

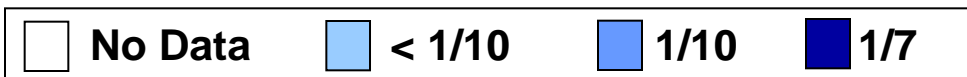
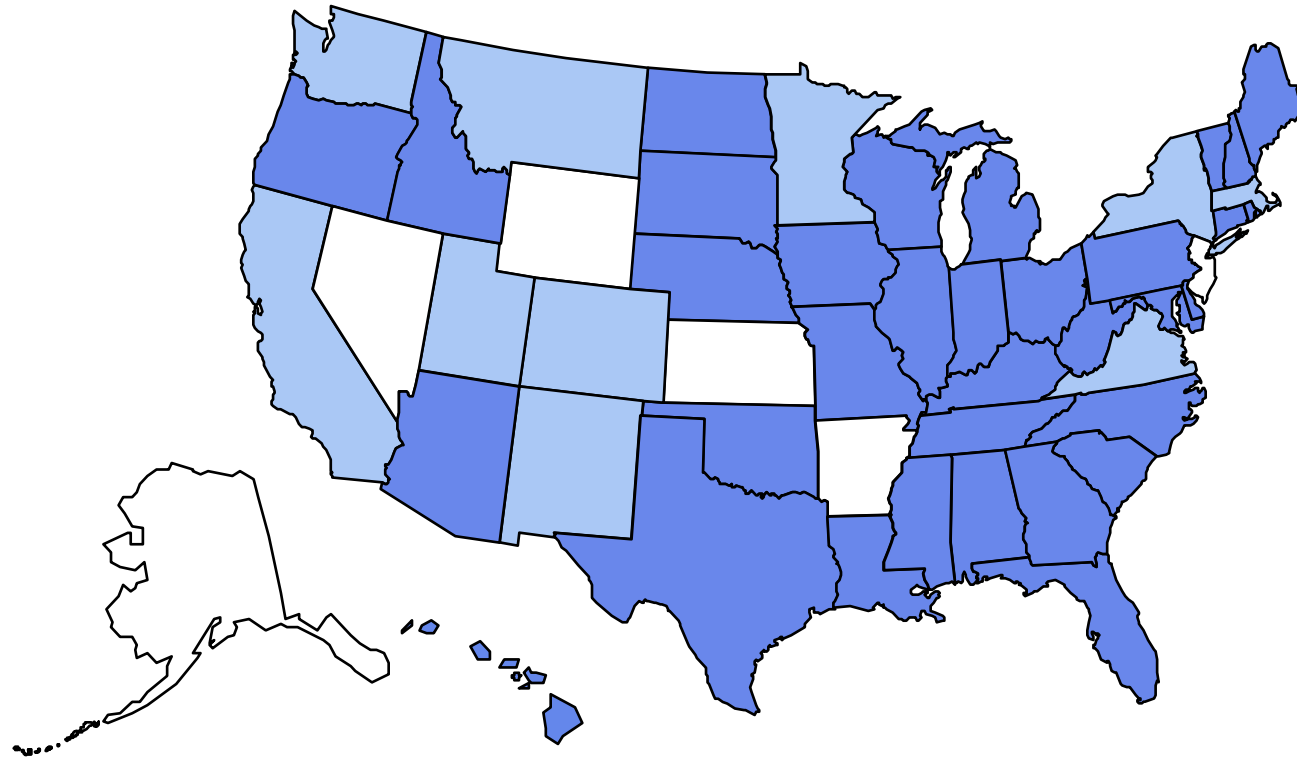
# Pediatric Obesity

Katie Boles, RD, LDN  
Brenner FIT, Brenner Children's Hospital

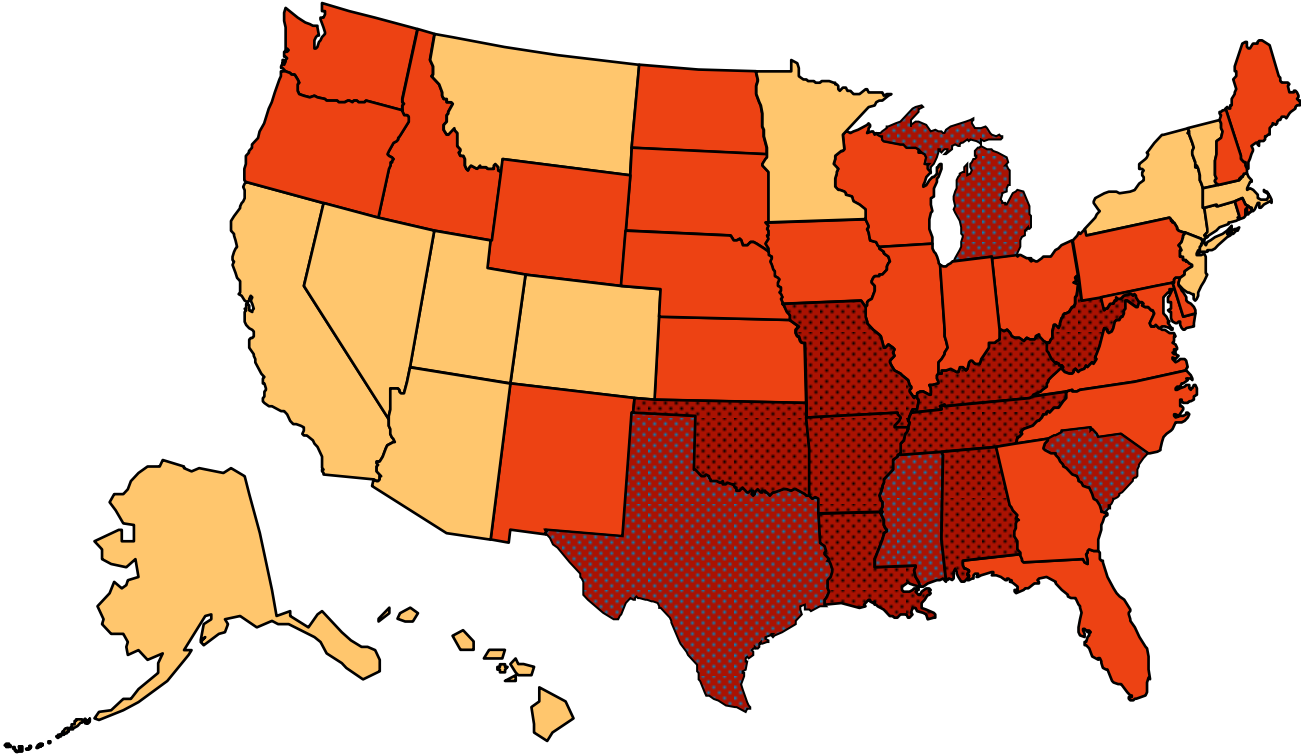


# Epidemic of Obesity?

# Obesity Trends 1990



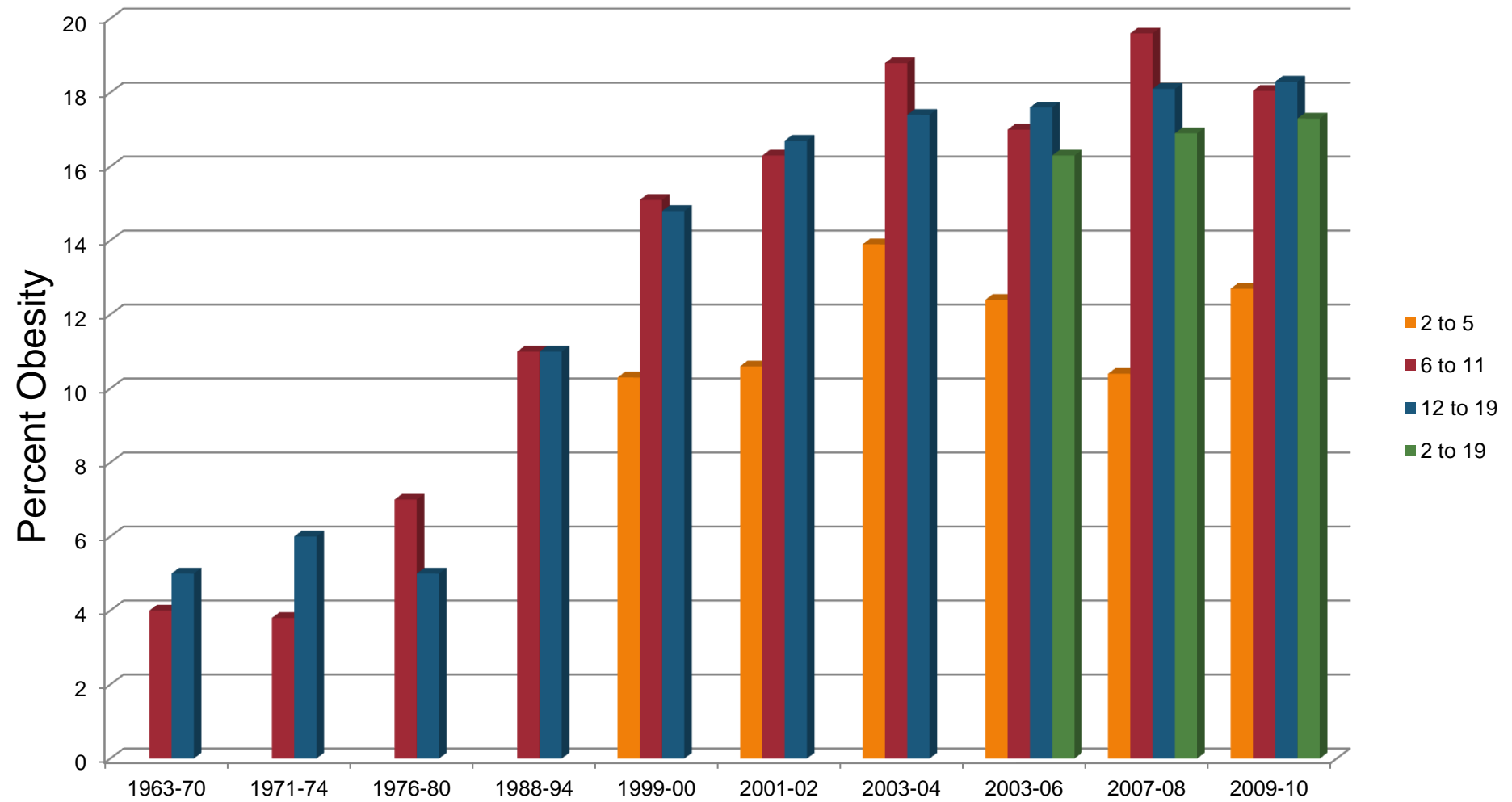
# Obesity Trends 2010







# The Spread of Obesity in Children by Age Group



Brenner Children's Hospital

Source: CDC/NCHS, NHES and NHANES

# What are Overweight and Obesity?

## Body Mass Index (BMI)

Relationship of weight to height (age and gender)

