

Up in Smoke: Research on Vaping

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What's All the Fuss About?

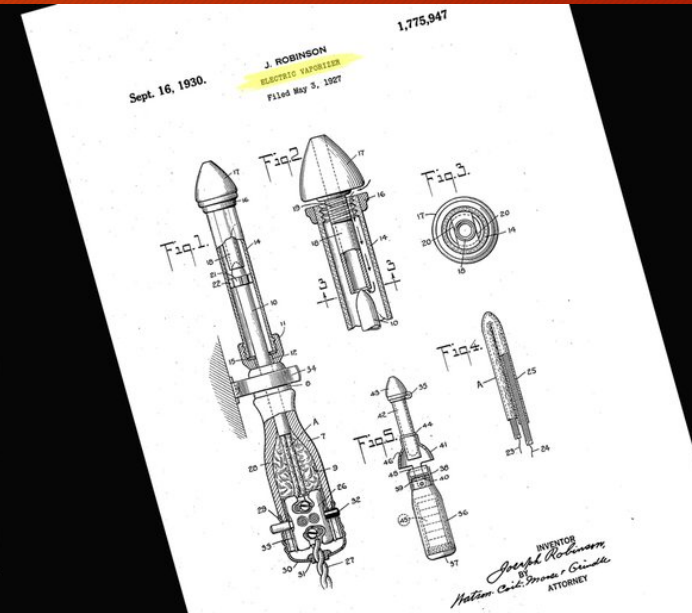
- New patterns of use
 - Surgeon General Jerome Adams Advisory: “I am officially declaring e-cigarette use(vaping) among youth an epidemic in the United States”
- Monitoring the Future
 - Rise in teenage use of liquid nicotine from 11% -2017 to 33%-2019
- CDC Vital Signs Report
 - In 2019, 5.2 million High School and Middle School students

How Did We Get Here?

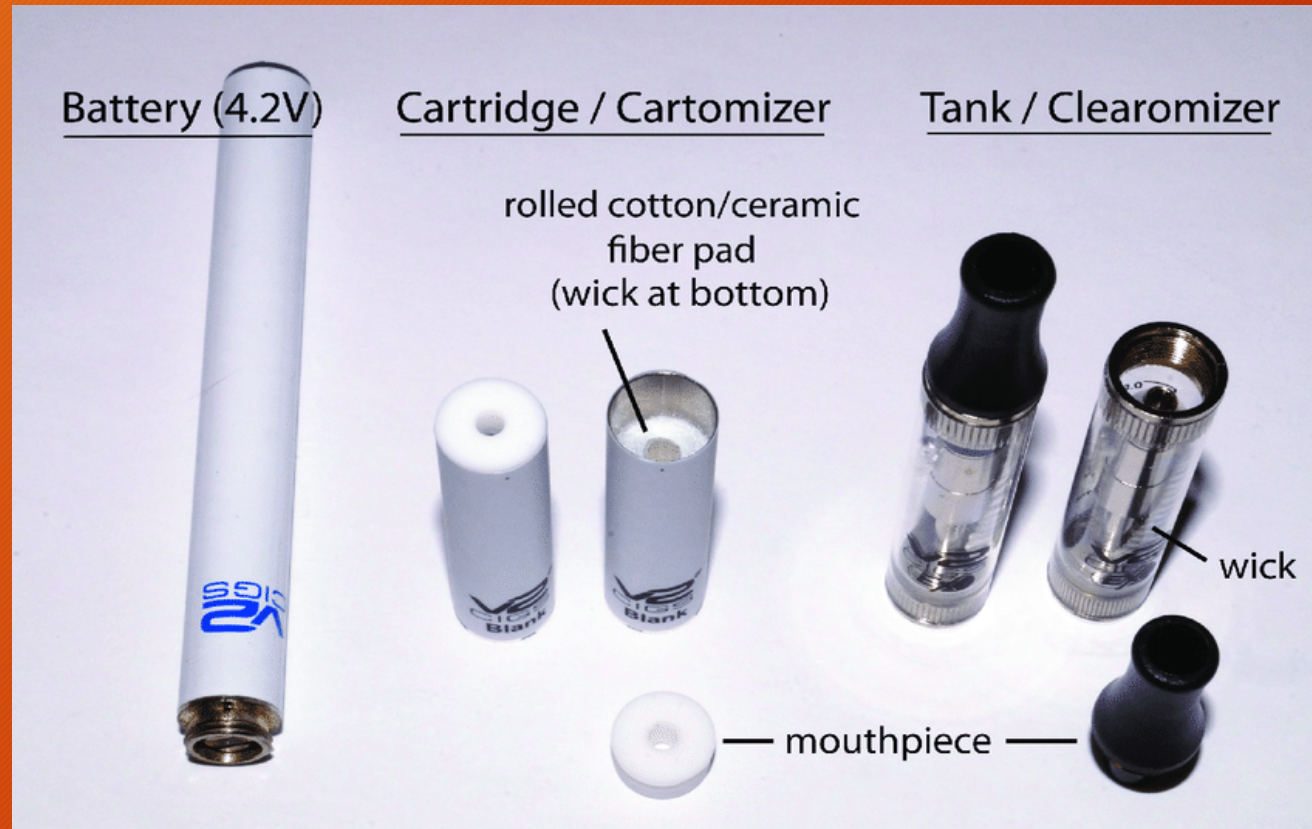
- 1927 first e-cigarette concept
- 1963 first device not FDA approved
- 1990-93 first use of vaping devices in Europe

1930

**THE FIRST
ELECTRONIC
VAPORIZER**



Tech Shift



Portability

- New devices to take with you



Big Tobacco Takes Notice

- Pharmacist from China Hon Lik
 - First marketable e-cigarette
 - Dragonite International introduces product Europe in 2006
US 2007



Real Cigarette Size

The Real Cigarette Size Used To Be In Use,
98mm length and 8.5mm Diameter

JUUL Takes Over

- A Better Way
 - Nicotine salts
 - Tech savvy device
- Flavors for Everyone
- PodMods



