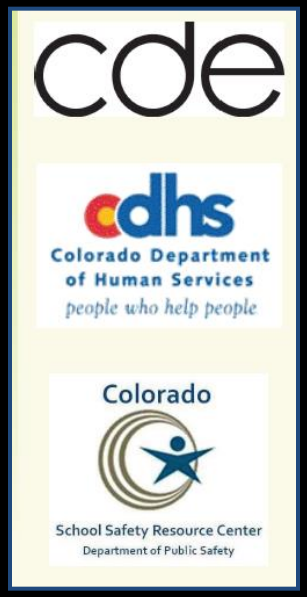


SUBSTANCE ABUSE SYMPOSIUM

What Does Research Tell Us About Prevention and Treatment of Adolescent Substance Abuse and Mental Health Problems?

Paula D. Riggs MD

Professor of Psychiatry

Director, Division of Substance Dependence

University of Colorado School of Medicine

Overview and Educational Goals

- Overview of developmental risk factors for adolescent substance and mental health problems
- Recent trends in substance use among high school students
- Evidence-based treatments for substance abusing adolescents
- Implications for school-based prevention and treatment

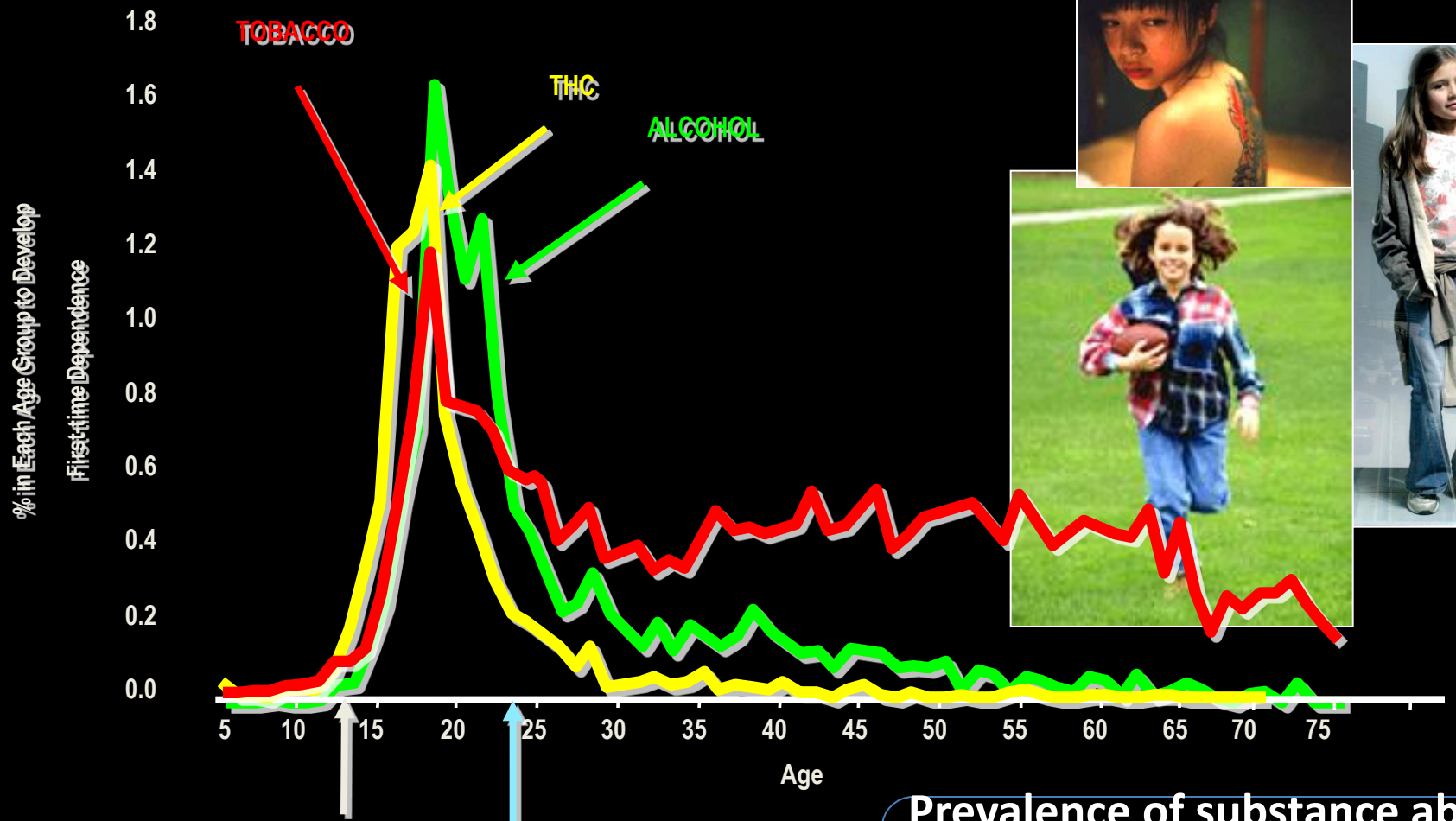
Objective #1

Developmental risk factors and inter-relationships between mental health problems and substance abuse in children and adolescents

Addiction and Mental Illness are Developmental Diseases

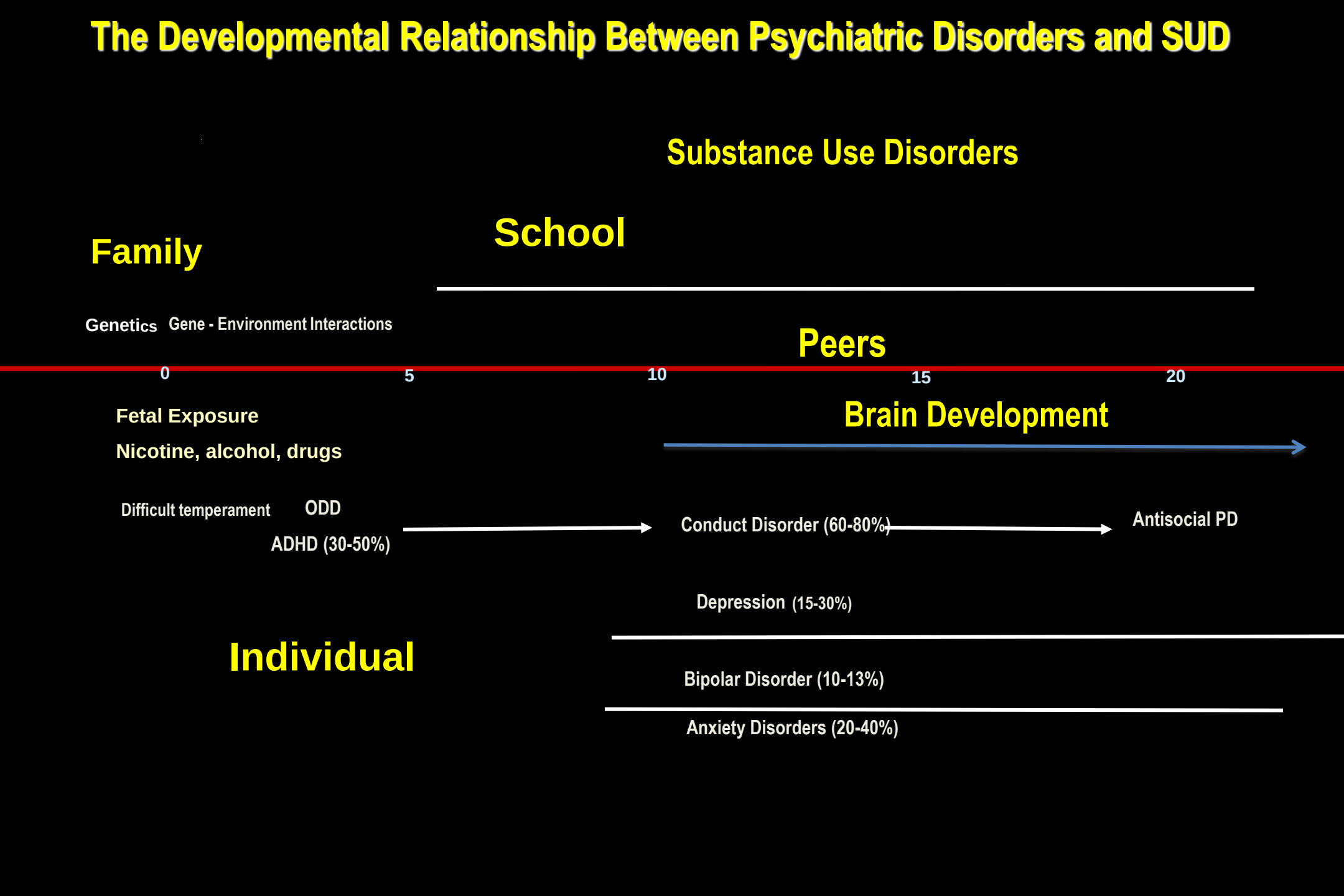
Childhood-onset psychiatric disorders increase risk for SUD

SUD increases risk for mental health problems



Prevalence of substance abuse and mental health disorders increasing among young people

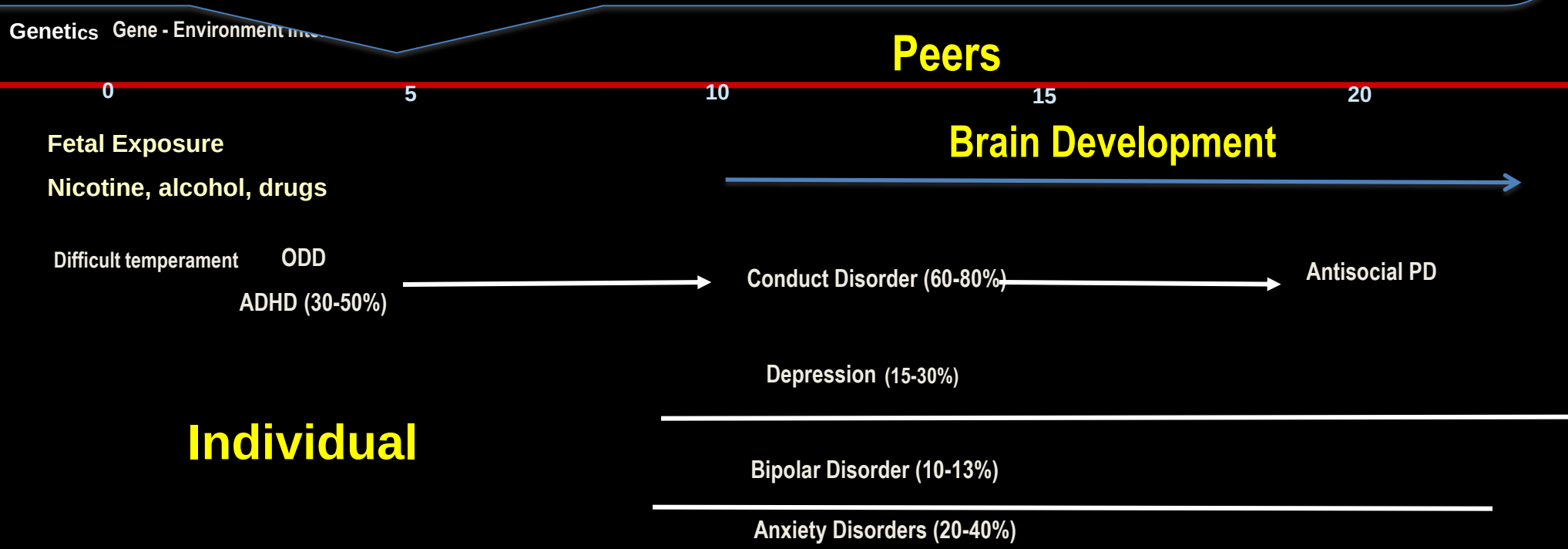
The Developmental Relationship Between Psychiatric Disorders and SUD



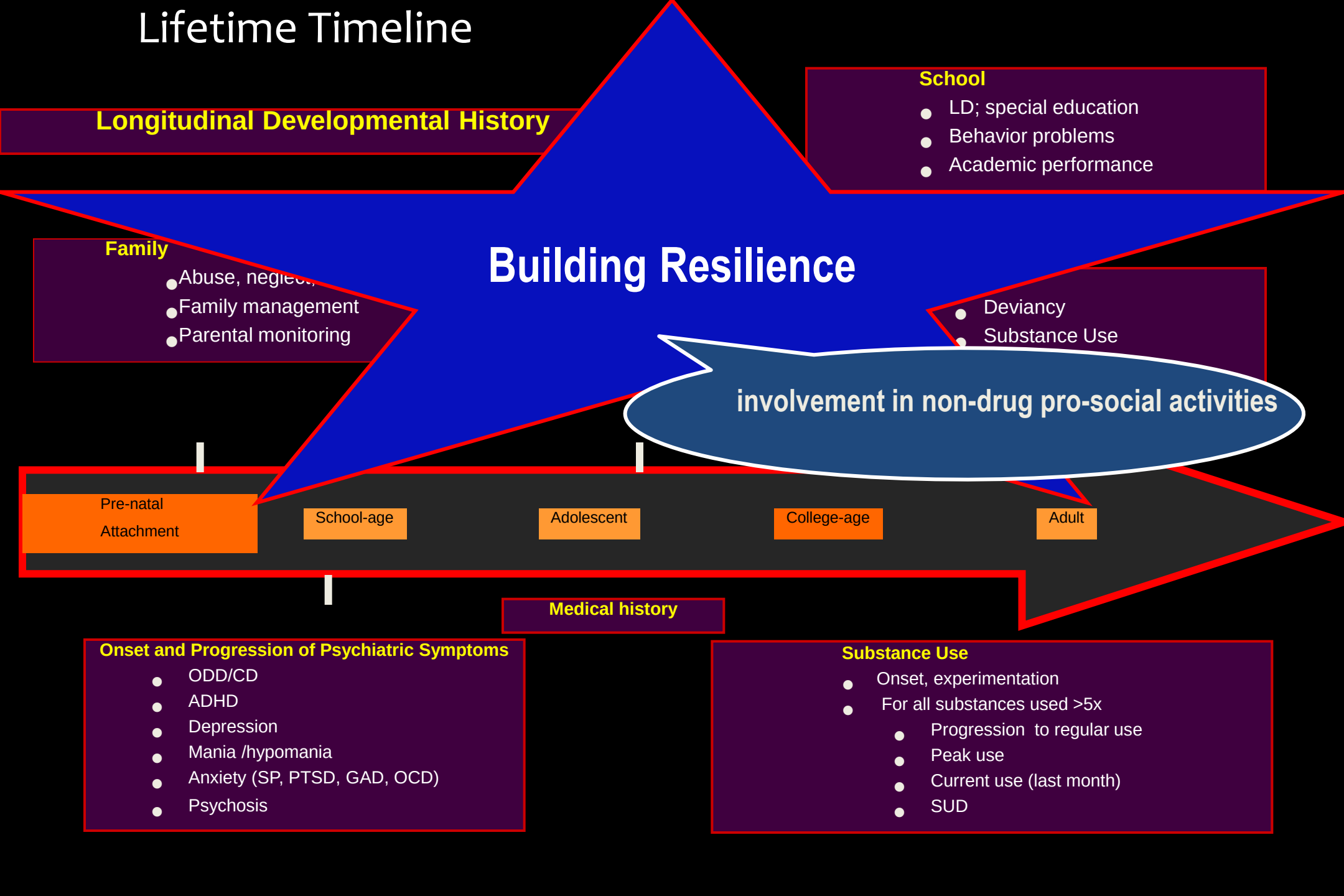
Research indicates that approximately 85% of HS students experiment with drugs and alcohol before graduating from high school.

Chronic and dangerous patterns of alcohol and illicit drug use among adolescents in the United States are hovering persistently at epidemic levels.