$$\text{BMI} = \text{Weight}/\text{height}^2$$

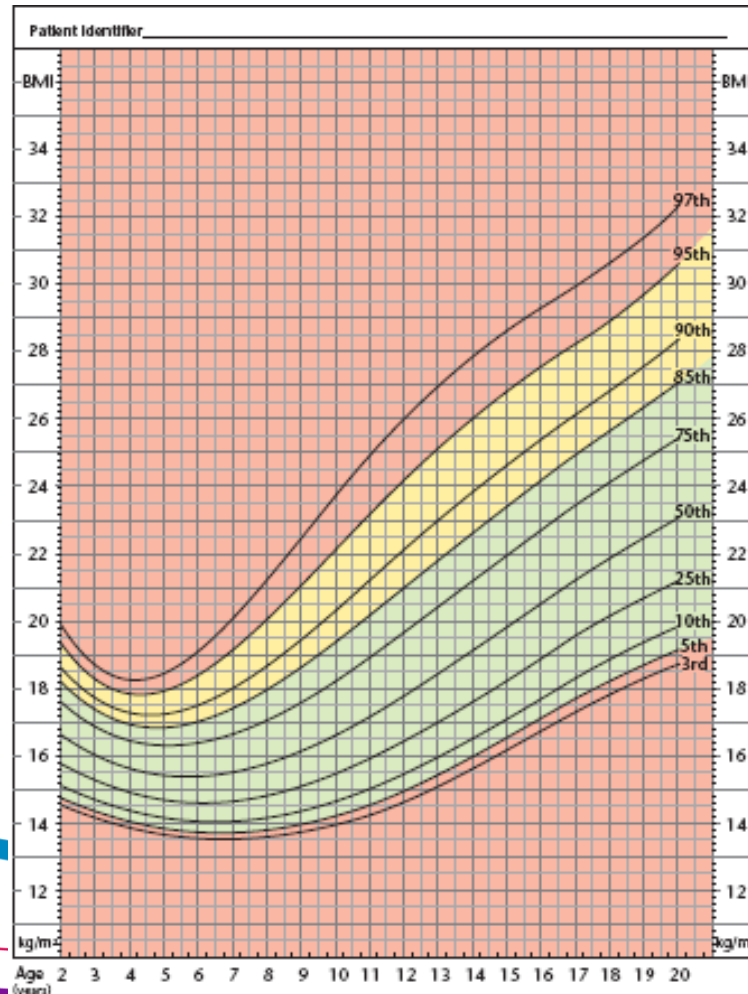
### Adults- BMI

< 18	Underweight
18-25	Normal weight
25-30	Overweight
>30	Obese

# What are Overweight and Obesity?

## Body Mass Index (BMI)

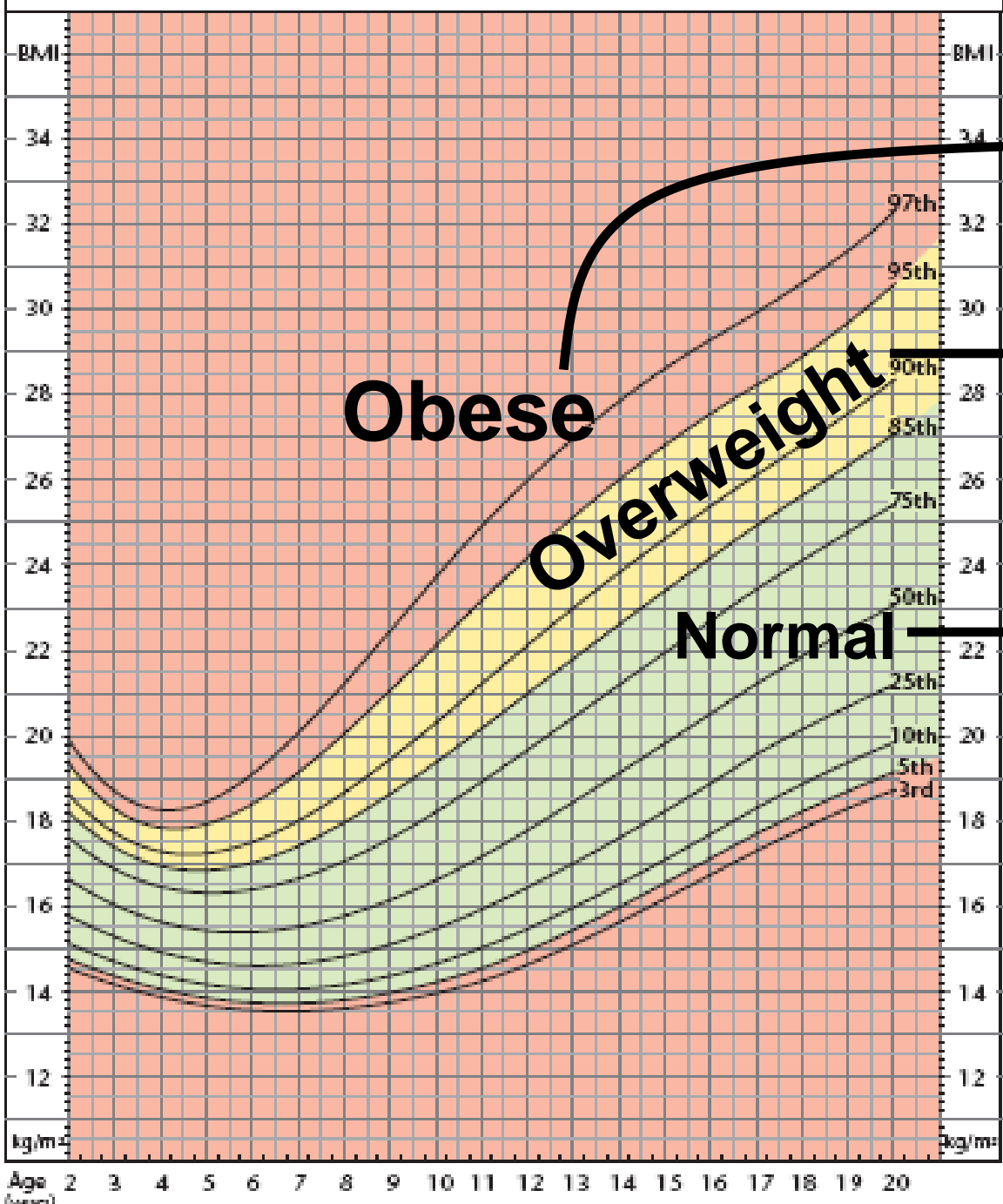
**BMI  
Percentiles**



**Relationship of  
weight to height  
(age and gender)**



Patient Identifier \_\_\_\_\_



## Adult Classification

**$\geq 95^{\text{th}}$  %ile**  
 **$= \geq 30 \text{ kg/m}^2$**

**$85^{\text{th}} - <95^{\text{th}}$  %ile**  
 **$= 25 - 30 \text{ kg/m}^2$**

**$5^{\text{th}} - <85^{\text{th}}$  %ile**  
 **$= 18 - 25 \text{ kg/m}^2$**

# BMI and Children

## What's the Difference?

**110 Pounds**

9 years old

5 feet tall

**BMI = 22**

**110 Pounds**

14 years old

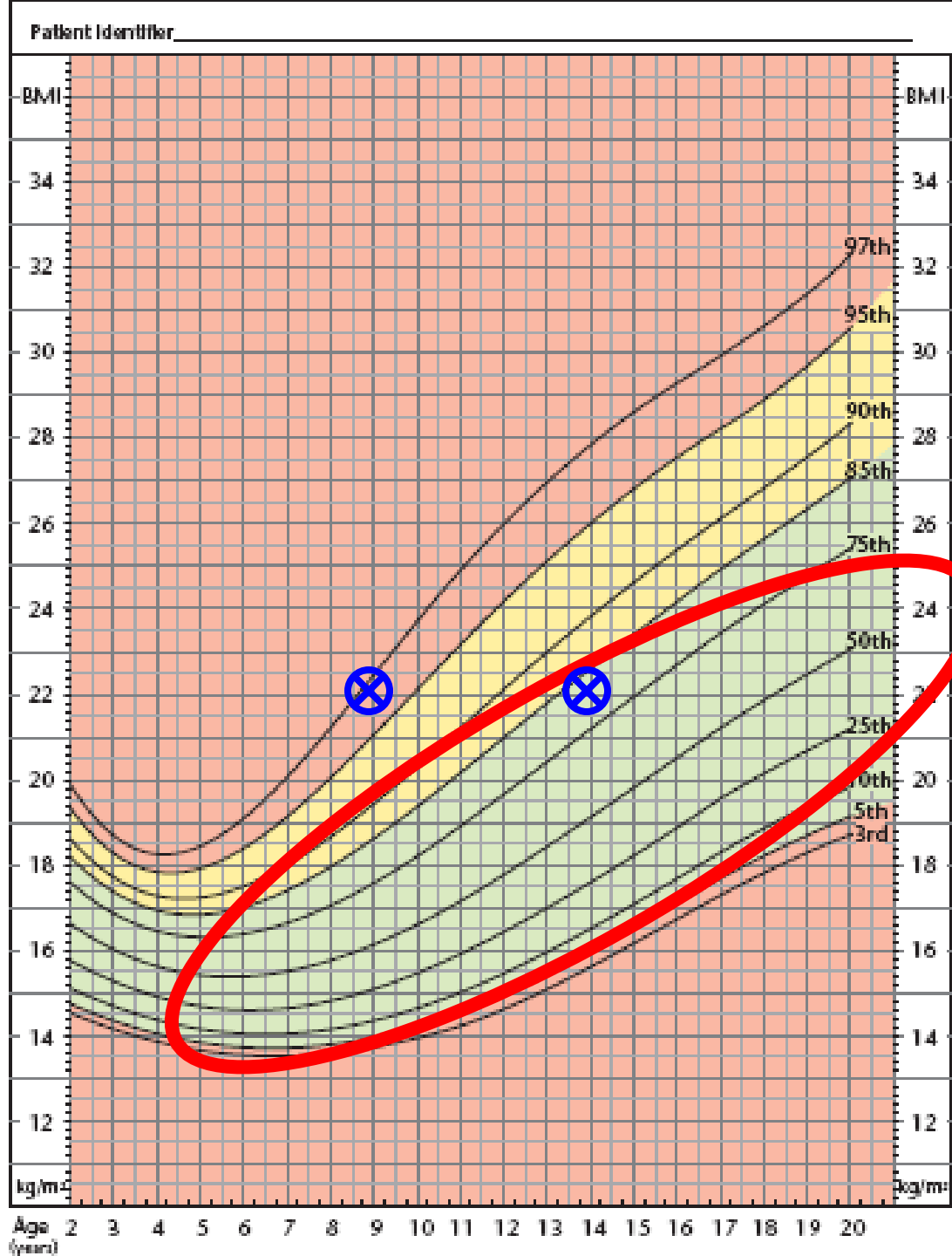
5 feet tall

**BMI = 22**

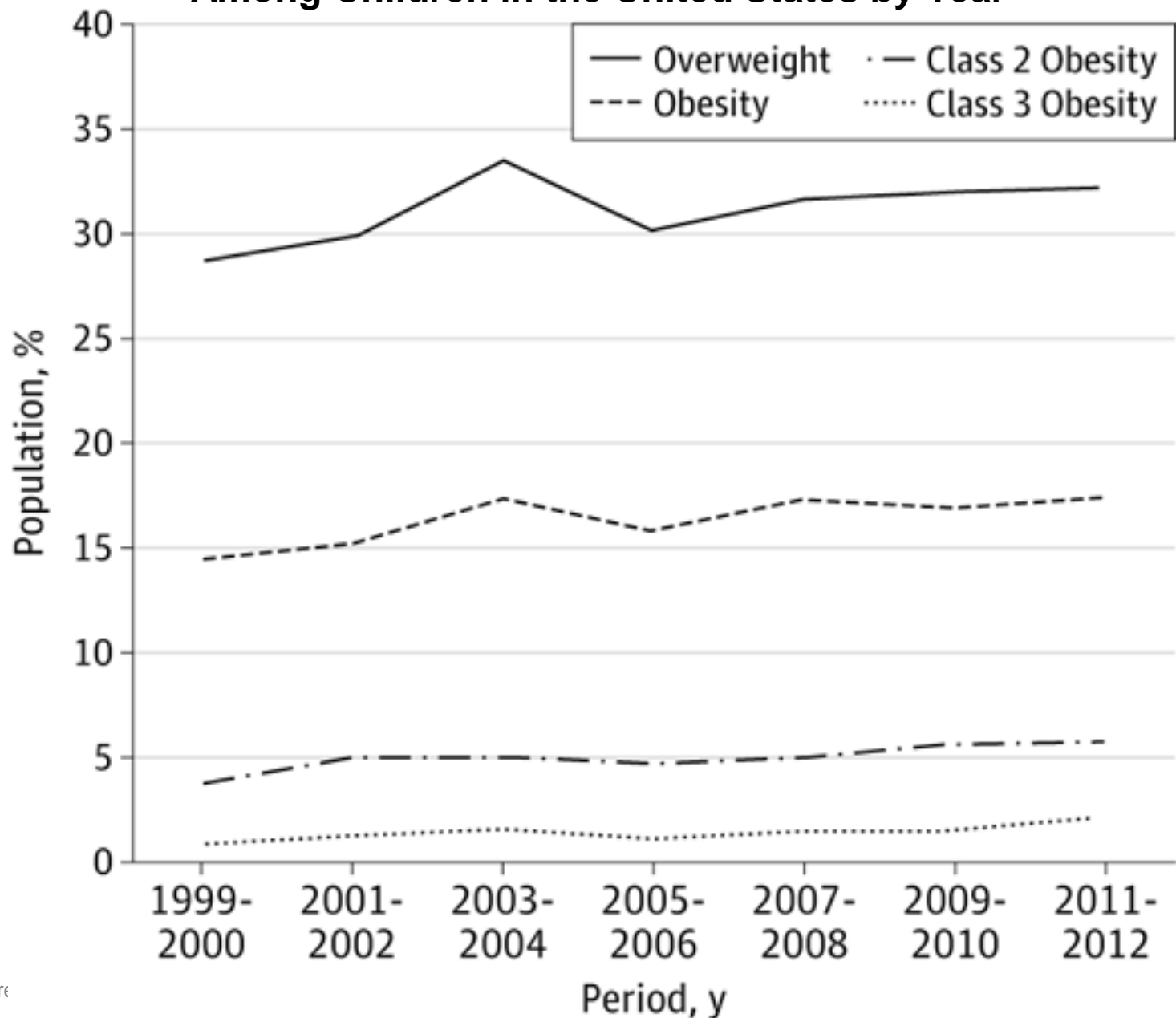


**Trajectory**

# Body Mass Index (BMI)

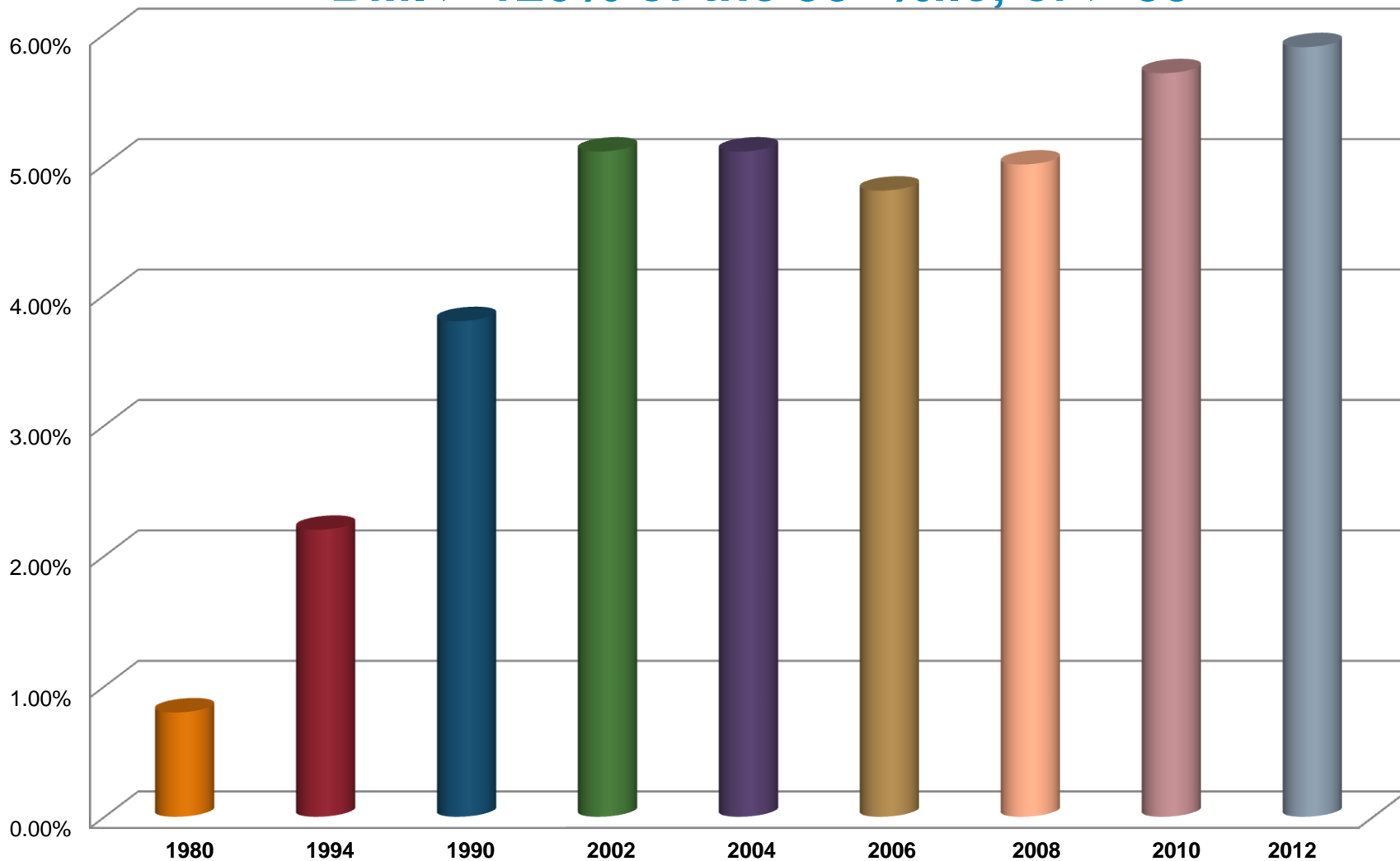


# Prevalence of Overweight, Obesity, Class 2 Obesity, and Class 3 Obesity Among Children in the United States by Year



# Severe Obesity (Class 2)

BMI > 120% of the 95<sup>th</sup> percentile, or > 35



