Brain Weight by Age

Slide adapted from Ken Winters, PhD.


Alcohol or Marijuana? A Pediatrician Faces the Question

MARCH 26, 2013

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


In 1988 researchers Allyn Howlett and William Devane discovered cannabinoid receptors in the brain and called them cannabinoid 1 receptors (CB1) (Devane et al., 1988). In 1992 researchers discovered an endogenous cannabinoid and called it anandamide (Devane et al., 1992).
Receptor binding in brain tissue

<table>
<thead>
<tr>
<th>Compound</th>
<th>Potency relative to THC</th>
</tr>
</thead>
<tbody>
<tr>
<td>(-)-Delta9-THC</td>
<td>1</td>
</tr>
<tr>
<td>Anandamide</td>
<td>.47*</td>
</tr>
</tbody>
</table>

*The affinity of anandamide for cannabinoid receptors ranges from about one-fourth to one-half that of THC. The differences depend on the cells or tissue that are tested and on the experimental conditions, such as the binding assay used.


The Dunedin Study  
*N=1,037*

**Assessment ages**

- 13 yrs (Pre-initiation)
- 18 yrs
- 21 yrs
- 32 yrs
- 38 yrs

Average IQ change:

- "Never used"
  - 99.8 to 100.6
- "Mj dependent 3+ yrs"
  - 99.7 to 93.9

Source: Meier et al. PNAS, 2012

A meta-analysis of 6 studies found an increased risk of psychotic outcome among those who used cannabis most frequently, compared with non-users. (Adjusted odds ratio: 2.09, 95% CI: 1.54-2.84)


Marijuana Use and Psychotic Disorders

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### Association between cannabis use and schizoaffective disorder

<table>
<thead>
<tr>
<th>Exposure</th>
<th>Cases</th>
<th>HR Crude</th>
<th>HR adjusted*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Never used cannabis</td>
<td>39,978</td>
<td>47</td>
<td>1</td>
</tr>
<tr>
<td>Ever used cannabis</td>
<td>5,109</td>
<td>12</td>
<td>2.1 (1.1-3.8)</td>
</tr>
<tr>
<td>&gt;50 times</td>
<td>855</td>
<td>7</td>
<td>7.5 (3.4-16.7)</td>
</tr>
</tbody>
</table>

* Adjustments for: prior personality disorders at conscription, IQ, disturbed behavior in childhood, social adjustment, risky use of alcohol, smoking, early adulthood socioeconomic position, use of other drugs, brought up in a city. The category ‘Ever used cannabis’ includes all individuals who reported cannabis use, including those who reported >50 times.

Mariquisite-Garcia, B.M. Psychiatry, 12, 112.

**Conclusion:** Cannabis use is a risk factor for the development of incident psychotic symptoms. Continued cannabis use might increase the risk for psychotic disorder by impacting on the persistence of symptoms.

The evidence is consistent with the view that cannabis increases risk of psychotic outcomes independently of confounding and transient intoxication effects ....
### History of “Medical Marijuana”

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1990</td>
<td>CA passes “medical marijuana ballot initiative”</td>
</tr>
<tr>
<td>1996</td>
<td>20 states and DC have “medical marijuana laws”</td>
</tr>
<tr>
<td>2013</td>
<td>CNN documentary supporting “medical marijuana”</td>
</tr>
</tbody>
</table>

“IOM poses “compassionate” use to relieve suffering in terminally ill patients.”

Limited evidence of therapeutic efficacy of medical marijuana:

<table>
<thead>
<tr>
<th>Condition</th>
<th>Level of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chemotherapy induced Nausea and Vomiting in Adults</td>
<td>Modest evidence¹</td>
</tr>
<tr>
<td>Chronic Pain</td>
<td>Insufficient evidence²</td>
</tr>
<tr>
<td>HIV/AIDS and Anorexia associated with AIDS</td>
<td>Insufficient evidence³</td>
</tr>
<tr>
<td>Neurological Problems</td>
<td>Insufficient evidence⁴</td>
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</table>

*Not one single study has ever included children.*

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Marijuana is NOT a medication
### Effects of State Medical Marijuana Laws on Health Outcomes Relevant for Youth

<table>
<thead>
<tr>
<th>Health Outcome</th>
<th>Any MML Law</th>
<th>Legal Dispensaries</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prevalence of youth MJ use</td>
<td>NS</td>
<td>NS</td>
<td>Pacula, 2015</td>
</tr>
<tr>
<td>Youth Treatment Admissions for MJ disorders</td>
<td>Decreased</td>
<td>Increased</td>
<td>Pacula, 2015</td>
</tr>
<tr>
<td>Alcohol Treatment Admissions</td>
<td>Increased</td>
<td>Increased</td>
<td>Pacula, 2013, Heaton, 2015</td>
</tr>
<tr>
<td>Youth Alcohol Involved Fatality</td>
<td>Decreased</td>
<td>Increased</td>
<td>Pacula, 2013, Sevigny, 2015</td>
</tr>
<tr>
<td>Youth Opioid Treatment Admissions</td>
<td>NS</td>
<td>NS</td>
<td>Powell, 2015</td>
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From Dr. Rosalie Pacula. “Effect of Medical Marijuana on the Health of the Young” at Pediatric Academic Societies on April 28th, 2015
The problem with R&D

- mid 19th century: <1% of tobacco consumed as smoked cigarettes
- 1880: Flue curing made tobacco inhalable
- Bonsack Machine could produce 70,000 cigs/day
- American Tobacco Co. created monopoly
- 1900: 1 out of 3 tobacco users smoked cigs
- 1947: 45% American adults smoked
- 1950: asbestos filter and ammonia free-base introduced
- 1957: First Surgeon General Report


Content of THC in marijuana has increased over time

Effects of State Laws on Health Outcomes Relevant for Youth

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Serving size: 1 cookie

Nutrition Facts

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Nutrition Facts
Serving size: 1/4 cookie

• Pure cannabis oils (100%) THC are now available.
• “Because they’re so potent, you don’t need a large amount to get high.”
  — The Wire, May 15, 2013
• “Reduces exposure to other toxins.”

Research on high potency THC

• Increases risk of psychosis
• Decreases age of onset psychosis
• Impairs “creative thinking”

Exclusive: “Skinnygirl Marijuana”, a Strain of Pot That Won’t Cause the Munchies!

Skinnygirl cocktails creator:
“She read about how profitable the cannabis industry is and wants to get in on that.”
-US Magazine online
3. The AAP opposes legalization marijuana ... and supports studying the effects of recent laws to better understand the impact and define best policies to, reduce adolescent marijuana use.


http://www.cde.state.co.us/cdereval/suspend-expelcurrent
Summary

• Marijuana use during adolescence is associated with increased mental health disorders and cognitive decline.
• There is enough evidence to suggest some of these relationships are causal.
• New products are driving up THC exposure for users.
• Surveillance infrastructure may be insufficient as harms are not typically medical.