Psychological Impact of Living With Severe Obesity

6th Conference on Recent Advances in the Prevention and Treatment of Childhood and Adolescent Obesity: *Understanding the Interplay Between Physical and Mental Health*

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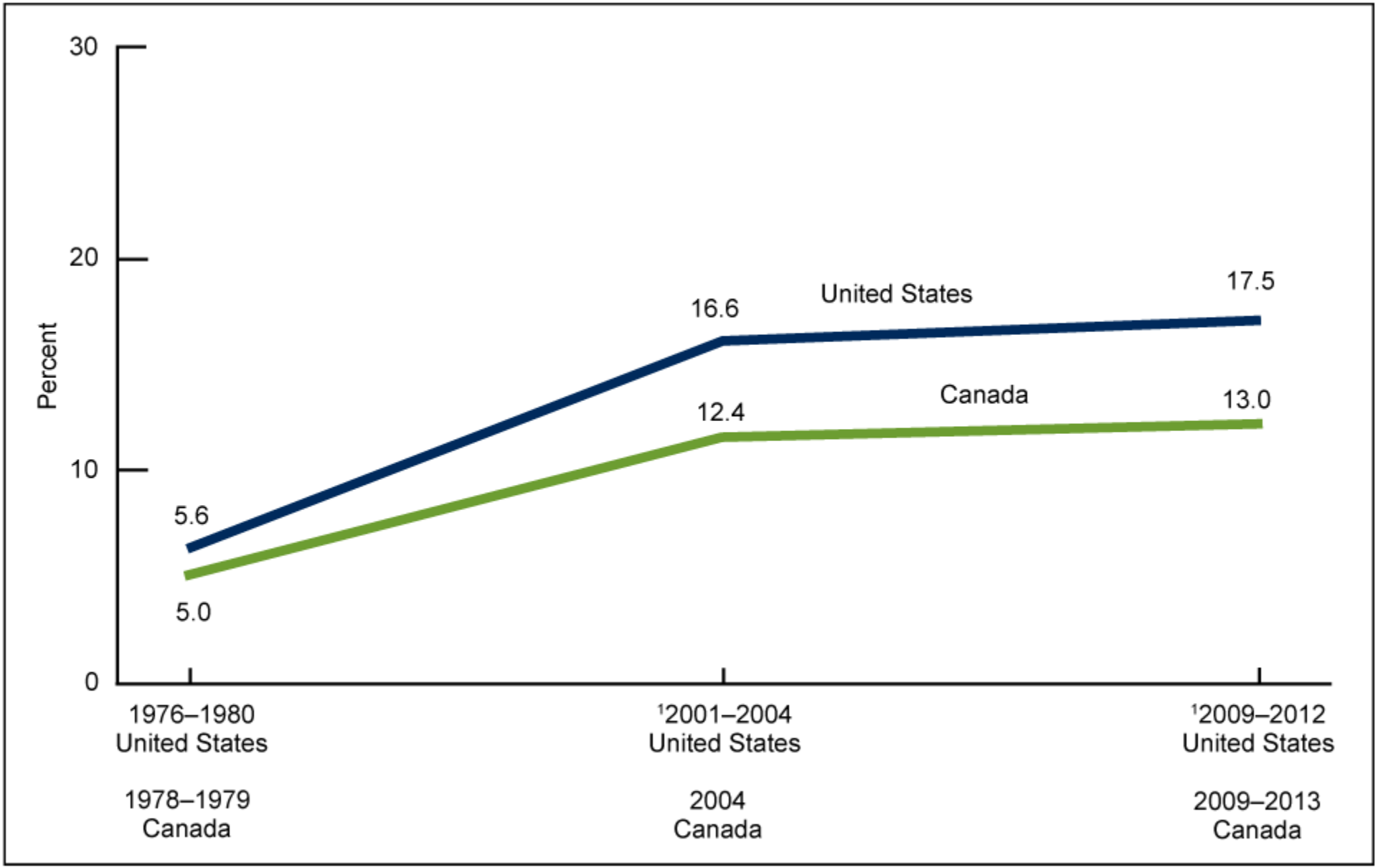
Pediatric Obesity = Public Health Crisis

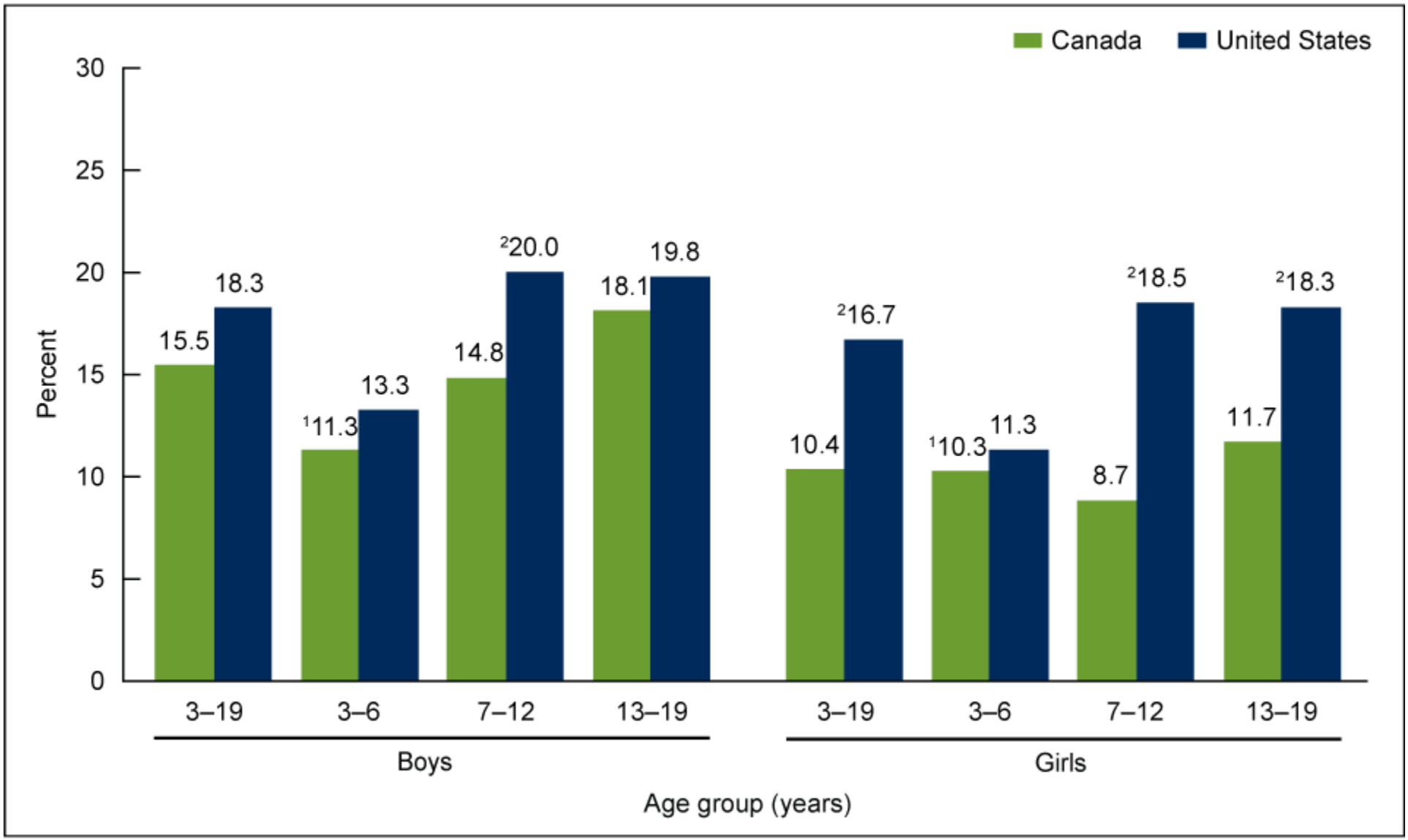
- Prevalence rates increased world-wide
- Few spared of risk
  - Across age range
  - Race/ethnic groups
  - Socioeconomic status
  - Some in disproportionate ways

Figure 1. Trends in childhood obesity among children and adolescents aged 3–19 in Canada and the United States



[1]Statistically significant difference compared with Canada, $p < 0.001$.
NOTE: Pregnant girls are excluded.
SOURCES: CDC/NCHS, National Health and Nutrition Examination Surveys, 1976–1980, 2001–2004, and 2009–2012; Canada Health, 1978–1979; Canadian Community Health Survey—Nutrition 2004; and Canadian Health Measures Survey, 2009–2013.

Figure 3. Childhood obesity among children and adolescents aged 3–19, by sex and age: Canada, 2009–2013, and United States, 2009–2012



[1]Use with caution (coefficient of variation between 16.6% and 33.3% for the Canadian Health Measures Survey). The coefficient of variation is obtained by dividing the standard error of the estimate by the estimate itself, and it is expressed as a percentage of the estimate.
[2]Statistically significant difference compared with Canada, $p < 0.001$.
NOTE: Pregnant girls are excluded.
SOURCES: CDC/NCHS, National Health and Nutrition Examination Survey, 2009–2012, and Canadian Health Measures Survey, 2009–2013.

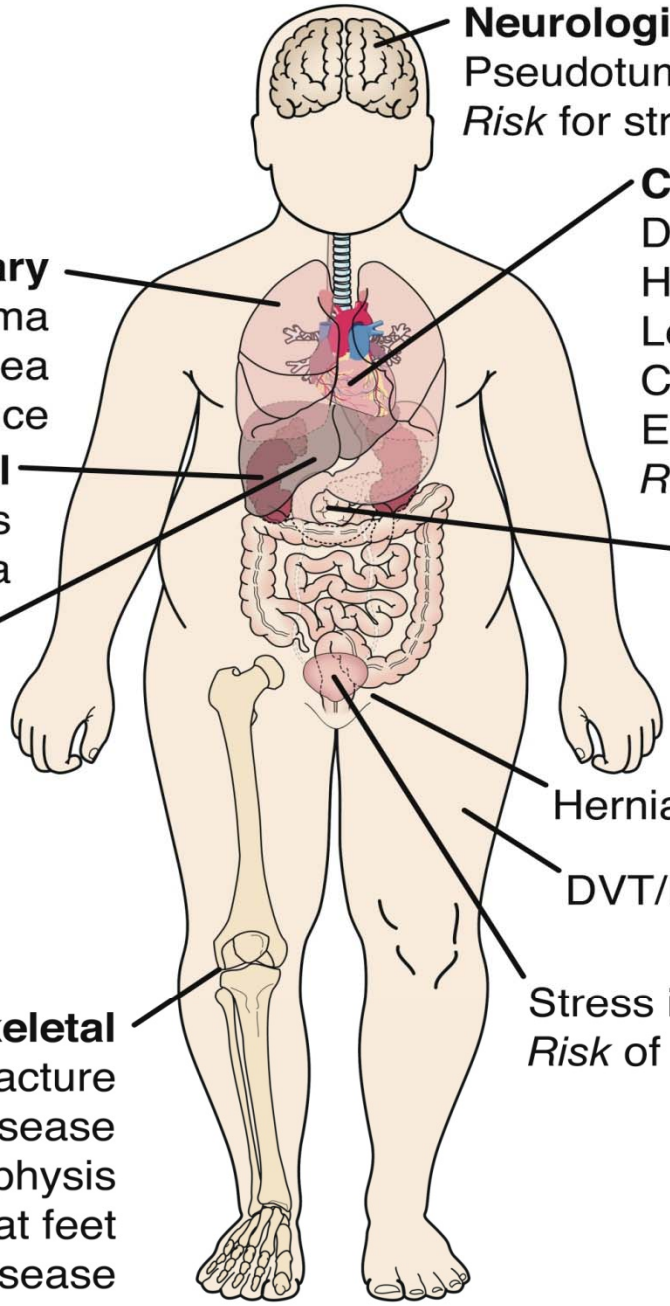
Hallmark of the pediatric obesity epidemic

- Increased prevalence of severe obesity
- Fastest growing subcategory of excess weight status in US
  - 1.7 percent of preschool children
  - 4.3 percent of school-aged children
  - 9.1 percent of adolescent girls
  - 9.2 percent of adolescent boys

Ogden, *JAMA,* 2016

- Without effective intervention, the vast majority will be adults with severe obesity

Complications of Childhood Obesity



Neurological
Pseudotumor cerebri
Risk for stroke

Cardiovascular
Dyslipidemia
Hypertension
Left ventricular hypertrophy
Chronic inflammation
Endothelial dysfunction
Risk of coronary disease

Pulmonary
Asthma
Sleep apnea
Exercise intolerance

Renal
Glomerulosclerosis
Proteinuria

Endocrine
Type 2 diabetes
Precocious puberty
Polycystic ovary syndrome (girls)
Hypogonadism (boys)

Gastrointestinal
Paniculitis
Steatohepatitis
Liver fibrosis
Gallstones
Risk for cirrhosis
Risk for colon cancer

Hernia

DVT/PE

Stress incontinence
Risk of GYN malignancy

Musculoskeletal
Forearm fracture
Blount's disease
Slipped capital femoral epiphysis
Flat feet
Risk for degenerative joint disease

The greater toll of pediatric obesity… may be psychosocial health, not physical health.

Blatantly visible

Highly stigmatized

Impacts day-to-day life independent of and/or prior to of any health effects

Objectives

- Overview of the psychosocial correlates of pediatric severe obesity
  - *adolescents*
- Understand for whom risks are greater
- Implications for clinical care

1ST - DEFINE SOME TERMS

Terminology for excess weight

- Defined differently over time
- Different reference data sets (WHO, CDC, IOTF)
- Mutually exclusive groups or includes others?
- Severe obesity
  - $\geq$ 99th percentile
  - BMI ≥ 120% of the 95th percentile OR Class 2 (BMI 35-39.9 kg/m^2)
  - BMI $\geq$ 40kg/m^2 (Class 3) often used in bariatric surgery literature

Teen Longitudinal Assessment of Bariatric Surgery

What is Teen-LABS?

- A cooperative agreement funded by NIH/NIDDK (UM1)
  - PI (Clinical): Thomas H. Inge, MD, PhD
  - PI (Data Center): C Ralph Buncher, Sc.D.
- 5 center adolescent bariatric research consortium
  - Cincinnati Children's Hospital Medical Center
  - Nationwide Children's Hospital (Columbus, OH)
  - Texas Children's Hospital (Houston, TX)
  - University of Pittsburgh Medical Center
  - University of Alabama-Birmingham (
- http://www.teen-labs.org

NIH National Institute of Diabetes and Digestive and Kidney Diseases

Teen Longitudinal Assessment of Bariatric Surgery

What is Teen-LABS?

