Childhood Obesity

Gilbert Lam
PGY-3 Pediatrics Resident, CHEO

December 2, 2016 - Telehealth Rounds

Supervisor:
Dr. Stasia Hadjiyannakis

Objectives

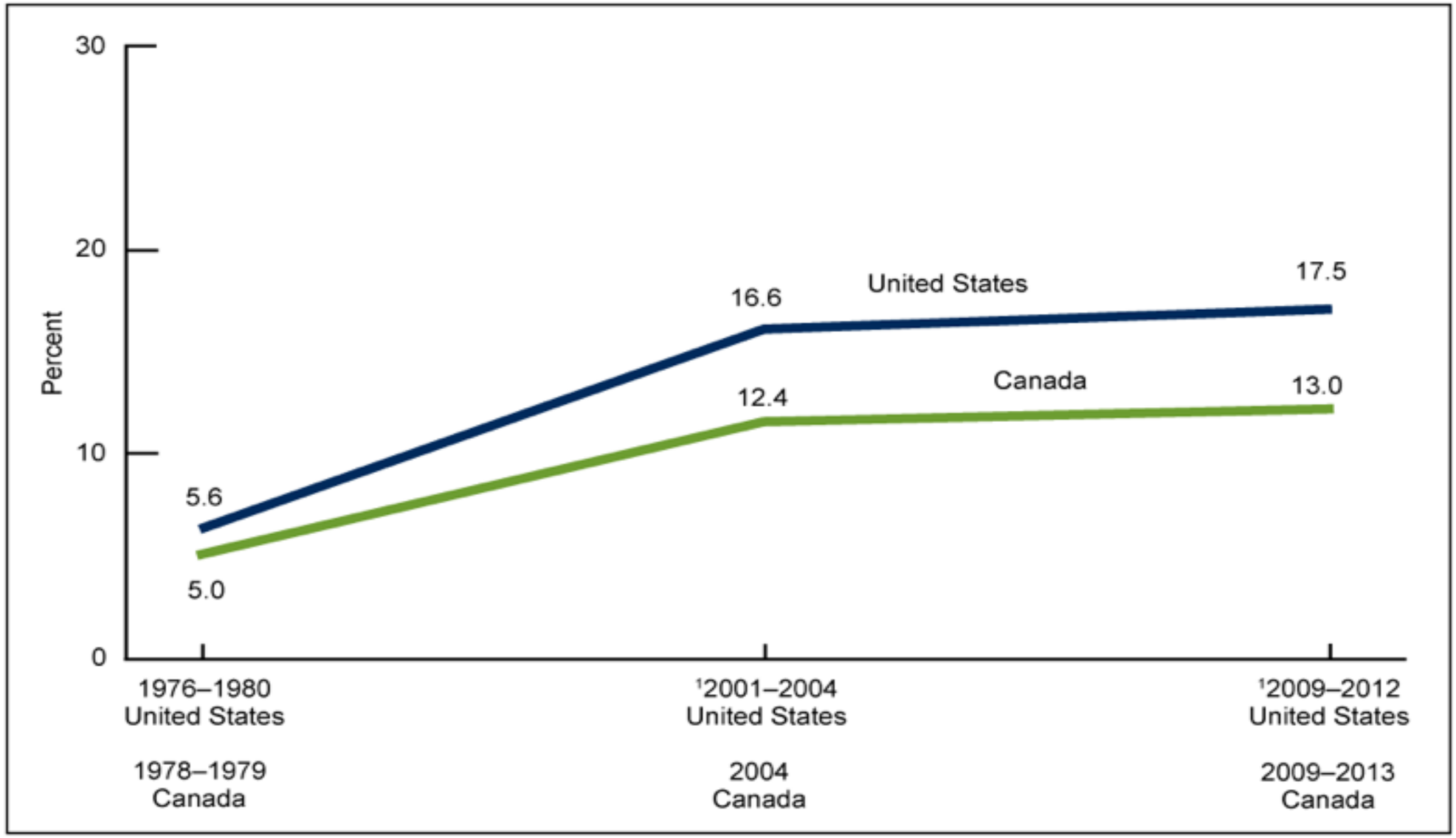
- To understand the complexity of childhood obesity from a biopsychosocial framework, including:
  - drivers of weight gain
  - complications of obesity
  - barriers to weight management
- To highlight differences between childhood and adult obesity
- To understand the resources available for weight management, including those specific to the Ottawa area

Outline

- Current trends in epidemiology
- Differences between childhood and adult obesity
- Obesity-specific history and physical exam
- Comorbidities & Staging
- Management strategies
- Resources

Trends in Prevalence

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.

Non-modifiable risk factors

- Genetics: 50-90% of obesity is genetically determined
- Prenatal risk factors
  - maternal diabetes, smoking
  - maternal weight at beginning of pregnancy, and weight gain
  - birth weight

