

# Obesity Prevention and Youth Sport:

What do we really know?



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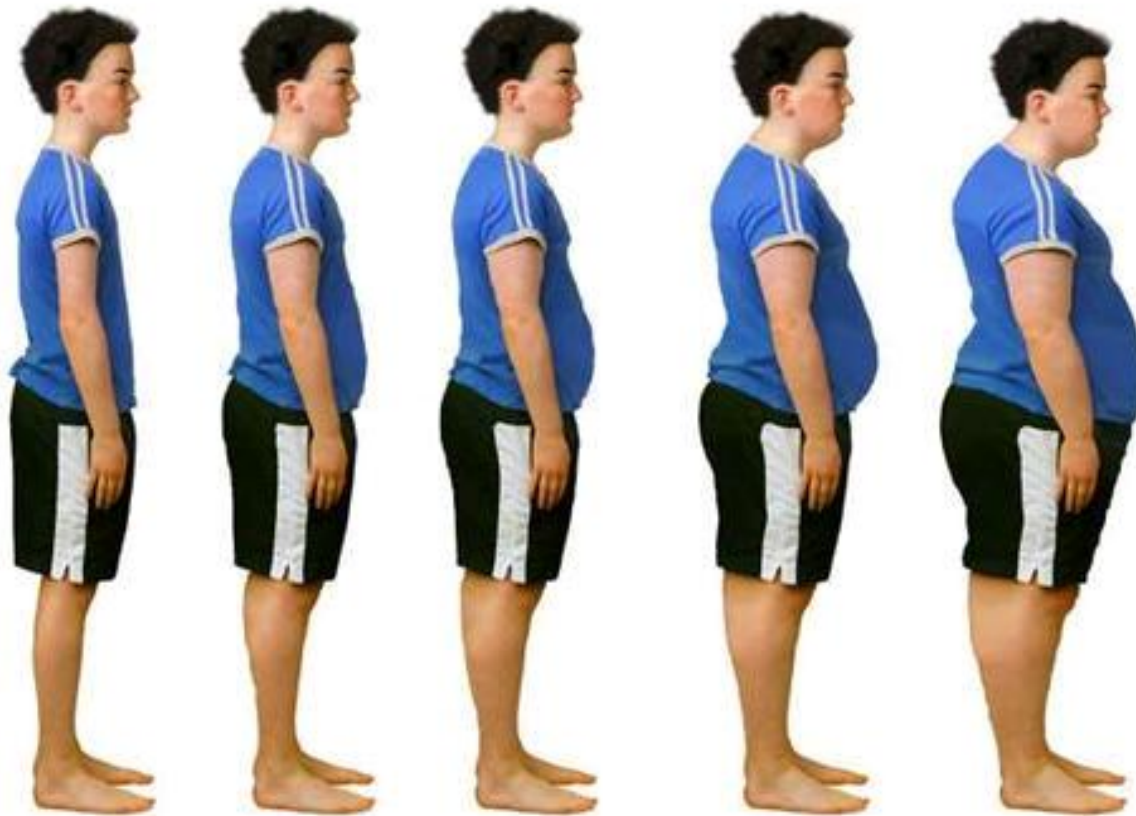
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# Support

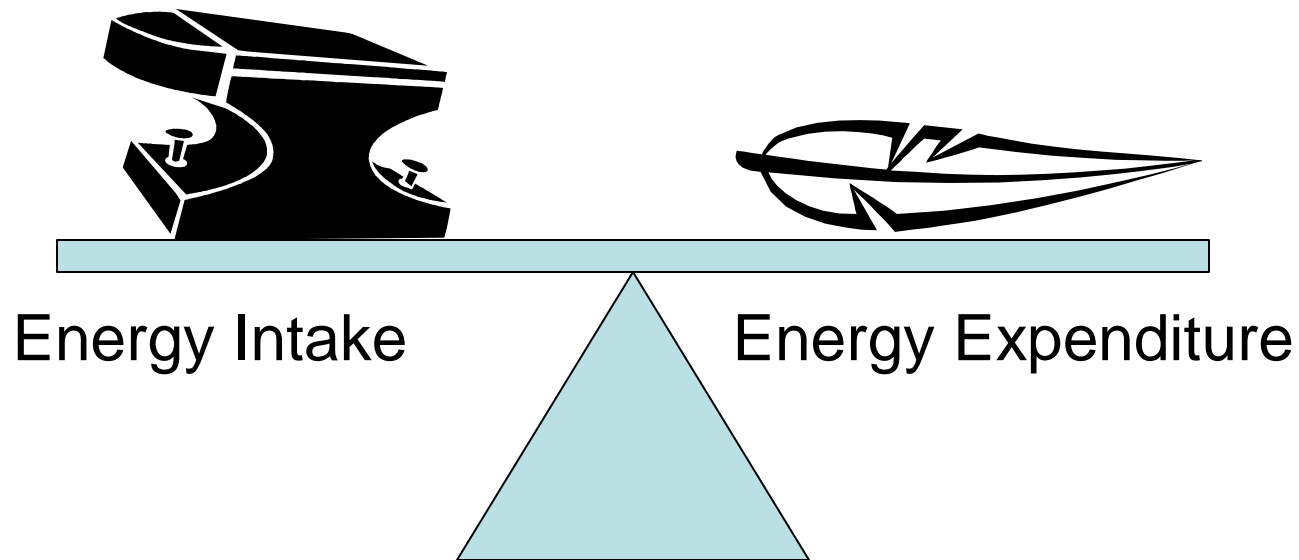
**Career Development award  
to T.F. Nelson from the  
National Cancer Institute  
Transdisciplinary  
Research in Energetics  
and Cancer (R Jeffrey,  
PI).**



