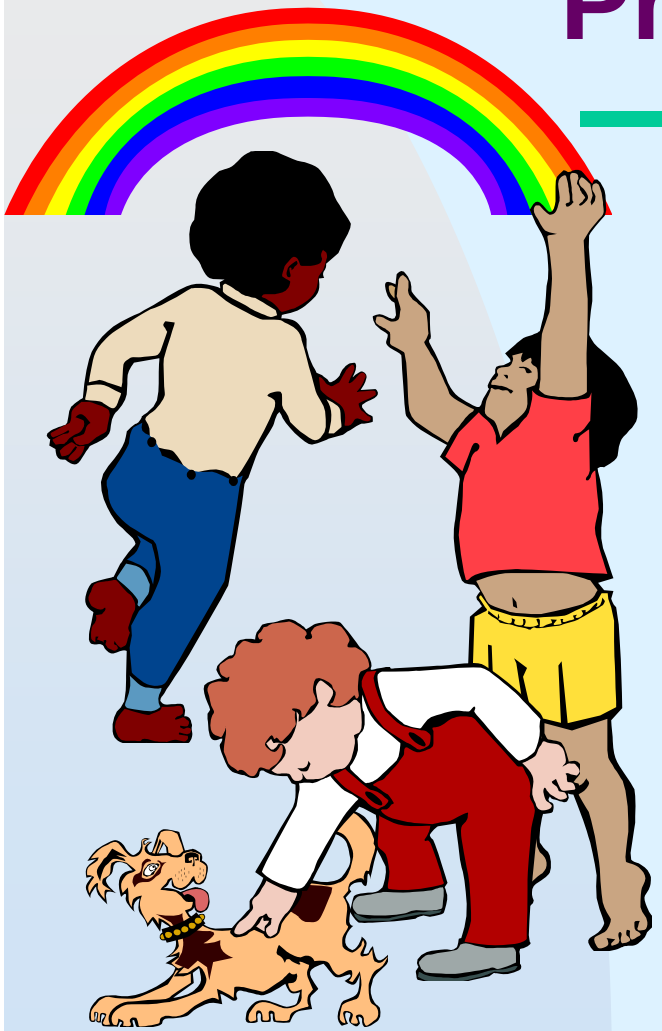
Promoting Health, Preventing Obesity



Email: msothe@lsuhsc.edu

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Promoting Health, Preventing Obesity

Objectives:

1. Describe what is known about childhood obesity:

Prevalence, risk factors, negative consequences

2. Provide practical and proven guidelines to **support primary, secondary and tertiary prevention of pediatric obesity:**

Evidenced-based protocols for improving nutrition and physical activity: benefits and current status

3. Identify potential targets for developing high-quality, multi-level obesity prevention programs

Engaging parents, schools, policy-makers, communities and health care resources

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Objective No. 1

Describe what is known about childhood obesity:

Prevalence, risk factors, negative consequences

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- **Affects 17% or 12.5 million of America's children**
- **Minority children and those living in rural communities are most impacted**
- **Louisiana has the 4th highest rate of overweight** (>85th BMI [U.S. CDC]) **and obese** (>95th BMI) **children in the nation:**
  - **48.4% are overweight (includes obese)**
  - **30.8% are obese**

Ogden, et al, JAMA 2007; McCurdy, et al, Current Problems in Pediatric and Adolescent Heatlh Care, 2010; Broyles, et al, Pediatrics, 2010

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Risk Factors for the Obesity and Metabolic Disease in Youth

- Low Socioeconomic Status
- Ethnicity (African American, Hispanic)
- Parental Obesity - under 6 years of age
- Weight Status (BMI) - over 6 years of age
- Low Birth Weight (<2.5 kg; <10%BMI (CDC)
- Maternal Obesity; Gestational Diabetes
- High Birth Weight (>4.3 kg; >90th BMI)
- Formula versus Breastfeeding
- Poor Nutrition - Food Preferences
- Low physical activity
- Lack of sleep

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Figure 2:
Maternal and Environmental Effects that Can Influence the Developing Fetus

Adapted from: Keen CL et al: The plausibility of micronutrient deficiencies being a significant contributing factor to the occurrence of pregnancy complications. J Nutr 133:1597S-1605S, 2003.

Fetal Origins Hypothesis

- The local availability of nutrients, especially protein during pregnancy, has strong implications for future metabolic health.
- Undernourished infant establishes a “thrifty” way of handling food:
  - Adjustments to protect brain tissue preferentially over visceral and somatic growth result in an altered metabolic profile, obesity & type 2 diabetes
- High blood glucose concentrations negatively impact glucose transportation the muscles.
- Decreased muscle growth - sarcopenia

Keller, 2003; McGarry, 2002; Ong, 2000; Barker, 1995; Law, 1996; Neel, 1962; Tappy, 2006; Hyponen, 2003

Low Birth Weight Phenotype

- Thin and long
- Insulin resistance during childhood
- Metabolic syndrome
- Adaptation to under-nutrition through endocrine and metabolic changes.

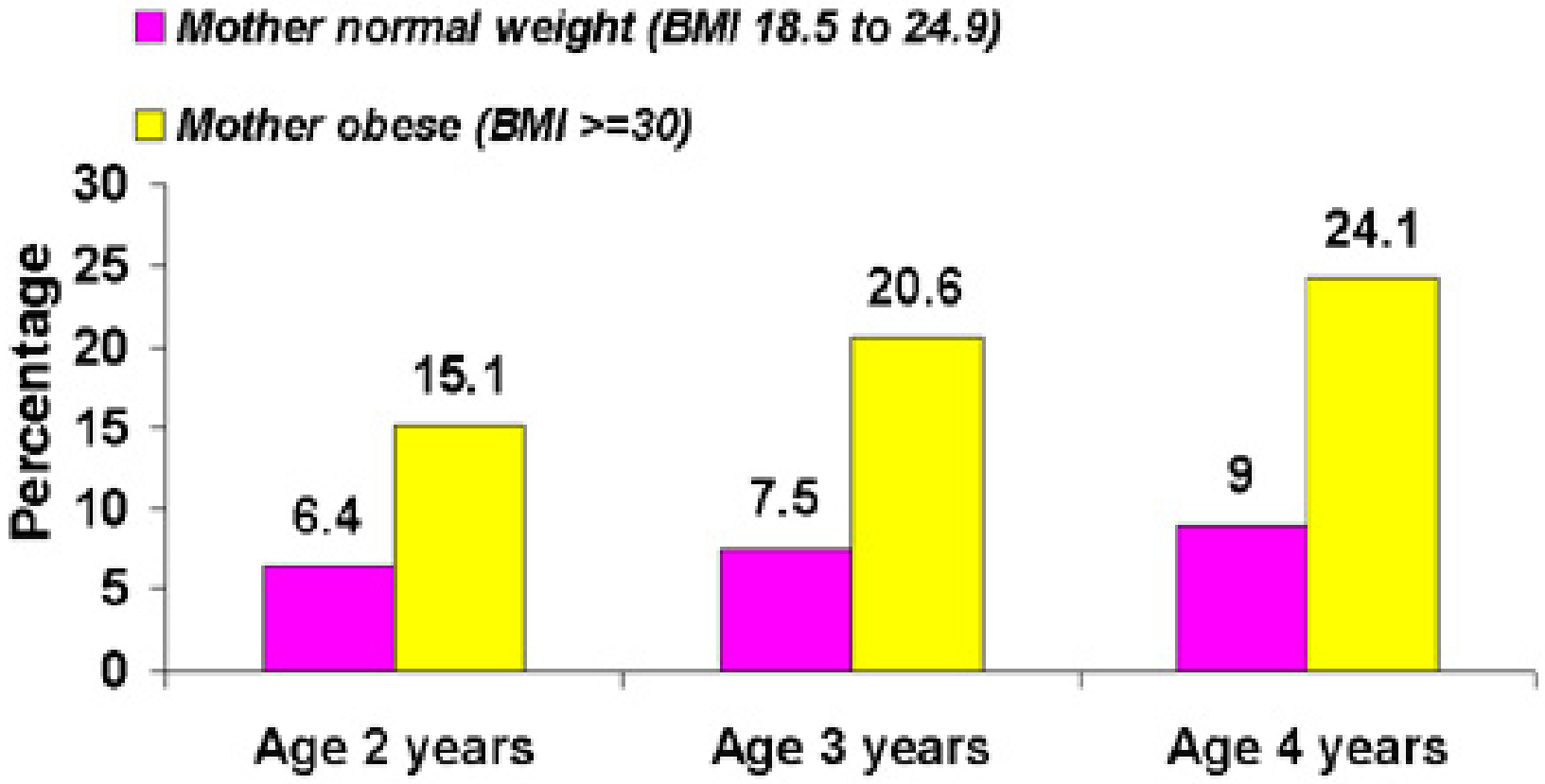
High Birth Weight Phenotype

- Short and Overweight
- Insulin deficient
- High rates of non-insulin dependent diabetes
- Maternal hyperglycemia
- Imbalance in the supply of glucose and other nutrients to the fetus.

Barker, 1999

Maternal Obesity

Percentage of newborns obese as preschoolers by maternal weight in the 1st trimester of pregnancy



Whitaker. *Pediatrics*. July 2004

Obesity Starts in the Womb

- Mothers with higher levels of omega-6 fatty acid (unhealthy fat) intake were more likely to have obese children 3 years later.
  - Data from mother's diet history and umbilical cord blood
- The increase in unhealthy fat consumption in the diet of American mothers promotes altered genetic expression in the unborn child.
- May explain why each succeeding generation of Americans is getting more obese
- Children with altered genetic profiles must be managed throughout life to maintain a healthy weight

Donahue, Amer J Clin Nutr, 2011; Godfrey, et al, Diabetes, 2011

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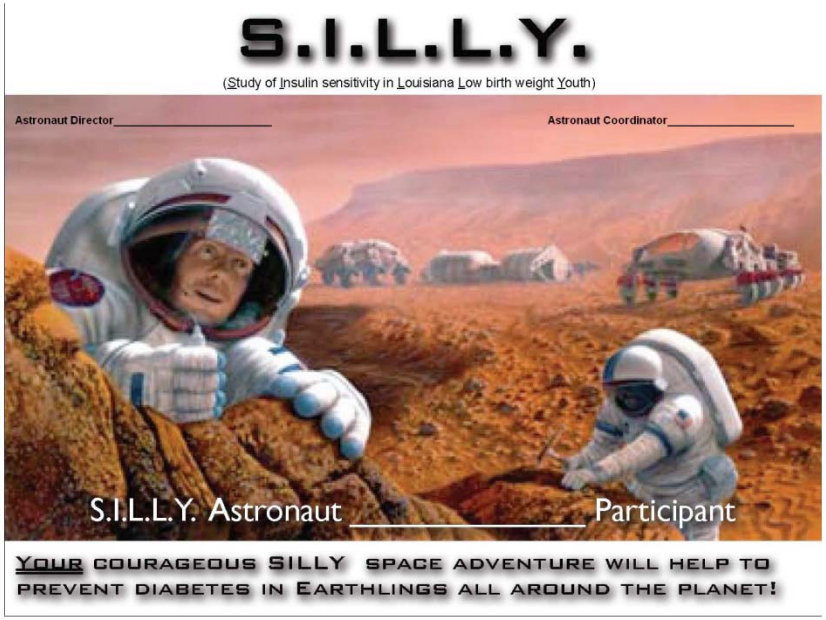

Certified Astronaut Hero enrolled in the SILLY study

Research sponsored by: NICHD

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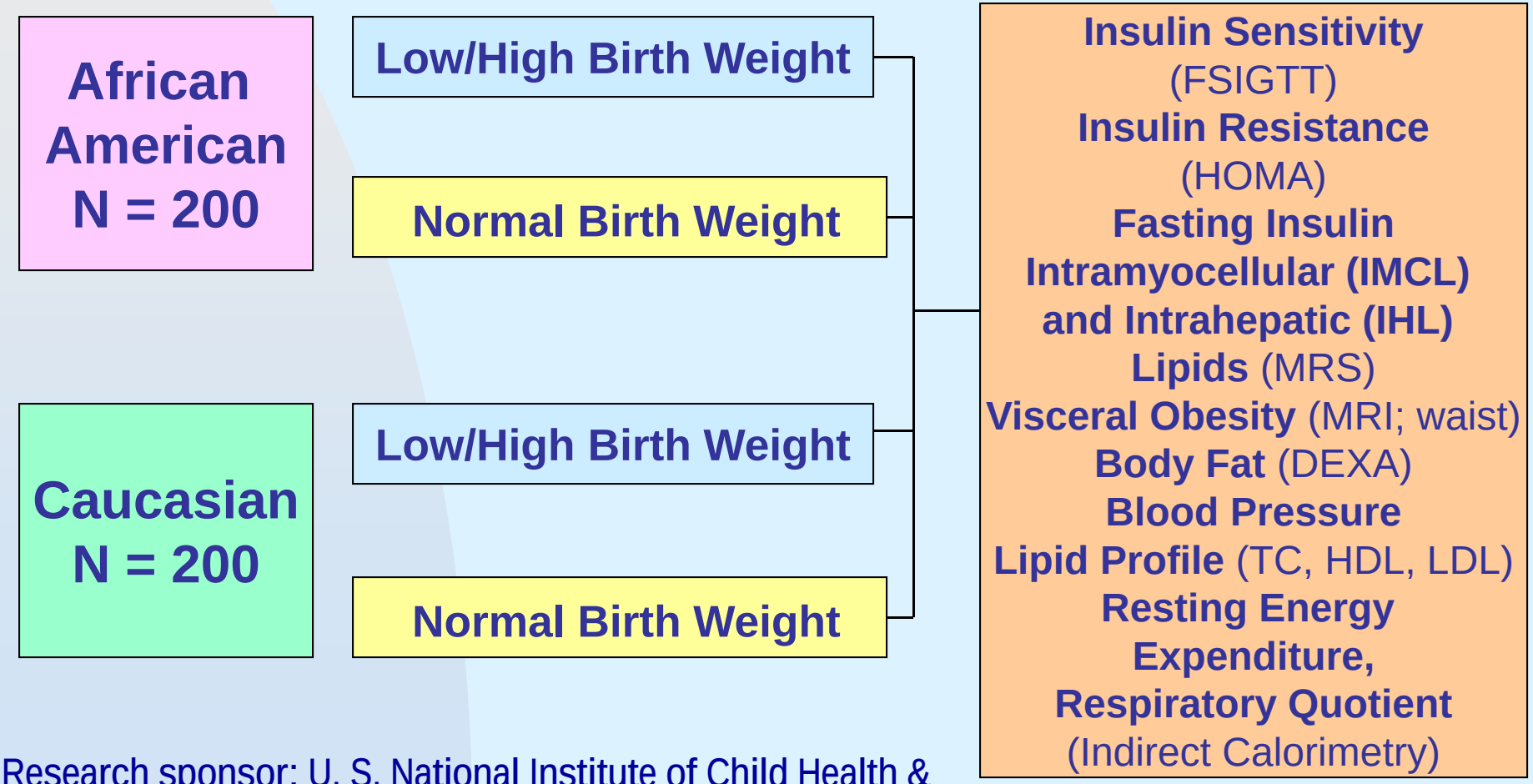
Study of Insulin sensitivity in Louisiana Low or high birth weight Youth (SILLY)



Research sponsor: U. S. National Institute of Child Health & Human Development (HD41071; HD49046),

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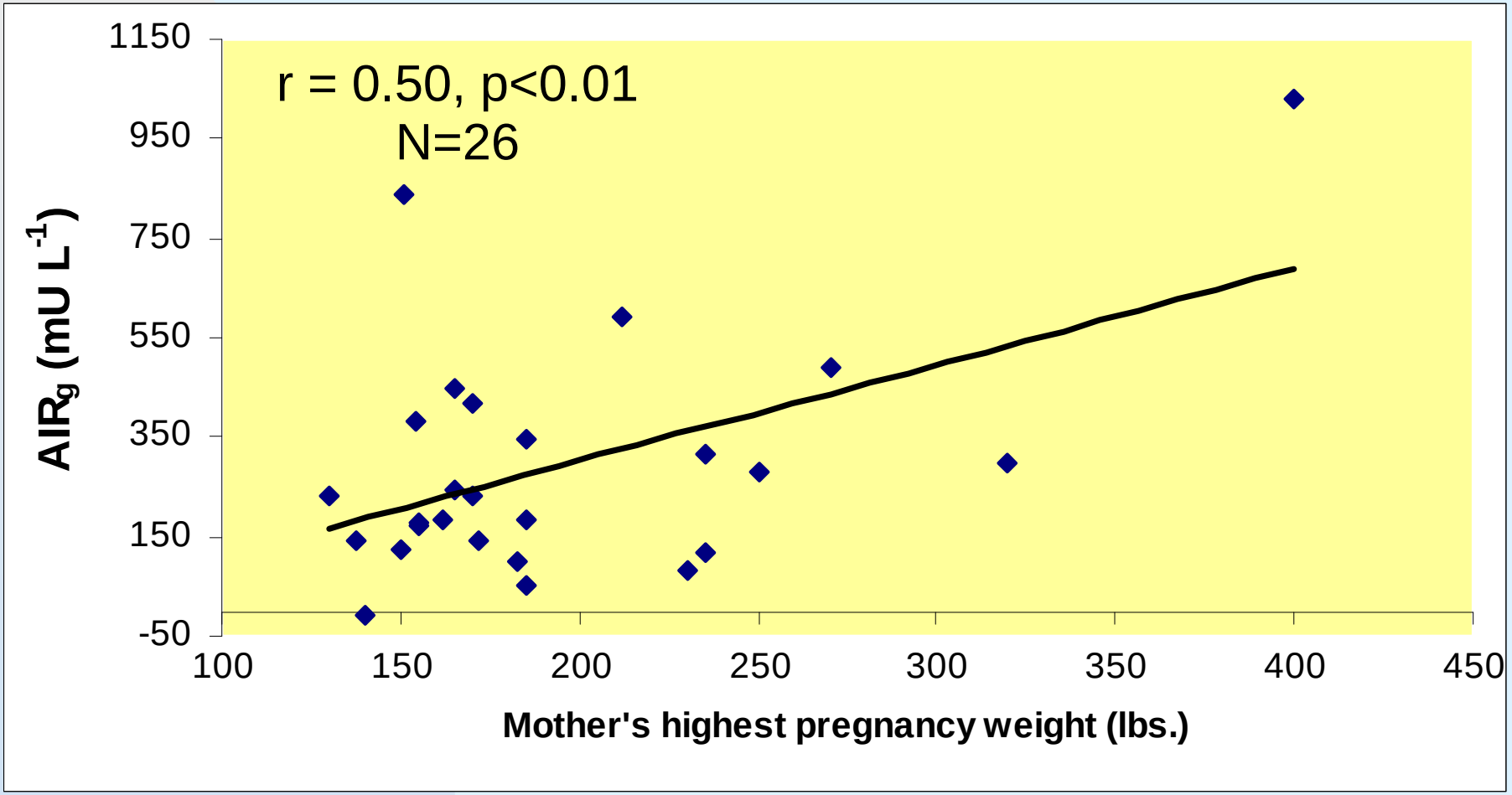
Preliminary Results: Mother's Highest Pregnancy Weight & Acute Insulin Response to Glucose (AIR_g)



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The SILLY Study - Results

The best model for predicting Insulin Resistance in healthy children prior to entering puberty is as follows:

Predictor Variables	R^2	Mean Squares	p-value
•Birth Weight •Low Density Cholesterol •Diastolic and Systolic Blood Pressure •Fat within Liver Cell (IHL) •Abdominal Fat (VAT) •Total Physical Activity	0.62	2.26	<0.004

Insulin sensitivity by FSIVGTT was significantly correlated with IHL (r=0.47; p=0.006)and VAT (r=0.42, p=0.04). Sothern, et al, Int'l J of Obesity, IASO, 2010

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Breastfeeding and Obesity

- Relative to formula feeding, breast feeding reduces the odds ratio for later obesity
- Breast feeding is associated with decreased risk for type 2 diabetes
- Non-breastfed infants displayed a fatty acid composition similar to insulin resistant adults
- Pediatric asthma is associated with less exclusive breast feeding
- Obesity is a risk factor for asthma
- Breast milk contains anti-inflammatory hormones, leptin and adiponection

Mayer-Davis, Diabetes Care. 2006; Dewey Lact 2003;Koletzko B, et. al. Adv Exp Med Biol. 2009;646; Oddy WH,. Am J Public Health. 2004; Baur, 1998; Lawrence,Childhood Obesity, 2010

Prenatal | **Postnatal/Infancy** | **Early Childhood**

Maternal Nutrition | *Breastfeeding* | *Obesity* | *Physical Activity*

Mother's Pregnancy Weight

Metabolic Functioning/Health (e.g. BP, Cholesterol, Ectopic Fat, Fat Oxidation)

High/Low Birth Weight Offspring; Fetal Programming

Glucose Tolerance
Insulin Sensitivity

Metabolic Syndrome
Type 2 Diabetes

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- Breakfast
  - Breakfast skipping associated with increased intra-abdominal adipose tissue in Hispanic youth
  - Daily consumption of breakfast is inversely associated with obesity prevalence in 10-12-year-old children.
- Family Meals
  - Regular family meals during early adolescence contributes to healthful eating habits 5 years later
  - Dining out results in higher intake of soft drinks, fast food, saturated fat, and lower intake of healthy foods.