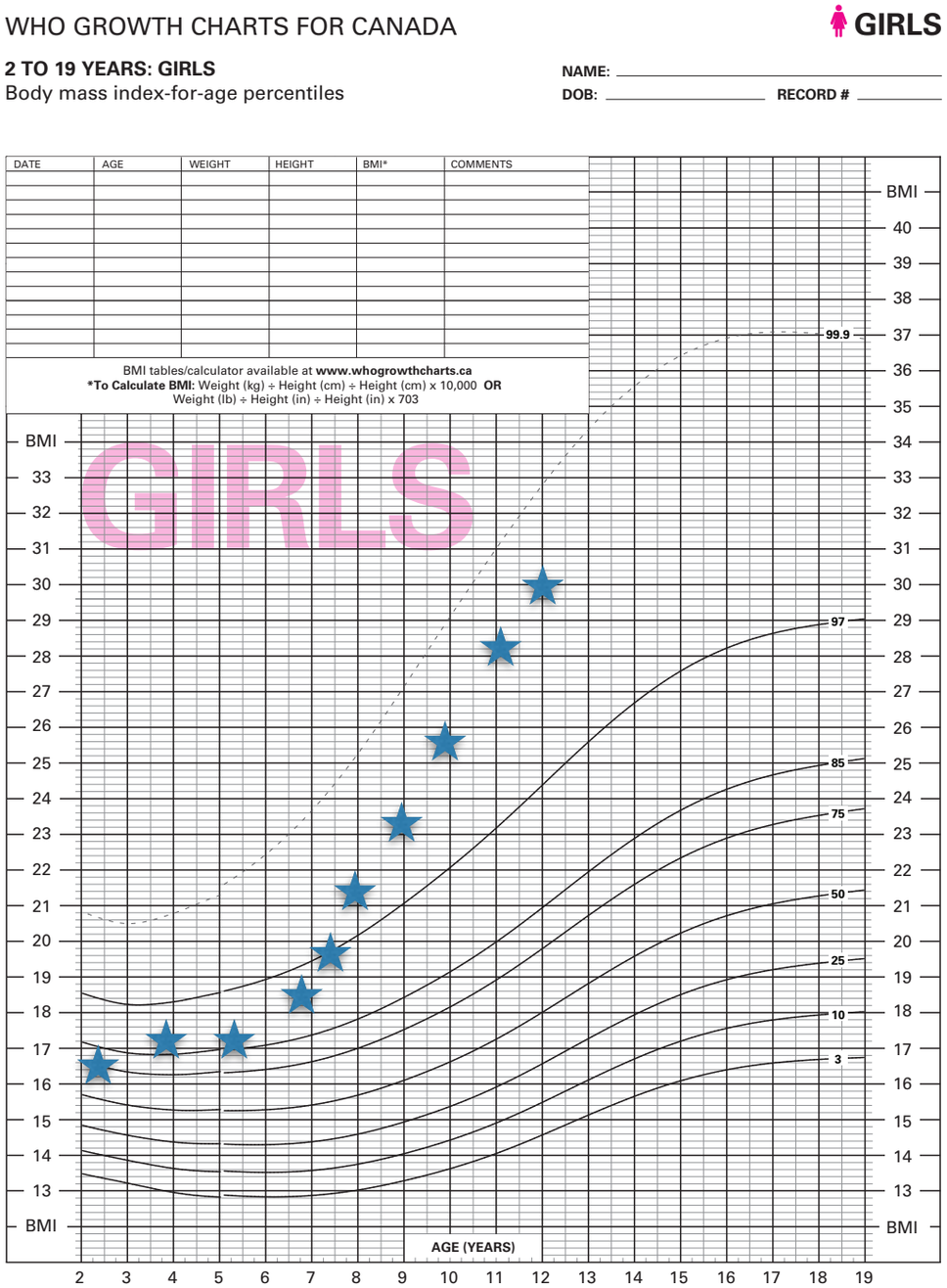
Fast-food fan Trump could remake healthy school lunches

MARY CLARE JALONICK / THE ASSOCIATED PRESS
NOVEMBER 15, 2016 11:01 AM

Like 0

Definitions as per BMI

- CDC: >95th percentile
- WHO: >97th percentile



SOURCE: Based on World Health Organization (WHO) Child Growth Standards (2006) and WHO Reference (2007) and adapted for Canada by Canadian Paediatric Society, Canadian Pediatric Endocrine Group, College of Family Physicians of Canada, Community Health Nurses of Canada and Dietitians of Canada.

