

How should we define success in the treatment of children with obesity?

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Obesity in childhood is a chronic and relapsing disease



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Clinical Information

Childhood Obesity Is a Chronic Disease Demanding Specific Health Care – a Position Statement from the Childhood Obesity Task Force (COTF) of the European Association for the Study of Obesity (EASO)

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Obesity in children

- Varies in its severity- there is a spectrum of disease
- Different genetic predispositions
- Has modifiable and non-modifiable risk factors
- Requires different levels of medical care
- Chronic
- *Relapses occur*

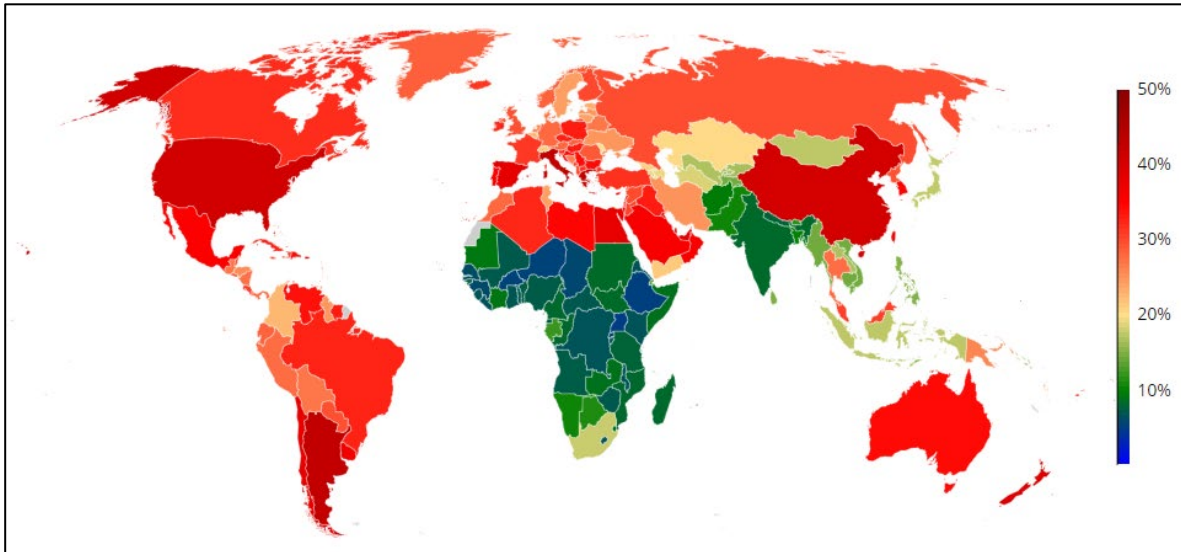
Obesity in children: how is it assessed?

- Adiposity is commonly assessed by body mass index
 - $BMI = \text{weight (kg)} / \text{height (m)}^2$
- Other methods
 - Waist circumference
 - Bioimpedence
 - DEXA

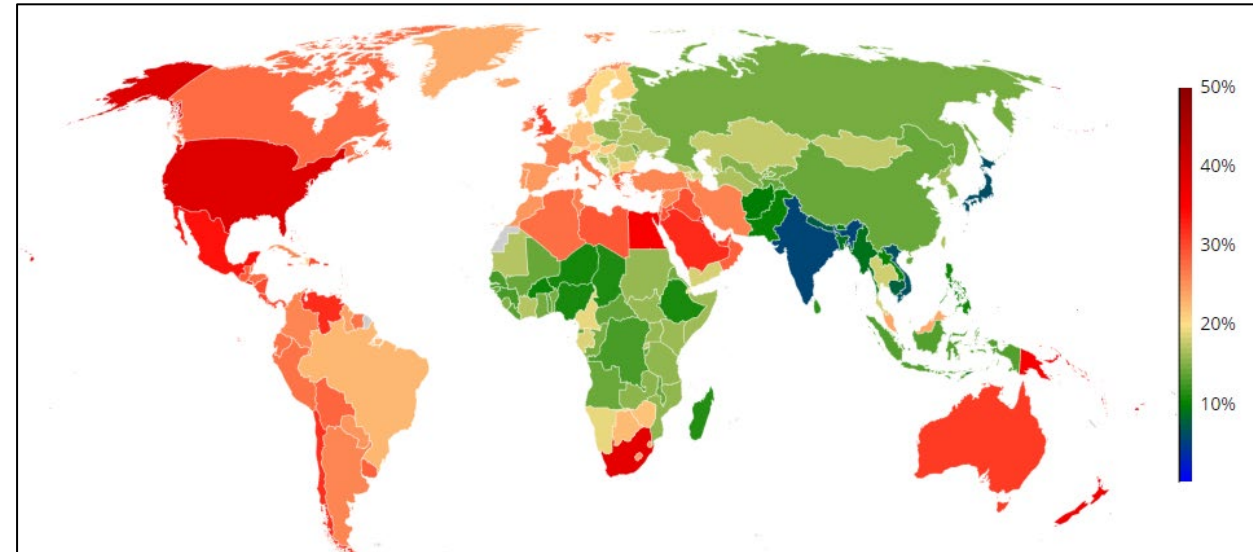
Prevalence of overweight and obesity

- Worldwide far too many children and adolescents are living with overweight and obesity

