

# Adolescent Obesity

In the Almost Post-Twinkie Era

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Coastal Children's Services

# twinkies

## Filter results

1 result

### Get it fast

**Pick up today at Wilmington** [edit](#)

- ☐ Free Order Pickup
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### ^ Deals

- ☐ All Deals
- ☐ Sale

### ^ Guest Rating



### Hostess Twinkies - 10ct/13.58oz



Hostess

★★★★★ 2

\$2.99

Get it as soon as 9am tomorrow with Shipt

Add for delivery

# twinkies

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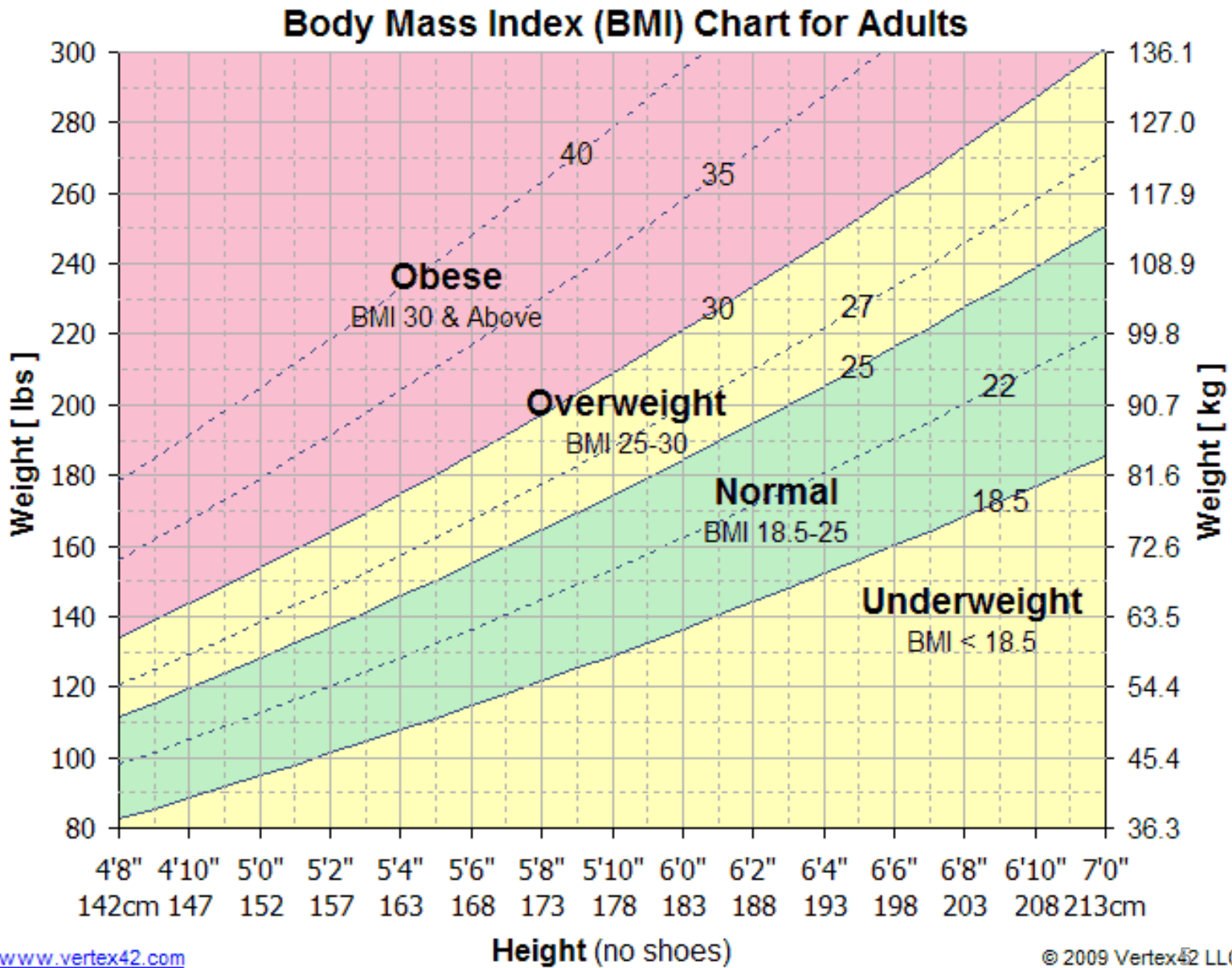


# Definitions of obesity

- **Body Mass Index (BMI)**
  - $BMI = (703 * \text{Weight in pounds}) / ((\text{Height in inches}) * (\text{Height in inches}))$
- **Overweight**
  - Adults with BMI 25 to 29.9
- **Obese**
  - Adults with BMI greater than 30
  - Children with BMI > 95<sup>th</sup> percentile



# Body Mass Index



# Military obesity

- About 1/3 of Americans aged 17-24 are too heavy to join the military
- 2/3 of active duty personnel are overweight, and an additional 12% are considered obese
- YMCAs have assisted the military in improving preparedness of personnel



# Honolulu 1945



Pause (k)

# Fire fighters

- About half are overweight
- About 1/3 are obese
- Many are staffed by volunteers, making enforcement of regulations difficult
- Firefighters die more frequently of heart attacks while on the job than other causes, such as fighting fires



# Hypertension

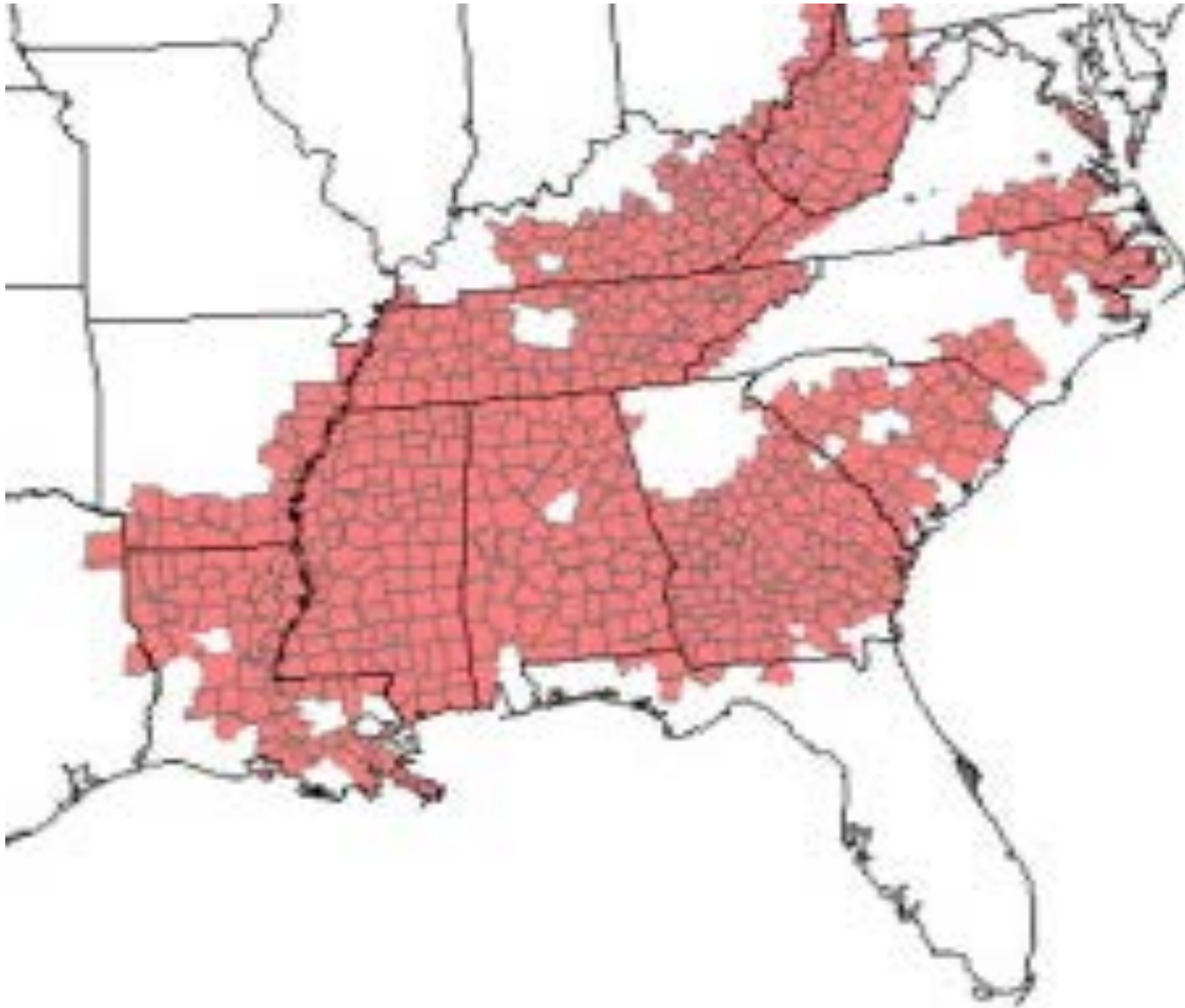
- All 10 states with the highest levels of hypertension are in the South

# Diabetes and stroke “belts”

- 1960s: The Southeastern “stroke belt” was identified
- Now: The “Diabetes belt” composed of 644 counties in mostly southeastern states
  - High proportion of African-Americans
  - High proportion of sedentary life styles



# Diabetes belt



# Diabetes rates

Rate per 100 population	North Carolina	South Carolina	Oregon
1995-97	0.57	0.54	
2005-07	1.01	1.15	0.67

