“What You Need to Know About Childhood Obesity”

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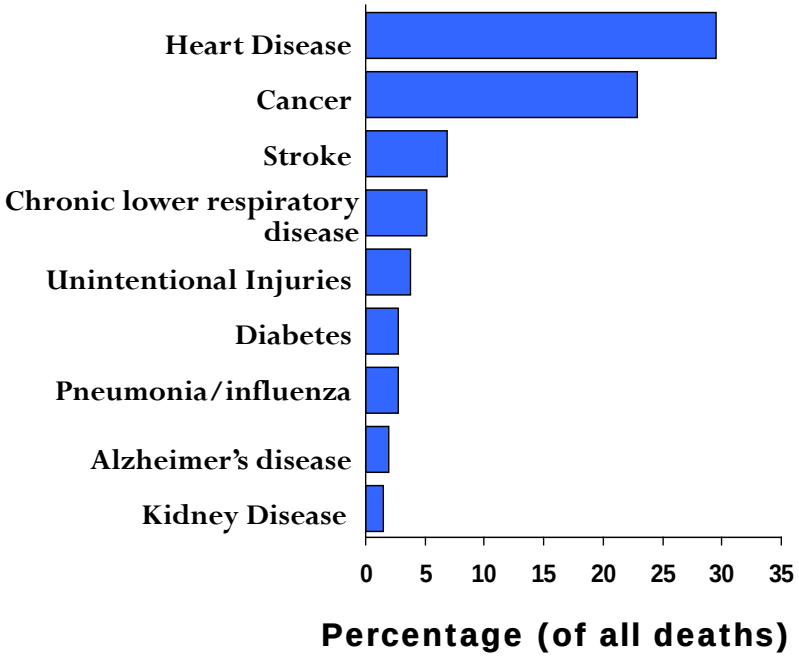
Objectives

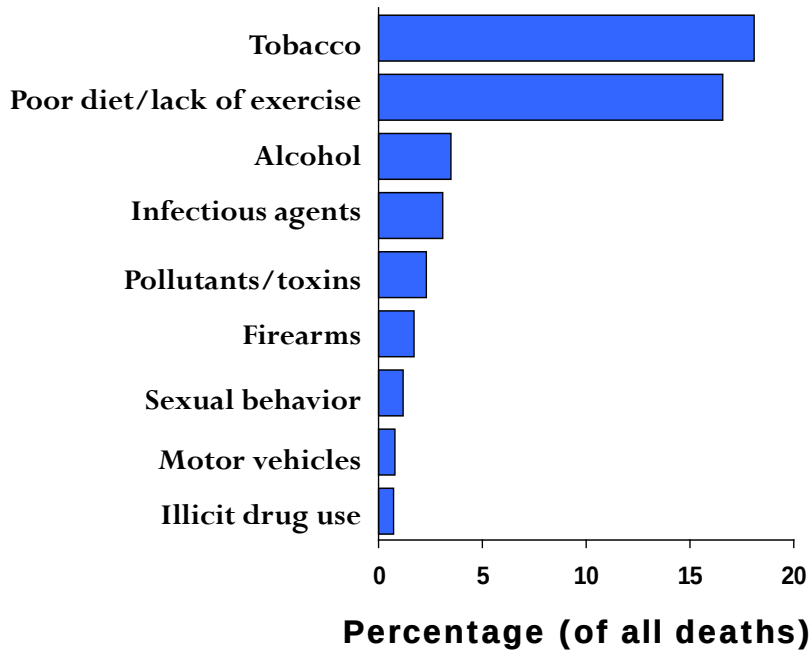
- What are the causes of childhood obesity
- How are children and adolescents being affected by the obesity epidemic
- What we can do to fight childhood obesity

Chronic Diseases and Related Risk Factors in the United States

Leading Causes of Death*



Actual Causes of Death†



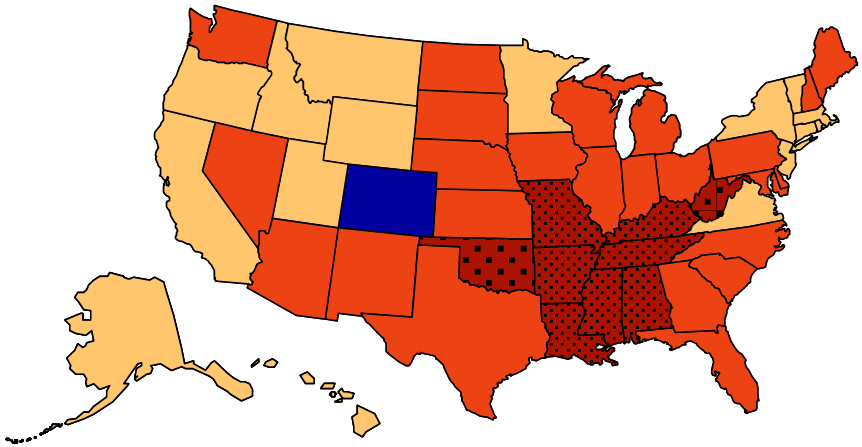
* National Center for Health Statistics. Mortality Report. Hyattsville, MD: US Department of Health and Human Services; 2002

† Adapted from McGinnis Foege, updated by Mokdad et. al.

Obesity

- **Obesity** – combined with poor diet and lack of physical activity – is the **second leading preventable cause of death** in Delaware and the U.S.