- Prospective, longitudinal cohort observational study
- Document the safety of bariatric surgery in adolescence and the post-operative health and quality of life outcomes at 6-, 12-months and the annually
- 242 adolescents (age ≤19)
  - Consecutive patients 2007-2012
  - Participants receive standard clinical care
  - Majority Roux-en-Y gastric bypass

Teen-LABS Ancillary Research

- **TeenView Series**
  - R01DK080020 (fully executed); R01DA033415; 2R01DK080020
  - Prospective, controlled, longitudinal design focused on psychosocial health and emerging risks

- **Following two parallel cohorts of adolescents to young adulthood**
  - Teen-LABS participants (ages 13-18)
  - Adolescent comparison group
    - Demographically similar
    - BMI $\geq$ 40
    - Non-operative
    - Recruited from the Teen-LABS sites
  - Primary caregiver (female)
  - Baseline (pre-surgery), 6-, 12-, 24-, 36-, 48-, and 72 months

Critical context

Teen Longitudinal Assessment of Bariatric Surgery
www.Teen-LABS.org

TeenView

Eligibility: BMI $\geq$ 40kg/m^2

Age 13-18 years

Caregiver participates

N = 141 Teen-LABS

88.7% of approached

M_{BMI}=51.5$\pm$8.3*

M_{age}=16.9$\pm$1.4*

79.9% female

66.2% White

7.2% Hispanic

N = 83 Non-surgical

96.5% of approached

M_{BMI}=46.9$\pm$6.1*

M_{age}=16.1$\pm$1.4*

81.9% female

54.2% White

6.0% Hispanic

- Work with adolescents with severe obesity?
- Work with adolescents undergoing bariatric surgery?
- Believe the majority of adolescents with severe obesity are experiencing significant psychosocial impairment? A minority?
- Believe something bad (i.e., abuse) must have happened?
- How many of you were adolescents?

Areas of psychosocial burden

- Adjustment
  - Psychopathology
- Peer relations
  - victimization
- High Risk Behaviors
- Family Dysfunction
- High Risk Contexts
- Health-Related Quality of Life

Knowns: Psychopathology

- Literature is **equivocal** regarding depressive symptoms or other psychopathology being highly prevalent in pediatric obesity – when age-normative references are available.

A Multisite View of Psychosocial Risks in Patients Presenting for Bariatric Surgery

Dana L. Rofey[1], Meg H. Zeller[2], Cassie Brode[2], Jennifer Reiter-Purtill[2], Carmen Mikhail[3], Gia Washington[3], Amy E. Baughcum[4], James Peugh[2], Heather Austin[5], Todd M. Jenkins[2], Anita P. Courcoulas[1], and the TeenView Writing Group in cooperation with the Teen-LABS Consortium

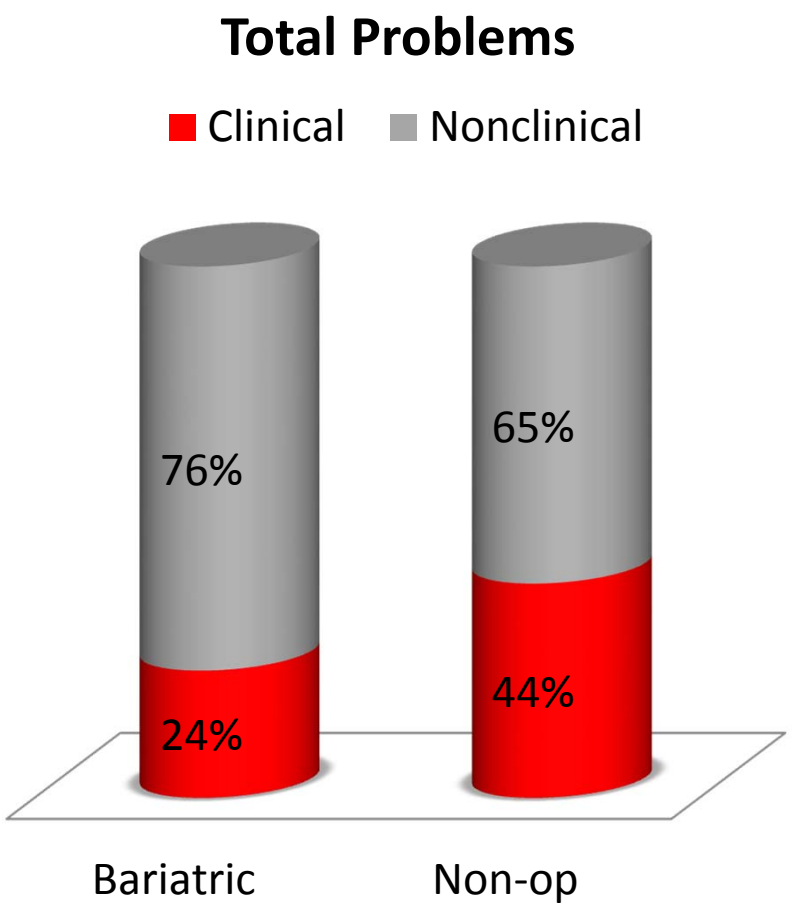
- Main outcomes – Psychopathology Prevalence
  - CBCL
  - YSR

- Correlates
  - Binge Eating Disorder (BED) screen (QEWP-R)
  - Global self-worth (SPPA)
  - WRQOL (IWQOL-Kids)
  - Caregiver distress (SCL-90R)
  - Family dysfunction (FAD)

Rofey et al., *Obesity*, 2015

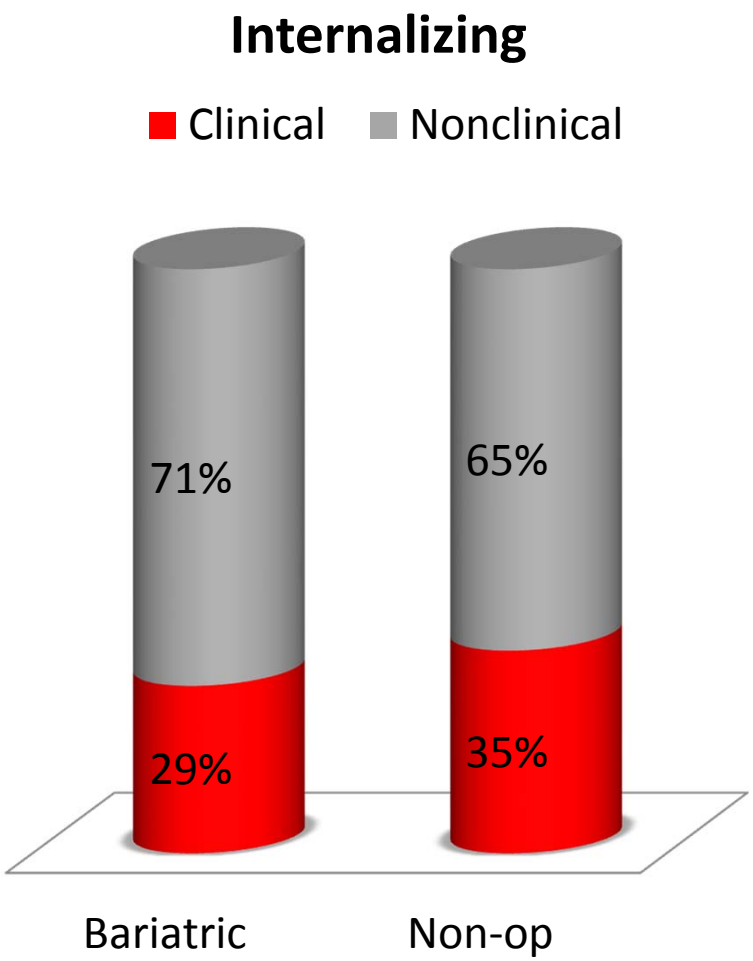
TeenView: Low Psychopathology

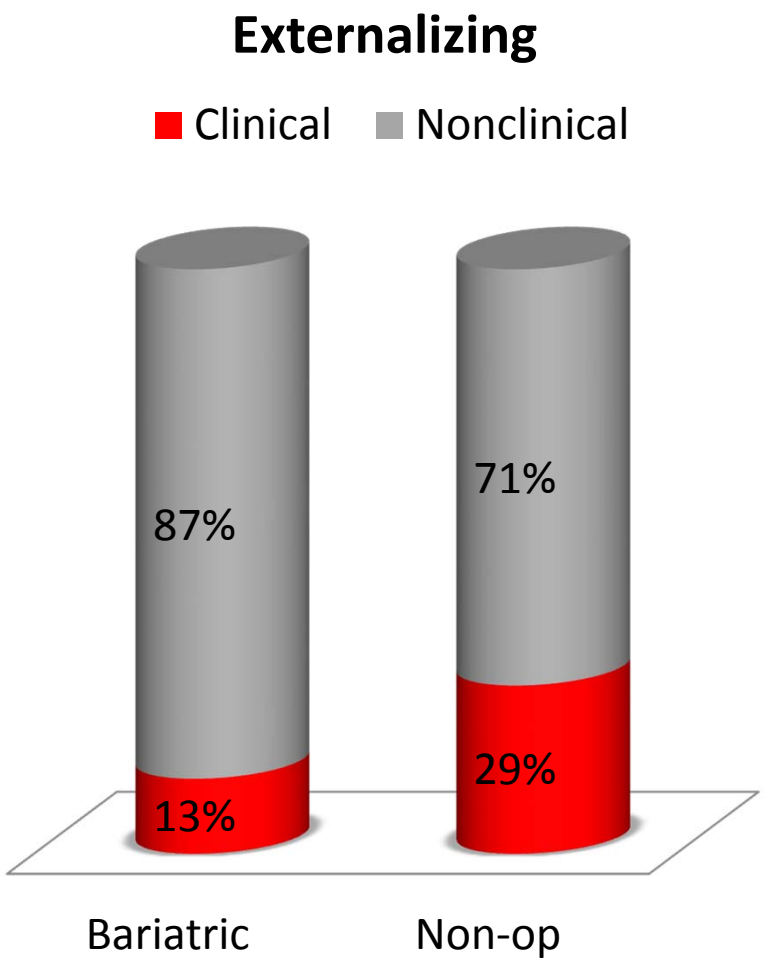
- **Mean scores** for all scales were in the **healthy** range based on age/gender normative samples
- Only a **minority** had elevated psychopathology compared to age-normative reference values
  - No higher than national base rates in National Comorbidity Study (40%)
- Non-surgical > surgical



Rofey et al., *Obesity*, 2015

TeenView: Low Psychopathology





Rofey et al., *Obesity*, 2015

What Predicts Psychopathology Risk?

- Being a non-surgical comparison
  - i.e., bariatric group less impaired
- Screening positive for BED
- Higher family dysfunction
- Greater impairment in WRQOL
- Living in a 2-caregiver home (?!)
  - Post hoc: single parent homes were primarily the biological mother, whereas 2-caregiver home was either biological and/or step-parents or a "non-traditional pairing" (one biological parent + grandparent, neither biological parent), with the non-traditional more likely to screen positive for psychopathology

Rofey et al., *Obesity*, 2015

Summary: Psychopathology

- Only a subgroup of adolescents with severe obesity present with psychopathology
- Rates are not different from national base rates
- Adolescents with psychopathology also have other psychosocial impairments as well as family environments which are more clinically dysfunctional, and may have experienced other adversities (divorce, parental death)

Clinical subgroup in both treatment settings in need of additional support

Rofey et al., *Obesity* (2015)

Knowns: Impairment in Peer Relations

- Weight is the most common reason for victimization, bullying and teasing among youth

Puhl et al., *Pediatric Obesity*, 2015

  - Risk increases with BMI

Puhl et al., *Pediatrics*, 2013

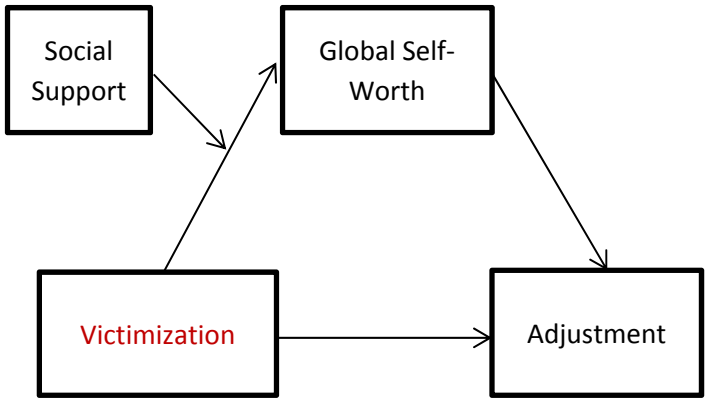
- Fewer friendships and social isolation

Zeller et al, *Obesity*, 2008

BMI ≥ 99th percentile not a focus

Impairment in Peer Relations: Adolescents with Severe Obesity

- TeenView Study
  - Surgical group
  - Non-surgical group
- Pre-surgery/baseline
- Measures
  - Revised Peer Experiences Questionnaire
  - Youth Self-report
  - Harter Self Perception Profile
  - Children's Social Support Questionnaire



Reiter-Purtill et al, *J Pediatr Psychol*, in press

Impairment in Peer Relations Adolescents with Severe Obesity

- As a group, adolescents with severe obesity did not report high levels of victimization, with **mean levels of victimization similar to the general adolescent literature**
  - Relational (social exclusion)
  - Overt (confrontational)
  - Reputational (gossip, rumors)

- Non-surgical > relational victimization, internalizing, and externalizing symptoms

- All associations were in the expected direction
  - Victimization was associated with lower self-worth and poorer adjustment

Reiter-Purtill et al, *J Pediatr Psychol*, in press

Impairment in Peer Relations Adolescents with Severe Obesity

- **Only some adolescents reported experiencing victimization (as adolescents)**
- Peer victimization was associated with feelings of lower self-worth
- Which in turn, led to greater to adjustment difficulties - internalizing & externalizing symptoms
- Social support was protective of these effects

Clinical subgroup in both treatment settings in need of additional support

Reiter-Purtill et al, *J Pediatr Psychol*, in press


CVS
VOLVO

Adolescence: ↑ High-Risk Behaviors

- Alcohol/tobacco/illicit drug use & risky sexual behavior increase across adolescence and peak in young adulthood

While “normative” – are not benign, as for some youth they are precursors to negative health outcomes.