Boys



Girls



Source: ncdrisc.org

Body mass index

- It is a *screening* tool
 - It is **NOT** a diagnostic tool
- It is a proxy for adiposity
 - Does not distinguish between lean and fat mass
- Although imperfect, it has clinical utility
 - Low and high levels are associated with increased risks of ill health
 - It is inexpensive

What about other anthropometric indices?

- Weight-for-age: affected by recent changes in health or nutritional status
 - Does not account for height
- Weight-for-height: sensitive indicator of current nutritional status
 - Obesity complicates its interpretation
- Waist-to-height: indicates visceral adiposity
 - Measuring waist circumference can be challenging

Important to assess all anthropometric information and not just BMI

How to assess change?

- Body mass index
- BMI SDS or z-scores
- BMI centiles
- DEXA, bioimpedence
- Waist circumference (WC)
- WC-for-height

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Adiposity change: assumptions and issues

- BMI change versus adiposity change: are the two the same thing?
 - Not necessarily
- Does a child tracking at a BMI centile also keep their position in the distribution of body fat?
 - Limited research available; largely unknown
- High BMI z-scores are a poor indicator of adiposity in children with very high BMIs
 - Issue for consideration

Source: Kakinami et al Arch Dis Child 2014, Freedman et al *Obesity* 2017

How to *practically* assess change?

- Body mass index
- BMI SDS or z-scores
- BMI centiles
- % of the 95th centile of BMI

Source: Cole et al *Eur J Clin Nutr* 2005

Primary goal of treatment

- Improve the current and future health and well being of the child
- Aim for a beneficial change in body weight
- Not necessarily weight loss
 - Increase muscle mass, decrease fat mass
 - Increase muscle mass, no change in fat mass
 - Increase muscle mass more than increase in fat mass
- Depending on the patient, even weight maintenance can be a goal

Treatment modalities

- Primary care-based
- Family-based
- Immersion (i.e. camps)
- Specialized clinic-based
- School based
- Community based
- Pharmacological
- Surgical

Source: Adapted from Coppock et al Curr Treat Opinions Cardio Med 2014

Treatment results: what can we expect?

- Obesity is heterogenous
- Treatments are heterogenous
 - Content, delivery and location
- Adiposity change is measured differently
 - Less of an issue in current studies
- Entry criteria vary widely
- Treatment duration and follow-up differ

Effects of treatment



**Cochrane
Library**

Cochrane Database of Systematic Reviews

Parent-only interventions for childhood overweight or obesity in children aged 5 to 11 years (Review)

Loveman E,
MI, Rees K

Diet, physical activity, and behavioural interventions for the treatment of overweight or obesity in preschool children up to the age of 6 years (Review)

Colquitt JL,
Rees K

Diet, physical activity and behavioural interventions for the treatment of overweight or obese children from the age of 6 to 11 years (Review)

Mead E,
O'Malley

Drug interventions for the treatment of obesity in children and adolescents (Review)