Obesity Trends* Among U.S. Adults
BRFSS, 2009
(*BMI ≥30, or ~ 30 lbs. overweight for 5' 4" person)



No Data | <10% | 10%–14% | 15%–19% | 20%–24% | 25%–29% | ≥30%

Childhood Overweight

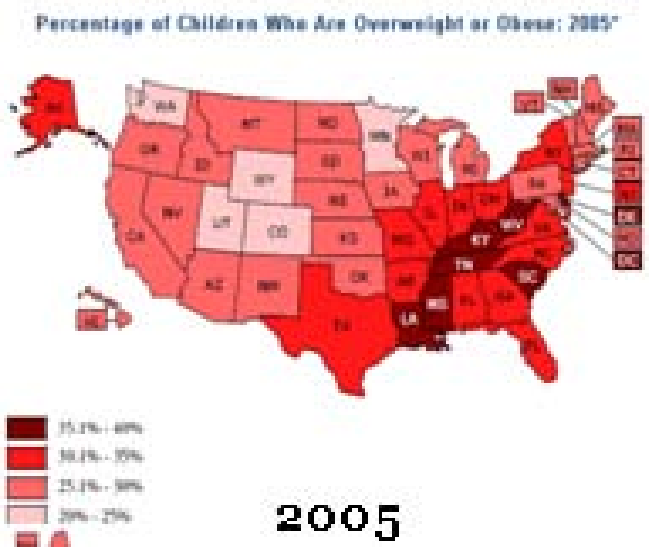
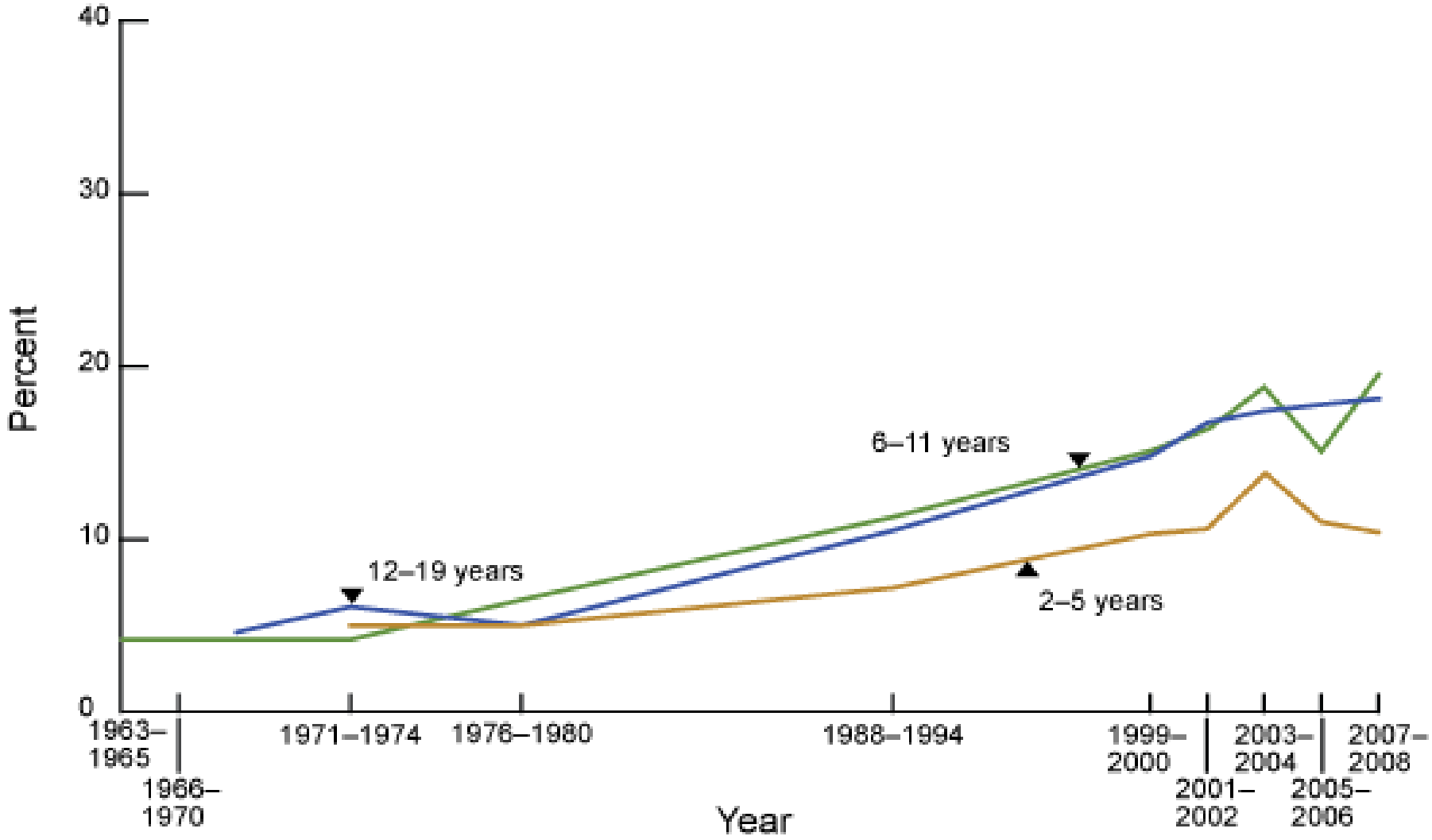


Figure 1. Trends in obesity among children and adolescents: United States, 1963–2008