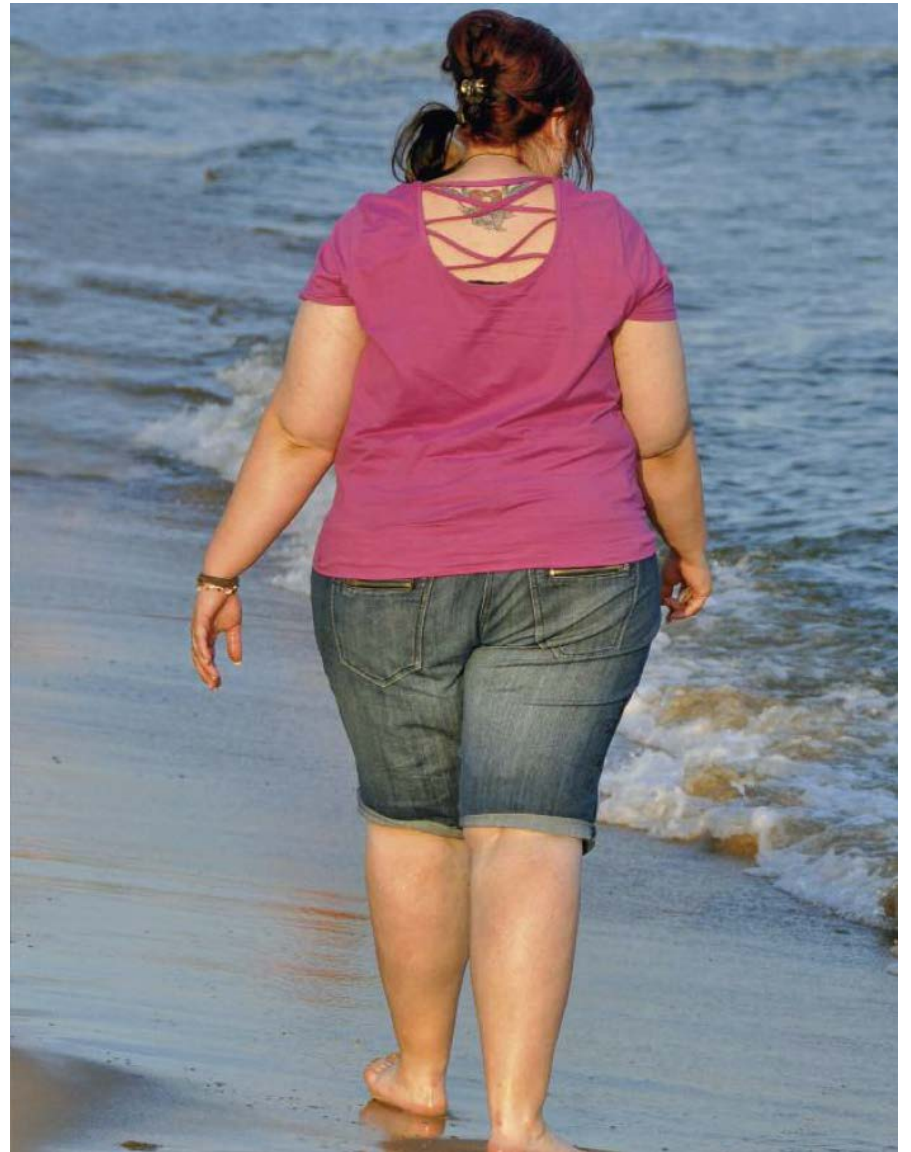
# Obesity and poverty

- States with high poverty rates also measure high in obesity percentage
- Highest rates in American Indian and Alaska native populations

# The new normal?



1989



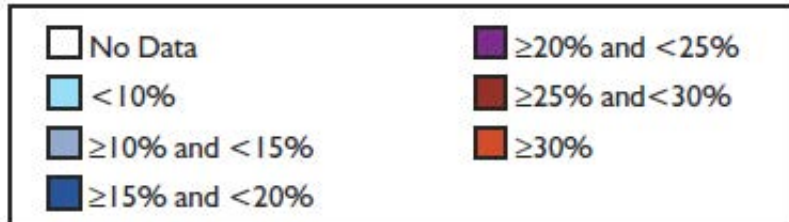
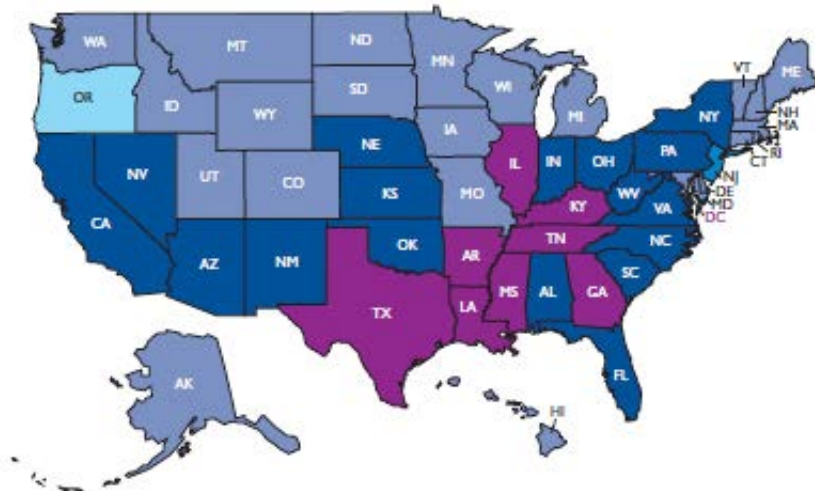


# Obesity in Children

## I. Study of Children Ages 10–17 (2007)

PROPORTION OF CHILDREN AGES  
10-17 CLASSIFIED AS OBESE, BY STATE

Obese 10-17 Year Olds, 2007 NSCH



Source: National Survey on Children's Health, 2007.

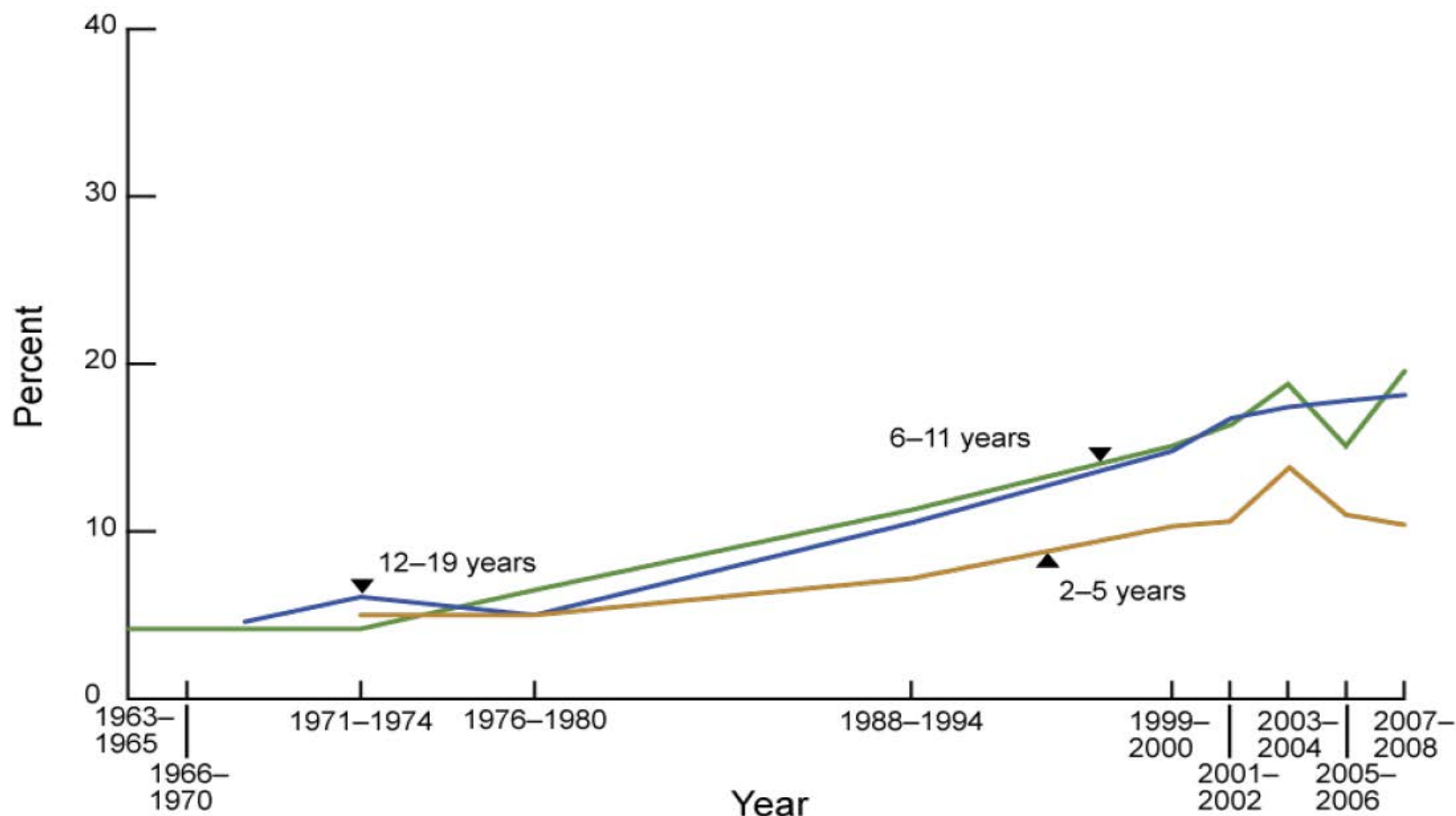
Rank	State	Percentage Obese
1	Mississippi	22
2	Georgia	21
6	Tennessee	21
11	N. Carolina	19
22	S. Carolina	15
23	Virginia	15
51	Oregon	10

National (2-19 years):