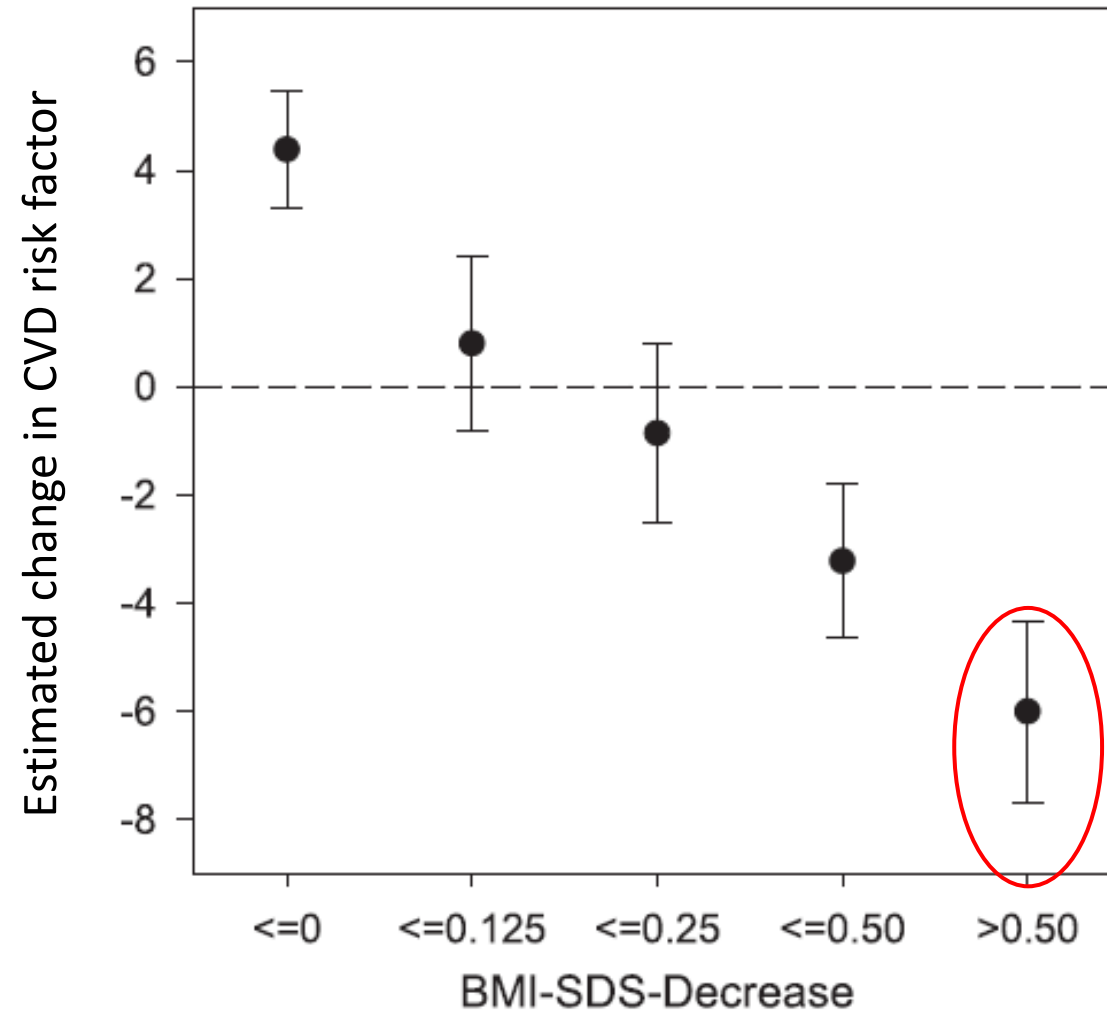
Axon E, A

Surgery for the treatment of obesity in children and adolescents (Review)

Ells LJ, Mead E, Atkinson G, Corpeleijn E, Roberts K, Viner R, Baur L, Metzendorf MI, Richter B

Source: www.cochranelibrary.com

BMI reduction and systolic blood pressure



Source: Reinehr et al *J Clin Endocrinol Metab* 2016;101:3171-79

Common definitions of success

- BMI SDS reduction of >0.25
 - May seem small, but typically equates to a large amount of weight for a given height in children and adolescents with obesity
- P-value of <0.05

Are these suggestions/definitions sufficient?

- Obesity is a spectrum of disease
- Obesity is heterogenous
- Children are growing and developing
- Differing co-morbidities and health issues
 - One level of BMI change will not resolve them all!

Why are we stuck in thinking *only* about change in BMI or weight?



Health is the outcome

Health is the outcome (1)

In addition to beneficial changes in weight:

- Improvement in blood pressure
- Reduction in cholesterol
- Decreased pain
- Improved cardiovascular fitness
- Increased mobility, reduction in falls
- Reduction in ALT
- Normalization of hs-CRP
- Decreased headaches
- Improved menstrual regularity

Health is the outcome (2)

- Improved mood
- Improved quality of life
- Improved grades in school
- Lower bullying
- Able to keep up with friends when playing
- Improved school attendance; fewer sick days

Challenges and open issues

- Are current approaches to examining BMI change sufficient?
- Are adverse events occurring?
 - Not consistently and thoroughly monitored; must change
- What is a sufficient follow-up time?
 - Needs to increase- too little is known about longer-term outcomes
- How to simultaneously consider all the aspects of health?

Conclusion and discussion: What is success?

- Beneficial changes in weight
 - Depends on the child- maintaining weight through growth, and decreasing fat mass
- Sustainability
 - Trust and respect with the health care professional
- Adherence
- Improved overall health and well-being

Thank you

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