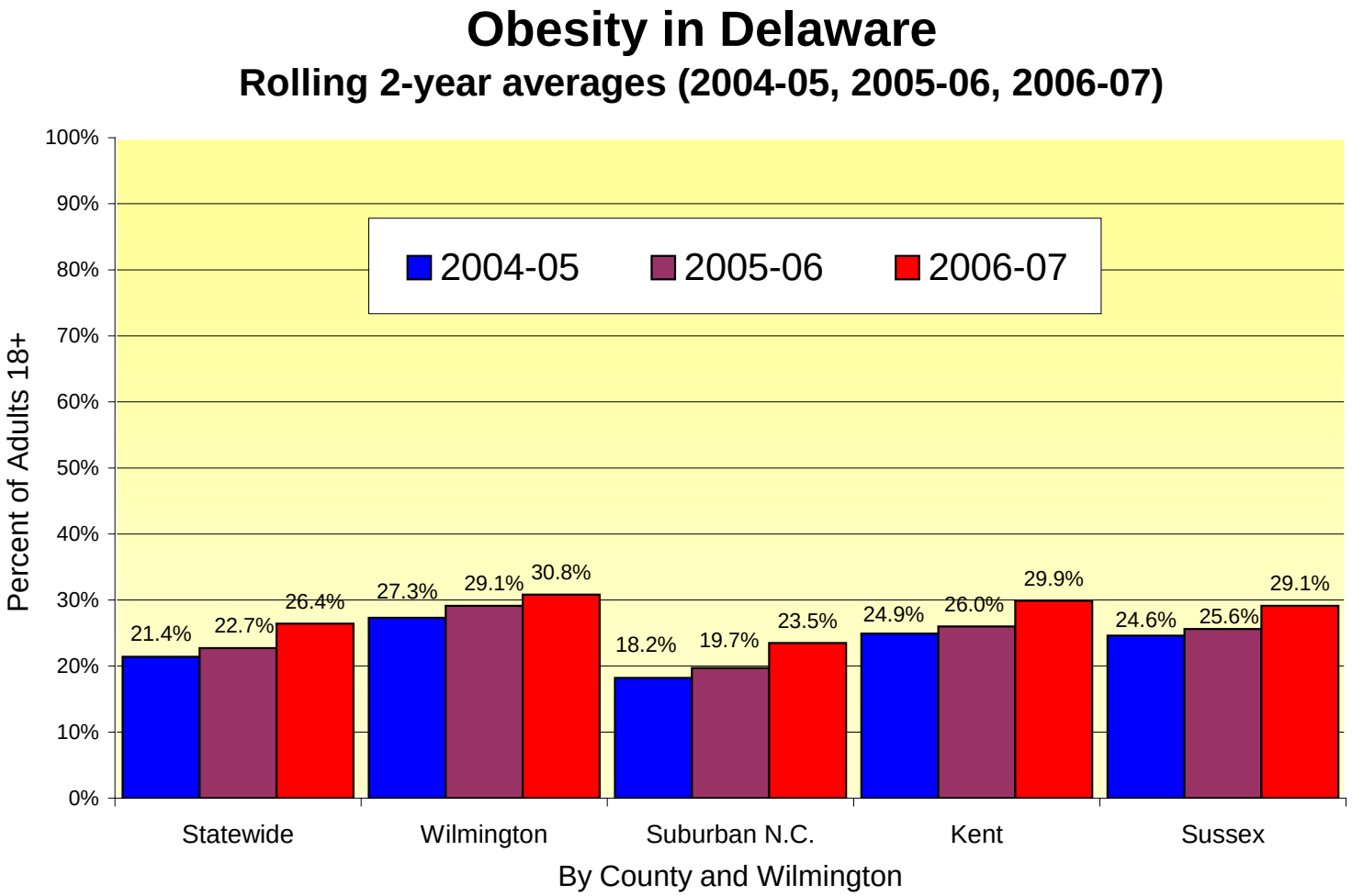
NOTE: Obesity is defined as body mass index (BMI) greater than or equal to sex- and age-specific 95th percentile from the 2000 CDC Growth Charts.
SOURCES: CDC/NCHS, National Health Examination Surveys II (ages 6–11), III (ages 12–17), and National Health and Nutrition Examination Surveys (NHANES) I–III,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

Prevalence of obesity in infancy

- Birth to 1 yr
  - 11.1% children 0-11 mo were >95% weight/length
- 1yr-2yr
  - 17.0% children 12-23 mo were >95% weight/length
- 2yr-3yr
  - 12.9% 24-35 mo had BMI>95%
- 3yr-4yr
  - 36-47 mo 15.2% had BMI >95%

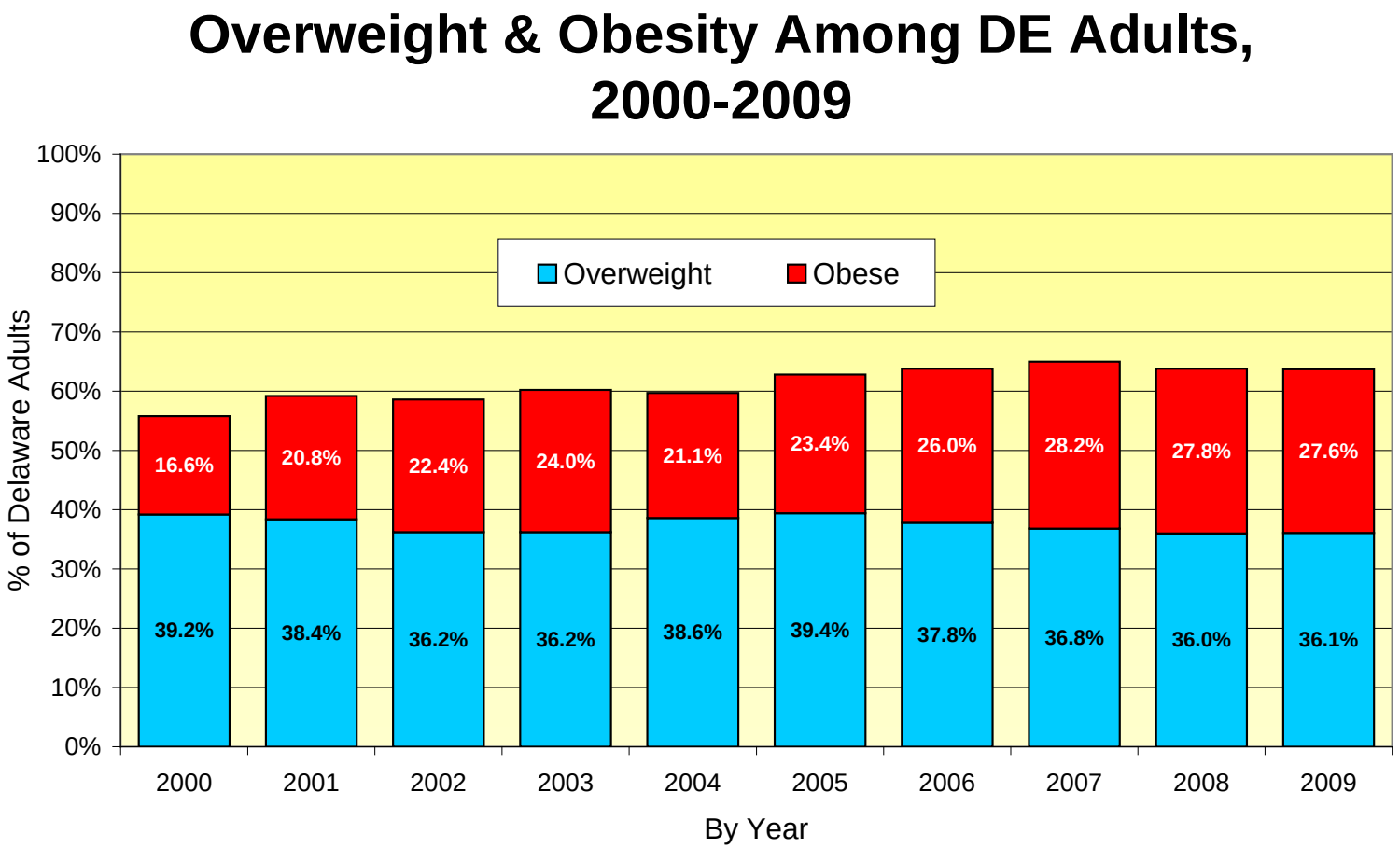
- http://www.cdc.gov/pednss/pednss_tables/pdf/national_table20.pdf