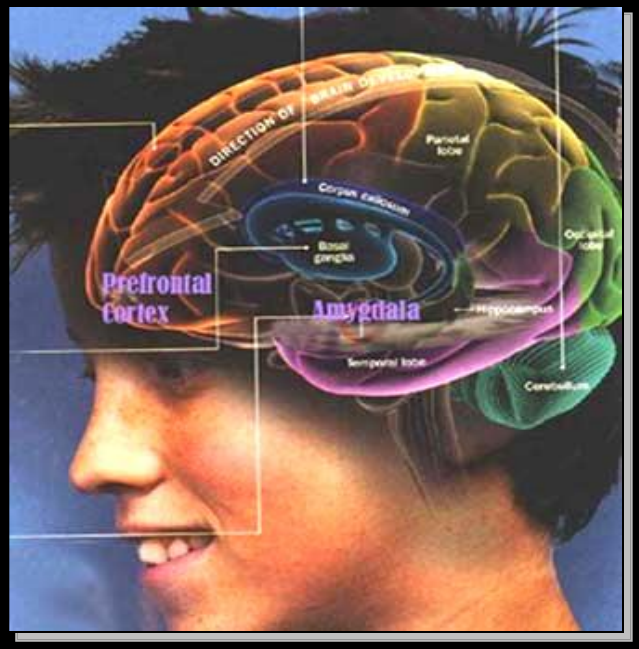
In 2007, the National Survey on Drug Use and Health reported that 7.8% (approximately 2 million adolescents) of U.S. adolescents met diagnostic criteria for alcohol or illicit drug abuse or dependence (United States Department of Health and Human Services, 2007)

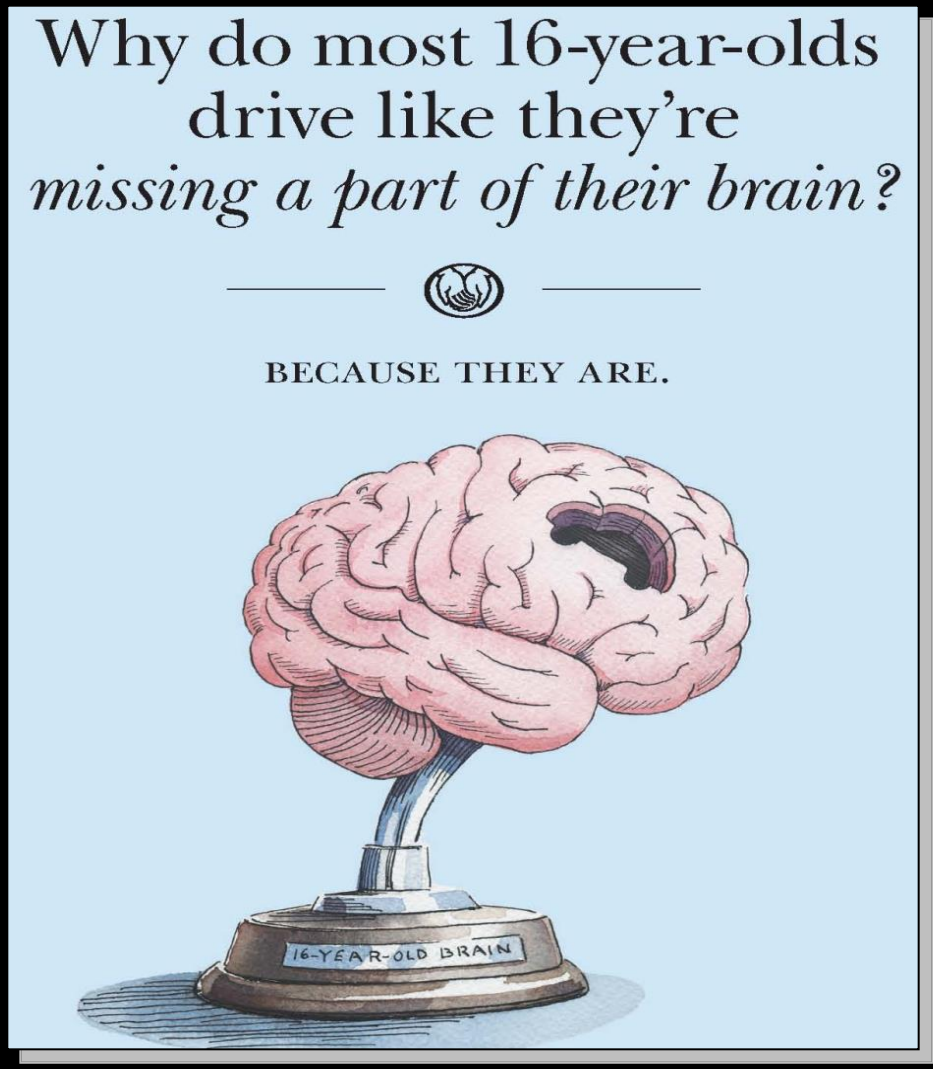


Lifetime Timeline

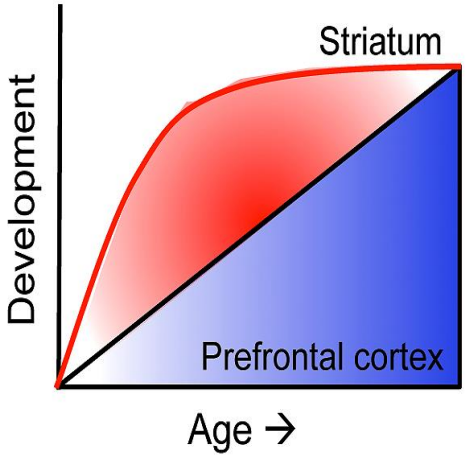


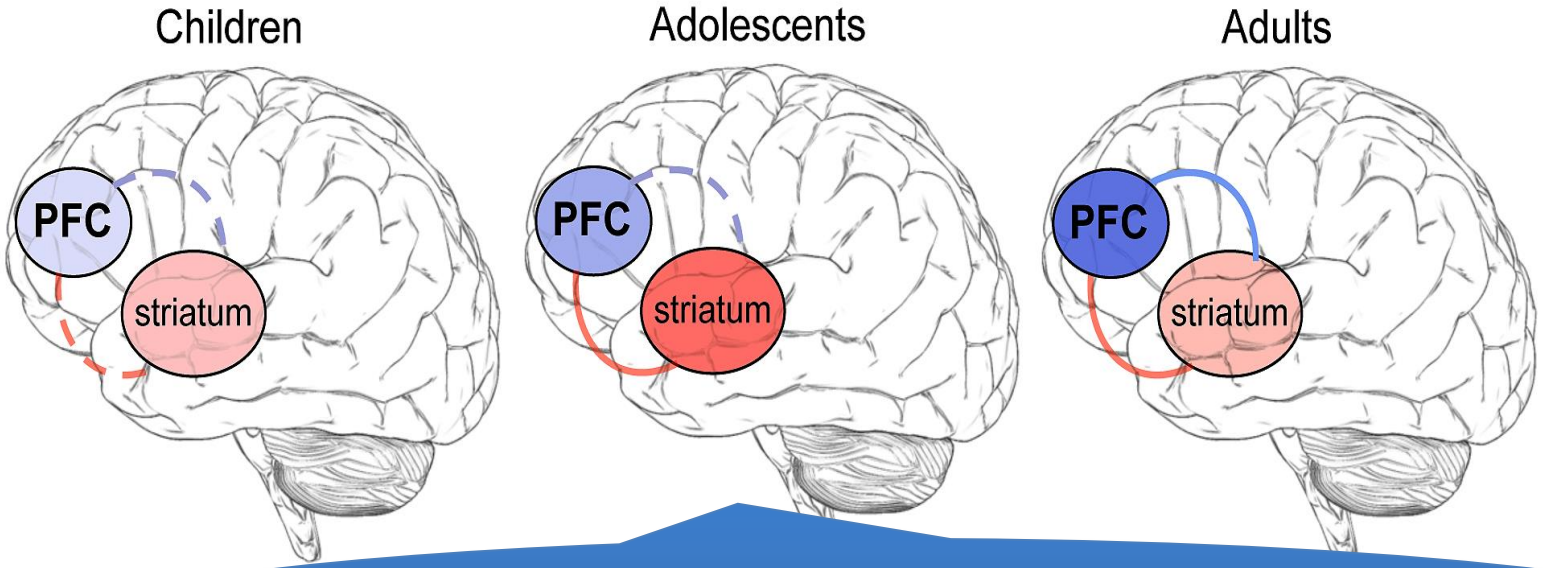
The Adolescent Brain – "A Work in Progress"





Adolescents appear to be more vulnerable to addiction in part due to rapid brain development





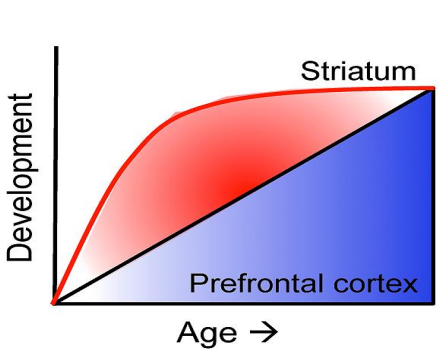
What do we know about the impact of substance abuse on adolescent brain development?

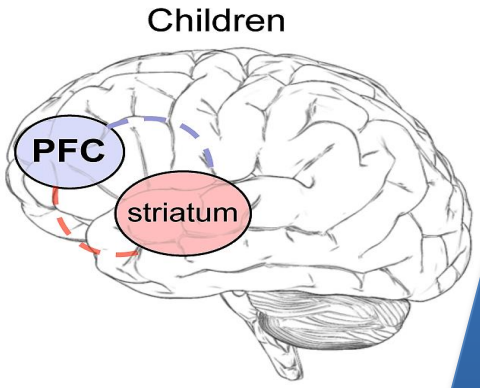
BJ Casey, JAACAP 2010

- "what teens do during their adolescent years – whether it's playing sports or playing video games – can affect how their brains develop" *-J Giedd*

- Environment and activities during teenage years guide selective synapse elimination ("pruning") during critical period of adolescent development

Cannabis is Neurotoxic to Ad

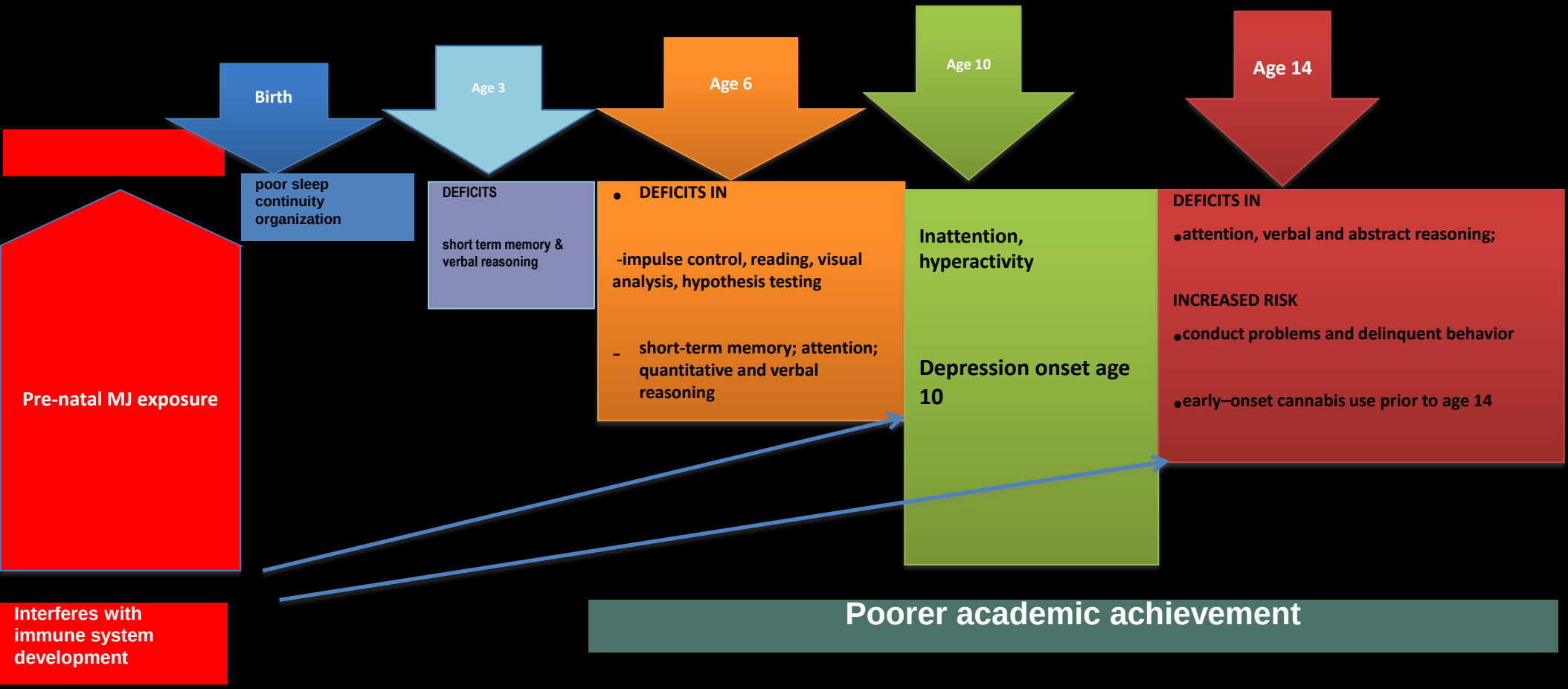




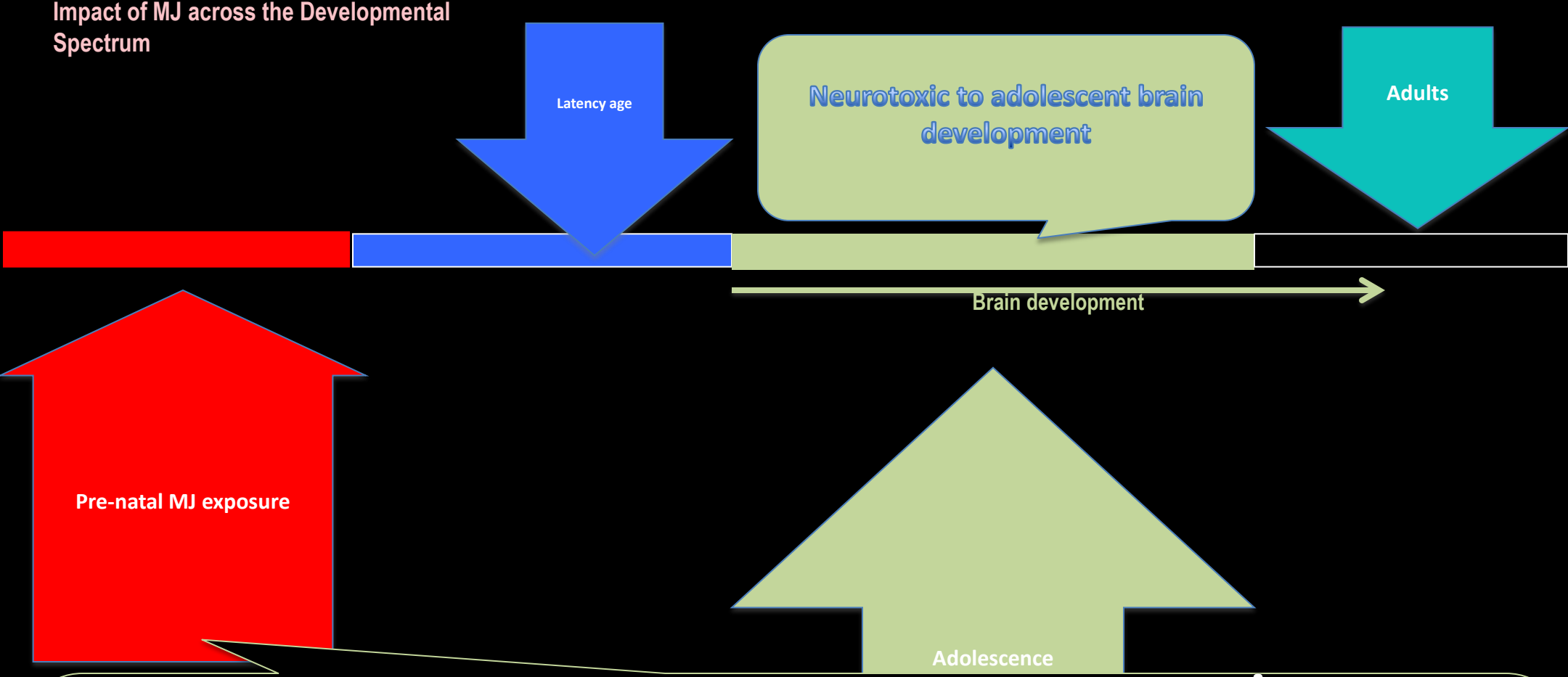
- Increases risk of psychosis, anxiety, depression
- May increase risk of becoming dependent/addicted to other substances tried later
- Associated with lower academic achievement/academic failure; HS drop out; under employment or unemployment daily use (6.5%) at 30 year peak levels among HS seniors

- Cannabis (CB1) receptor plays a critical regulatory role in development of pre-frontal cortex; increases risk of psychosis; produces more lasting lasting cognitive deficits (*Meier et al 2012; Matthijs et al 2010; Crean et al 2011)*
- Compared to controls or those who started smoking MJ after age 17, those who start smoking MJ before age 17 have > deficits in executive functioning, working memory, verbal fluency, learning (*Pope 2003)*
- Adolescents who started smoking MJ between 14 and 22 but stopped by age 22 had > cognitive problems at age 27 than non-users *(Brook et al., 2008)*
- Regular cannabis use during adolescence was associated with 6-8 point reduction in adult IQ *Meier et al PNAS April 23, 2012*