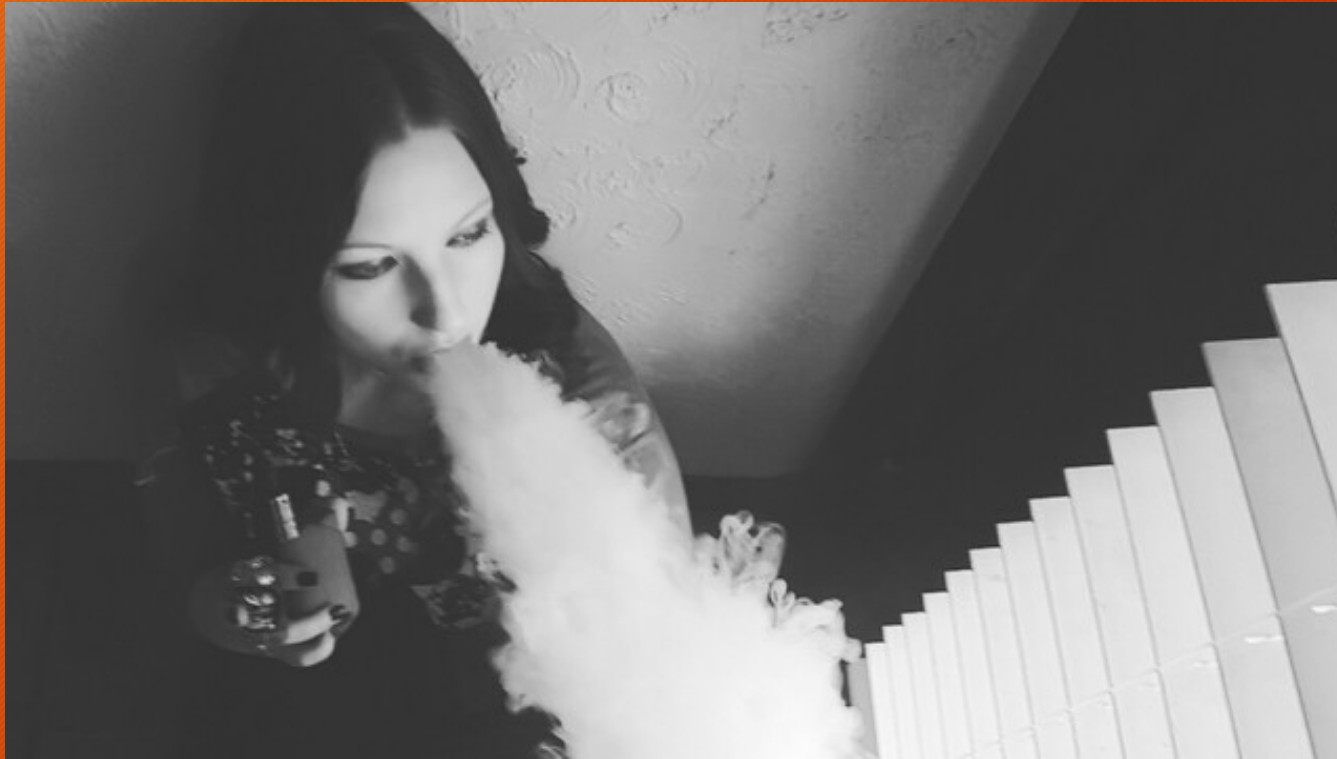
- 2 Guys from Stanford
 - James Monsees, Adam Bowen

Stated mission: “Improving the lives of the world’s one billion adult smokers”

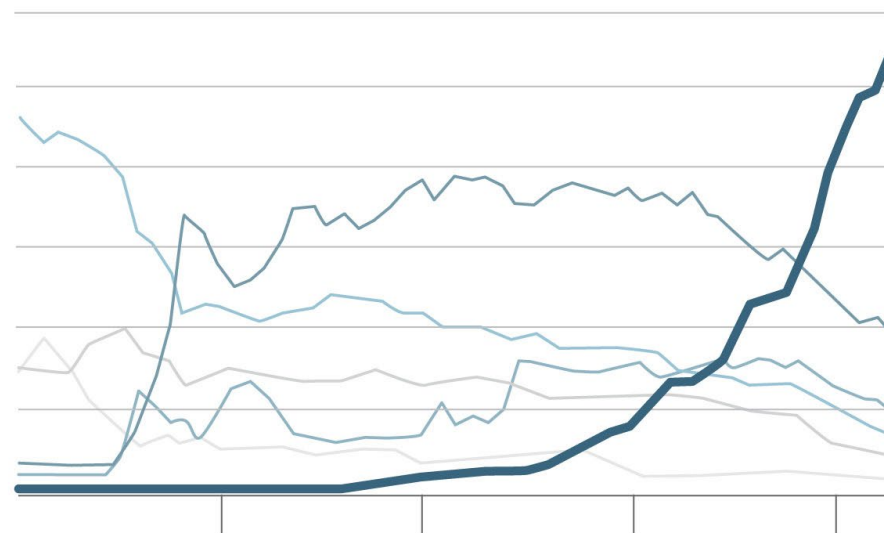
Introduced JUUL in 2015 using social media as well as print

4 year outcomes: 3%-8% of Adults use to kick cigarettes
21% of teens use for the buzz

#doitforjuul



Nobody Does It Better



Vox

New Entries into Vaping

- VUSE



Why is this Brain at Risk?