Overweight: 32 %

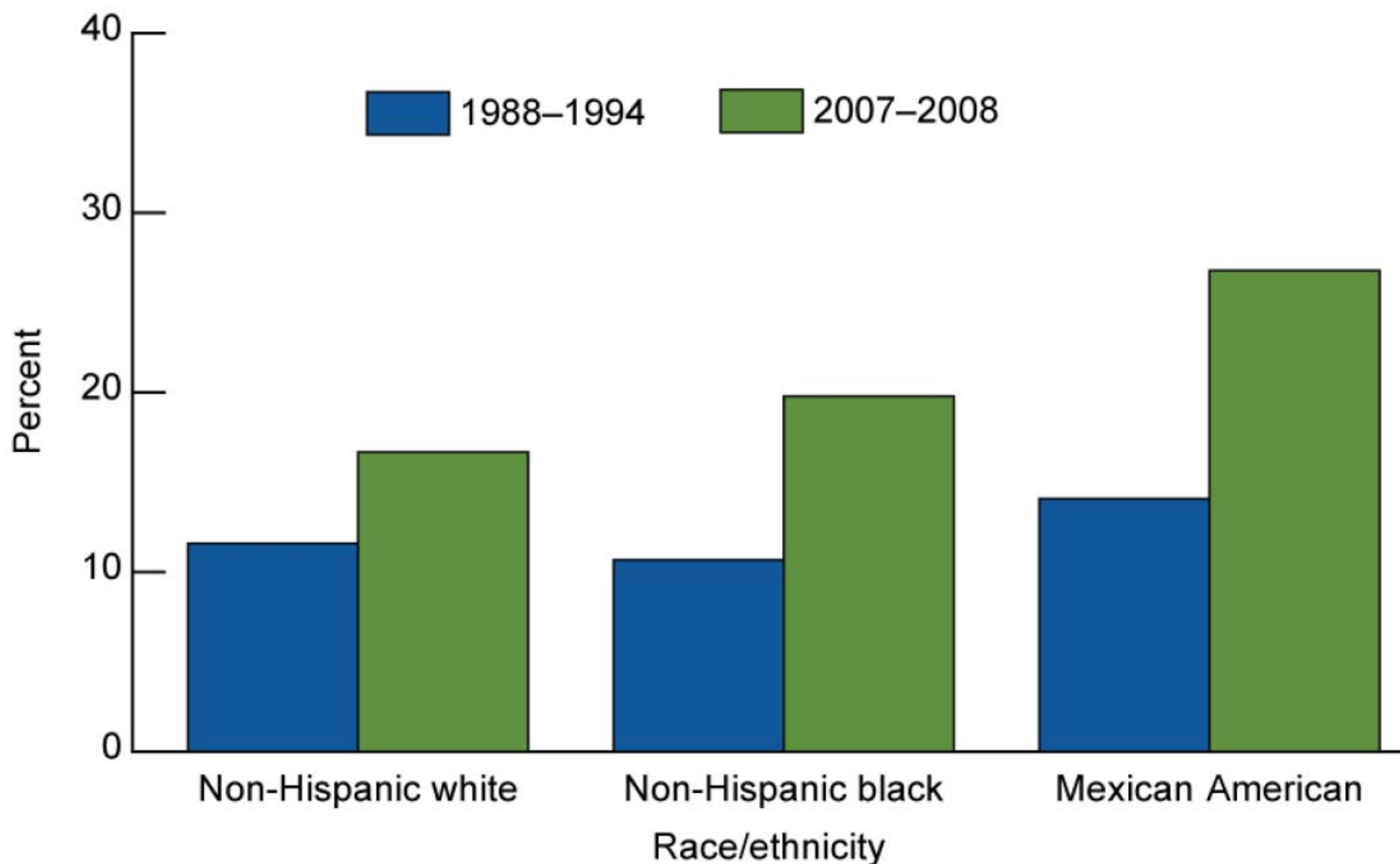
Obese: 17 %

**Figure 1. Trends in obesity among children and adolescents:  
United States, 1963–2008**



NOTE: Obesity is defined as body mass index (BMI) greater than or equal to sex- and age-specific 95th percentile from the 2000 CDC Growth Charts.  
SOURCES: CDC/NCHS, National Health Examination Surveys II (ages 6–11), III (ages 12–17), and National Health and Nutrition Examination Surveys (NHANES) I–III, and NHANES 1999–2000, 2001–2002, 2003–2004, 2005–2006, and 2007–2008.

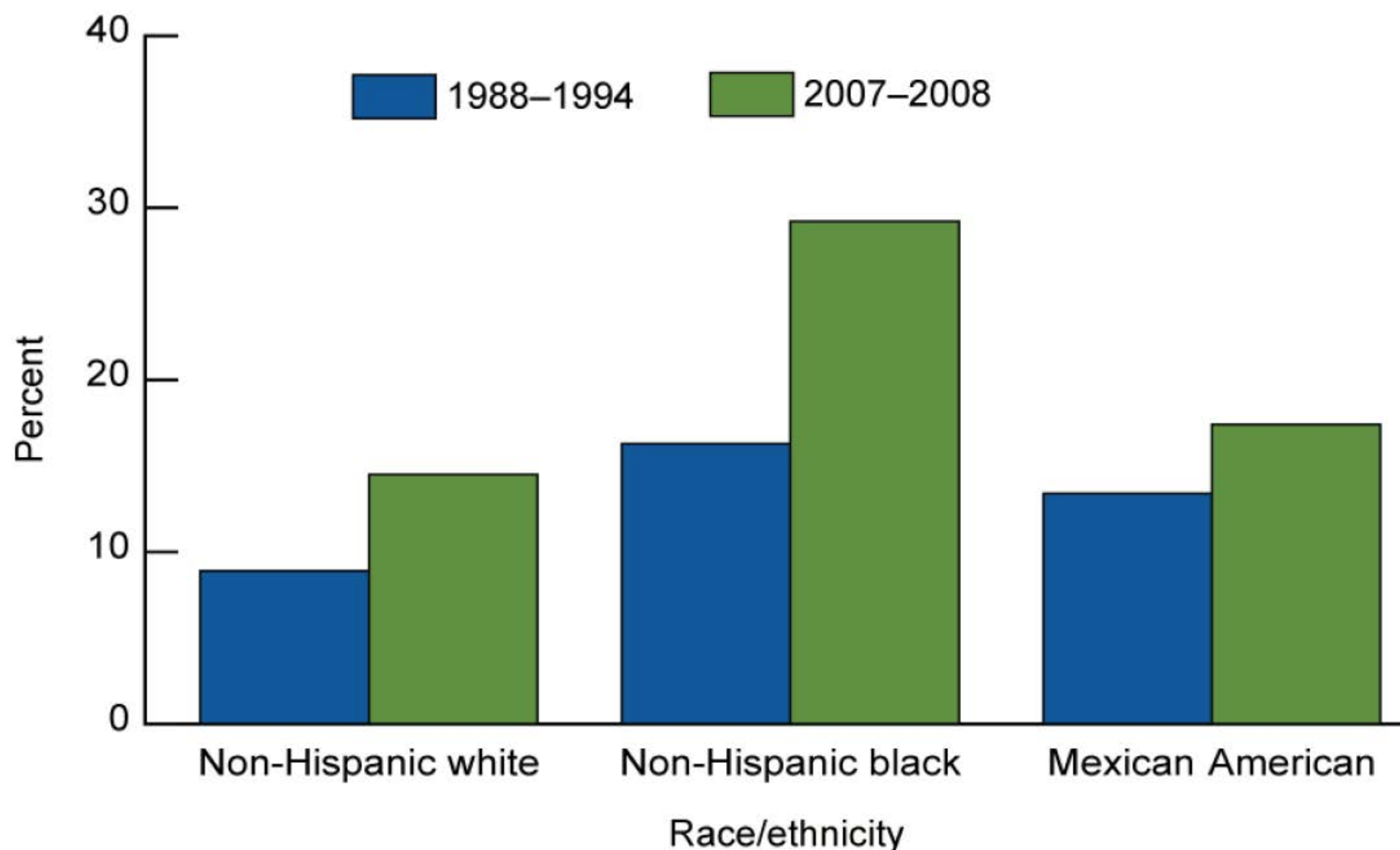
**Figure 2. Prevalence of obesity among boys aged 12–19 years, by race/ethnicity: United States, 1988–1994 and 2007–2008**



NOTE: Obesity is defined as body mass index (BMI) greater than or equal to sex- and age-specific 95th percentile from the 2000 CDC Growth Charts.

SOURCES: CDC/NCHS, National Health and Nutrition Examination Survey (NHANES) III 1988–1994 and NHANES 2007–2008.

**Figure 3. Prevalence of obesity among girls aged 12–19 years, by race/ethnicity: United States, 1988–1994 and 2007–2008**



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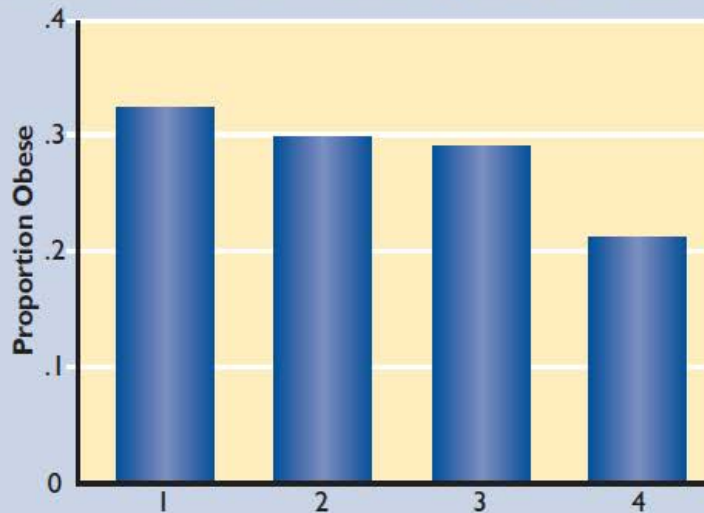
SOURCES: CDC/NCHS, National Health and Nutrition Examination Survey (NHANES) III 1988–1994 and NHANES 2007–2008.

# Socioeconomic status

- Obesity rates are related to socioeconomic status and level of education achieved

**Figure 1**

Association between level of schooling completed and obesity



1 = Did not graduate High School

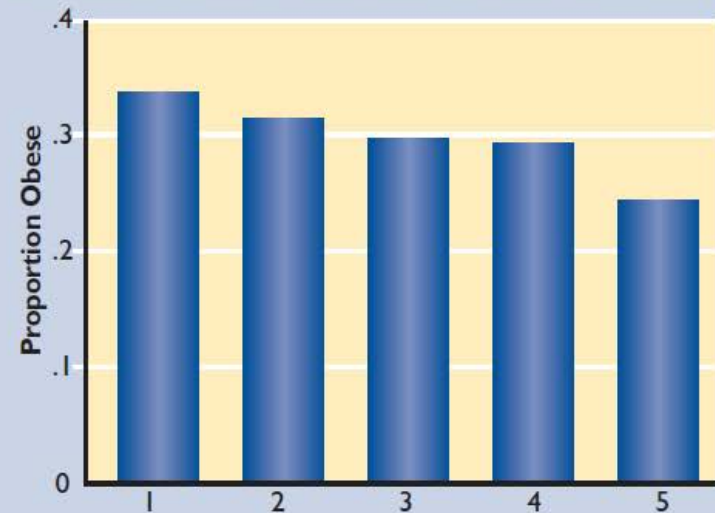
2 = Graduated High School

3 = Attended College or  
Technical School

4 = Graduated from College or  
Technical School

**Figure 2**

Association between household income and obesity



1 = Less than \$15,000

2 = \$15,000 to less than \$25,000

3 = \$25,000 to less than \$35,000

4 = \$35,000 to less than \$50,000

5 = \$50,000 or more

# A national problem

- More than one third of children aged 10-17 are either obese (16%) or overweight (18%)
- Nine states have childhood obesity rates greater than 20%, and most are in the South
- Childhood obesity rates have tripled since 1980





# Children in North Carolina

- (2009) Percentage of obese high school students: 13.4%
- (2009) Percentage of overweight high school students: 14.6 %
- (2007) Percentage of obese 10-17 year olds: 19% (ranking 11)

# Obesity and Childhood

- Care of the obese child estimated to be about 3 times as expensive as a non-obese child
- Obese children are about 2-3 times more likely to be hospitalized
- Increased frequency of mental health and bone/joint disorders
- Gastric bypass increasing in adolescence

# Obesity and puberty

- Significant increase in numbers of girls in the United States who start puberty early in last 10 years (about 15%).
- Puberty is partly triggered when a child reaches a certain weight, generally around 100 pounds. Higher percentage of body fat and a higher BMI may also be associated.
- African-American girls have earlier onset of puberty than Caucasian girls independent of BMI

# Type 2 diabetes in childhood

- Risk factors:
  - Overweight, particularly abdominal weight
    - 85% of new diagnoses of Type 2 DM are either overweight or obese
  - Family history
- Physical finding:
  - Acanthosis nigricans (patchy skin hyperpigmentation)