# Appropriate weight for height?



3 year old male  
30 lbs  
37 inches

BMI =  $15.4 \text{ kg/m}^2$   
30<sup>th</sup> percentile



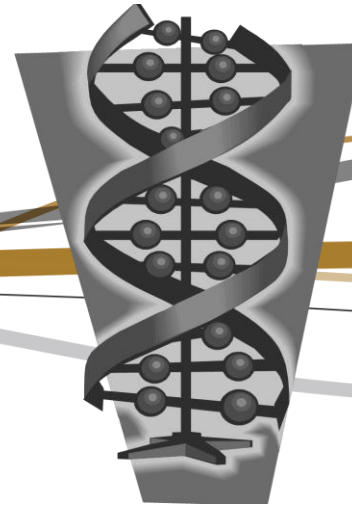
# Appropriate weight for height?

7 year old male  
60 lbs  
49.5 inches

BMI = 17 kg/m<sup>2</sup>  
83<sup>rd</sup> percentile



# How Has This Happened?



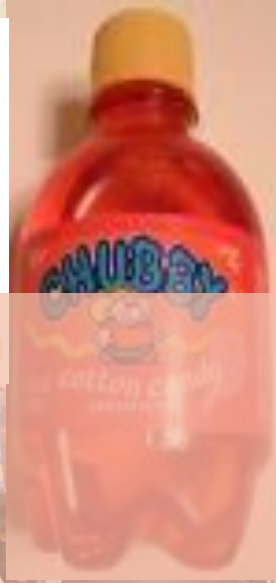
**Nutrition + Exercise + Genetics**

*How much & What we eat*

*We don't move enough*

*Our bodies are made to store fat*





We live in an  
unhealthy world





ONE MILLION DOLLARS

1,000,000

THE UNITED STATES OF AMERICA

1,000,000

THIS NOTE IS  
NON-NEGOTIABLE  
IT'S SALE PURPOSE IS TO  
PROMOTE SPECIAL EVENTS  
AND GOOD TIES

D. 7



G75302645A 7  
ATLANTA, GA

G75302645A  
7



1,000,000

SERIES 2001  
National Director  
President

D. 7

1,000,000

ONE MILLION DOLLARS

1,000,000





# “The Toxic Environment”

*“It is hard to envision an environment more effective than ours for producing obesity”* Battle and Brownell 1996