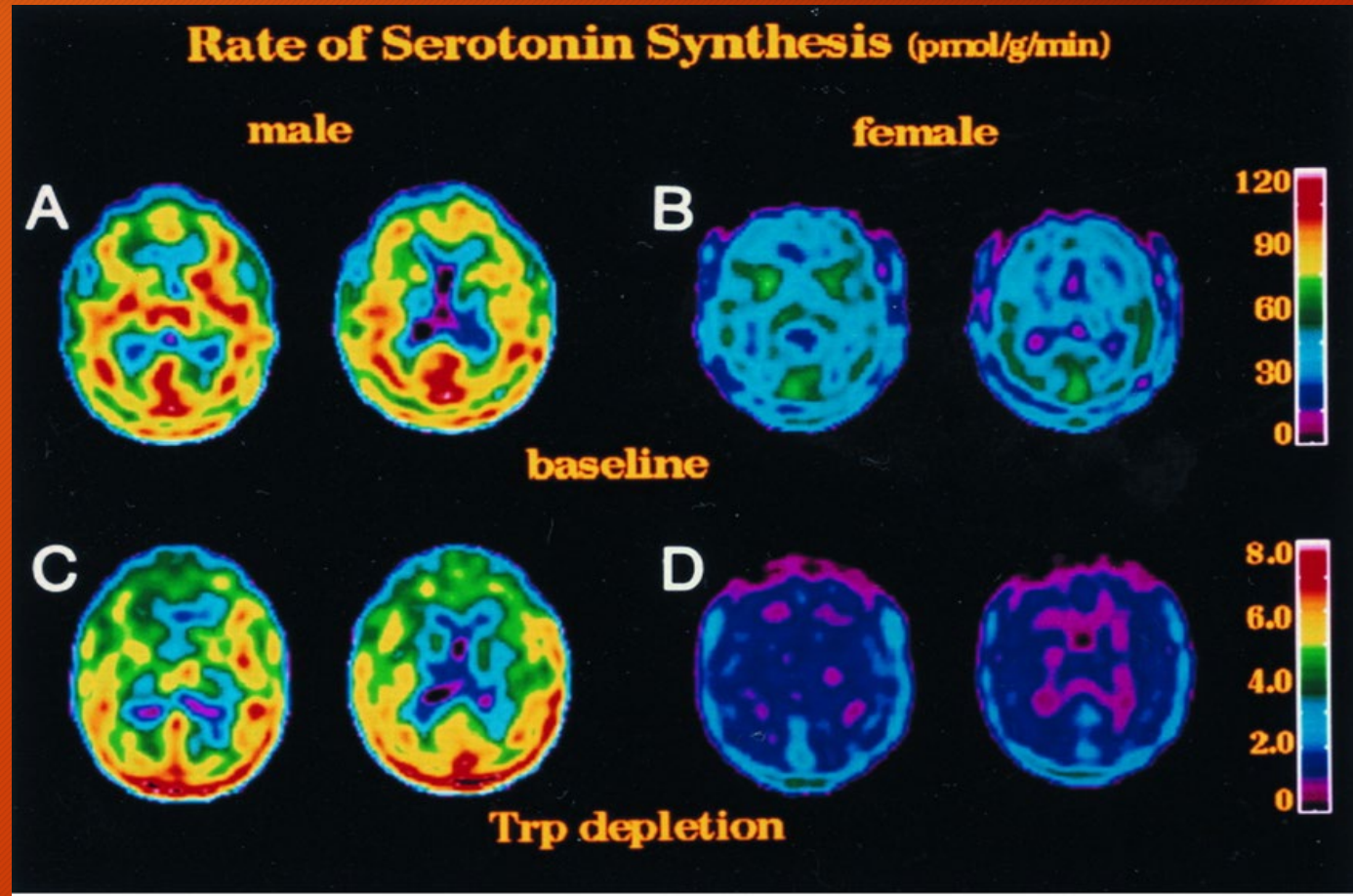
- Emotional Intensity
 - 2 to 4 Times
 - More Frequent Change
 - Male/Female
- Legitimate/Normal



Why is this Brain at Risk?

Depression

Serotonin Synthesis



Depression and Teen Age Girls

- 3x higher than Males
- Multi-variables
- Gender specific genetics

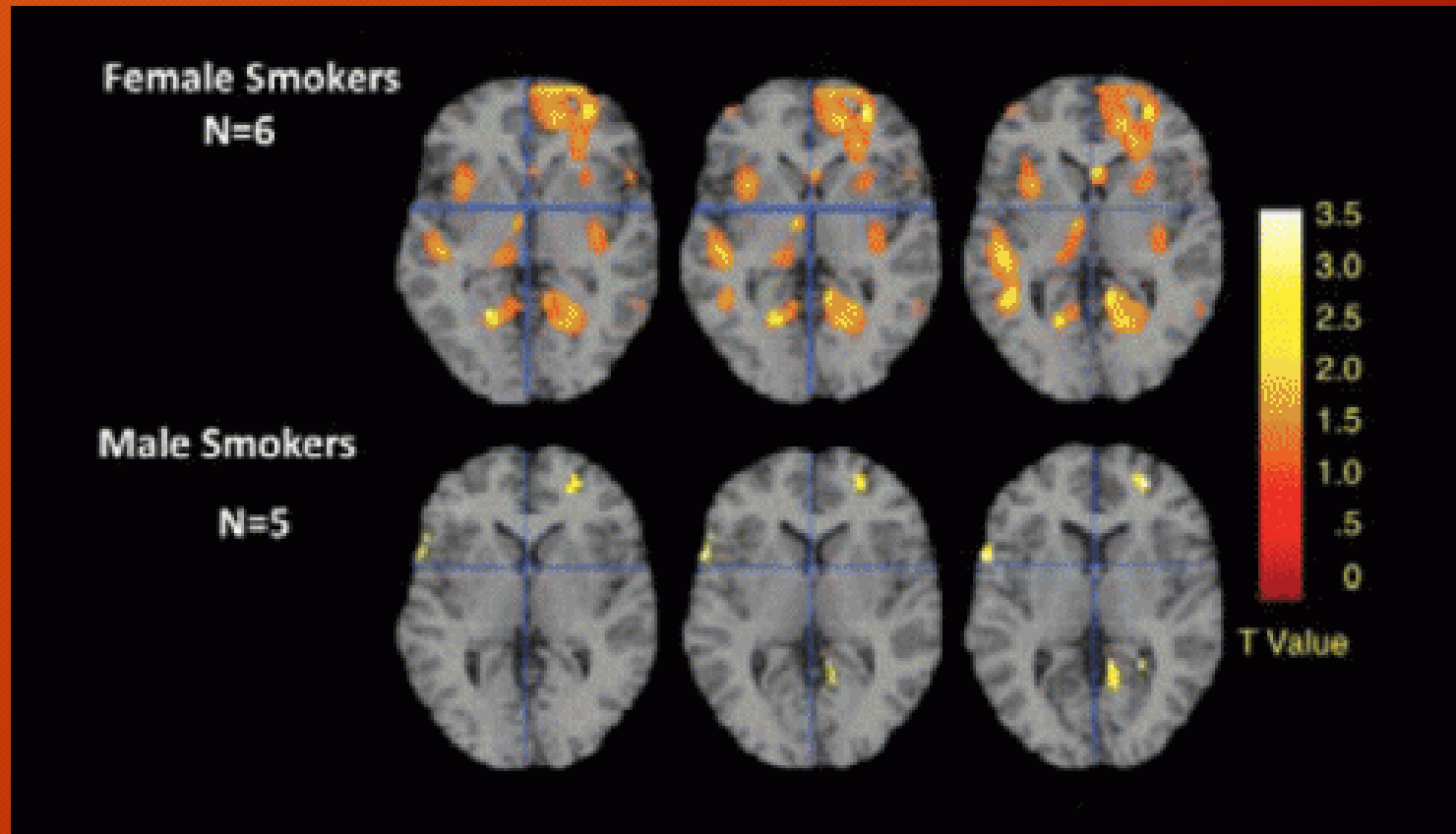


Gender Differences

- Yale Study in Israel

More females use nicotine
to improve/regulate mood

More males use nicotine
for dopamine induced reward



Brain Facts

- Risk Taking
 - New Sites of Activity
 - Influence of Peers
 - Male/Female
- Emotional Reward