Severe Obesity: High-Risk Behaviors

Ratcliff et al., Pediatrics, 2011

- Nationally representative school-based sample
  - YRBSS 2007
- Compared odds of engagement of severely obese (n=410) vs. healthy weight (n=8,669)
  - Alcohol/tobacco/drug use behaviors were essentially similar (e.g., age at initiation, current use, or abuse)
  - Exceptions …severe obesity associated with greater odds of
    - Ever having tried a cigarette
    - Females – being a current smoker
    - Males – first smoking before age 13

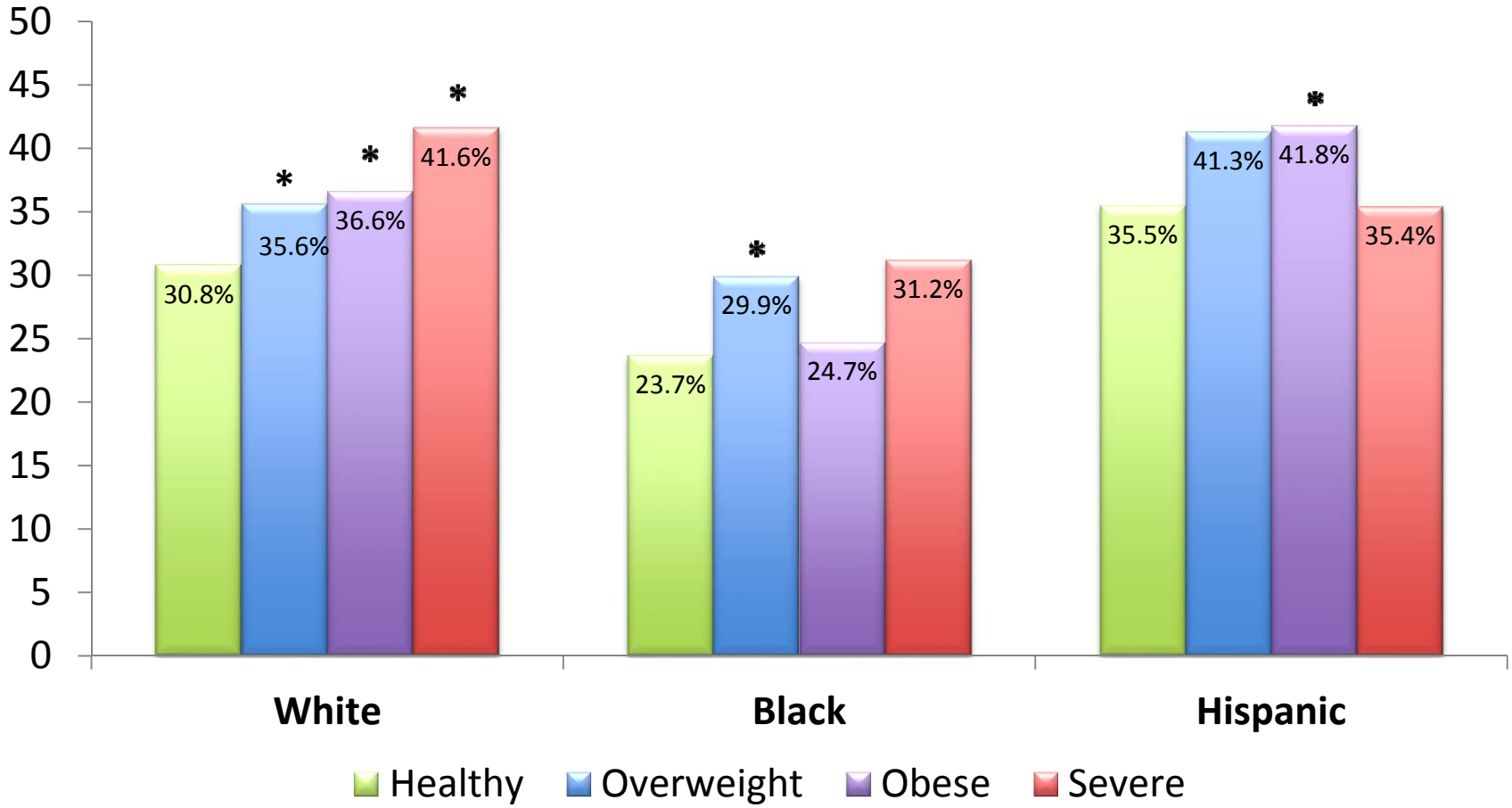
Substance Use Across the Excess Weight Status Spectrum

- Nationally representative school-based sample
- Compared odds of engagement in high risk behaviors across the excess weight status spectrum
- Healthy weight group as reference sample

- Pooled sample 2008 & 2009
  - N = 19,678
    - Grade 10 (M_{age}=16.07 yrs)
    - 53% female
    - White, Black, Hispanic

- Self-reported heights/weights
  - Healthy = 14,261
  - Overweight = 3,012
  - Obese = 1,963
  - Severe = 442

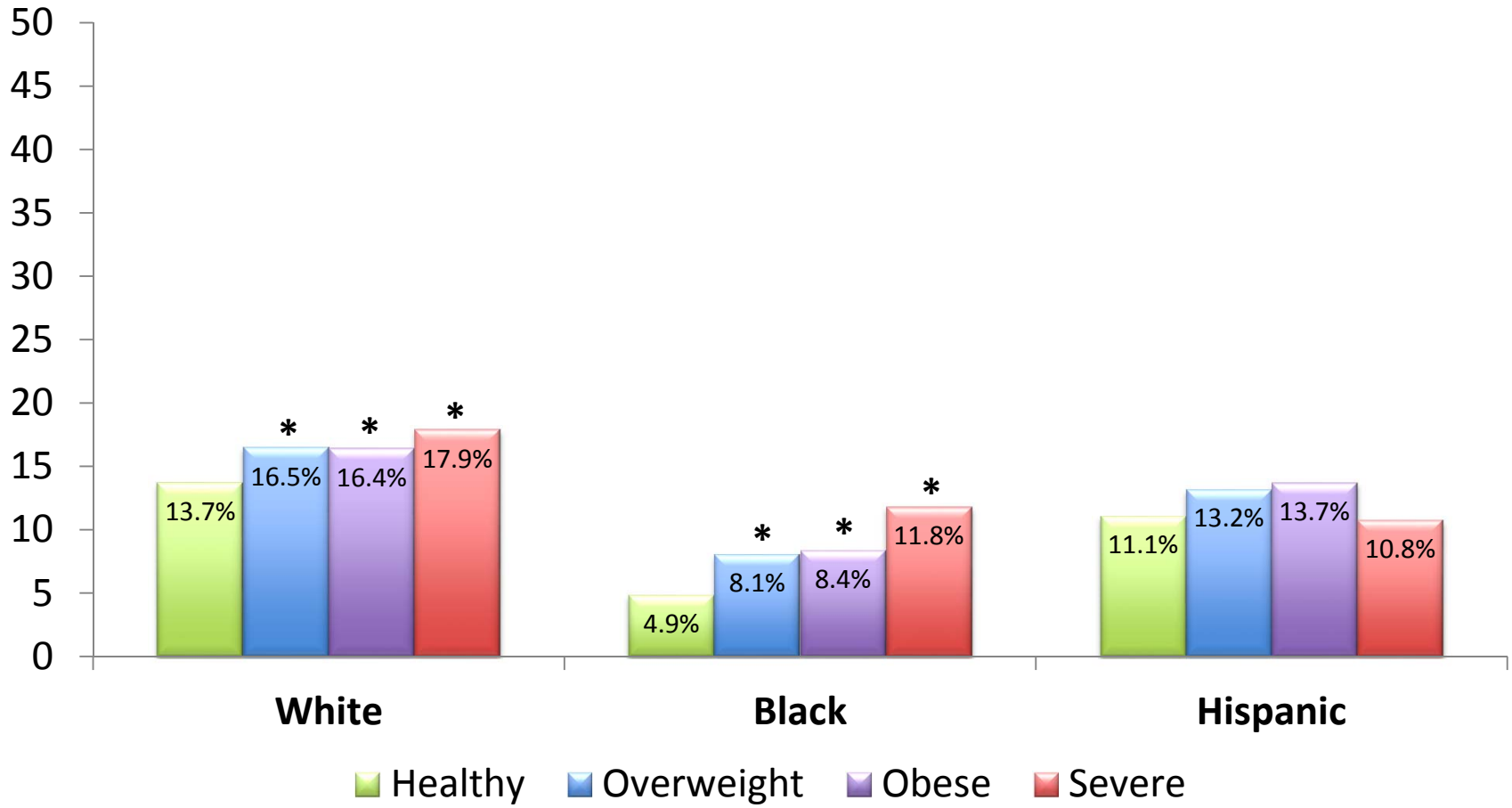
Percent of 10th graders ever trying a cigarette



*p<0.05 when compared to healthy weight adolescents of the same race, controlling for gender and parental education.

Zeller et al., Childhood Obesity, 2015

Percent of 10th graders smoking a cigarette in past 30 days



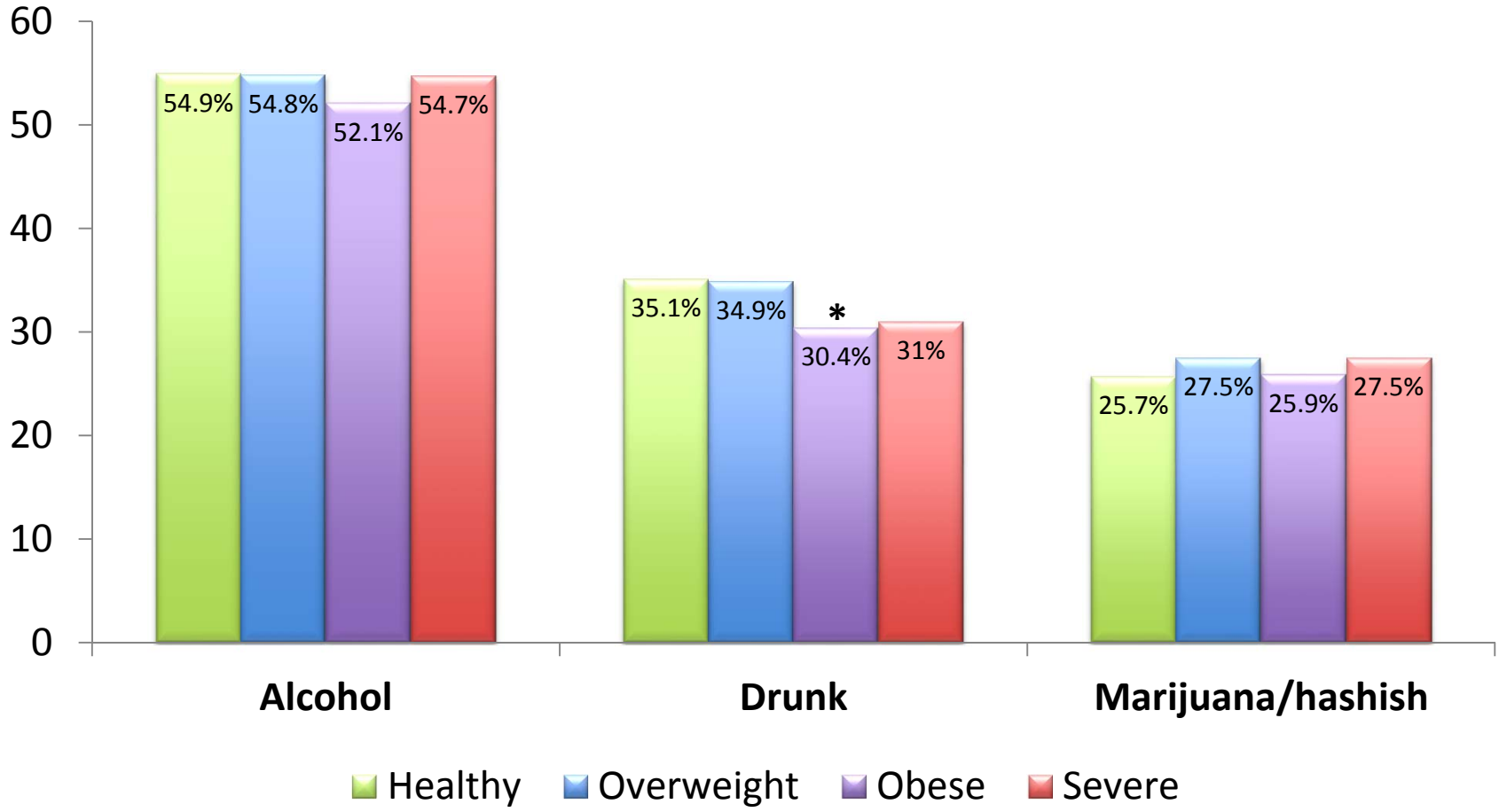
*p<0.05 when compared to healthy weight adolescents of the same race, controlling for gender and parental education.