Delaware Adult Obesity by County



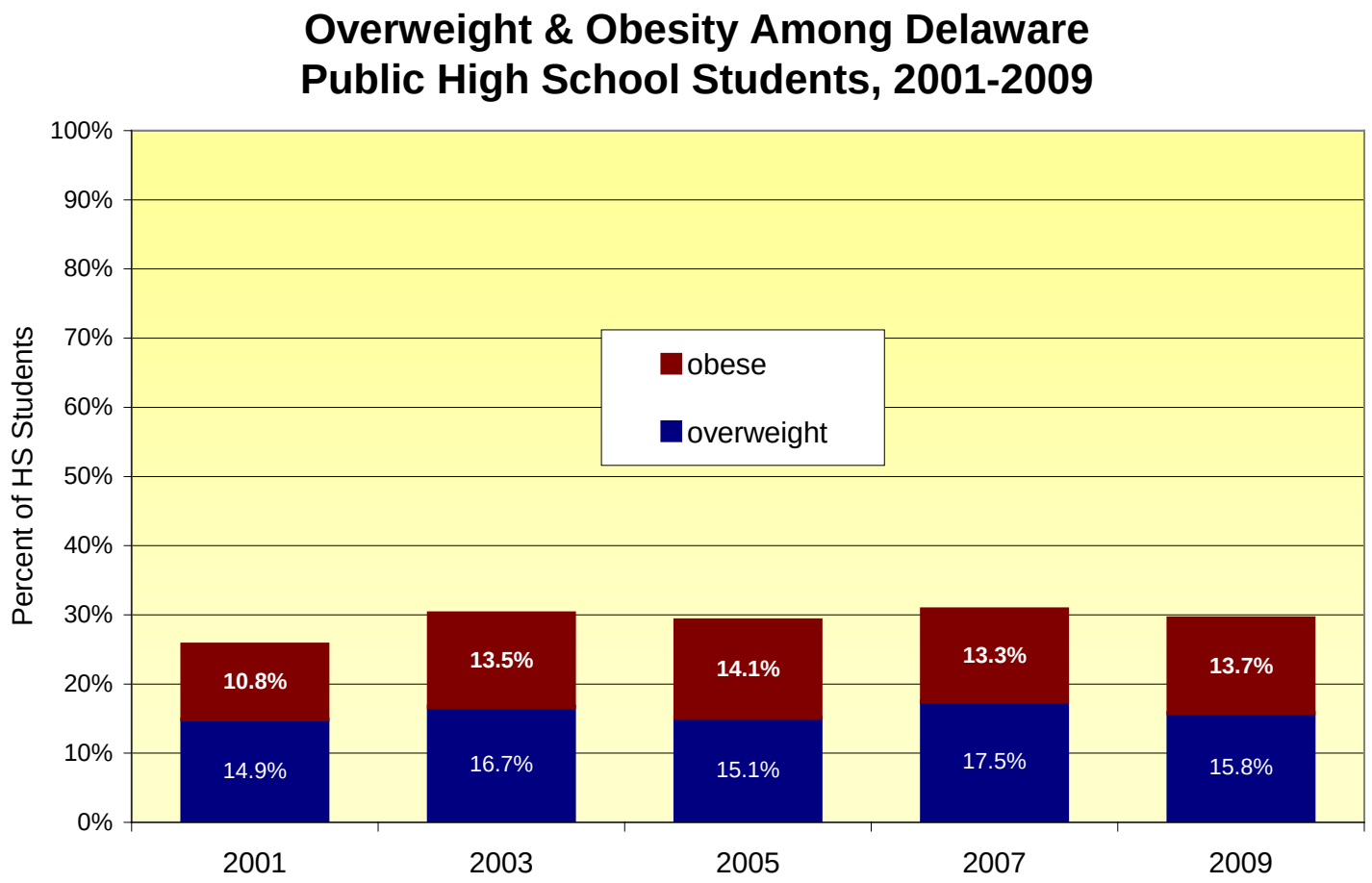
Source: Delaware Health & Social Services, Division of Public Health, Behavioral Risk Factor Survey (BRFS), 2004-2007.