# Childhood obesity is a serious problem in the US



# Obesity Fundamentals



*Weight gain results when intake **exceeds** expenditure over time*

# Small daily energy surplus drives childhood obesity

## Energy surplus:

- 110-165 kcal/day among children aged 2-7
- older youth and adolescents  
678-1017 kcal/day – accounts for prior weight gain...

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Wang, Gortmaker & Kuntz (2006)

The Surgeon General's  
Call To Action  
To Prevent and Decrease  
Overweight and Obesity  
2001

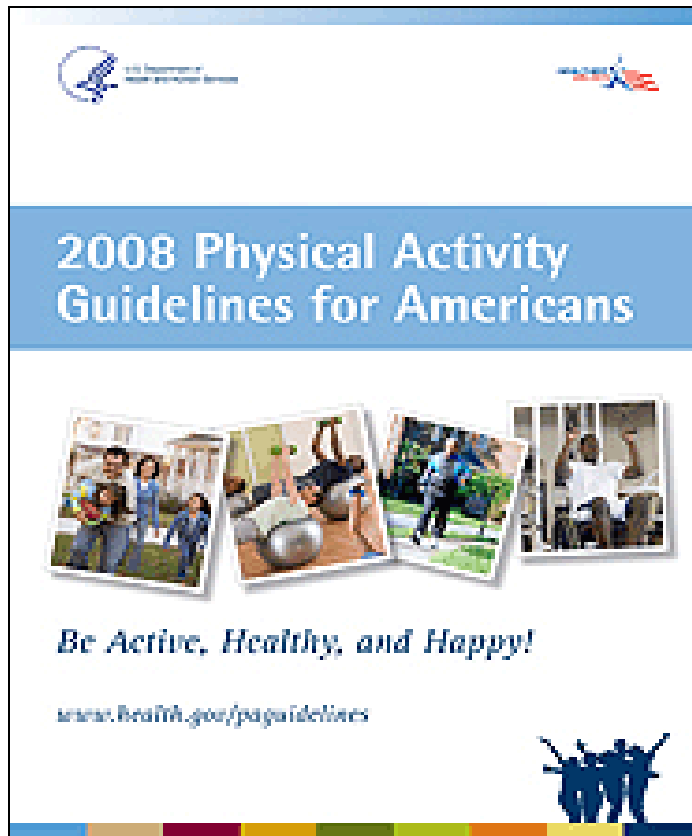


U.S. Department of Health and Human Services

# Surgeon General Recommendations for preventing overweight among youth

- √ increase physical activity
- √ promote healthful eating

# Physical Activity Recommendations

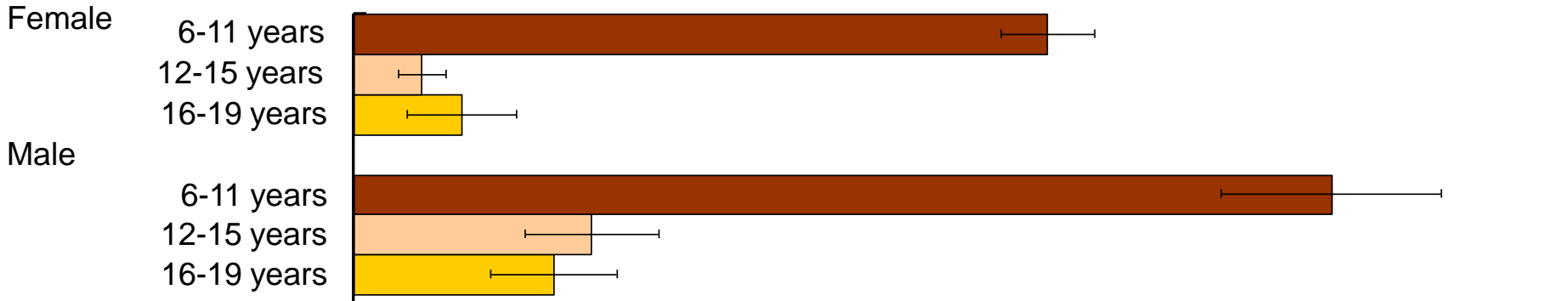


- **1 hour (60 minutes) or more of Aerobic activity:**
  - Most should be either moderate- or vigorous-intensity PA
  - Vigorous-intensity PA at least 3 days a week
- **Encourage participation in PA:**
  - Age appropriate
  - Enjoyable
  - Offers variety

