

Adolescent Medicine Potpourri

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Disclosures

I have no actual or potential conflict of interest in relation to this program/presentation.

I am an employee of the University of Florida College of Medicine.

I was a teenager a long time ago.

Learning Objectives:

- **Recognize the key elements of adolescence impacting current and future health**
- **What are the trends in prevention and treatment on both an individual scale and a cultural scale?**
- **Discuss the causes, treatments, and long-term morbidity and mortality of childhood obesity.**
- **Discuss the trends in adolescent alcohol, tobacco, and drug abuse, their causes, treatment, and short and long term morbidity and mortality.**

Big picture questions for teen health

- What are the leading causes of mortality globally and nationally?
- How are behavior problems implicated in mortality?
- Interventions?

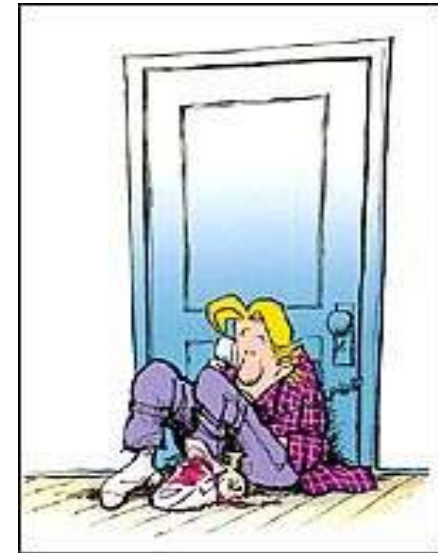
Recognition of Importance of Adolescent Health

- Key developmental period in life span.
 - Physical, social, emotional, and cognitive growth and development – with impact on long term health outcomes.
- Health promotion, primary preventive and secondary interventions during adolescence can have profound and positive lasting health, educational, and economic effects.

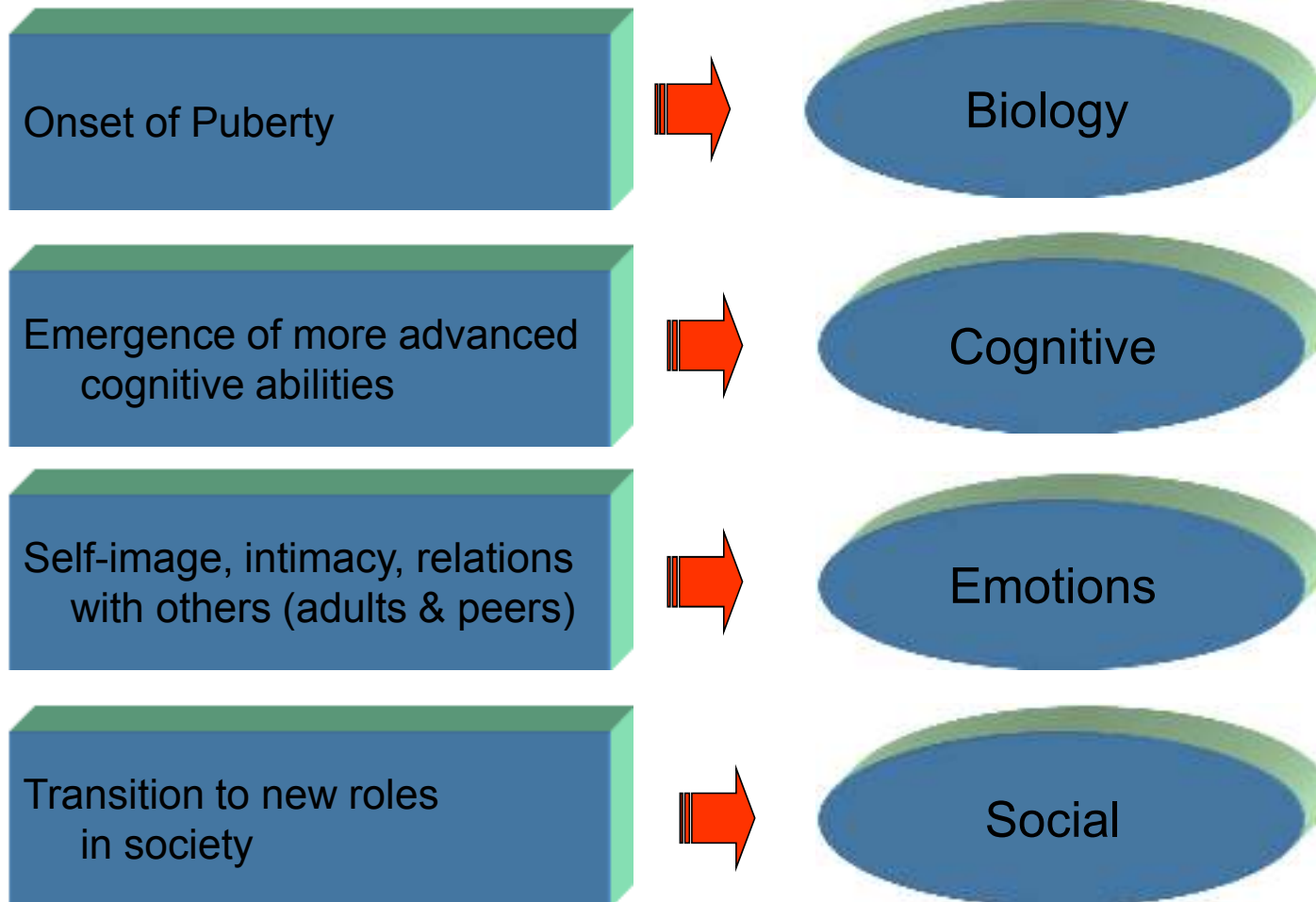


A key task of adolescence is to develop and establish a sense of self. In doing so, a teenager often seems to change personalities more often than he or she changes clothes.

(Michael Rich (2003) The adolescent male. Adolescent Medicine Vol.14 No.3)



Features of Adolescent Development



WHO, 2003

Adolescent Behavioral Development

- Change in focus --more personalized viewpoint
- Emotional lability
- Body image
- Change of social domains
- Formation of personal identity
- Social integration



These changes and the enormous plasticity of the teen brain make adolescence a time of great risk and great opportunity.