Majority Are Overweight or Obese



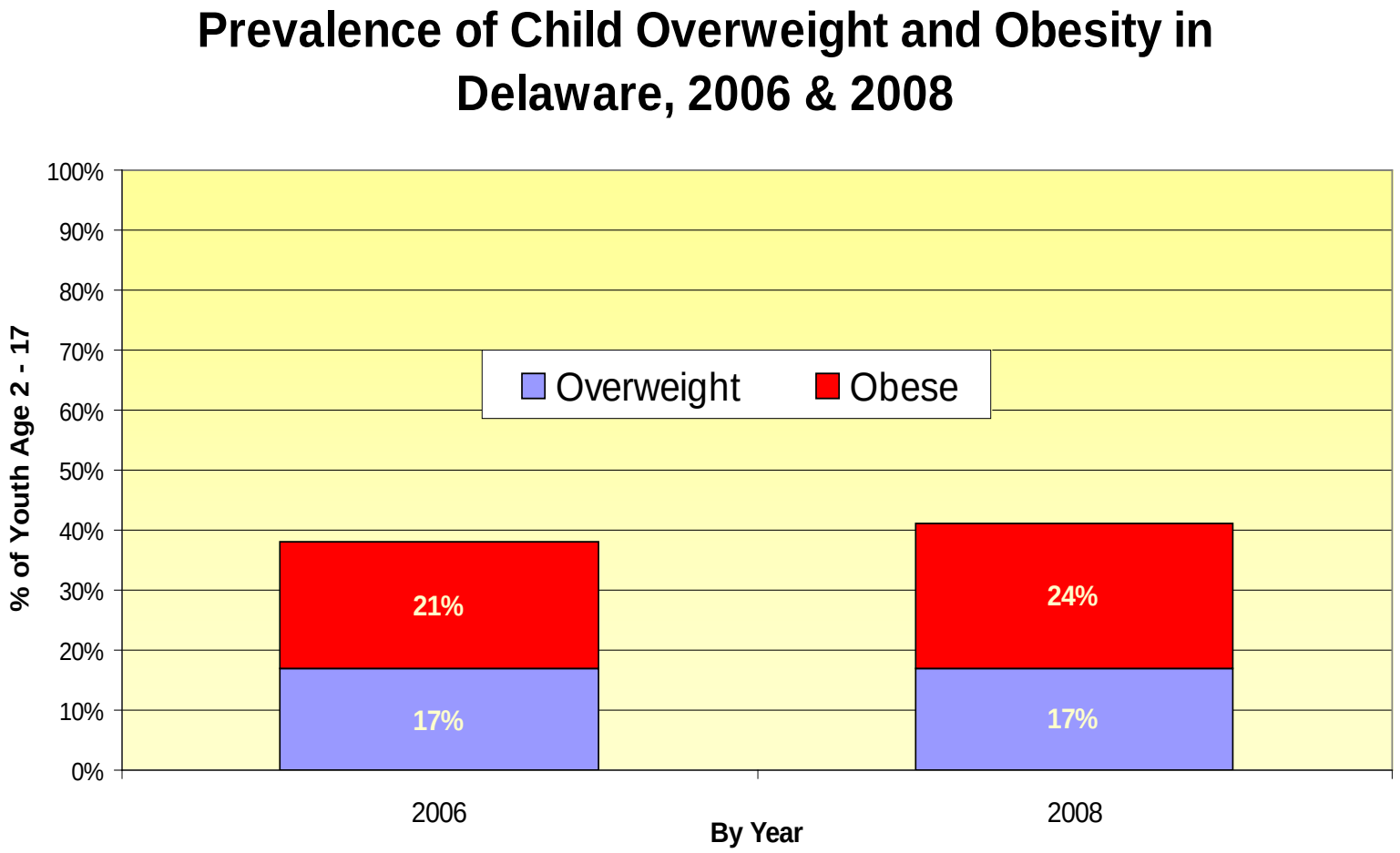
Source: Delaware Health and Social Services, Division of Public Health, Behavioral Risk Factor Survey (BRFS), 2000-2009.
Overweight = BMI 25-29.9; Obese = BMI ≥30

Overweight and Obesity Among Delaware H.S. Students



Source: Centers for Disease Control and Prevention and Deleware Department of Education, Youth Risk Behavior Survey, 2001-2009.