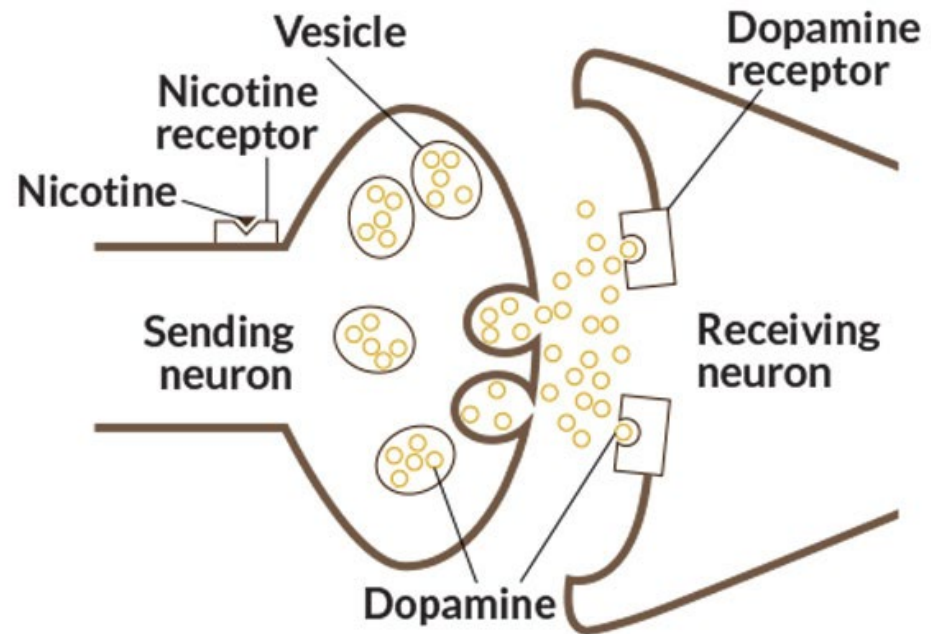


The Role Of Flavors

- Mask irritants
- Allow repeated doses
- Emotional response
- Can cause damage in combination
- FDA Warning



Nicotine and the Brain



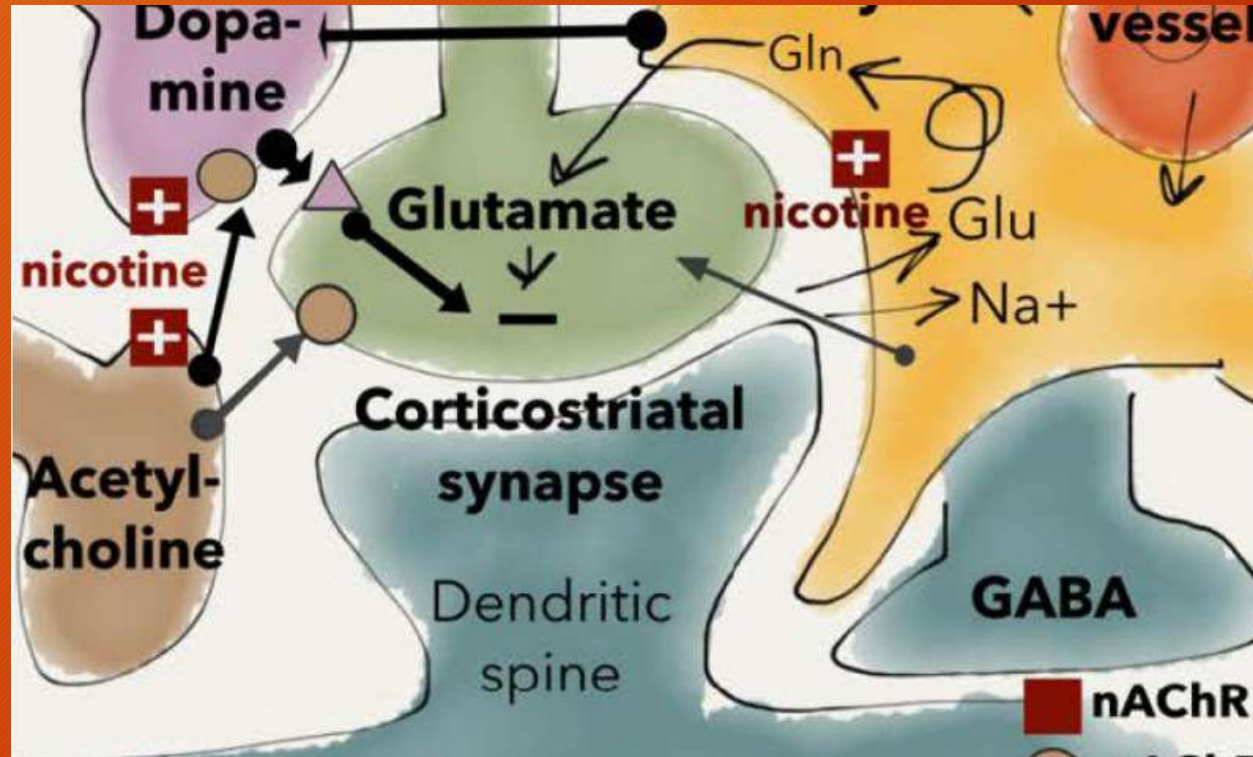
Nicotine and the Brain

- Age of onset
- Addiction and Relapse
- Kindling
- Later Vulnerability for Marijuana and Alcohol