Alexander, et. al. Obesity, 2009; Panagiotakos, et. al. Nutr Metab Cardiovasc Dis. 2008; Larson et. al. J Am Diet Assoc. 2009 ; Fulkerson, et. al Obesity, 2008

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- Independent of diet and exercise, 4-year-olds were 40 percent less likely to be obese if they:
  - Limited TV to < two hours daily,
  - Dined as a family at least 6 nights a week
  - Slept at least 10 1/2 hours on weekdays.

- Other benefits include improved cognitive and language development and improved social skills

(Anderson & Whitaker, Household Routines and Obesity in U. S. Preschool Children, Pediatrics, 2010, 125; 3:420-28)

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Studies show that students with fast food restaurants within a half-mile of their school are more likely to be overweight than students whose schools are not near fast food restaurants.

Oreskovic, et al, Acad Pediatr, 2009

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Neighborhoods with large minority populations have fewer produce stores and a higher number of convenient stores.

Snack foods offered in convenient stores are high in fat, sodium and sugar, and consumption is associated with obesity.

Adler and Steward, Milbank Q, 2009; Galves, et al, Acad Pediatr, 2009

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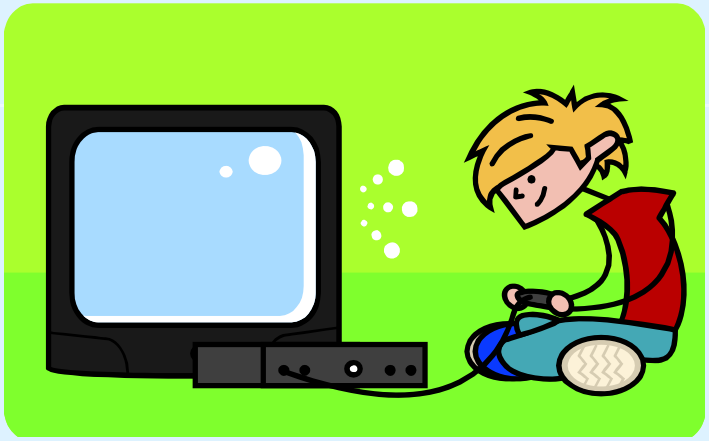
Sedentary Indoor Lifestyles



- Childhood obesity
- Asthma
- Vitamin D insufficiency
- Attention problems by age 7 years
- Attention-Deficit/Hyperactivity Disorder (ADHD)
- Social and emotional problems

Russ, et al, Acad Pediatr, 2009; Perrin, J Am Med Assoc, 2007;
Mithal, Osteoporos Int, 2009; Sheriff, et al, Thorax, 2009; Martinez-Gomez, et al, 2009

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- **Hours of TV-watching is positively correlated with obesity, asthma and high blood pressure**
- **Advertising exposure is related to childhood obesity, poor nutrition, cigarette/alcohol abuse.**
- **TV sitting time is associated with metabolic syndrome in adults**

Pediatrics, 2006; Caroli, et al, 2004; Dunstan, 2005/2007; Healy, 2008;

Vitamin D Insufficiency and Childhood Obesity

- Vitamin D levels are insufficient in 35% of children 4-18 years of age.
- Children who play outdoors less than one half hour per day or watch more than 2.5 hours per day of TV are more likely to have Vitamin D insufficiency
- Vitamin D is associated with childhood obesity, insulin resistance, high cholesterol and blood pressure.

Absoud, et al, PLoS One, 2011; Ly, et al, J Allerlgy Clin Immunol, 2011; Ganji, et al, Am J Clin Nutr, 2011

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The Built Environment: Sidewalks, Biking Lanes, Parks and Playgrounds, Green Space

- Increased vegetation in neighborhoods is associated with lower odds of obesity
- Children who live within a kilometer of a playground were 5 times more likely to have a healthy weight
- Green features in school yards promote physical activity
  - 50% report green space promotes outdoor play

Dyment & Bell, Health Educ Res, 2008; Bell, et al, Am J Prev Med; Potwarka, et al, J Community Health, 2008

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Summary of Risk Factors

- Pre-and-post natal factors promote the development of obesity and insulin resistance via a mechanism of impaired fat oxidation and lipid metabolism, which leads to excess fat in liver cells.

- Low or high pregnancy weight, birth weight, lack of breastfeeding, poor nutrition and physical activity behaviors may collectively increase the risk for obesity, poor metabolic function and insulin resistance during adolescence.

- Pregnancy weight, birth weight, breastfeeding, and nutrition, physical activity can all be modified, **BUT...**

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Can Pre-pubertal youth with metabolic dysfunction be de-programmed?

- The fetal period represents the only time when the number of muscles fibers can increase (Zhu, 2006).

- In 10-16 year olds, significant, positive correlations were observed between physical activity and both fasting insulin and insulin sensitivity (Schmitz, 2002).

- In overweight 9-15 year olds, 12 weeks of aerobic training improved insulin sensitivity and glucose metabolism **WITHOUT CHANGES IN BODY FAT** (Nassis, 2005).

- The improvement in insulin sensitivity may be due an increased ability to oxidize fat in the muscles after physical training.

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Objective No. 1

Describe what is known about childhood obesity:

Negative consequences to being obese during childhood

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Overweight Children are not like Healthy Weight Children

- **Physically compromised during weight-bearing aerobic exercise**
- **Metabolically compromised due to impaired fat oxidation and insulin sensitivity**
- **Biomechanical disadvantaged during walking and running**
- **Emotionally compromised due to teasing** (Schwimmer, 2003)

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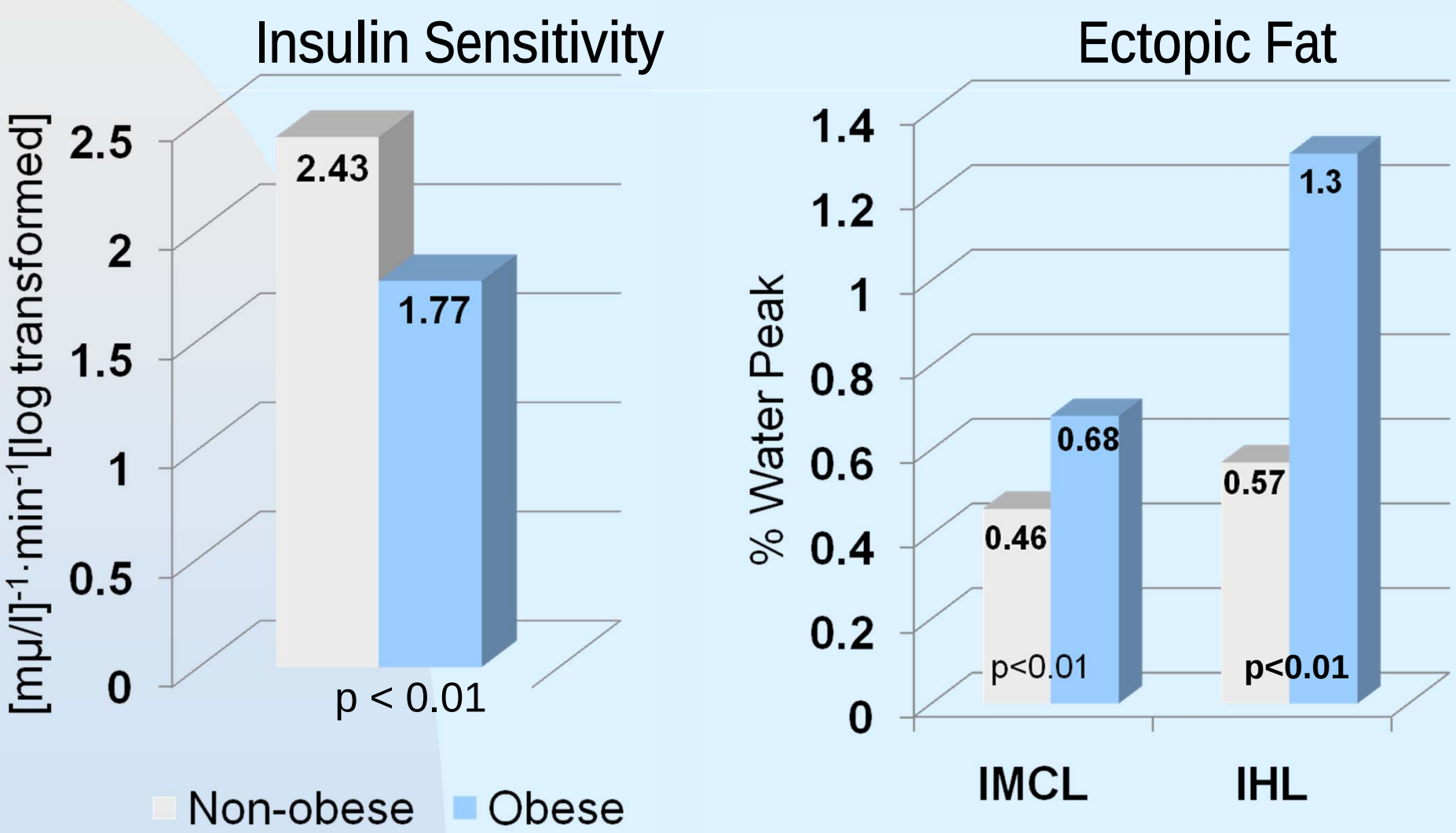
Overweight Youth are Metabolically Compromised (Mean Age: 12.4 yrs [Sothern and colleagues, 1992-2007])

Parameter	N	Mean ± SD or Range	Normal Range
Percent Fat	24	43.1 ± 27.1	<30
Cholesterol	50	170.8 ± 29.3	<170
LDL	31	123.5 ± 25.7	<110
VO_2Max	22	19.8 ± 4.4	45-53
Asthma	150	10.9 - 31.6%	10.5%
Liver Fat	9	0.049±0.04	0.022±0.02
Low Birth Wt.	177	3.4 - 29.6%	<10%
High Birth Wt.	177	7.4 - 18.6%	<10%

Obese Children are Metabolically Compromised



Bennett, et al, The Obesity Society, October, 2009, Obesity, manuscript in press; Larsen-Meyer, et al, Diabetologia, 2011; Research supported by NICHD # HD49046 and #HD41071

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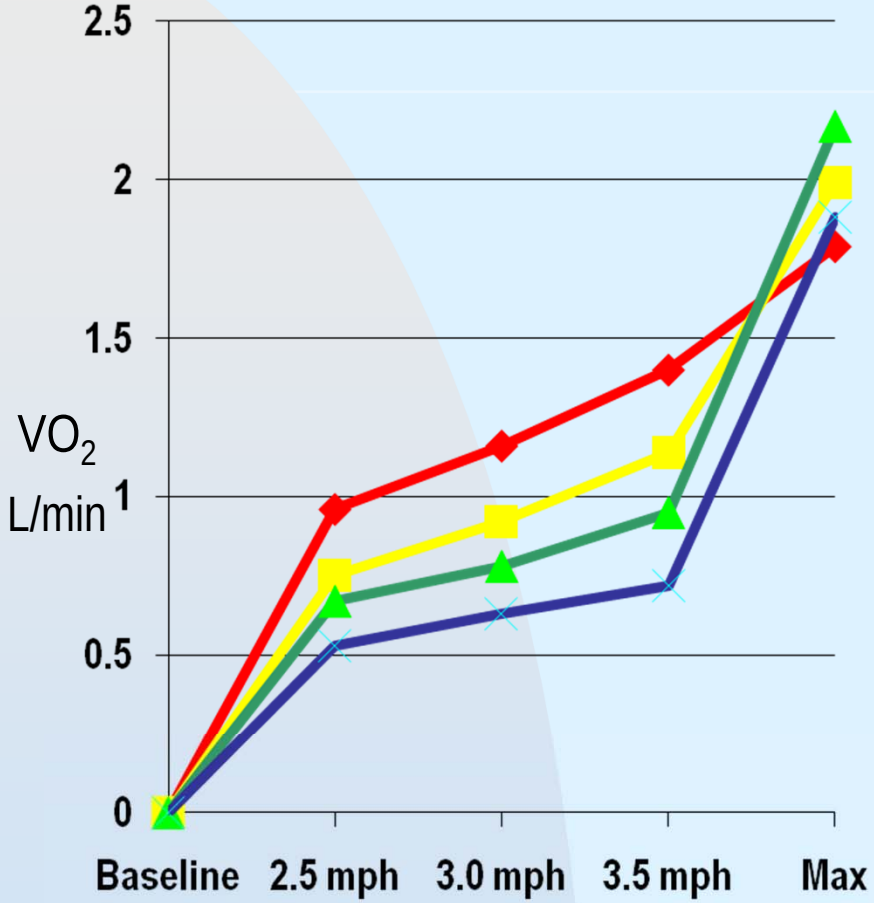
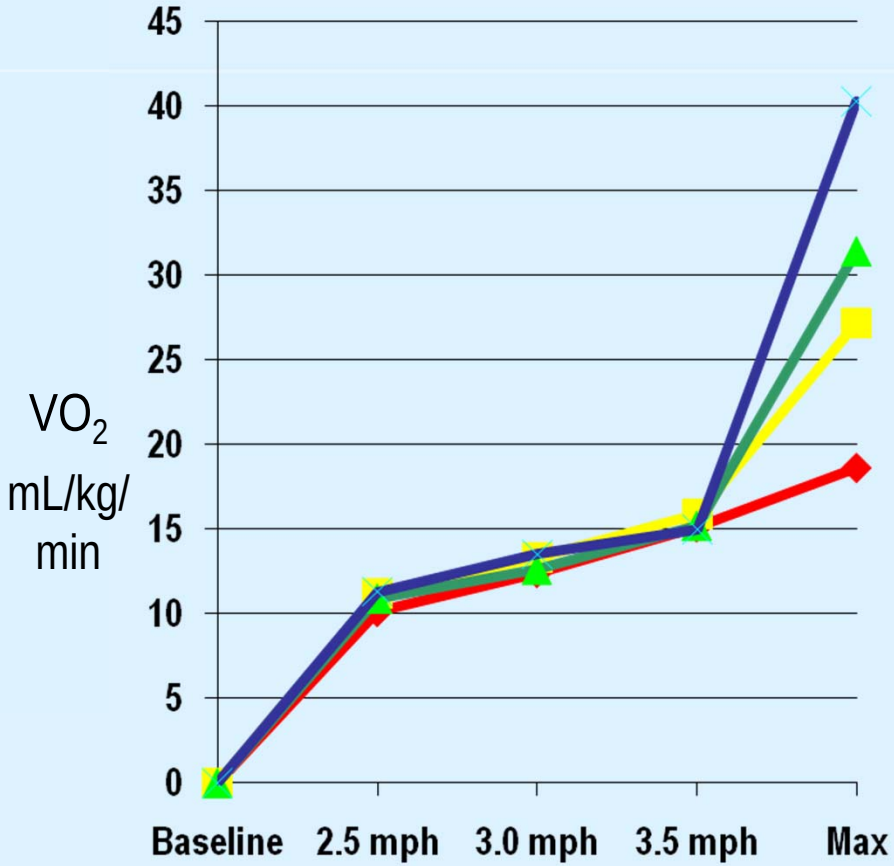
Certified Astronaut Hero enrolled in the SILLY Study

Exercise Tolerance in Children with Increasing Overweight Levels



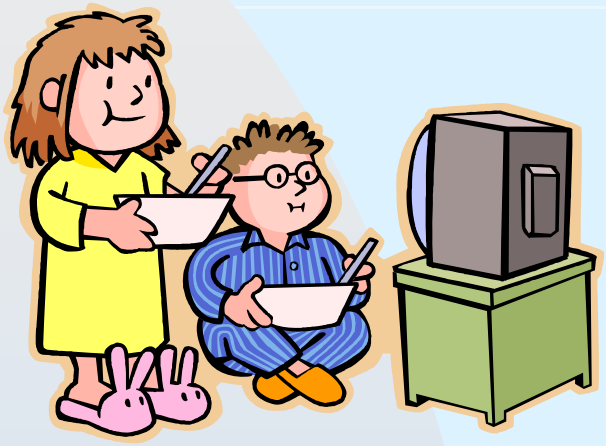


Severe (>99th% BMI)
Obese (>95thBMI%
Overweight (>85th<95th%BMI
Healthy (50-85th% BMI)

Sothern, et al, 1999, 2001

Four group repeated measures ANOVA; p <0.03

Obese Youth have a Biomechanical Disadvantage



A group of 43 eight-year-olds with an average weight of 40 kg took twice as long as average-weight kids to get out of a lounge chair. Some even needed assistance.