Impact of Pre-natal Cannabis Exposure

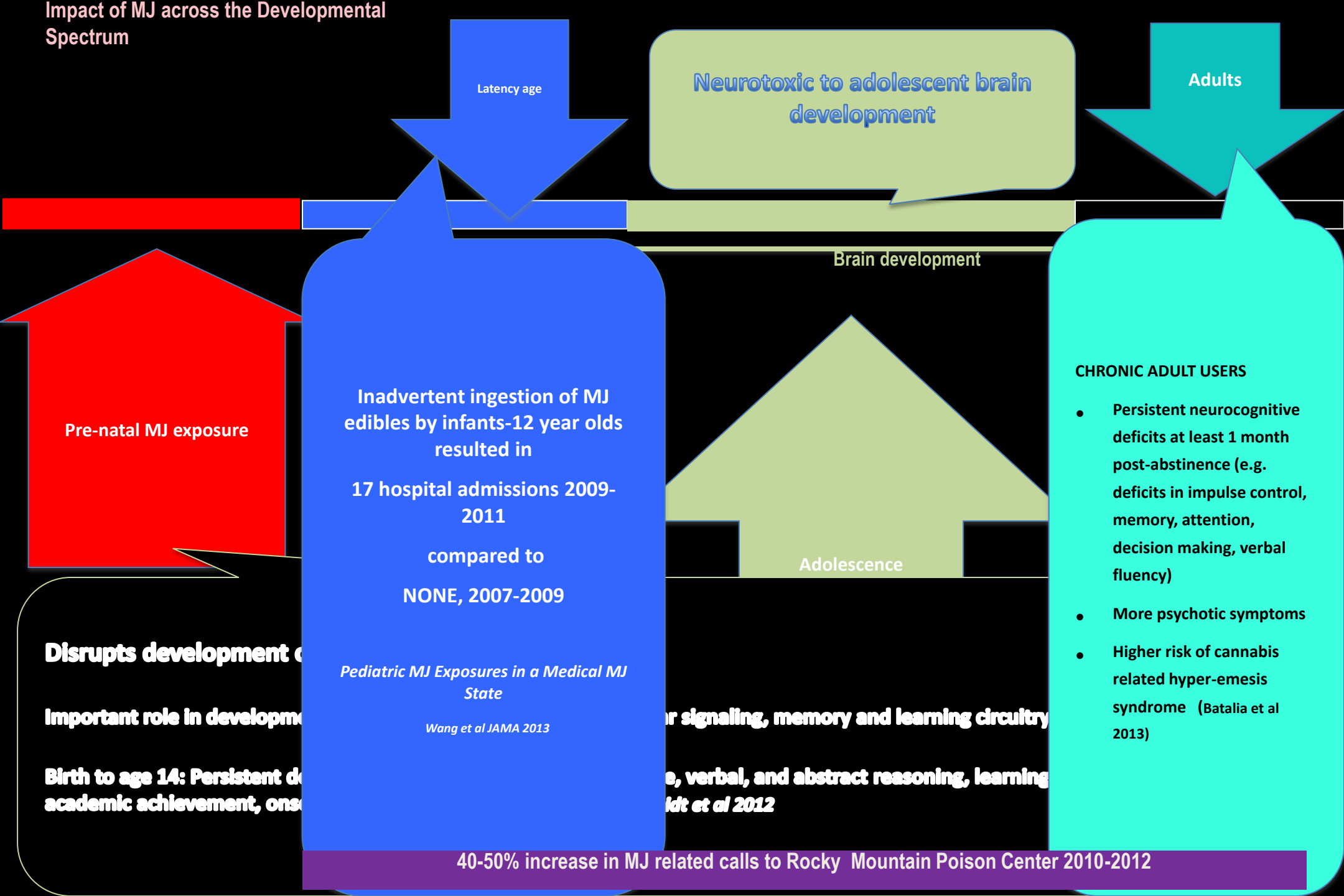


Goldschmidt et al 2012 –Longitudinal Study of pre-natal MJ exposure < 1 joint per day vs > 1 joint per day . Most findings associated with first trimester MJ use ***(heavy users smoked 2.4, 2.1,2.4 joints per day 1st, 2nd, 3rd trimesters, respectively)***

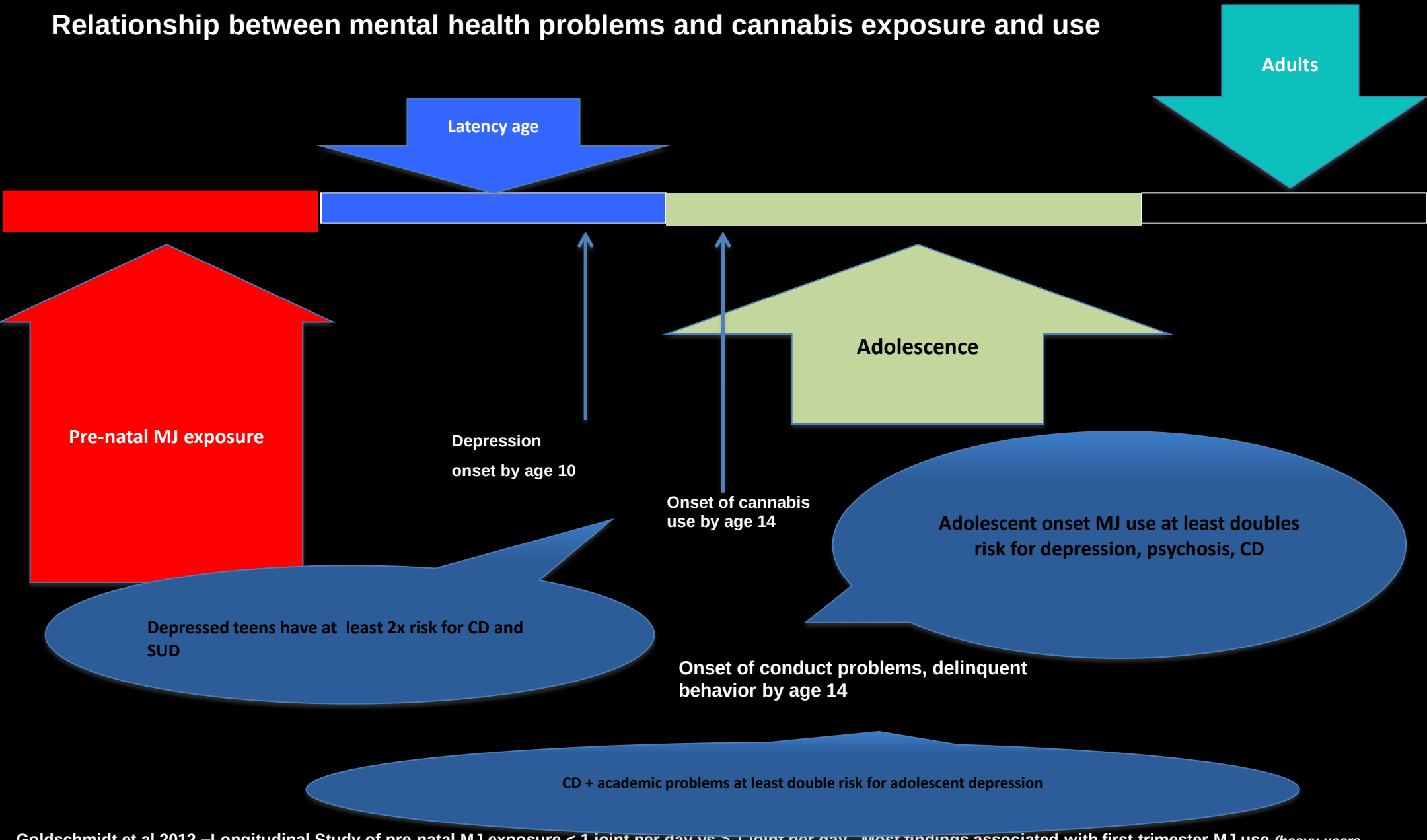


Disrupts development of the endocannabinoid system which plays an important role in development of neuronal connectivity, intercellular signaling, memory and learning circuitry

Birth to age 14: Persistent deficits in memory, attention, quantitative, verbal, and abstract reasoning, learning disabilities, poorer academic achievement, onset of depression by age 14 ***Goldschmidt et al 2012***


Impact of MJ across the Developmental Spectrum
Latency age
Neurotoxic to adolescent brain development
Adults
Brain development
Pre-natal MJ exposure
Inadvertent ingestion of MJ edibles by infants-12 year olds resulted in
17 hospital admissions 2009-2011
compared to
NONE, 2007-2009
Pediatric MJ Exposures in a Medical MJ State
Wang et al JAMA 2013
Adolescence
CHRONIC ADULT USERS
Persistent neurocognitive deficits at least 1 month post-abstinence (e.g. deficits in impulse control, memory, attention, decision making, verbal fluency)
More psychotic symptoms
Higher risk of cannabis related hyper-emesis syndrome (Batalia et al 2013)
Disrupts development
Important role in developm
r signaling, memory and learning circuitry
Birth to age 14: Persistent d
e, verbal, and abstract reasoning, learning
academic achievement, ons
dt et al 2012
40-50% increase in MJ related calls to Rocky Mountain Poison Center 2010-2012

Relationship between mental health problems and cannabis exposure and use



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Objective #2

Prevalence of Substance Use Disorders In Adolescents

Monitoring the Future Study: Trends in Prevalence of Various Drugs for 8th-Graders, 10th-Graders, and 12th-Graders

2009-2012 (in percent)*

Drug	Time Period	8th-Graders				10th-Graders				12th-Graders			
		2009	2010	2011	2012	2009	2010	2011	2012	2009	2010	2011	2012
Any Illicit Drug Use	Lifetime	19.9	21.4	20.1	**18.5**	36	37	37.7	**36.8**	46.7	48.2	49.9	**49.1**
	Past Year	14.5	[16.0]	14.7	**13.4**	29.4	30.2	31.1	**30.1**	36.5	38.3	40	**39.7**
	Past Month	8.1	[9.5]	8.5	**7.7**	17.8	18.5	19.2	**18.6**	23.3	23.8	25.2	**25.2**
Marijuana/Hashish	Lifetime	15.7	17.3	16.4	**15.2**	32.3	33.4	34.5	**33.8**	42	43.8	45.5	**45.2**
	Past Year	11.8	[13.7]	12.5	**11.4**	26.7	27.5	28.8	**28**	32.8	34.8	36.4	**36.4**
	Past Month	6.5	[8.0]	7.2	**6.5**	15.9	16.7	17.6	**17**	20.6	21.4	22.6	**22.9**
	Daily	1	[1.2]	13	**1.1**	2.8	[3.3]	3.6	**3.5**	5.2	[6.1]	6.6	**6.5**
Inhalants	Lifetime	14.9	14.5	13.1	**11.8**	12.3	12	[10.1]	**9.9**	9.5	9	8.1	**7.9**

- Adolescent use declined mid-late 1990s -2000 but increased past 5 years
- Regular (past 30 days 25% and Daily MJ use at 30-year peak levels
- 1/6 adolescents who experiment w/ MJ become dependent vs 1/11 adults
- 2013 PEW National Survey
  - > 50% Americans currently favor MJ legalization (unprecedented)
  - 20 states have medical MJ; 13 states considering MJ legalization

MJ most widely used illicit substance in U.S and the World

Monitoring the Future Study: Trends in Prevalence of Various Drugs for 8th-Graders, 10th-Graders, and 12th-Graders

2009-2012 (in percent)*

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	Past Year	14.5	[16.0]	14.7	**13.4**	29.4	30.2	31.1	**30.1**	36.5	38.3	40	**39.7**
	Past Month	8.1	[9.5]	8.5	**7.7**	17.8	18.5	19.2	**18.6**	23.3	23.8	25.2	**25.2**
Marijuana/Hashish	Lifetime	15.7	17.3	16.4	**15.2**	32.3	33.4	34.5	**33.8**	42	43.8	45.5	**45.2**
	Past Year	11.8	[13.7]	12.5	**11.4**	26.7	27.5	28.8	**28**	32.8	34.8	36.4	**36.4**
	Past Month	6.5	[8.0]	7.2	**6.5**	15.9	16.7	17.6	**17**	20.6	21.4	22.6	**22.9**
	Daily	1	[1.2]	13	**1.1**	2.8	[3.3]	3.6	**3.5**	5.2	[6.1]	6.6	**6.5**
Inhalants	Lifetime	14.9	14.5	13.1	**11.8**	12.3	12	[10.1]	**9.9**	9.5	9	8.1	**7.9**

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- 2013 PEW National Survey
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So Why Should I Care?

Isn't MJ a fairly low risk, benign recreational drug?

Public Health Impact of Current Levels of MJ in U.S. High School Students

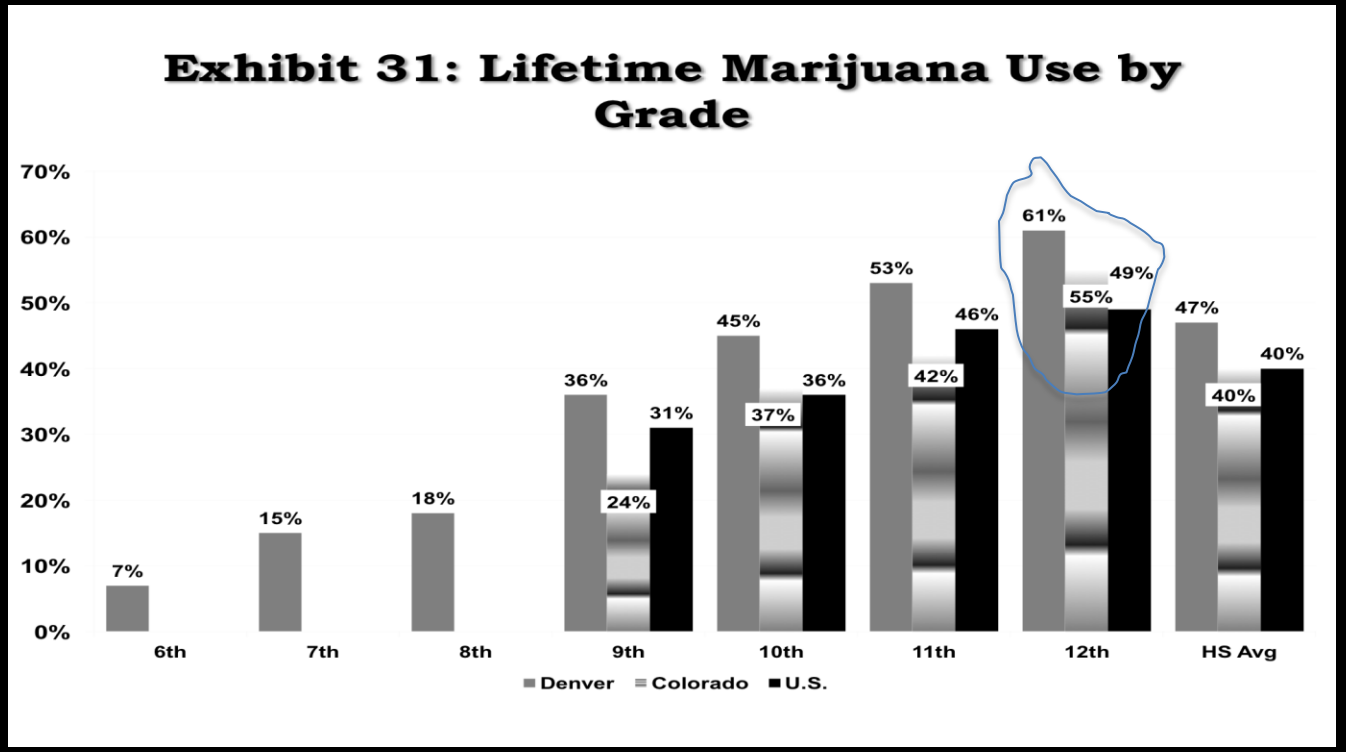
Lets do the math

- 17.29 million HS students, grades 9-12 in US (2008)
- 45% lifetime MJ use = 7,740,000
- 1/6 adolescents who try MJ will become addicted or cannabis dependent =1,290,000

More than1 million U.S. high school students currently using MJ at levels associated with