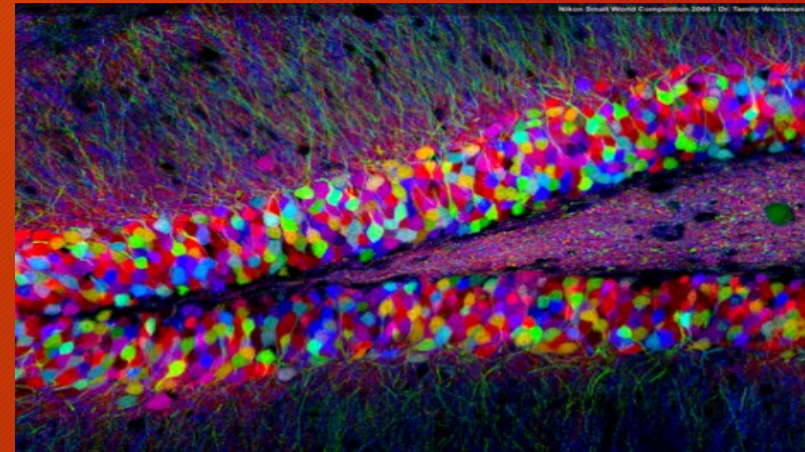
Multiple Pathways

- Shift from Ventral to Dorsal Striatum



Addictive process

- Tolerance
 - Liver
- Brain
 - Receptor sites



Addictive process

- Compulsion



Addictive process

- Loss of Control
 - How much
 - How often
 - How long



Addictive process

- Withdrawal
 - Physical
 - Psychological



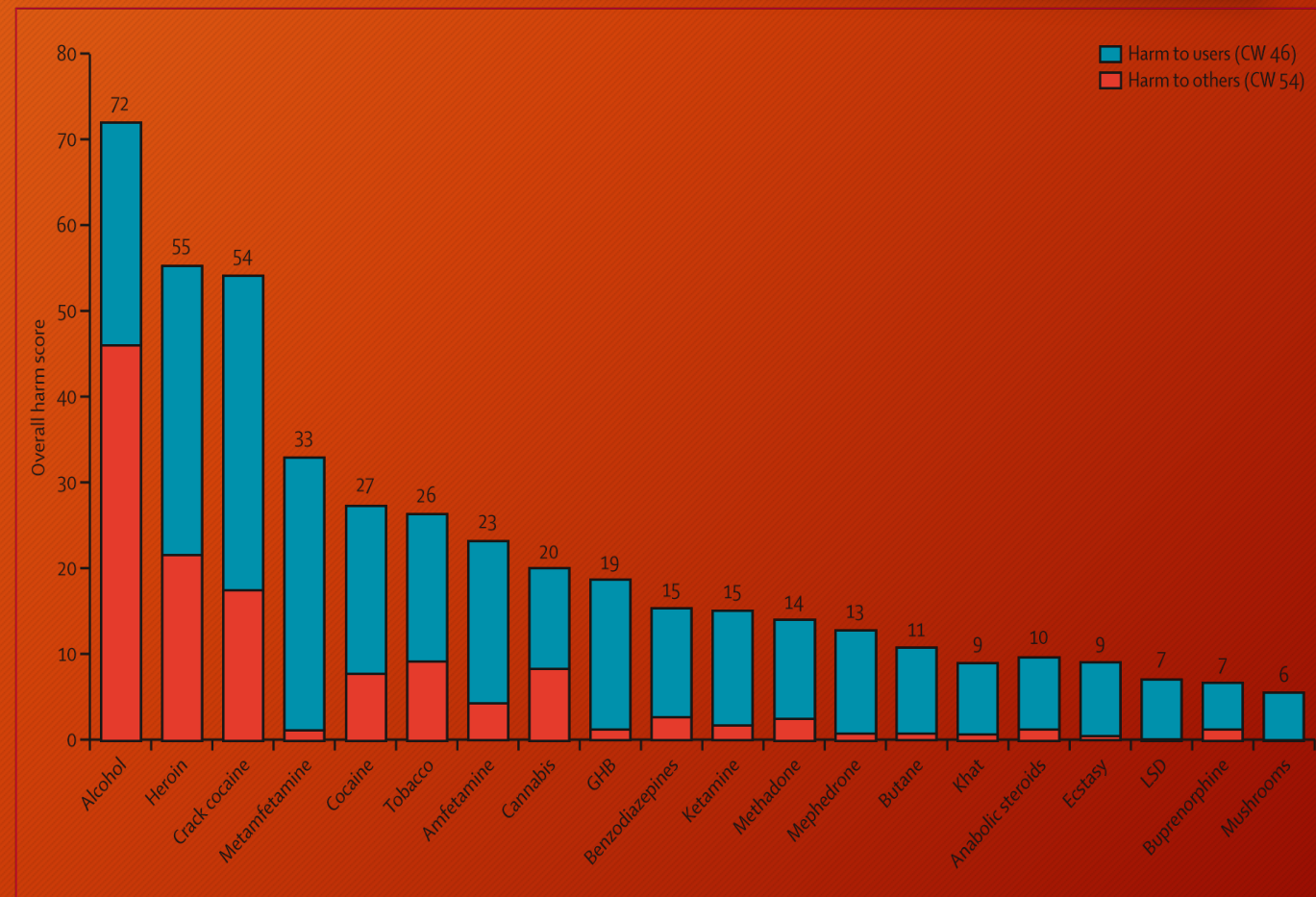
Addictive process

- Continued abuse in spite of consequence



Same process for all addictive drugs

- Alcohol
- Opioids
- Cocaine