"They have flatter feet, collapsed arches,". "We think they are just more uncomfortable all the time." (Professor Steele)

Steele, et al, 2006, Int'l J of Ped Obesity

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Obese Children are Emotionally Different from Healthy Weight Children, and Similar to Children with Cancer

Child self-report total score

Odds Ratio	Obese vs Healthy	Obese vs Cancer
Physical health score	5.0 (3.4-8.7)	1.0 (0.6-1.7)
Social Functioning	5.3 (3.4-8.5)	1.8 (1.0-3.1)
School Functioning	4.0 (2.4-6.5)	1.1 (0.6-2.0)

Schwimmer, et al, JAMA, 2003

Excess Fat and Physical Activity in Youth

- Excess body fat in children does not necessarily reduce the ability to maximally consume oxygen.
  - **has a detrimental effect on sub-maximal aerobic capacity.**
- Physical Activity recommendations for obese youth should account for their limited exercise tolerance.
  - include realistic goals to encourage success.
- Physical training **improves insulin sensitivity.**
  - **may** counteract the decline in fat oxidation from calorie reduction
- Recommend activities that keep demands below ventilatory threshold so that physical activity can be sustained.

Goran, Int'l J Ob, 2000; Norman, Pediatrics 2005; Brandou, Diabetes Metabol., 2005; Nassis, Metabolism, 2005; Drinkard, Med Sci Sports Exer, 2007; Hassink, J Ped Endo Metab 2008; Daniels, Circulation, 2009

Promoting Health, Preventing Obesity

Objective No. 2

Provide practical and proven guidelines to support primary, secondary and tertiary prevention of pediatric obesity:

Evidenced-based protocols for improving nutrition and physical activity: *benefits* and current status

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Preventing Childhood and Adolescent Obesity

- Primary prevention
  - **Maintaining a healthy weight from infancy to adolescence especially in high risk populations**
- Secondary prevention
  - **Preventing overweight children from developing obesity and metabolic disease**
- Tertiary prevention
  - **Preventing obese youth from becoming severely obese adolescents**

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Preventing Childhood and Adolescent Obesity

- Primary prevention
  - **Maintaining a healthy weight from infancy to adolescence especially in high risk populations**

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- Promotes higher dietary diversity scores in children
  - increase in diet variety
- Associated with more frequent consumption of vegetables

Cabalda, et al, J Am Diet, Assoc, 2011

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- **Improves students' preference towards fruits and vegetables**
- **Increases students' consumption of fruits and vegetables**

Heim, 2009; Parmer, 2009; Viola 2006; Morris & Zidenberg-Cherr, 2002; Radcliff, 2009; McAleese & Rankin, 2007

- Decrease in nurse, counseling and discipline referrals
- Improved standardized test scores
- Improved academic performance in math and English

Nansel, et al, Public Health Nutr, 2010; Shilts, et al, J Nutr Educ Behav, 2009

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Let the Children Play!

Vigorous, intermittent physical activity is shown to reduce obesity & components of the metabolic syndrome in pre-pubertal children.

Barre, et al, 2006; Owens, 2006; Barbeau, et al, 2007; Yu, et al,, 2005; Kahle, 1996; Shaibi, et al, 2006; Nassis, 2005; Ortega, et al, Med Sci Sports Exerc, 2011

Position Statement: American Academy of Pediatrics: Play Promotes Healthy Development in Children

Play is essential to the social, emotional, cognitive, and physical wellbeing of children beginning in early childhood……It is essential that parents, educators, and pediatricians recognize the importance of lifelong benefits that children gain from play…… Regardless of their socio-economic status, all children have the right to engage in safe and regular physical activity that will decrease the incidence of lifelong health disparities

Milteer, MD, Ginsburg, MD, et al, American Academy of Pediatrics, Pediatrics, 2012

Benefits of Physical Activity to Academic Achievement

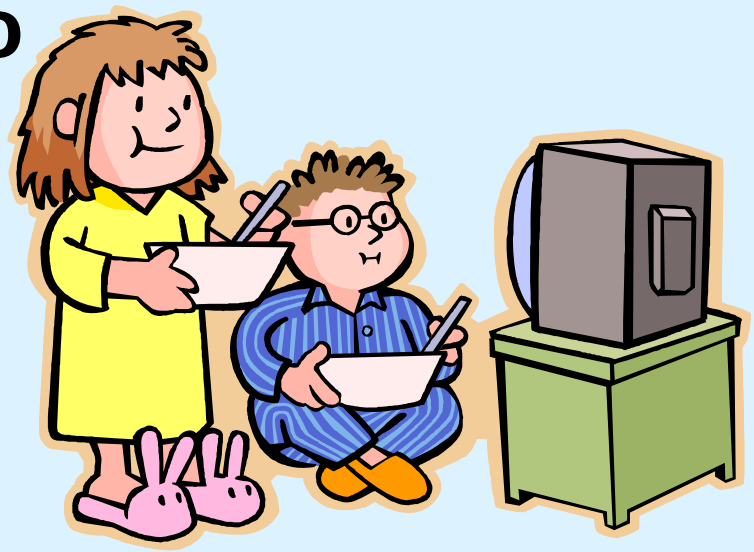
- Objectively measured physical activity improves cognition and academic achievement (Woodcock-Johnson III) in overweight children
  - Improvements are associated with brain activity during executive function tasks

- Physically active classroom lessons improve test standardized test scores.
- Overall physical fitness is a better predictor of academic achievement than obesity.

Davis, et al, Health Psychol, 2011; Castelli, et al, J Sport Ex Psyc, 2007; Grissom, J of Ex Physio, 2005; Davis, Res Quart Ex Sport, 2007; Donnelly & Lambourne, Prev Med, 2011; London, J School Health, 2011

Physical Activity Breaks and Sedentary Behavior at Home

- **Children who spend long hours in the classroom in their seats without physical activity breaks are more likely to be sedentary at home**



(Dale, et al, Res, Quarterly Ex Sport, 2000)

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Children are not Little Adults

- Movement is required for cognitive development
- Enjoy unstructured physical activity (play)
- Play fosters healthy emotional development
- Unable to stay focused for long periods of time
- Immature metabolic systems and lower oxygen uptake (Bar Or and Rowland, 2000; Sothern, 2001))

30-minute rule

- **The ability to focus and pay attention begins to decline after 30 minutes of intense mental activity – less time for children**

- **After 30 minutes of computer or written work take a 3-5 minute break**

Sothern et al, Trim Kids, Harper Collins, 2001;
Handbook of Pediatric Obesity: Clinical Management, 2006

Music is a Motivational Tool for Physical Activity

- The motivational qualities of music are heightened when the music is delivered at a higher volume.
- Females reported the importance of music more highly than males.
- Music facilitates performance on cardiovascular equipment more so than on any other equipment.
- There is an effect of music compared to age:

  - Older adults (36-45 years) preferred non-current music,

  - Younger age groups (16-26) preferred current music and dance music

Priest, et al, 2004

Classy Moves – Exercise Breaks

- *Rocky* (martial arts/boxing moves)
- *Raise the Roof* (overhead press)
- *Off the Wall* (wall push-ups)
- *Hot Seat* (chair squats)
- Do the *Swim*
- Music break (dance to one song)
- Flex at Your Desk
- Stand like a tree and balance
- Reward positive behavior with indoor or outdoor play periods

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- **Music break (dance to one song)**

"We can dance if we want to…cause if you don't dance…"

(Men Without Hats)

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Preventing Childhood Obesity with Physical Activity

Recent research indicates that, especially in girls, dancing promotes an improvement of weight status and may be useful in the prevention of pediatric obesity.

Robinson, et al, 2003 (GEMS); Engels, et al, JADA, 2005; Ildiko, et al, J Physiol Anthropol, 2007 (Folk); Tak, et al, Taehan Kanho Hakho Chi, 2007 (Hip-Hop)

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Let the Children Play!

OUTSIDE!

Cleland, et al, Inter J of Obesity, 2008;
Pellegrini, et al, Anim Behav., 1998

- **Time outdoors is associated with greater physical activity and lower overweight prevalence in 10-12 year old girls and boys.**
- **Caloric expenditure of outdoor play is greater than indoor play**

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Benefits of Natural Environments

- Lower all cause mortality
- Lowers stress and improves mood
- Lowers blood pressure
- Reduced psychological distress
- Improved social support
- Restores children's capacity for attention
- Reduces ADHD symptoms

Mitchell, et al Lancet, 2008; Pretty, et al, Int J Environ Health Res, 2005; Wells and Evans,Environ Behav, 2003; Kaplan, Environ Psychol, 1995; Taylor, et al, Environ Behav; 2001; Kuo, and Taylor, Am J Public Health, 2004; Smith, J Atten Disord, 2011

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Benefits of Outdoor Play in Nature

- **Promotes creativity and imagination while building dexterity and physical strength**
- **Encourages healthy brain development**
- **Improves self-advocacy skills**
- **Improves social skills: working in groups, sharing, negotiating, resolving conflicts**
- **Increases Vitamin D levels**
- **Improves symptoms of Attention Deficit Hyperactivity Disorder (ADHD)**
- **Improves well-being and problem solving**

Ginsberg and AAP, Pediatrics, 2007; Brender, et al, J Am Med Assoc, 2005; Kuo & Taylor, Am J Public Health, 2004; Taylor & Kuo, J Atten Kdisord, 2009

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Benefits: Strength and Aerobic Training in Short term Studies - Health Outcomes

- Percent Fat ↓
- Bone Mineral Density ↑
- Visceral adipose tissue (VAT) ↓
- Oxygen Uptake (VO_2) - relative/kg ↑
- Total Cholesterol and LDL ↓
- Insulin Sensitivity ↑
- Insulin Resistance ↓
- Strength (1 rep/max) ↑
- Cardiovascular fitness ↑
- Fat oxidation and HDL ↑

Sothern, et al, 2006; Shaibi, et al, Med Sci Sports Exerc, 2006; Barbeau, et al, Obesity, 2007; Ounis, Acta Paediatr, 2010; Yu, 2005; Dao, 2004

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Benefits: Strength Training and Skeletal Muscle Metabolism

Dr. Sothern's Hero

Strength training improves the ability of the muscles to use fat as a fuel (fat oxidation)

Improved fat oxidation is associated with improved glucose metabolism and decreased insulin resistance.

Kraemer, 2007; Talanian, 2007; Benson, 2007

More things to consider:

- Physical activity:
  - improves metabolic health in obese youth independent of adiposity change (Shaibi, 2009)
  - reduces depression---childhood obesity is associated with depression (Erickson, 2000).
  - reduces inflammatory cytokines (Radak, 2008)---childhood obesity is associated with inflammation and asthma (Arshi,2010).

- Physical activity lifestyle changes positively alter satiety factors in youth (Balagopal, et al, Obesity, 2010)

- Chronic sustained periods of muscular unloading (sitting) reduce contractile stimulation, suppress muscle LPL, triglyceride and glucose uptake and HDL production (Hamilton, 2005; Bey, 2003).

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Promoting Health, Preventing Obesity

Objective No. 2

Provide practical and proven guidelines to support primary, secondary and tertiary prevention of pediatric obesity:

Evidenced-based protocols for improving nutrition and physical activity: benefits and *current status – what is really happening*

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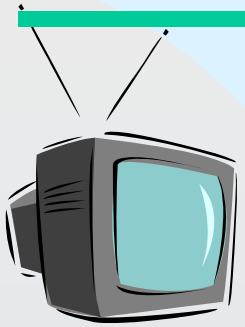
Family Food Facts that are Hard to Swallow

- Americans eat out and average of 3.7 times per week and 57% eat out every day.
- One third of those eating out eat fast food.
- Soft drink intake increased 500% in 50 years.
- 40% of males, 12-59 years eat fast food daily.
- Vending machine snack sales increased 85% since 1973.
- 60-75% of teens drink soda daily.

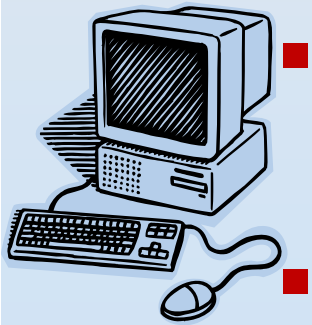
Ludwig, 2001; Gallup, 1990;Barlow & Dietz, 1998; Borrud, 1997

Childhood Obesity and Screen Time



- **Today U.S. Children watch TV an average of 3 hours per day**
- **96% of children watch TV regularly.**

- **They view 40,000 ads per year.**
- **One in 4 children under 2 years have a TV in his/her bedroom.**



- **Children from heavy TV households are less likely to be able to read.**
- **81% of children play computer games**

Pediatrics, 2006; Caroli, et al, 2004;Dunstan, 2005/2007; Healy, 2008; Kaiser Family Foundation, 2003, 2010; Clements, Cont. Issues Early Child, 2004

Are Children Playing Outside?

Recent survey of 830 mothers of 8-12 year olds:

- 85% state today's children play outdoors less often

- 82% state crime/safety concerns prevent outdoor play
- 61% identify lack of adult supervision & fear of physical harm
- 85% identify screen time as competing for time outdoors
- 33% report that children engage in outdoor games such as hopscotch using child-initiated rule

Clements, Cont. Issues in Early Childhood, 2004

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Outdoor Play at School - Recess

- 30% of kindergarten classrooms are deprived of a recess period to account for increased academics.

- Since the 1970's children have lost roughly 12 hours/week of free time:
  - 25% decrease in play
  - 50% decrease in unstructured outdoor activities

Pellegrini, Recess: Its role in education and development, 2005; National PTA, Recess at risk, 2010; Juster, et al, Institute for Social Research, 2010

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Promoting Health, Preventing Obesity

Objectives:

3. Identify potential targets for developing high-quality, multi-level obesity secondary and tertiary prevention programs

Engaging parents, health care resources, communities, schools and policy-makers

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What Can Parents Do?

- Re-establish family meals. Require that all drinks and foods be consumed at the kitchen/dining table or other designated area (Fulkerson, et al, J Am Diet Assoc, 108:706-709, 2008; Fulkerson, et al, Obesity, 16(11):2529-2534, 2008; Larson, et al, JAm Diet Assoc, 109(1):72-79, 2009.
- Discourage consumption of high sugar beverages . Serve water for thirst (Ludwig, 2001; Ebbeling, et al, 2006).
- Skipping breakfast is related to obesity; always require children to eat a healthy breakfast (Alexander et al, Obesity, 2009; O'Dea & Wilson, 2006; Panagiotakos, et al, 2008).
- Discourage snacking after dinnertime so children are hungry in the morning. **– AFTER 8 is TOO LATE!**

Sothern, Schumacher, von Almen, Trim Kids, 2001

Parent Role Modeling

- Parents don't have to be thin but they must set a good example by:
  - **participating in physical activities**
  - **reducing TV viewing** (Gable , et al, JADA 2007)
  - **buying and preparing healthy foods** (Fisher , Matern Child Health J. 2009; Keery, Psychosom Res. 2006).
  - **insisting on family dinners** (Anderson & Whitaker, 2010)
  - **dedicating 1/2 day of each weekend for family physical fitness**

Sothern et al, Trim Kids, 2001; Handbook of Pediatric Obesity, 2006

Strategies to Decrease Sedentary Behavior Inside the Home

- **Allow active play before homework.**
- **Re-arrange the family or living room to provide areas for movement.**
- **Turn on the stereo, not the TV and teach your child to dance.**
- **Interactive computer games**

Sothern et al, Trim Kids, Harper Collins, 2001; Handbook of Pediatric Obesity: Clinical Management, 2006

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Play Now! Homework Later!

- When children get home after school, their brains are tired, but not their bodies.
- They've had a long day in a sedentary environment and need to be active to let off steam.

- Instead of a snack, hand your child a glass of water and send him outside to ride a bike, skate, play ball or tag for about 30 minutes. Indoors he can dance, shoot hoops with foam balls or skip rope.
- Then when he does homework, he'll concentrate better. Sothern et al, Trim Kids, Harper Collins, 2001

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Interactive Computer Games (ICG)

- **ICG is similar in intensity to light to moderate traditional physical activities such as walking, skipping, and jogging (Maddison R, Ped Ex Sci, 2007)**

- **Playing ICG on a regular basis may have positive effects on children's overall physical activity levels (Ni Mhurchu C, Int J Beh Nut Phys Act, 2008)**

- **Improves aerobic fitness and blood pressure (Murphy, et al, 2010, Int'l J Ped; Lanningham-Foster et al, 2006, Pediatrics; Ob; Madsen, Arch Pediatr Adolesc Med, 2007).**

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What Can Health Care Providers Do?

- **Primary Prevention: Promote the maintenance of a healthy weight from infancy to adolescence especially in high risk populations**

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The Obesity Trinity

- Tobacco use during pregnancy,
- Formula vs. Breastfeeding
- Frequent Pregnancies……

resulted in fetal-programmed obese baby-boomers, maternal obesity, obese infant-toddlers, obese children/adolescents, maternal obesity and so on……

Solutions:

- Implement intense nutrition, physical activity and behavioral counseling/education during first visit to the Ob/Gyn and continuing until the child enters puberty
- Establish high-quality weight management programs for obese adolescent girls to ensure healthy pregnancies

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Obesity and Asthma: Determinants of Inflammation and Effect of Intervention

Specific Aims:

In African-American females, 13-19 years of age:

1. Determine the frequency of single nucleotide polymorphisms and SNP haplotypes in pro and anti-inflammatory genes in obese and non-obese asthmatic and non-asthmatic adolescents.

2. Examine the effects of diet or exercise on lung specific inflammation and pro-and-anti-inflammatory responses in obese asthmatic and non-asthmatic adolescents compared to active (combined) and inactive controls.

3. Determine the effects of the inflammatory SNPs in the modulation of several inflammatory markers and lung specific inflammation in obese asthmatic and non-asthmatic adolescents before and after weight loss through diet, exercise, or both.