Zeller et al., Childhood Obesity, 2015

White teens with severe obesity: Tobacco

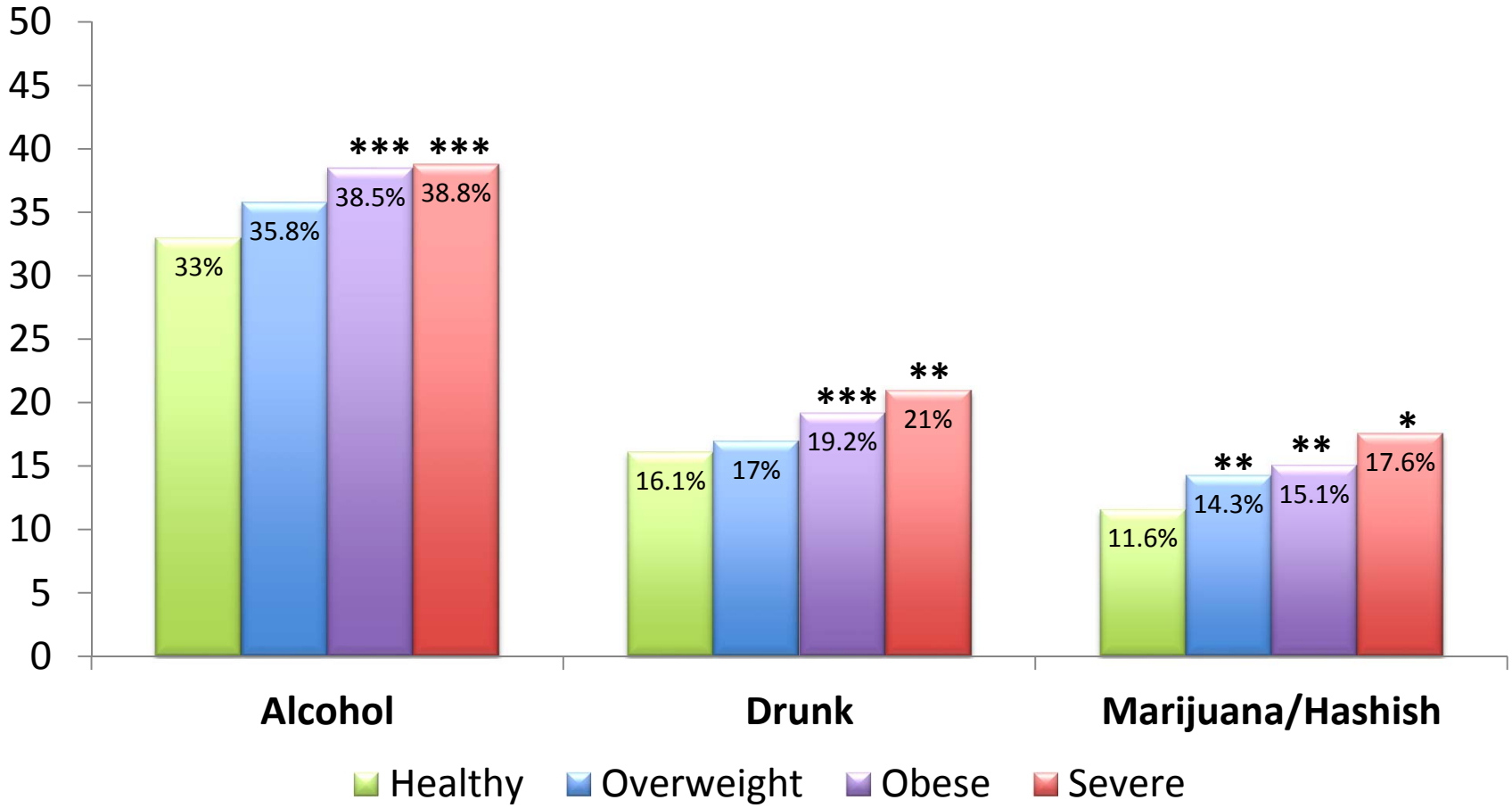
- 42% said some or all of their friends smoked
  - Healthy weight: 35%
- 32% saw low risk of harm in smoking ≥ 1 pack per day
  - Healthy weight: 25%
- 28% who had smoked did so for the first time before the 9th grade (i.e., 14 years or younger)
  - Healthy weight: 18%

White 10th graders: Percent who used alcohol, were drunk, or used marijuana/hashish in the past year



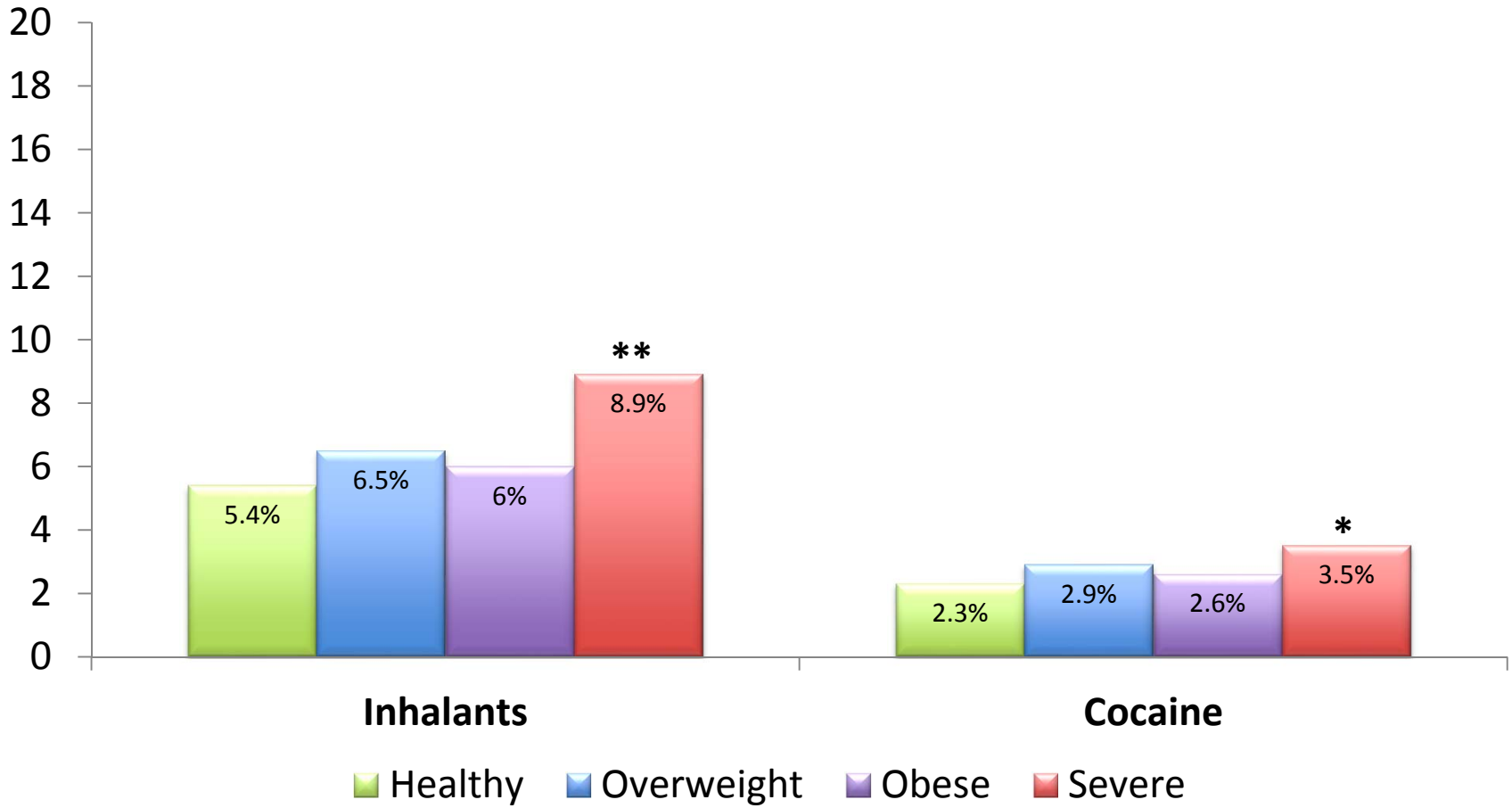
Zeller et al., Prevention Science, 2016

White 10th graders: Percent who used alcohol, got drunk, or used marijuana/hashish before 9th grade



Zeller et al., Prevention Science, 2016

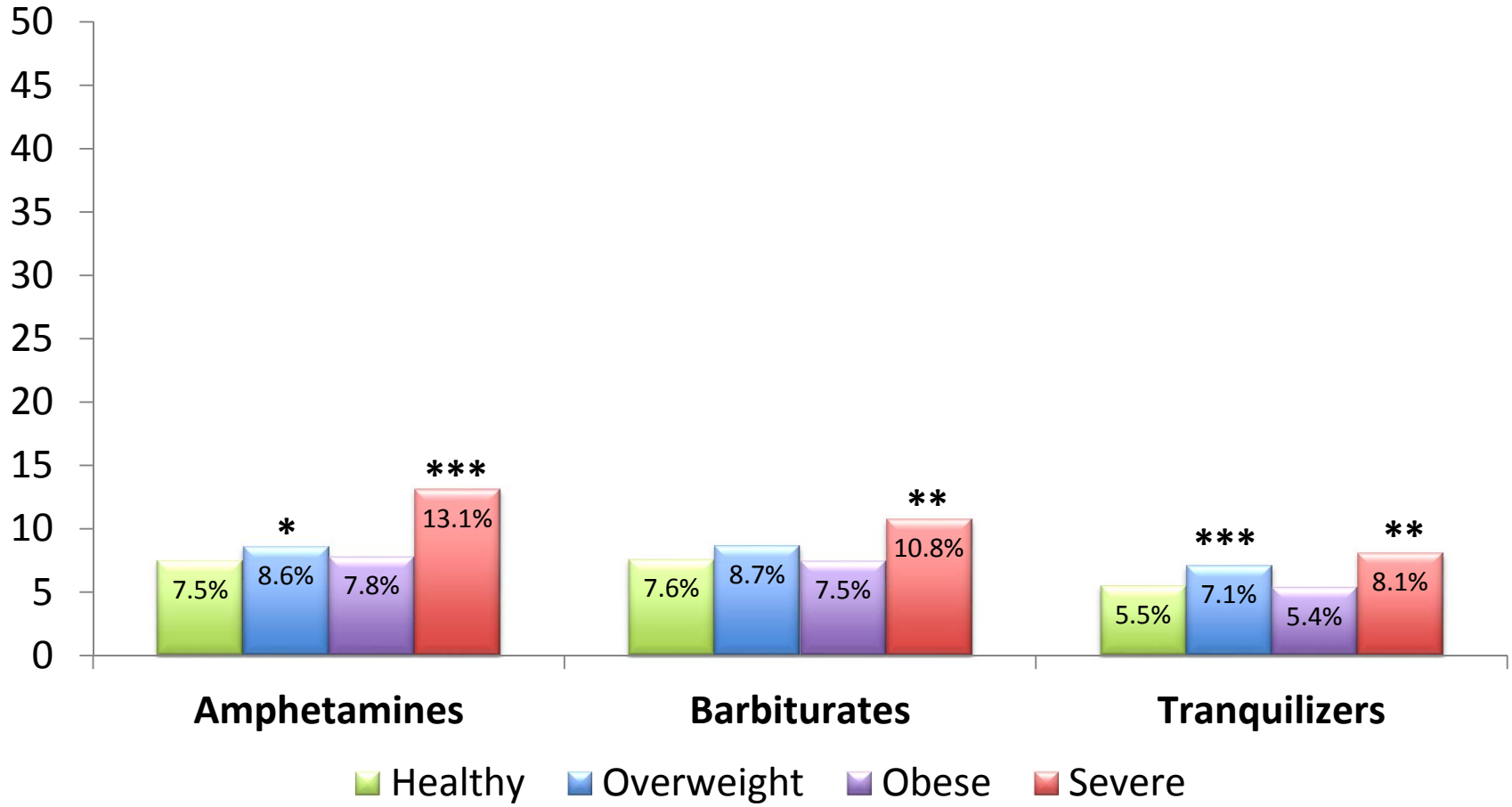
White 10th graders: Percent who used inhalants or cocaine in the year



*p<0.05, **p<0.01 when compared to healthy weight adolescents of the same race, controlling for gender and parental education.

Zeller et al., Prevention Science, 2016

White 10th graders: Percent who used amphetamines, barbiturates, or tranquilizers in the past year



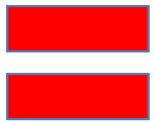
Zeller et al., Prevention Science, 2016

White teens of excess weight in general, and those of severe excess weight specifically, are high risk targets for tobacco and substance use monitoring and prevention messaging – EARLY!

In pediatric settings, the "patient" is the adolescent and the family

The broader pediatric literature demonstrates that impaired family functioning impacts child health outcomes, particularly in pediatric conditions that are reliant on:

(1) regimen adherence
(2) lifestyle change
(3) and/or treatment intensity

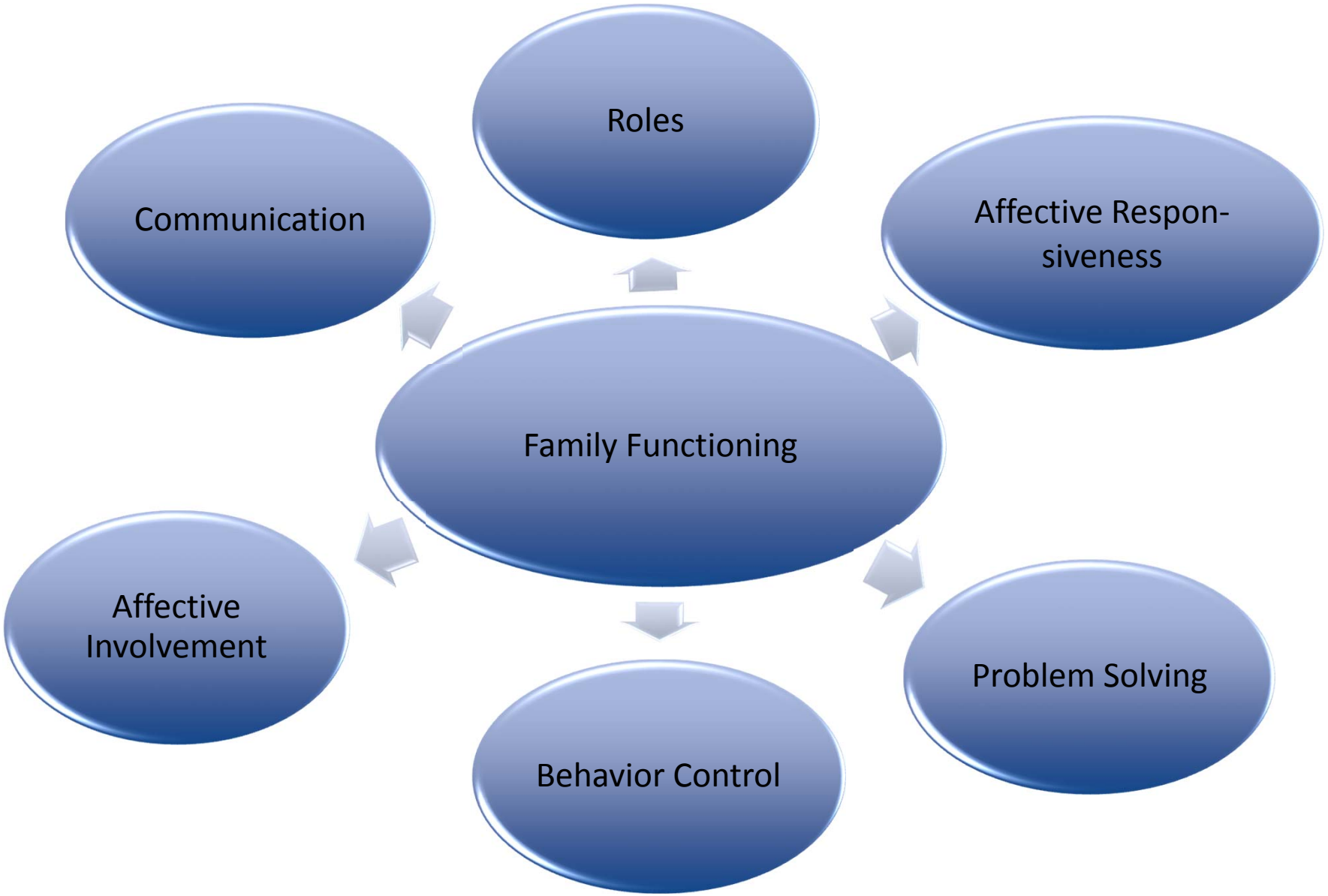


Pediatric weight management, including bariatric surgery

SHARED DISEASE

66-90% of female caregivers who seek weight management care for their obese child/adolescent are also obese, if not severely obese