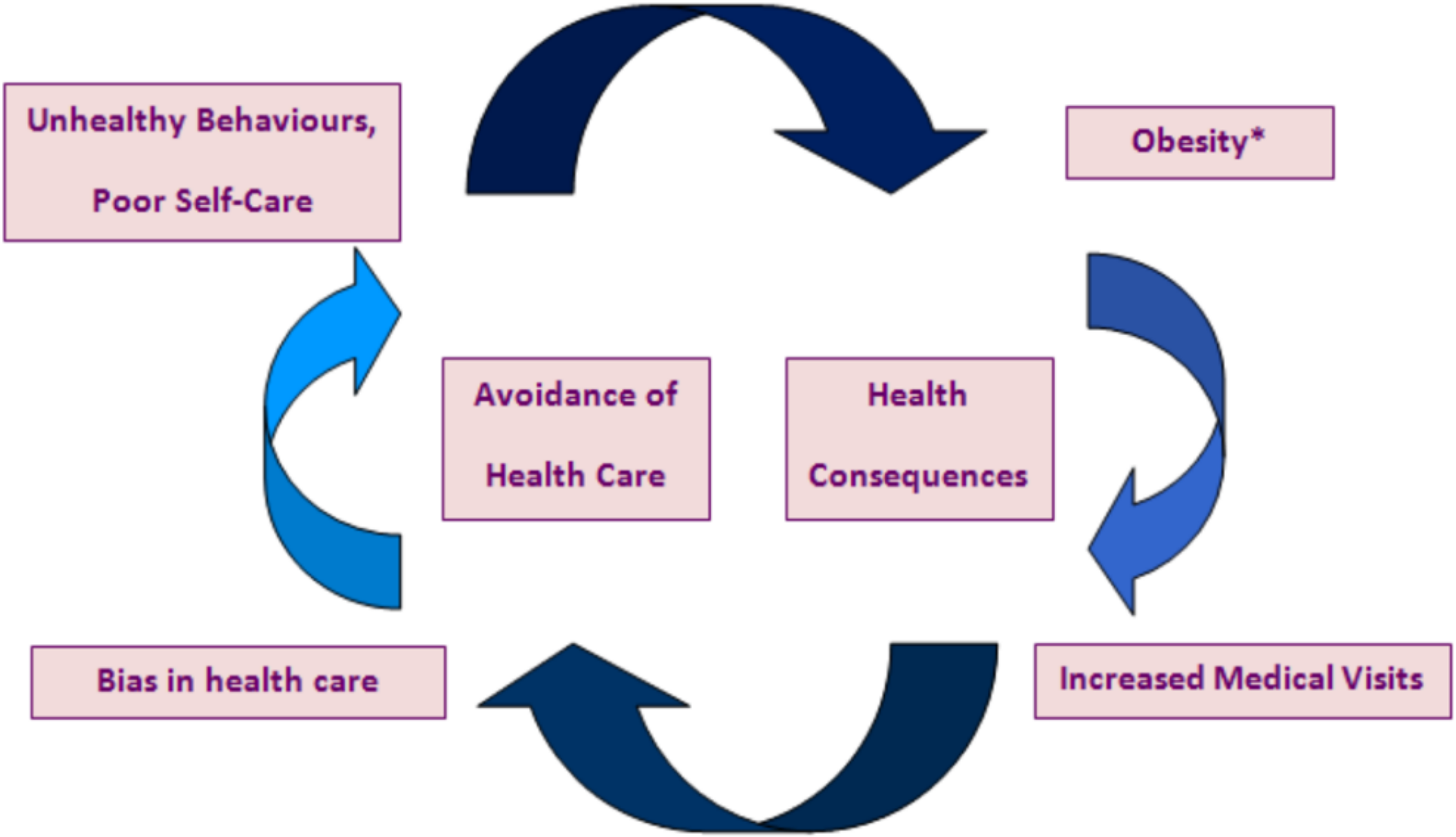
© Dietitians of Canada, 2014. Chart may be reproduced in its entirety (i.e., no changes) for non-commercial purposes only. www.whogrowthcharts.ca

Obesity is not...

- a sensitive indicator of health, or health behaviours
- a character flaw
- a lack of will power

Why the physician is important

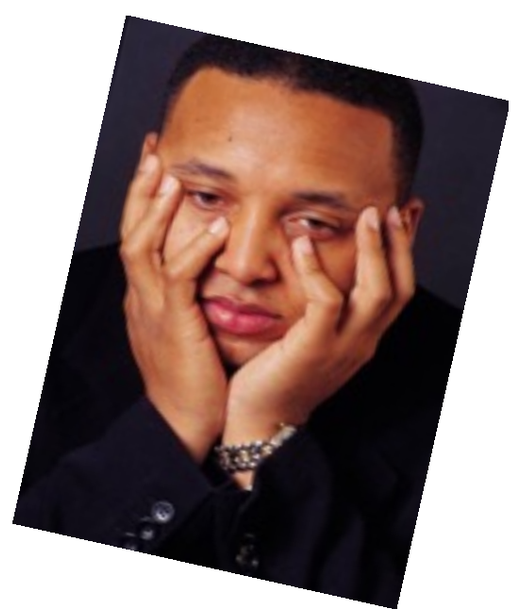
- Persons who reported receiving advice to lose weight were significantly more likely to report trying to lose weight than those who did not Galuska et al. JAMA. 1999.
- Overweight/obese parents endorsed the physician's office more frequently than the normal-weight parents
- 2/3 of parents in a primary care practice felt the physician's office was the best place to address weight concerns Eneli et al. Clinical Pediatrics. 2007.


Unhealthy Behaviours,
Poor Self-Care
Obesity*
Avoidance of
Health Care
Health
Consequences
Bias in health care
Increased Medical Visits