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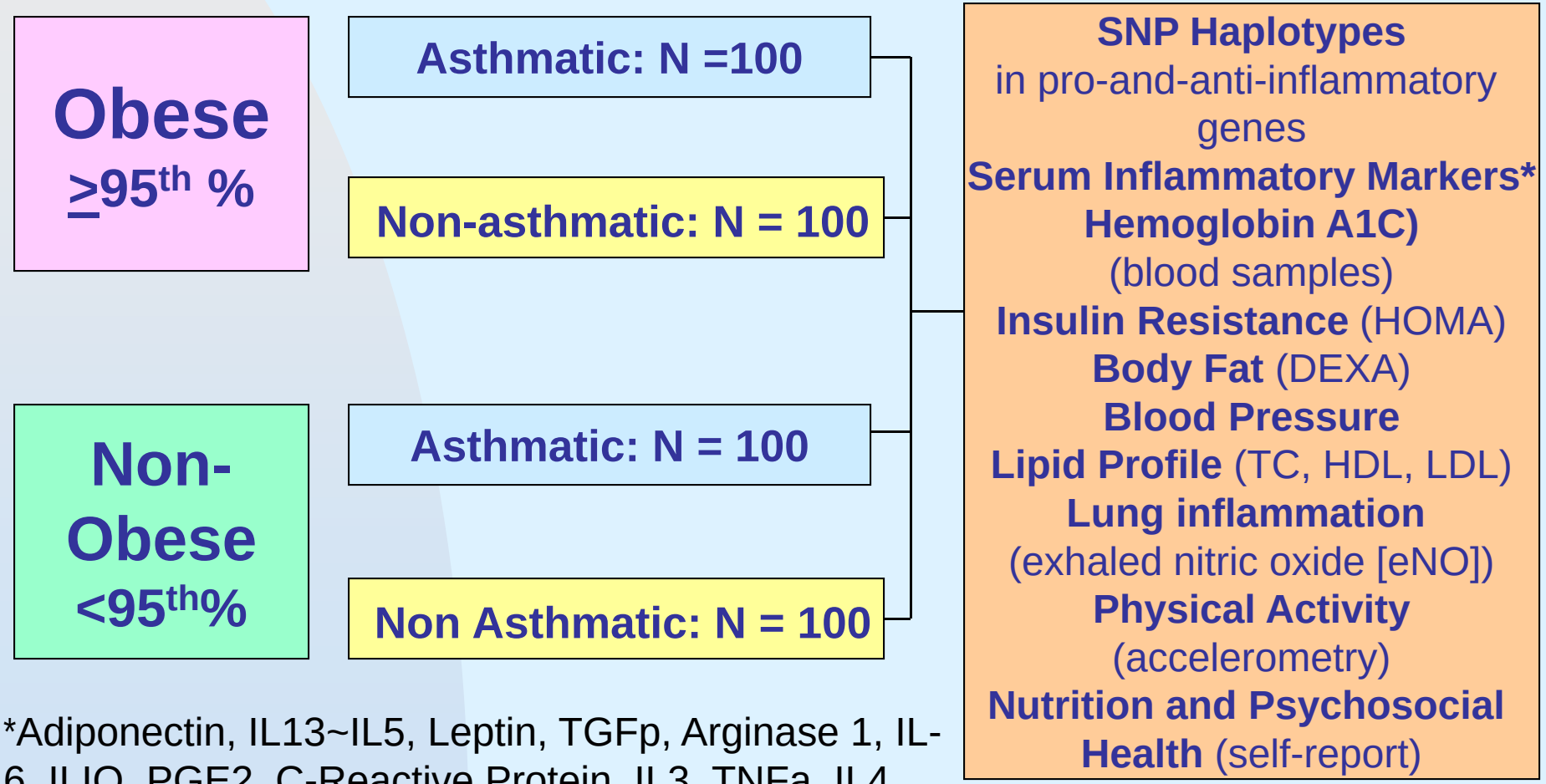
Obesity and Asthma: Determinants of Inflammation and Effect of Intervention in African-American Female Adolescents



*Adiponectin, IL13~IL5, Leptin, TGFp, Arginase 1, IL-6, ILIO, PGE2, C-Reactive Protein, IL3, TNFa, IL4

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. . other's ctions cream . ouder than er ords… (Trim Kids, 2001)

- Mothers' food consumption is the single best predictor of toddlers' food consumption
- Children's food preferences are more strongly correlated with mother.
- Children will eat more food if served more.
- Mothers who are preoccupied with dieting may influence their daughters habits
- Mothers food decisions influence daughters' choices (milk, fruits/veggies, whole grains)

Horodynski MA, Stommel M, et. al. Matern Child Health J. 2009 Jul 23; Keery, Eisenberg, Boutelle, et. al. Psychosom Res. 2006 Jul;61(1):105-111; Fisher, et al, JADA, 2002; .Birch, 1980 & 1995

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Encourage Outdoor Play for All Children

89% of pediatricians believe that unstructured play helps to prevent obesity.

88% of pediatricians believe that the availability of quality play spaces for unstructured play is important.

Physician Specialty Panel Harris Poll Online, 2005

Outdoor Play in Nature

Clements, Contemporary Issues in Early Childhood, 2004; Sothern, Trim Kids, 2001; Handbook of Pediatric Obesity, 2006

The most successful outdoor play experiences involve the child's free choice, which is self-motivated, enjoyable and process oriented.

Natural experiences such as collecting leaves, throwing stones in a pond, jumping over small brush or logs, and building sandcastles challenge the child's imagination and reasoning abilities.

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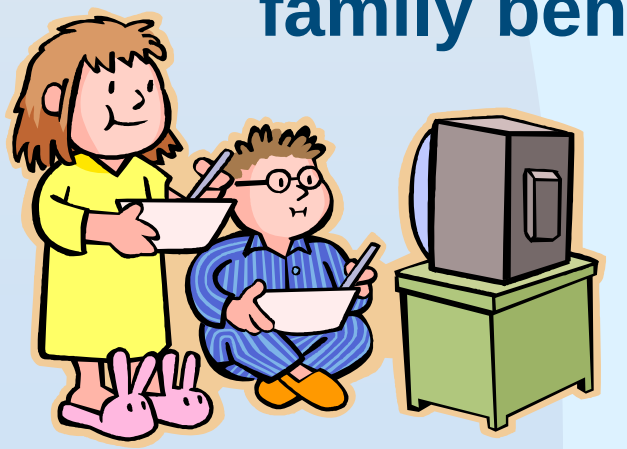
What Can Health Care Providers Do?

- Secondary prevention
  - **Establish/support programs that prevent overweight children and adolescents from developing obesity and metabolic disease**
- Tertiary prevention
  - **Implement high quality, intense group family behavioral programs including nutrition and exercise to prevent obese children from becoming severely obese young adults**



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American Heart Association Childhood Obesity Summit

- The complex and multiple factors causing pediatric obesity warrant a multi-disciplinary, collaborative approach:
  - Engage professionals across multiple disciplines
  - National effort including research, health, advocacy, education, media, consumer advertising.

Daniels SR, et al. American Heart Association Childhood Obesity Research Summit: Executive Summary. Circulation (2009) 119: 2114-2123.

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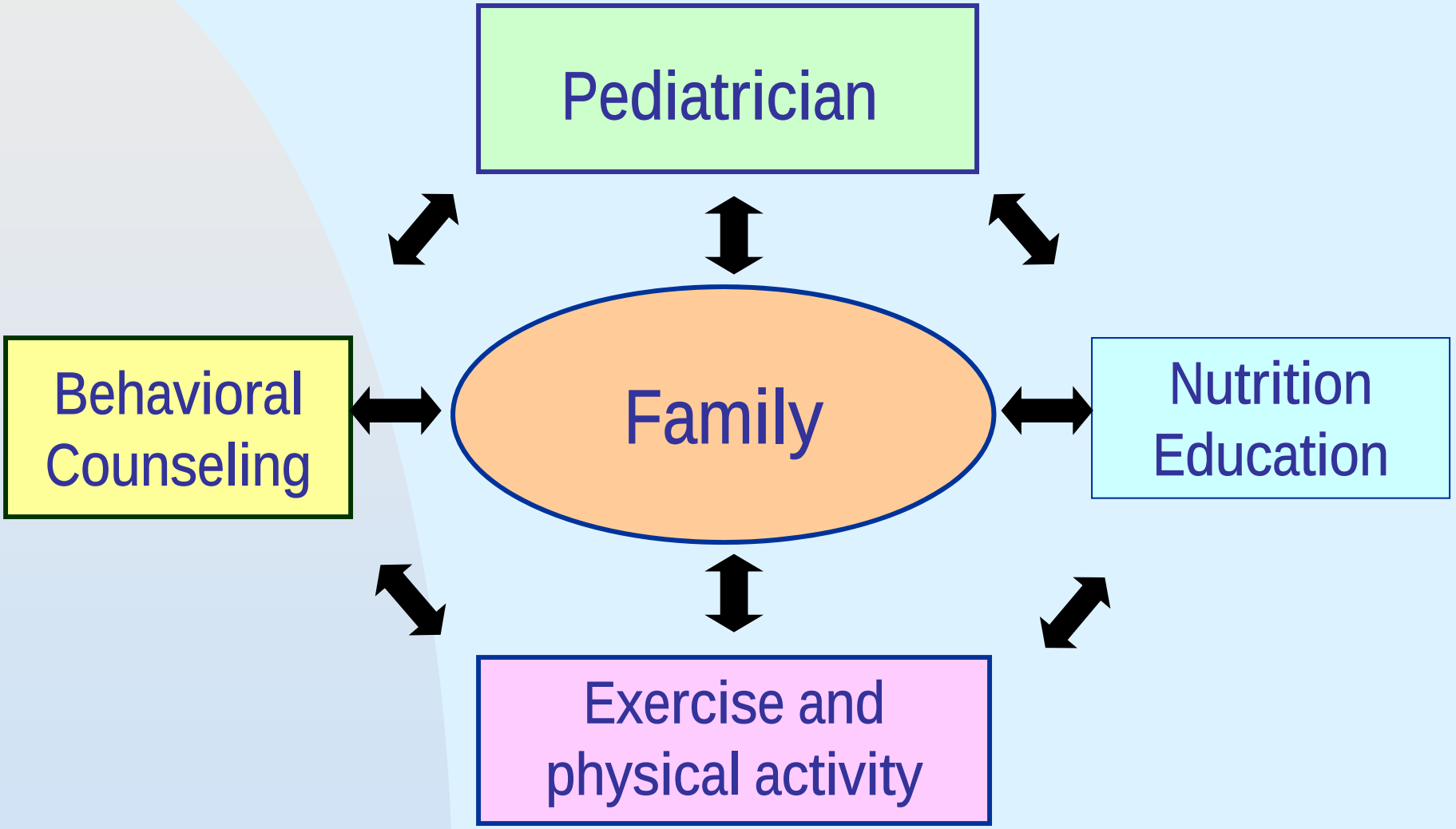
Pediatric Obesity Weight Management Program



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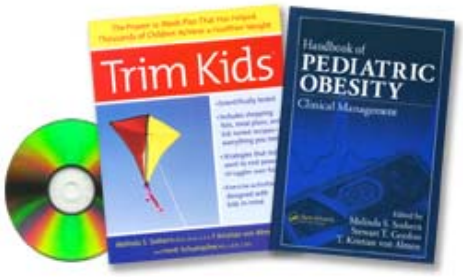
Summary of Evidence Based Studies in Overweight Children – Tertiary Prevention

U.S. Preventive Services Task Force Recommendation Statement – February 2010

Recommendations:

- Adequate evidence that multi-component, moderate-to-high-intensity behavioral interventions for obese children and aged 6 years and older.
- Multi-component interventions included dietary, physical activity and behavioral counseling
- Adequate evidence that the harms of behavioral interventions are no greater than small.

Pediatrics , 2010, 125(2): 360-367



Trim Kids Inter-disciplinary, Multi-level Weight Management Program

- Incorporates short-term goal setting, regular feedback, and motivational techniques to improve the diet and exercise behaviors of the family.
- Exercise and dietary guidelines are stratified to the age, health and weight status of the child
- Recognized by the National Cancer Institute as a Research Tested Intervention Program
- Acknowledged by the U. S. Surgeon General for its community dissemination in YMCA centers in Louisiana

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Summary

Interventions to prevent childhood obesity should involve families and be fun and entertaining.

"Provide parent training while you play with the kids"

for more information:

msothe@lsuhsc.edu

Trim Kids and Handbook of Pediatric Obesity available at www.amazon.com

TRIM KIDS™

The Proven **12-WEEK PLAN** That Has Helped Thousands of Children Achieve a Healthier Weight

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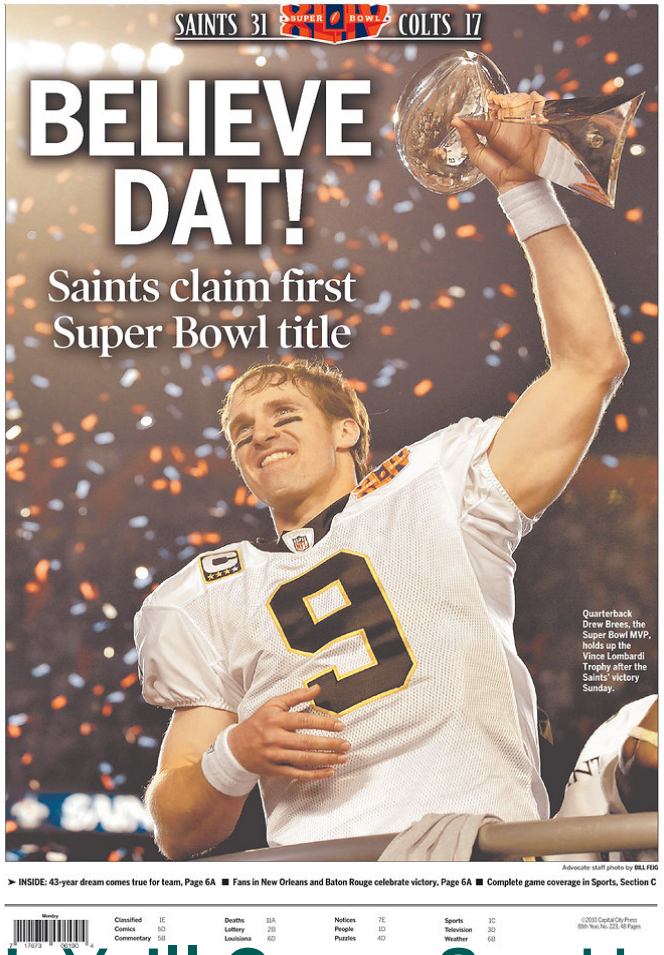
Mambo in New Orleans

2010 Super Bowl Champions

Who Dat!



We're Back and Better than Ever! Ya'll Come See Us....

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What Can Policy Makers Do?

Implement Policies and Allocate Financial Resources to:

- Support high quality, intense, multi-disciplinary, out-patient weight management programs
- Encourage community and school gardens, farmers markets, support for local producers
- Build/improve/maintain parks and playgrounds
- Zoning requiring sidewalks, biking lanes, green space and trees
- Minimum PE and recess (outdoor play) standards
- Stricter laws and enforcement of adults who prey on children and **TERRORIZE** our neighborhoods:

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Parent and Preschool Staff Perceptions about Physical Activity – Barriers and Concerns

- Access to safe play areas in the community
- Safety concerns exacerbated by negative media stories – 82% believe playing outdoors is unsafe
- Time restraints
- Financial restraints
- Safety regulations about equipment design and use
- Lack of physical activity supplies (movables)

Dwyer, et al, Int J Behav Nutr Phys, Act, 2008; Clements, Cont. Issues in Early Child Dev, 2004

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The Built Environment: Sidewalks, Biking Lanes, Parks and Playgrounds, Green Space

- Connected streets, sidewalks and access to recreational facilities promote outdoor play
- Absence of community playgrounds, sidewalks and cul-de-sacs discourages physical activity
- Children spend more time in vehicles being transported to indoor activities than in outdoor play in nature.
- Children with less adult supervision spend less time outdoors
- Minority and poor children have less access

AAP, Pediatrics, 2009; Cleland, et al, J Epidemiol Community Health, 2009; Gordon-Larsen, et al, Pediatrics, 2006

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What Can Schools Do?

- Encourage and support gardening, cooking and recreational programs before, during and after school:
  - share resources with community members
- Require that ALL foods (cafeteria, vending, snack, party) are healthy and nutritious
- Increase recess time $\geq$ 60 minutes per day

(15 min. morning; 30 min lunch; 15 min. afternoon)

- Provide green space & outdoor supplies for natural play
- Require daily health and physical education (PE) class and provide elementary PE teachers
- Include PE questions on standardized testing
- Enforce homework limits based on scientific developmental literature

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Impact of a community-based school garden intervention on caretaker attitudes and behaviors towards fruits and vegetables: *The Makin' Groceries pilot study*

LSUHSC School of Public Health
Behavioral and Community Health Sciences
Masters of Public Health Thesis
Megan Burns

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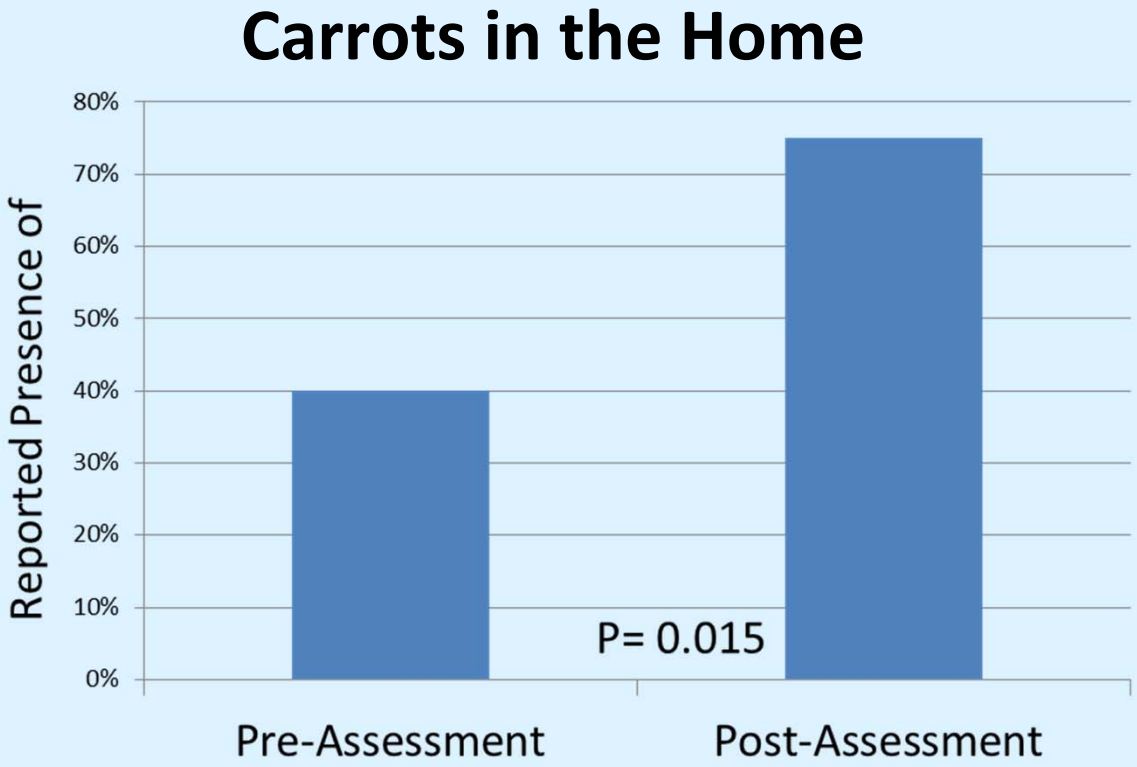
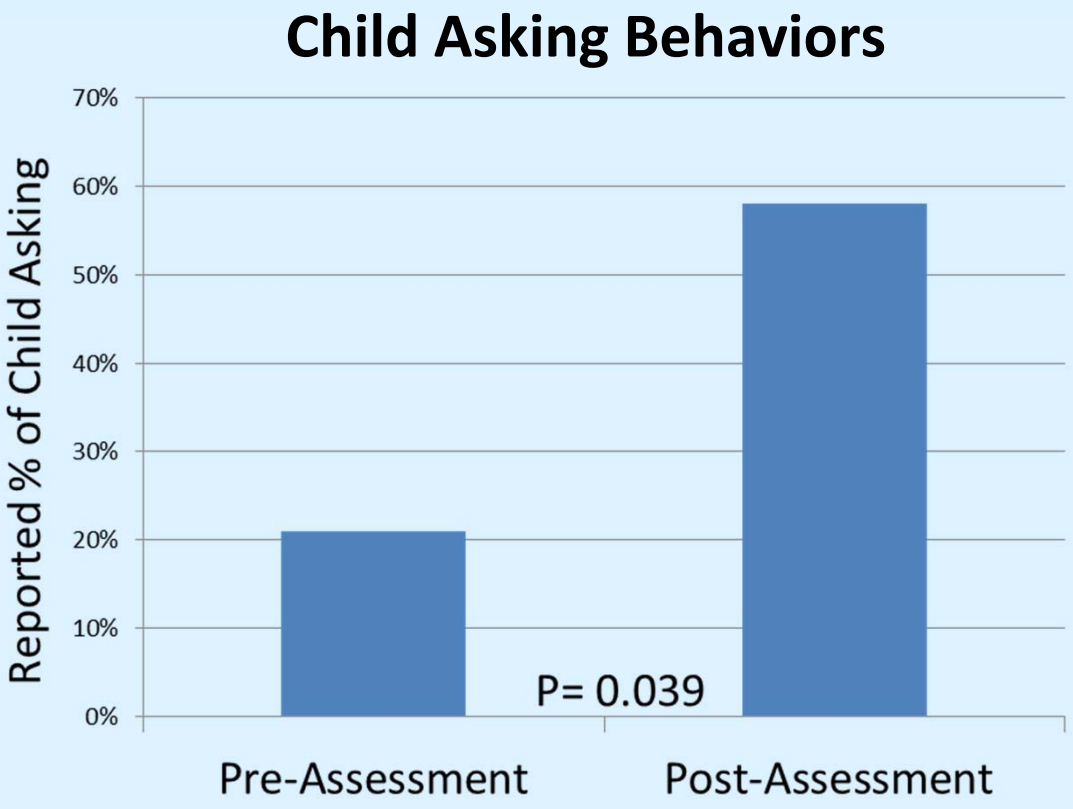
Results: *Caretakers – Presence of Carrots in the Home*



Self-reported - in the previous 2 weeks.
Paired t-test (N=20)

Burns, Brown, Tortu, Nuss, Sothern, Obesity, 2011; The Obesity Society, 2011, Orlando FL

Results: ***Caretakers Child Asking for New Fruits/Veggies***



Parent Self-Report of child asking for new fruits and vegetables in the previous week. Paired t-test (N=19)

Burns, Brown, Tortu, Nuss, Sothern, Obesity, 2011; The Obesity Society, 2011, Orlando FL

Pre-school Day Care Centers: Target of Opportunity

1) About 75% of children between 3-6 years are in some type of out-of-home child care.