McMaster Approach to Families

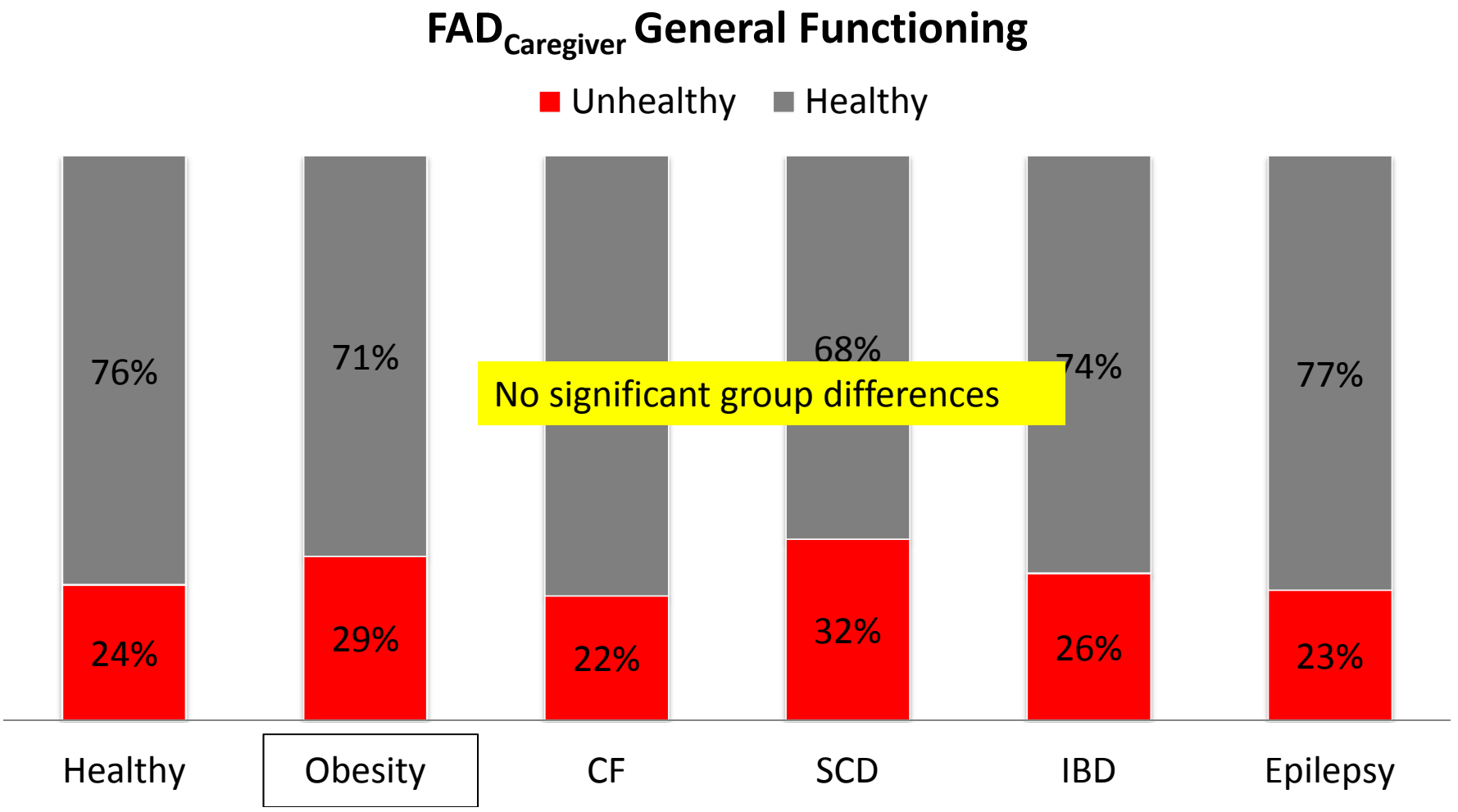


Family Assessment Device (FAD)

- Based on McMaster Model
- 60-item measure
- 6 dimensions & General Functioning Summary Score
- Respondents rate their level of agreement/disagreement on a 4-point scale on specific family behaviors
- Caregiver and adolescent-report forms
- Clinical cut-off scores differentiating “healthy” versus “unhealthy” family functioning
- Strong psychometrics

Family Functioning in the Context of Pediatric Chronic Conditions (N=301)

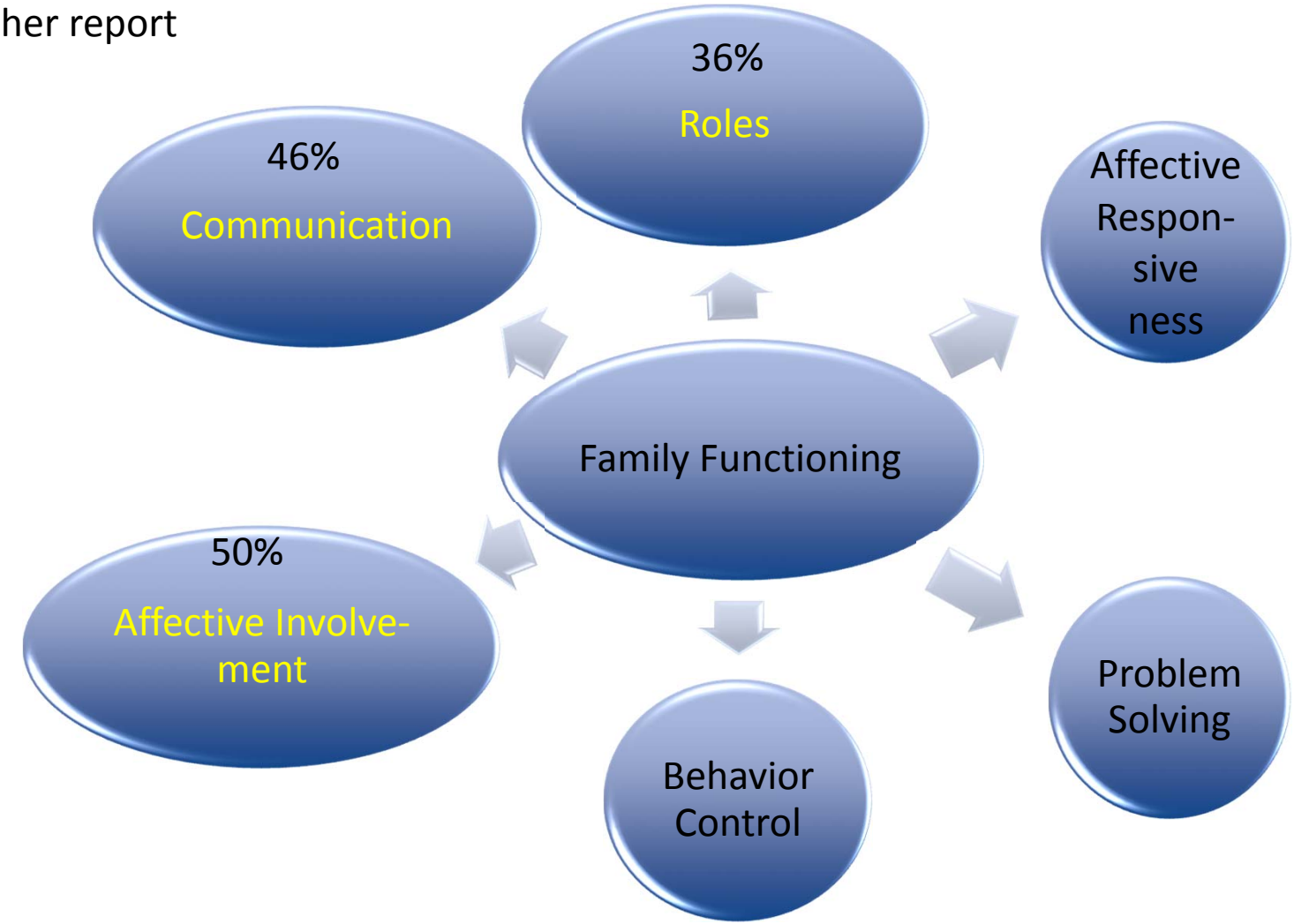
Herzer et al., *J Dev Behav Pediatr*, 2010



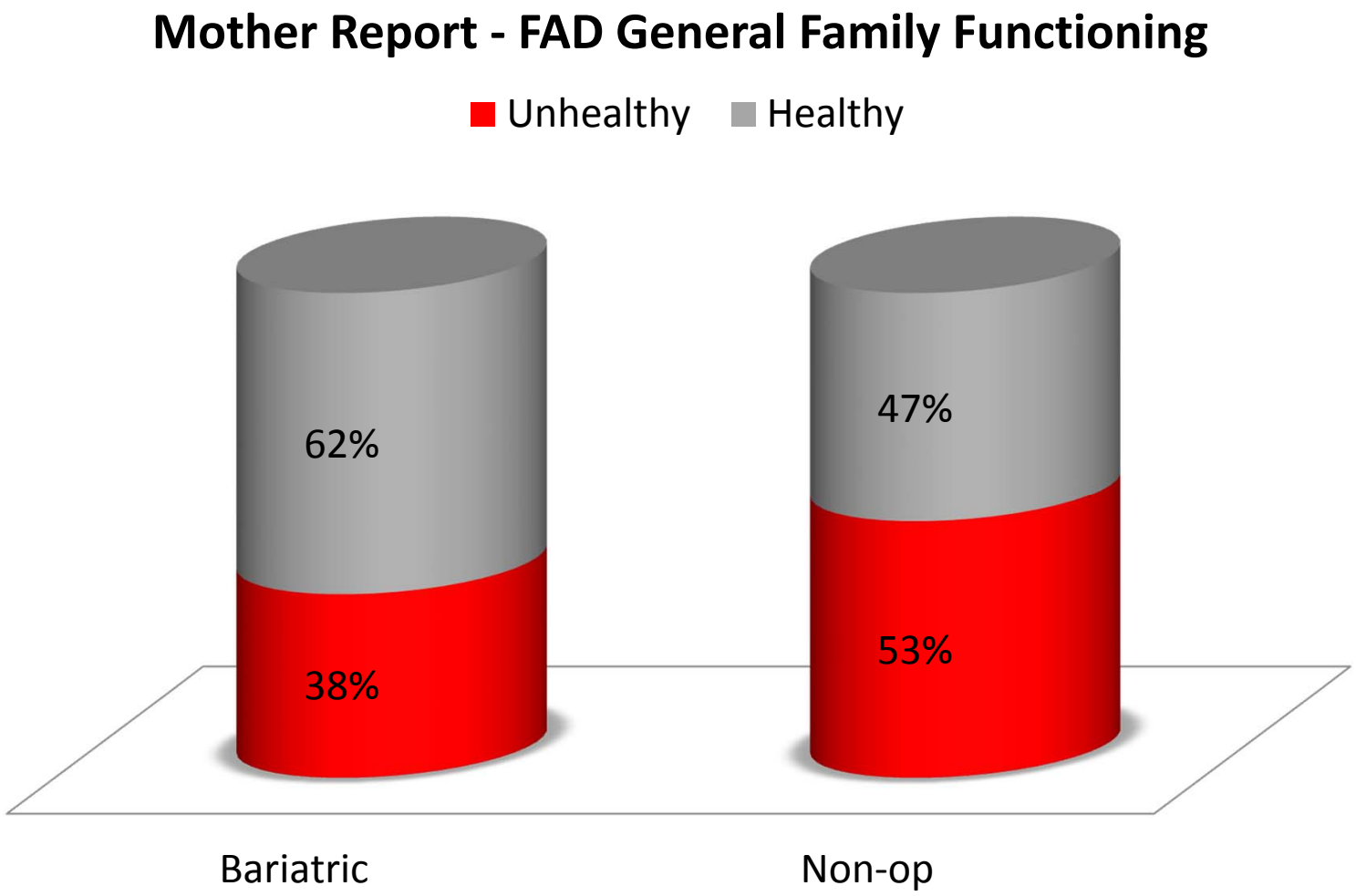
Families of Obese$_{BMI \geq 95th}$ Youth: Unhealthy Domains