A weight-obsessed world

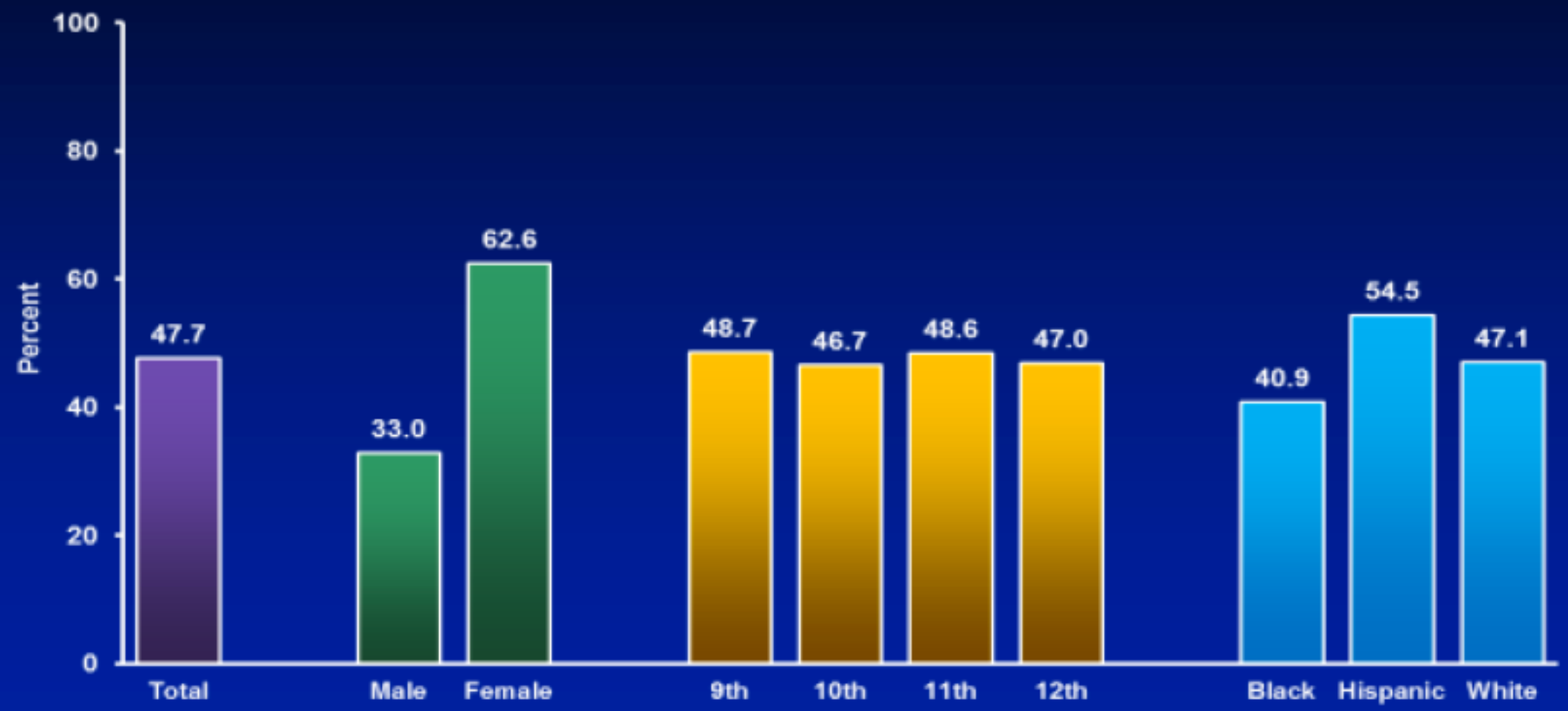
Body Image in Adolescents

- 40-50% of girls aged 11-15 say they need to lose weight
- 60% of grade 7-8 students try to lose weight
- Dissatisfaction with their body: 40-60% of adolescent girls / 25% of adolescent boys



Jones et al. 2001.

Percentage of High School Students Who Were Trying to Lose Weight, by Sex, Grade, and Race/Ethnicity, 2013

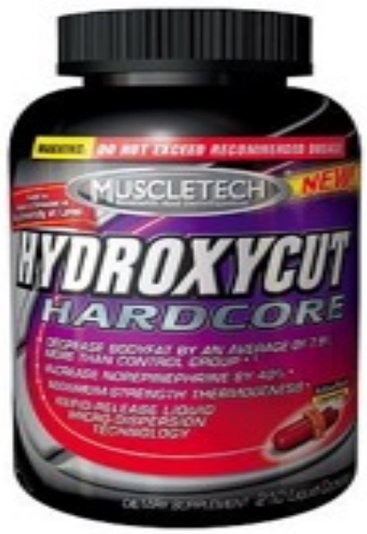


*F > M; H > B, H > W, W > B (Based on t-test analysis, $p < 0.05$.)
Black and White races are non-Hispanic.

National Youth Risk Behavior Survey, 2013

THIN, THIN, THIN

MUSCLE, MUSCLE, MUSCLE



Bullying

- 40% of youth report obesity is the primary reason why peers are bullied
- ~30% of overweight boys/girls experience weight focused per victimization
- Even at home: 34-47% of overweight boys/girls report being teased by their parents about their weight

Puhl RM et al, J Sch Health (2011) Puhl RM et al, Psych Bull (2007)

In the news

Google

childhood obesity

All | Images | **News** | Videos | Books | More | Search tools

About 163,000 results (0.50 seconds)

Scientists list three 'strong predictors' for **childhood obesity**
Globalnews.ca - 8 hours ago
Parents may be worried about lack of exercise or poor nutrition, but new research suggests lifestyle factors such as an irregular sleep routine ...

Sleep issues, skipping breakfast strong predictors of **childhood** ...
CTV News - Nov 14, 2016
Early lifestyle factors such as eating breakfast and getting enough sleep in **childhood** could predict whether or not a **child** will become **obese** ...

Study Reveals Smoking During Pregnancy Can Lead To **Childhood** ...
Highly Cited - Parent Herald - Nov 13, 2016

View all

Childhood obesity linked to irregular sleep and skipping breakfast
The Guardian - Nov 10, 2016
The study, led by academics from University College London, challenges the widely-held view that soaring **childhood obesity** rates are caused ...

Impact of weight

- low body satisfaction
- low self esteem
- high depressive symptoms
- poor self-perception of physical appearance
- disordered eating
- isolation/withdrawal
- poor academic outcomes
- school absences
- poor peer relationships

Weight Bias

- Providers view obese patients as:
  - lazy, noncompliant, weak-willed, unsuccessful, unintelligent, dishonest, etc.