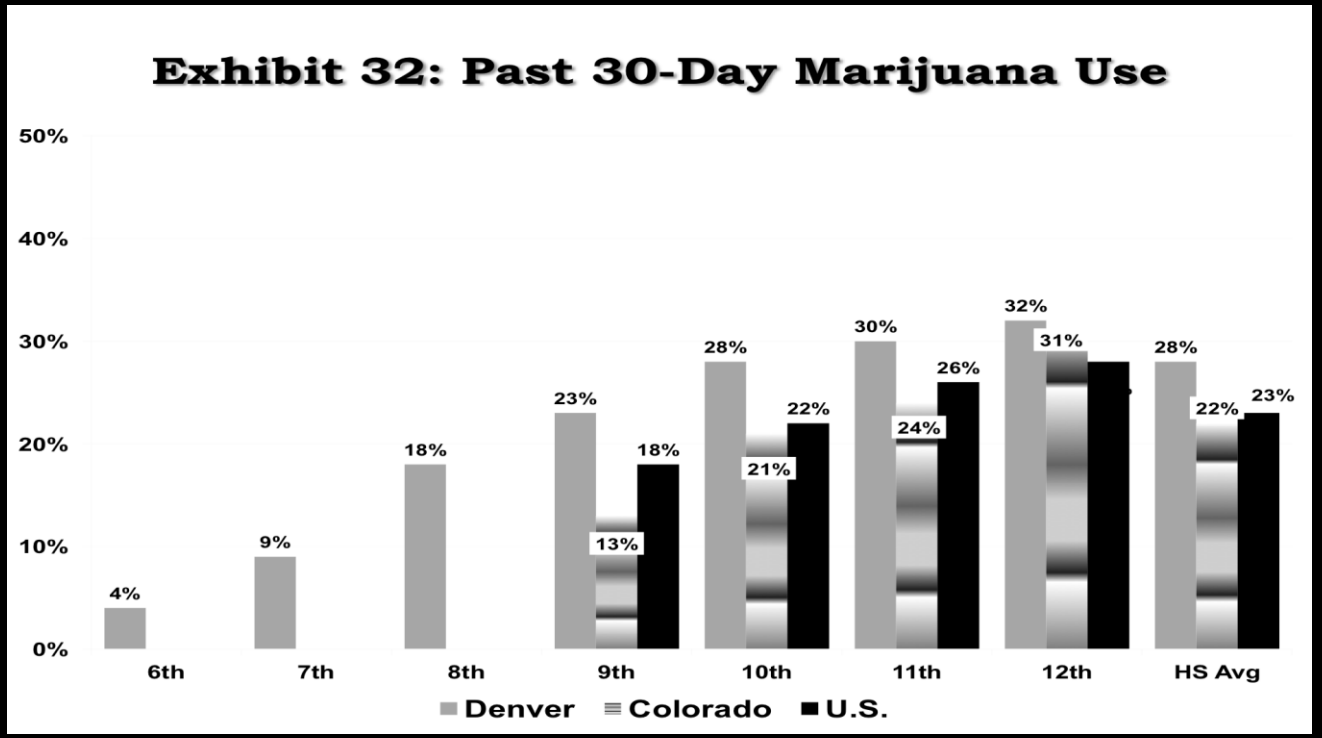
- 6-8 point reduction in IQ
- Persistent neurocognitive deficits, lower academic achievement, HS drop out
- Adult unemployment/under-employment, lower SES
- Increased risk of psychosis, depression, behavior probs

Public Health Impact of Medical and Recreational MJ Use in Colorado



Source : Healthy Kids Colorado Survey in the Denver and Colorado Public Schools 2011, and 2011 Youth Risk Behavior Survey

Public Health Impact of Medical and Recreational MJ Use in Colorado



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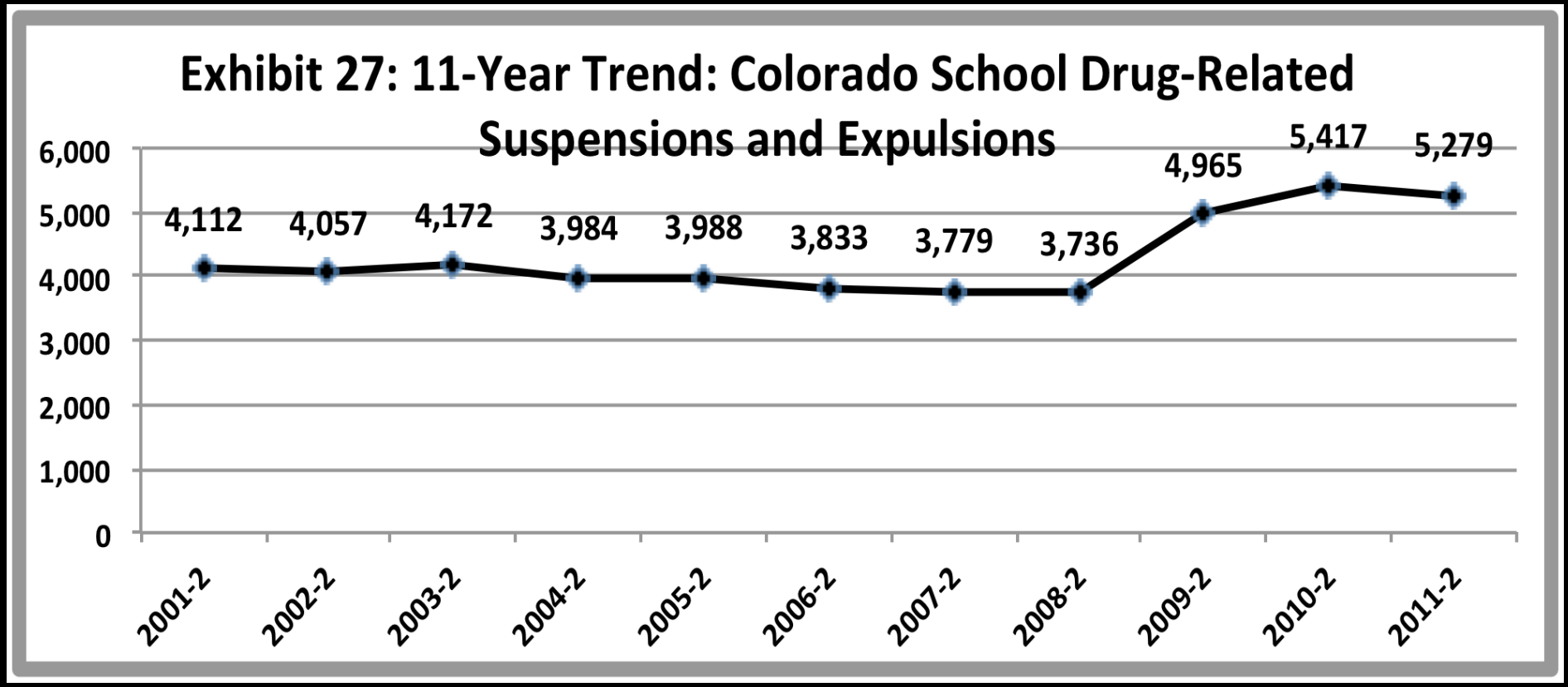


Exhibit 27: 11-Year Trend: Colorado School Drug-Related Suspensions and Expulsions
6,000
5,000
4,000
3,000
2,000
1,000
0
4,112
4,057
4,172
3,984
3,988
3,833
3,779
3,736
4,965
5,417
5,279
2001-2
2002-2
2003-2
2004-2
2005-2
2006-2
2007-2
2008-2
2009-2
2010-2
2011-2

Begs the Question?

If there was a neurotoxin in the air or the water that at least 50% of our kids were being exposed to and 1/6 of these, exposed at levels associated with significant reductions in IQ, learning problems, academic underachievement, and persistent neurocognitive deficits

WOULDN'T WE BE ALL OVER THAT?

The public health impact of current rates of MJ use among U. S. HS students is comparable to environmental lead poisoning

Intellectual impairment in Children with Blood Lead Concentrations below 10 micrograms per Deciliter

"IQ declined by 7.4 points as lifetime average blood lead concentrations increased from 1-10 micro grams per deciliter"

Canfield et al 2003, NEJM

Objective #3

Evidence-Based Prevention, Early Intervention, and Treatment

School-based Interventions

What we have

What we need

School-Based Prevention Programs

- **TYPE**
  - "universal" delivered to all students
  - "indicated" delivered to those engaging in high risk behaviors/early warning signs

- **COCHRANE REVIEW (FAGGIANO 2010)**
  - Most prevention programs are considered relatively "weak" with modest effect sizes that diminish over time.
  - Almost all are designed for youth who have not yet started using substances
  - Greatest efficacy support for:
    - **Life Skills Training Program:**
      - Cognitive Behavioral Framework to improve self esteem, communication skills, assertion of one's rights, building positive relationships, management of anxiety, mood, problem solving skills, drug resistance; education about negative consequences of drugs/alcohol (7th grade with boosters in 8th, 9th, 12th grade) (Botvin et al. 1995)
    - **Unpugged Program**

"Unplugged" is a tobacco, alcohol and drug abuse prevention program for students ages 12-14. It was developed, successfully implemented and evaluated by the European Commission in 7 countries in 2003-2007

WHAT ARE THE GAPS?

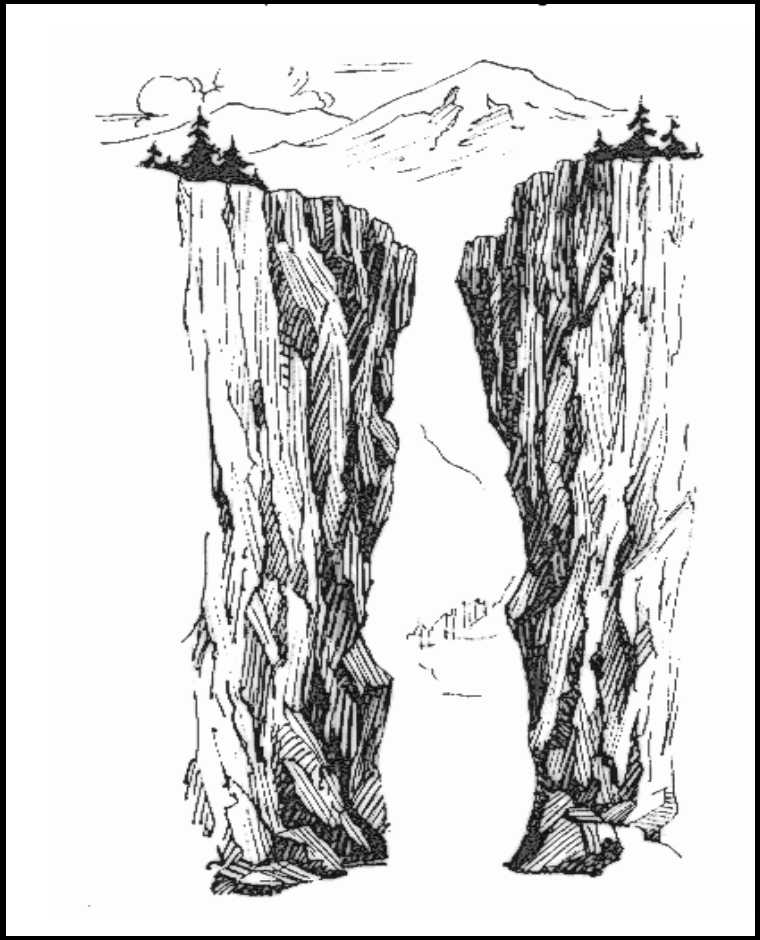
Existing school-based prevention, early intervention, treatment

MOST PREVENTION PROGRAMS HAVE WEAK SHORT TERM EFFECTS AND ARE DESIGNED FOR STUDENTS WHO HAVE NOT YET STARTED USING

Early Interventions

- limited to brief 2-3 session motivational enhancement interventions
- weak short term effects and no long term impact

(Winters et al 2007, 2009; Walker et al 2007, 2009).



Evidence –Based Substance Treatment

In community-based treatment settings largely serving adolescents referred by juvenile justice

Few integrate MH/SUD treatment or adapted as school-based interventions

Evidence-Based Substance and Psychiatric Treatments for Adolescents

Psychiatric Disorders

Conduct Disorder (60-80%)

- Family-Based
- CBT

Depression, Anxiety(30-40%)

- CBT
- Pharmacotherapy

ADHD (30-50%)

- CBT
- Pharmacotherapy

Substance Use Disorders

- **Family-based** (MDFT, FFT, MST, BSFT, ACRA-with MET/CBT)
- **Behavioral--CM/ motivational incentives**
- **Cognitive Behavioral Therapy (CBT)+ MET**
- Pharmacotherapy

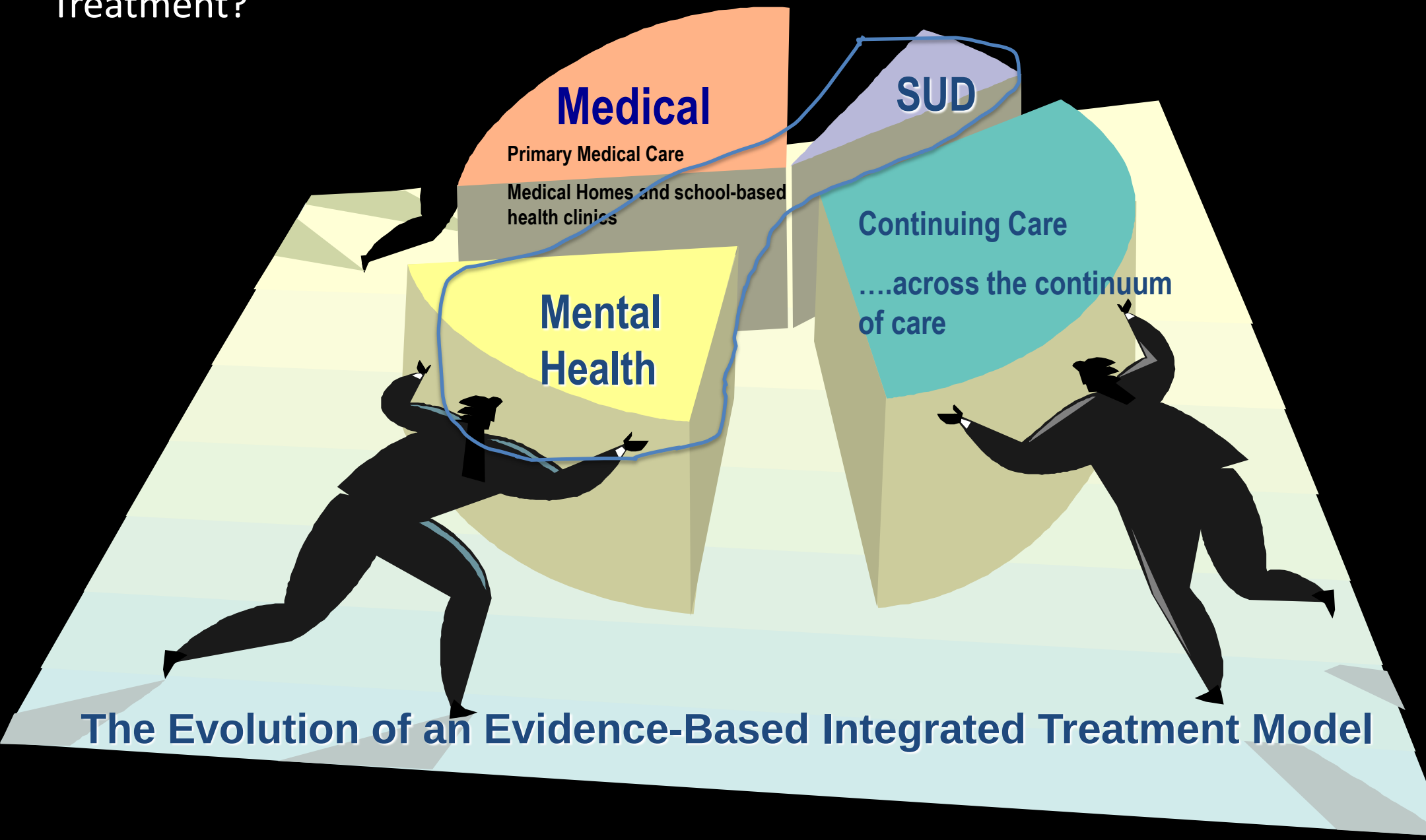
- Individual cognitive/behavioral treatment showed higher effect sizes and better long-term effects compared to family-based interventions
- CM Motivational Incentives has been shown to significantly increase the effect size, abstinence, compliance when added to EB psychosocial interventions

Family-Based and MET/CBT
3 Month Post-Treatment Effect Size

Family-Based Therapy		MET/CBT	
2/18	↑	9/12	↑
7/18	=	2/12	=
9/18	↓	1/12	↓

*Waldron H, Turner C. Evidence-Based Psychosocial Treatments for Adolescent Substance Abuse Journal of Clinical Child Adol Psychology 37:1, 238-261

What Does Research Say About Integrated Mental Health and Substance Treatment?