2) More than 50% of children are in centers; others in family child care homes

3) NAP SACC:

Nutrition And Physical-activity Self Assessment for Child Care (Ammerman, 2007)

Developed by University of North Carolina School of Public Health (Dianne Ward, PhD)

4) Pilot program with Louisiana Office of Public Health MCH and LSU Health Sciences Center

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What Can Communities Do?

Partner with health-care providers, schools, policy-makers, and industry:

- Support zoning for community health centers, safe areas for children to play outdoors.
- Provide opportunities for community gardening
- Form coalitions between neighborhood associations to:
  - increase green space, trees
  - improve park/playground maintenance and safety
  - build sidewalks and biking trails
  - limit access to convenient/fast food outlets

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Prevention of Pediatric Obesity in Community Health Care Settings

The Obesity Society offers a Childhood Obesity Resource Guide for Health Care Providers free of charge on the website:

http://www.obesity.org/publications/other-obesity-society-publications.htm

The guide was developed by pediatric obesity experts in collaboration with the National Association of Community health Centers and funded by a gift from Covidien Pharmaceuticals.

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What Can Communities Do?

Support the Children and Nature Initiative to encourage children to spend more time outdoors and learn how to protect their health and the environment:

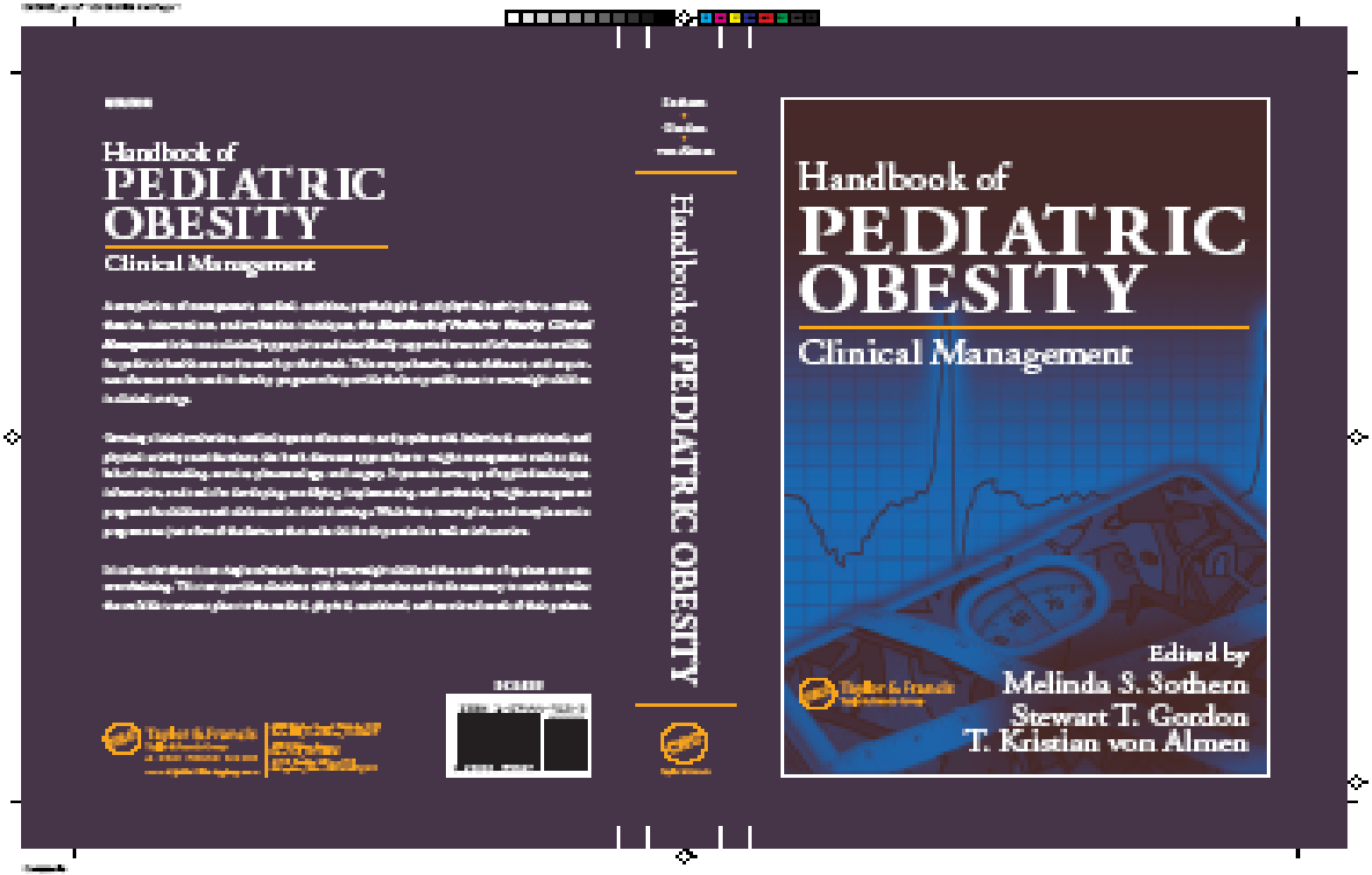
http://www.neefusa.org/health/children_nature/resources.htm

Kruger, et al, Health Promt Pract, 2009; McCurdy, et al, Current Problems in Pediatric and Adolexcent Health Care, 201

Additional Resources:

Louisiana Public Broadcasting System (PBS) one hour documentary, **"Kids Trying to Trim Down",** and a series of six 30-minute segments, **“Kids Trimming Down”** on healthy eating, physical activity and family behavioral counseling. Website: **www.lpb.org**

Additional Resources:



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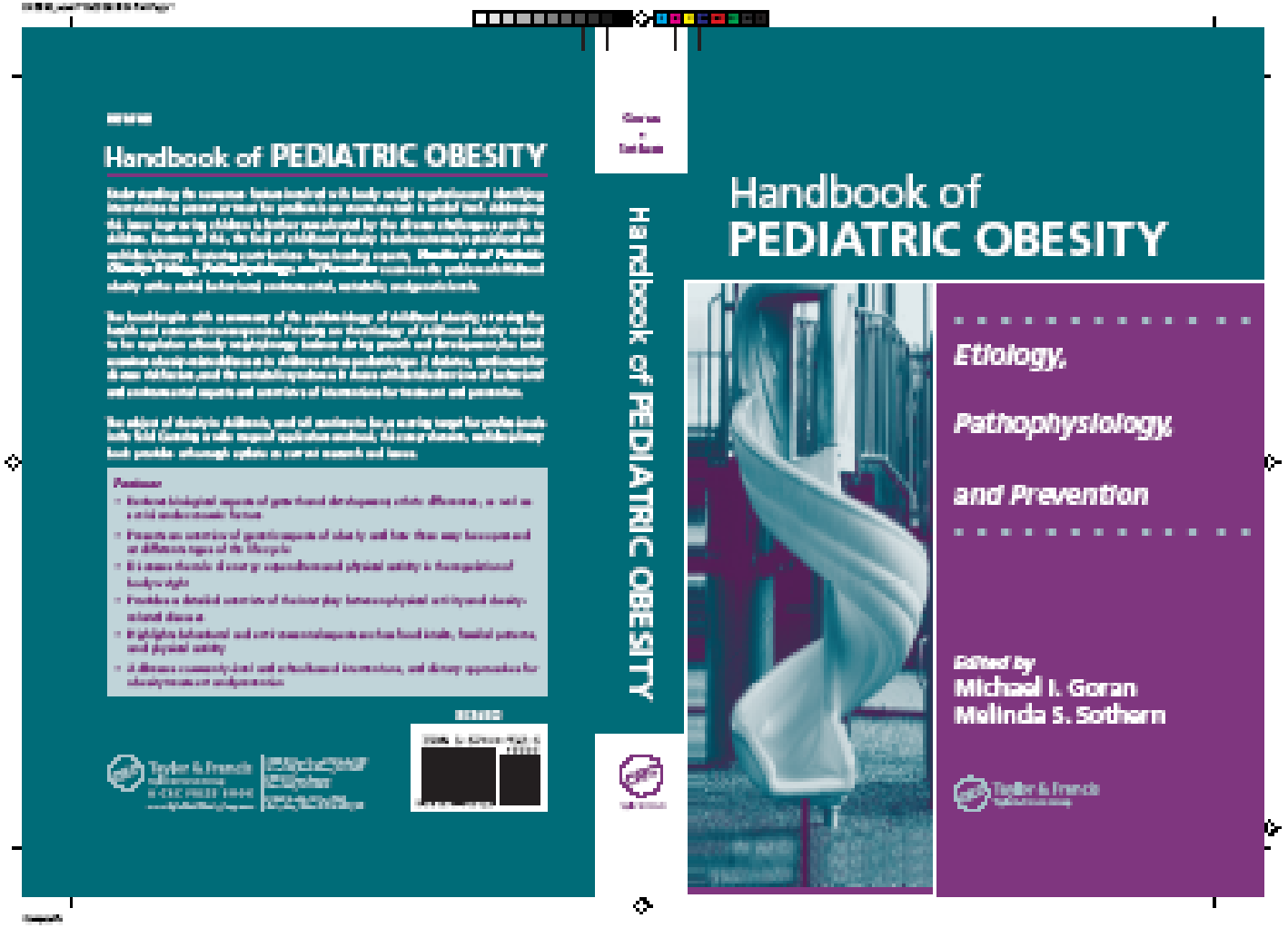
Additional Resources



Ed. Melinda S. Sothern, Michael I. Goran

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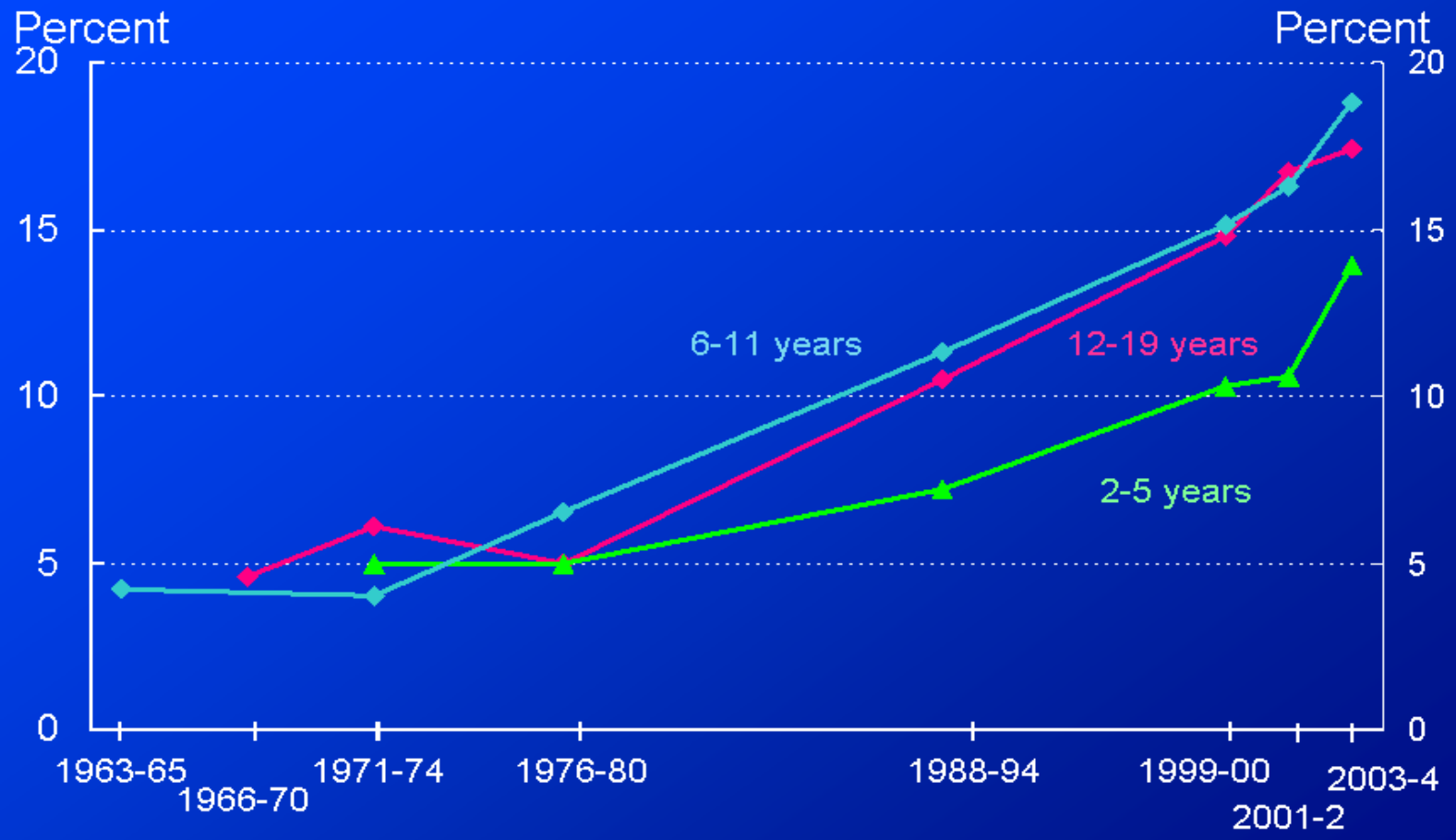
Trends in Child and Adolescent Overweight



Note: Overweight is defined as BMI >= gender- and weight-specific 95th percentile from the 2000 CDC Growth Charts.
Source: National Health Examination Surveys II (ages 6-11) and III (ages 12-17), National Health and Nutrition Examination Surveys I, II, III and 1999-2004, NCHS, CDC.

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Breastfeeding, cont'd

- In studies reviewed, lower risk of obesity found in children who had been breastfed

- Relative to formula feeding, meta-analyses showed that breast-feeding reduces the odds ratio for obesity during school years.

- Associated with decreased risk for many early-life diseases and conditions: respiratory tract infections, atopic dermatitis, gastroenteritis, sudden infant death syndrome.

- Associated with health benefits to women: decreased risk for type 2 diabetes, ovarian cancer, and breast cancer.

[i] Cope MB, Allison DB. Obes Rev. 2008, Mayer-Davis EJ, Rifas-Shiman SL, et. al. Diabetes Care. 2006; Dewey KG. J Hum Lact 2003;Koletzko B, et. al. Adv Exp Med Biol. 2009;Oddy WH, Sherriff JL, et. al. Am J Public Health. 2004; MMWR Morb Mortal Wkly Rep. 2007

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The American Experience

Objective No. 2

Provide practical and proven guidelines to support primary, secondary and tertiary prevention of pediatric obesity:

Evidenced-based protocols for improving nutrition and physical activity: benefits, *requirements* and current status

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Lifestyle Recommendations by Weight Classification for Management of Obesity in Youth (ages 2-18 years)

Weight Classification	Healthy Weight (5^{th} – 84^{th} % BMI)
Level of Behavioral Treatment	Receive support in maintaining or establishing healthy lifestyle (prevention) behaviors
Dietary Counseling	Family nutrition education and parent training emphasizing appropriate food portions , reduced sugar and saturated fat, increased fruits and vegetables, and recommended dairy and fiber intake
Physical Activity	Limit screen time < 2 hours/ day; recommended physical activity requirements: 60 minutes of daily moderate to vigorous physical activity (3 days/week of vigorous activity) and bone and muscle strengthening activities

Adapted from Barlow, Pediatrics, 2007; Sothern, Handbook of Pediatric Obesity, Taylor and Francis, 2006

**Note: Guidelines should be readjusted every 10-15 weeks based on evaluation results*

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Nutrition Guidelines for Parents

- Observe the child's eating and physical activity behaviors.
- Begin nutrition education prior to pre-school
- Schedule frequent sessions with the pediatrician for advice and monitoring.
- Select healthy fruits and snacks as treat foods, i.e. grapes, raisins, etc.

Lannigan, Child, 2010; Barlow, Pediatrics, 2007; Sothern, Handbook of Pediatric Obesity, Taylor and Francis, 2006

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Nutrition Guidelines for Parents

- Create a safe home food environment:
  - *Gradually* replace non-nutritious foods in the home.
  - Display and keep within reach nutritious foods naturally low in fat and sugar.
  - Allow infrequent consumption of non-nutritious foods away from the home.
  - Downsize: Place foods in serving size containers.