Puhl, R. (2013). Obesity Stigma: Implications for Patients and Providers. http://www.yaleruddcenter.org

Effective Weight Management Programs

- Moderate to High intensity with child/family:
  - >25 hours of contact over 6 months
- Long term follow up
- Parental involvement

Realistic expectations: the expected change in BMI

	Lifestyle	Medication	Surgery
Δ BMI (kg/m2)	-1.9-3.3	-0.85 (orlistat) -0.9 to 1.8 (metformin)	-8.5

- ~75 hours of physician contact over 6-12 months

Stress & Obesity

- Perceived stress is associated with emotional eating in both obese and non-obese children
- Perceived stress in parents was associated with fast food consumption children
- Family function and parental distress were related to fruit and vegetable consumption

Nguyen-Rodriguez et al. Eating Disorders 2008. / Parks et al. Pediatrics. 2002. / Renzaho AM. Health Prom Int. 2011.

Screen Time & Obesity

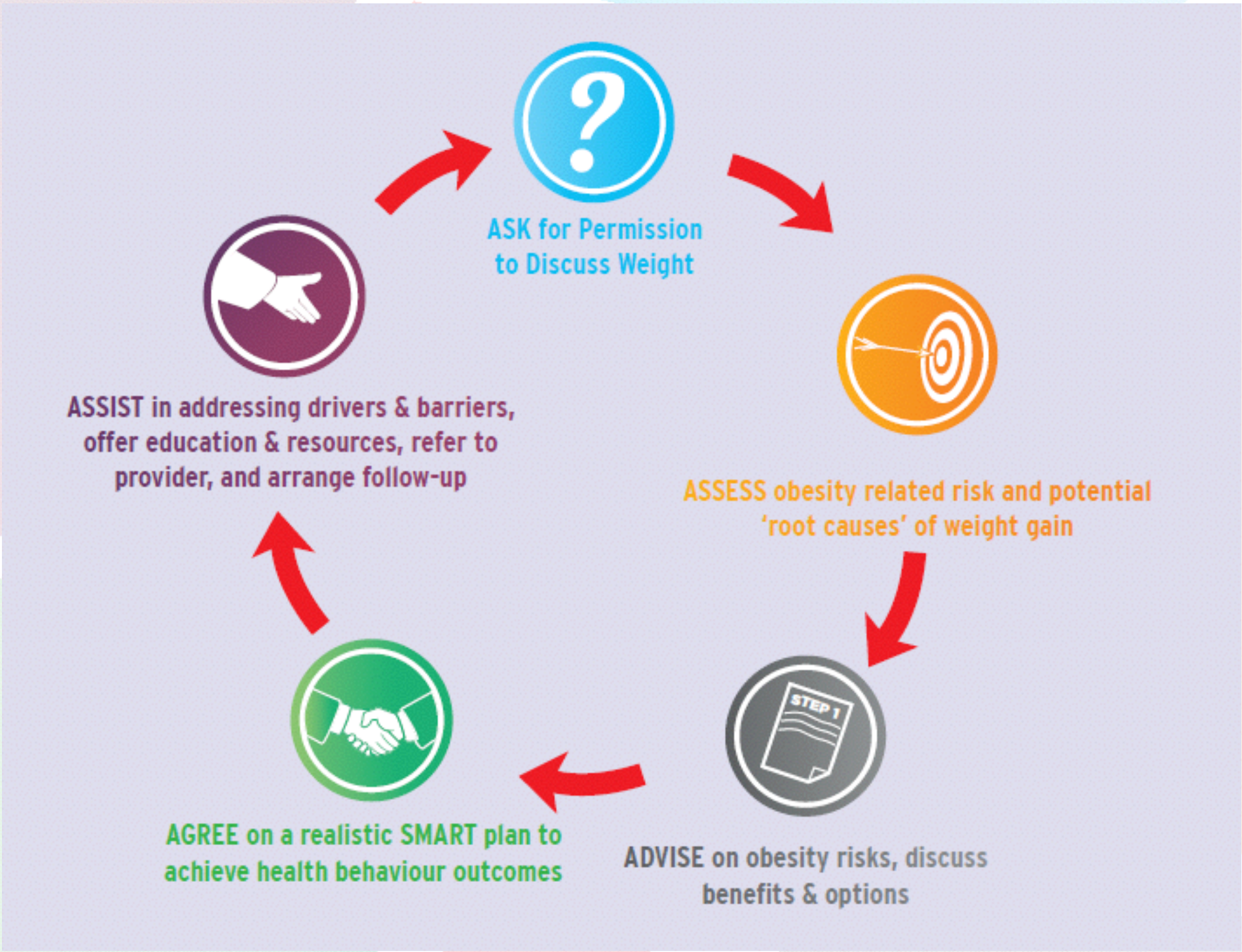
- In 2 year olds, risk increases for every hour per week of media
- Total hours increases risk of obesity
- TV in bedroom increases risk
- Studies to decrease screen time resulted in lower BMIs
- Effects on sedentariness, mindless eating, weight bias, body image, sleep

CHEO

uOttawa

Key Principles

- Weight management success should not be focused on weight itself, but rather: change in health behaviours improvement in overall health, how you eat/move/cope
- Weight bias can be a barrier to weight management
- Interventions should include addressing root causes of obesity and removing roadblocks
- Success is different for every child and family
- A child's best BMI may never be their ideal BMI


ASK for Permission to Discuss Weight
ASSESS obesity related risk and potential 'root causes' of weight gain
STEP 1
ADVISE on obesity risks, discuss benefits & options
AGREE on a realistic SMART plan to achieve health behaviour outcomes
ASSIST in addressing drivers & barriers, offer education & resources, refer to provider, and arrange follow-up

ASK for permission to discuss weight

Weight is a sensitive issue. Many patients are embarrassed or fear blame and stigma.

