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.

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 96⁰, HR 50, RR 10 irregular, O₂ sat. 78%

Case 1, Part 2

- Placed on O₂, 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 0.37%
- 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

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


- **Suicides**: 17.7%
- **Unintentional Injuries**: 41.5%
- **Homicides**: 15%
- **Other**: 23%


- **Suicides**: 17%
- **Unintentional Injuries**: 41%
- **Homicides**: 15%
- **Motor vehicle crashes**: 30%
- **Poisoning**: 11%
- **Other**: 27%

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

Birth Giving Birth

0 5 10 15 20 25
Conception

The Brain’s Information Superhighway:
Myelinated axons = White Matter Tracts

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

THC = Anandimide IMPOSTER

Brain's Chemical

Anandamide

Drug

THC

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Center for Adolescent Substance Abuse Research (CeASAR), Boston Children’s Hospital. All rights reserved.
THC/Anandimide Binding Sites

Source: National Institute on Drug Abuse

This axonal bundle is one of the brain’s connectivity “super highways”.


The Reward Pathway

Marijuana is no exception...

VTA

Ventral-Tegmental Area

nucleus accumbens

prefrontal cortex

Neuropsychopharmacology

original article

Δ9-Tetrahydrocannabinol Induces Dopamine Release in the Human Striatum

Matthijs G Bossong1, Bart NM van Berkel2, Ronald Boellaard3, Lineke Zuurman1, Robert C Schuit3, Albert D Windhorst1, Joop M A van Gerven1, Nick F Ramsey5, Adriaan A Lammertsma1 and René S Kahn2
Dopamine Response to Drug Over Time

- Elevated Mood, Euphoria
- Baseline Mood
- Depressed Mood, Anhedonia

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

- % Lifetime Dx. Alc. Dep.: 47, 45, 38, 32, 28, 15, 17, 11, 9

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

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?

Sources:
### Validity of CRAFFT Score ≥ 2

<table>
<thead>
<tr>
<th>Problem Use, Abuse or Dependence</th>
<th>Sensitivity</th>
<th>Specificity</th>
<th>PPV</th>
<th>NPV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Problem Use</td>
<td>.76</td>
<td>.94</td>
<td>.83</td>
<td>.91</td>
</tr>
<tr>
<td>Abuse or Dependence</td>
<td>.80</td>
<td>.86</td>
<td>.53</td>
<td>.96</td>
</tr>
<tr>
<td>Dependence</td>
<td>.92</td>
<td>.80</td>
<td>.25</td>
<td>1.0</td>
</tr>
</tbody>
</table>


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### CRAFFT 2.0 Screening System

- **Past-12-mo Frequency**
- **Use**
- **No use**
- **CAR question only**

- **Six CRAFFT items**

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### Study Safety Protocol

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

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


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### Validity of CRAFFT

<table>
<thead>
<tr>
<th>CRAFFT positive</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Received SW appt</td>
<td>75</td>
</tr>
<tr>
<td>Kept SW appt</td>
<td>0</td>
</tr>
</tbody>
</table>

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)

- **Non-Problematic Use** 19.3%
- **Problematic Use** * 13.9%
- **Abstinence** 56.6%
- **Dependence** 6.9%

#### 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

#### Provider Follow-up Plans

<table>
<thead>
<tr>
<th>Diagnostic Impression</th>
<th>Total (N=2034)</th>
<th>No Plan (N=369)</th>
<th>Periodic Screen (N=1557)</th>
<th>Notify Parents (N=13)</th>
<th>Return Visit (N=98)</th>
<th>Counseling (N=44)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No Use</td>
<td>75.9%</td>
<td>22.1%</td>
<td>77.4%</td>
<td>0.1%</td>
<td>0.6%</td>
<td>0.3%</td>
</tr>
<tr>
<td>Occasional Use</td>
<td>18.4%</td>
<td>7.5%</td>
<td>84.8%</td>
<td>1.3%</td>
<td>7.2%</td>
<td>3.7%</td>
</tr>
<tr>
<td>Problem Use</td>
<td>4.8%</td>
<td>0.0%</td>
<td>43.3%</td>
<td>6.2%</td>
<td>54.6%</td>
<td>22.7%</td>
</tr>
<tr>
<td>Absence or Dependence</td>
<td>0.1%</td>
<td>0.0%</td>
<td>15.8%</td>
<td>5.3%</td>
<td>42.1%</td>
<td>21.1%</td>
</tr>
</tbody>
</table>

P<.001 for all categories


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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

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**2 CFR Part 2 CONSENT TO DISCLOSURE OF INFORMATION THAT IS PROTECTED BY FEDERAL LAW**

This form is compliant with federal confidentiality laws that allow spoil refrigeration to disclose records of information, concerning drug and alcohol treatment, specifically 42 CFR Part 2. 