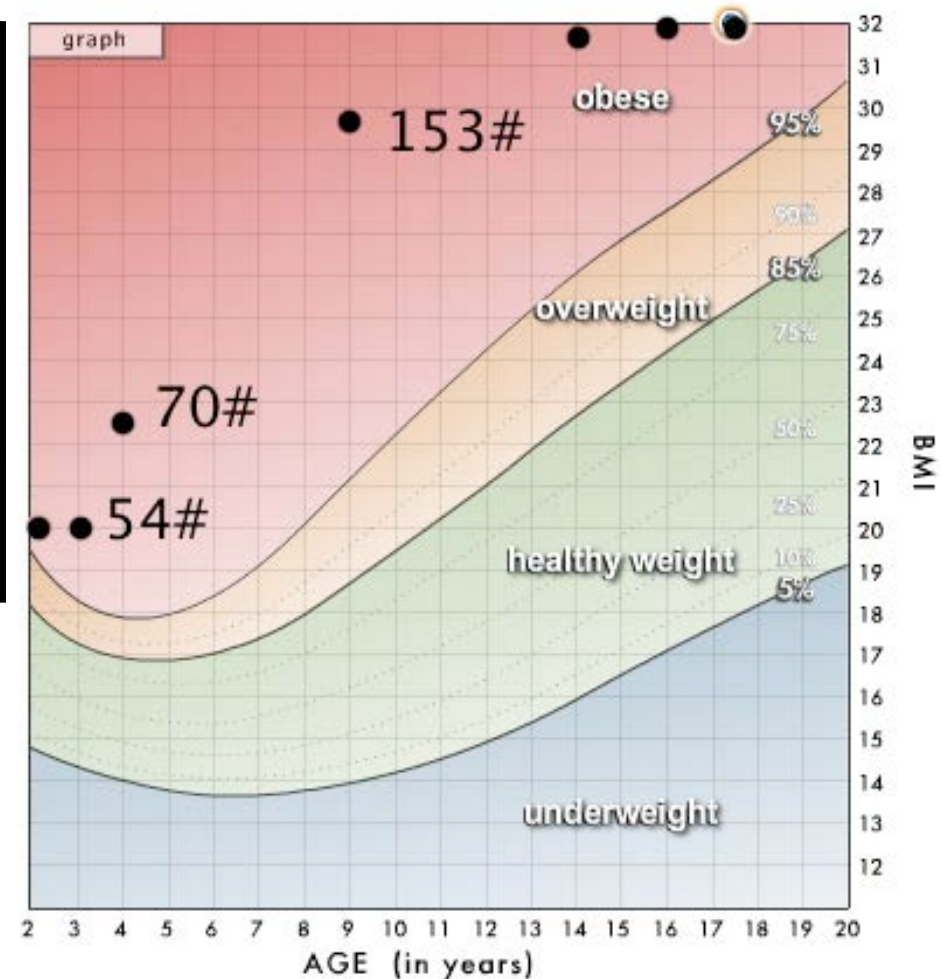
# Obesity and Pediatric Cardiology

- Marked increase in number of children referred for hypertension or exercise intolerance with unhealthy lifestyles starting in pre-teen years
- Many are the second or third generation to have high blood pressure, high lipid levels, or type 2 diabetes

# Football scholarship DENIED

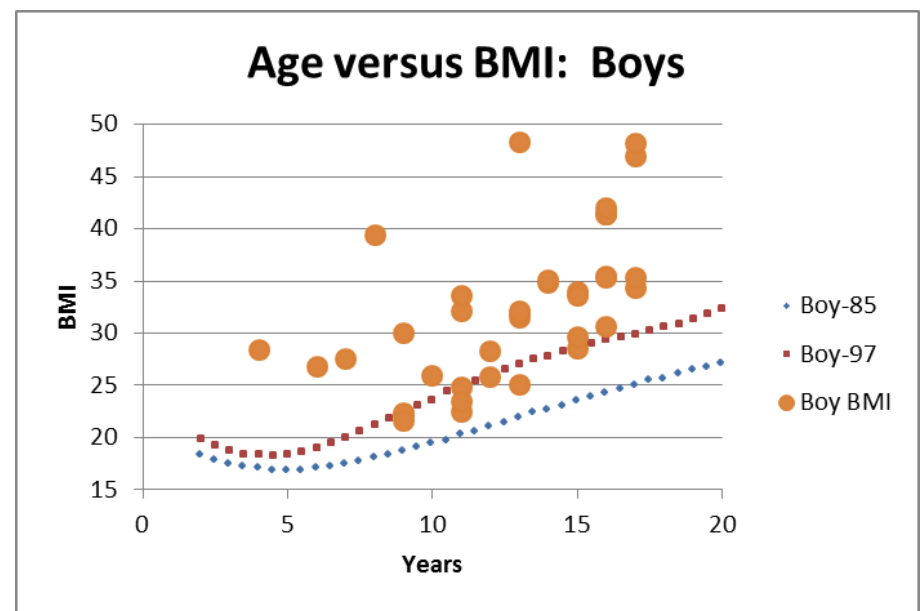
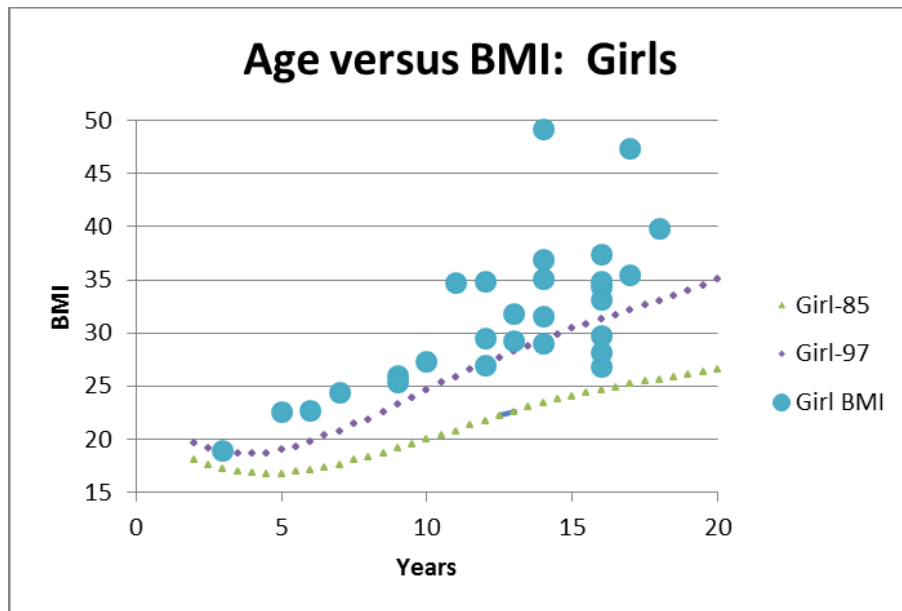
Age	Pounds	Inches	BP	BMI
14	238	72.5	157/69	31.8
17	274	74	169/85	35
17	298	74.2	149/80	38

- Chest pain and palpitations with activity
- Medication for hypertension
- BP increased to 300mmHg during exercise test at NHRMC
- Cardiac MRI demonstrated normal coronary anatomy
- Removed from competitive sports





# Obese patients at CCC-Wilmington

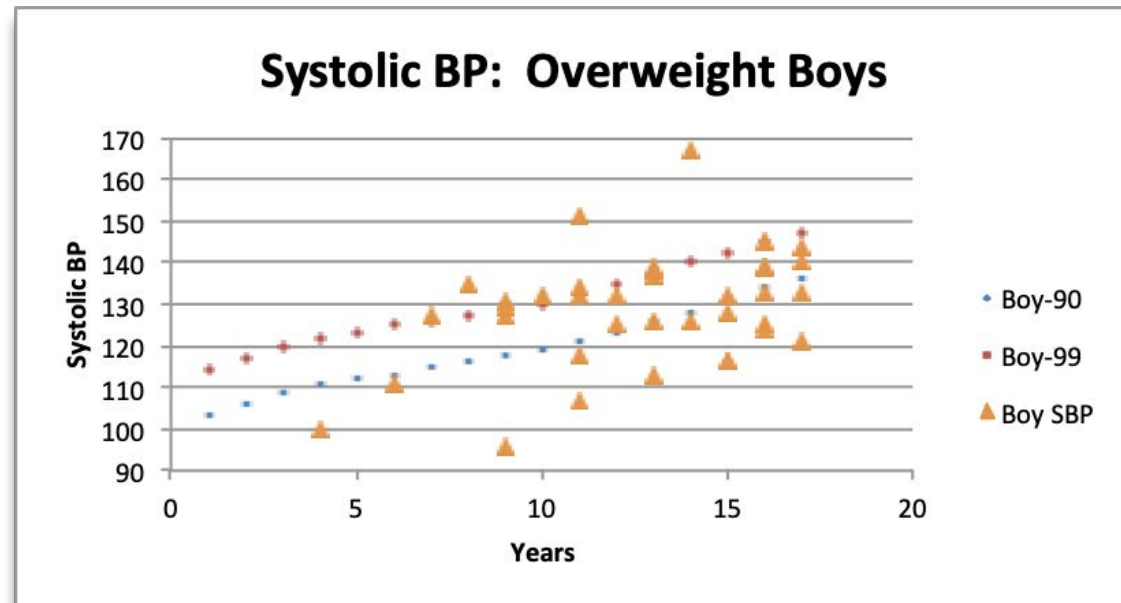
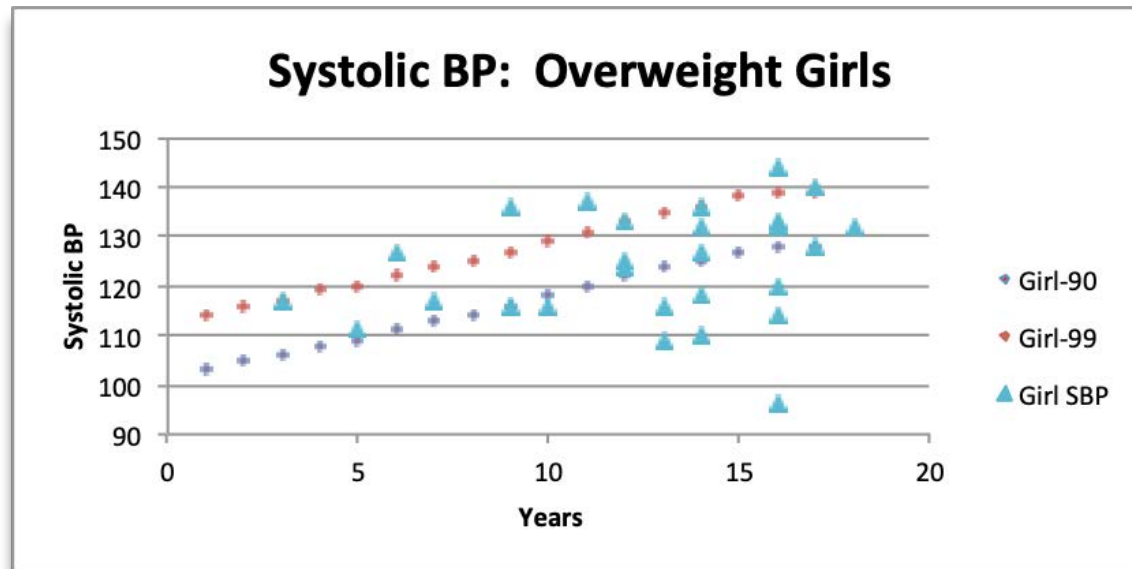