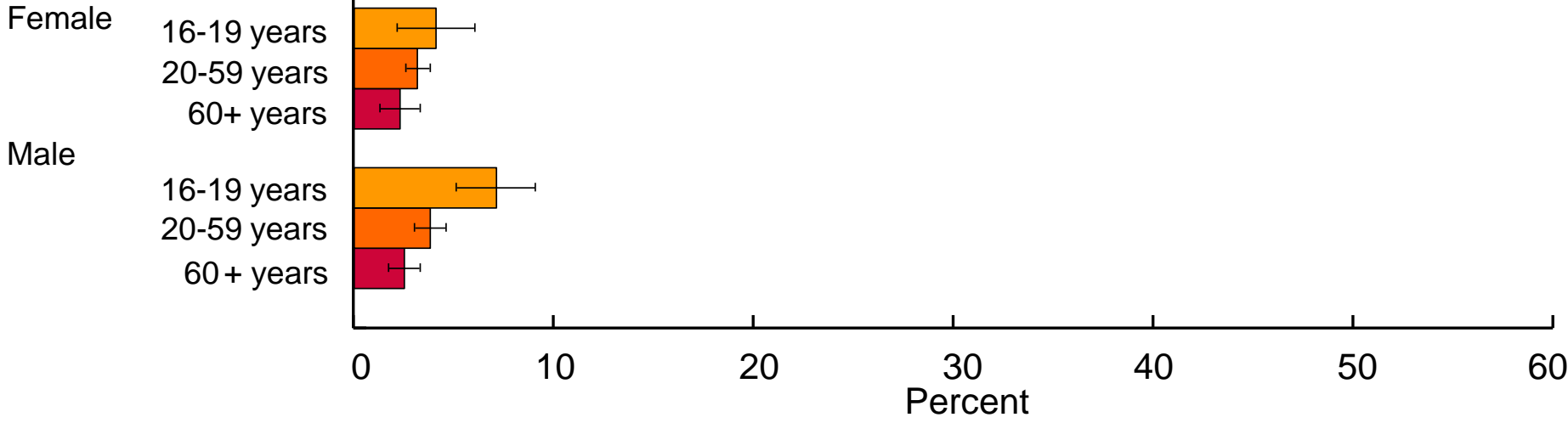


# Few Meet Recommended Activity Levels

## 60+ min/5-7 days

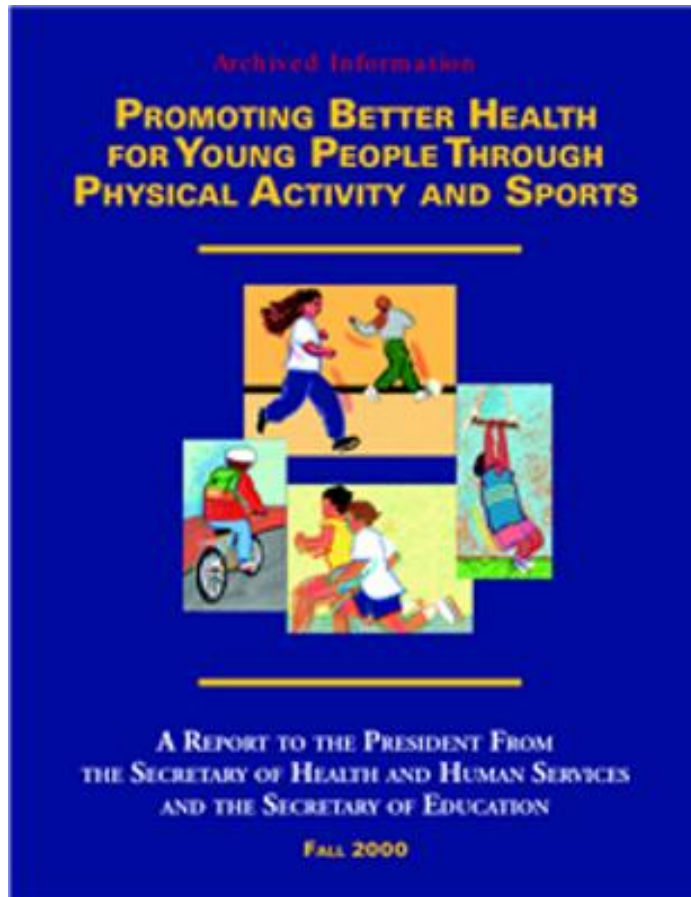


## 30+ min/5-7 days



Note: Adherence: for ages 6–19 years - 60 or more minutes of moderate- or greater-intensity activity on 5 of 7 days; for ages 16 years and older – 30 or more minutes of moderate- or greater-intensity activity on 5 of 7 days, accumulated in 10-min “bouts.” I = 95% confidence interval.  
 Source: Troiano, RP, et al. Physical Activity in the United States Measured by Accelerometer. *Medicine & Science in Sports & Exercise*. 2008, 40(1): 181-188. National Health and Nutrition Examination Survey (NHANES), NCHS, CDC.

# A national priority to increase physical activity



## Recommendations:

- Provide access to community and recreation sports for all children
- Provide proper training to deliver high-quality experiences to youth sport participants for youth coaches and recreation staff

*But what does the research say about sport and obesity prevention?*

# Youth who participate in sport are more physically active

Consistent findings across 8 studies

- Cross sectional
- 7/8 studies used *self-report* measures

1 study measured PA in 6-12 boys with accelerometers

- Sport contributed an additional 30 minutes of MVPA compared to non-sport days

***However, most (52%) time in youth sport spent in sedentary or light-intensity activities.***

# Influence of sport participation on weight status is mixed

- 11 studies examined
- No difference in BMI between sport participants and non-participants (6/11 studies)
- Sport participants have lower BMI than non-participants (5/11 studies)
  - Differed by sex

# Sport participation does not create immunity from obesity

**1 in 4** (26% male; 27% female)  
youth sport participants (ages 8-16) are overweight (85<sup>th</sup> percentile)

Source: Dowda et al. (2001) NHANES III

# Type of sport matters

Assessed BMI of adolescents in:

- Power team sports (hockey, soccer, football)
- Weight control (wrestling, gymnastics, ice skating)
- Non-participants

Females

- Power sport and no-sport group had similar BMI; weight control had slightly lower BMI

Males

- No differences in BMI observed among groups

*Source: Croll et al (2006)*

The Surgeon General's  
Call To Action  
To Prevent and Decrease  
Overweight and Obesity  
2001