- The information may not be disclosed without a signed authorization from the patient or parent (except as provided by 2 CFR Part 2). 

**In accordance with 42 CFR Part 2, consent to disclosure of information that is protected by federal law**

1. I hereby consent to the disclosure of the following information
2. The purpose for which I am disclosing information is: 
3. The information I am disclosing includes: 
4. The recipient of the information is: 
   
**I authorize the use of the enclosed information for the following purposes:**

- Meet medical, legal, social, school, or other health education evaluation needs
- To determine my eligibility for benefits
- To develop a comprehensive written, educational, social, or other health education evaluation

**I consent to the disclosure of information for the following purposes:**

1. I consent to the disclosure of information for the following purposes:
2. I consent to the disclosure of the following information:
3. I consent to the disclosure of the following information:
4. I consent to the disclosure of the following information:

**I authorize the use of the enclosed information for the following purposes:**

1. I authorize the use of the enclosed information for the following purposes:
2. I authorize the use of the enclosed information for the following purposes:
3. I authorize the use of the enclosed information for the following purposes:
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4. I consent to the disclosure of information for the following purposes:

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*Adolescent Substance Abuse Research (CeASAR), Boston Children's Hospital. All rights reserved.
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

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.”
Before/After Comparative Effectiveness Trial

Months

1

18

36

PCPs instructed: “Do what you usually do.”

Recruit/test TAU

Recruit/test cSBA

1° PCP training; Computer system initiated at all sites

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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))

<table>
<thead>
<tr>
<th></th>
<th>USA</th>
<th>CZR</th>
</tr>
</thead>
<tbody>
<tr>
<td>ALCOHOL</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initiation</td>
<td>.66 (0.47-0.93)</td>
<td>.76 (0.53-1.08)</td>
</tr>
<tr>
<td>Cessation</td>
<td>1.50 (0.93-2.42)</td>
<td>1.18 (0.37-3.73)</td>
</tr>
<tr>
<td>CANNABIS</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Initiation</td>
<td>.81 (0.54-1.21)</td>
<td>.47 (0.29-0.76)</td>
</tr>
<tr>
<td>Cessation</td>
<td>1.01 (0.57-1.78)</td>
<td>2.53 (1.06-6.05)</td>
</tr>
</tbody>
</table>

% 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=1.90***
  - (1.73, 2.09)
- **aRRR=4.56***
  - (3.39, 6.15)

*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.

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
Contract/Pledge for Life

Brief counseling tool to address riding/driving risk

**Age < 18 yrs**

**YOUNG PERSON**

I acknowledge that there are many potentially dangerous decisions I have every day and will make decisions. The best choices are not always easy, but I can make them on my own. I understand that I can contact the clinician with any questions I have about these topics

**PARENT (or other adult)**

I am an adult and will be in charge of this child. I understand that I can contact the clinician with any questions I have about these topics.

**COMMITTED OTHERS**

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

---

**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

---

Adjusted Hazard Ratio

0.69 (95%CI: 0.47, 1.02), p = .07

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

Group: Past-12-month Alcohol Use at Baseline

Survival Proportion

Days After Wellness Visit

* 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 Hazard Ratio: 0.66 (95%CI: 0.40, 1.10), \( p = 0.097 \)
  - 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 Hazard Ratio*: 0.62 (95%CI: 0.41, 0.94), \( p = 0.03 \)
  - Adjusted for patient's age

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

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

- Adjusted Hazard Ratio: 0.87 (95%CI: 0.57, 1.31), \( p = 0.43 \)
  - Adjusted for patient's age

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

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

- Adjusted Hazard Ratio: 0.76 (95%CI: 0.44, 1.32), \( p = 0.32 \)
  - Adjusted for patient's age
**Basic Principles of MI**

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

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/hrnI75HOc
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)
State Marijuana Laws, 2017

- 28 states legalized in some form
- 8 for recreational use

2018 Marijuana Laws


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

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 δ opioid 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
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

Risk Factors for Suicide

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

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