# Obese patients at CCC-Wilmington

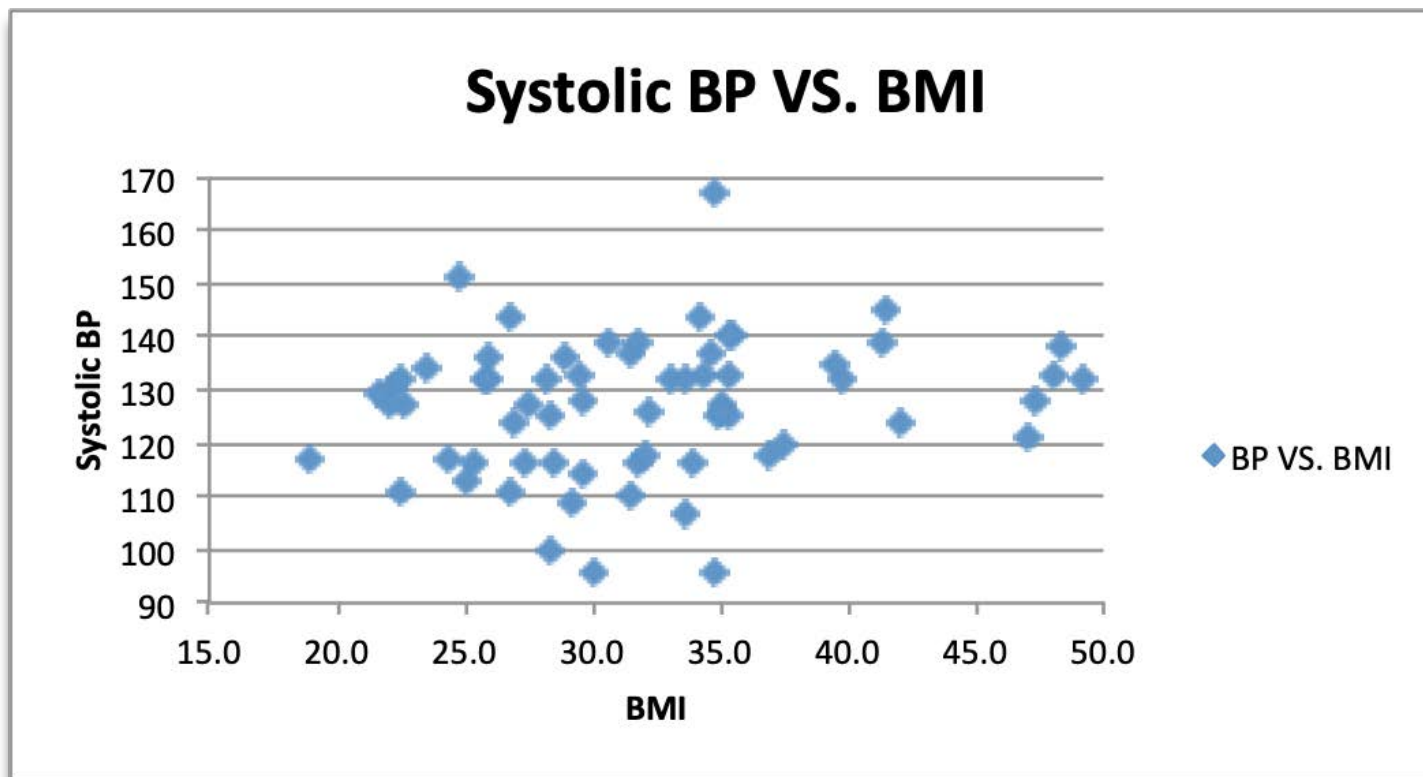
<u>Gender</u>	Number	Percent	<u>Ref. Reason</u>	Number	Percent
Male:	37	57	HTN:	17	26
Female:	28	43	Syncope:	5	8
Total	65		CP:	12	18
<u>Race</u>	Number	Percent	Arr:	10	15
Caucasian:	27	42	Other:	21	32
Black:	25	38	<u>BP %ile:</u>	Number	Percent
Hispanic:	9	14	90	15	23
			95	16	25
			99	20	31
			Total	51	78
			<u>Sleep Apnea:</u>	Number	Percent
				30	46

Hypertension either underdiagnosed or underreported by family

# Hypertension in the obese

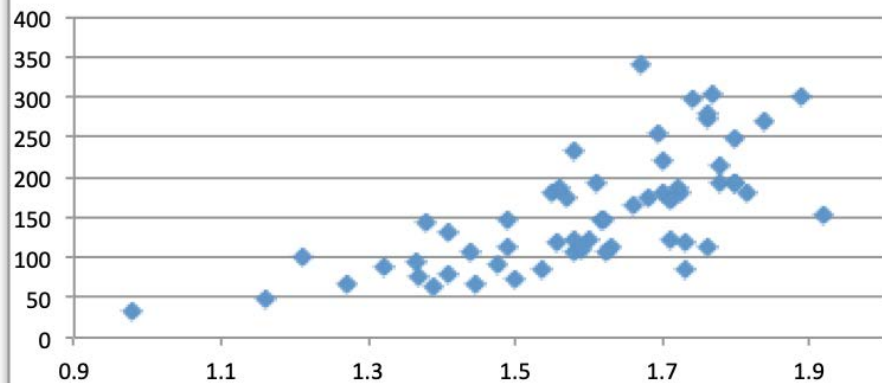


# Hypertension and BMI

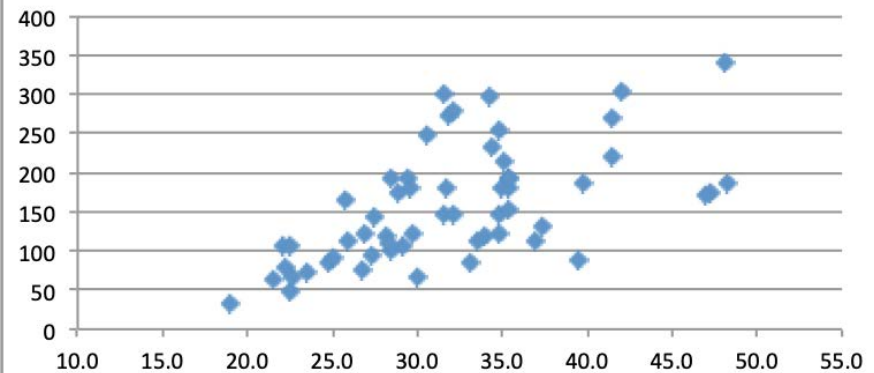


# Left Ventricular Mass in overweight children

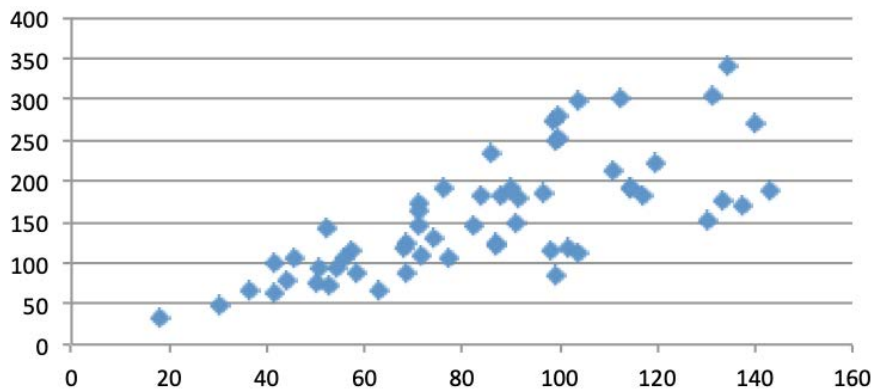
**LVMass(ASE) versus height**



**LVMass(ASE) versus BMI**



**LVMass(ASE) versus weight**



35 out of 51 with LVH based on  $\text{height}^{2.7}$

# So the Twinkie survived...

Nutrition Facts	
Serving Size 1 cake (42.5 g)	
Amount Per Serving	
<b>Calories</b> 150	Calories from Fat 41
% Daily Value*	
<b>Total Fat</b> 4.5g	<b>7%</b>
Saturated Fat 2.5g	<b>13%</b>
Trans Fat 0.0g	
<b>Cholesterol</b> 20mg	<b>7%</b>
<b>Sodium</b> 220mg	<b>9%</b>
<b>Total Carbohydrates</b> 27.0g	<b>9%</b>
Sugars 18.0g	
<b>Protein</b> 1.0g	
Vitamin A 0%	Vitamin C 0%
Calcium 0%	Iron 2%
* Based on a 2000 calorie diet	

[See more](#) extended nutritional details





# Causes of obesity

- Intake Important
- General suggested daily intake for an adult:
  - 2000 calories
  - 65 g fat
  - 300 g carbohydrate



# Sugar fortified drinks

- A 12-ounce can of regular soda has about 150 calories and 40 grams of carbohydrate, the same amount of carbohydrate in 10 teaspoons of sugar!
- One cup of fruit punch and other sugary fruit drinks have about 100 calories (or more) and 30 grams of carbohydrate.
- A Hershey bar has 218 calories



# Cook-out

Item	Calories	Fat	Carbohydrate	Protein
¼ lb. Hamburger	136	4.5	17	6
Cheeseburger	578	41	22	29
Seasoned Fries	590	38	57	7
Chicken Nuggets (3)	135	9	7.5	7.5
Peach Cobbler Milkshake	884			

Cheeseburger + Fries + Nuggets + Milkshake:  
2187 Calories  
88 gm fat

# Hardee's

- ½ pound grilled sourdough thickburger

<b>DietFacts.com</b>	
<b>Nutrition Facts</b>	
 +1  0	
<b>Serving Size:</b> 1 sandwich • 403g	
<b>Amount Per Serving</b>	
<b>Calories</b> 1040	Calories from Fat 650
	% DV
<b>Total Fat</b> 73g	112%
Saturated Fat 30g	150%
<b>Cholesterol</b> 155mg	52%
<b>Sodium</b> 1420mg	59%
<b>Total Carbohydrate</b> 49g	16%
Dietary Fiber 3g	12%
Sugars 12g	
<b>Protein</b> 45g	90%
Vitamin A 6%	Vitamin C 15%
Calcium 30%	Iron 30%
<b>Unofficial Pts+: 28</b>	
(Old Pts: 26)	
Percent of Calories from:	
<b>Fat: 62.5%</b>	<b>Carb: 18.8%</b> <b>Protein: 17.3%</b>
(Total may not equate 100% due to rounding.)	