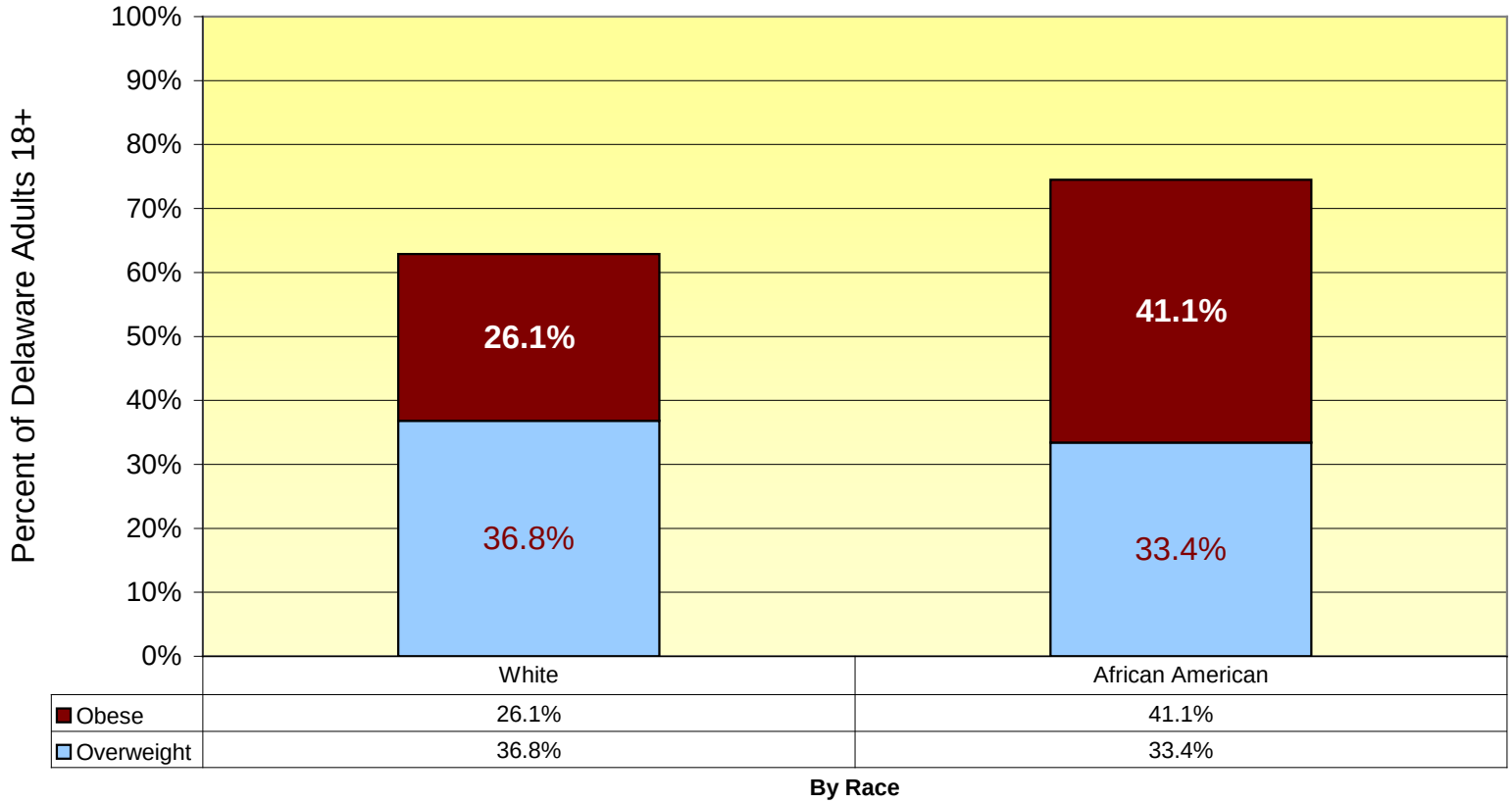
Estimates for Delaware



Source: Nemours Health and Prevention Services, Delaware Survey of Children's Health, 2006 and 2008; published in Health Affairs, *March 2010, 29:3.*

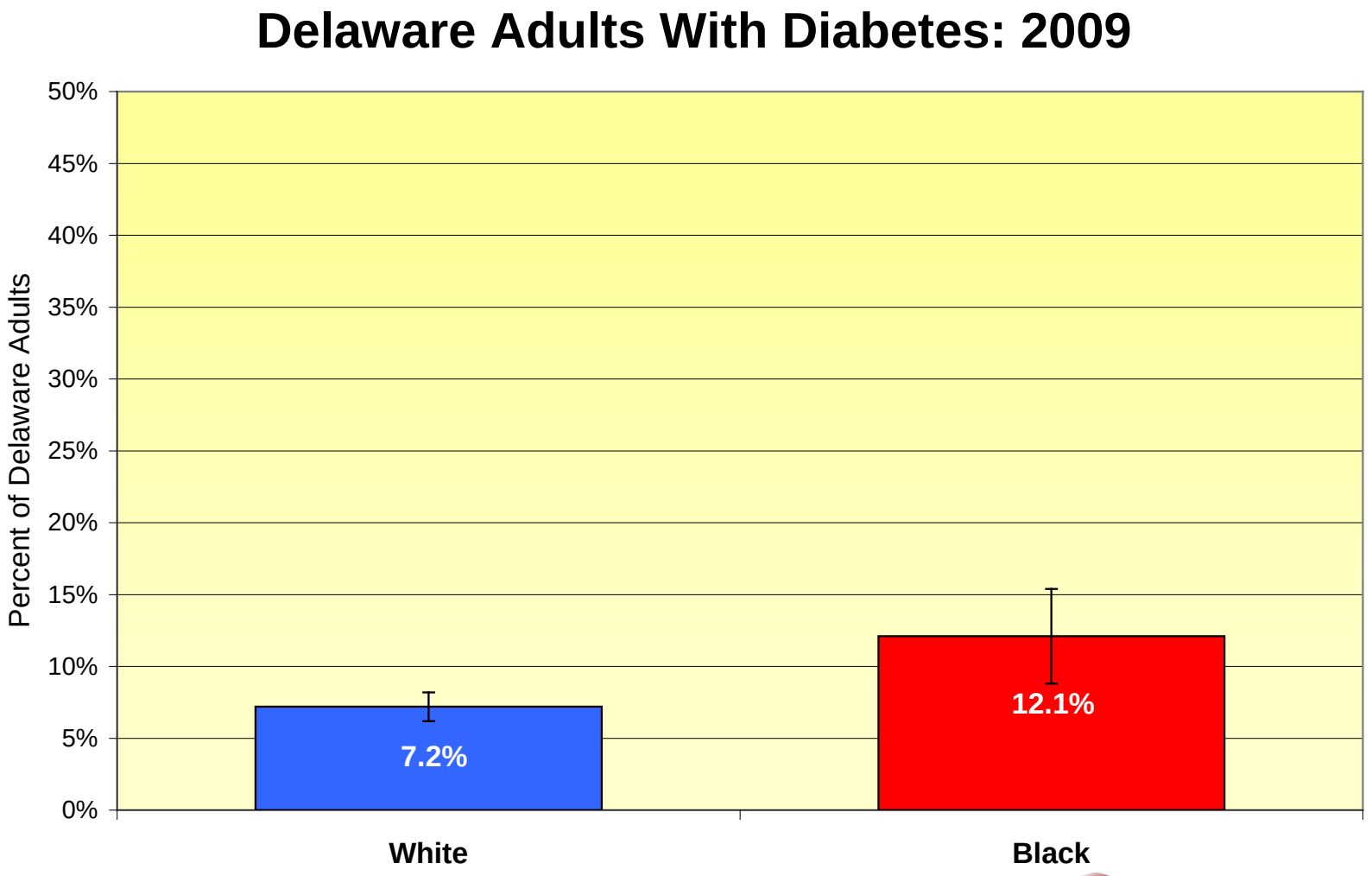
Significant Racial Disparity Exits

White and African American Adults, 2009: Significant Disparity for Obesity



Source: DHSS, Division of Public Health, Behavioral Risk Factor Survey (BRFS), 2009.