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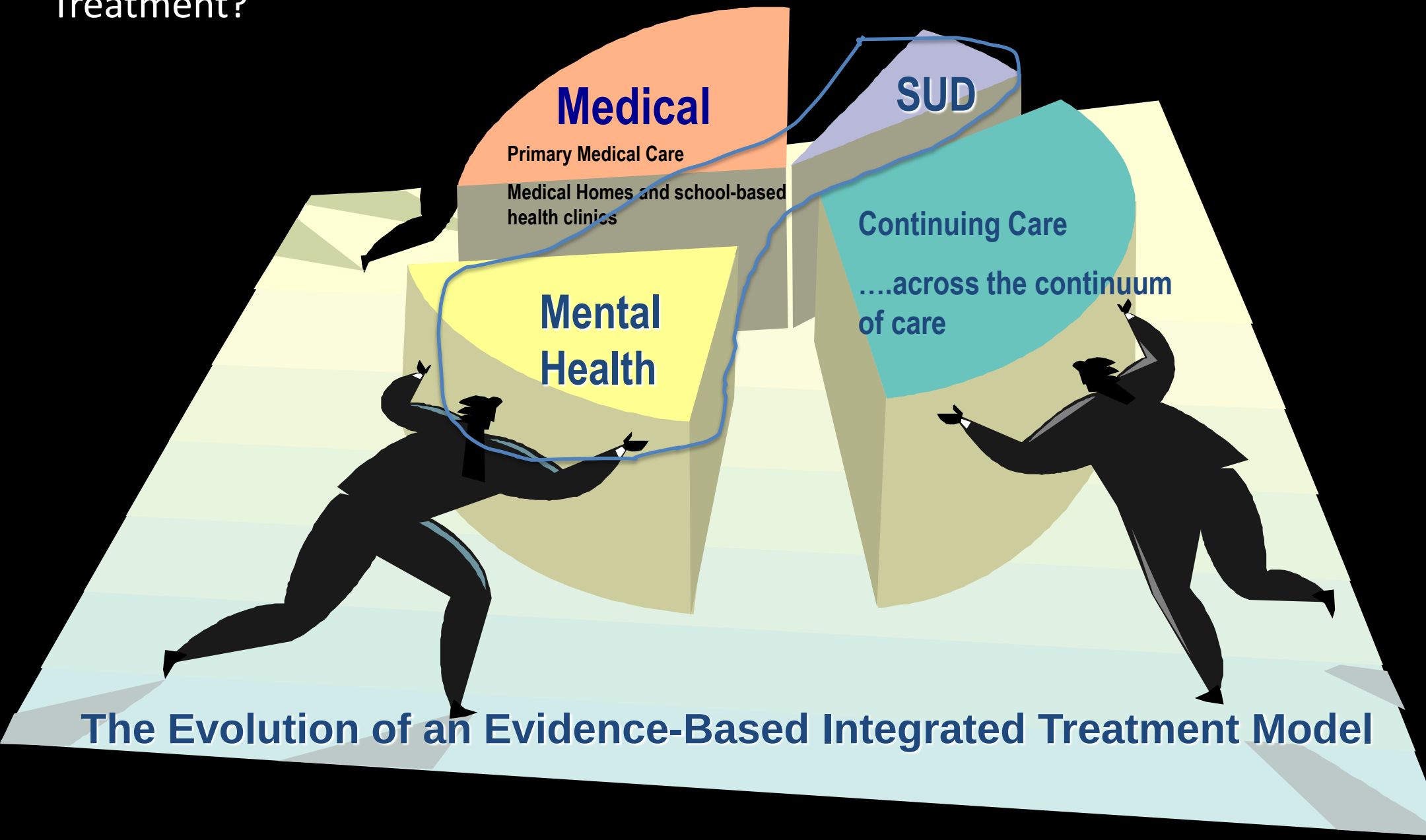
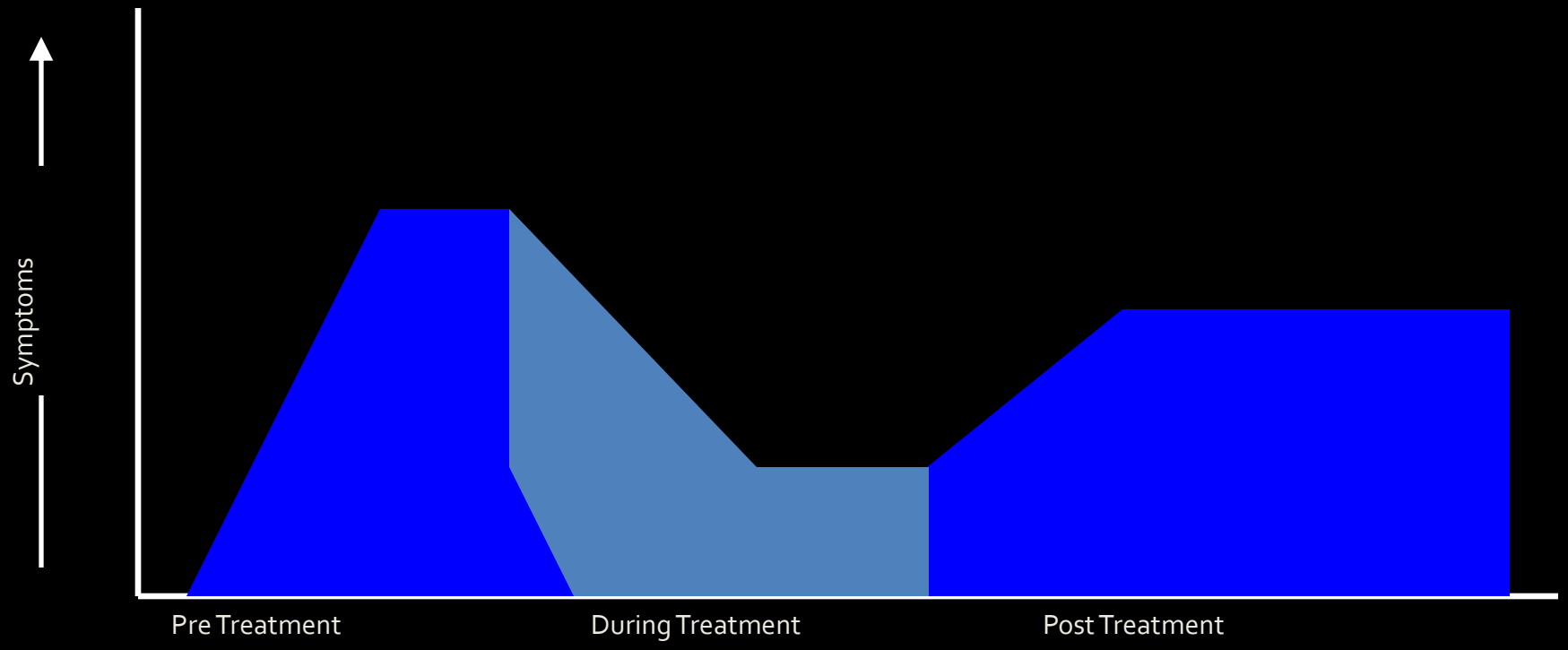


Treatment is Effective……but…

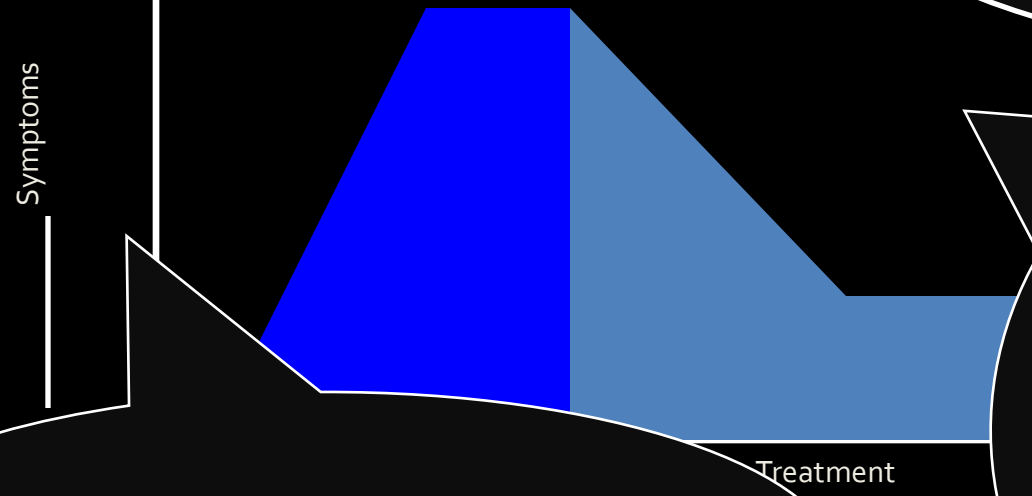


Treatment is Effective……but…

Treatment access <10%

In part, artifact of third party payers

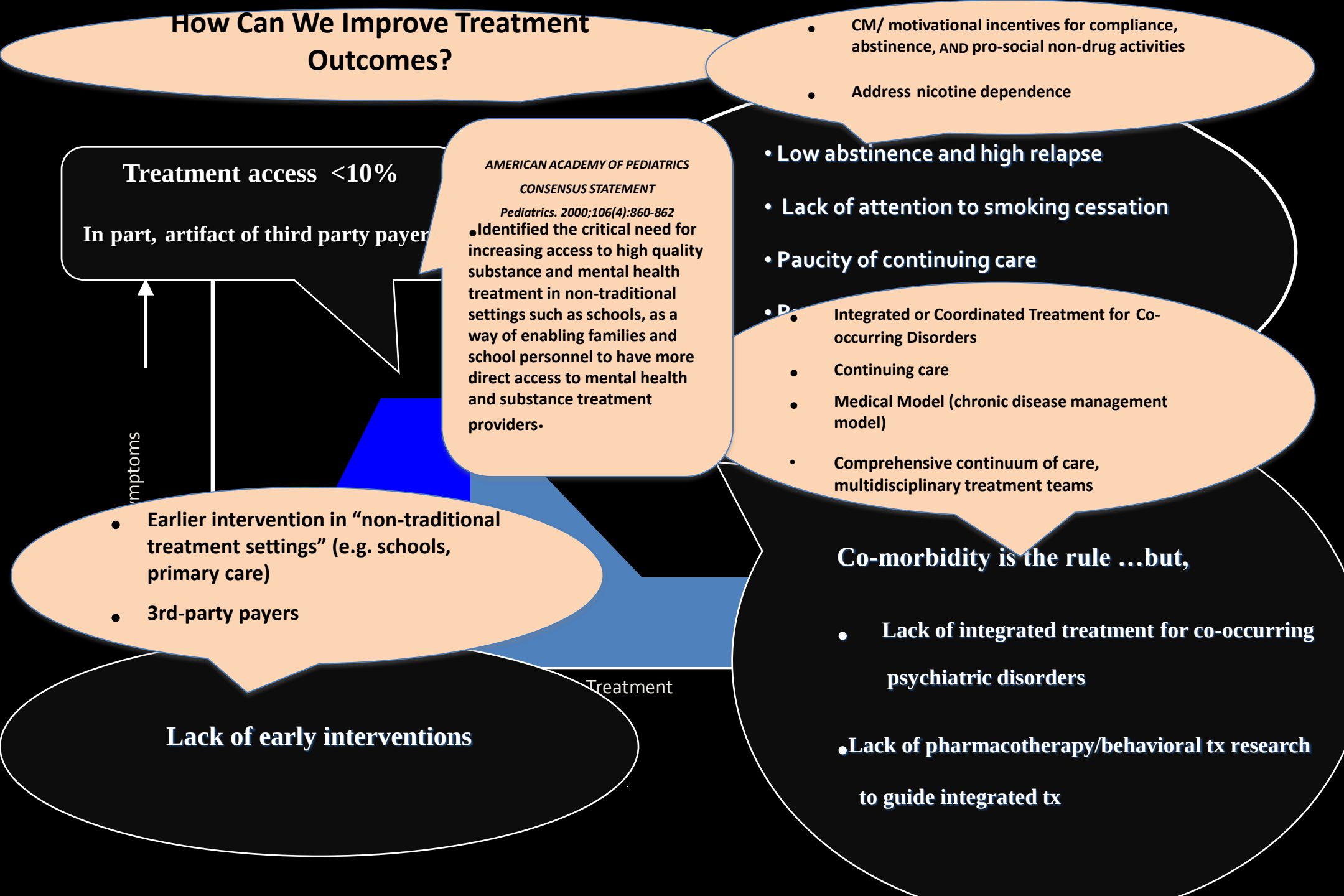
- Modest reductions in drug use
- Low abstinence and high relapse
- Lack of attention to smoking cessation
- Paucity of continuing care
- Poor coordination of care
- Lack of attention to smoking cessation



Lack of early interventions

Co-morbidity is the rule …but,

- **Lack of integrated treatment for co-occurring psychiatric disorders**
- **Lack of pharmacotherapy/behavioral tx research to guide integrated tx**


How Can We Improve Treatment Outcomes?
CM/ motivational incentives for compliance, abstinence, AND pro-social non-drug activities
Address nicotine dependence
Treatment access <10%
In part, artifact of third party payer
AMERICAN ACADEMY OF PEDIATRICS
CONSENSUS STATEMENT
Pediatrics. 2000;106(4):860-862
Identified the critical need for increasing access to high quality substance and mental health treatment in non-traditional settings such as schools, as a way of enabling families and school personnel to have more direct access to mental health and substance treatment providers.
• Low abstinence and high relapse
• Lack of attention to smoking cessation
• Paucity of continuing care
Integrated or Coordinated Treatment for Co-occurring Disorders
Continuing care
Medical Model (chronic disease management model)
Comprehensive continuum of care, multidisciplinary treatment teams
Earlier intervention in "non-traditional treatment settings" (e.g. schools, primary care)
3rd-party payers
Treatment
Lack of early interventions
Co-morbidity is the rule …but,
Lack of integrated treatment for co-occurring psychiatric disorders
Lack of pharmacotherapy/behavioral tx research to guide integrated tx

What Does Research Say About Integrated Treatment for Co-occurring Mental Health and Substance Use Disorders?