- Methamphetamine
- Nicotine
- Marijuana



Exploding Vape Devices

- Facial Injuries
- Burns
- Fatalities

Texas man dies from vape pen explosion

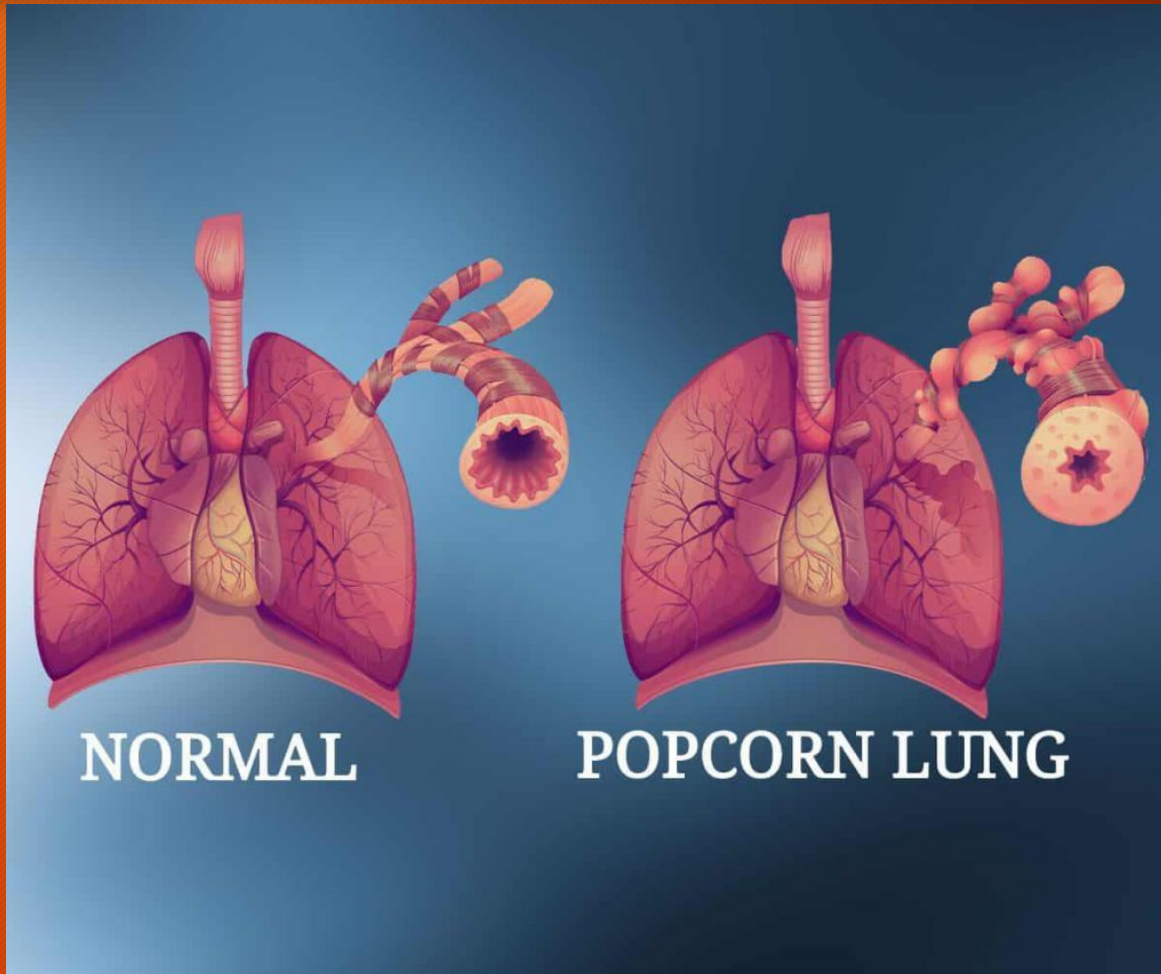


It's All About That Vape

- Physical Systems
 - Pulmonary
 - bronchiolitis obliterans,”
 - Diacetyl
 - 2,3 pentanedione
 - acetoin



Popcorn Lung



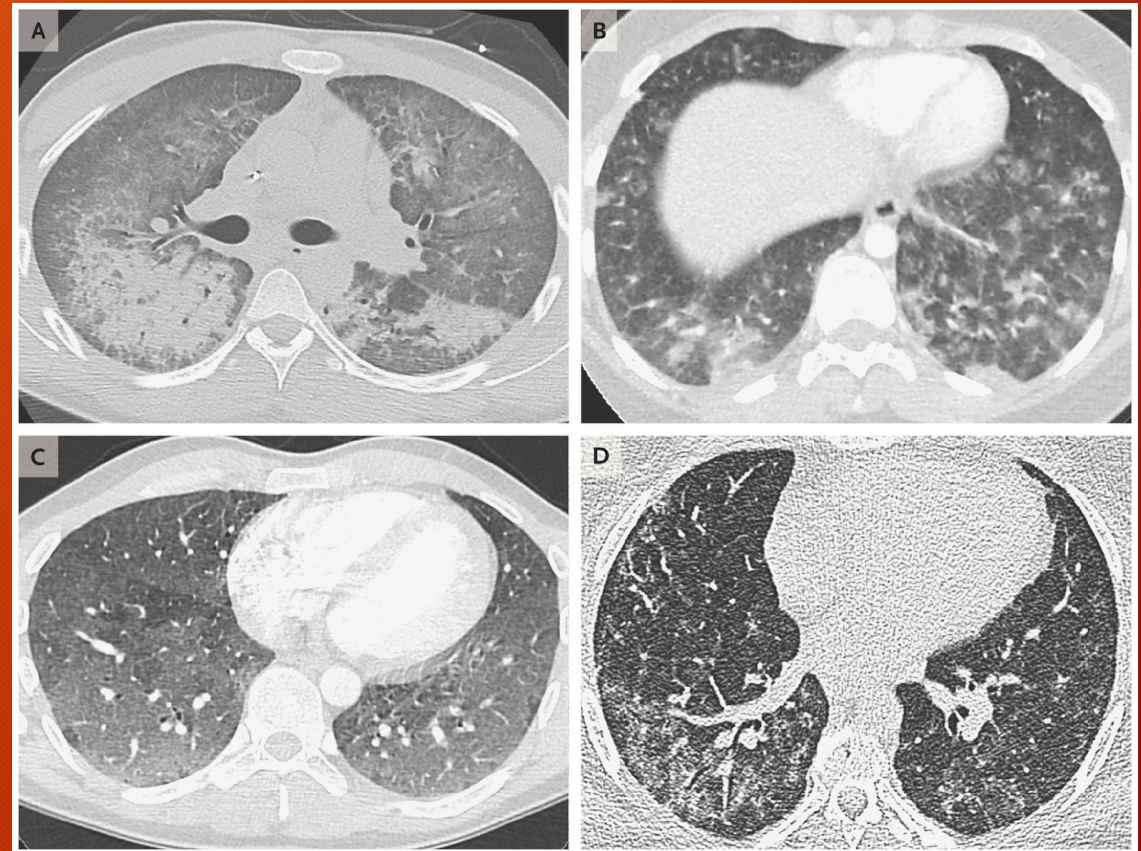
EVALI-What We Know

- E-cig or Vaping associated lung injury
- 2807 confirmed hospital cases,
- Extended Hospital Stays
- 68 fatalities