Giedd, JN (2008) The teen brain: Insight from Neuroimaging. J. of Adolescent Health (42), 4 :335 - 343



Global Leading Causes of Mortality: 10-24 Year Olds

Rank	Cause	Total deaths x1000
1	Road Traffic Accidents	259 (10.0%)
2	Self-inflicted injuries	164 (6.3%)
3	Violence	157 (6.0%)
4	Lower RTI	153 (5.9%)
5	Tuberculosis	142 (5.5%)
5	HIV/AIDS	142 (5.5%)
7	Drowning	106 (4.1%)
8	Fire-related	67 (2.6%)
9	Meningitis	53 (2.0%)
10	War	46 (1.8%)

**64% due to
behaviors**

Behaviors initiated in adolescence have implications for morbidity and mortality across the lifespan:

- **Behaviors cause harm in adolescence**
- **Behaviors initiated in adolescence cause harm into adulthood**
- **Preventing these behaviors during adolescence can reduce mortality and morbidity worldwide**
- **Example:**
 - **Preventing tobacco initiation is critical to ending the tobacco epidemic**
 - **80% of adult smokers began smoking by 18 years of age**
 - **Adolescents are uniquely susceptible to social and environmental influences**

Thomas Frieden quoted in USDHHS Preventing Tobacco Use Among Youth and Young Adults: A report of the Surgeon General, 2012

Pertinent Healthy People 2020 Topics:

10 of 42 topics focus on common adolescent behaviors

Adolescent Health*

Educational and Community-Based Programs

Family Planning

HIV

Injury and Violence Prevention

Mental Health and Mental Disorders

Nutrition and Weight Status

Physical Activity

Sexually Transmitted Diseases

Substance Abuse

Tobacco Use

** New Topic Area for 2020*

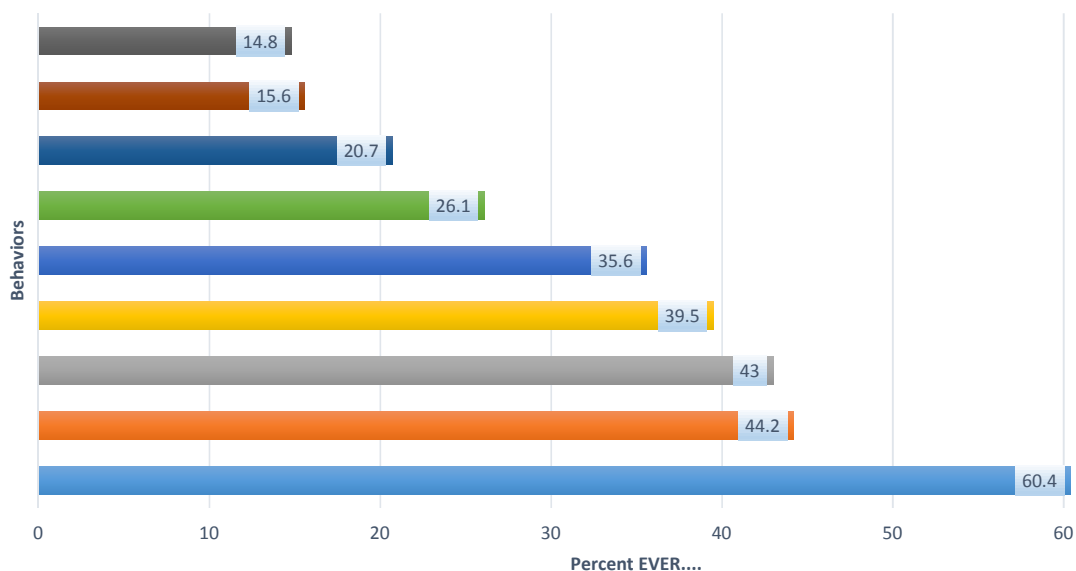
CDC: Critical Health Objectives:

Most serious health and safety issues facing 10-24 year olds

- **Mortality** (*reduce deaths*)
- **Unintentional Injury** (*reduce deaths, increase seatbelt usage, decrease DUI and being a passenger with DUI driver*)
- **Violence** (*reduce homicides, physical altercations and weapon carrying*)
- **Mental Health and Substance Abuse** (*decrease bingeing, decrease use of MJ, reduce suicide rate and attempts*)
- **Reproductive Health** (*decrease pregnancy rate, new cases of HIV and chlamydia, increase abstinence rates*)
- **Prevent Chronic Diseases of Adulthood** (*reduce tobacco use, reduce obesity rate, increase physical activity*)

Selected Indicators of Behavior Problems Associated with Adolescent Health, High School Youth Risk Behavior Survey, 2017

EVER:

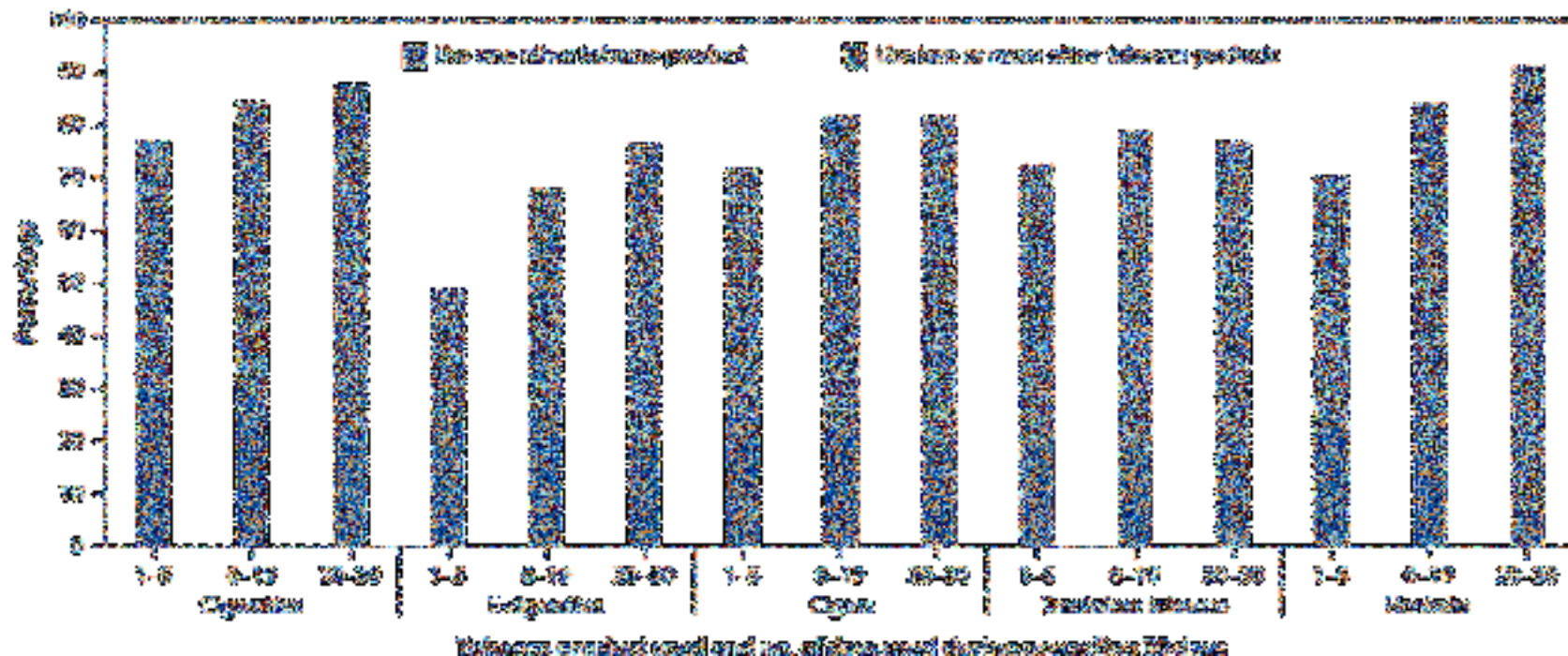


- **Obese** (>95%)
- **Overweight** (>85-<95%)
- **TV** (>3 hrs/d)
- **Physically Active** (60 min/d for 7 d)
- **Marijuana**
- **Sex**
- **Video Games** (>3 hrs/d)
- **Tobacco**
- **Alcohol**