# Subway

- 6-inch cold cut combo sandwich



<b>DietFacts.com</b>	
<b>Nutrition Facts</b>	
g +1 0	
<b>Serving Size:</b> 1 six-inch sandwich • 250g	
<b>Amount Per Serving</b>	
<b>Calories</b> 410	Calories from Fat 150
	% DV
<b>Total Fat</b> 17g	26%
Saturated Fat 7g	35%
Trans Fat 0.5g	
<b>Cholesterol</b> 60mg	20%
<b>Sodium</b> 1530mg	64%
<b>Total Carbohydrate</b> 47g	16%
Dietary Fiber 4g	16%
Sugars 8g	
<b>Protein</b> 21g	42%
Vitamin A 10%	Vitamin C 35%
Calcium 20%	Iron 30%
<b>Unofficial Pts+: 11</b>	
(Old Pts: 9)	
©DietFacts.com	
Percent of Calories from:	
<b>Fat: 36.6%</b>	<b>Carb: 45.9%</b>
<b>Protein: 20.5%</b>	

# Twinkie

Nutrition Facts	
Serving Size 1 cake (42.5 g)	
Amount Per Serving	
<b>Calories</b> 150	Calories from Fat 41
% Daily Value*	
<b>Total Fat</b> 4.5g	<b>7%</b>
Saturated Fat 2.5g	<b>13%</b>
Trans Fat 0.0g	
<b>Cholesterol</b> 20mg	<b>7%</b>
<b>Sodium</b> 220mg	<b>9%</b>
<b>Total Carbohydrates</b> 27.0g	<b>9%</b>
Sugars 18.0g	
<b>Protein</b> 1.0g	
Vitamin A 0%	Vitamin C 0%
Calcium 0%	Iron 2%

\* Based on a 2000 calorie diet

[See more](#) extended nutritional details

# Hardee's Sourdough Thickburger

DietFacts.com Nutrition Facts	
Serving Size: 1 sandwich • 403g	
Amount Per Serving	
<b>Calories</b> 1040	Calories from Fat 650
% DV	
<b>Total Fat</b> 73g	<b>112%</b>
Saturated Fat 30g	<b>150%</b>
<b>Cholesterol</b> 155mg	<b>52%</b>
<b>Sodium</b> 1420mg	<b>59%</b>
<b>Total Carbohydrate</b> 49g	<b>16%</b>
Dietary Fiber 3g	<b>12%</b>
Sugars 12g	
<b>Protein</b> 45g	<b>90%</b>
Vitamin A 6%	Vitamin C 15%
Calcium 30%	Iron 30%
Unofficial Pts+: 28 (Old Pts: 26)	
Percent of Calories from:	
<b>Fat: 62.5%</b>	<b>Carb: 18.8%</b> <b>Protein: 17.3%</b>
(Total may not equate 100% due to rounding.)	

# Obese children exercise less

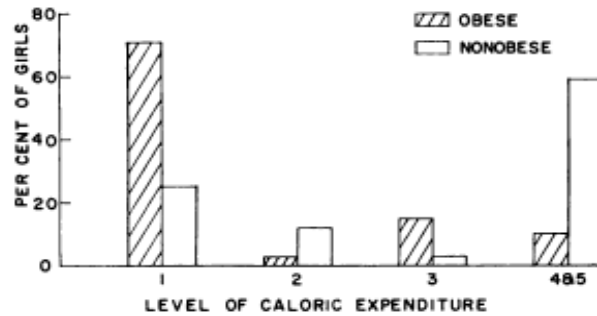


FIG. 3. Level of caloric expenditure of obese and non-obese girls during swim periods.

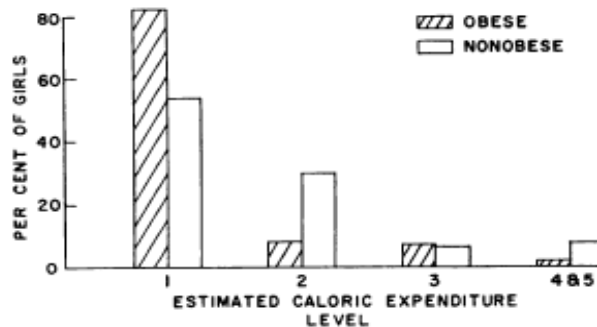


FIG. 4. Level of caloric expenditure of obese and non-obese girls during volleyball periods.

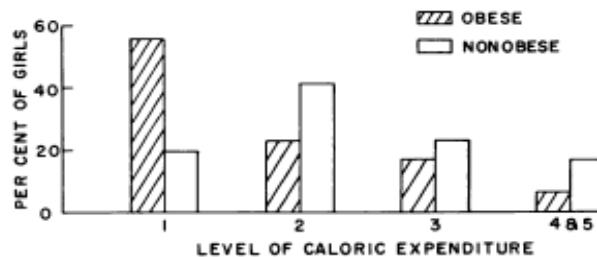


FIG. 5. Level of caloric expenditure of obese and non-obese girls during tennis periods.

- Observational study in 1963
- Obese girls less active in summer camp with swimming, tennis, and volleyball



# Effects of exercise

- Expend calories
- Some decrease in appetite (mechanism not known)

One hour of activity	Calories expended
Walking, slow pace	175
Walking, fast pace	560
Tae kwon do	700
Surfing	210

# Prevention of CV Disease: Adults

- Determine if patient in high risk group
- Internet based or App
  - <http://tools.cardiosource.org/ASCVD-Risk-Estimator/>
  - Based on gender, age, HDL and total cholesterol, smoking, diabetes, systolic blood pressure and BP treatment

Total-C	Systolic BP	Smoker	Diabetic	10-year risk (%)
170	110	N	N	5.2
320	110	N	N	9.6
170	200	N	N	14.3
170	110	Y	N	8.6
170	110	N	Y	9.9
320	200	Y	Y	60.8

# Risk factors for CV disease

- Other risk factors not included in ASCVD rate evaluation
  - Family history
  - CRP
  - Coronary artery calcium score
  - Ankle-brachial index (LE BP versus UE BP; used to assess for peripheral arterial disease)
  - Carotid intima-medial thickness measurements (cIMT) of no known benefit
  - Body size/BMI

# Obesity and weight loss in adults

- Measure height, weight, BMI annually
- Overweight: BMI 25-29, obese 30 or greater
- Measure waist circumference if BMI elevated
- If overweight with CVD risk factors (hypertension, hyperlipidemia, hyperglycemia) modest weight loss (3-5%) can lower CV disease risk
- Dietary recommendations:
  - Up to 1500 kcal/day for women, or up to 1800 kcal/day for men, 500-750 kcal energy deficit;
  - Restrict high carb, low fiber, or high fat foods
- Bariatric surgery:
  - BMI 40 or greater, or 35 or greater with comorbid conditions and
  - No response to behavioral treatments

# Pediatric guidelines to lower risk of CV disease as adult

- [http://www.nhlbi.nih.gov/guidelines/cvd\\_ped/peds\\_guidelines\\_sum.pdf](http://www.nhlbi.nih.gov/guidelines/cvd_ped/peds_guidelines_sum.pdf)
- Risk factor tracking from childhood:
  - Obesity tracks more strongly than other risk factors
    - 84% of children in 95-99 percentile become obese adults
    - All with BMI > 99<sup>th</sup> percentile become obese adults
    - LVH associated with increased mortality in adults has been seen in severely obese children
  - Cholesterol and blood pressure: correlation coefficients weak (0.4)
    - In adolescents with high LDL-C due to familial heterozygous hypercholesterolemia (LDL-C > 160), there are abnormal levels of coronary calcium, altered endothelial function, and increased cIMT, and half have coronary events before age 50
    - Homozygous hypercholesterolemia: LDL-C > 800, coronary events in first decade

# Risk factors from pediatric to adult

- Physical fitness: limited data
- Tobacco use: addictive
- Hypertension
  - Increased LV mass, abnormal LV geometry, and increased cIMT
- Family history of atherosclerotic heart disease
  - Children with this family history have increased cIMT, higher prevalence of coronary calcium, and endothelial dysfunction

# Integrated CV health schedule

- Family history of atherosclerotic heart disease
  - Inquire about family history changes every few years
  - CV events in males < 55 years, females < 65 years
  - No EMR ties together family history, left to caregivers
- Tobacco exposure
  - Advise smoke free home from birth
  - Active antismoking advice with children starting age 5



# Diet

- Support breast feeding at birth to at least 12 months
- Transition of CHILD 1 diet by age 2
  - Cardiovascular Health Integrated Lifestyle Diet
  - Fat intake in infants less than 1 year of age not restricted
  - Transition to reduced fat milk at one year, and to nonfat by 2 years
  - Limit fruit juice
- Continue review throughout life
- General dietary recommendations:
  - Total fat limited to 30% of calories
  - Saturated fat limited to 7-10% of calories
  - Limit dietary cholesterol to 300 mg/d
- Limit trans fat intake

# Blood pressure

- Annual BP from age 3; earlier if renal disease or previous HTN in NICU
- Pre-HTN: BP  $> 90^{\text{th}}$ ,  $< 95^{\text{th}}$  percentile
- Stage 1 HTN: BP  $> 90^{\text{th}}$ , less than  $99^{\text{th}}$  percentile + 5 mmHg
  - Further workup including cardiac and renal
- Stage 2 HTN: BP  $99^{\text{th}}$  percentile plus 5 mmHg or greater
  - Initiate drug therapy if no predisposing condition found

# Physical Activity

- Encourage parents to model routine physical activity from birth
- No screen time before age 2
- Limit screen time to less than 2 hours/day
- Activity history from child age 9
- Encourage moderately vigorous activity for 1 hour a day at age 9 and above

# Obesity Intervention

- Discuss family history of obesity from birth
- Classify weight by BMI at age 2
- Age 5 onward: intervene if BMI > 85<sup>th</sup> percentile with increased focus of diet and activity, possible dietician consult
- Obesity intervention if BMI 95<sup>th</sup> percentile > age 5
  - Increasing activity in isolation generally of little benefit
  - Reducing sedentary time had some effect
  - Diet with exercise activity effective
  - Metformin approved by FDA above age 10
  - Bariatric surgery only recommended if BMI>35 after all interventions, and as part of a research program

# Lipid Monitoring

- No lipid screening at birth
- Lipid profile at age 1-4 if positive family history of hyperlipidemia, other risk factors, or high-risk condition
- Obtain universal lipid screen at age 9-11 (nonfasting)
- Measure nonfasting non-HDL-C or fasting lipid panel 18 yrs.
- Non-HDL-C more predictive of future atherosclerotic events than other cholesterol measures, and can be measured in non-fasting state
- Recommend dietician intervention in several places in algorithm

# Lipids

Category	Acceptable	Borderline	High
TC	170	170-199	200
LDL-C	110	110-129	130
Non-HDL-C	120	120-144	145
ApoB	90	90-109	110
TG			
0-9 years	75	75-99	100
10-19 years	90	90-129	130
HDL-C	>45	40-45	<40
Apo-A1	>120	115-120	< 115