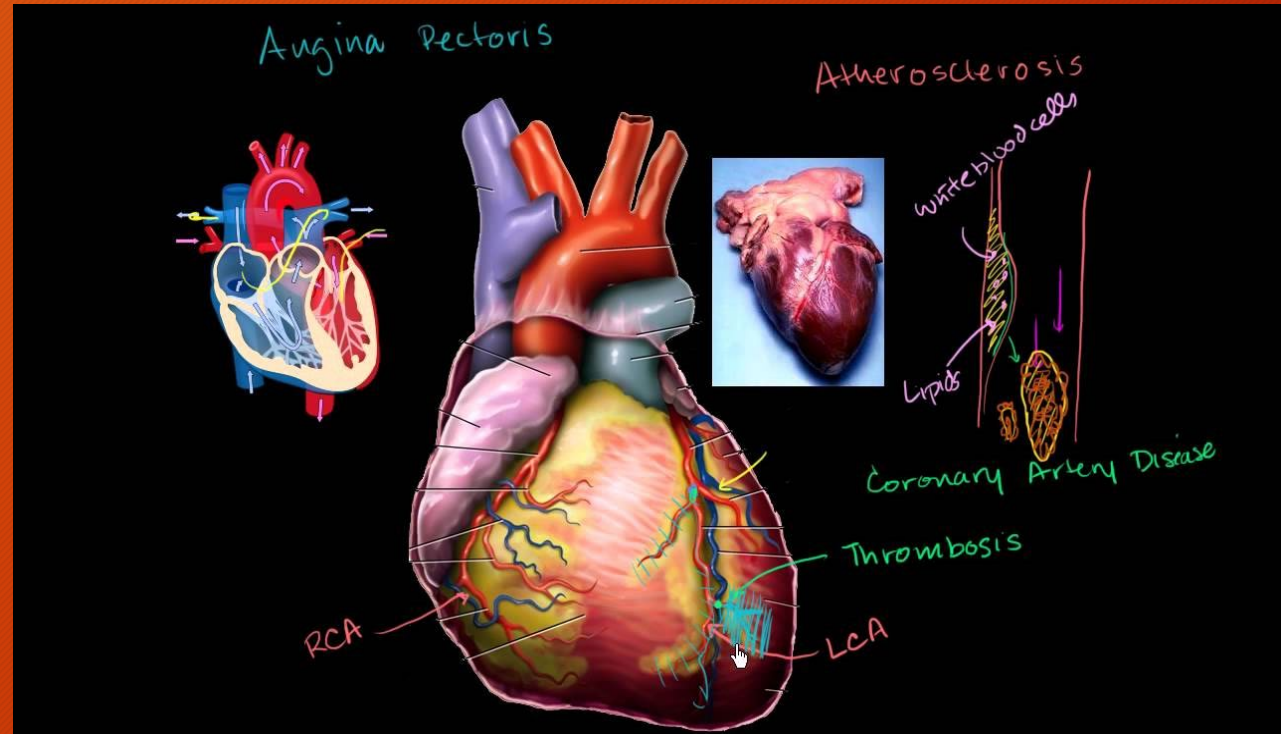
Lung Damage and Disease

- A diffuse alveolar damage
- B acute eosinophilic pneumonia
- C hypersensitivity pneumonitis
- D lipoid pneumonia



It's All About That Vape

- Cardiovascular
- Carbonyls; Aldehydes
Formaldehyde,
acetaldehyde, and acrolein
- Heavy Metals



Vaping and COVID19

- Nicotine may upregulate ACE2 receptor
- Point of viral entry in the lungs
- Downregulate cilia and immune response



Known Carcinogens

• Cancer Risk Projected Lower Insufficient Data

- Propylene Glycol
- Vegetable Glycerin
acrolein

Heavy Metals

Concurrent Use of Alcohol Increases Cancer Risk



Marijuana Buds, Liquids, Oils, and Synthetics

- The Chemistry of Learning
Long Term Potentiation

Glutamate, ATP

- Alcohol and Marijuana
deplete chemistry



Spindles and such

- Cell Firing
- Synchronicity
- Alcohol
All lower

Marijuana
Same Volume
Less Synchronicity



Drugs and Alcohol

- Big Four
- Inhalants
- Methamphetamine
- Alcohol
- Marijuana

Marijuana and Memory

- Word Recall Studies
 - List of words
 - 10-20% lower
- Misperception
 - “I’ve seen those words before”

WORD RECALL

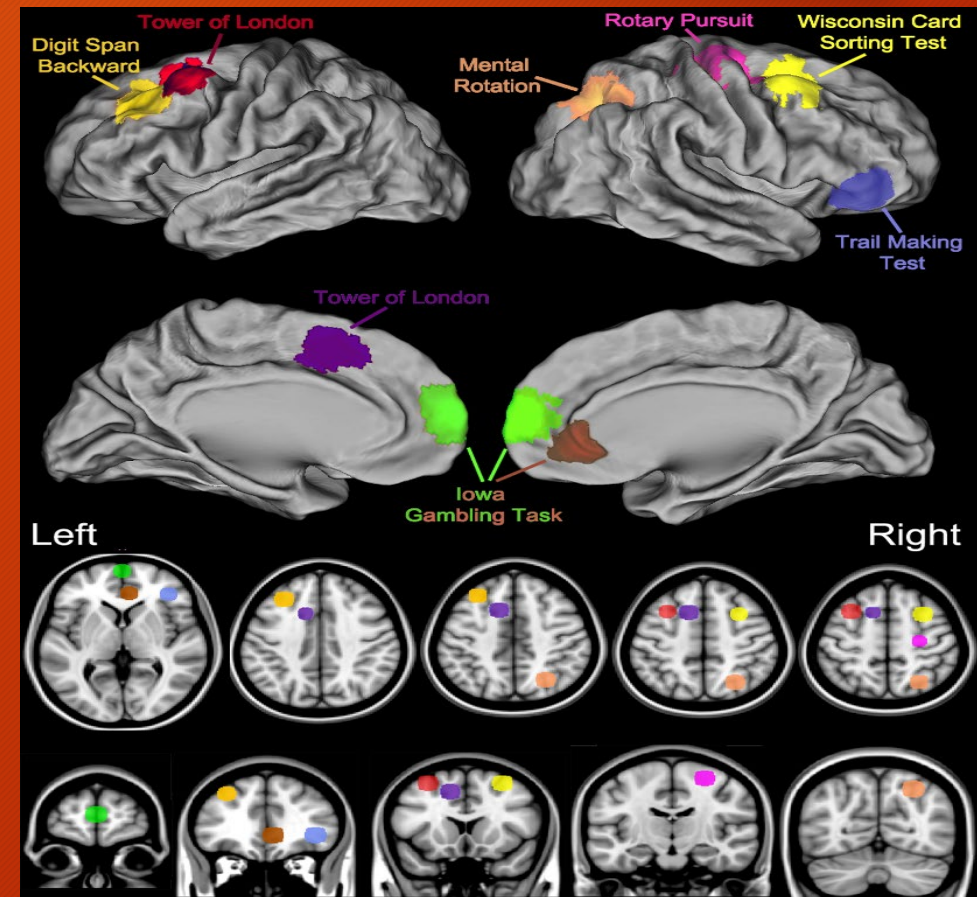
ALLOW yourself three minutes to study the following list of 20 words. Then write down as many words as you can recall. The order is not important.