Contribution to unintentional injuries

- Rode with a Driver Who Had Been Drinking Alcohol
 - Nationwide, **16.5%** of students had ridden one or more times during the 30 days before the survey in a car or other vehicle driven by someone who had been drinking alcohol
- Drove When They Had Been Drinking **Alcohol**
 - Among the 62.6% of students nationwide who drove a car or other vehicle during the 30 days before the survey, **5.5%** had driven a car or other vehicle one or more times when they had been drinking alcohol during the 30 days before the survey
- Drove When They Had Been Using **Marijuana**
 - Among the 64.5% of students nationwide who drove a car or other vehicle during the 30 days before the survey, **13.0%** had driven a car or other vehicle one or more times when they had been using marijuana during the 30 days before the survey

Percentage of middle and high school students who were current users of cigarettes, e-cigarettes, cigars, smokeless tobacco, and hookahs, who reported **multiple tobacco product use** by number of days used during the preceding 30 days — National Youth Tobacco Survey, United States, 2015–2017



2018 NATIONAL YOUTH TOBACCO SURVEY FINDS CAUSE FOR CONCERN

Current e-cigarette use among middle and high school students increased alarmingly between 2017 and 2018.

Here is a breakdown of the recent findings:

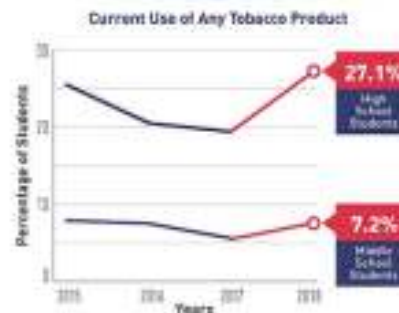
SURGE IN YOUTH CURRENT E-CIGARETTE USE – 1.5 Million More Students Used E-Cigarettes in 2018 vs 2017



AMONG HIGH SCHOOL CURRENT E-CIGARETTE USERS – Rise in Frequency and Use of Flavors



E-CIGARETTE USE SURGE LED TO UPTICK IN OVERALL TOBACCO USE – Reversing Previous Declines



Note: All numbers in this infographic are estimates.

Sources: U.S. Center for Tobacco Products, National Youth Tobacco Survey (NYTS), 2017-2018. NYTS is a survey of middle and high school students. Data for 2017 and 2018. NYTS is a survey of middle and high school students. Data for 2017 and 2018. NYTS is a survey of middle and high school students. Data for 2017 and 2018.

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CENTER FOR TOBACCO PRODUCTS

www.fda.gov/tobacco



@FDA_tobacco



facebook.com/fda



WHY CARE? FLORIDA 2016!

- Easy: COPD, Lung Cancer --future....
- Harder to wrap around:
 - **Complex tobacco product use patterns among youths :**
 - Use by youths of products containing nicotine in any form is unsafe
 - among young persons with asthma, use of combustible tobacco products, particularly cigarettes, is associated with worsening symptoms, poor asthma control, and an increased need for medical management). Studies suggest that youths with asthma adopt health risk behaviors, including tobacco product use, at rates similar to or higher than those of youths without asthma.
 - In 2016 ;
 - 11.1% of middle school and 27.9% of high school students with asthma
 - 7.9% of middle school and 24.2% of high school students without asthma
 - Reported any current tobacco product use. Current use of each tobacco product type was considerably higher among students with asthma than among those without asthma. E-cigarettes were the most commonly used tobacco product type reported by middle and high school students with asthma (7.9% and 19.6%, respectively) and without asthma (5.8% and 17.2%, respectively).

*Addicted to Vaped Nicotine, Teenagers
Have No Clear Path to Quitting*



Joe Santorno (right), a pediatric pulmonologist at Children's Hospital, holding a piece of a cigarette and a vape pen. (Left) Santorno, a pediatric pulmonologist at Children's Hospital, holding a piece of a cigarette and a vape pen. (Right) Santorno, a pediatric pulmonologist at Children's Hospital, holding a piece of a cigarette and a vape pen.



Trends in the Prevalence of Alcohol Use National YRBS: 1991—2017

The national Youth Risk Behavior Survey (YRBS) monitors health behaviors that contribute to the leading causes of death, disability, and social problems among youth and adults in the United States. The national YRBS is conducted every two years during the spring semester and provides data representative of 9th through 12th grade students in public and private schools throughout the United States.

Percentages														Trend from 1991–2017 ¹	Change from 2015–2017 ²
1991	1993	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013	2015	2017		
Ever drank alcohol (at least one drink of alcohol on at least 1 day during their life)															
81.6	80.9	80.4	79.1	81.0	78.2	74.9	74.3	75.0	72.5	70.8	66.2	63.2	60.4	Decreased 1991—2017 Decreased 1991—2007 Decreased 2007—2017	No change
Drank alcohol before age 13 years (had their first drink other than a few sips)															
32.7	32.9	32.4	31.1	32.2	29.1	27.8	25.6	23.8	21.1	20.5	18.6	17.2	15.5	Decreased 1991—2017 No change 1991—1999 Decreased 1999—2017	No change
Current alcohol use (at least one drink of alcohol on at least 1 day during the 30 days before the survey)															
50.8	48.0	51.6	50.8	50.0	47.1	44.9	43.3	44.7	41.8	38.7	34.9	32.8	29.8	Decreased 1991—2017 Decreased 1991—2007 Decreased 2007—2017	No change

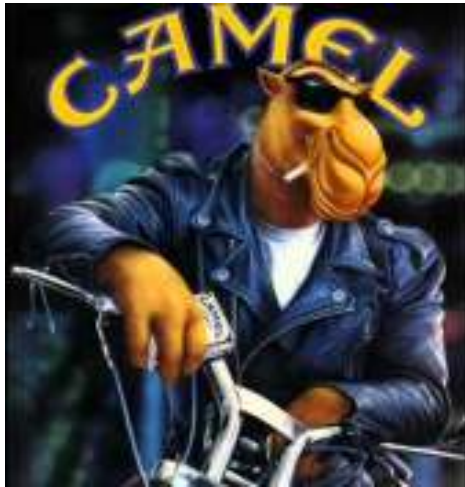
¹ Based on linear and quadratic trend analyses using logistic regression models controlling for sex, race/ethnicity, and grade, $p < 0.05$. Significant linear trends (if present) across all available years are described first followed by linear changes in each segment of significant quadratic trends (if present).

² Based on t-test analysis, $p < 0.05$.



What are solutions?

- Primary prevention:
 - Prevent Youth ACCESS to tobacco products
 - Stop youth targeted marketing
 - Educate adolescents about dangers of use
 - Educate retailers as they have a key role in gatekeeping





Trends in the Prevalence of Marijuana, Cocaine, and Other Illegal Drug Use National YRBS: 1991–2017

The national Youth Risk Behavior Survey (YRBS) monitors health behaviors that contribute to the leading causes of death, disability, and social problems among youth and adults in the United States. The national YRBS is conducted every two years during the spring semester and provides data representative of 9th through 12th grade students in public and private schools throughout the United States.