# Lipids: Drug Therapy

- No drug therapy if  $< 10$  years of age unless high risk condition present
- At age  $> 10$ , manage with diet and recheck levels
- Consider statins if LDL-C  $> 190$  after dietary intervention
- Consider statins if LDL-C 130-190 after dietary intervention if risk factor of early CV disease present
- Other details



# CDC Community Recommendations

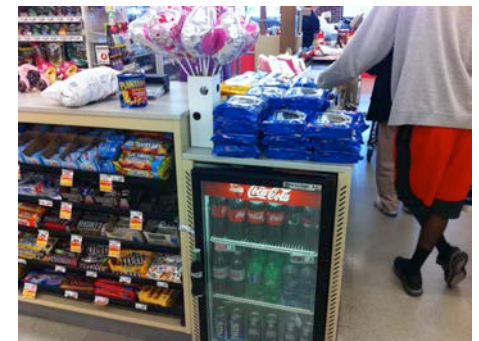
- Healthier food and beverage choices (schools)
  - Improved access results in healthier food intake
  - Farm-to-school salad bar program
- Lower pricing for healthier food options (coupons)
  - WIC vouchers for fresh produce

# WIC Fruits and Vegetables

Approved	Not approved
Fruits with no added sugar/fats/oils	Added corn syrup
Vegetables with no added sugar/fats/oils	Artificial sweeteners
	Fruit roll-ups

# CDC and Supermarkets

- Increase supermarket availability in underserved areas with retailer incentives
  - Supermarket availability increases purchase of healthier foods
  - Associated with lower adolescent BMI



# CDC Community Recommendations

- Lower portion sizes in government facilities
- Limit advertising of less healthy food
- Discourage consumption of sugar-sweetened beverages (day care centers)
- Support breastfeeding

# Exercise

- Recent study from Augusta, GA
- 222 obese sedentary children, average age 9.4 years
- Randomized to 40 min/day, 20 min/day, or no aerobic training after school (intermittent vigorous movement such as jumping rope, basketball, soccer)
- Average heart rate in 160s
- Average calorie consumption 135 to 270 kcals/d
- Measured insulin sensitivity, aerobic fitness, and body fat composition after 13 weeks

# Exercise

- 20 or 40 minutes/day demonstrated improvements in insulin resistance, as well as overall fat composition in only a few months
- Should directly impact frequency of type 2 diabetes in adolescents and young adults

# CDC Community Recommendations

- Increase school and extracurricular physical activity and reduce screen viewing time
- Improve access to outdoor recreational facilities
- Improve access to public transportation
- Encourage mixed use developments
- Enhance bicycling and walking infrastructure



# What else to do?



- Tip O'Neill
  - “All politics is local.”

# Walk Wilmington

Table 3 Top 10 North Carolina Cities for Pedestrian Crashes (2001-2005)

	<b>Number of Crashes</b>	<b>Percent of NC Total</b>	<b>Population</b>	<b>Crashes as Percentage of City Population</b>	<b>Crashes per 10,000 People</b>
Asheville	246	2.02	71,119	0.35%	<b>34.59</b>
<b>Wilmington</b>	<b>324</b>	<b>2.66</b>	<b>99,623</b>	<b>0.33%</b>	<b>32.52</b>
Gastonia	220	1.81	67,776	0.32%	<b>32.46</b>
Charlotte	1,730	14.20	671,588	0.26%	<b>25.76</b>
Greensboro	595	4.88	247,183	0.24%	<b>24.07</b>
Durham	510	4.18	217,847	0.23%	<b>23.41</b>
Raleigh	840	6.89	375,806	0.22%	<b>22.35</b>
Fayetteville	343	2.81	171,853	0.20%	<b>19.96</b>
High Point	171	1.40	86,211	0.20%	<b>19.84</b>
Winston-Salem	298	2.45	215,348	0.14%	<b>13.84</b>

# No sidewalks, but no excuse

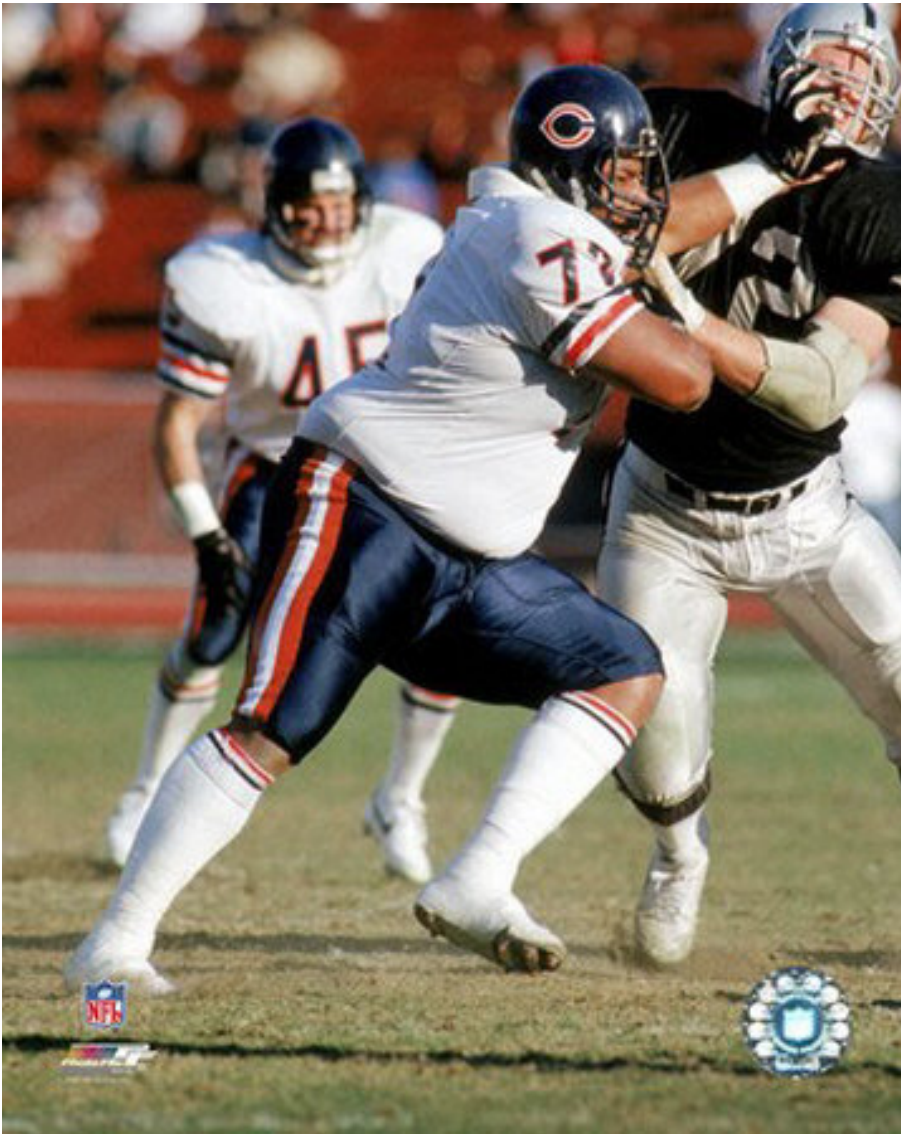


# NFL Offensive Lines 2011

Team	Average Weight	Average BMI
Cincinnati	315	38.3
Chicago	311	37.9
San Francisco	310	37.7
Arizona	306	37.2
Pittsburgh	313	37.1



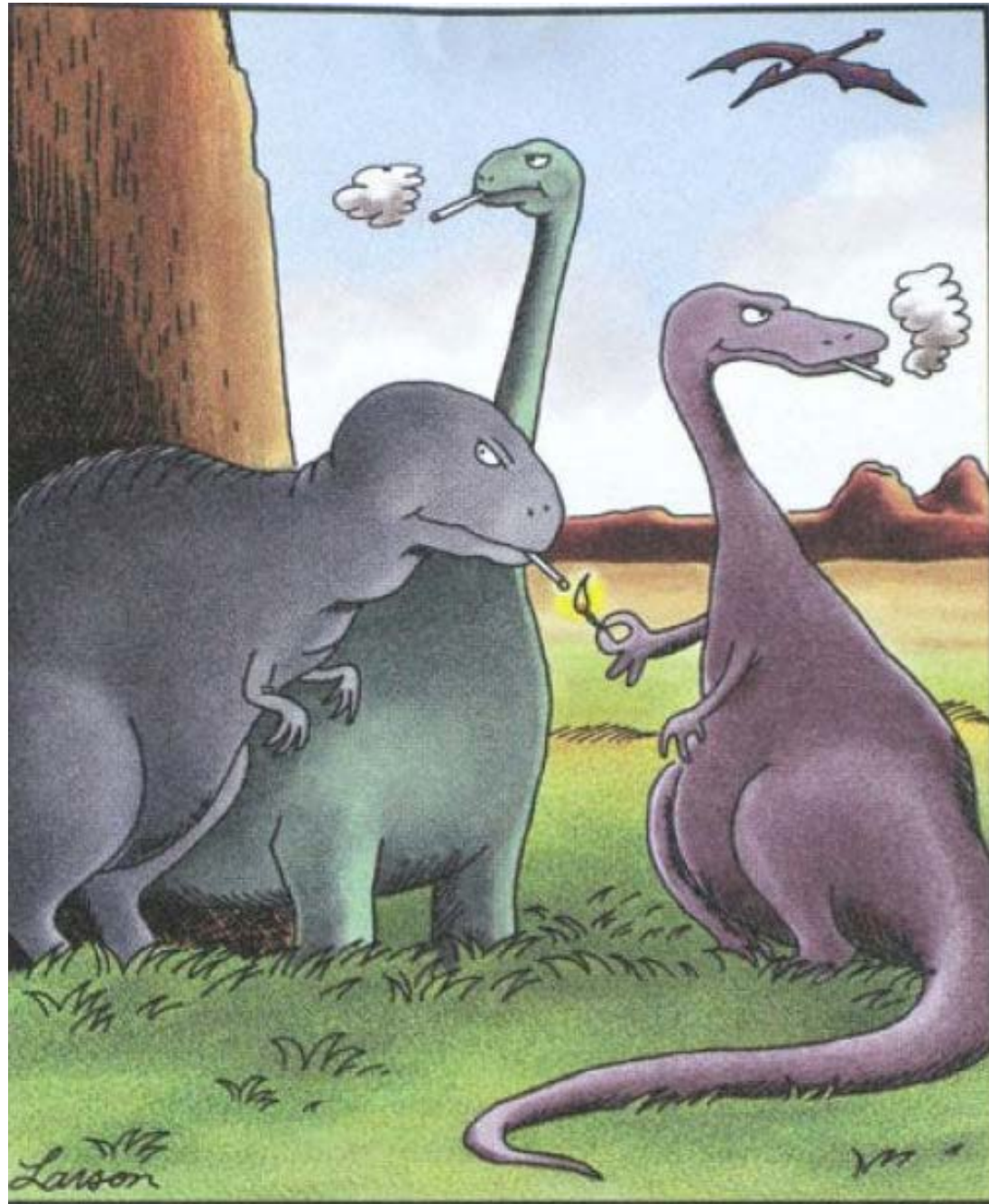
# Obesity scholarship



- 335 pounds
- 74 inches
- BMI 43

# Parade All-America Team 2014

Position	Average BMI	Highest BMI	Lowest BMI
Defensive Line	29	35	26
Offensive Line	37	45	35
Defensive Other	27	32	23
Offensive Other	27	34	23



The real reason dinosaurs became extinct

# Involve the whole family

- President George Bush asked the White House staff to sign this pledge:
  - “WE AGREE NOT TO FEED RANGER. WE WILL NOT GIVE HIM ANY BISCUITS. WE WILL NOT GIVE HIM FOOD OF ANY KIND.”
  - “I will, of course, report on Ranger’s fight against obesity. Right now he looks like a blimp, a nice friendly appealing blimp, but a blimp.”



