugs? Illegal drugs? Inhalants?

- **NO USE**
  - Positive Reinforcement

- **ONCE OR TWICE**
  - Ask follow-up S2BI questions
  - Brief Advice

- **MONTHLY USE**
  - Ask follow-up S2BI questions
  - Motivational intervention: assess for problems, advise to quit, make a plan
  - Reduce use & risky behaviors

- **WEEKLY USE**
  - Reduce use & risky behaviors & referral to treatment
Brief Advice with Low-Risk populations

Delayed onset of drinking

Increased alcohol cessation rates

Brandon is a 12 year old boy did not use substances last year.

Marcus is a 15 year old boy who used marijuana 1-2 times last year.
Of course most kids your age don't drink.
Brief Advice with Low-Risk populations

Delayed onset of drinking

Increased alcohol cessation rates

Brandon is a 12 year old boy who did not use substances last year.

Marcus is a 15 year old boy who used marijuana 1-2 times last year.


MI compared to BA for high risk teens

MI reduced use by high risk teens more than BA

Eric is a 15 year old boy who drinks once a month.

Corrie is a 16 year old girl who smokes marijuana every week.

**Date:** June 4th, 2015

**S2BI Screen Result:**

<table>
<thead>
<tr>
<th></th>
<th>None</th>
<th>1-2X</th>
<th>Monthly</th>
<th>Weekly +</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alcohol</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Marijuana</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tobacco</td>
<td></td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

**Plan:** My doctor recommends that I stop, but for now I will:
- Limit to two drinks a night.
- Never drive after drinking or ride with an impaired driver.
- I am not interested in an alcohol counseling session at this time.

**Follow Up:** In one month
Eric is a 15 year old boy who drinks once a month.

Corrie is a 16 year old girl who smokes marijuana every week.

Individual Counseling

Evidence Based Therapies
– Motivational interviewing
– Cognitive behavioral therapy
– Contingency management
Medication Assisted Treatment
Buprenorphine Waiver Training:
The Half and Half Course – specifically for Pediatricians and Family Physicians that treat youth

http://www.cvent.com/d/l4q2mj
<table>
<thead>
<tr>
<th>I agree to stop using all drugs.</th>
</tr>
</thead>
<tbody>
<tr>
<td>I understand that it is dangerous to mix buprenorphine with alcohol or other sedatives</td>
</tr>
<tr>
<td>I agree to cooperate with urine drug testing whenever requested.</td>
</tr>
<tr>
<td>I will schedule and keep all recommended appointments.</td>
</tr>
</tbody>
</table>

**PATIENT SIGNATURE AND DATE:**
Buprenorphine Program
Monitoring
Buprenorphine Program
Psychosocial Support
Ancillary Treatment
Take home messages

• Adolescents are developmentally vulnerable to problems associated with substance use
• Routine medical care is an opportunity for substance use prevention and early intervention
• Medication assisted treatment can be provided in pediatric primary care
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1 YEAR
CLEAN AND SOBER

Maintenance and Beyond

KEEP CALM AND TAPER ON