Percentages														Trend from 1991–2017 ¹	Change from 2015–2017 ²
1991	1993	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013	2015	2017		
Ever used marijuana (also called grass, pot, or weed, one or more times during their life)															
31.3	32.8	42.4	47.1	47.2	42.4	40.2	38.4	38.1	36.8	38.9	40.7	38.6	35.6	Increased 1991–1997 Decreased 1997–2017	No change
Tried marijuana before age 13 years															
7.4	6.9	7.6	9.7	11.3	10.2	9.9	8.7	8.3	7.5	8.1	8.6	7.5	6.8	Decreased 1991–2017 Increased 1991–1999 Decreased 1999–2017	No change
Current marijuana use (one or more times during the 30 days before the survey)															
14.7	17.7	25.3	26.2	26.7	23.9	22.4	20.2	19.7	20.8	23.1	23.4	21.7	19.8	Increased 1991–1995 Decreased 1995–2017	No change
Ever used cocaine (any form of cocaine, such as powder, crack, or freebase, one or more times during their life)															
5.9	4.9	7.0	8.2	9.5	9.4	8.7	7.6	7.2	6.4	6.8	5.5	5.2	4.8	Decreased 1991–2017 Increased 1991–2001 Decreased 2001–2017	No change
Ever used hallucinogenic drugs (such as LSD, acid, PCP, angel dust, mescaline, or mushrooms, one or more times during their life)															
—	—	—	—	—	13.3	10.6	8.5	7.8	8.0	8.7	7.1	6.4	6.6	Decreased 2001–2017 Decreased 2001–2005 Decreased 2005–2017	No change

Youth Tobacco Use in the U.S.

Key Findings From the 2017 National Youth Tobacco Survey



Current Use of Any Tobacco Product Decreased From 2011 to 2017



Current Use of Any Tobacco Product in 2017



1 in 5

high school students currently used a tobacco product.

1 in 18

middle school students currently used a tobacco product.

Of those students who currently used a tobacco product, many reported using two or more tobacco products.



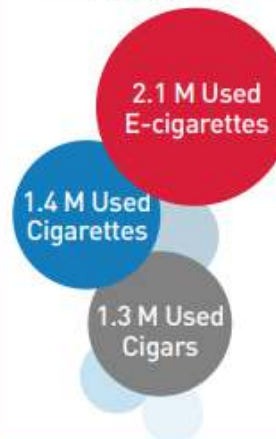
High School Students



Middle School Students

Most Used Tobacco Products in 2017

E-cigarettes continue to be the most commonly used tobacco product among middle and high school students.



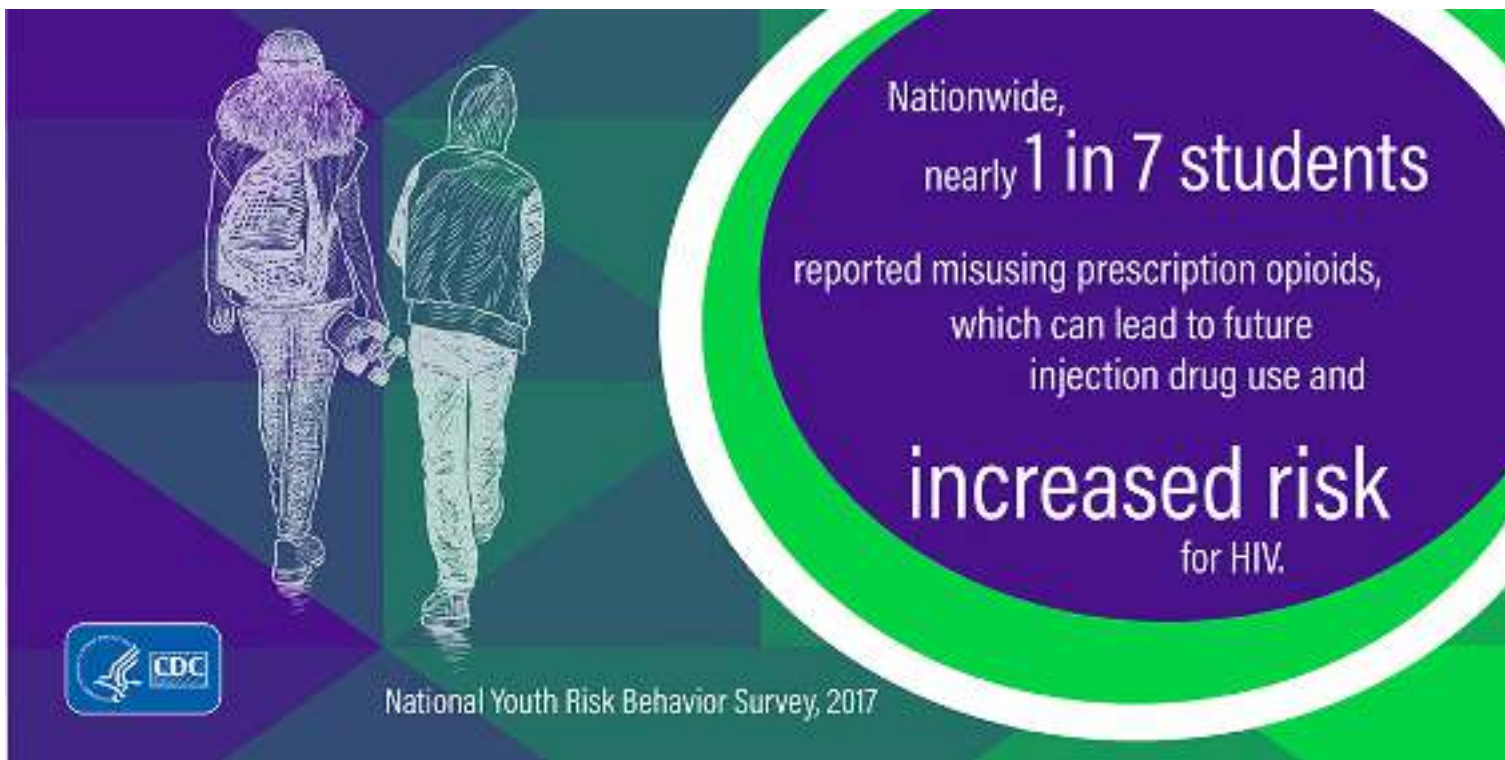
Source: Wang TW, Gentzke A, Sharma S, Collins KA, Ambrose BK, Jamal A. Tobacco product use among middle and high school students—United States, 2011–2017. *MMWR Morb Mortal Wkly Rep*. 2018;67.

CONTACT US

1.877.CTP.1373 | AskCTP@FDA.hhs.gov | www.fda.gov/tobacco

FDA Center for Tobacco Products | 10903 New Hampshire Avenue | Silver Spring, MD 20993-0002

Last Updated June 2018
CTP-411



What works with substance use?