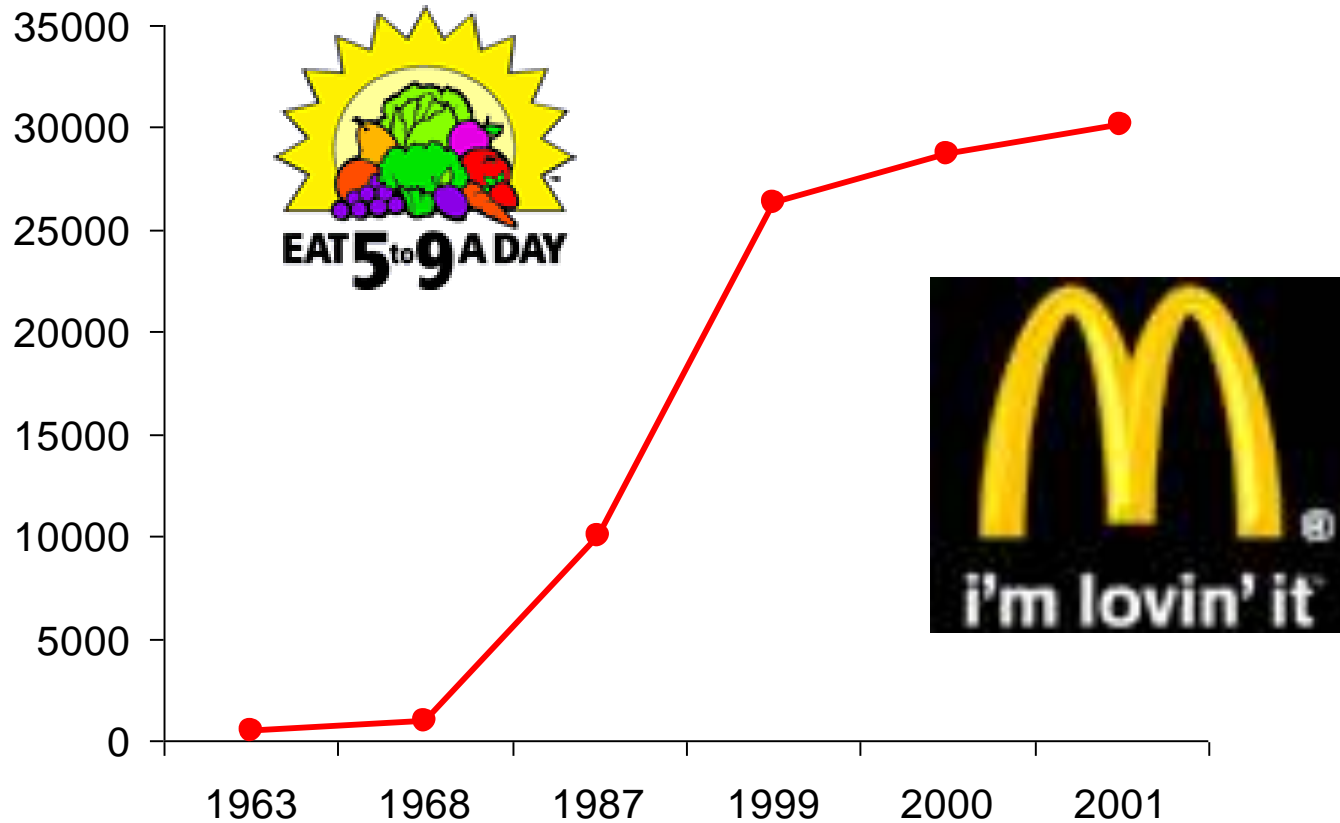
---

- 170,000+ fast food restaurants in US
  - \$12 billion/yr spent on marketing food to parents and children
  - \$12 million spent between 1989-2000 by the sugar industry on candidates for Congress
- 

**If we eat less & exercise more, who profits?**



# Fast Food Restaurant Growth Worldwide



Source: Fast Food Corporation <sup>21</sup>



**DRIVE-THRU**  
**OPEN**





# NUTRITION FACTS

		Calories	Calories from Fat	Total Fat (g)	Saturated Fat (g)	Trans Fat (g)	Cholesterol (mg)	Sodium (mg)	Carbohydrates (g)	Dietary Fiber (g)	Sugars (g)	Protein (g)	% Daily Value				
													Vitamin A	Vitamin C	Calcium	Iron	
Flour Tortilla (burrito)	1 ea.	290	80	9.0	3	0	0	670	44	2	0	7	0%	0%	20%	15%	
Flour Tortilla (taco)	1 ea.	90	25	2.5	1	0	0	200	13	<1	0	2	0%	0%	6%	4%	
Soft Corn Tortilla	1 ea.	60	5	0.5	0	0	0	25	13	1	0	1.5	0%	0%	6%	2%	
Crispy Taco Shell															6%	2%	2%
Cilantro-Lime Rice															6%	2%	2%
Black Beans															6%	4%	10%
Pinto Beans															6%	4%	10%
Fajita Vegetables															6%	2%	2%
Barbacoa															6%	2%	15%
Chicken															6%	2%	8%
Carnitas															6%	2%	8%
Steak															6%	2%	15%
Fresh Tomato Salsa															6%	2%	2%
Green Tomatillo Salsa															6%	2%	2%
Roasted Chili - Ancho															6%	0%	4%
Red Tomatillo Salsa	2 fl oz.	40	10	1.0	0	0	0	510	8	4	4	2	40%	10%	2%	6%	
Cheese	1 oz.	100	80	8.5	5	0	30	180	0	0	0	8	8%	0%	20%	0%	
Sour Cream	2 oz.	120	90	10.0	7	0	40	30	2	0	2	2	8%	0%	4%	0%	
Guacamole	3.5 oz	150	120	13.0	2	0	0	190	8	6	1	2	4%	20%	2%	2%	
Romaine Lettuce (salad)	2.5 oz	10	0	0.0	0	0	0	5	2	1	1	1	80%	30%	2%	4%	
Romaine Lettuce (tacos)	1 oz	5	0	0.0	0	0	0	0	1	1	0	0	35%	10%	0%	2%	
Chips	4 oz.	570	240	27.0	3.5	0	0	420	73	8	4	8	0%	2%	4%	6%	
Vinaigrette	2 fl oz.	260	220	24.5	4	0	0	700	12	1	11	0	60%	0%	0%	2%	

**Fajita Burrito  
w/ Grilled Chicken:  
1730 calories  
79 grams of fat**

# Fast Food Hype



**Chicken Selects®  
Premium Breast Strips  
(5 pc)**

<b>Calories</b>	<b>630</b>
<b>Fat</b>	<b>33g</b>
<b>Trans fat</b>	<b>4.5</b>
<b>Fiber</b>	<b>0</b>



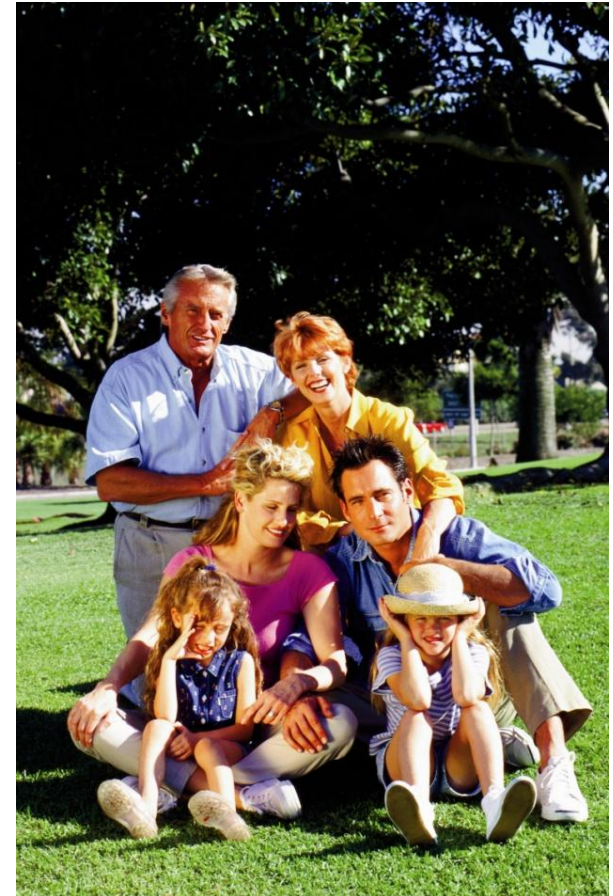
**Quarter Pounder® with Cheese**

<b>Calories</b>	<b>510</b>
<b>Fat</b>	<b>26g</b>
<b>Trans fat</b>	<b>1.5g</b>
<b>Fiber</b>	<b>3</b>

# Families- Mayberry No Longer

- Single Parents
- Dual Working Parents
- Over-scheduling
  - Busy does not mean active
- Homework

**ALL IMPACTING:**  
**FAMILY MEALS**  
**FAMILY LIFE**  
**FAMILY TIME**



# Family Meals

- **Nearly 60% of children do not have a meal with their families on a daily basis\***
- **Cheaper than eating out**
- **Families that have daily meals together eat:**
  - **Higher amounts of: calcium, fiber, iron\*\***
  - **Less saturated fat\*\*\***
  - **Eat more fruits, vegetables, and grains\*\*\***
- **Kids who eat meals with their families:**
  - **Higher scholastic scores**
  - **Happier**
  - **Less likely to smoke, use marijuana, or drink alcohol**

\*Sen, Obesity 2006; Tavaras, Obesity Research 2005

\*\*Neumark-Sztainer J Am Diet Assoc 2003

\*\*\*Gillman Arch Family Med 2000



# Sweetened Beverages



**20 oz**

**250 calories**

**17 teaspoons sugar**



**42 oz**

**410 calories**

**35 teaspoons sugar**

**Cost of Soda**

**\$1.29**

**Actual Cost to  
Restaurant**

**10¢**

**Cost to Our Health**

**Priceless**

Wieliczka,  
Poland

June, 2008





# Gatorade



**20 oz bottle = 125 calories, 35g sugar**

# School Food Policy and BMI

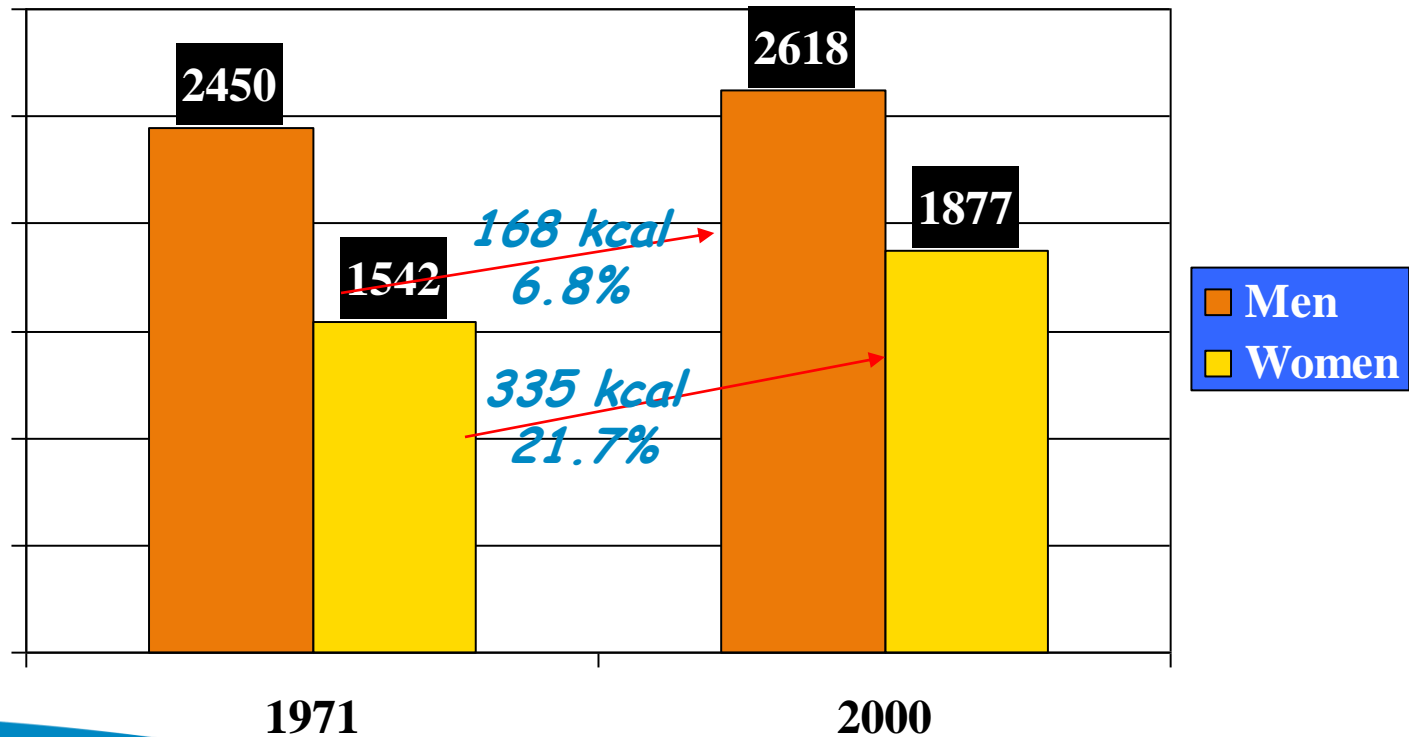
- Can students have food in class?
- Can students have drinks in class?
- Can students have snacks in hallways?
- Can students have drinks in hallways?
- Is food used as a reward or incentive?
- Does classroom fundraising include food sales?
- Does school-wide fundraising include food sales?