ASK - for permission

- Is the diagnosis and conversation a surprise/blindside?
- Why don't we ask?
  - Obesity management in medical education?
- When and how should we ask?
  - Are you concerned about your child's health/weight?
  - Would it be alright if we discussed your child's weight?
- Creating a weight-friendly practice
  - i.e. reading materials in waiting room; appropriately sized gowns

ASSESS obesity related risk and potential 'root causes' of weight gain

The 4Ms of Pediatric Obesity

Mental

- Anxiety
- Depression
- Body image
- ADHD
- Learning disorder
- Sleep disorder
- Eating disorder
- Trauma

Mechanical

- Sleep apnea
- MSK pain
- Reflux disease
- Enuresis
- Encopresis
- Intertrigo

Metabolic

- IGT/T2DM
- Dyslipidemia
- Hypertension
- Fatty liver
- Gallstones
- PCOS
- Medication
- Genetics

Milieu

- Parent health/disability
- Family stressors
- Family income
- Bullying/Stigma
- School attendance
- School support
- Neighbourhood safety
- Medical insurance
- Accessible facilities
- Food Environment
- Opportunities for physical activity

Consider the rest of the dDx

- Low growth velocity (endocrine)
- Dysmorphic features; developmental delay (genetic syndrome)
- Onset before 6 months of age (monogenic)
- Brain tumours (hypothalmic obesity)

Obesity-specific ROS

Symptoms	Probable causes
Snoring/sleep disturbances	Obstructive sleep apnea
Abdominal pain	GERD, constipation, gall bladder disease, NAFLD
Menstrual irregularities	Polycystic ovary syndrome/Prader-Willi syndrome
Hip, Knee, Leg pain	SCFE
Foot Pain	Musculoskeletal stress from weight
Polyuria/Polydipsia	Type 2 DM
Anxiety, school avoidance, social isolation	Depression
Severe recurrent headaches	Pseudotumor cerebri
Shortness of breath	Asthma

Obesity-specific Physical

Findings	Possible Explanations
Elevated Blood Pressure (correct cuff)	Hypertension on 3 or more occasions
Short Stature	Underlying endocrine conditions
Acanthosis nigricans	Increased risk of insulin resistance
Acne, Hirsutism	Polycystic ovary syndrome
Skin irritation, inflammation	Intertrigo
Papilledema, cranial nerve VI paralysis	Pseudotumor cerebri
Tonsillar hypertrophy	Obstructive sleep apnea
Goiter	Hypothryroidism
Wheezing	Asthma
Tender Abdomen	GERD, gallbladder disease, NAFLD
Abnormal gait, limited hip range	SCFE
Bowing of tibia	Blount disease
Small hands and feet, polydactyly	Some genetic syndromes
Reproductive (Tanner stage, apparent micropenis, undescended testes)	Premature puberty, may be normal penis buried in fat, Prader-Willi syndrome

Screening for T2DM

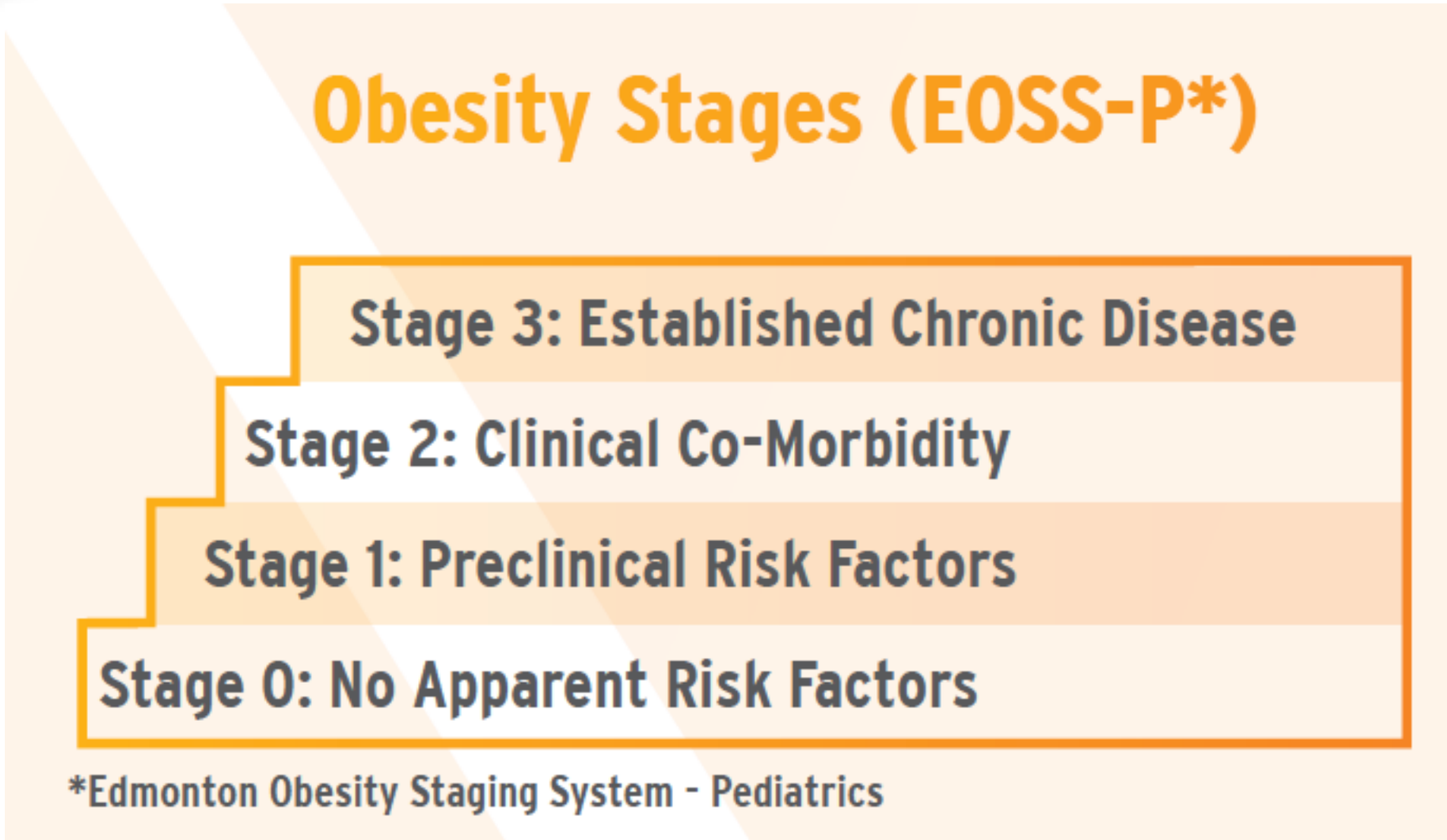
- Who
  - BMI >85th percentile and two of the following
    - FHx T2DM in 1st or 2nd degree relative
    - signs of insulin resistance or conditions associated with insulin resistance (acanthosis nigricans, HTN, PCOS)
    - Race: African, First Nations, Asian, Latino
- When
  - every two years starting at 10 years, or puberty