U.S. Department of Health and Human Services

## Surgeon General Recommendations

- increase physical activity
- promote healthful eating

**How does youth sport do?**

# Sport Participation and Nutrition

- Research is limited
- Mostly focuses on elite performers
- Few have compared sports participants and non-participants
- Focus is on nutrient deficiency, not overconsumption



# Sport Participation and Nutrition

Existing studies have produced *mixed results*

Sport participants report

- Higher consumption of:
  - Fruits/vegetables
  - Milk
  - Sport drink
  - Fast food
  - Total Calories
- No difference observed in consumption of dietary fat

# Limitations

- Small sample sizes
- Cross-sectional study design
- Use of BMI to assess weight status
- Self-report measures
- Nuanced questions not addressed
- Provides little direction for how to intervene

# Summary

## Youth sport participants...

- Get more physical activity
- Evidence about overweight is mixed
- Preliminary findings suggest
  - Some positive dietary habits
    - fruits and vegetables
    - milk
  - And some not so positive
    - more overall calories
    - more sport drinks
    - more fast food

# Sport drinks are now 'standard equipment' in youth sport







Gatorade is specially formulated to give athletes what water cannot.

**it's science...  
it's proven**



Studies have shown that athletes who hydrate with Gatorade outperform athletes who hydrate with just water in a number of key performance measures, including the ability to exercise longer and maintain a faster pace in the second half of competition.

**Hydrate  
safely**



# How much hydration do kids really need?

## Recommendations:

### Before exercise:

- At least 4 hours before, ~2-3 mL/lb body weight

### During exercise:

- Depends on
  - sweat rate
  - exercise duration
  - opportunities to drink.
- Carbohydrate-containing beverages (Gatorade, Powerade) recommended for exercise longer than 1 hour

### After exercise:

- 16-24 ounces for every pound of body lost

*What are the implications for youth sport?*



# How Many Calories Do Athletes Need?

## Females

	Activity Level		
Age	Sedentary	Moderately Active	Active
4-8	1,200	1,400-1,600	1,400-1,800
9-13	1,600	1,600-2,000	1,800-2,200
14-18	1,800	2,000	2,400

Source: Dietary Guidelines for Americans 2005 (Institute of Medicine equation)