Diabetes Prevalence Mirrors Disparity in Obesity



Source: DHSS, Division of Public Health, Behavioral Risk Factor Survey (BRFS), 2009.

1 in 3 Children Could Develop Diabetes

- If current trends continue, **1 in 3 Americans** will develop diabetes during in their lifetime, and those with diabetes will lose, on average, 10-15 years of life.

- In 2009, about **54,400 Delaware adults** had been told by a doctor that they have **diabetes**.

- In 2009, an additional **36,000 Delaware adults** had been told by a doctor that they have **pre-diabetes.**

- For people with pre-diabetes, **lifestyle changes**—including a 5 to 7% weight loss and at least 150 minutes of physical activity per week—can reduce the rate of onset of type 2 diabetes by 58%.

Sources: CDC Diabetes web page; Delaware Behavioral Risk Factor Survey (BRFS), 2009.

Impact on Youth

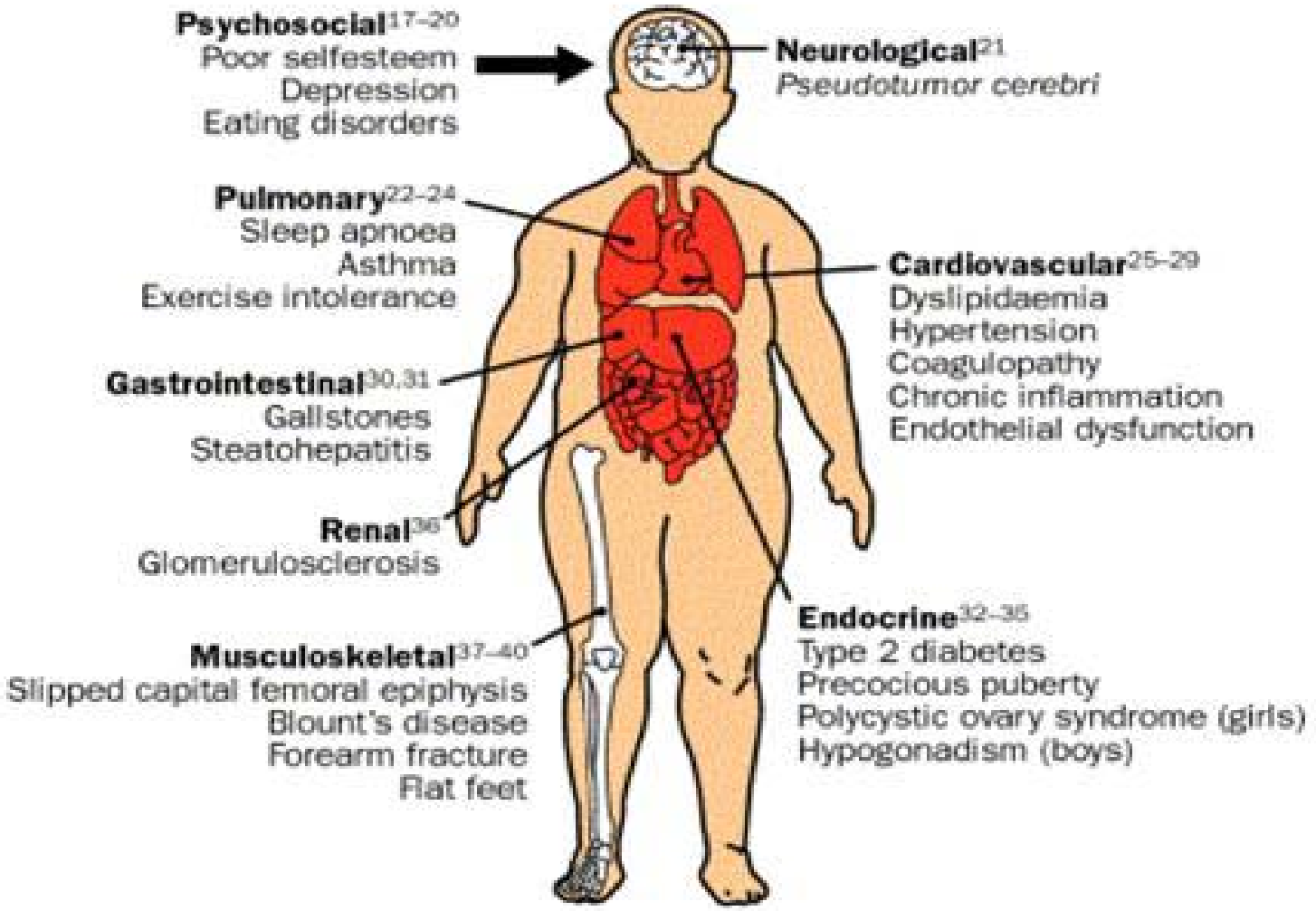
- "**No longer considered to be a condition of primarily adult onset**, type 2 diabetes has become increasingly common among children aged 6-11 years and adolescents aged 12-19 years."
- "The increase in type 2 diabetes among children and adolescents has emerged in parallel with an **alarming rise** in the number of young people who have become overweight or obese."