Other screening studies

- Fasting lipid profile at 10 years or onset of puberty
  - or at 2 years if family history of dyslipidemia
- BP —> workup if high
- ALT, AST (after age 10) —> ultrasound if high for >6 months
- Sleep study if symptomatic
- Hip/knee X rays if symptomatic
- Hormone profile for adolescent females with PCOS symptoms
- Fundoscopy - routine for pseudotumour cerebri

New Staging: EOSS-P

- Edmonton Obesity Staging System for Pediatrics
- Published in 2016 - Pediatrics & Child Health
- Adult version provides prognostic information for higher stages predicting increased risk of all-cause mortality
- Unlike the adult version, incorporates “social milieu” as an important aspect of the assessment



Goals:

- Stage 0: prevent progression of disease
- Stage 1-3: prevent progression and reverse modifiable risk factors

EOSS-P: Edmonton Obesity Staging System – Pediatrics Staging Tool

Stage 0

- ***Metabolic***: No metabolic abnormalities
- ***Mechanical:*** No functional limitations
- ***Mental:*** No psychopathology
- ***Milieu:*** No parental, familial or social environment concerns

Stage 1

- ***Metabolic***: Mild metabolic abnormalities (i.e. IGT, pre-hypertension, mild lipid abnormalities, mild fatty infiltration of liver/elevation in transaminases)
- ***Mechanical:*** Mild bio-mechanical complications (i.e. OSA not requiring PAP therapy, mild MSK pain not interfering with ADL, GERD)
- ***Mental:*** Mild psychopathology, ADHD, LD, mild body image pre-occupation, occasional emotional/binge eating, bullying, mild developmental delay
- ***Milieu:*** Minor problems in relationships, minor limitations in caregivers ability to support child's needs

Stage 2

- ***Metabolic***: Moderate metabolic complications requiring pharmacotherapy (i.e. Type 2 Diabetes, Hypertension, lipid abnormalities, PCOS, moderate to severe fatty infiltration of liver)
- ***Mechanical:*** Moderate bio-mechanical complications (i.e. OSA requiring PAP therapy, GERD, MSK pain limiting activity, moderate limitations in ADLs)
- ***Mental:*** Moderate mental health issues (i.e. major depression, anxiety, frequent binging, significant body image disturbance, moderate developmental delay)
- ***Milieu:*** Moderate problems in relationships, significant bullying at home or at school, significant limitations in caregivers ability to support child's needs

Stage 3

- ***Metabolic***: Uncontrolled metabolic complications (i.e. T2DM (+ complications/ not meeting glycemic targets), uncontrolled hypertension, FSGS, markedly elevated liver enzymes and/or liver dysfunction, symptomatic gall stones, marked lipid abnormalities)
- ***Mechanical:*** OSA requiring PAP therapy and suppl. oxygen, limited mobility, shortness of breath sitting/sleeping
- ***Mental:*** Uncontrolled psychopathology, school refusal, daily binge eating, severe body image disturbance
- ***Milieu:*** Severe problems in relationships, caregivers unable to support child's needs (may include exposure to family violence), dangerous environment (home, neighbourhood or school)

ADVISE on obesity risks, discuss benefits & options

Advise on Family-Based Management Options

- Sleep
- Sedentary Behaviour
- Eating Behaviours
- Mental Health
- Physical Activity
- Bariatric Surgery

Sleep	• management interventions can significantly improve eating and activity behaviours as well as mood and school performance.
Eating Behaviours	• should focus on eating & drinking hygiene. Extreme and “fad” diets are not sustainable in the long-term.
Physical Activity	• interventions should aim at reducing sedentariness and increasing daily physical activity levels to promote fitness, overall health, and general well-being , rather than focusing on “burning calories”.

Sedentary Behaviour	• should be limited through minimizing recreational screen time to less than 2 hours per day, choosing active transportation over motorized, and increasing active play and active family time.
Mental Health	• treatment referrals to help manage underlying /co-morbid psychological issues • interventions can improve body-esteem, self-esteem, reduce emotional eating, and promote coping strategies.
Bariatric Surgery	• may be considered for adolescents who've reached their final adult height, with BMI>40, and with obesity related health complications. Candidates & their families are required to have completed a multidisciplinary 6-month presurgical intervention.