# Discretionary Calories

Daily Amount of Food From Each Group (vegetable subgroup amounts are per week)												
Calorie Level	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
Food Group <sup>1</sup>	Food group amounts shown in cup (c) or ounce-equivalents (oz-eq), with number of servings (srv) in parentheses when it differs from the other units. See note for quantity equivalents for foods in each group. <sup>2</sup> Oils are shown in grams (g).											
Fruits	1 c (2 srv)	1 c (2 srv)	1.5 c (3 srv)	1.5 c (3 srv)	1.5 c (3 srv)	2 c (4 srv)	2 c (4 srv)	2 c (4 srv)	2 c (4 srv)	2.5 c (5 srv)	2.5 c (5 srv)	2.5 c (5 srv)
Vegetables <sup>3</sup>	1 c (2 srv)	1.5 c (3 srv)	1.5 c (3 srv)	2 c (4 srv)	2.5 c (5 srv)	2.5 c (5 srv)	3 c (6 srv)	3 c (6 srv)	3.5 c (7 srv)	3.5 c (7 srv)	4 c (8 srv)	4 c (8 srv)
Dark green veg.	1 c/wk	1.5 c/wk	1.5 c/wk	2 c/wk	3 c/wk	3 c/wk	3 c/wk	3 c/wk	3 c/wk	3 c/wk	3 c/wk	3 c/wk
Orange veg.	.5 c/wk	1 c/wk	1 c/wk	1.5 c/wk	2 c/wk	2 c/wk	2 c/wk	2 c/wk	2.5 c/wk	2.5 c/wk	2.5 c/wk	2.5 c/wk
Legumes	.5 c/wk	1 c/wk	1 c/wk	2.5 c/wk	3 c/wk	3 c/wk	3 c/wk	3 c/wk	3.5 c/wk	3.5 c/wk	3.5 c/wk	3.5 c/wk
Starchy veg.	1.5 c/wk	2.5 c/wk	2.5 c/wk	2.5 c/wk	3 c/wk	3 c/wk	6 c/wk	6 c/wk	7 c/wk	7 c/wk	9 c/wk	9 c/wk
Other veg.	3.5 c/wk	4.5 c/wk	4.5 c/wk	5.5 c/wk	6.5 c/wk	6.5 c/wk	7 c/wk	7 c/wk	8.5 c/wk	8.5 c/wk	10 c/wk	10 c/wk
Grains <sup>4</sup>	3 oz-eq	4 oz-eq	5 oz-eq	5 oz-eq	6 oz-eq	6 oz-eq	7 oz-eq	8 oz-eq	9 oz-eq	10 oz-eq	10 oz-eq	10 oz-eq
Whole grains	1.5	2	2.5	3	3	3	3.5	4	4.5	5	5	5
Other grains	1.5	2	2.5	2	3	3	3.5	4	4.5	5	5	5
Lean meat and beans	2 oz-eq	3 oz-eq	4 oz-eq	5 oz-eq	5 oz-eq	5.5 oz-eq	6 oz-eq	6.5 oz-eq	6.5 oz-eq	7 oz-eq	7 oz-eq	7 oz-eq
Milk	2 c	2 c	2 c	3 c	3 c	3 c	3 c	3 c	3 c	3 c	3 c	3 c
Oils <sup>5</sup>	15 g	17 g	17 g	22 g	24 g	27 g	29 g	31 g	34 g	36 g	44 g	51 g
Discretionary calorie allowance <sup>6</sup>	165	171	171	132	195	267	290	362	410	426	512	648

Source: Dietary Guidelines for Americans, 2005

# How much added sugar can you consume?

Discretionary calories that remain at each calorie level												
Food Guide calorie level	1,000	1,200	1,400	1,600	1,800	2,000	2,200	2,400	2,600	2,800	3,000	3,200
Discretionary calories <sup>1</sup>	165	171	171	132	195	267	290	362	410	426	512	648
Example of division of discretionary calories: Solid fats are shown in grams (g); added sugars in grams (g) and teaspoons (tsp).												
Solid fats <sup>2</sup>	11 g	14 g	14 g	11 g	15 g	18 g	19 g	22 g	24 g	24 g	29 g	34 g
Added sugars <sup>3</sup>	20 g (5 tsp)	16 g (4 tsp)	16 g (4 tsp)	12 g (3 tsp)	20 g (5 tsp)	32 g (8 tsp)	36 g (9 tsp)	48 g (12 tsp)	56 g (14 tsp)	60 g (15 tsp)	72g (18 tsp)	96 g (24 tsp)

Source: Dietary Guidelines for Americans, 2005

# Added Sugar: Gatorade



Nutrition Facts	
Serving Size 8 fl oz (240ml)	
Servings Per Container 4	
Amount Per Serving	
<b>Calories 50</b>	
	<b>% Daily Value*</b>
<b>Total Fat</b> 0g	<b>0%</b>
<b>Sodium</b> 110mg	<b>5%</b>
<b>Potassium</b> 30mg	<b>1%</b>
<b>Total Carbohydrate</b> 14g	<b>5%</b>
Sugars 14g	
<b>Protein</b> 0g	
Not a significant source of Calories From Fat, Saturated Fat, Cholesterol, Dietary Fiber, Vitamin A, Vitamin C, Calcium, Iron.	
* Percent Daily Values are based on a 2,000 calorie diet.	