Tree	Wardrobe
Time	Caterpillar
Face	Garden
Pipe	Treacle
Clock	Picture
Mouse	Harness
Engine	Sleep
Planet	Apple
Thunder	Ocean
Necklace	Book

Score one point for each word you can recall correctly. Maximum points: 20, Untrained: 4+, Improver 8+, Master 18+

Problem solving /time

- Tower of London test
- Wisconsin Card Sorting
- Iowa Gambling Task



Add It Up

- Global/Detail
- Declarative Memory
- Motivation
- Time Management
- Critical Self Evaluation



Social, Emotional, Cognitive

- Internalize new skills
 - Neural pathways and chemistry
 - How to learn
 - How to manage emotions
 - How to behave



Effective Language for Risk Assessment

- Immediate
Mind and Money
- Social/Emotional
School Rules, Team Contract, Relationships
- Impact on Others

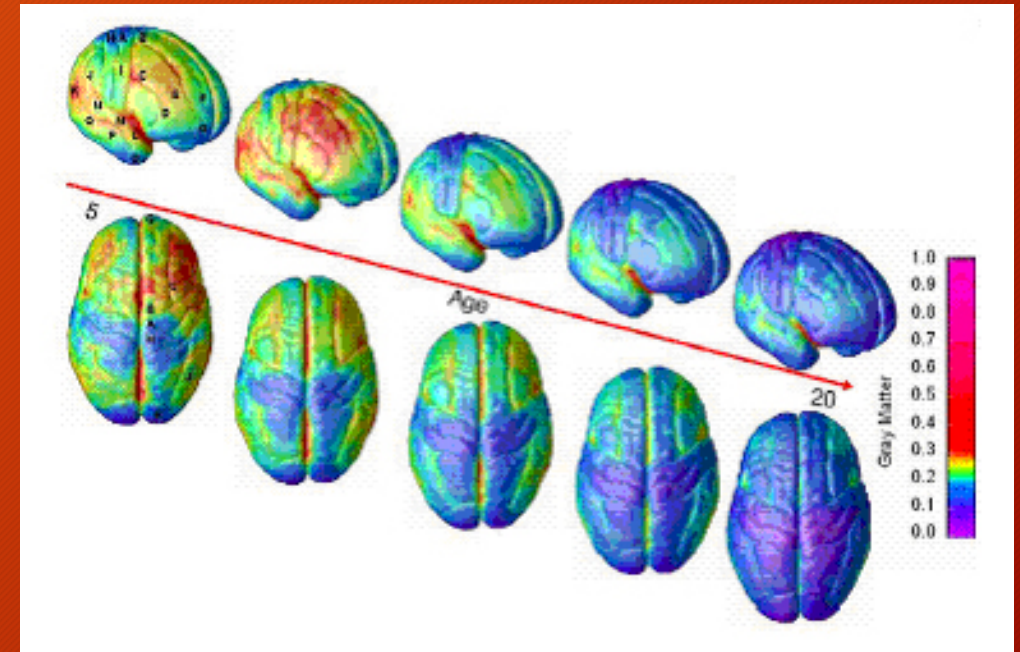
Why is this Brain at Risk?

A Work in Progress

- Stages of Adolescent Development

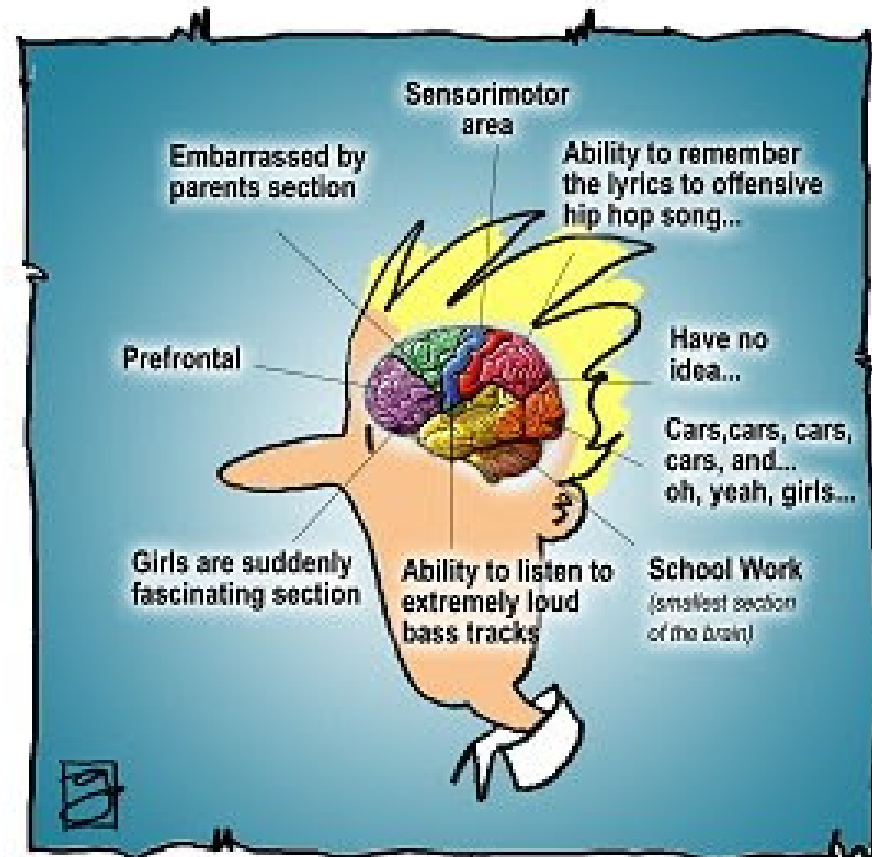
Emerging Adult Brain

- The Long and Winding Road



Wrap Up

- Validate Emotions
- Social Bonding
- Risk-Taking Opportunities
- Crisis Support
- Early Intervention



Anatomy of a Teenager's Brain