Herzer et al., *J Dev Behav Pediatr*, 2010

Mother report



TeenView: Unhealthy Family Functioning

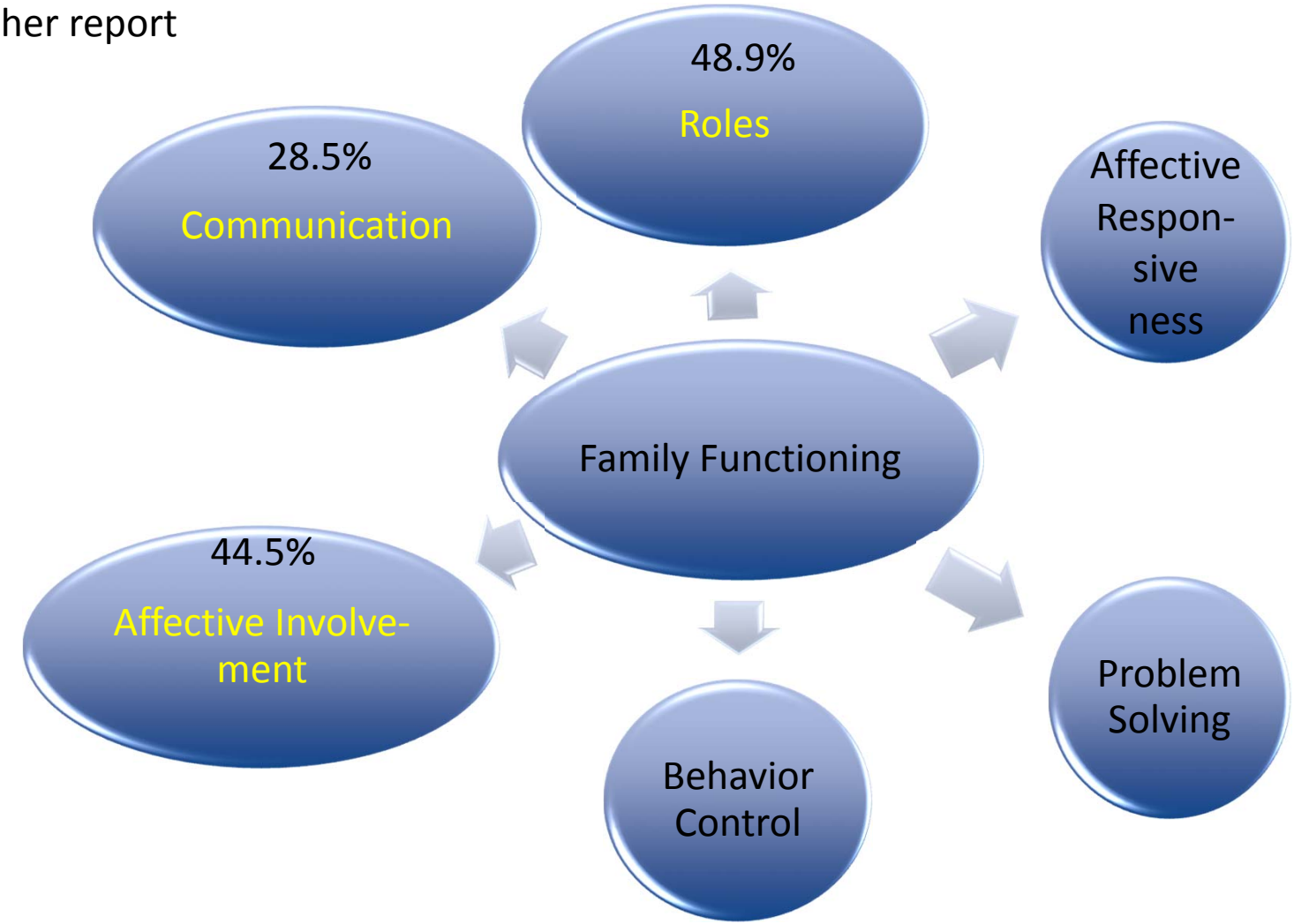


Zeller et al., *Obesity,* 2016

Families of TeenView Bariatric: Unhealthy Domains

Zeller et al., *Obesity*, 2016

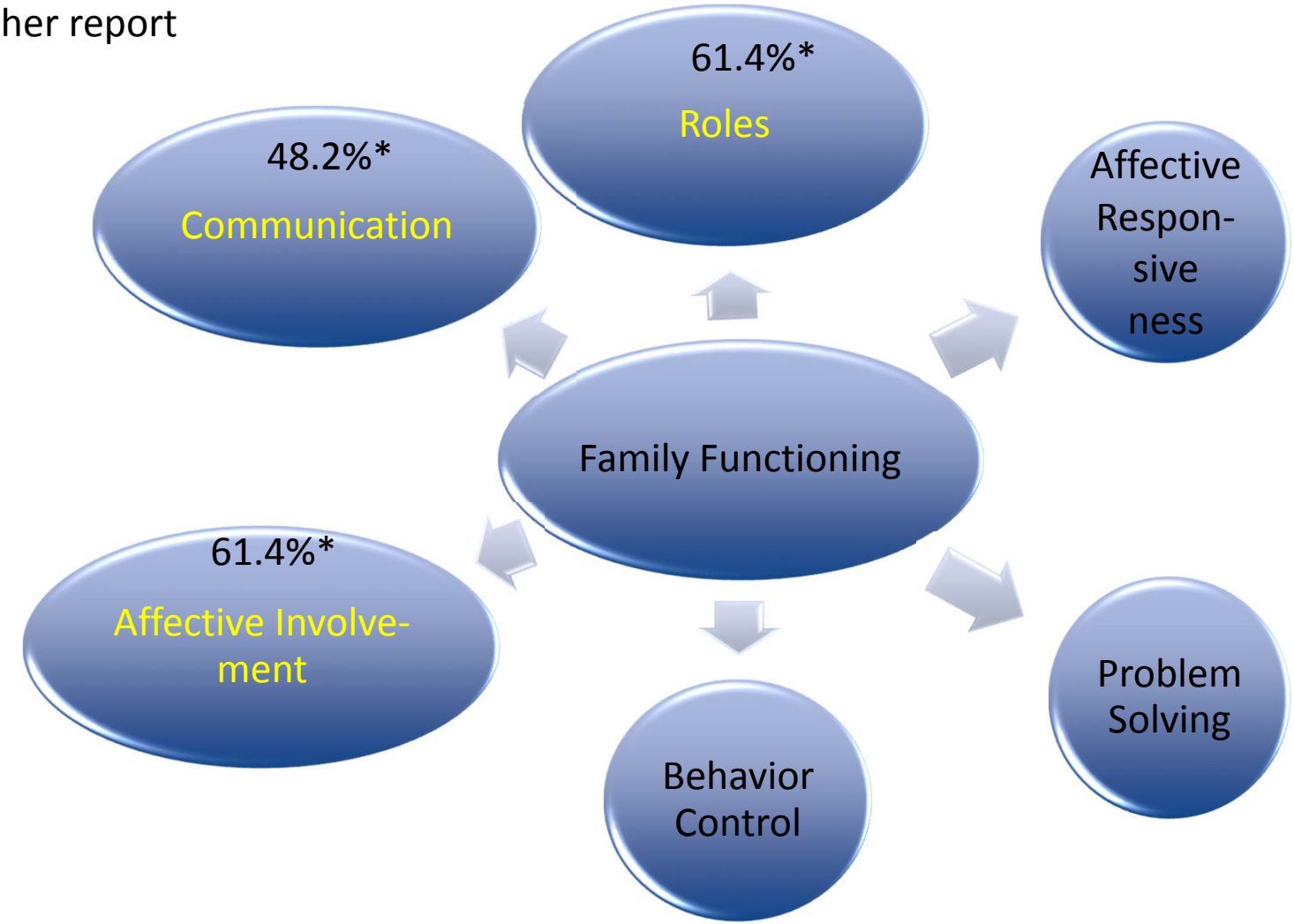
Mother report



Families of TeenView Non-Surgical: Unhealthy Domains

Zeller et al., *Obesity*, 2016

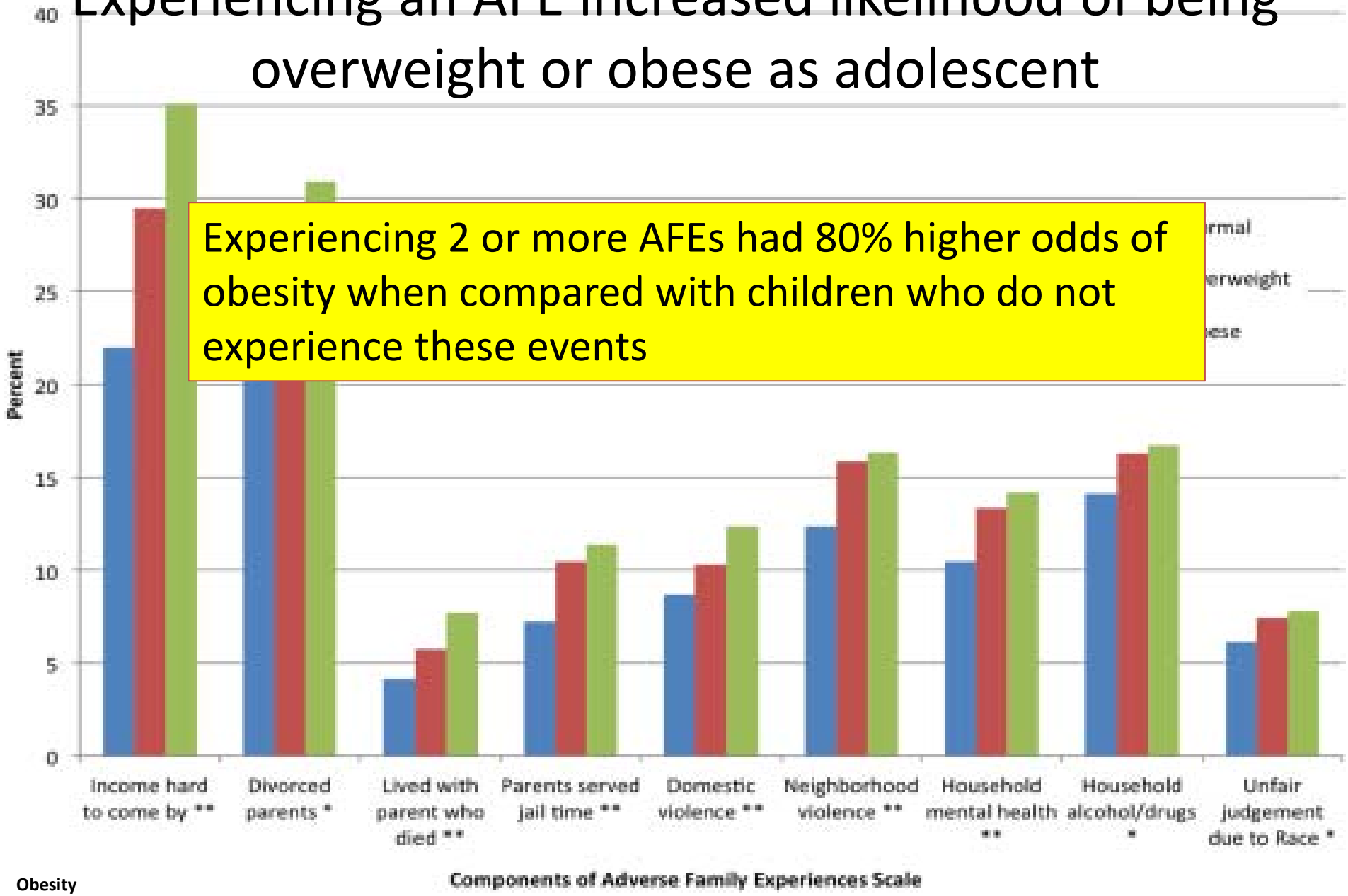
Mother report



Adverse Family Experiences

- National Survey of Children's Health 2011-2012
  - CDC
- Phone survey of US households
  - Subsample with youth ages 10-17 in home
- Parent reported
  - AFE
  - Height/weight
- 42,239 families
  - 68.7% Healthy, 15.6% overweight, 15.7% obese

Experiencing an AFE increased likelihood of being overweight or obese as adolescent



Obesity
Volume 24, Issue 3, pages 696-702, 8 FEB 2016 DOI: 10.1002/oby.21413
http://onlinelibrary.wiley.com/doi/10.1002/oby.21413/full#oby21413-fig-0002

Knowns: Child Maltreatment (CM)

- CM: sexual and/or physical abuse, emotional and/or physical neglect, or emotional abuse
- Strong evidence that CM increases obesity risk
- Adult WLS literature
  - 2 out of 3 adult patients with severe obesity *retrospectively* report some type of CM

TeenView Child Maltreatment

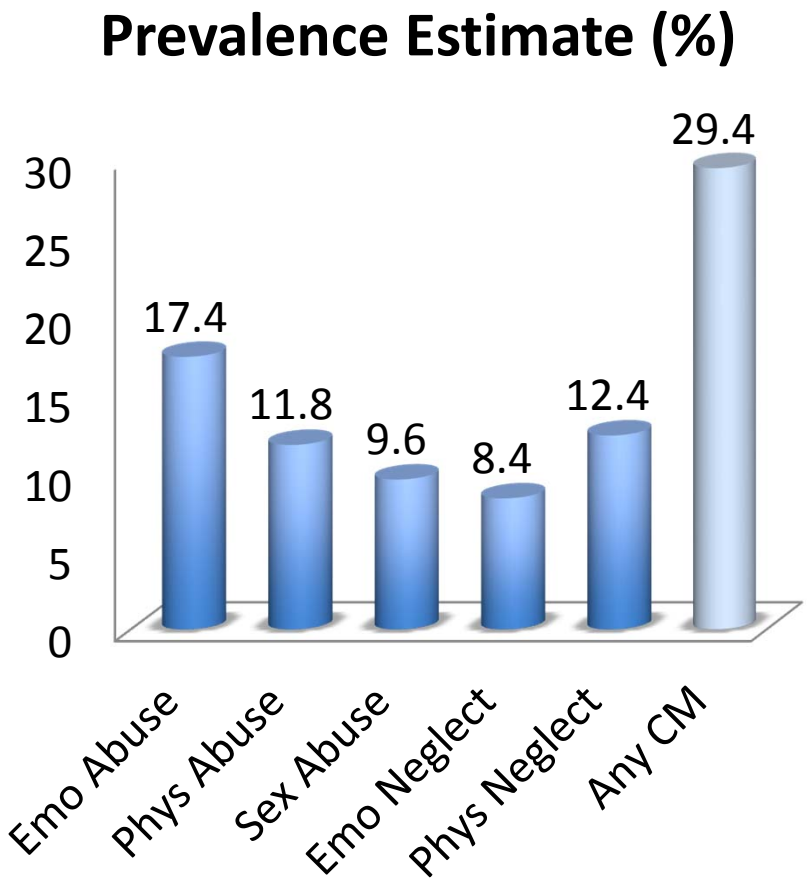
- Rates of CM via Child Trauma Questionnaire
- Correlates of CM
  - Psychopathology
  - Body-esteem
  - WRQOL
  - Risky sexual behaviors
  - Family functioning

Child Maltreatment and the Adolescent Patient With Severe Obesity: Implications for Clinical Care

Meg H. Zeller,[1] PhD, Jennie G. Noll,[1,2] PhD, David B. Sarwer,[3] PhD, Jennifer Reiter-Purtill,[1] PhD, Dana L. Rofey,[4] PhD, Amy E. Baughcum,[5] PhD, James Peugh,[1] PhD, Anita P. Courcoulas,[6] MD, MPH, Marc P. Michalsky,[7] MD, Todd M. Jenkins,[8] PhD, MPH, Jennifer N. Becnel,[1] PhD, and for the TeenView Study Group and in Cooperation With Teen-LABS Consortium

Journal of Pediatric Psychology, 40(7), 2015, 640–648

Adolescent girls with severe obesity: History of child maltreatment



Similar to national base rates

Boys: Any CM=12%

- CM rates were higher in non-surgical group
- Correlates were similar for both cohorts
  - greater psychopathology, substance use, and family dysfunction, and lower quality of life.