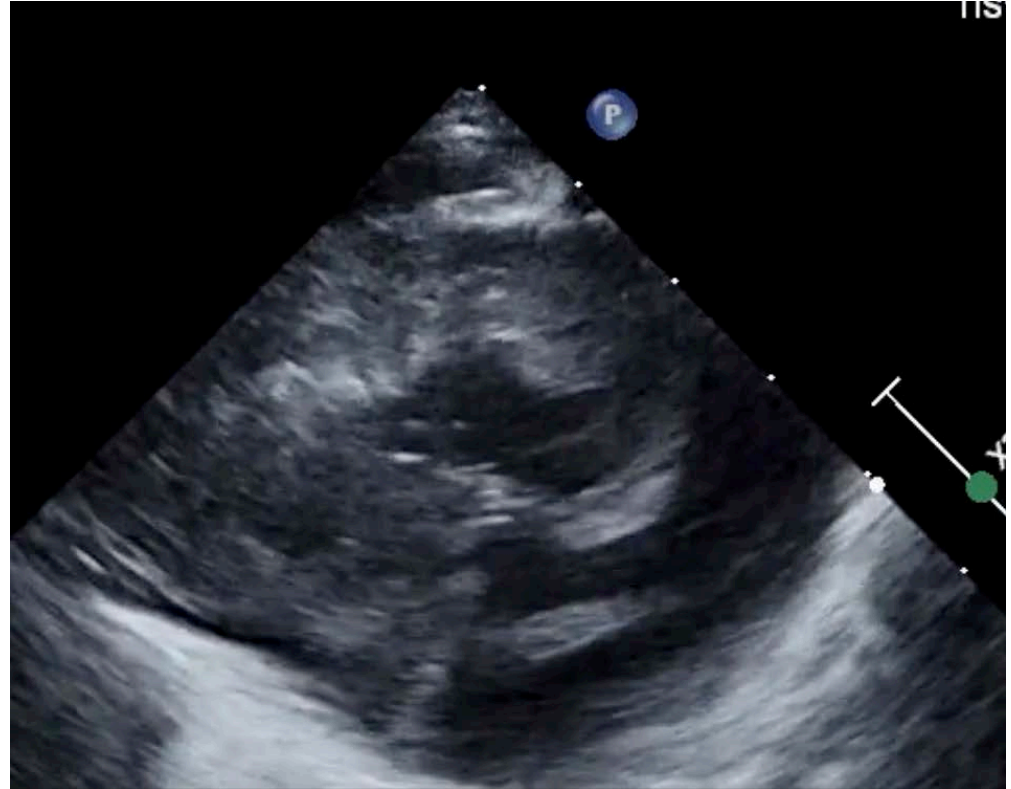
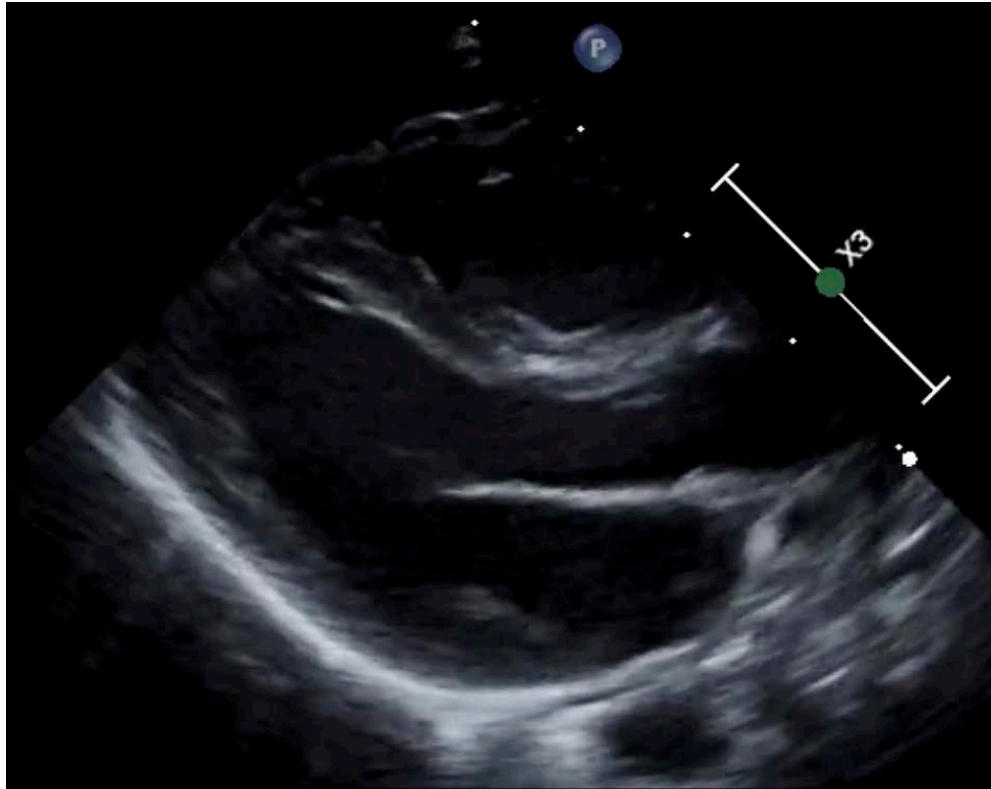
# It's not rocket science

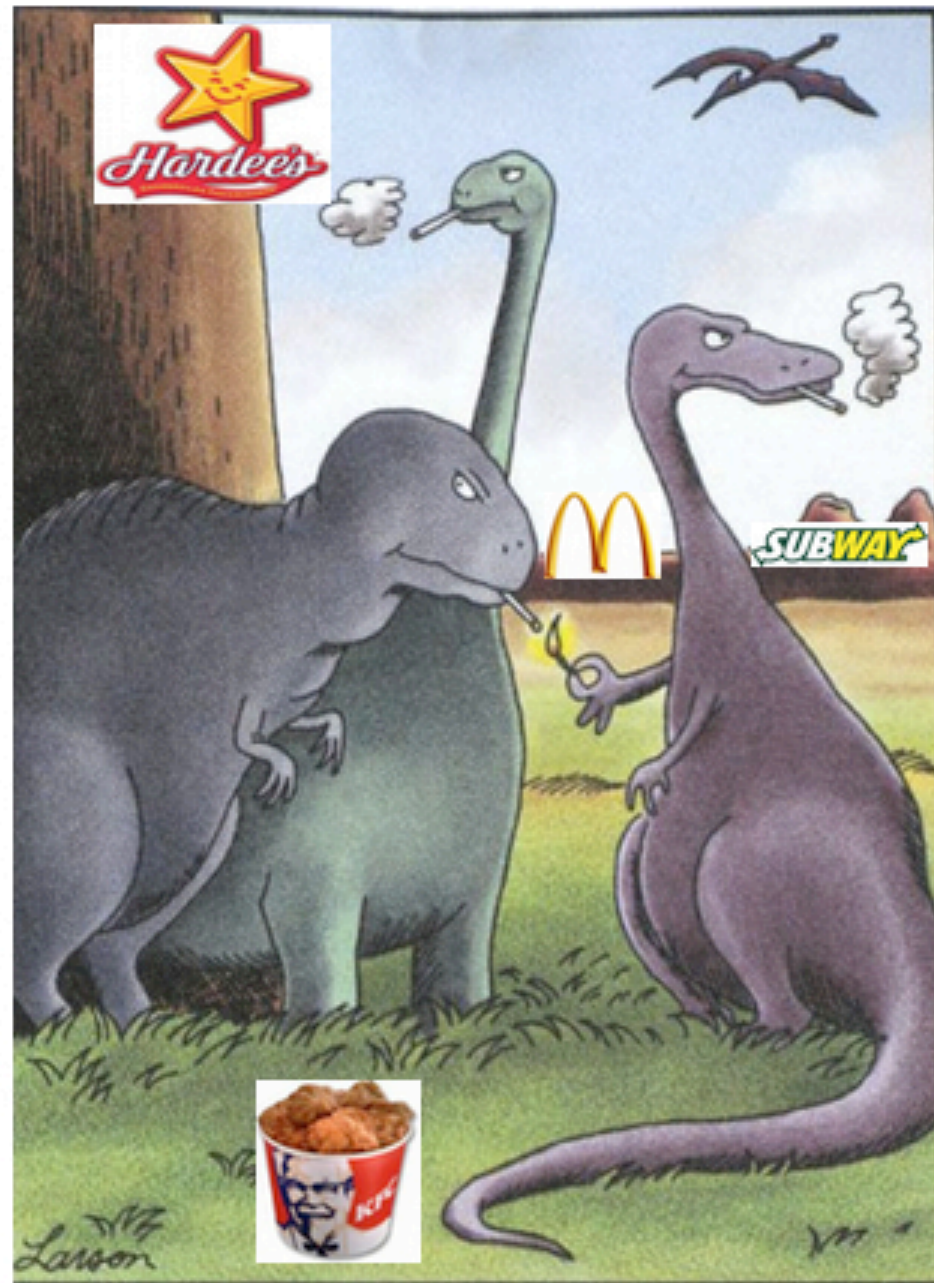
- Increasing physical activity to an average of 30 minutes every day with activities that your child enjoys
  - Walking to school
- Make changes gradually and for the whole family
- It may not take much activity to make substantial benefit to adolescents

# The next generation

- Complications of pregnancy in adolescents with type 2 diabetes
  - 25% pregnancy loss
  - Of live born, 15% were preterm and 20% had a major congenital anomaly
    - 2 VSDs; one TAPVR
- Increase in frequency of congenital heart disease in pregnancies of obese mothers
  - Transposition of the great vessels and aortic arch defects in offspring born at twice the rate in mothers with severe obesity

# Cardiomyopathy





The real reason dinosaurs became extinct





# Changes in North Carolina Ranking

	Obesity	Overweight and Obese	Diabetes	Hypertension
20 years ago	9	12	11	14
15 years ago	12	17	17	48
10 years ago	11	12	16	25
Current	14	16	13	10