Controlled Trials of Pharmacotherapy for Co-occurring Psychiatric Disorders in Adolescents with SUD

ADHD

Randomized Controlled Trial Pemoline for ADHD in 69 Out-of-Treatment Adolescents with CD and SUD

- Pemoline > efficacy than placebo (0.5 effect size)
- Good safety, tolerability despite non-abstinence
- No decrease in substance use with pemoline or placebo treatment in the absence of behavioral intervention for SUD

Riggs et al 2007

RCT Atomoxetine + CBT vs placebo + CBT (n=70)

- Good safety, tolerability in non-abstinent dually- diagnosed adolescents
- No difference between atomoxetine /pbo primary outcome measure

Thurstone et al., JAACAP 2008

RCT Osmotic-Release Methylphenidate (OROS-MPH) + CBT In Adolescents with ADHD and Substance Use Disorders

Riggs et al JAACAP 2011

DEPRESSION

Fluoxetine + CBT in Adolescents with MDD, SUD, CD

- Fluoxetine > efficacy than placebo
- High rates of remission in both groups suggested contribution of CBT to depression tx response

Riggs et al 2008

Randomi[illegible]Controlled Trial

[illegible] CBT

Cannabis Youth Treatment Study:

Main findings from two randomized trials

"Of the adolescents assigned to one of the four

12- to 14-week treatment interventions,

52% had lengths of stay that reached 90 days"

Dennis et al J Subst Ab Tx 2004

Fluoxetine N = 63

Placebo N= 63

Withdrawals::

4 Went to Jail/Detention
3 Went to Residential Treatment at a Facility Unable to Continue Study
3 Lost to Follow-up
+ 1 Moved Out of Area
11 Participants Withdrawn

Wit[illegible]

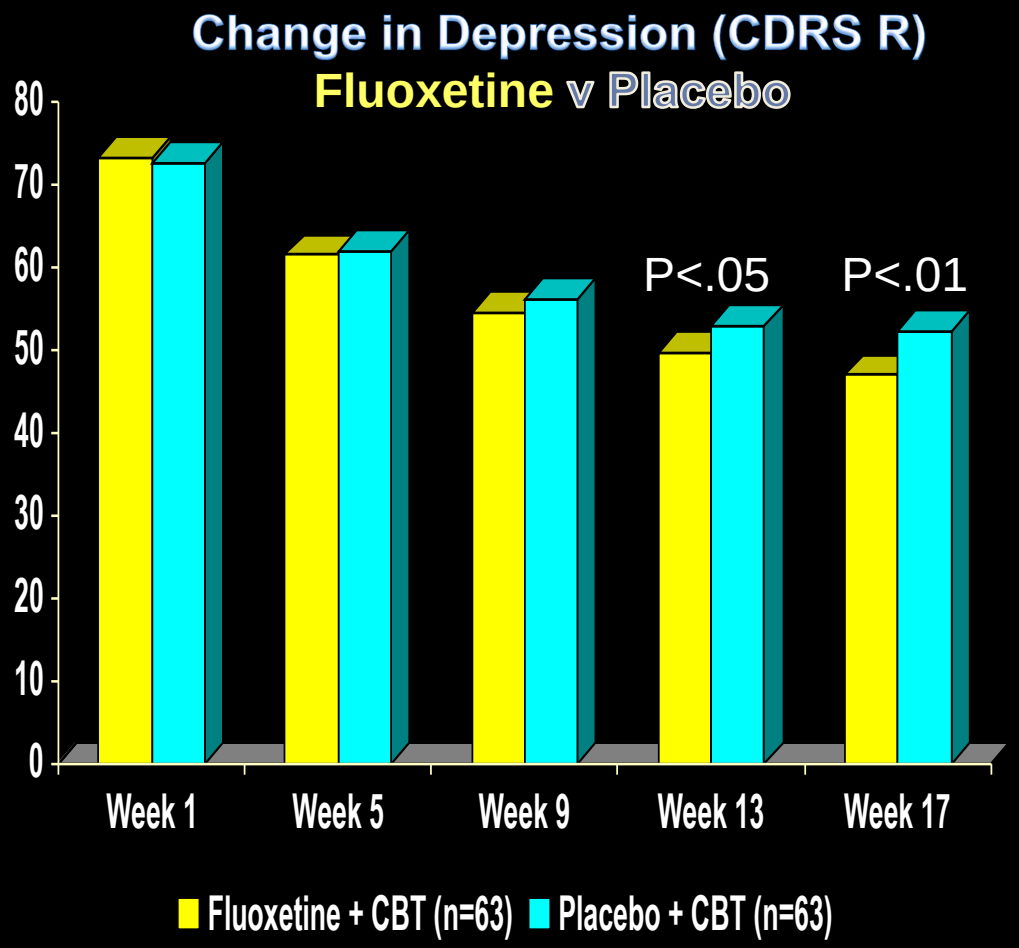
9 Part[illegible]

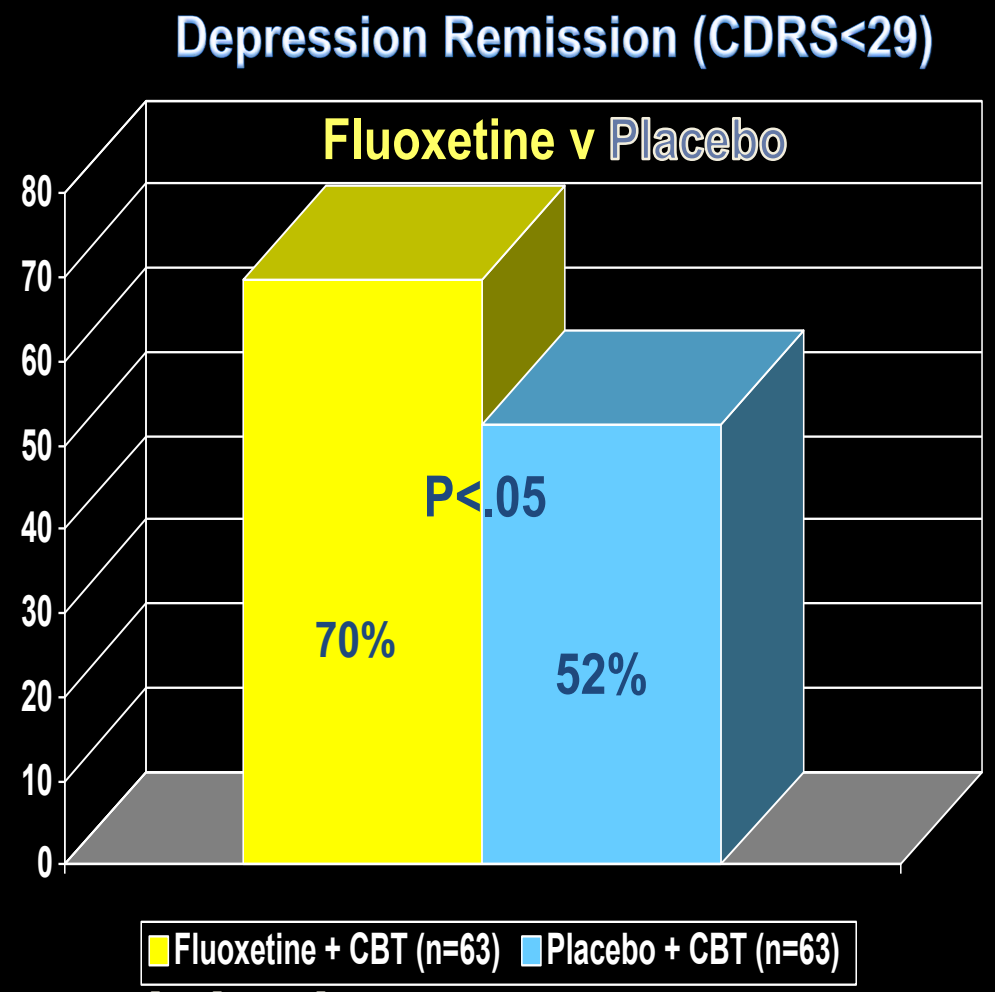
That's weird!

85% tx completion; medication follow up compliance weekly medication visits;

>70 % compliance with CBT

Change in Depression

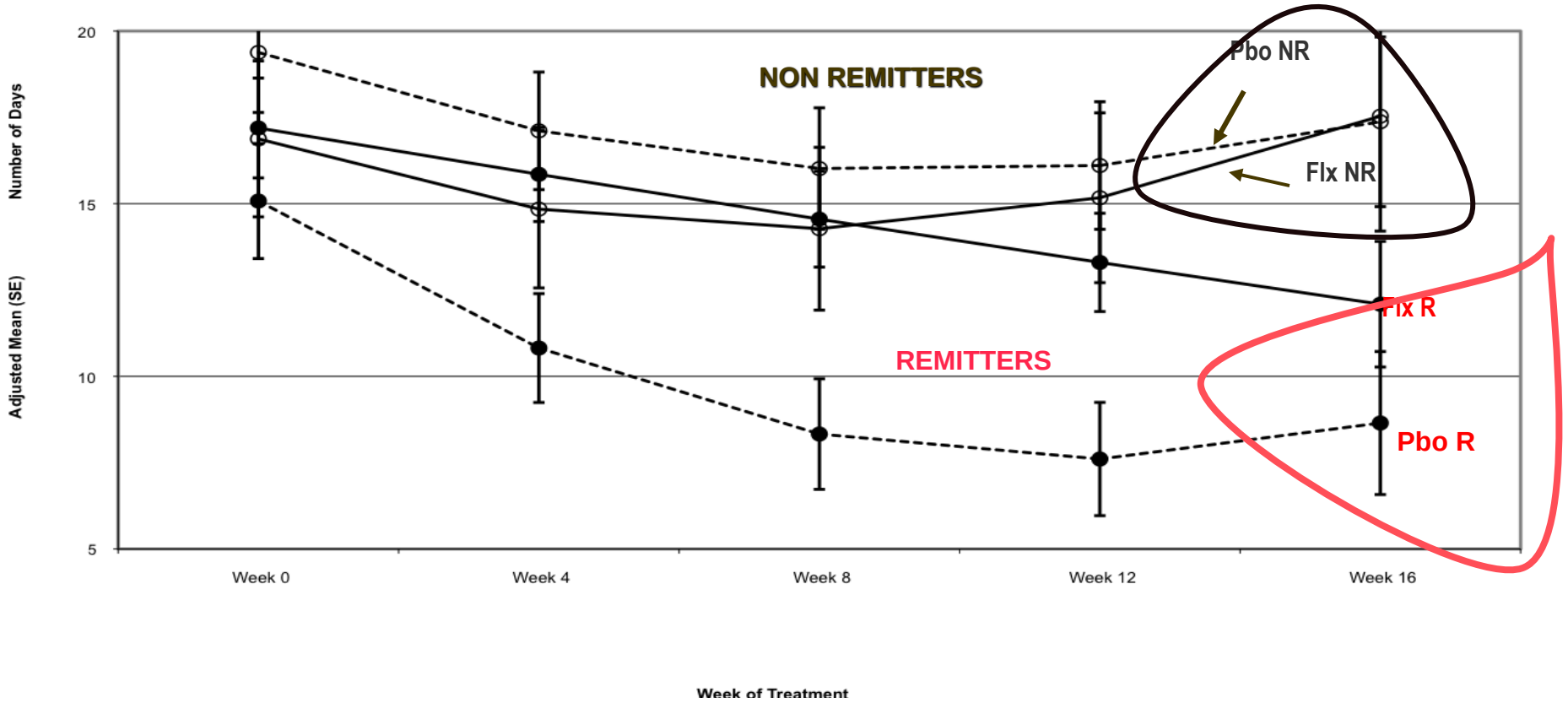




High depression remission in both fluoxetine and placebo groups support antidepressant action of CBT

Riggs et al., Archives of Pediatric and Adol Med, 2007

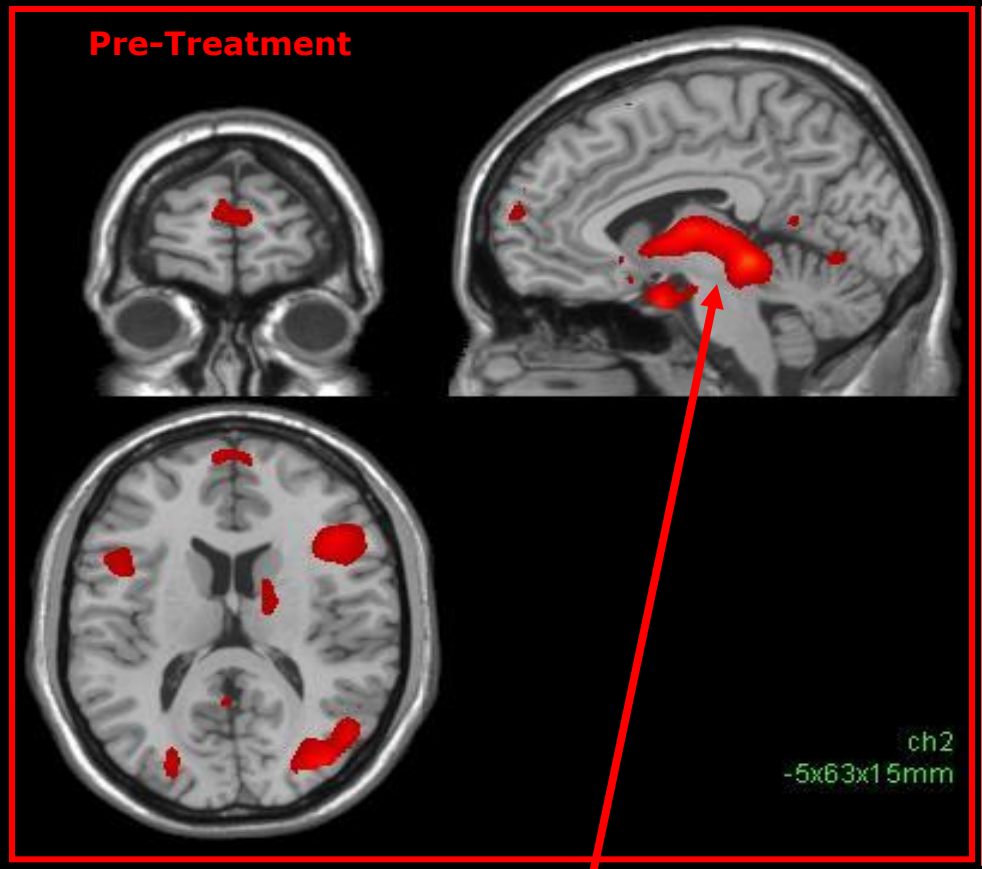
CHANGE IN DRUG USE: REMITTERS V NON-REMITTERS

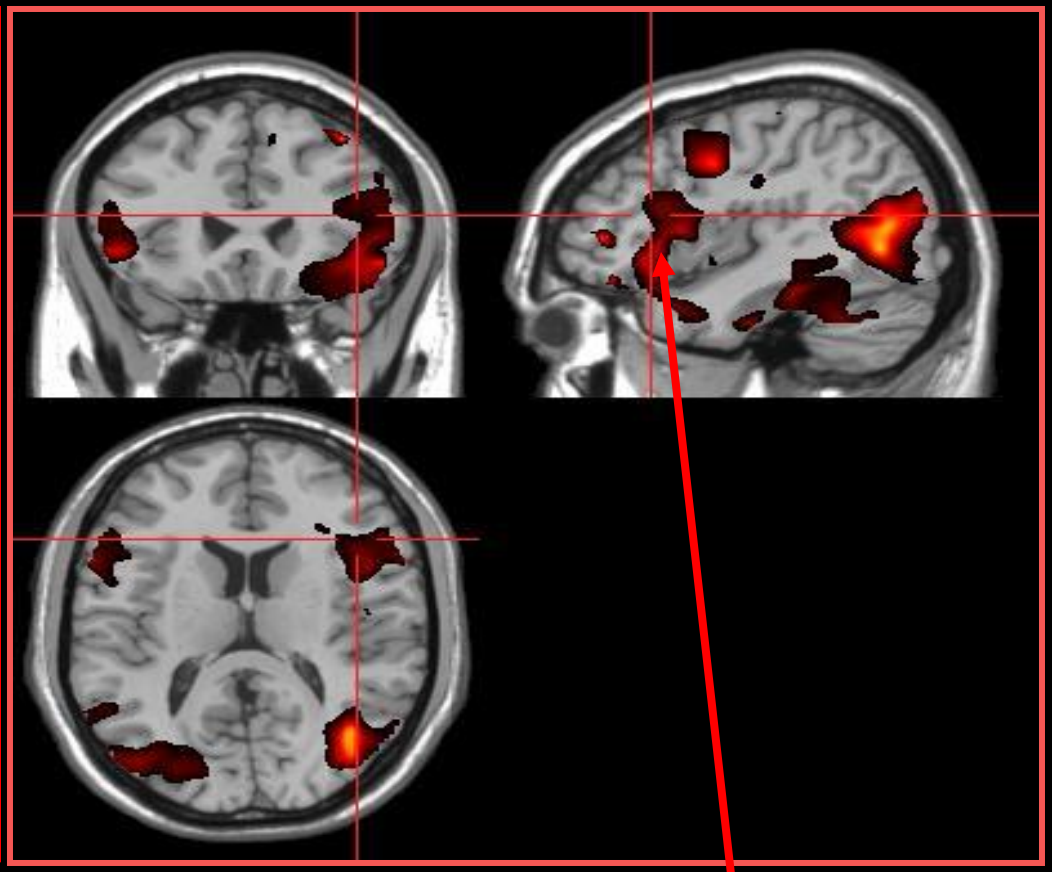


Remitters: pre/post change in drug use p<.001 (0.5 effect size)

Non-Remitters: pre/post change in drug use = NS

Changes in Brain Activation Patterns Before and After Treatment in Adolescents Addicted to Marijuana