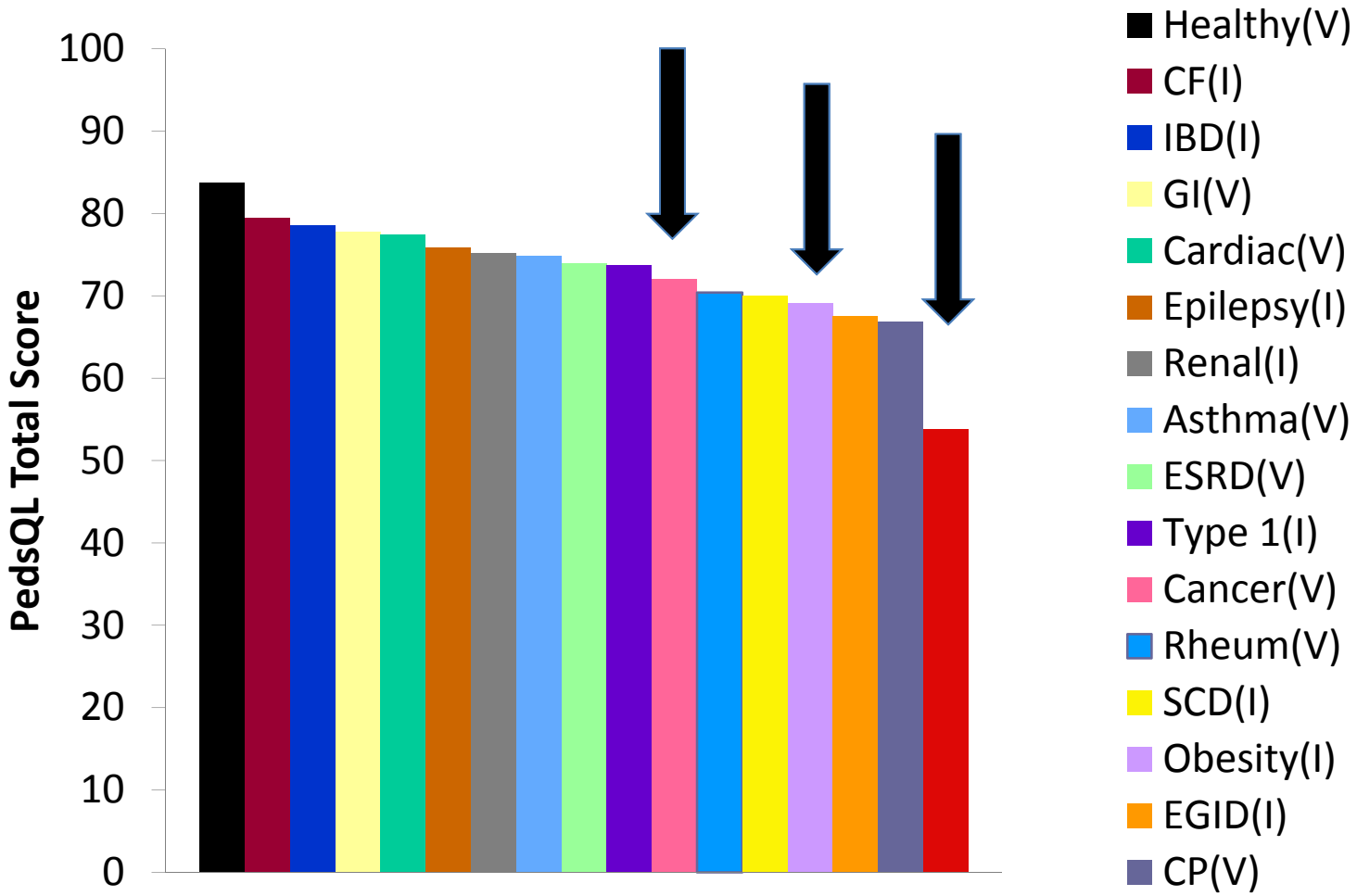
While a minority of adolescents with severe obesity reported a CM history, they carry greater psychosocial burden into the clinical setting.

Journal of Pediatric Psychology, 40(7), 2015, 640–648

Health-Related Quality of Life

- Measures day-to-day functioning
- Comes directly from the patient
- Assesses how a patient feels or functions with respect to his or her health condition
  - Observable behaviors
  - Nonobservable perceptions
- Generic and condition-specific
  - e.g., weight/obesity (“WRQOL”)
- Important patient reported outcome (PRO) to be used as primary or secondary endpoints in clinical trials

HRQOL (PedsQL) across pediatric chronic diseases



V = Varni, Limbers, & Burwinkle, 2007
I = Ingerski et al., 2010
Ext Obese = Zeller et al., 2009

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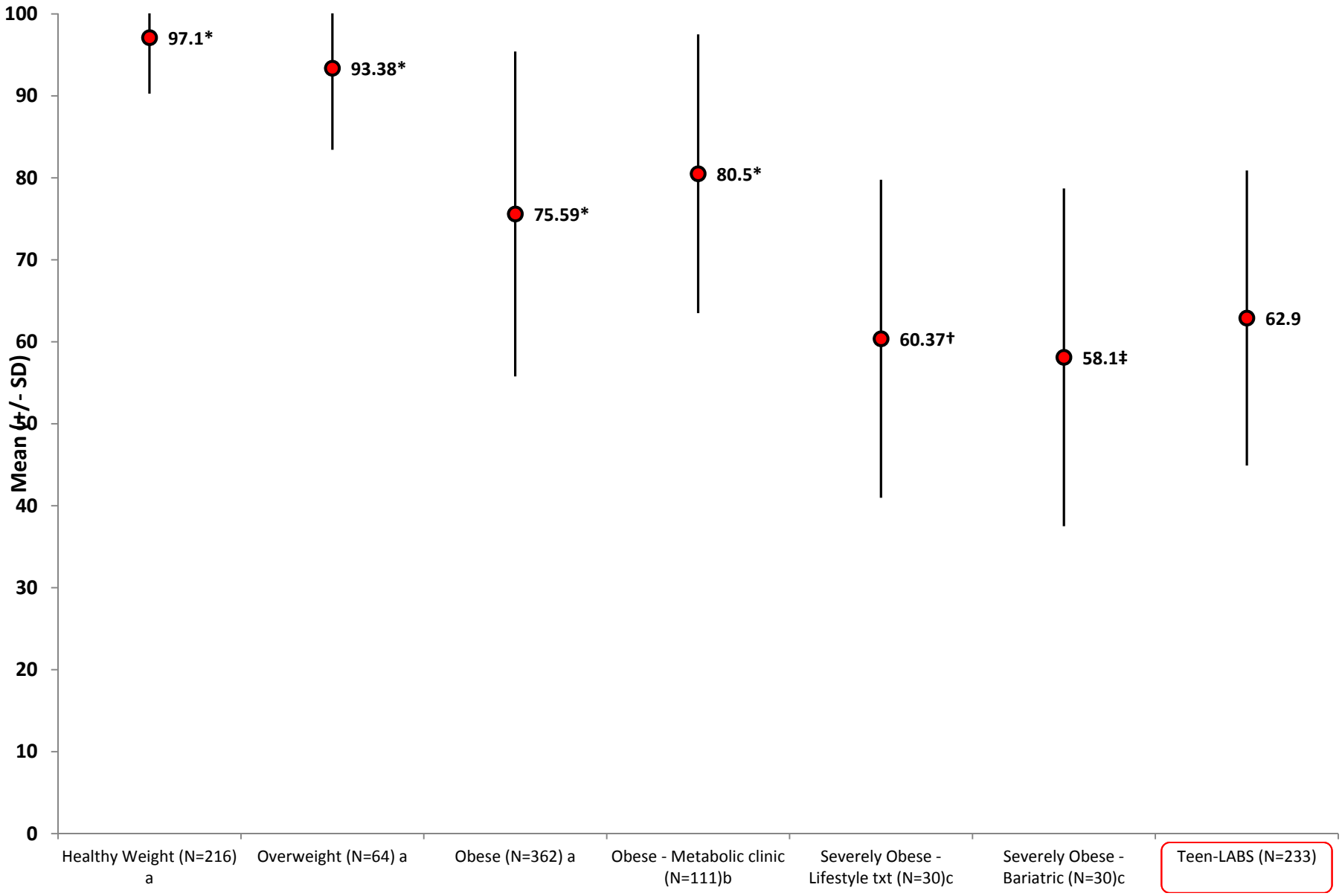
ORIGINAL ARTICLES

Severe Obesity and Comorbid Condition Impact on the Weight-Related Quality of Life of the Adolescent Patient

Meg H. Zeller, PhD[1], Thomas H. Inge, MD, PhD[1], Avani C. Modi, PhD[1], Todd M. Jenkins, PhD[1], Marc P. Michalsky, MD[2], Michael Helmrath, MD[1], Anita Courcoulas, MD, MPH[3], Carroll M. Harmon, MD, PhD[4,5], Dana Rofey, PhD[3], Amy Baughcum, PhD[2], Heather Austin, PhD[4], Karin Price, PhD[6], Stavra A. Xanthakos, MD, MS[1], Mary L. Brandt, MD[6], Mary Horlick, MD[7], and Ralph Buncher, ScD[8], on behalf of the Teen Longitudinal Assessment of Bariatric Surgery (Teen-LABS) Consortium*

- N= 242 Adolescents
  - Mdn BMI = 50.5 kg/m^2
  - Mean age = 17.1 years
  - 75.6% female
  - 71.9% White
  - WRQOL via the IWQOL-Kids

Figure 1. IWQOL-Kids Total scores from published studies of healthy weight, overweight, obese, severely obese, and Teen-LABS adolescents.



Zeller et al., (2015) *J Pediatr*, 166(3), 651–659.e4

THE JOURNAL OF PEDIATRICS • www.jpeds.com ORIGINAL ARTICLES

Severe Obesity and Comorbid Condition Impact on the Weight-Related Quality of Life of the Adolescent Patient

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- N= 242 Adolescents
  - Mdn BMI = 50.5 kg/m^2
  - Mean age = 17.1 years
  - 75.6% female
  - 71.9% White
  - WRQOL
  - Assessment of 16 comorbid conditions prior to WLS
  - Comorbidity Load = estimate of burden
- Prevalence estimates and impact on WRQOL

Teen-LABS participant comorbid condition prevalence by sex

	Total (N=242)	Females (n=183)	Males (n=59)	*p*
Comorbid Conditions [%(n)]				
Dyslipidemia	74.4 (180)	70.5 (129)	86.4 (51)	0.01
Joint or Back Pain	58.3 (141)	57.9 (106)	59.3 (35)	0.85
Obstructive Sleep Apnea	56.6 (137)	49.7 (91)	78.0 (46)	<0.01
Hypertension	45.0 (109)	38.8 (71)	64.4 (38)	<0.01
Menstrual Irregularities/PCOS	43.2 (79)	43.2 (79)	*NA*	*NA*
Fatty Liver Disease[b]	36.9 (89)	35.5 (65)	41.4 (24)	0.42
Chronic Kidney Disease (any stage)[c]	19.2 (43)	20.8 (35)	14.3 (8)	0.28
Binge Eating Disorder[d]	15.4 (36)	15.8 (28)	14.0 (8)	0.75
GERD[b]	14.5 (35)	14.2 (26)	15.5 (9)	0.81
Stress Urinary Incontinence[b]	14.5 (35)	16.9 (31)	6.9 (4)	0.06
Depression[e]	14.0 (32)	16.3 (28)	7.1 (4)	0.09
Diabetes	13.6 (33)	12.6 (23)	17.0 (10)	0.39
Asthma	9.5 (23)	7.1 (13)	17.0 (10)	0.02
Blount's Disease	3.7 (9)	2.2 (4)	8.5 (5)	0.04
Pseudotumor Cerebri	2.5 (6)	2.2 (4)	3.4 (2)	0.64
Cholelithiasis	1.2 (3)	1.1 (2)	1.7 (1)	0.57
Comorbidity Load		3.9 (range 1-9)	4.3 (range 1-8)	0.01