AGREE on a realistic SMART plan to achieve health behaviour outcomes

Agree on Sustainable Behavioural Goals

Focus on sustainable behavioural changes rather than on specific weight targets.

Behavioural goals should be SMART:

- **S**pecific
- **M**easurable
- **A**chievable
- **R**ewarding
- **T**imely

CHEO

uOttawa

ASSIST in addressing drivers & barriers, offer education & resources, refer to provider, and arrange follow-up

Ability to improve:

- Lipid profile
- Blood pressure
- Insulin sensitivity
- Apnea/hypopnea index in those youth with established sleep disordered breathing
- Quality of Life measure (using PedsQL)
- Decreased dependence on pharmacotherapeutic and technological support;
- Improved physical activity and sedentary behaviour profile
- Improved indicators of cardiorespiratory and musculoskeletal fitness (measured by objective exercise and fitness testing);

Referrals

- Physicians
  - Endocrinology (T2DM, PCOS)
  - Neurology (pseudotumour cerebri)
  - Orthopaedics (SCFE, tibia vara)
  - GI (elevated liver enzymes; fatty liver)
- Dietitian
- Psychologist
- Social worker
- OT/PT
- Surgery
- CHAL

CHAL
Referral criteria

For children and youth, 5-16 years of age, with complex severe obesity which is defined as:

1. BMI > 99th% or
2. BMI > 95th% with associated severe medical or psychosocial co-morbidity or chronic illness impacted by obesity:

- Hypertension requiring pharmacotherapy
- Hyperlipidemia requiring pharmacotherapy-(LDL-C and/or Non-HDL- C > 4.2 mmol/L)
- Technology dependant sleep disordered breathing (CPAP or BiPAP)
- Persistent Impaired Glucose Tolerance or Impaired Fasting Glucose(over a 6 month period- defined as fasting plasma glucose > 6.1 mmo/L and/or 2h plasma glucose > 7.8 mmo/L)
- Type 2 diabetes
- Polycystic Ovarian Syndrome
- Non-Alcoholic Fatty Liver Disease (elevated liver enzymes and U/S evidence of fatty infiltration)
- Hypothalamic obesity (secondary to CNS tumour)

Chronic disease negatively impacted by obesity

Referring to CHAL

www.cheo.on.ca/en/centrehealthyactiveliving

Centre for Healthy Active Living

RETURN TO A - Z

- Centre for Healthy Active Living
  - Program Information
  - Referral Form & Criteria Info
  - Our Team
  - Information Session
  - Contact Info

Centre for Healthy Active Living

Our mission:

To improve the health and quality of life of children with weight related health complications and support them and their families in achieving a healthy active lifestyle.

CHEO's Centre for Healthy Active Living works with children and their families with complex severe obesity through one coordinated and patient-specific plan of care which includes specialists such as a pediatric endocrinologist, general pediatrician, psychologists, case management nurse, registered dietitian, exercise specialist, social worker and child and youth counselor.

Recognizing that healthy bodies come in a wide range of body shapes and sizes, CHEO's Centre for Healthy Active Living works with families to help them improve health through changes in health behaviours. Making changes to health behaviours - how and what you eat, how you move and how you cope - can lead to significant improvements in health and well-being, with little or no changes in body weight.

Patients must meet criteria and be referred by a physician using our **referral form**

Universal Health Messages for All Kids

- Promote good sleep habits
- Maintain and support healthy food environments within our homes, schools and communities
- Ensure opportunities and access to physical activity for all
- Set limits on screen time for all members of the family and encourage social connectedness and engagement

Universal Health Messages for All Kids

- Encourage, teach and support stress management skills and improve access to mental health services
- Create, foster and maintain positive relationships and sense of belonging within families, schools and communities
- Foster positive body image – regardless of size
- Advocate against weight bias and prejudice

Resources

- CHEO - Centre for Healthy Active Living
- EOSS-P staging
- www.obesitynetwork.ca - with patient resources
- Dr. Katie Baldwin (Orleans Centrum Medical Clinic)
- Dr. Angela Seshardi (Ottawa Cardiovascular CEntre)
- LEAF Weight Management Clinic (16yrs+)
- Online: Kurbo (app) - www.kurbo.com

More resources

Physical activity:

- City of Ottawa Recreation Guides
- YMCA/YWCA- sliding scale for cost based on income
- Boys and Girls Clubs
- Ottawa Swordplay- popular for kids who aren't stereotypical athletes
- RA Centre- Archery- popular since the Hunger Games books/movies

Nutrition:

- The good food box: ottawafoodbox.ca
- Market Mobile: marketmobileottawa.ca
- Ellyn Satter Institute's Division of Responsibility: ellynsatterinstitute.org

Mental Health Resources / Family Supports

- Crossroads (up to 12 years)
- Youth Services Bureau (13 years +)
- Schools: referral through CCAC for social work or child and youth counseling support at school
- Family Services Ottawa - parenting courses, children's groups
- Jewish Family Services Ottawa
- Catholic Family Services
- Application - Assistance for Children with Severe Disabilities
  - Patients with complex obesity may qualify for funding through ACSD

Conclusions

- The causes of obesity are multifactorial:
  - genetic, biologic, psychologic, socio-economic and environmental risk factors
- The physician can play a powerful role in weight management
- "4-M's" may be helpful in assessing multidimensionality of obesity
- A new staging system EOSS-P can help to evaluate and guide weight management
- Focus on well being and health behaviours, not body size

My contact: glam@cheo.on.ca