- SBIRT
 - Screening
 - Standardized
 - Brief Interventions
 - Praise and encouragement or
 - Advise to STOP use or
 - Further assessment
 - Referral to Treatment

CRAFFT is a mnemonic acronym of first letters of key words in the 6 screening questions. The questions should be asked exactly as written.

- 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 or drugs while you are by yourself, or **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?

https://www.integration.samhsa.gov/clinical-practice/sbirt/adolescent_screening_brief_intervention_and_referral_to_treatment_for_alcohol.pdf

Most Males and Females Have Had Sexual Experiences By 17 years

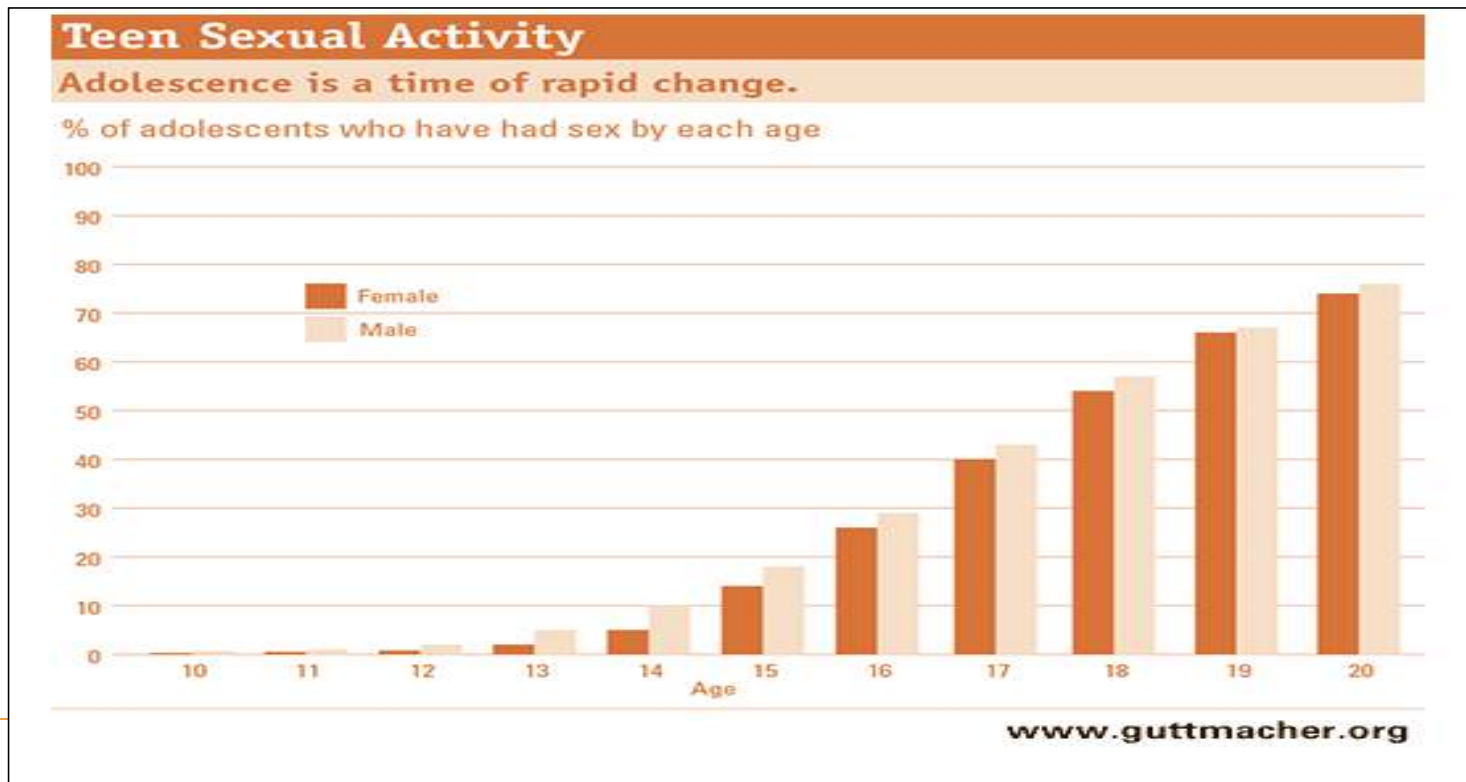
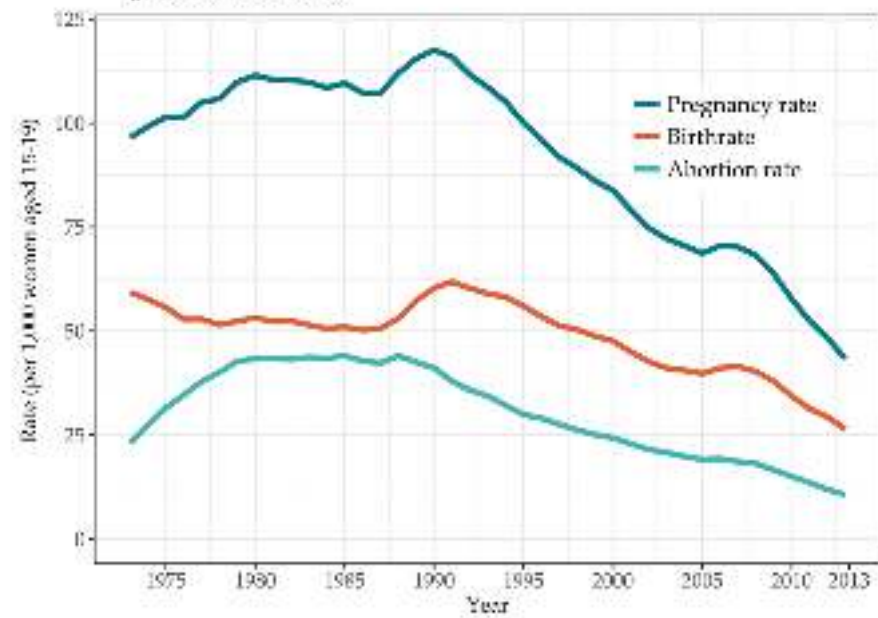
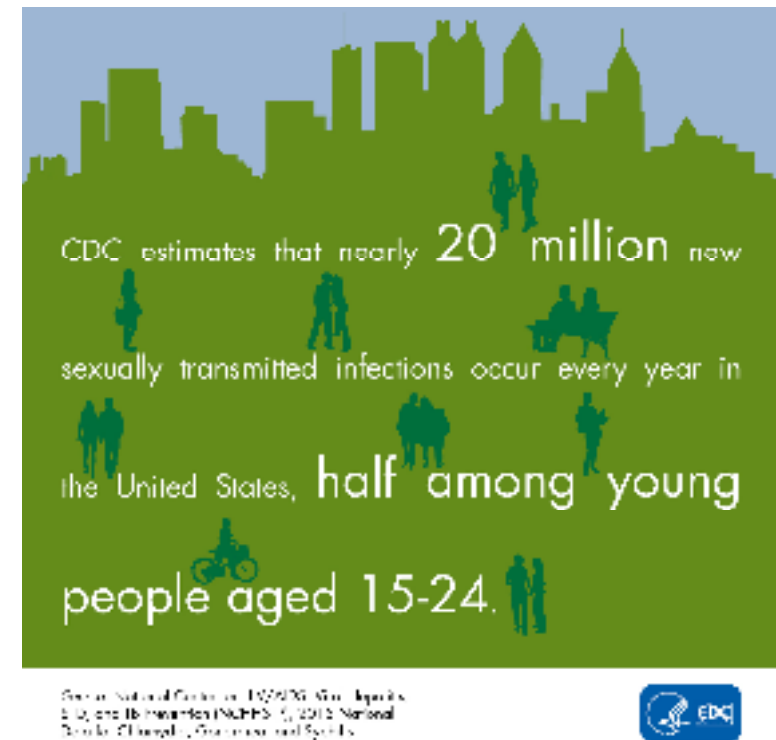