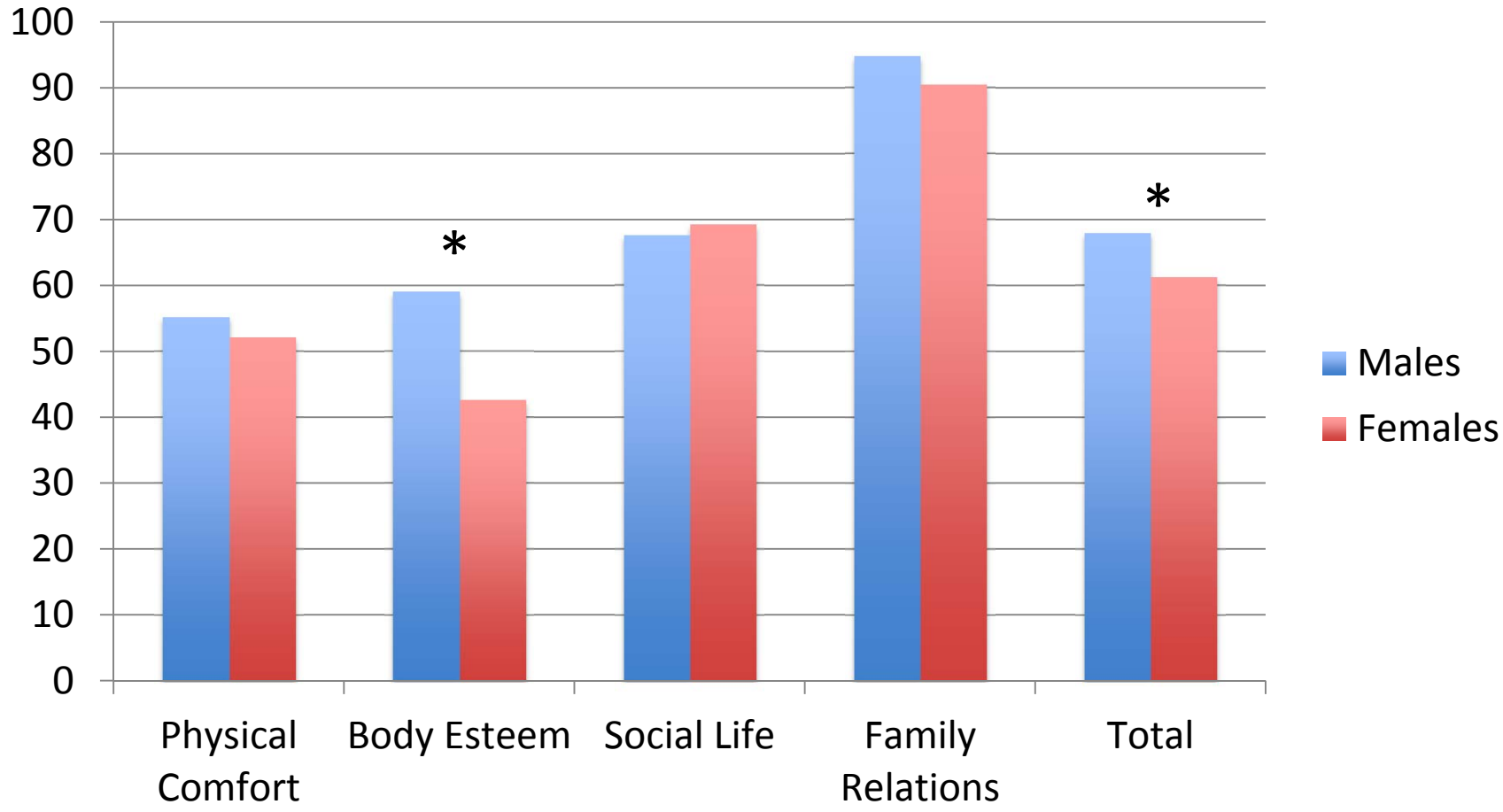
PCOS= Polycystic Ovary Syndrome, GERD = Gastroesophageal Reflux Disorder. [a] N=11 missing. [b] N=1 missing. [c] N=18 missing. [d] N=8 missing. [e] N=14 missing with clinical range based on Beck Depression Inventory-II total raw score ≥ 17.

Zeller et al., (2015) *J Pediatr*, 166(3), 651–659.e4

Summary: Comorbidity Impact on WRQOL

- Males vs. females
  - Males had higher BMI and comorbidity burden but less perceived burden on their WRQOL

Weight-Related QOL Prior to Surgery



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Summary: Comorbidity Impact on WRQOL

- Dose response (even within severe obesity)
  - Higher BMI was associated with greater Total impairment and weight-related physical discomfort
- Strongest predictors of WRQOL impairment:
  - Males: When comorbidities “add up” (Cload), depression, chronic pain, BMI
  - Females: Psychosocial health – depression, BED, BMI

What is the psychological impact of living with severe obesity?

IT DEPENDS ON WHO YOU ASK AND MAYBE, WHAT YOU ASK….

Be wary of assumptions #1

Not all youth of severe excess weight manage significant psychosocial challenges, including:

- Internalizing symptoms/depression
- Social difficulties/Peer victimization
- Lower self-worth
- History of child maltreatment
- Family dysfunction

Clinical subgroups with greater risk exist and risks cluster together

Be wary of assumptions #2

Even youth with severe excess weight engage in high risk behaviors

- Prevention and monitoring use of
  - Alcohol use normative (not benign)
  - Tobacco & illicit substances problematic
- Girls – risky sexual behaviors

MAKE TIME FOR CONVERSATIONS IN ROUTINE CARE

Clinical Implications

Burden is additive for any child – excess weight may be just one of many "rocks" they carry around

THOROUGH ASSESSMENT AND BE PRIMED WITH ADJUNCTIVE CARE REFERRALS

Clinical Implications

IDEA TO START WITH:

“So how do you think your weight impacts your life?”

OR to a parent

“How do you think your child/adolescent’s weight impacts their life?”

Clinical Implications

- Parents typically initiate treatment and bring to all appointments
- Domains of HRQOL capture concerns of what prompts seeking care
  - Child/adolescent's well-being versus a BMI value
- Allows provider/caregiver/pediatric patient to speak the same language
- Asking patient and family "how do you think weight impacts your child/adolescent's day-to-day life" is a salient and more neutral opening to discussing weight and need for intervention

Clinical Implications

- For patients doing well
  - Support and foster the influences contributing to these strengths
  - focus care on other issues of importance to the patient
    - Ex. Improvement in medical comorbidities may be of greater concern for males
- For adolescents experiencing greater issues
  - Cognitive behavioral therapy
  - Family interventions
  - Encourage to engage in activities (e.g., volunteering) that provide opportunities for building social support and increasing self-worth not tied to weight management or body esteem

Caveat: Bariatric Surgery

- Adolescents undergoing bariatric surgery may be a unique clinical group (*United States*)
- Must navigate a complex system
  - Their own/parent motivation
  - Physician referral and support
  - Clinical team approval
  - Insurance approval
- Adolescents managing greater psychosocial burden may not be seeking surgery, not being referred, drop out, or are not being approved to proceed to surgery

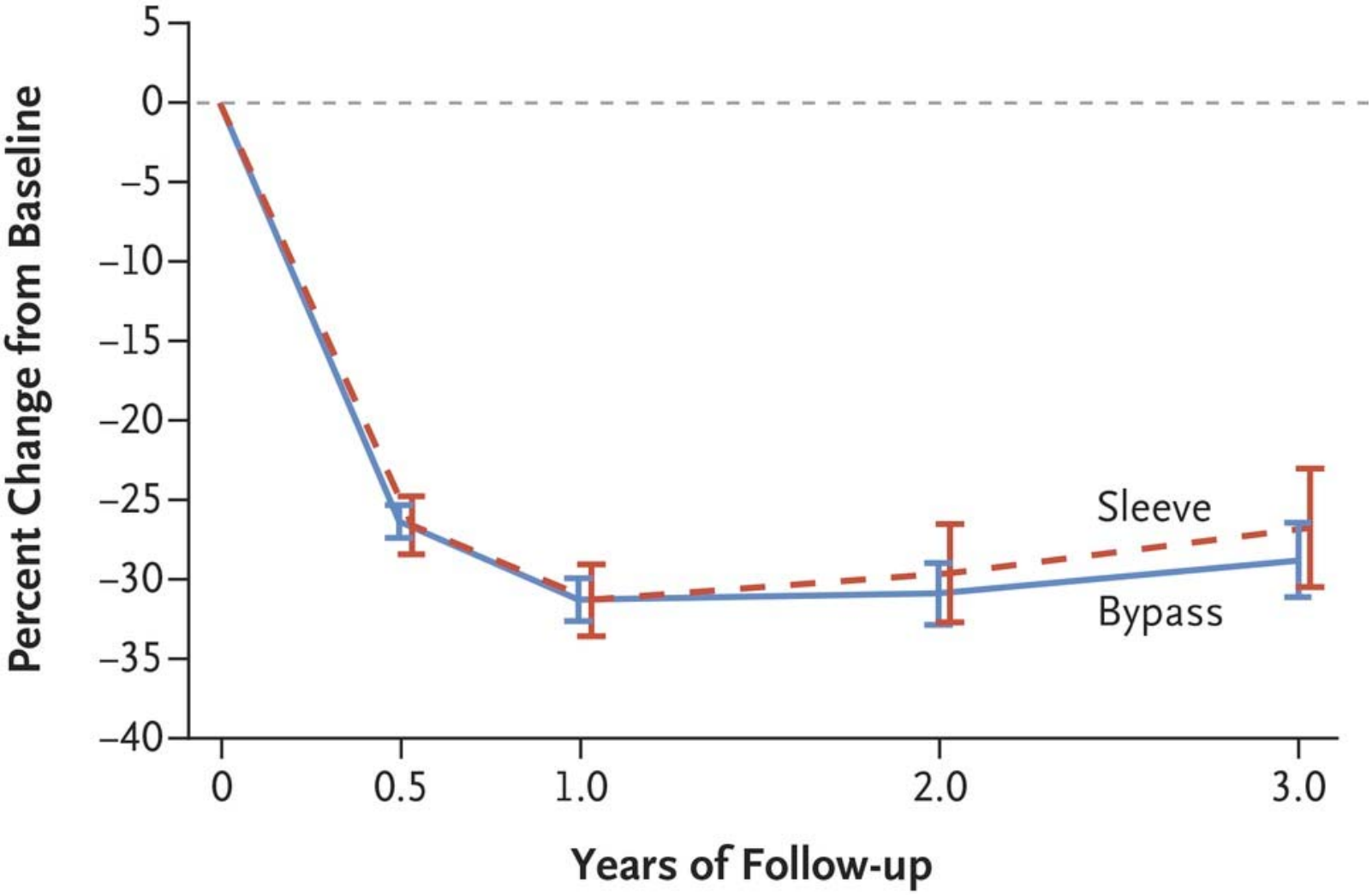
The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 JANUARY 14, 2016 VOL. 374 NO. 2

Weight Loss and Health Status 3 Years after Bariatric Surgery in Adolescents

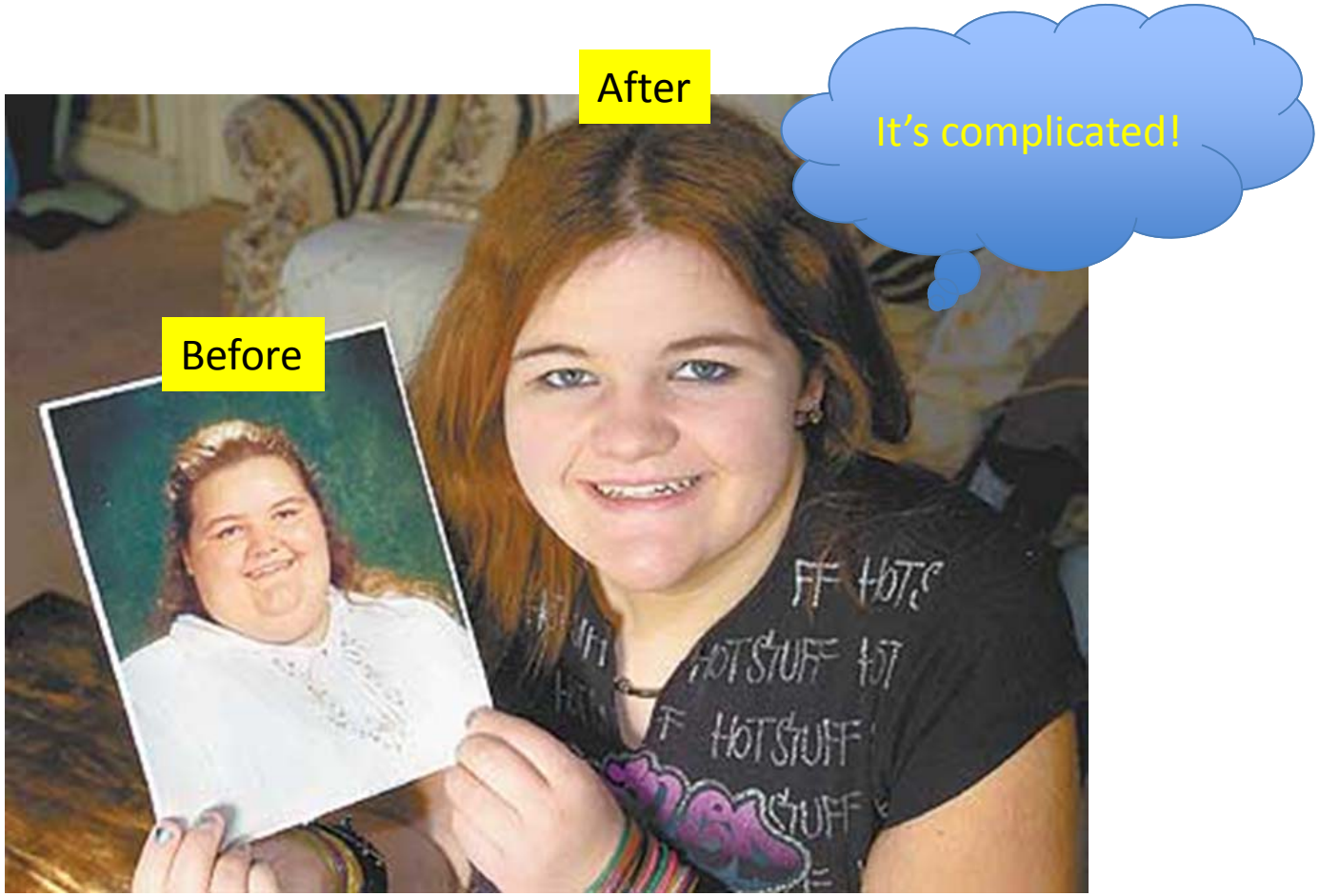
Thomas H. Inge, M.D., Ph.D., Anita P. Courcoulas, M.D., Todd M. Jenkins, Ph.D., Marc P. Michalsky, M.D., Michael A. Helmrath, M.D., Mary L. Brandt, M.D., Carroll M. Harmon, M.D., Ph.D., Meg H. Zeller, Ph.D., Mike K. Chen, M.D., Stavra A. Xanthakos, M.D., Mary Horlick, M.D., and C. Ralph Buncher, Sc.D., for the Teen-LABS Consortium*

A Weight Change from Baseline



No. of Participants					
Bypass	161	140	140	137	131
Sleeve	67	56	61	58	52

How does a teen navigate the transition to young adulthood in this context?



Ongoing work

- Fewer rocks = better weight loss outcomes?
- More rocks = poorer weight loss outcomes?
- Does burden lead to a critical secondary outcome
  - ex. Substance use disorder, suicide

Of greater concern are those without intervention, who seem at greater psychosocial risk, and will be carrying this burden into adulthood.

Thank you! Questions?

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