*Kubik Archives of Pediatrics & Adolescent Medicine 2005. 159:1111-4*

# Changing Nutrition... Not So Simple

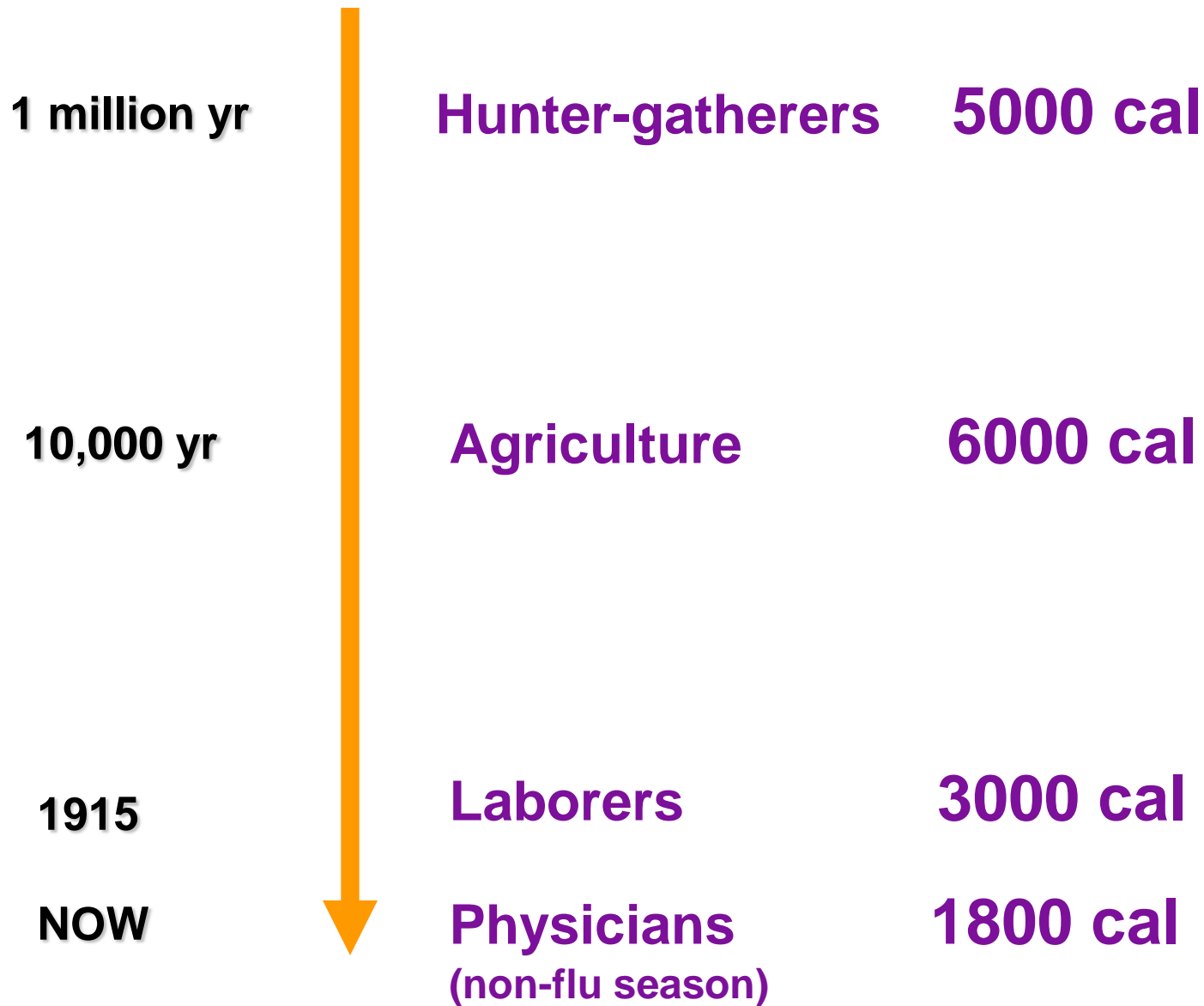
- 1) How much we eat
- 2) What we eat
- 3) How we eat
- 4) How we parent

# Nutrition- Not So Simple





# ENERGY EXPENDITURE ESTIMATES



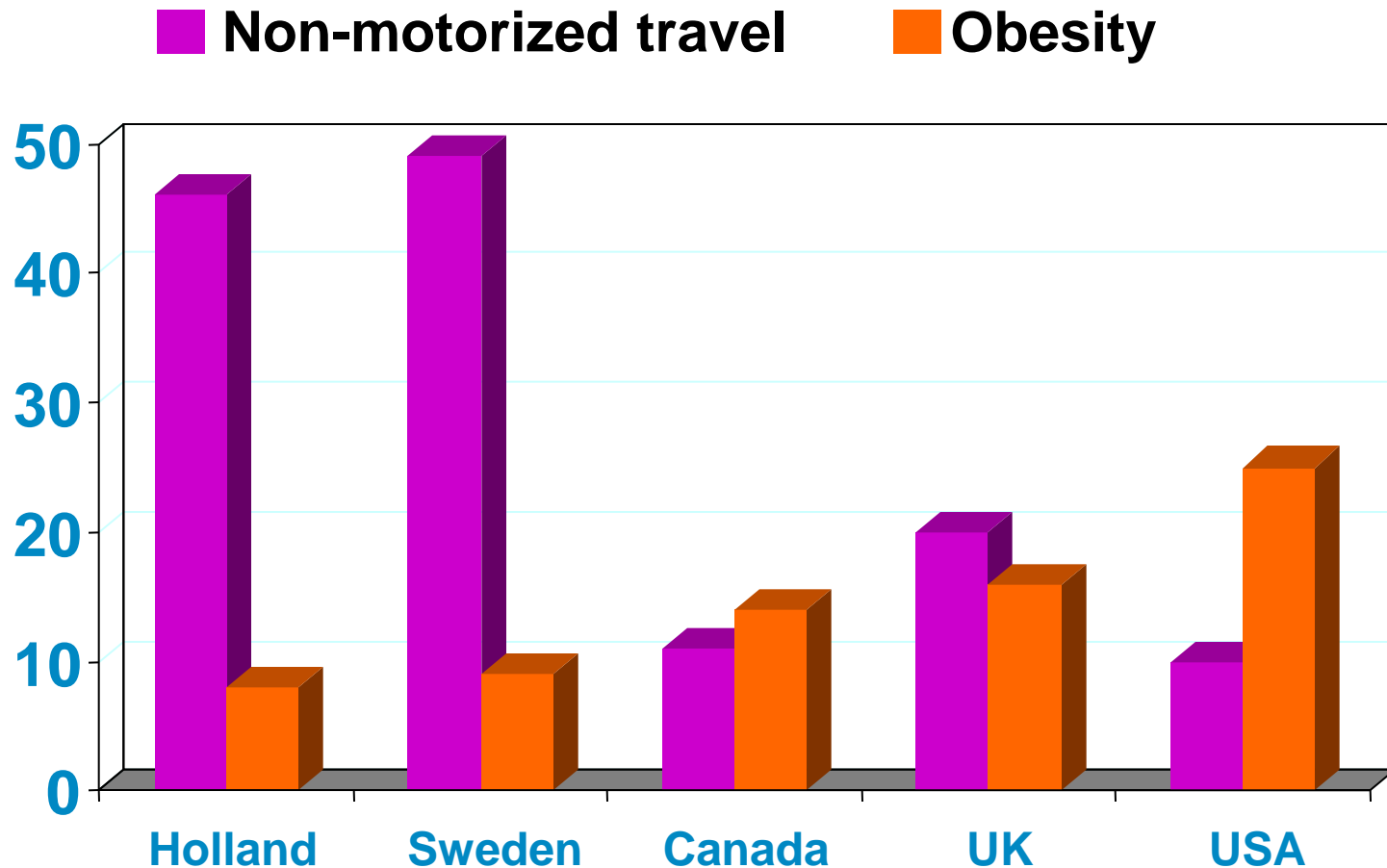
# Television

- Children watch > 20 hours of TV per week  
20 hours/week X 10 food commercials/hour = 200 commercials/wk
- TV in the bedroom increases viewing by 38 min
- Television increases caloric intake & decreases resting metabolic rates
- Television is independently linked to obesity
  - Robinson *JAMA* 1999: Prospective study of 2 schools showed relative decrease in BMI & body fat in intervention school



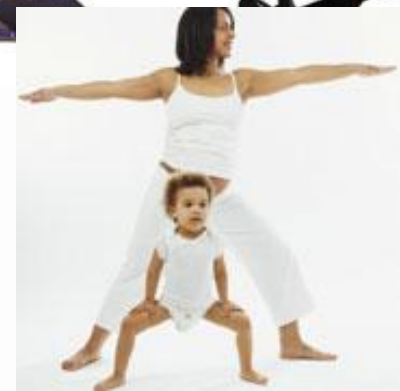


# Non-Motorized Travel and Obesity: 2000



Victoria Transport Institute, 2002; WHO, 2000









# Predictive Value of Pediatric Obesity

- Young Age
  - Review of all studies 1970-1992
    - 26-41% of obese preschool children became obese adults
    - 42-63% of obese school-age children became obese adults
    - Risk increases with age
    - Serdula, Prev Med 1993;22
- Risk increases with obese parents
  - Whitaker, NEJM, Sept 25, 1997

# Life Expectancy

- **2/3rds of adults are overweight or obese**
- **1/3 of children are overweight or obese**
- **Average life expectancy today= 78 years**
- **Life expectancy of our children= 74 years**