Barlow, Pediatrics, 2007; Sothern, Handbook of Pediatric Obesity, Taylor and Francis, 2006

Evidence-based Recommendations for Physical Activity in School-Age Youth

School-age youth should participate daily in 60 minutes or more of moderate to vigorous physical activity that is:

- Developmentally appropriate
- Enjoyable
- Involves a variety of activities

Strong, Malina, Blimkie, et al, J Pediatrics, 2005; U.S. 2008 Guidelines

Evidence-based Recommendations for Physical Activity in School-Age Youth – Type

- **Pre-school Years:**

  General movement activities (jumping, throwing, running, climbing)

- **Pre-pubertal (6-9 years):**

  More specialized and complex movements, anaerobic (tag, games, recreational sports)

- **Puberty (10-14 years):**

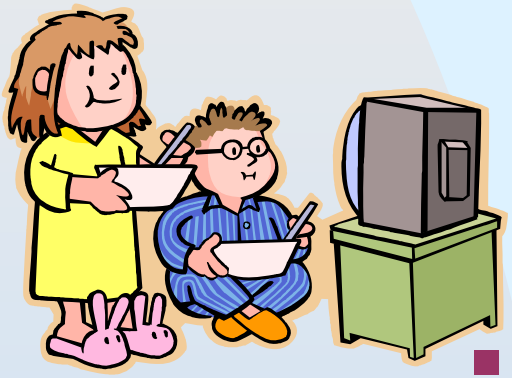
  Organized sports, skill development

- **Adolescence (15-18 years)**

  More structured health and fitness activities, refinement of skills

Strong, Malina, Blimkie, et al, J Pediatrics, 2005;2008 U. S. guidelines

Evidence-based Recommendations for Physical Activity in School-Age Youth



Physically inactive youth:

- Incremental approach to reach the 60 minute per day recommendation
- Increase activity by 10% per week
- Progressing too quickly is counter productive and leads to injury

Strong, Malina, Blimkie, et al, J Pediatrics, 2005; 2008 U.S. guidelines

American Heart Association Childhood Obesity Summit

- **Overweight youth should be given realistic, easily obtainable physical activity goals**
  - **Should not be compared to normal weight peers**

Daniels SR, et al. American Heart Association Childhood Obesity Research Summit: Executive Summary. Circulation (2009) 119: 2114-2123.

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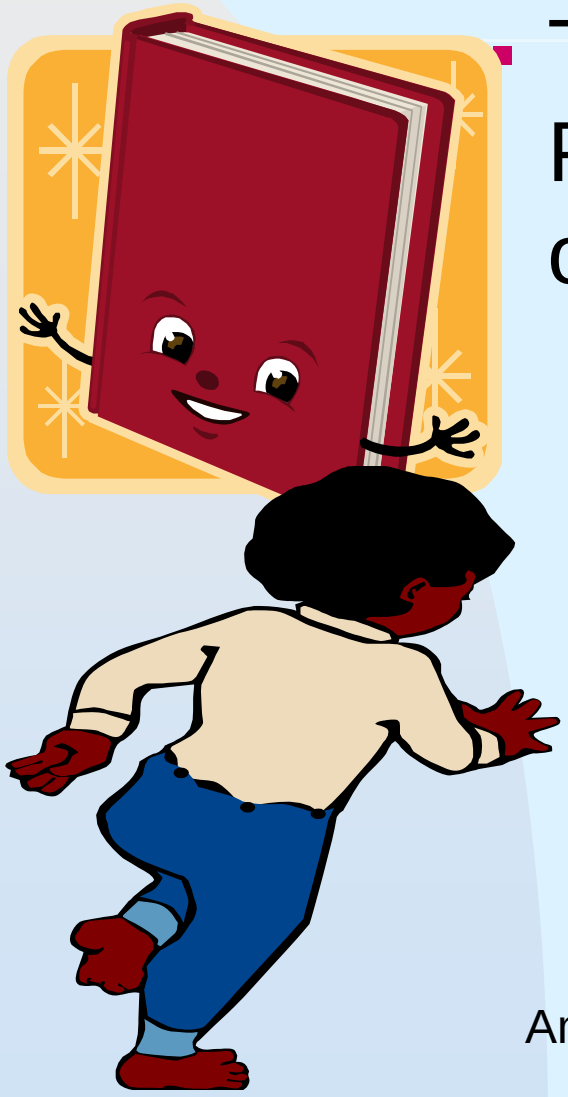
Recommendations for Outdoor Play



- The American Academy of Pediatrics recommends more outdoor play in order to:
  - promote healthy emotional and physical development
  - increase vitamin D levels
  - replace screen time indoors
  - increase overall physical activity
  - reduce risk of attention problems

American Academy of Pediatrics, 2010; Christakis, et al, Pediatrics, 2004; Ginsberg, Pediatrics, 2007

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Young children will engage in large volumes of intermittent, non-structured physical activity if provided with an environment that promotes free play.

Bailey, Med Sci Spor Ex, 1994; Stucky-Ropp, Prev, Med, 1993; DiNubile, Prev Med,1993

Provide opportunities for young children to safely climb, run and jump to encourage the development of muscular strength and endurance.

Sothern, 2001

Initial Exercise Guidelines for Healthy and Overweight Children

Recommended Strength Training:

2-3 days per week at 60-80% of 1Rep Max.

1-2 sets per exercise.

1 exercise for each major muscle group.

Recommended Flexibility Training:

5 days per week 15-30 minutes.

1 exercise for each major muscle group.

NOTE: Guidelines should be readjusted every 10-15 weeks based on evaluation results.

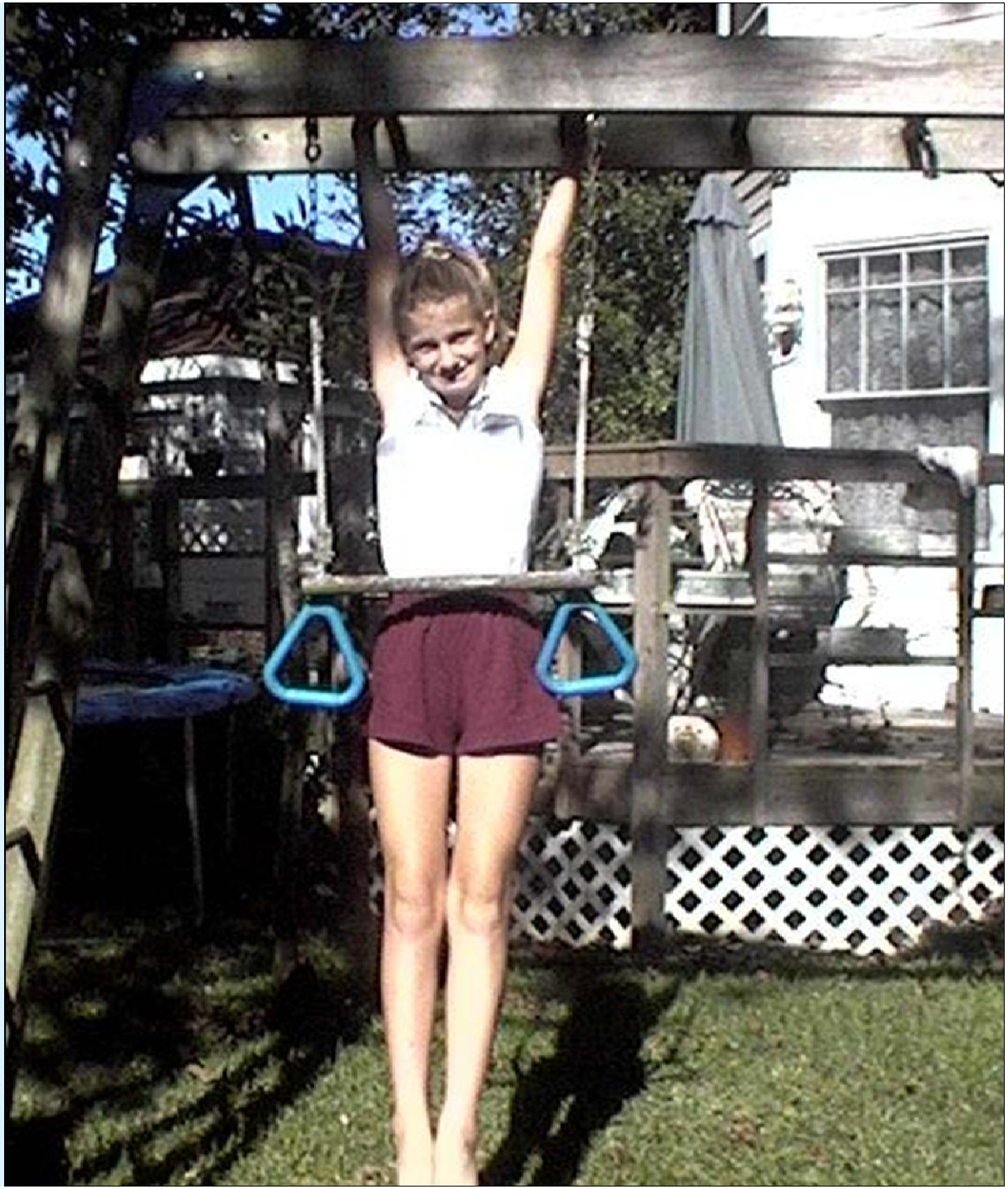
ACSM, 2010; Sothern, Handbook of Pediatric Obesity: Clinical Management, 2005

Windows of Opportunity

Show a 4-year old a move and they'll remember it for years and years.

Strength training develops *muscle intelligence*, which has numerous long term health benefits.

Sothern, 2001



Strength Training Improves Lean Muscle and Bone Mineral Content

Obese, prepubertal children ~ 10 yrs; randomized to

- Diet alone (n = 41) (control group).
- Diet plus strength training (n = 41) (training group)

75-minute strength exercise 3 times/wk

After 6 weeks, the children in the training group showed significantly larger increases in:

- Lean body mass (+ 0.8 kg [2.4%] vs. +0.3 kg [1.0%], $p < 0.05$) than control group
- Total bone mineral content (+46.9 g [3.9%] vs. +33.6 g [2.9%], $p < 0.05$) than control group

Yu, et al, J Strength Cond Res, 2005

A 16-wk resistance training program significantly increases insulin sensitivity in overweight Latino adolescent males at risk for type 2 diabetes

- Overweight Latino adolescent males (N=22) were randomly assigned to 2/week resistance training (RT=11) or a non-exercising control (C=11) for 16 wks.
- Strength by1-rep max; lean and fat mass by DEXA, and insulin sensitivity by the frequently sampled intravenous glucose tolerance test with minimal modeling.
- Significant increases in strength ($P<0.05$) and insulin sensitivity in the RT compared to C group (45.1+/-7.3% in the RT group versus -0.9+/-12.9% in controls [$P<0.01$]).
- Results remained significant after adjusting for fat and lean mass ($P<0.05$).

Shaibi, et al, Med Sci Sports Exerc, 2006

Lifestyle Recommendations by Weight Classification for Management of Obesity in Youth (ages 7-18 years)

Weight Classification	Overweight (85^{th} – 94^{th} % BMI)
Level of Behavioral Treatment	Some children should receive prevention counseling (if no evidence of health risk), whereas others (evidence of health risk) should receive more-active interventions
Dietary Counseling	Family nutrition education and parent training in combination with portion control methods or balanced calorie meal plans emphasizing appropriate food portions , reduced sugar and saturated fat, increased fruits and vegetables, and recommended dairy and fiber intake
Physical Activity	Limit screen time < 2 hours/day; incremental approach to increase physical activity volume; weight bearing aerobic activities (e.g. field sports, tennis, jump rope); pacing skills; parent training; fitness education

Adapted from Barlow, Pediatrics, 2007; Sothern, Handbook of Pediatric Obesity, Taylor and Francis, 2006

**Note: Guidelines should be readjusted every 10-15 weeks based on evaluation results*

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U.S.Centers for Disease Control Body Mass Index Percentiles for Children and Adolescents*

Age (yrs.)	Healthy Weight 50th-85th %	Overweight > 85th %	Obese > 95 %	Severely Obese > 97 %
5	15-17	> 17	> 18	> 18
8	16-18	> 18	> 20	> 21
11	17-20	> 20	> 23	> 25
14	19-23	> 23	> 26	> 28
17	21-25	> 25	> 28	> 30

*Males

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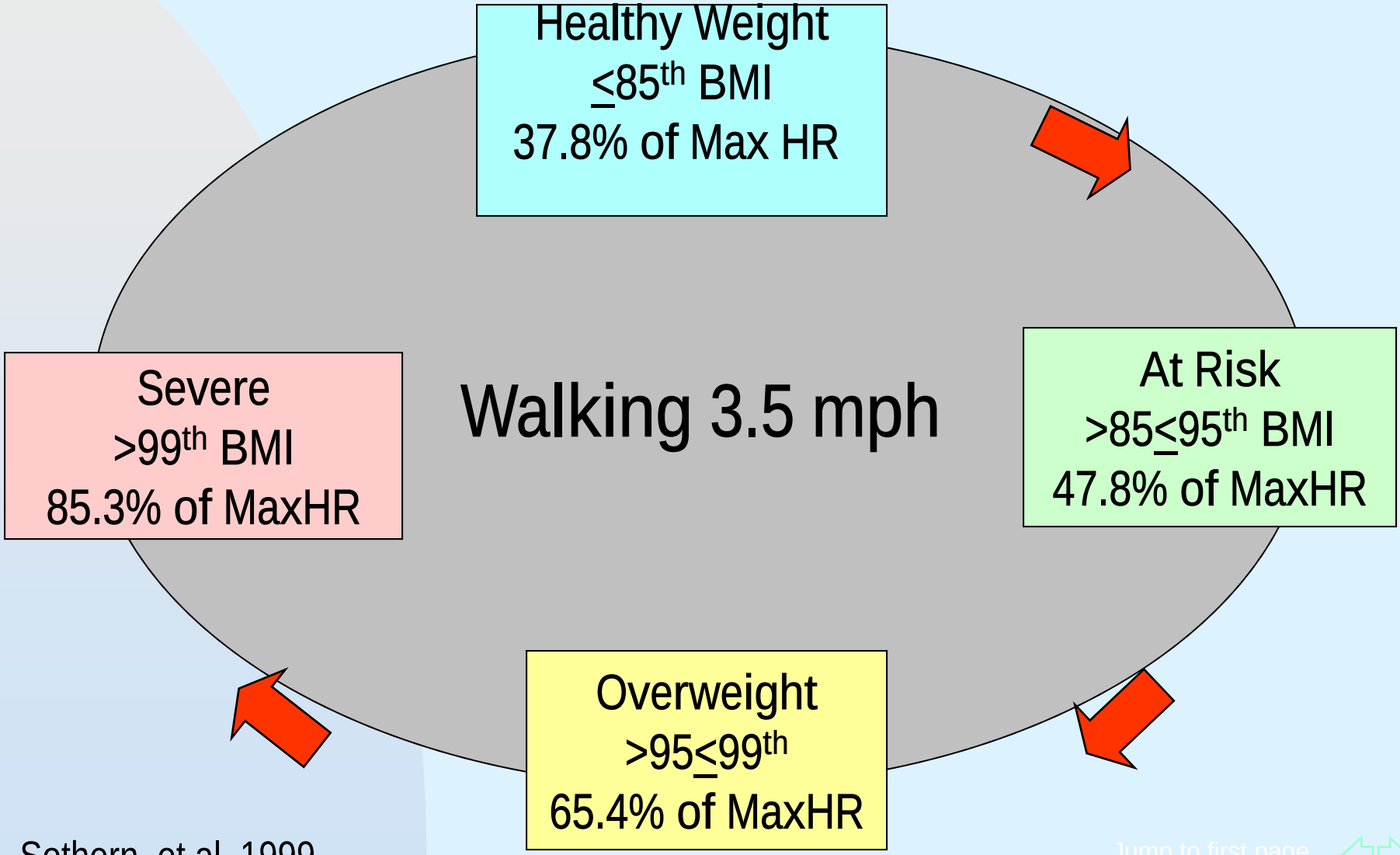
Heart Rate during Walking in Children with Increasing Overweight Levels



Sothern, et al, 1999

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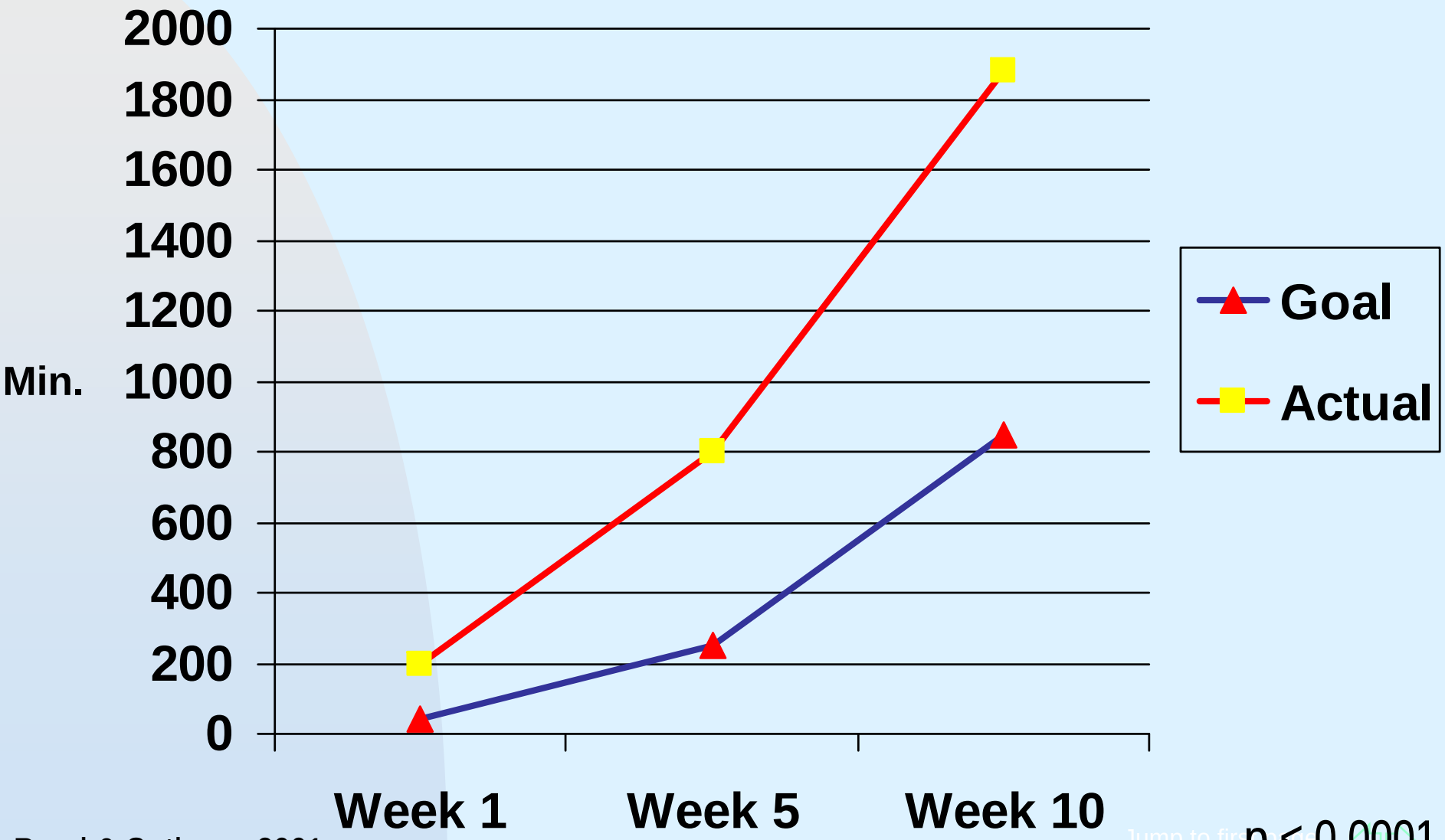
Volume of Exercise in Severely Overweight Children



Reed & Sothern, 2001

$p < 0.0001$

Lifestyle Recommendations by Weight Classification for Management of Obesity in Youth (ages 7-18 years)

Weight Classification	Obese (≥95th% BMI)
Level of Behavioral Treatment	Most children considered obese should be advised to focus on weight control practices.
Dietary Counseling	Family nutrition education and parent training in combination with balanced hypocaloric diets emphasizing appropriate food portions, reduced sugar and saturated fat, increased fruits and vegetables, recommended dairy and fiber intake, and Low GI Diet
Physical Activity	Limit screen time; incremental approach to increase physical activity volume; alternate between weight-bearing and non-weight-bearing activities (e.g. swimming, cycling, seated or lying circuit training); parent training; fitness education

Adapted from Barlow, Pediatrics, 2007; Sothern, Handbook of Pediatric Obesity, Taylor and Francis, 2006

**Note: Guidelines should be readjusted every 10-15 weeks based on evaluation results*

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Lifestyle Recommendations by Weight Classification for Management of Obesity in Youth (ages 7-18 years)

Weight Classification	Severely Obese (>99th % BMI)
Level of Behavioral Treatment	Other emotional and dietary concerns must be addressed
Dietary Counseling	Family nutrition education and parent training in combination with altered macronutrient dietary approaches as follows: Low GI Diet, Atkins Diet, protein modified fast diet followed by balanced hypo-caloric diet
Physical Activity	Limit screen time < 2 hours/day; incremental approach to increase physical activity volume; non-weight-bearing activities (e.g. swimming, cycling, seated or lying circuit training); parent training; fitness education

Adapted from Barlow, Pediatrics, 2007; Sothern, Handbook of Pediatric Obesity, Taylor and Francis, 2006

**Note: Guidelines should be readjusted every 10-15 weeks based on evaluation results*

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Physical Activity for Metabolic Syndrome: Label for Use in Childhood (adapted from Brambilla, et al, IJO, 2011)

Description of the Drug	Any body movement produced by skeletal muscles that results in energy expenditure
Clinical pharmacology	Effect on insulin sensitivity and substrate disposal; regular use induces changes in enzyme function and mitochondrial activity
Indications	Metabolic health maintenance and treatment, any condition requiring an increase of energy expenditure, improvement of vascular function
Contraindications	None
Warnings	Modulate according to gender and age categories, endurance training is not recommended in young children, suggested use in small groups
Precautions	Hypoglycemia in DM1, risk for water and salt losses in particular climate conditions
Adverse effects	Musculoskeletal disorders, hypertension (limited to activities with high work load)

What is Dance Dance Revolution?