Figure 1. Trends in rates of pregnancy, birth and abortion per 1,000 women aged 15-19, 1973-2013



¼ of the sex and half the infections....



SEXUALLY TRANSMITTED INFECTIONS AMONG YOUNG AMERICANS

Youth bear disproportionate share of STIs

Americans ages 15-24 make up just 27% of the sexually active population

but account for 59% of the 20M new STIs in the U.S. each year



Consequences are particularly severe for young women

Undiagnosed STIs cause 24,000 women to become infertile each year



Ages 15-24
Ages 25+

Young people account for a substantial proportion of new STIs



Many do not know they're infected because STIs often have no symptoms

Get more facts at www.cdc.gov



Unique factors place youth at risk



Young people can protect themselves

GET TESTED

REDUCE RISK BEHAVIORS

GET VACCINATED AGAINST HPV

More than **40%** of sexually active high school students **did not** use a condom the last time they had sex.



Youth Risk Behaviors

Of high school students in 2017:

40% have ever had sex



10%

have had sex with 4+ people
(during their lifetime)

29%

are currently sexually active
(have had sex during the previous 3 months)



National Youth Risk Behavior Survey, 2017

Risky Behaviors & HIV Prevention

Of currently sexually active students:

46%

did not use a condom
the last time they had sex

19%

drank alcohol or used
drugs before having sex

Of all high school students:

9%

had been tested for HIV

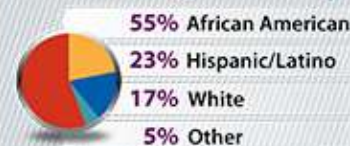


HIV Among Youth

8,451
new HIV diagnoses among youth
aged 13–24 years in 2016



1 in 5
of all new
HIV diagnoses



88%
male

12%
female

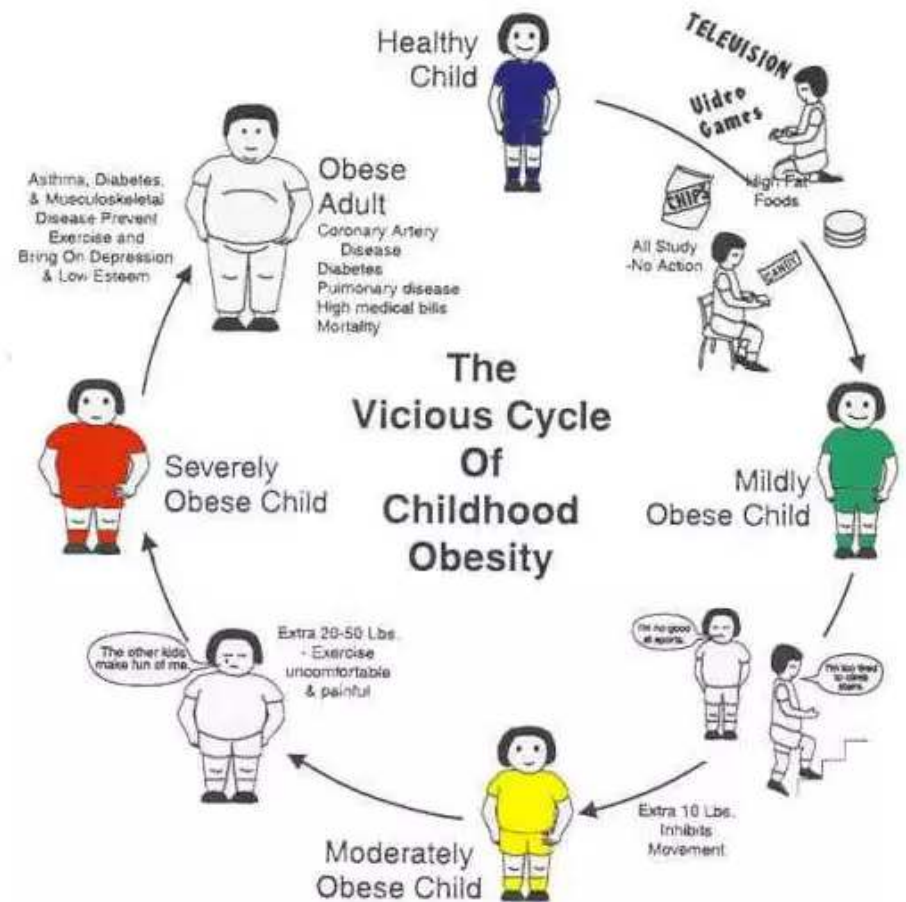


Among male youth,
92%
of new HIV diagnoses were from
male-to-male sexual contact

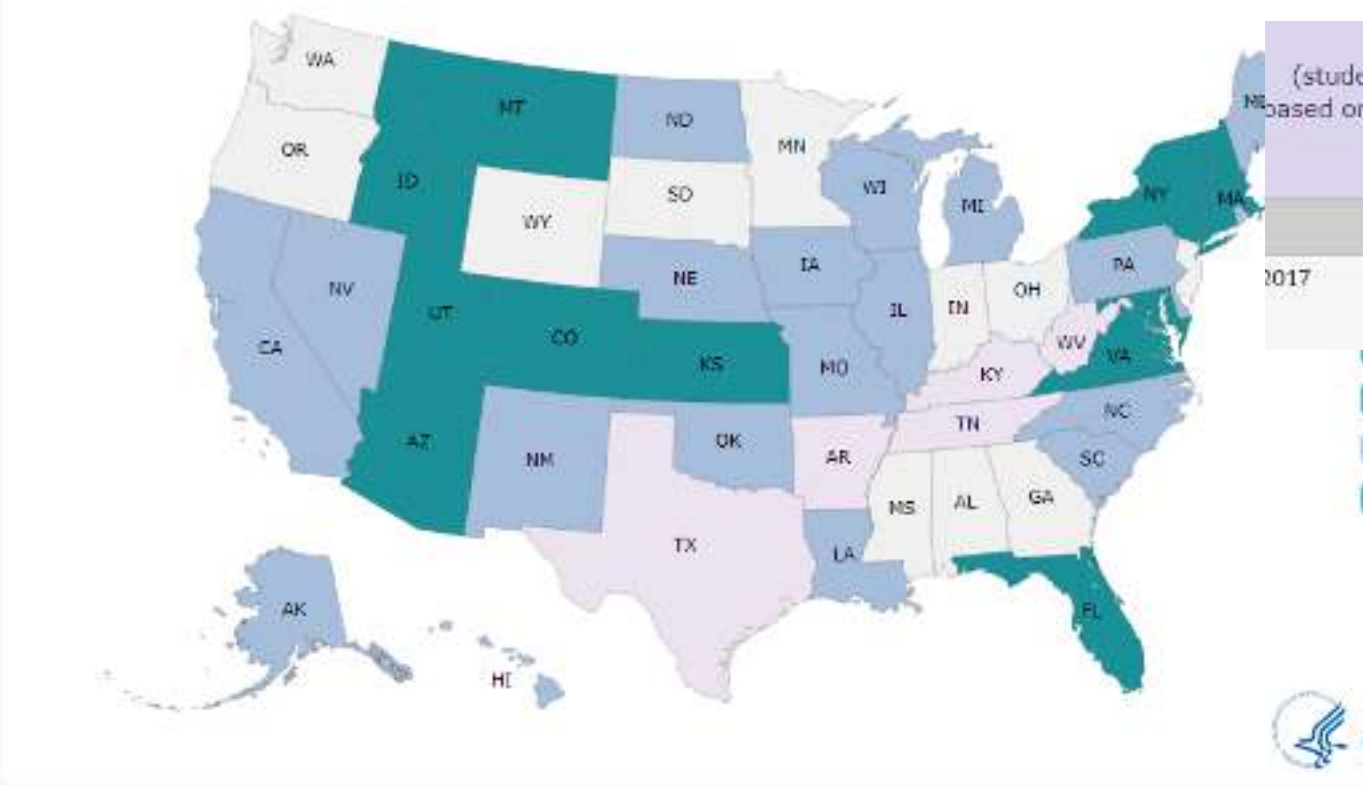


HIV Surveillance Report, 2016

Adolescent Obesity

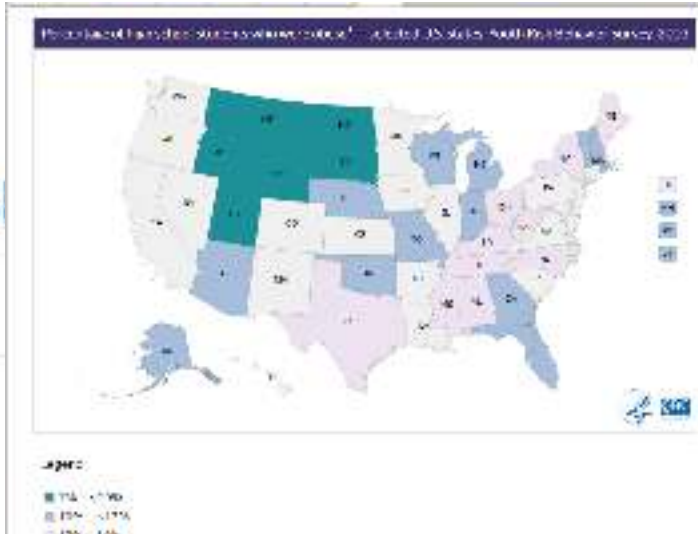


Percentage of high school students who were obese* — selected U.S. states, Youth Risk Behavior Survey, 2017



Had Obesity (students who were \geq 95th percentile for body mass index, based on sex- and age-specific reference data from the 2000 CDC growth charts)	
Florida, High School Youth Risk Behavior Survey, 2017	
Year	Totals
2017	10.9 (9.6–12.4) 4,885 [†]

- MT
- NH
- RI
- VT





Trends in the Prevalence of Obesity and Dietary Behaviors National YRBS: 1991–2017

The national Youth Risk Behavior Survey (YRBS) monitors health behaviors that contribute to the leading causes of death, disability, and social problems among youth and adults in the United States. The national YRBS is conducted every two years during the spring semester and provides data representative of 9th through 12th grade students in public and private schools throughout the United States.

Percentages														Trend from 1991–2017 ¹	Change from 2015–2017 ²
1991	1993	1995	1997	1999	2001	2003	2005	2007	2009	2011	2013	2015	2017		
Had obesity (≥ 95th percentile for body mass index, based on sex- and age-specific reference data from the 2000 CDC growth charts)															
— ³	—	—	—	10.6	10.5	12.0	13.0	12.8	11.8	13.0	13.7	13.9	14.8	Increased 1999–2017	No change
Were overweight (≥ 85th percentile but <95th percentile for body mass index, based on sex- and age-specific reference data from the 2000 CDC growth charts)															
—	—	—	—	14.1	13.6	14.7	15.6	15.6	15.6	15.2	16.6	16.0	15.6	Increased 1999–2017	No change
Did not eat fruit or drink 100% fruit juices (during the 7 days before the survey)															
—	—	—	—	5.4	6.1	6.1	5.8	5.8	5.1	4.8	5.0	5.2	5.6	No change 1999–2017	No change
Ate fruit or drank 100% fruit juices three or more times per day (during the 7 days before the survey)															
—	—	—	—	24.9	21.6	21.1	19.8	21.3	22.9	22.4	21.9	20.0	18.8	Decreased 1999–2017	No change
Did not eat vegetables (green salad, potatoes [excluding French fries, fried potatoes, or potato chips], carrots, or other vegetables, during the 7 days before the survey)															
—	—	—	—	4.2	4.6	5.2	6.0	5.9	6.0	5.7	6.6	6.7	7.2	Increased 1999–2017	No change

Obesity: Short and Long Term Consequences Why CARE?

• Systems:

- Skin
- Neurologic
- Head and Neck
- CV
- Respiratory
- GI
- MSK
- Endocrine
- Psychosocial