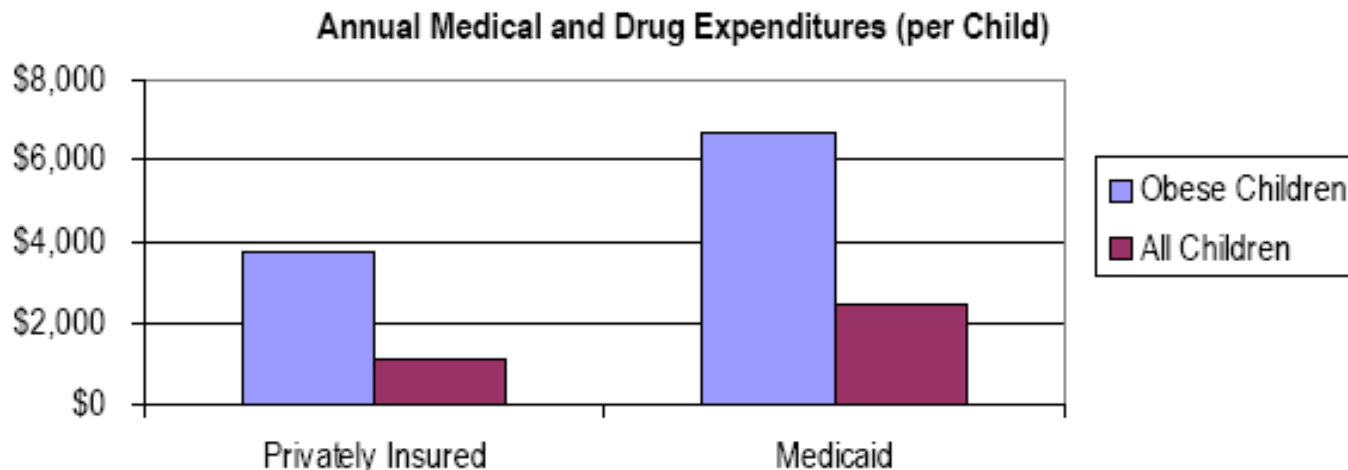
# Weight-related Pediatric Comorbidities

- **Costs**

- Medical costs of treating obesity-related disease in US= \$147 billion (CDC, 2008)
- Costs doubled from 1998 to 2008

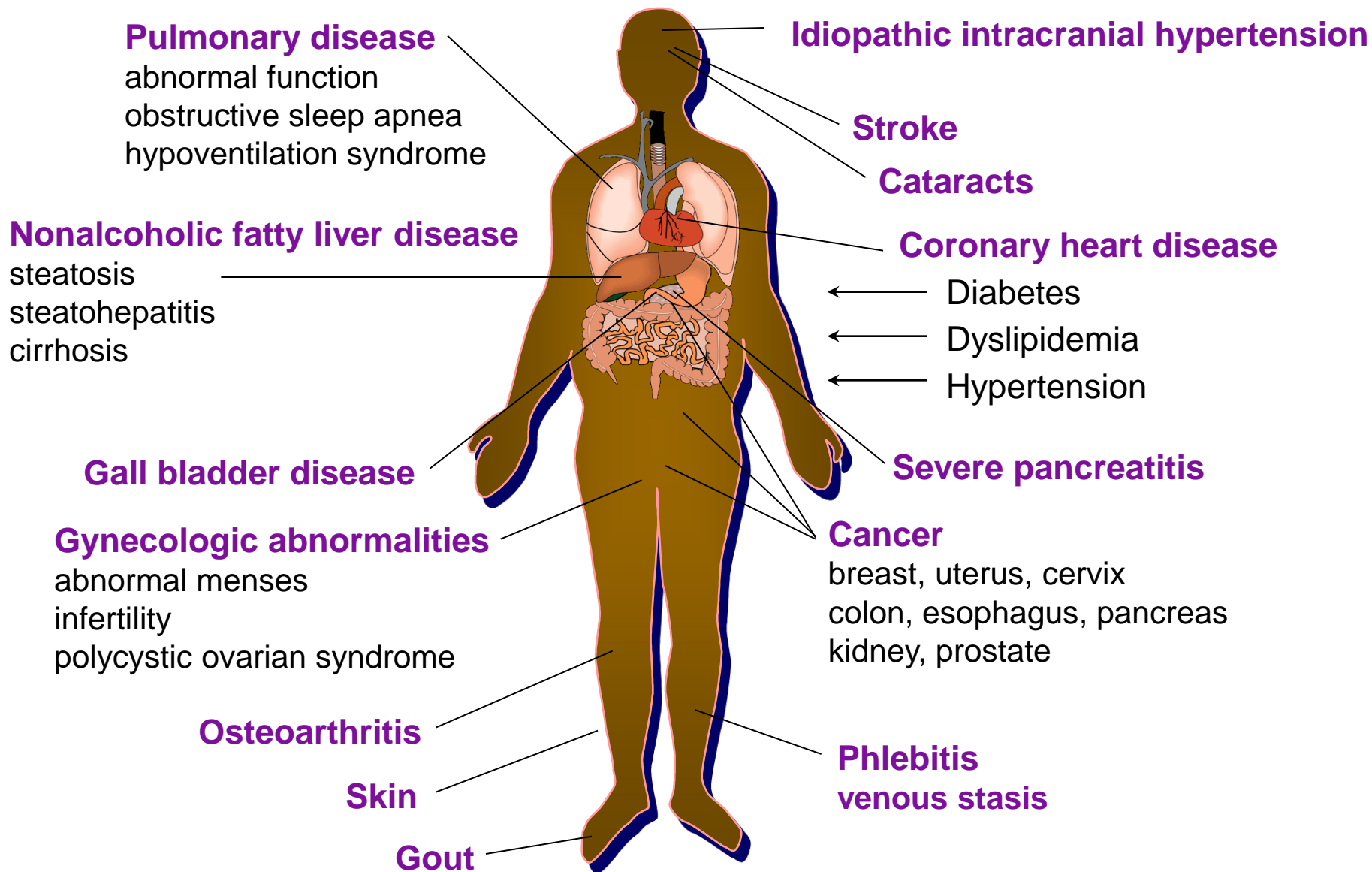
- **Pediatric obesity costs** (Marder, Thomson Medstat, 2005)

- Obese children with Medicaid have higher health costs than those with private insurance
- Cost of childhood obesity: \$14 billion
- Obese children 2-3x more likely to be hospitalized

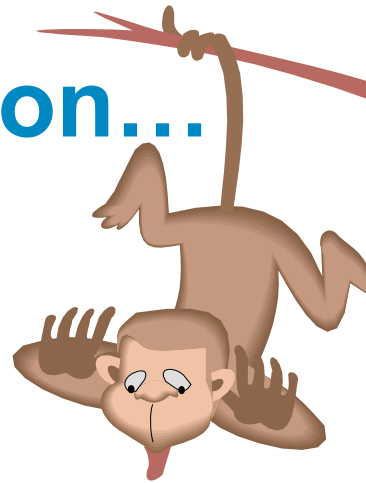




# Obesity-related health risks in ~~Adults~~ Children



# More than just a physical condition...



- Fewer friends
- Experience rejection from peers
  - *Name calling, teasing, physical aggression, withdrawal of friendships, rumors/lies* \*
- Least liked compared to other children \*\*
  - *Preference for non-overweight friends is 41% greater than it was in 1961*
- Quality of life comparable to a child with cancer \*\*\*

\*Janseen, I. (2004). *Pediatrics*

\*\*Latner, J. & Stunkard, A. (2003). *Obesity Research*

\*\*\*Schwimmer J (2003) *JAMA*

## Social Discrimination

**“It seemed like the last form of open discrimination... I started walking down the street and within 10 seconds, a trio of people looked at me, snickered... started pointing and laughing in my face.”**

**-Tyra Banks, 2005**



**“For every complex problem  
there is an answer that is clear,  
simple, and wrong.”**

**-HL Mencken**

**“Obesity is a complex disease...  
It will take a complex approach”**

**- Bill Dietz, MD, PhD**



“Those who cannot remember the past are condemned to repeat it.”

-George Santayana 1863-1952


# Health guidelines: It's tough keeping up

Obesity Fight,  
1-Year Cost

Exercise, blood pressure, obesity: The standards keep changing. One weight watcher's lament: 'I don't pay attention anymore.' Such resignation concerns doctors.

By Nancy Hellmich and Rita Rubin  
USA TODAY

**DR. ATKINS' NEW DIET**



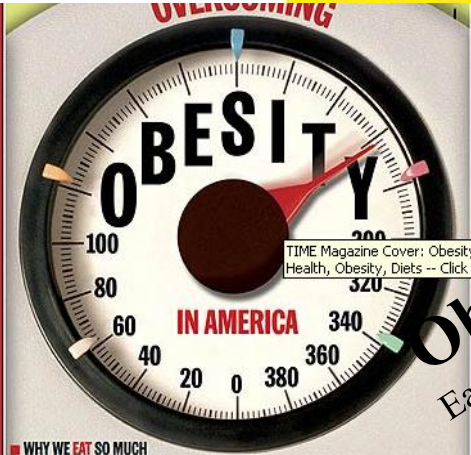
ENTER **THE ZONE**

**THE SOUTH BEACH DIET**

**Flat Belly Diet!**

**MAX'S MAGICAL DELIVERY**  
Fit For Kids

A DVD for Parents and Kids!