Active screen media device that transforms typical sedentary screen time into physical activity

- Overweight children expend more energy than normal weight children during Dance, Dance Revolution
- Similar to a 12 minute walking treadmill test
- Significantly increases energy expenditure when compared to traditional screen time.

High school students playing DDR during PE class

Unnithan et al. (2006) Int J Sports Med,

In recent studies Dance Dance Revolution was shown to:

- Improve aerobic fitness
- Improve blood pressure
- Elicit higher energy expenditure values compared to similar devices.
- Have a broader appeal and greatest ease of use
- Not be sufficiently motivating to produce sustained physical activity over time

(Murphy, et al, 2010, Int'l J Ped; Lanningham-Foster et al, 2006, Pediatrics; Ob; Madsen, Arch Pediatr Adolesc Med, 2007).

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Motivating Overweight Children to Increase Physical Activity

Do a Little Dance!

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If you create the environment, they will play outdoors.

Bop balls,

Pogo stick,

Scooter

Cable ride

Clement, Cont. Issues of Child Dev, 2004, Sothern, Trim Kids, 2001

If you create the environment, they will play indoors.

Discovery mat

Mini-Tramp

Hopscotch

Nerf basketball,

Exercise Breaks, Improved Weight and Metabolic Profiles

- Integrating daily 10-minute exercise breaks during paid work time over one year in 335 adults reduced waist circumference by 1.6 m ($p<0.009$) in all, BMI ($p<0.03$) in males and DBP in females ($p<0.42$ [Lara, et al, Prev Chronic Dis, 2008])

- Increased moderate-to-vigorous intensity activity breaks in sedentary time were beneficially associated with waist circumference ($p<0.026$), BMI, $p<0.026$), triglycerides, $p<0.029$), and 2-h plasma glucose ($p<0.025$) in 168 adults (Healy, et al, Diabetes Care, 2008).

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The Inclusion of Indoor and Outdoor Physical Activity Centers to Increase Unstructured Play in 2-6th Grade Youth.

Students' participation when they were given access to the outdoor physical activity equipment. (Highest = 1; Lowest = 5; Mean ± SD: 1.64 ± 0.78)

Always	Often	Sometimes	Seldom/Never
52.3%	29.4%	17.7%	0% / 0%

Students' participation when they were given access to the indoor physical activity equipment. (Highest = 1; Lowest = 5; Mean ± SD: 2.35 ± 1.06)

Always	Often	Sometimes	Seldom/Never
17.7%	47.1%	23.5%	5.9% / 5.9%

The Wise Mind Study; Sothern, et al, Obesity, 2006

Physical Activity Center Imagination Station

- Plastic tub filled with dress-up clothes
- Microphone, drums, toy musical instruments
- Puppets, marionettes, magician kits, various stuffed animals
- Batons, small flags, pom poms, streamers, hula hoops
- Foam mats and wedges, indoor tents
- Hop scotch mat, action games like Twister, Charades
- Paddle balls, indoor ball toss games,, hacky sack
- Kid-safe dart boards or other target games
- Indoor basketball hoop and soft foam balls
- Jump ropes, skip-it, small kid-safe hand weights, exercise stretch bands.

Sothern et al, Trim Kids, Harper Collins, 2001

Benefits of Imaginative Play

- Improves social cognition
- Increases Inventiveness
- Enhances language development
- Encourages the use of symbols
- Improves comprehension skills
- Provides opportunities for children to imitate and interpret adult behavior

Guddemi & Eriksen, 1992; Singer & Singer, 2000; Bergen, 2002, Perry, 2003

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Physical activity is essential for healthy growth and development in youth. Large motor skills: (running, skipping, hopping, the “butterfly”) are associated with better cognitive and executive functioning (and reading ability) later in life.

Hills, 2007; Kalish, 2007; Hillman, 2006; Davis, et al, Health Psychol, 2011

- During in-seat classes the overall activity of ADHD students was higher than other students.
- Differences were greater during afternoon in-seat class; may be explained by the effect of fatigue
- No effect was found in not-in seat classes, i.e. PE

(Noa, et al, Psychiatry and Clinical Neurosciences, 2007)

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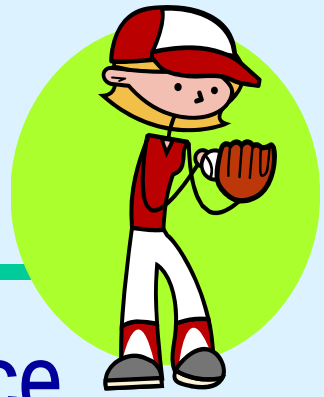
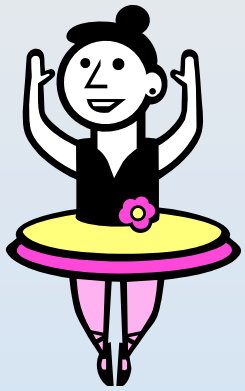
Solutions: What Can Parents Do?



- Enroll children in structured dance, sport or movement classes. Make sure the teachers are qualified.
  - If your child is already overweight, discuss his or her condition beforehand with the teacher.
- Select one grocery store aisle during each shopping trip and read food labels with your children. (Powell, et al, *J Nutr. 2010)*

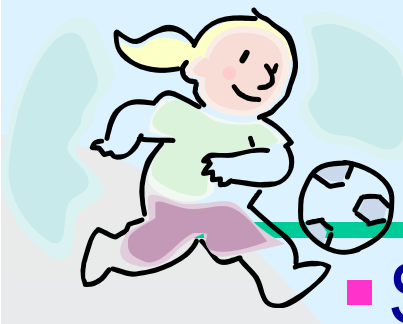


Sothern et al, Trim Kids, 2001; Handbook of Pediatric Obesity, 2006

Behavioral Treatment Strategies

- Monitoring of Diet and Activity
- Redirection & Give Choices
- Cue Elimination & Stimulus Control
- Limits Setting & Consistency
- Goal Setting & Action Planning
- Relapse Prevention
- **Based on Social Cognitive Theory***

*Bandura, 1988; Hunter, 1996; Sothern & Hunter, 1999; von Almen, 2006



Mastery Experiences

Social Cognitive Theory Construct

- Set short-term, achievable physical activity goals and provide activity rewards for those achieved.
- Applaud and encourage healthy nutrition choices, e.g. trying a new vegetable.
- Expose children to varied activities in a non-intimidating and nurturing environment.
- Realize that young children have immature metabolic systems. Don't impose adult exercise goals.

Sothern et al, Trim Kids, 2001; Handbook of Pediatric Obesity, 2006

Name_____Date_____
Goal Setting and Action Planning

My nutrition goal for this week is to:
Try cucumbers and kiwi fruit

My physical activity goal for this week is to: Ride my bike 3 times for 30 minutes

1. Does it say exactly what I plan to DO?
2. Do I have control over it?
3. Can I tell when I've done it?
4. Does it say what I WILL do instead of what I WON'T do?
5. Is it easy to do?

Sothern et al, Trim Kids, Harper Collins, 2001

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What is the Best Dietary Approach for Treating Overweight Children?

Nutritional Counseling in Overweight Children (>85th <99th BMI), 7-18 Years

- Dietary approaches based on portion control and/balanced calorie healthy, high fiber, low saturated fat, low sugar meal plans.
  - *The Stop Light Meal Plan* color-coded system
  - *Portion Control* reduces calorie intake by limiting the amount of food (portions).
  - *Portion Control* also helps to normalize food intake over a period of time.
  - Rules for Eating: Limit intake to 15 grams of "sugar" and 5 grams of "total fat" per serving.
- Parent training and nutrition education

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Trim Kids Nutrition Education

- **Educational and interactive sessions:**
  - **Four 10-week sessions in all.**
- **Each session is approximately 20 minutes.**
- **Alternate educational activities to maintain participation:**
  - **Cooking, games, classes, labs, etc.**
- **Begin with simple topics and advance to applied activities.**

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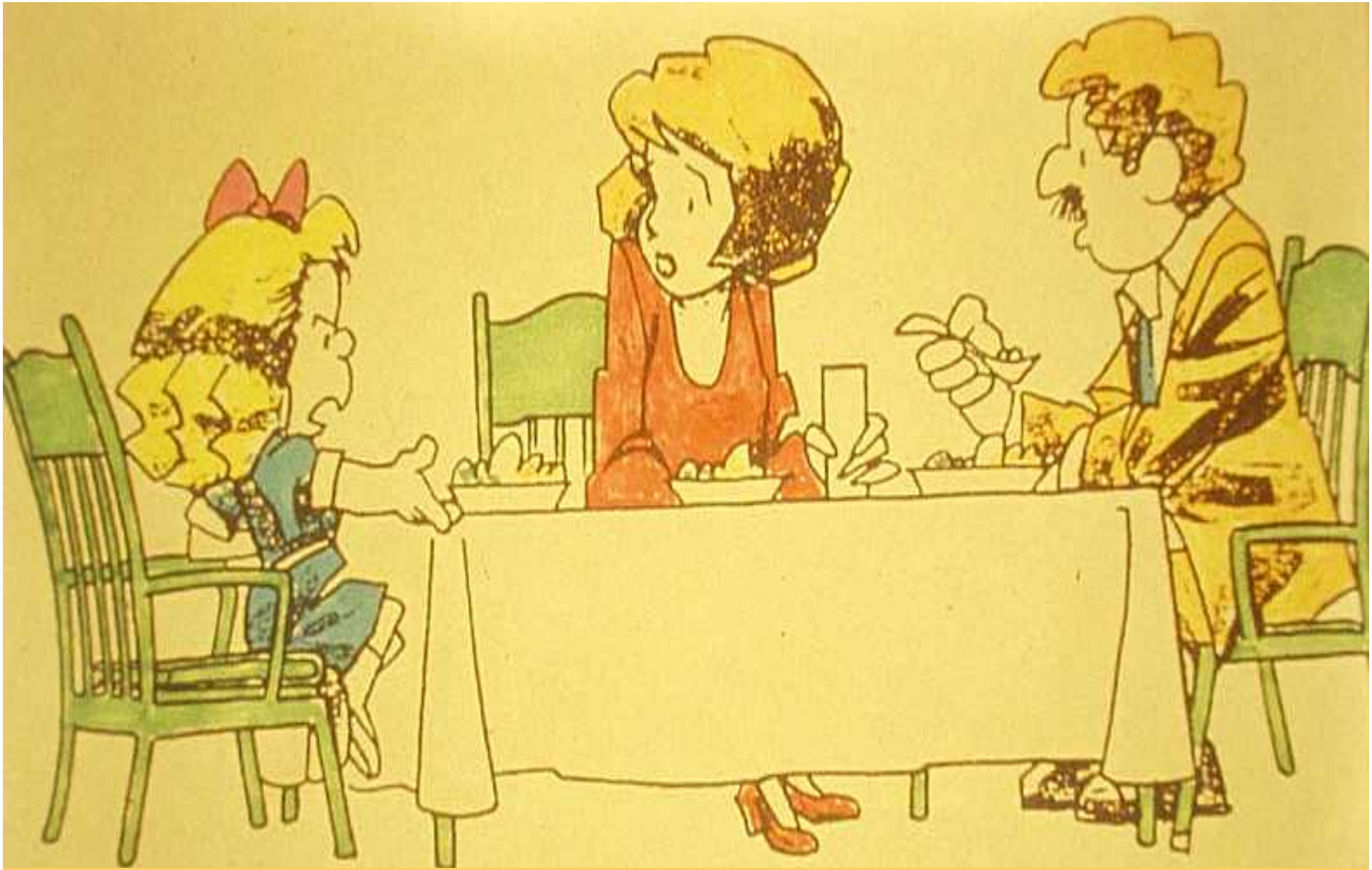


"I *do* like vegetables...
That's why I hate to see them brutally killed and eaten!"

How can Parents Increase Vegetable Intake in the Home

- **Promote repeat experience with new foods**

  (Birch LL, Ventura AK. Int J Obes (Lond). 2009

- **Grade the vegetables:**
  - A = excellent, let's have this more often
  - C = OK, we'll try again
  - F = No way

- **Involve children in grocery shopping and meal preparation. Skip the snack isle and let them choose their favorite fruit and veggie to prepare and cook at home.** (Powell, et al, *J Nutr. 2010;* Fisher JO, Mitchell DC, Smiciklas-Wright H, Birch LL. Eat as I say and eat as I do: Parental influences on young girls' fruit and vegetable, micronutrientand fat intakes. JADA 2002; 102:58-64)

Sothern, Schumacher, von AlmenTrim Kids, 2001

Physiologic Feedback

Social Cognitive Theory Construct

- Teach pacing techniques such as breathing and heart rate monitoring
- Re-evaluate the child's status every 3-6 months.
- Encourage self-monitoring of physical activity and provide activity rewards for goals achieved.
- The sight and smell of food provides instant positive and negative experiences.
- Don't draw attention to unhealthy activities with negative comments. Instead, praise the child when they choose active play or healthy foods.

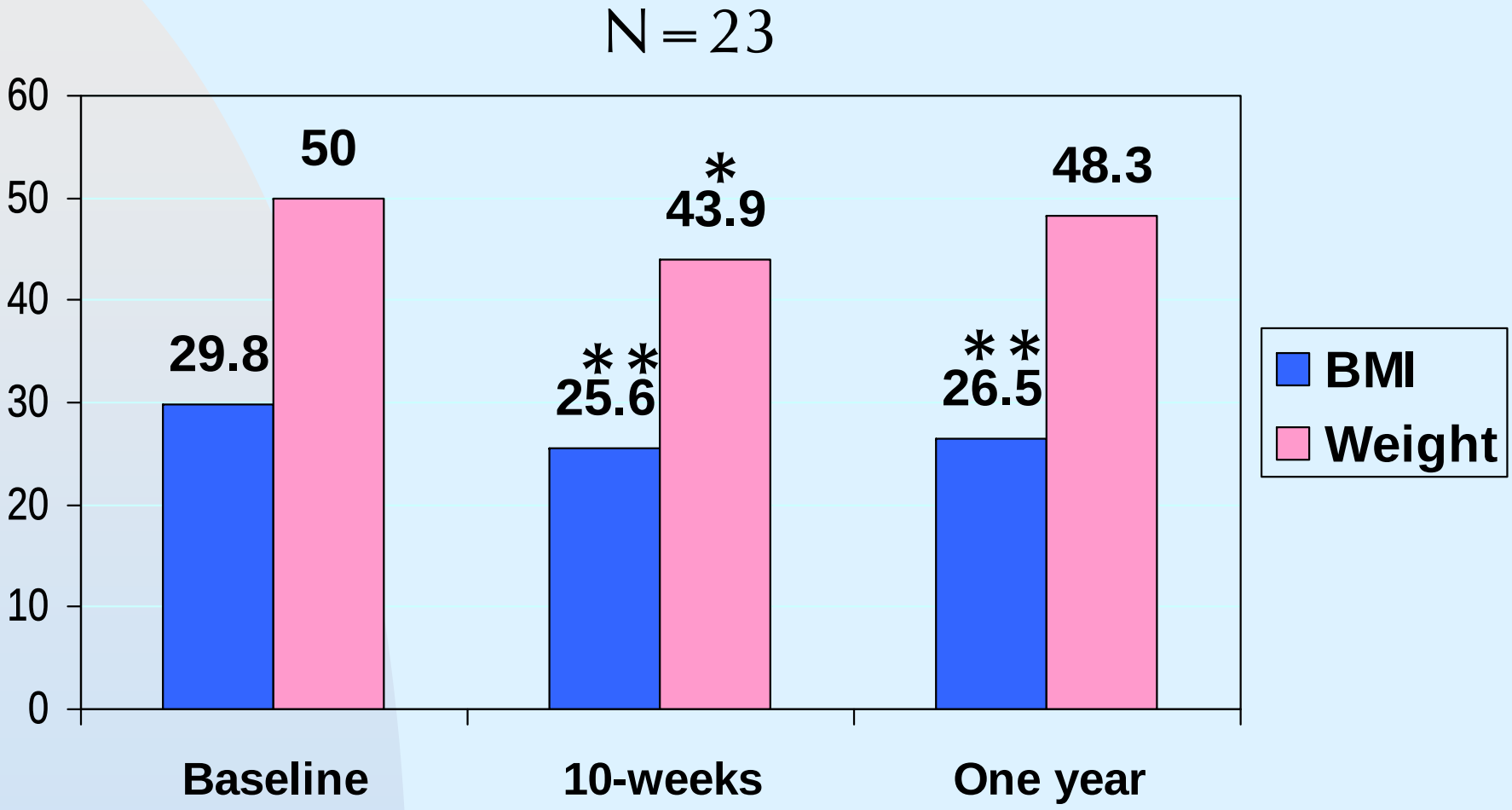
Sothern et al, Trim Kids, 2001; Handbook of Pediatric Obesity, 2006

What Does the Research Say about Dietary Counseling Interventions?