NO FRUIT JUICE  
INGREDIENTS: WATER, SUCROSE SYRUP, GLUCOSE-FRUCTOSE SYRUP, CITRIC ACID, NATURAL GRAPE FLAVOR WITH OTHER NATURAL FLAVORS, SALT, SODIUM CITRATE, MONOPOTASSIUM PHOSPHATE, RED 40, BLUE 1.  
**SHAKE WELL. REFRIGERATE AFTER OPENING.**  
© 1997 S-VC  
DISTRIBUTED BY: THE GATORADE COMPANY  
P.O. BOX 049003, CHICAGO, IL 60604-9003  
QUALITY GUARANTEED: FOR QUESTIONS OR COMMENTS, CALL 1-800-88-GATOR (1-800-884-2867), MONDAY-FRIDAY, 8:30 a.m. TO 4:30 p.m. CENTRAL TIME; SAVE UPC AND CODE ON THE CAP OR BOTTLE NECK.

38724-05 GATORADE 32 GRAPE  
UPC PURCHASE SEAL 05-2075-12

0 52000 32673 4

**2 servings= 28 g sugar,  
220 mg sodium**

# Nutrients of Concern: Female Athletes

- **Iron**
  - Oxygen transport, muscle function and work capacity
- **Calcium and Vitamin D:**
  - Bone-mineral density and stress fractures
- **Protein**

*Are female athletes getting enough of some things and too much of others?*

# Actual Nutrient Intake: Females

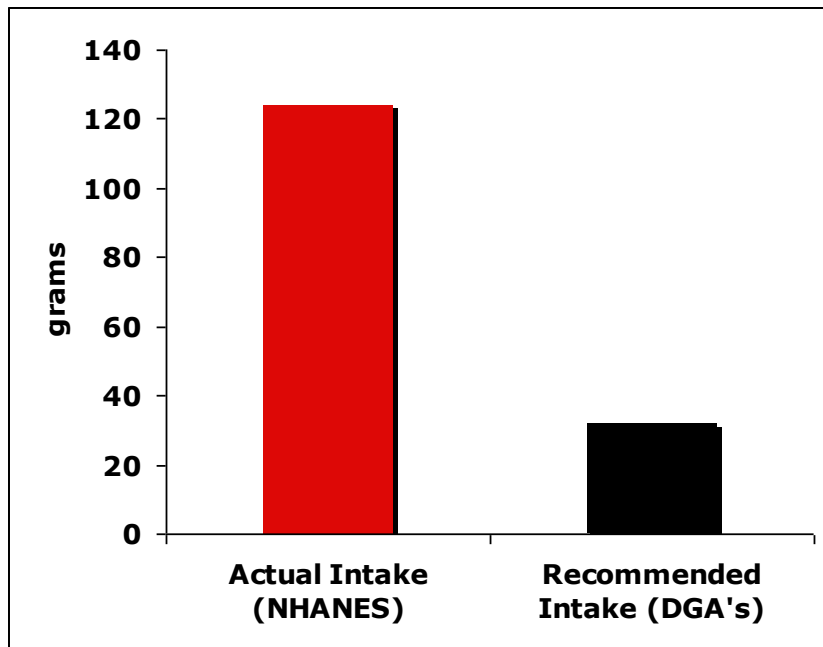
Age	Energy (kcal)	Total Sugars	Total Fat	Calcium	Sodium
6-11	1,879 <b>High</b>	124 g <b>High</b>	71.6 g <b>High*</b>	946 mg <b>Low</b>	2,966 mg <b>High</b>
12-19	1,906	124 g	72.3 g	849 mg	2,950 mg

Data source: What We Eat in America, NHANES, 2005-2006, individuals 2 years and older, day 1 dietary intake data