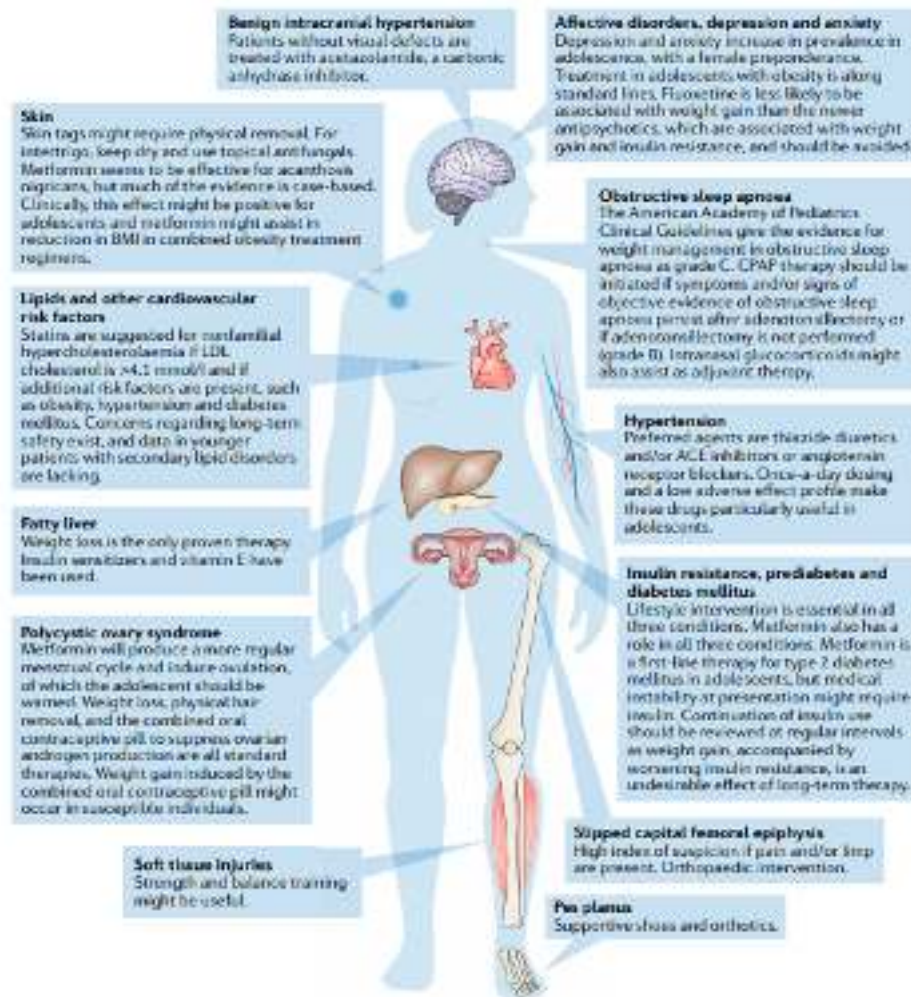


Fig. 5 | Management of comorbidities^{[25][26][27]}. Obesity-associated complications are multisystemic, and the summarized treatment recommendations should be considered when the complication is identified in conjunction with weight-loss advice. ACE, angiotensin-converting enzyme; CPAP, continuous positive airway pressure.

What interventions work with obesity?

One does NOT outgrow obesity with puberty.

- **Evidence based treatment includes**
 - **Management of obesity-associated complications**
 - **A developmentally appropriate approach**
 - **Support for long-term behavioral change**
 - **Long-term weight maintenance strategies**
- **Other therapies**
 - **Bariatric surgery**
 - **Pharmacotherapy** (none approved for children)
 - Metformin
 - Orlistat, phenteramine and topiramate, Serotonin modulator
 - Bupropion and Naltrexone, Liraglutide



What are the solutions?

- **Primary prevention**
 - Better health education
 - Adolescent friendly comprehensive health services
 - Community, school and family involvement
 - Parent engagement
- **Secondary Prevention**
 - Manage comorbidities
 - Screen, brief interventions
 - Motivational interviewing



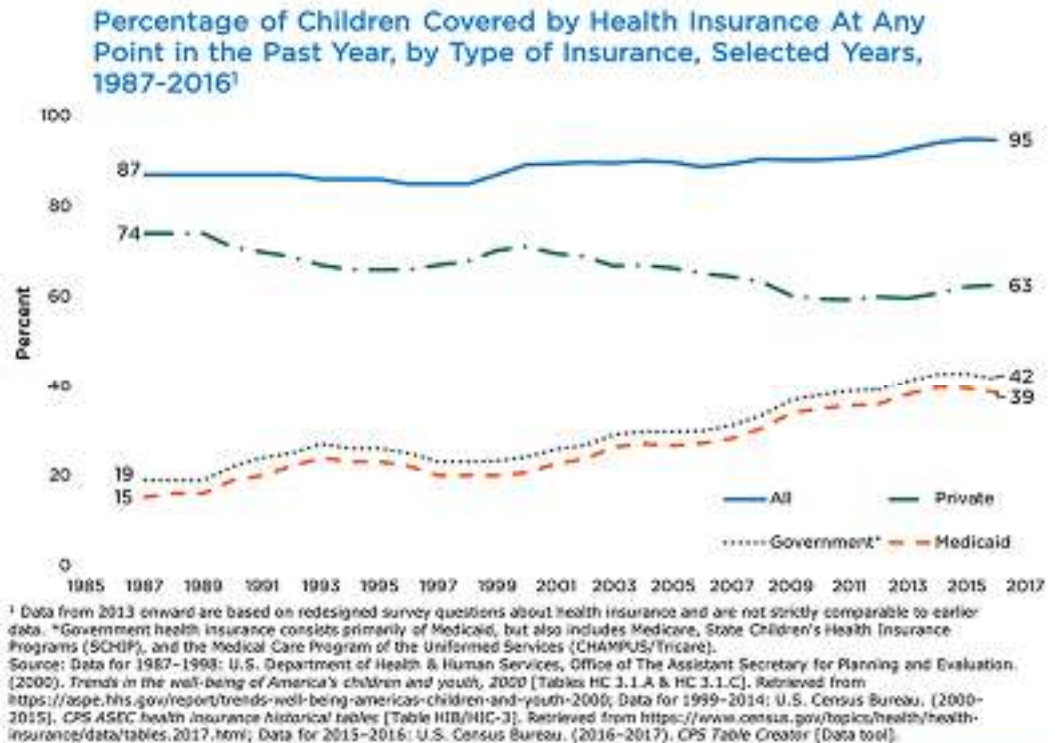
30,000 feet: access to care

- As is true for all Americans, medically uninsured adolescents are less likely to have a regular source of primary care and use medical and dental care less often compared with those who have insurance.
- The majority of medically uninsured adolescents aged 10–18 are eligible for public coverage but not yet enrolled.
 - Their parents say they would enroll their children in public programs, but many do not know their children are eligible.
- Having health insurance does not ensure adolescents' access to affordable, high-quality services given problems associated with high out-of-pocket cost-sharing requirements, limitations in benefit packages, and low provider reimbursement levels.

National Research Council (US) and Institute of Medicine (US) Committee on Adolescent Health Care Services and Models of Care for Treatment, Prevention, and Healthy Development; Lawrence RS, Appleton Gootman J, Sim LJ, editors.

Washington (DC): [National Academies Press \(US\)](#); 2009.

- Historically, the risk of being uninsured doubled when a teen turned 19.
- Affordable Care Act allows young adults to stay on parent's health care plan until age 26.



30,000 Feet versus in the trenches:

Adolescent friendly comprehensive health services

- **Decrease barriers to healthcare for adolescents**
 - **Accessible**
 - Flexible hours
 - Continuity
 - Transitioning
 - Peer educators
- **COMMUNICATION!**
 - Confidential, safe, respectful
- **HEEADSSS**
 - Screen for high risk behaviors
 - Address resilience
- **H: Home**
- **E: Education/Employment**
- **E: Exercise/Eating**
- **A: Activities**
- **D: Drugs**
- **S: Suicidality/Depression**
- **S: Sexuality**
- **S: Safety**

Questions?

ADOLESCENTS ARE THE GREATEST RESOURCE FOR A SOCIETY TO THRIVE



Investments in adolescents
bring a triple benefit:



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