- Dietary Counseling/Nutrition Education within multi-component (Grade I & II)
  - 38 studies- significant reductions in adiposity (24 RCTS; 14 other design)
  - 29 included nutrition education such as portion control and reductions of high density foods
  - 12 included theTraffic Light diet
  - 7 diets were based on ADA guidelines
  - 5 included balanced hypocaloric diets

J Am Diet Assoc. 2006;106:925-945

Changes in BMI and Weight in Obese Children, 5-7 years



*p < 0.05; **p < 0.01 from baseline

Sothern, et al, 2000

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Severely Obese Children And Adolescents, 5-18 Years

- In obese children with a history of unsuccessful attempts a more restrictive diet for a short term period may be indicated.
- However, low calorie diets are not a substitute for nutrition education and establishing long-term healthy eating habits.
- Other emotional concerns must be addressed during dietary treatment.
- Prevention and long term maintenance require healthy eating strategies and increased physical activity.

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Trim Kids– Moderate Intensity Progressive Exercise Prescribed Duration of Exercise (minutes per session)

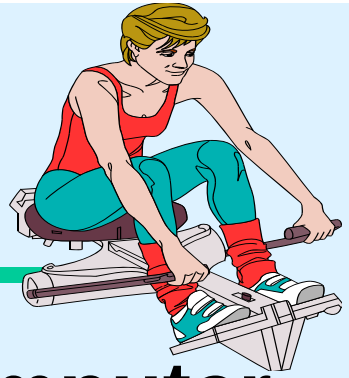
Level	Week 1	Week 5	Week 10
Overweight	30	45	60
Obese	25	40	55
Severely Obese	20	35	50

Table 2 – Moderate Intensity Progressive Exercise Prescribed Frequency of Exercise (days per week)

Level	Week 1	Week 5	Week 10
Overweight	3	4.5	6
Obese	2	4	5.5
Severely Obese	1	3	5

Sothern, et al, 2006, Handbook of Pediatric Obesity: Clinical Management

Severely Obese Children (>99th BMI), 7-18 Years

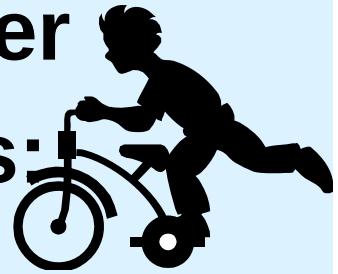


- Limit access to TV/video/computer
- Recommended Aerobic Activities:

  - ***Non-weight-bearing*** only such as swimming, recline bike, arm ergometer, seated (chair) aerobics and seated or lying circuit training.
  - *NOTE: Guidelines should be readjusted every 10-15 weeks based on*
- Parent training and fitness education
- Other emotional and dietary concerns must be addressed during treatment.

Sothern, 2000; Myers, et al, 1998; Strauss, 2000; Barlow & Dietz, 1998, von Almen, 1985

Obese Children (>95th BMI), 7-18 Years



- Limit access to TV/video/computer
- Recommended Aerobic Activities:
  - ***Non-weight-bearing*** such as swimming, cycling, strength/aerobic circuit training, arm specific aerobic dancing, arm ergometer (crank), recline bike, and interval walking.*
    - *Walking with frequent rests as necessary. Gradually work up to longer walking periods and fewer rest stops.
  - ***NOTE: Guidelines should be readjusted every 10-15 weeks based on***

- Parent training and fitness education

Sothern, 2000;2001; Sothern, Handbook of Pediatric Obesity: Clinical Management, 2006

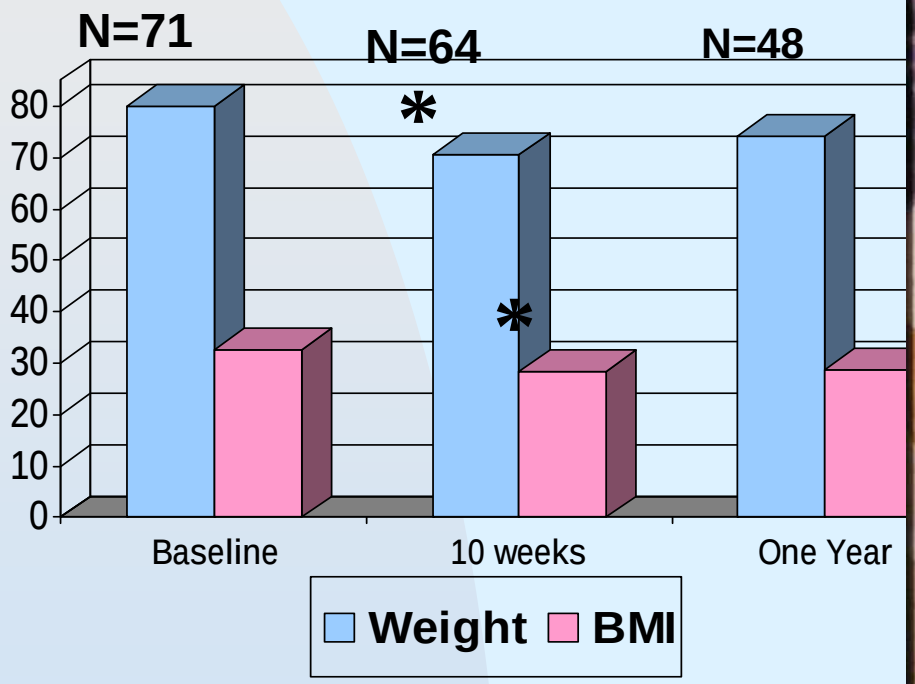
Children at Risk for Overweight Conditions (>85th BMI), 7-18 Years

- **Limit access to TV/video/computer**
- **Recommended Aerobic Activities:**
  - Weight-bearing such as brisk walking, treadmill, field sports, roller blading, hiking, racket ball, tennis, martial arts, skiing, jump rope, indoor/outdoor tag games.

  NOTE: *Guidelines should be readjusted every 10-15 weeks based on evaluation results.*
- **Parent training and fitness education**
- **Pacing Skills**

Sothern, 2000; 2001; Sothern, Handbook of Pediatric Obesity: Clinical Management, 2006

Weight and Body Mass Index after Diet, Behavior Modification and Exercise

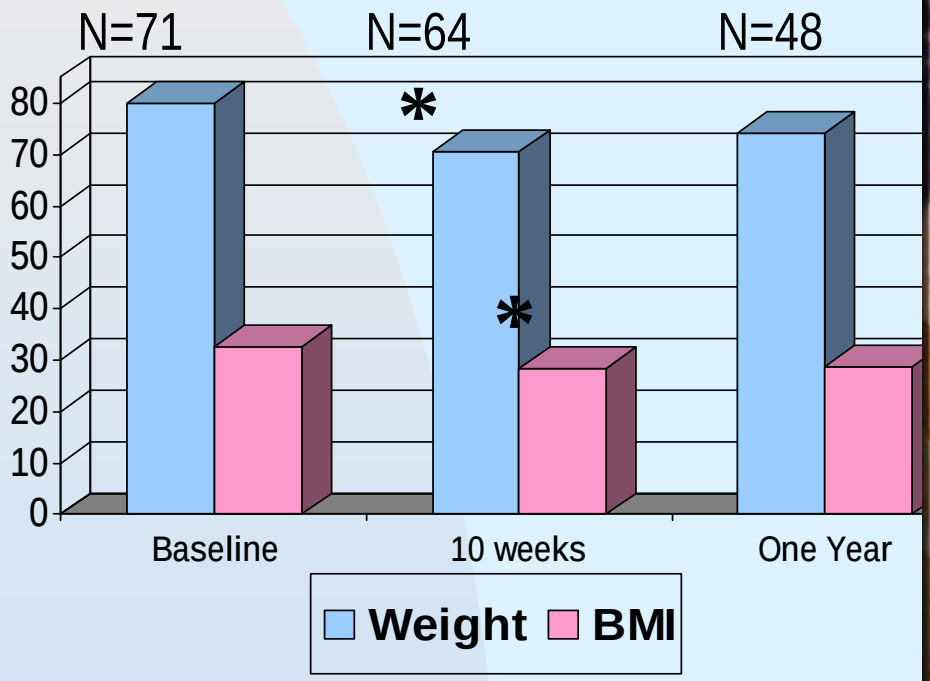


Limitations: Non-randomized, repeated measures clinical outcome trial.

*** p < 0.001 (RM ANOVA) Baseline vs. 10ks & 1-yr.**
NS = 10 weeks vs. one year.

Sothern,et al, Acta Pediatrica, 2000

Weight and Body Mass Index after Diet, Behavior Modification and Exercise



Limitations: Non-randomized, repeated measures clinical outcome trial.

*** p < 0.001 (RM ANOVA) Baseline vs. 10ks & 1-yr.**
NS = 10 weeks vs. one year.

Sothern,et al, Acta Pediatrica, 2000

Physical Activity in School Settings

- Physical activity interventions in school settings did not improve BMI among children.
  - Potential reasons: volume of PA, adherence to program, or diet
- Keep PA in schools to promote overall health but more research is needed to establish its ability to prevent childhood obesity in school settings
- Future interventions should focus on improving diet
  - A well balanced diet may help improve BMI more than physical activity alone

Harris KC *et* al. Effect of school-based physical activity interventions on body mass index in children: a meta-analysis. CMAJ 2009; 180(7): 719-26.

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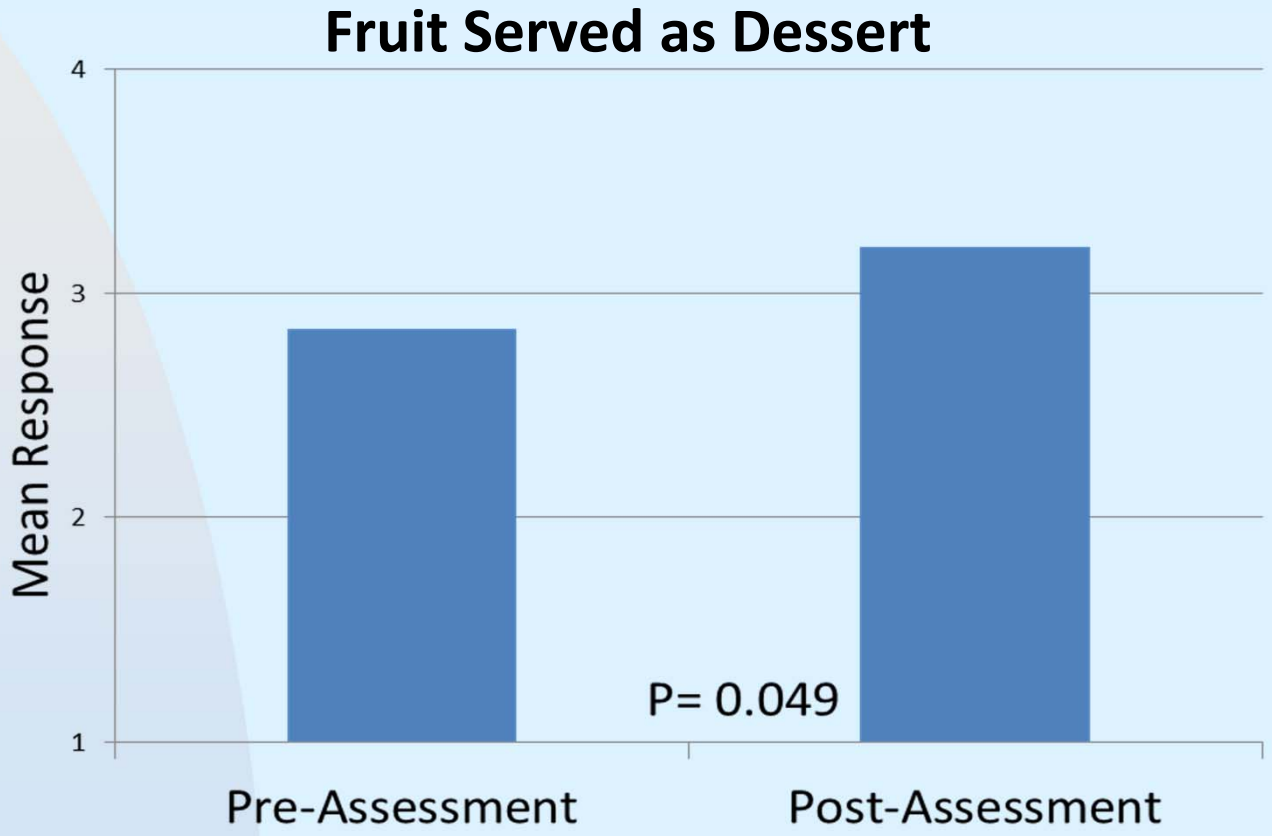
Results: ***Caretakers Serving Fruit as Dessert in the Home***



Parent Self-report of frequency of fruit being served as dessert.
Paired t-test (N=19)

Burns, Brown, Tortu, Nuss, Sothern, Obesity, 2011; The Obesity Society, 2011, Orlando FL

Ten months of exercise improves %fat, visceral adiposity, bone density and fitness

8-12 year old African American girls participated in 30 minutes homework/healthy snack time and 80 minutes of physical activity (PA):

- 25 m skills instruction, 35 m aerobic PA, and 20 m strengthening/stretching)

Compared to controls, children in intervention:

- decreased %Body Fat ($p < 0.0001$), BMI ($p < 0.01$)and Visceral Adipose Tissue ($p < 0.01$)
- increased bone mineral density ($p < 0.0001$) and cardiovascular fitness ($p < 0.05$).

Higher attendance and heart rate were associated with greater increases in BMD ($p < 0.05$) and greater decreases in %BF ($p < 0.01$)

Barbeau, et al, Obesity, 2007

What is the promise and what are the limits of multi-disciplinary, lifestyle change interventions in obese youth?

- Retention rates range from 60-90% and participations rates are typically greater than 50%.
- Few studies are successful in reporting the long term (> 2 years) outcome of their treatment interventions.
- Long term follow up rates in children >12 years average as low as 13% in some trials.
- Four long term studies report >80% follow-up in children, 6-12 years.
- More studies are needed especially in adolescents with severe overweight conditions.

Source: J Am Diet Assoc. 2006;106:925-940; Epstein, 2001

Physical Activity and Obese Youth

- Regular physical activity is shown to lessen the burden of obesity-related comorbidities, including reductions in blood pressure, increased insulin sensitivity, and decrease in hepatomegaly.

- Exercise prescriptions for obese children should involve family support, activities which are doable, fun and develop participatory skills.

Hassink, et al, Progress in Pediatric Cardiology, 2008, 25(2): 153-157

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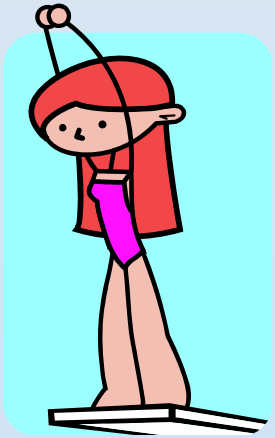
Are Children Playing Outside?

Children are 6 times more likely play a video game than to ride a bike.

Only 47% of children report riding bikes at least 6 times a year—down 31% since 1995. Bike sales fell by 21% in the past 5 years.



Only 6% of children report playing baseball on their own. Swimming, fishing and touch football are down 1/3 since 1995. Visits to U.S.National Parks are lower.

Pergams, et al, Proc Natl Acad Sci, 2008CDC/Kaiser Foundation. 2005; NSGA; Bicycle Industry News, 2005

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Role Play and Semi-structured Interviews in Preschool Children

- The majority of children's leisure activity selections involved media and low active pursuits.
- Children listed the media as their source of health information - not adults.
- Gaps in knowledge included: importance of water, snacks can be nutritious benefits of physical activity.

Lanigan, Child: Care Health and Development, 2010

Clinical Management of Pediatric Obesity

Methods to engage community, school, government resources and settings to promote the development of high-quality, intense behavioral multi-component, family-based pediatric weight management programs:

- Share primary care office resources with dieticians, behavior and exercise specialists – one stop shop
- Coordinate efforts with a local recreation program, fitness center or YMCA or utilize school facilities after hours
- Coordinate efforts with ob/gyn physicians
- Non-profit organizations provide funding for patient fees and equipment or to offer free memberships to facilities.

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Multi-Disciplinary Weight Management Sample Class Schedule

	Medicine	Nutrition	Behavior	Exercise
4:00-4:30		Return Calls Set-up		
4:30-4:50	Nurse Supervises Weigh-In	Check Food Records	Talk with Parents Review Charts	Check Exercise Cards
4:50-5:10	Group	Group	Group	Group
5:10-5:30	Review Charts	Behavior Session	Return Calls Review Charts	Review Charts Return Calls
5:30-6:00	Physician Q&A or Session	Clean-up	Nutrition Session	Set-up Exercise
6:00-6:30	Physician Q&A or Session		Clean-up	Exercise Session
6:30-7:00	Clean-up			Clean-up

Trim Kids Implemented in YMCA Centers in South Louisiana

- A pilot program started in July, 2007
- LSU School of Public health provided professional training
- Intervention programs were launched in February, 2008 in seven locations:
  - Baton Rouge, East Jefferson, West Bank, Northshore, Luling, Uptown, Downtown
  - Currently in week 5 of the fifth 12 week- program
  - Approximately 6-12 families per site
  - Weight losses range from 5-45 pounds to date
  - Statewide initiative began in Nov., 2008

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- Participating students and parents spent one afternoon per week attending classes.
- Trained YMCA instructors provided physical activities, assistance with goal setting, and nutrition education
- Families were able to participate in the program for free as long as their child met inclusion criteria based on their BMI.
- A free family membership to the YMCA was provided for the 3 months of the program.
- An additional free month was added if families attended at least 10 out of the 12 classes

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10 children and their families completed the Trim Kids program

	Age	Sex	Days	Wt	Ht	BMI
Participant 1	12	M	6	0	1	-2
Participant 2	10	F	11	-2	0	-0.4
Participant 3	10	M	11	4	2	-1.2
Participant 4	6	F	11	2	1	-0.2
Participant 5	10	F	9	6	1	0
Participant 6	8	F	9	4	1	-0.1
Participant 7	9	M	10	-2	0.5	-0.9
Participant 8	11	M	10	5	1.25	-0.4
Participant 9	8	F	9	1.5	1	-0.7
Participant 10	10	F	8	-6	0.75	-1.3
Average	9.4		9.4	1.25	.95	-.72

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NEWS

LPB & BLUE CROSS & BLUE SHIELD OF LOUISIANA LAUNCH *STEP IT UP!* THIS MONTH

LPB, funded by a grant from Blue Cross & Blue Shield of Louisiana, is launching an online site – www.lpb.org/stepitup -- in September, designed to help teens and tweens control and reduce their weight. We will provide information from health professionals in order to motivate and encourage young people to get active and eat healthier. We will also have handy excerpts from LPB's program **Kids: Trying to Trim Down** and our series **Step by Step: Kids Trimming Down**. Kids will be able to ask questions on the site that will be answered by the health professionals. Kids and parents will also get tips on tackling the problem of childhood obesity.

Anyone is welcome to log on to www.lpb.org/stepitup and take part in the program. C'mon everybody – Step It Up!

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