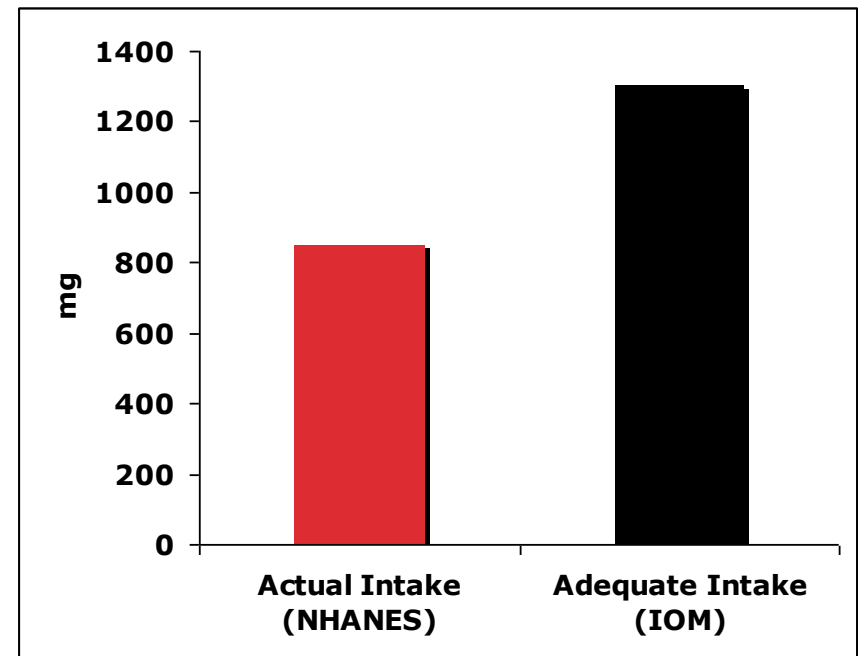
# Too much of the wrong stuff; Not enough of the good stuff

Active 10 year old girl; approximately 2,000 calories

## Sugar



## Calcium



Data source: What We Eat in America (NHANES 2005-2006), Dietary Guidelines for Americans (2005), IOM

How are youth sport participants getting these extra calories that have low nutritional value?



Kids are socialized to associate it  
with sport



**Adults give it to them!**









Adults model the behavior!



# Sport leagues sell it to them!



# Sugar, Salt and/or Fat...

<b>COLDSTONE</b>	3.00		<b>SHIRTS OR HATS</b>	10.00
<b>NACHOS&amp;CHEESE</b>	2.00		<b>COOKIES CHIPS</b>	50
<b>PIZZA</b>	2.25		<b>COFFEE HOTCHOCOLATE</b>	
<b>HOTDOGS, WATER,</b>	1.50		<b>SLIM JIMS, RINGPOP</b>	
<b>LEMONADE, POWERADE</b>	1.50			
<b>PRETZEL, BUBBLE TAPE</b>	1.25			
<b>SOUPUNCH, CANDY BARS,</b>	1.00		<b>MEAL DEALS</b>	
<b>M&amp;M, SKITTLES, CAN POP</b>	1.00		<b>POP HOT DOG, CHIPS</b>	2.50
<b>POPCORN, JERKY, ICEES</b>	75		<b>PIZZA &amp; POP</b>	2.75
<b>SUNFLOWER SEEDS, LICORICE</b>				
<b>NERDROPE, CINNAMON ROLLS,</b>				
<b>FRUIT SNACKS, CHEESE</b>				
<b>GRANOLA BARS</b>	75			
			<b>LAFFY TAFFY</b>	10 OR 3 FOR 25
			<b>FLAVOR ICE</b>	15 OR 2 FOR 25
			<b>AIRHEADS</b>	25
			<b>DOUBLE BUBBLE</b>	05

The concessions stand will not offer hot items this evening due to the extreme weather. Thank you for your understanding and respect for the volunteers running the booth tonight.





Walking Taco 3.00  
Burger 2.00 - Burger Slam 3.50  
Ch Burger 2.50 - Cheeseburger Slam 4.00  
Hot dog - Beef 1.50 - Hot dog slam 3.00  
Brat 2.00 - Brat Slam 3.50

Slam includes: chips + pop / water  
Gatorade upgrade add 1.00


Water / Pop 1.00  
Gatorade 2.00  
Coffee 1.00

cookies<sup>(mini)</sup> 1.00  
chips .75  
Candy bar 1.00  
gum - mint 1.00  
-Boregata 3/.25


Fruit .50  
Muffin 1.00  
Trail mix 1.00  
Pickle .75  
Sunflower Seeds 1.00  
ring pops .25  
mega piri stick .75  
frozen  
minute maid 1.00




# Sport leagues promote it

**ROSEVILLE**  
  
**BASEBALL**

**ROSEVILLE BASEBALL  
CHAMPIONSHIP WEEK SPECIAL**

  
**COLD STONE**  
CREAMERY

**25% OFF ANYTHING AT COLD STONE CREAMERY THIS WEEK!**



# Sponsorships reinforce it





Sport  
schedules  
demand  
convenience

Its widely available



# Typical snacks at youth sport events



135 kcal\*



140 kcal\*



124 kcal\*



270 kcal+



78 kcal\*



80 kcal+



118 kcal\*



270 kcal+



140 kcal+



280 kcal+



180 kcal+

\*per 12 oz;