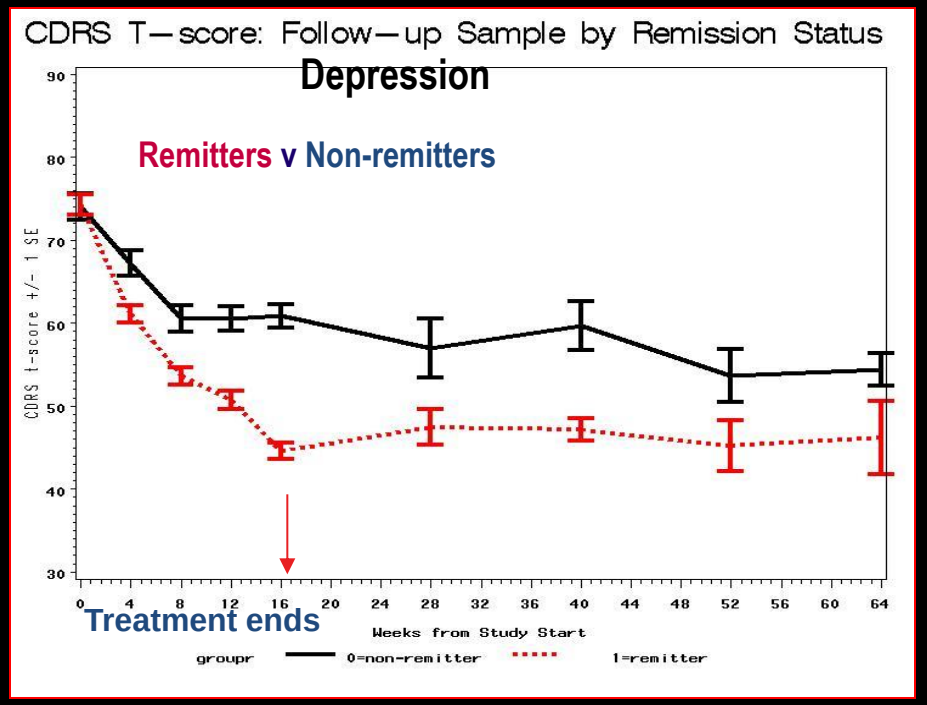


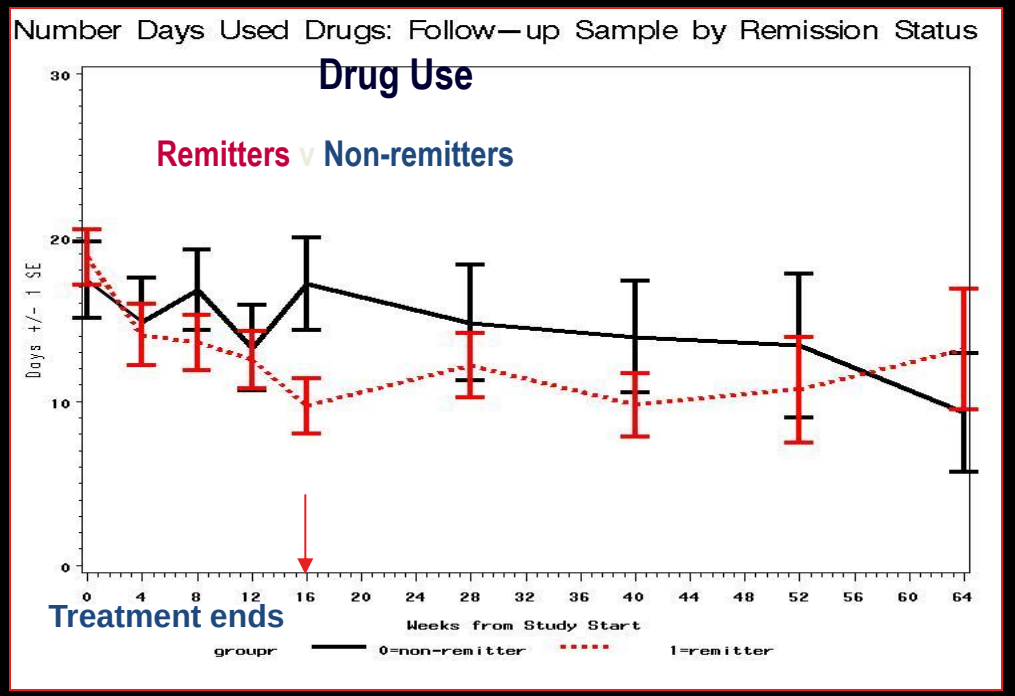
Before treatment, adolescents showed greater **brain reward** activation to marijuana cues vs food*

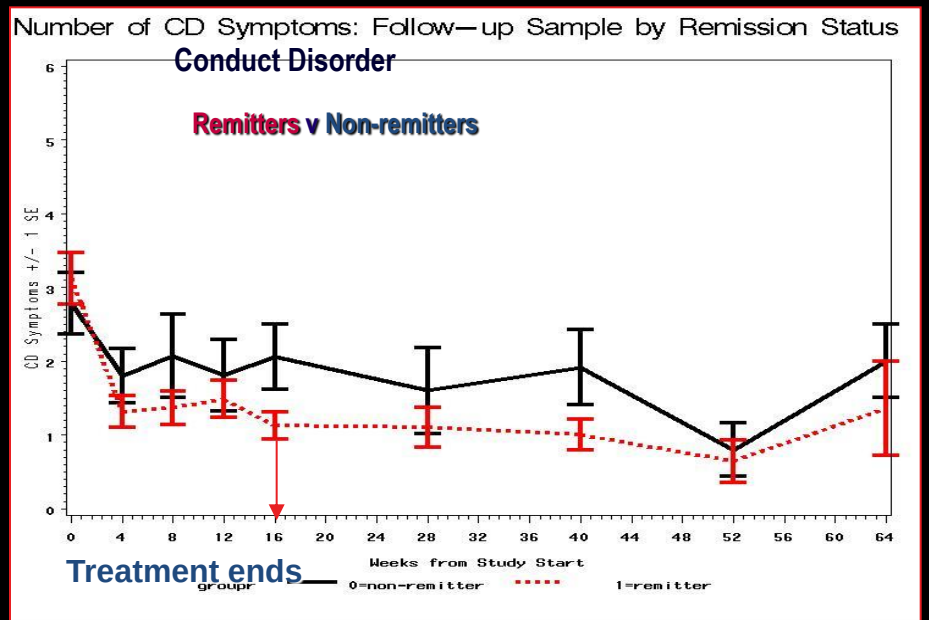
After 16 weeks of CBT adolescents showed greater activation to marijuana vs food in areas of **cognitive control** than before treatment

Riggs et al., *Drug and Alcohol Dependence*,91, 2007

1 Year Post-treatment Outcomes







Summary of Outcomes

Fluoxetine vs Placebo

- Fluoxetine > Placebo for MDD
- Significant reduction in drug use both FLX and PBO but no difference between groups
- Significant decrease in CD in both FLX and PBO but no difference between groups

Remitters vs Non-remitters

- Those whose depressions remitted reduced drug use significantly
- Non-remitters drug use did not decrease from baseline
- Remitters had greater reduction in CD symptoms compared to non-remitters

Overall treatment gains maintained throughout 1 year post-treatment follow up

Riggs et al 2007

Randomized Controlled Trial OROS-MPH + CBT in Adolescents with ADHD and SUD

NIDA Clinical Trials Network

Telephone Prescreened
N=1334

Informed Consent
Baseline Screening
N=446

143 Excluded (32%)
- 139 Not eligible (97.2%)
- 4 Other (2.8%)

Randomized
N=303

OROS-MPH + CBT
N=151

Placebo + CBT
N=152

Non-completes N=33 (21.9%)
- 11 withdrew consent
- 3 moved form area
- 2 practical problems
- 4 incarceration
- 1 pressure/advice from outsiders
- 9 failed to return to clinic and lost
- 3 other

Non-completes N=43 (28.3%)
- 11 withdrew consent
- 1 moved form area
- 3 practical problems
- 5 incarceration
- 1 pressure/advice from outsiders
- 1 feels treatment not working
- 17 failed to return to clinic and lost
- 4 other

79% research visit attendance

72% CBT sessions attended (mean=11.1)

76% research visit attendance

68% CBT sessions attended (mean = 10.4)

16 week completes N=118 (78.1%)

16 week completers N=109 (71.7%)

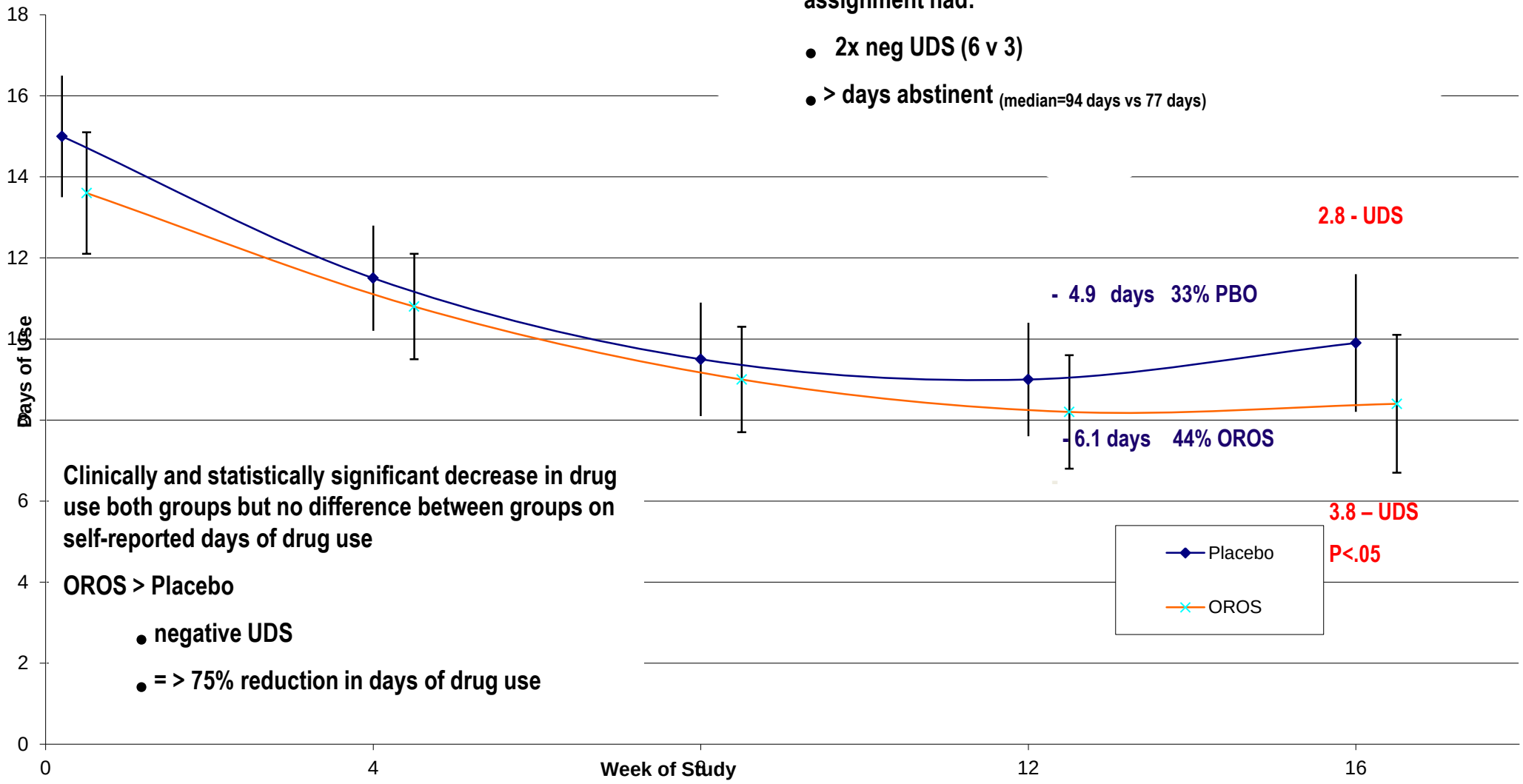
Completed 1-month follow-up
N=109 (72.2%)

Completed 1 month follow-up
N=105 (69.1%)

Change in Past 28 Day Substance Use

ADHD tx responders regardless of medication group assignment had:

- **2x neg UDS (6 v 3)**
- **> days abstinent** (median=94 days vs 77 days)



Clinically and statistically significant decrease in drug use both groups but no difference between groups on self-reported days of drug use

OROS > Placebo

- **negative UDS**
- **= > 75% reduction in days of drug use**

Summary of Main Study Findings

1. **ADHD outcomes as good or better than in adolescents without SUD**

2. **Substance outcomes as good or better than in youth with less severe psychopathology**

3. **Treatment compliance, completion superior to that reported in studies of youths with less severe SUD and psychopathology**

4. **Results suggest contribution of CBT to both SUD and ADHD outcomes**

CBT appears to be good for what ails you

Objective #4

Implications of Current Research for

Clinical Practice

School-Based Interventions

Future Research

Improve Screening, Brief Intervention, Referral, Treatment

SBIRT Guidelines

Guideline for Alcohol and Substance Use Screening, Brief Intervention, Referral to Treatment

Why screen for alcohol and drug use?

Brief motivational conversations with patients can promote significant, lasting reductions in risky use of alcohol and other drugs. Nearly 30% of adult Americans engage in risky, problematic use of alcohol and/or other drugs, yet very few are identified or participate in a conversation that could prevent injury, disease, or more severe use disorders.

Brief Screening - Ask

Substance	Questions	Positive Screen
Alcohol*	When was the last time you had more than 3 (for women/men >65 yrs.)/4 (for men) drinks in one day?	In the past 3 months
	How many drinks do you have per week?	More than 14 (men) More than 7 (women, men >65 yrs.)
*Any alcohol use is a positive screen for patients under 21 years or pregnant women. **A standard drink in the U.S. is any drink that contains about 14 grams of pure alcohol. One drink = 12 oz. beer, 5 oz. wine, 1.5 oz. liquor**		
Drugs	In the past 12 months, have you used drugs other than those required for medical reasons?	Yes
Tobacco	Do you currently smoke or use any form of tobacco?	Yes

(+) Positive on Brief Screen

Assess

- Use a brief assessment instrument (see table below) to determine level of risk or assess risk with interview based on DSM criteria for substance abuse and dependence.
- For patients who screen positive for drug use, ask further questions to determine which drug(s) and how often they use.
- Advise tobacco users to quit. Refer to Colorado QuitLine 1-800-784-8669 or www.coquitline.org. Go to www.coloradoguidelines.org/tobacco for specific recommendations.
- Consider co-occurring conditions such as depression, other mood disorders, ADHD, anxiety, pain, and sleep disorders. Go to www.coloradoguidelines.org/guidelines/depression.asp for information about managing depression.

Brief Assessment Instruments

Available at www.coloradoguidelines.org/guidelines/sbirt.asp

	AUDIT *(adult alcohol use)*	DAST-10© *(adult drug use)*	CRAFFT *(adolescent alcohol & drug use)*
Hazardous use *(risky use)*	Score 8-15 for men Score 7-15 for women	Score 3-5	Score of 2 or more positive items indicates need for further assessment
Harmful use *(use plus consequences)*	Score 16-19	Score 6-8	
Possible dependence *(compulsive use)*	Score ≥ 20	Score 9-10	

(-) Negative on Brief Screen

Reinforcement and Continued Screening

- Reinforce positive decisions.
- Rescreen at least yearly.
- Consider more frequent screening for:
  - women who are pregnant or contemplating becoming pregnant
  - adolescents (transition to middle school, high school, college)
  - significant increase in psychosocial stressors (e.g., major change in finances, primary relationship/support system)
  - people with substance use problems who have recently changed their behavior

(continue on back for hazardous/harmful use and possible dependence)

SBIRT Guidelines Cannabis Supplement

HealthTeamWorks
Building Systems. Empowering Excellence.

SBIRT Guideline Supplement: Guidance on Marijuana

In conjunction with the SBIRT Guideline, for those who work with children, adolescents & adults.

Peer Assistance Services | SBIRT Colorado

Goals:

- Promote SBIRT screening that detects any marijuana use in adolescents and adults
- Offer effective brief interventions to prevent use and reduce harm among users

Other Resources (all available at healthteamworks.org):

- SBIRT Guideline
- Adult and adolescent screening tools
- Information on brief interventions and motivational interviewing
- DSM V diagnostic criteria

Things to Consider

- *Users who begin in adolescence have a 1 in 6 chance of developing dependence* [1]
- *Potential increased risk in pregnant women, people taking certain medications, and people with certain health conditions*

SBIRT For Marijuana Use

- Begin routine screening for marijuana use in all patients by age 12.
- Screen for any use of marijuana. Recommended question:
  "In the past year, how many times have you used marijuana?"
  Positive score = > 1 time
- Assess for risky behaviors related to use
- Assess for cannabis use disorder (mild, moderate, severe)
- Offer brief intervention

Discussion with Parents about Children Using Marijuana

Risk Factors: [3]

- Early aggresive behavior
- Lack of parental supervision
- Substance abuse
- Drug availability
- Poverty

Protective Factors: [3]

- Impulse control
- Parental monitoring
- Academic competence
- Antidrug use policies
- Strong neighborhood attachment

Things parents should consider: [3]

- Be nonjudgmental; encourage openness and offer opportunities for young person to disclose marijuana experimentation or use.
- Communicate a "no-use" expectation.
- Take advantage of everyday "teachable moments."
- Share stories of people in recovery.
- Use convenient blocks of time to talk (on the way to school, after dinner, etc.)
- Talk about a recent drug- or alcohol-related incident in your neighborhood/community.