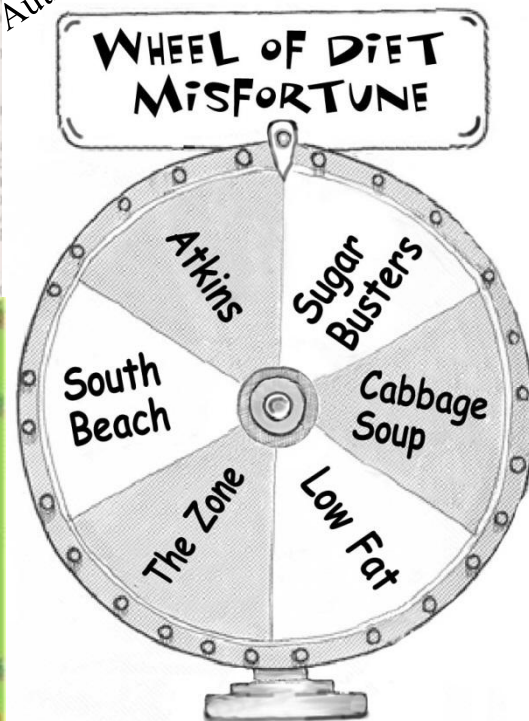


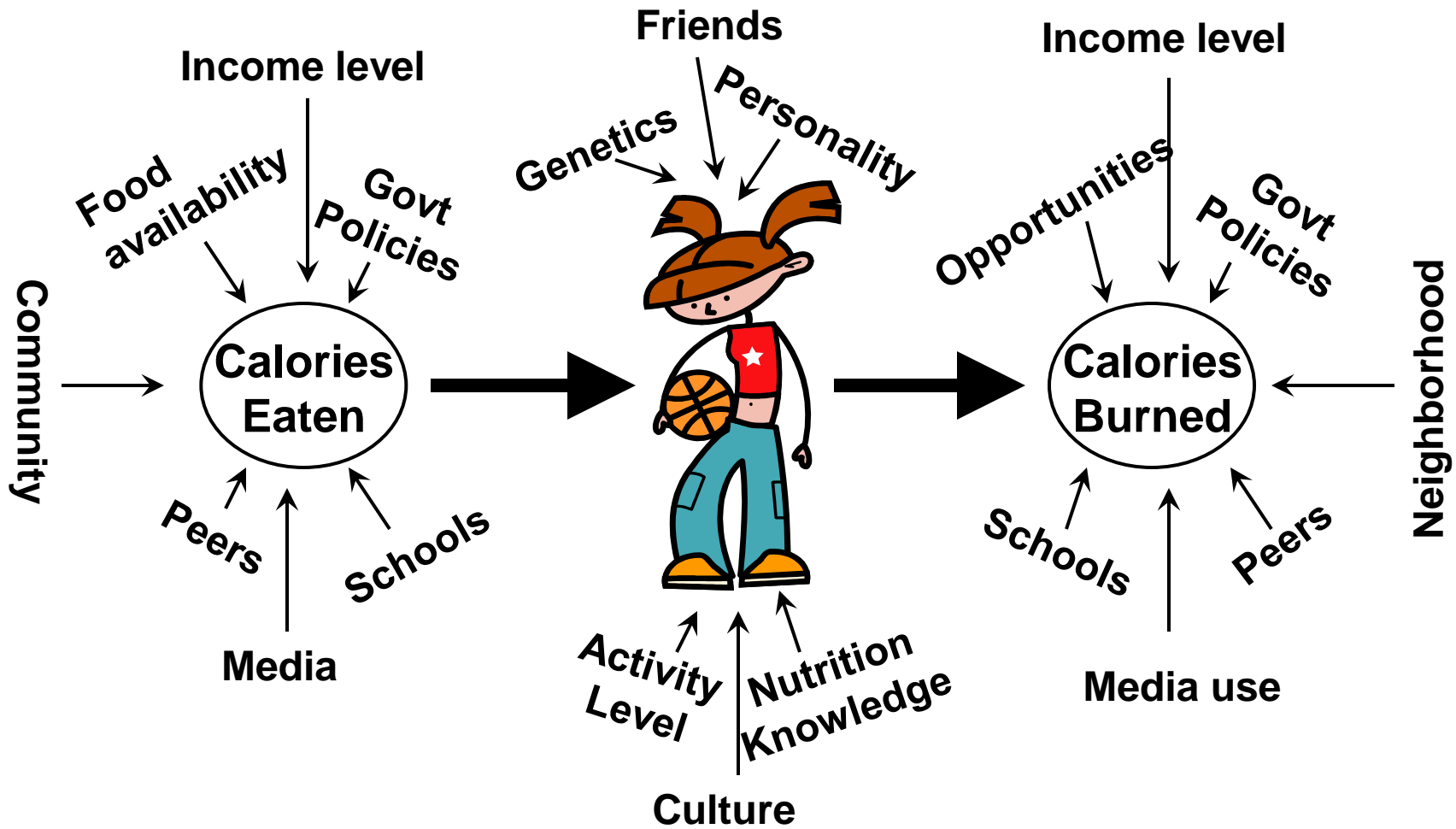
- WHY WE EAT SO MUCH
- THE ANTI-FAT CRUSADERS
- WEIGHT-LOSS HEROES
- WHAT TO TELL YOUR KIDS
- A GUIDE TO DIET BOOKS

**Obesity Gets Early Intervention Is Key to Control**

**Broccoli**  
Vegetable Group  
Your body needs fruits and vegetables every day.

Amount Collected	1/2 cup
Vegetable Serving	1/2 cup
Calories	32
Fat	0



# OBESITY

## Nutrition

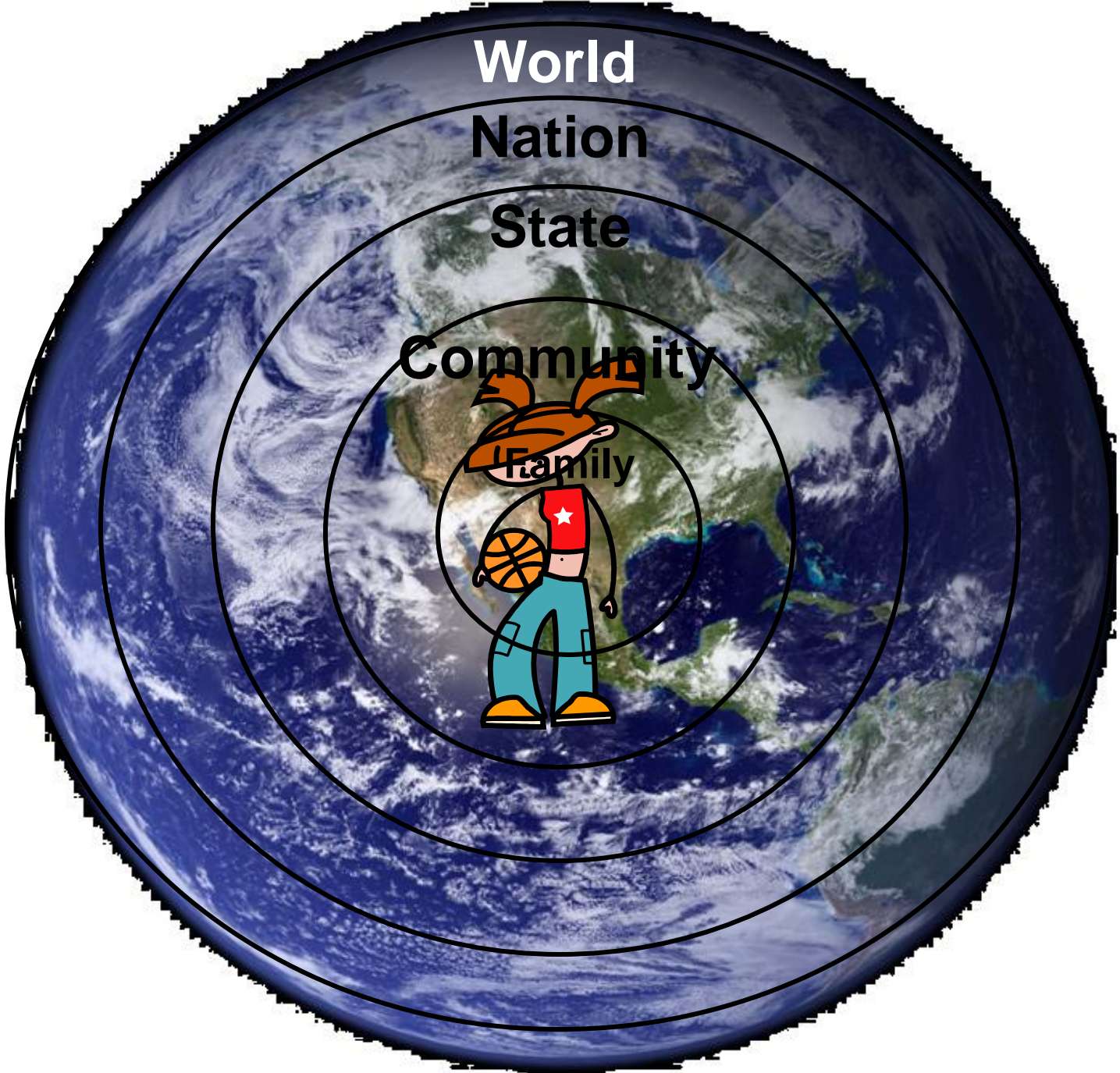
## Exercise

- Food Away from Home
- Sweetened Beverages
- Portion Sizes
- Cooking Skills
- Energy Density
- Fruit Intake
- Veggie Intake
- Breakfast
- Snacks
- Meal Skipping
- Mindless Eating
- Macronutrients

- Encouragement for Activity
- Free Play
- Outdoor Activity
- Active Transport
- Exercise
- Enjoyable PA/Sports
- Sedentary Time
- TV in Bedroom
- Family Activity

*ENVIRONMENT*





**World**

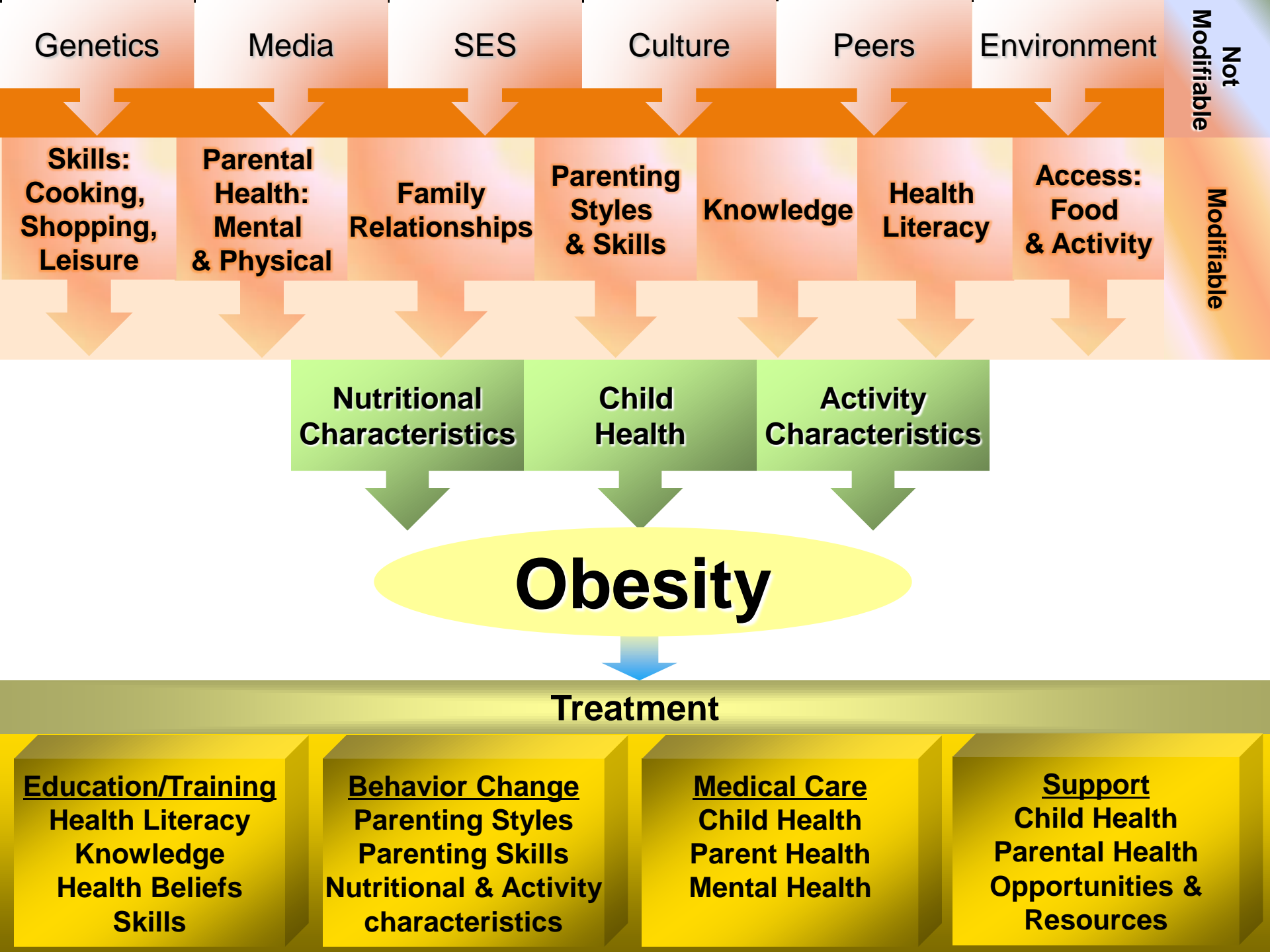
**Nation**

**State**

**Community**

**Family**





# Parent Participation

- Evidence for including parent strong\*
  - Significantly better with parent in treatment
  - Fine print: Parent target of treatment also
- Parents as exclusive agents of change
  - Theory: Modeling, change in environment, translation of behavior change by parent
  - Evidence treating parent alone more effective vs child alone (6-12 year olds)\*\*
  - Parent-only as effective as family-based, both better than control\*\*\*