+per single serving

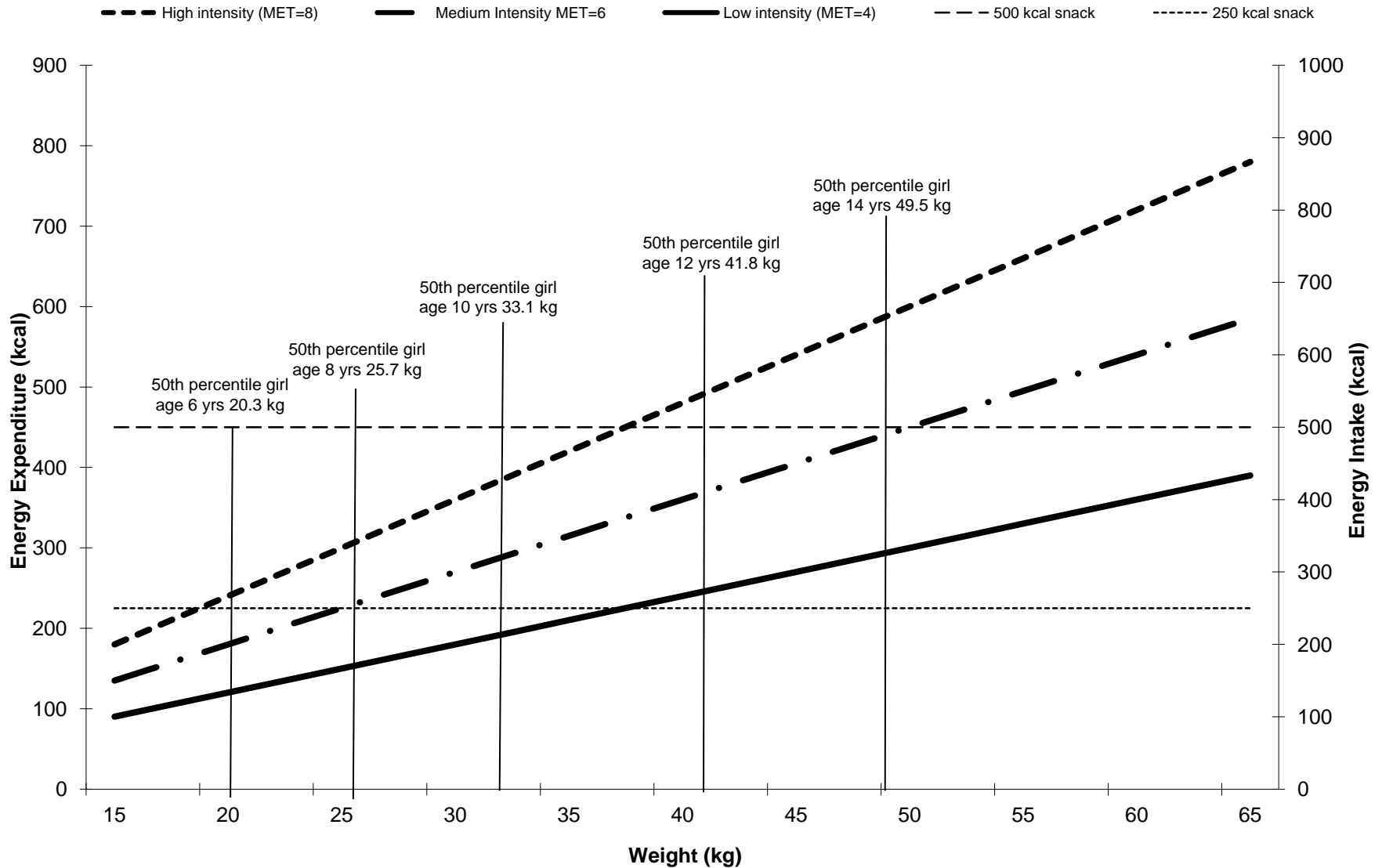
# Fast Food

550 kcal





# Energy Expenditure and Intake in Youth Sport



# Conclusions

Youth sport participants may be in energy *surplus* after a sport event!

The toxic food environment in youth sport is undermining its health promoting benefits

We can do better!

# There is much we don't know

- Very few studies
- Energy balance has not be directly observed/documentated
- Substitution of calories among athletes
- Variation in physical activity & diet by:
  - Sport
  - Skill level
  - Age
- Contribution to disparities in health

# What can we do?

- Have a better understanding through research
- Be aware
- Create guidelines
- Prepare and plan ahead

# Questions?



<http://www.sph.umn.edu/>