Preconception/Pregnancy/ Postpartum Key Points

- THC crosses the placental barrier and accumulates in fetal tissue.
- Increases risk of anencephaly, interferes with immune system development
- Increased risk of miscarriage
- Use while breastfeeding can cause irritability in infant, and is considered a form of exposure.

Effects of Prenatal Exposure to Marijuana

Infants	• Visual behavior disturbances • Poor sleep • Mental, motor and neurobehavioral deficiences • Aggresive behavior • Attention problems • Poor sleep
Children (Ages 1-10)	• Lower scores in verbal and memory domains • Lower intelligence test scores • Social behavioral disorders • Decrease in learning abilities • Decrease in academic achievement • Neuropsychological problems • ADHD • Depressive symptoms • Poor sleep
Adolescents	• Increase in conduct problems and deliquent behavior • Deficits in attention

Effects in Adolescents Who Use Marijuana

- Problems with learning and memory
- Distorted perception (sights, sounds, time, touch)
- Increased heart rate
- Diminished motor coordination
- Increased risk of psychosis
- Risk of long-term neurocognitive deficits and reduced IQ

Effects in Adults Who Use Marijuana

Physical Risks

General Effects:

- Temporarily increases blood pressure and heart rate
- Quadruples risk of heart attack
- Increased stroke risk
- Cognitive and memory issues
- Smoked increases risk for:
  - Oral cancer
  - Chronic bronchitis
  - Frequent chest colds
  - Pneumonia
- Increased incidences of motor vehicle crashes; reduced reation time
- Cannabinoid hyperemesis syndrome
  - Especially seen in adolescent/young adult users
  - Results from chronic use
  - Relatively rare

Long-term Effects:

- Weakened immune system
- Infertility in both men and women
- Testicular cancer

Mental Health Risks

- Individuals with psychiatric disorders or other mental health problems have higher rates of marijuana use compared to the general population.
- Regular use of marijuana may cause impairment in memory and cognition and impaired decision-making.
- Regular marijuana use increases the risk of developing mental health problems including depression and anxiety.

Conversations with Patients

Avoid Marijuana If: [3]

- Pregnant or breastfeeding
- Heart problems or hypertension
- Lung problems
- Immune system problems
- Scheduled for surgery in the next 2 weeks. (marijuana may cause excessive sedation if combined w/ medications used during and after surgery.)

Safety Concerns for Marijuana Users [3]

- Can cause dry mouth, nausea, vomiting, red eyes, heart and blood pressure problems, lung problems, impaired mental functioning, panic reactions, hallucinations, flashbacks, depression, and sexual problems
- Can cause impaired driving

Safety Concerns for Others

- Second-hand smoke exposure
- Safe disposal
- Safeguard edibles and all forms of marijuana from young children and pets

Brief Intervention Key Points

- Use reflective listening to try to understand a person's beliefs about marijuana and reasons for using it.
- Offer feedback (with permission) on short and long term health effects of marijuana tailored to the person's age and life circumstances.
- Explore underlying reasons for using marijuana (stress, anxiety, depression, physical symptoms). Explore lifestyle and other alternatives to marijuana for management of symptoms.
- Advise to cut back or (ideally) abstain.
- Negotiate a plan to stop or decrease use. Focus on reducing harm to self and others if not willing to abstain.
- Offer assistance and referral if needed.
- Follow-up to monitor progress.

Responding to Issues that May Arise in Conversations About Marijuana

Marijuana is all natural

- *Marijuana may also contain harmful contaminants. Many natural substances are known to harm human health.*

Marijuana is not addictive

- *Marijuana can be addictive.*

No one has ever died from a marijuana overdose

- *In Colorado emergency room visits are increasing related to marijuana induced delirium, cyclic vomiting and overdoses. Potency has increased dramatically over the years. Edibles may especially deliver very high doses. There are no reliable controls over strength and dosing.*

It's legal. So why quit, or how could it be a problem?

- *Other legal substances such as tobacco, alcohol, and prescription narcotics cause significant harm. Marijuana is associated with serious and sometimes long-term negative health effects.*

Marijuana is safer than tobacco or alcohol

- *Similar to tobacco and alcohol use above moderate levels in adults or any alcohol in youth, marijuana can harm health.*

Marijuana is an effective treatment for serious medical conditions (cancer, epilepsy, diabetes, depression, migraines, glaucoma, etc.)

- *Serious medical conditions should be managed by a qualified health professional. Self-treatment or augmenting conventional treatments with marijuana could cause significant harm.*

Marijuana is safer than smoking tobacco during pregnancy

- *Tobacco and marijuana can harm the developing fetus in different ways. The effects of marijuana on fetal development may be particularly long-term and include problems with learning and behavior.*

Marijuana helps with stress and anxiety

- *It is important to identify underlying causes of stress and anxiety. Explore alternatives to marijuana. Heavier users of marijuana may experience improved mental clarity and motivation when they stop using.*

PREVENTION, EARLY INTERVENTION

CONTINUE EVIDENCE BASED PREVENTION PROGRAMS

CONSIDER

LIFE SKILLS PROGRAM

UNPLUGGED PROGRAM

TREATMENT

THERE IS A CRITICAL NEED TO ADAPT EXISTING

EVIDENCE-BASED SUBSTANCE TREATMENT

INTERVENTIONS AS SCHOOL-BASED

INTERVENTIONS……

THESE efficacious interventions currently exist almost exclusively in community-based treatment settings and largely serve youth referred by juvenile justice system

TO ADDRESS THE GROWING NUMBER OF HIGH SCHOOL STUDENTS WHO MISUSE, REGULARLY USE/ABUSE AND WHO ARE DEPENDENT ON SUBSTANCES OF ABUSE

Family-based interventions

MET/CBT

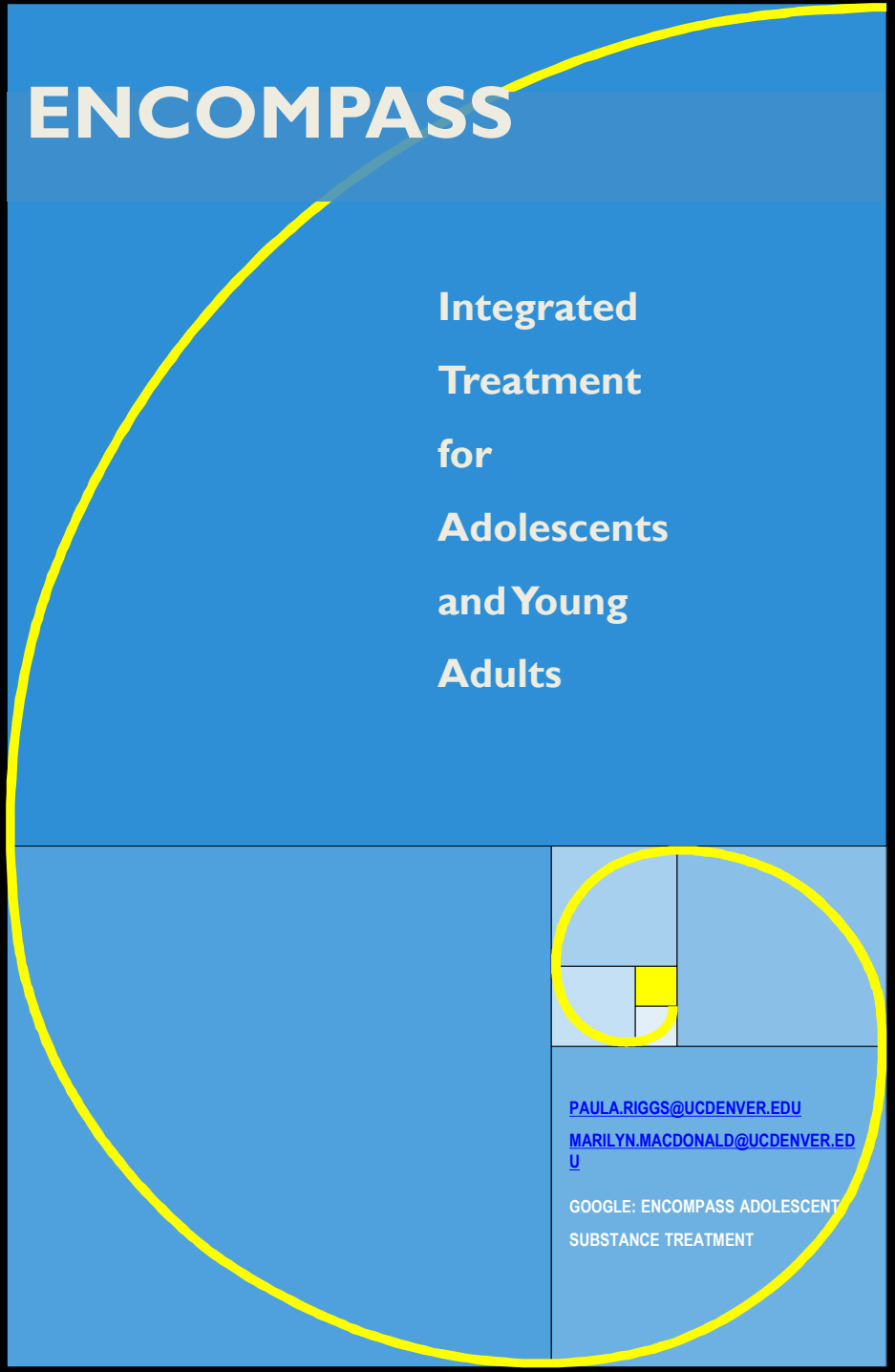
Individual

group

+

CM /motivational incentives

to reward compliance, abstinence, pro-social non-drug activities



Research-Based Integrated Mental Health and Substance Treatment

Practice

ENCOMPASS (16 WKS/17 SESSIONS) IS IN THE EARLY NATIONAL DISSEMINATION STAGE WITH SITES IN SEATTLE, INDIANA, AND DENVER

A BRIEFER 8 WK/8 SESSION SCHOOL-BASED ADAPTATION OF ENCOMPASS IS CURRENTLY BEING IMPLEMENTED AND PILOT TESTED AT ADAMS CITY HS THIS YEAR

- Could not individually tailor treatment as clinically indicated

Relapse prevention/ continuing care

- Constrained by research protocol

- **MET /CBT 16 weeks**
- **CM Incentives** "fishbowl"
  - Compliance
  - Abstinence
  - Non-drug alternative activities

Psychiatric treatment

- Broader range of options
- Psychotherapy
- Pharmacotherapy

Relapse prevention/continuing care

- Involvement in non-drug alternative activities sustained drug-free lifestyle

School-Based Encompass

Briefer version of Encompass (8 weeks, 8 sessions) adapted as a school-based intervention

Delivers integrated MH/Substance Treatment onsite in high school setting for students referred for drug/alcohol-related school offences

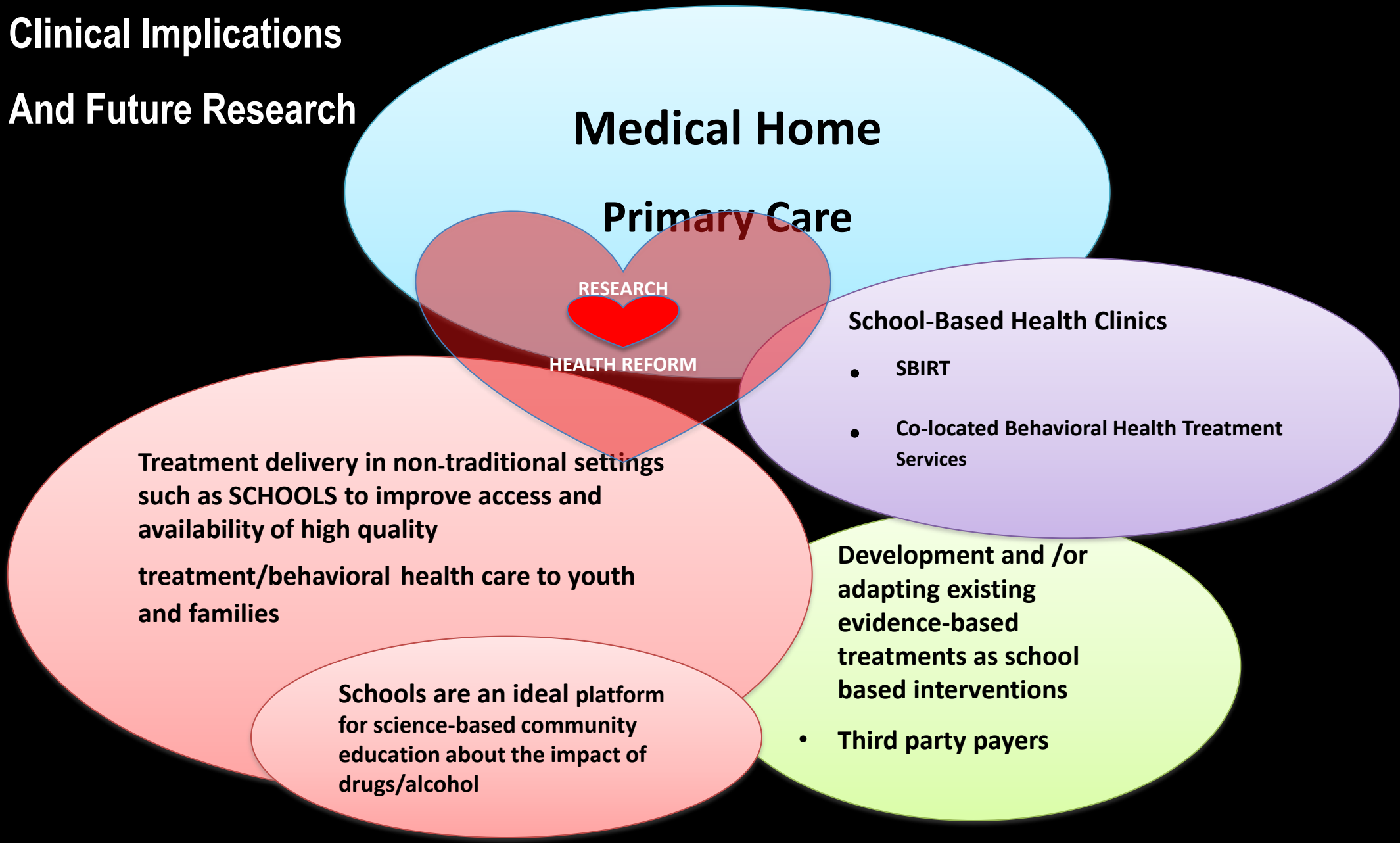
Adams City HS is first implementation site

- Outcomes
  - Reductions in substance use, treatment compliance
  - Increased frequency of non-drug pro-social activities
  - Increased GPA
  - Reductions in truancy, suspensions, expulsions

SUMMARY AND CONCLUSION

Clinical Implications

And Future Research



Impulsivity, Variation in the Cannabinoid Receptor (CNR1) and Fatty Acid Amide Hydrolase (FAAH) Genes, and Marijuana-Related Problems

L. Cinnamon Bidwell, Jane Metrik, John McGeary, Rohan H. C. Palmer, S. Francazio, Valerie S. Knopik

Objective: Impulsivity is associated with increased marijuana use and subsequent marijuana-related problems among marijuana users. In addition, single nucleotide polymorphisms (SNPs) in the cannabinoid receptor 1 (CNR1) and fatty acid amide hydrolase (FAAH) genes have been associated with cannabis-related phenotypes. This exploratory study tested whether the association between different aspects of impulsivity and the number of marijuana-related problems among users is explicated by variation in these putative cannabinoid-related genes. **Method:** A total of 151 young adult regular marijuana users (used on M = 41.4% of the prior 60 days, SD = 24.3%) provided DNA and completed measures of trait (Barratt Impulsiveness Scale) and behavioral impulsivity (Stop Signal Task and Delay Discounting Questionnaire), as well as a self-report of marijuana-related problems. Three CNR1 and five FAAH SNPs were genotyped, tested for haplotype blocks, and subsequently examined for association with phenotypes described above. **Results:** CNR1 variation significantly moderated the association between trait-level, but not behavioral, impulsivity and marijuana-related problems, such that the combination of higher trait impulsivity and CNR1 variation was associated with a greater number of marijuana-related problems. In contrast, there were no significant FAAH by impulsivity interactions; however, there was a main effect of FAAH on marijuana-related problems. **Conclusions:** These findings support an association with CNR1 and FAAH genes and marijuana-related problems among regular marijuana users. CNR1 variation emerged as a moderator of the relationship between trait impulsivity and marijuana problems, thus suggesting that marijuana users with CNR1 risk variants and a higher trait impulsivity are at greater risk for developing marijuana-related problems and supporting a role for CNR1 in a broader impulsivity phenotype. (J. Stud. Alcohol Drugs, 74, 867–878, 2013)