\* Epstein, multiple studies

\*\*Golan M, Weizman A. *J Nutrition Education* 2001

\*\*\* Janicke et al *Arch Pediatr Adolesc Med.* 2008

# Brenner FIT

- **Multidisciplinary**

- Pediatrician
- Dietitian
- Family Counselor (LCSW, LMFT)
- Physical Therapist
- Activity Specialist
- Social Worker

- **Multi-dimensional**

- Behavioral approach
- Motivational Interviewing
- Family-centered
- Individual & Group
- Outcomes and Satisfaction

- **Multi-component**

- Kohl's Family Collaborative (Community)
- Mejor Salud Mejor Vida (Hispanic Outreach)
- TeleFIT (Telemedicine)
- Bariatric surgery

# Brenner FIT Referral Criteria

- 2- 18 years of age
- $\geq 95^{\text{th}}$  %ile BMI with a comorbidity
  - AST, ALT, Lipid Profile, Glucose, Insulin
  - With a touch of common sense
- Other tests as indicated
  - Sleep apnea
  - Orthopedic (SCFE, Blount's Disease)
  - Pseudotumor Cerebri
  - Hypertension
- BMI > 40



# Brenner FIT: difficult

- **Pros**

- Long-term changes
- Family experience
- Evidence-based into practice
- Expertise

- **Cons**

- Staff intensive
- Incremental success
- Treatment-intensive: poor understanding
- Little to no reimbursement



**Joseph Skelton,  
MD, MS**  
Director



**Gail Cohen, MD**  
Pediatrician



**Dara Garner-Edwards**  
Associate Director and  
Family Counselor



**Christine Jordan**  
Family Counselor



**Angelica Guzman**  
Community Program  
Manager, MSMV



**Ligia Vasquez**  
Exercise, Activity  
& Play Specialist



**Casey Hicks**  
Exercise, Activity  
& Play Specialist



**Sherry Frino**  
Physical Therapist



**Melissa Dellinger**  
Dietitian



**Katie Boles**  
Dietitian



**Melissa Moses**  
Dietitian



**Deborah Pratt**  
Administrative  
Assistant  
Brenner Children's Hospital



**Megan Irby**  
Research Program  
Manager



**Sara Ebbers**  
Community Program  
Coordinator



**Sara Glenn**  
Project Coordinator



**Lorri Busby**  
Family Support  
Specialist

# To prevent obesity, we must start early!



The rate of infant weight gain during the first 6 months of life has significant influences in long term infant and child weight outcomes

Taveras et al. *Arch Pediatr Adolesc Med.* 2008

# Infant Factors & Characteristics

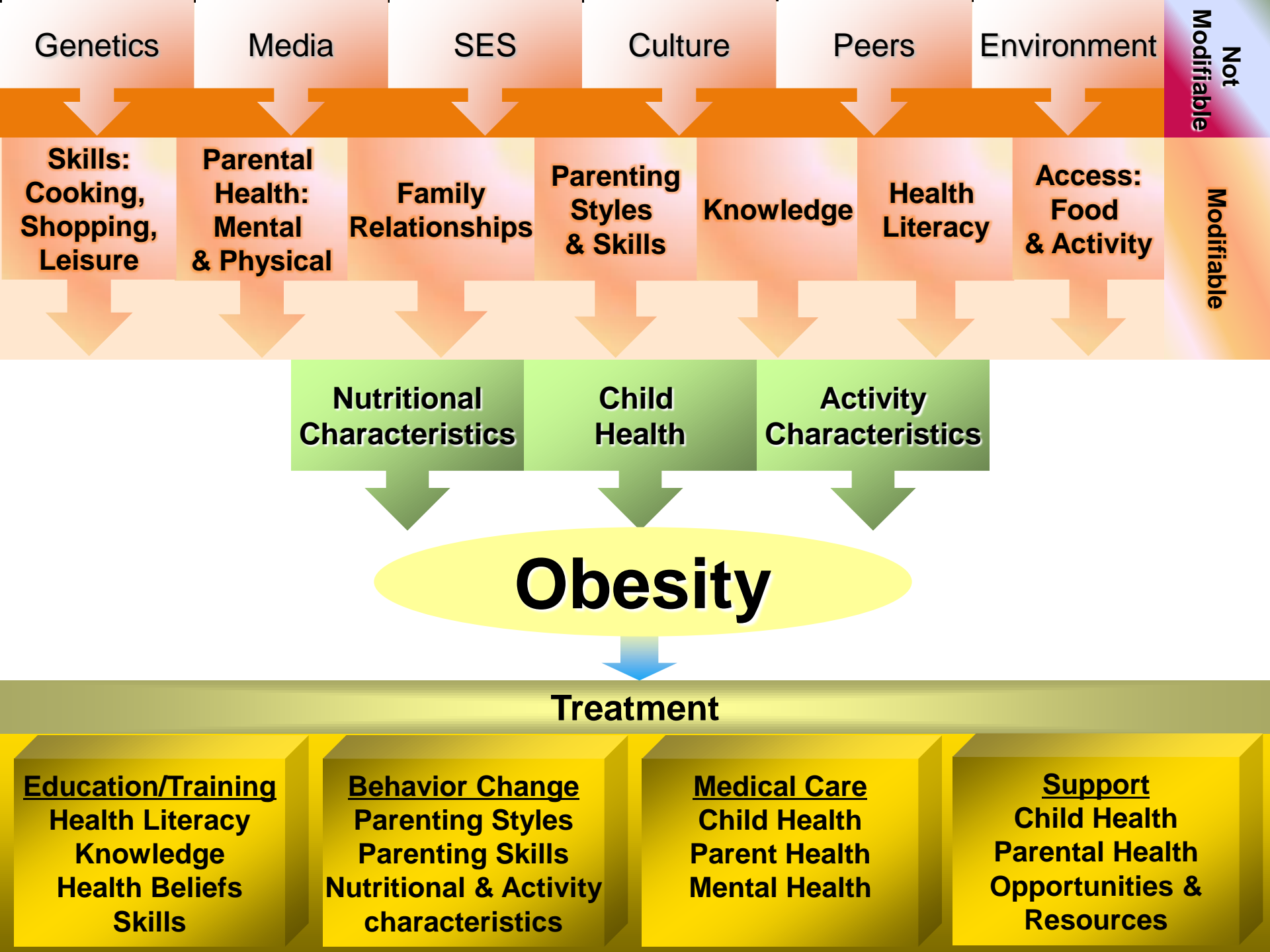
- Genetics
- Age
- Temperament
  
- Nutrient intake
- Infant Appetite
- Infant sleep
- Energy output
- Responsiveness
- Ability to communicate

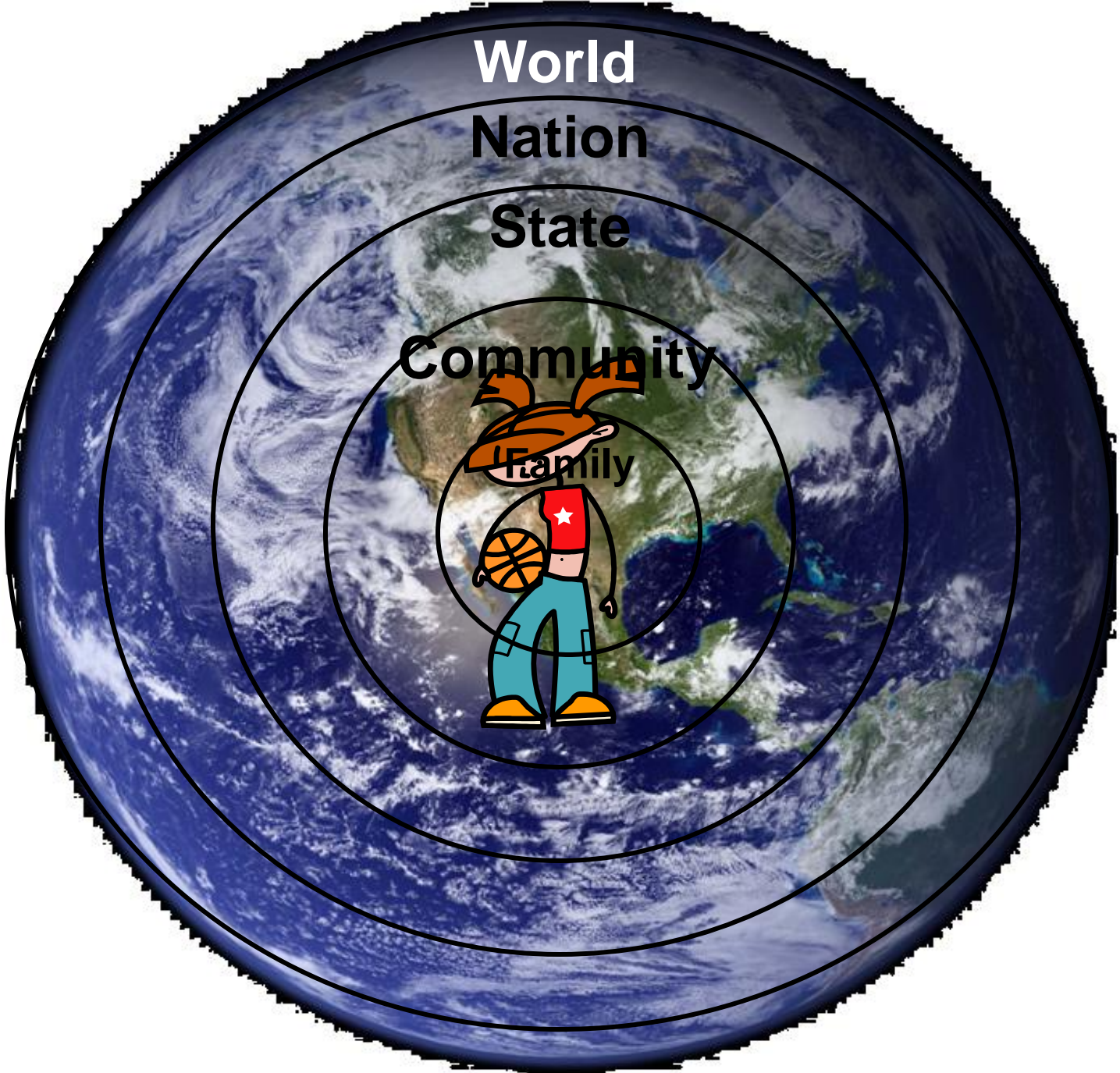
← Infants depend on their caregivers to facilitate these behaviors.

# Maternal & Parenting Factors

- Knowledge and education
- Prenatal care
- Breastfeeding versus bottlefeeding
- Weaning and introduction to solid foods
- Perceived access to resources
- Supplying nutritious food and opportunities for activity
- Parent-child relationships and interactions
- Maternal sensitivity
- Ability to accurately identify and respond to infant cues







**World**

**Nation**

**State**

**Community**

**Family**

# Katie Boles, RD, LDN

Brenner FIT (Families in Training)

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[katboles@wakehealth.edu](mailto:katboles@wakehealth.edu)