➢ Kenneth Copeland, M.D., *et al*, ***Clinical Diabetes*** October 2005; vol. 23 no. 4; 181-185

Health Costs of Obesity

- Heart Disease and Stroke
- Several Types of Cancer
- Type 2 Diabetes
- Liver Disease
- Orthopedic problems
- Sleep Apnea
- Arthritis
- Liver and Gallbladder Diseases
- Gynecological Problems
- Stress and Emotional Problems

Comorbidities of Obesity



http://www.cheo.on.ca/en/weightandhealth

Diabetes Is Costly:

- Total US costs (direct and indirect) of diabetes: **$174 billion**.
- Direct US medical costs: **$116 billion**.
- Indirect US costs (related to disability, work loss, premature death): **$58 billion**.
- People with diagnosed diabetes have medical expenditures that are about **2.3 times higher** than medical expenditures for people without diabetes

- *US data from CDC*

Potential Medical Care Savings From Primary Disease Prevention

- National estimate: **"reducing diabetes and hyperten prevalence by 5% would save approximately $9 billion annually in the near term."**
- Savings could rise to about **$24.7 billion annually in the medium term**.
- Returns were greatest in absolute terms for private payers, but **greatest in percentage terms for public payers**.
- Well-designed interventions that achieve improvements in lifestyle-related risk factors could result in sufficient savings to **offset intervention costs**.

American Journal of Public Health, January 2011

Potential Medical Care Savings From Primary Disease Prevention

- Short-term and medium-term modifiable diseases:
  - Diabetes
  - High blood pressure
    - Heart disease
    - Cerebrovascular disease
    - Renal disease
- Estimated **Delaware medical expenditure sav** following a **5% reduction in prevalence** of the above conditions:

  - Short-run: **$33 million** a year

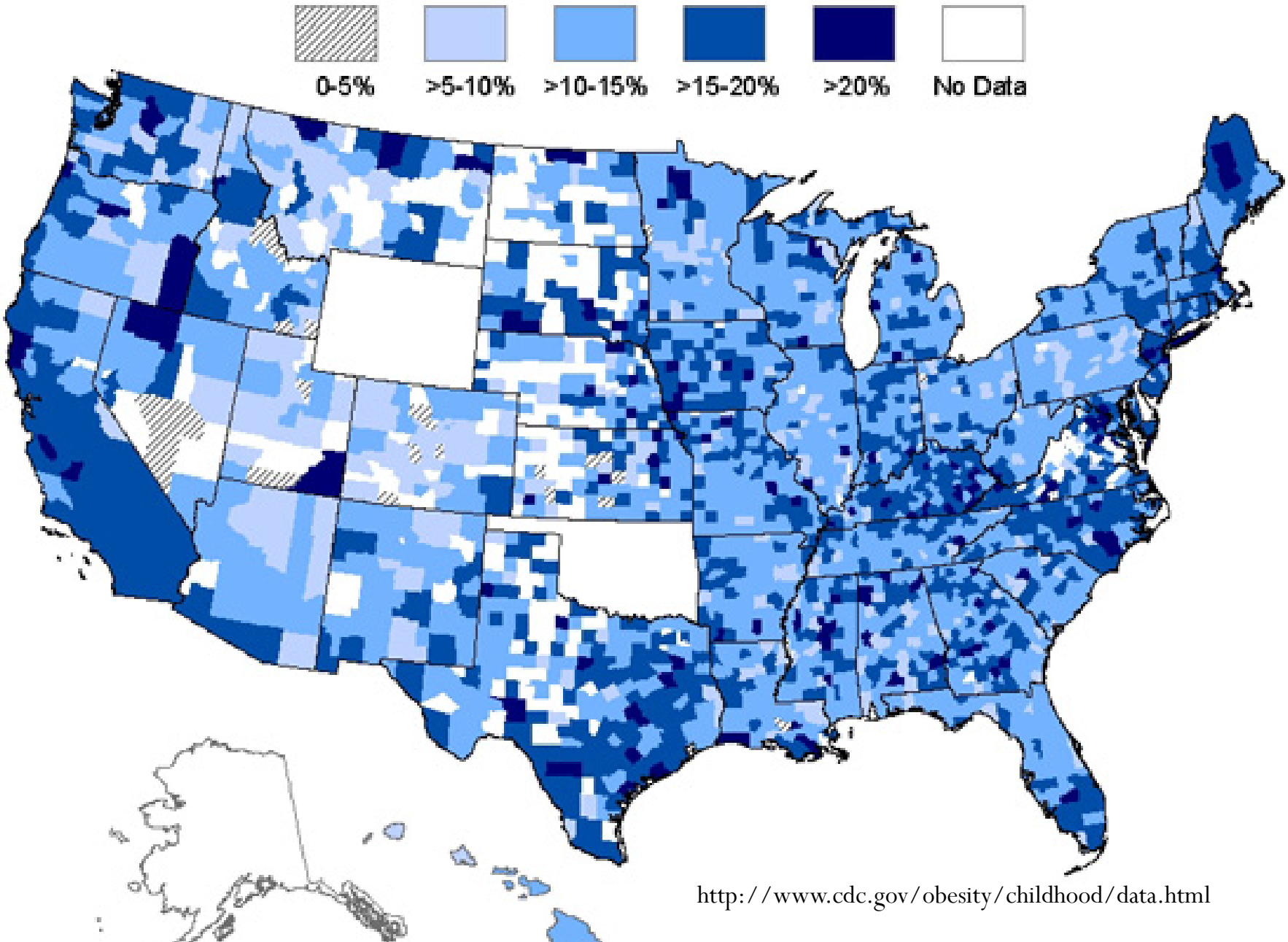
  - Medium-run: **$92.4 million** a year

Source: Ormand *et al*, "Potential National and State Medical Care Savings from Primary Disease Prevention," *American Journal of Public Health*, November 18, 2010. http://ajph.aphapublications.org/cgi/content/abstract/AJPH.2009.182287v1

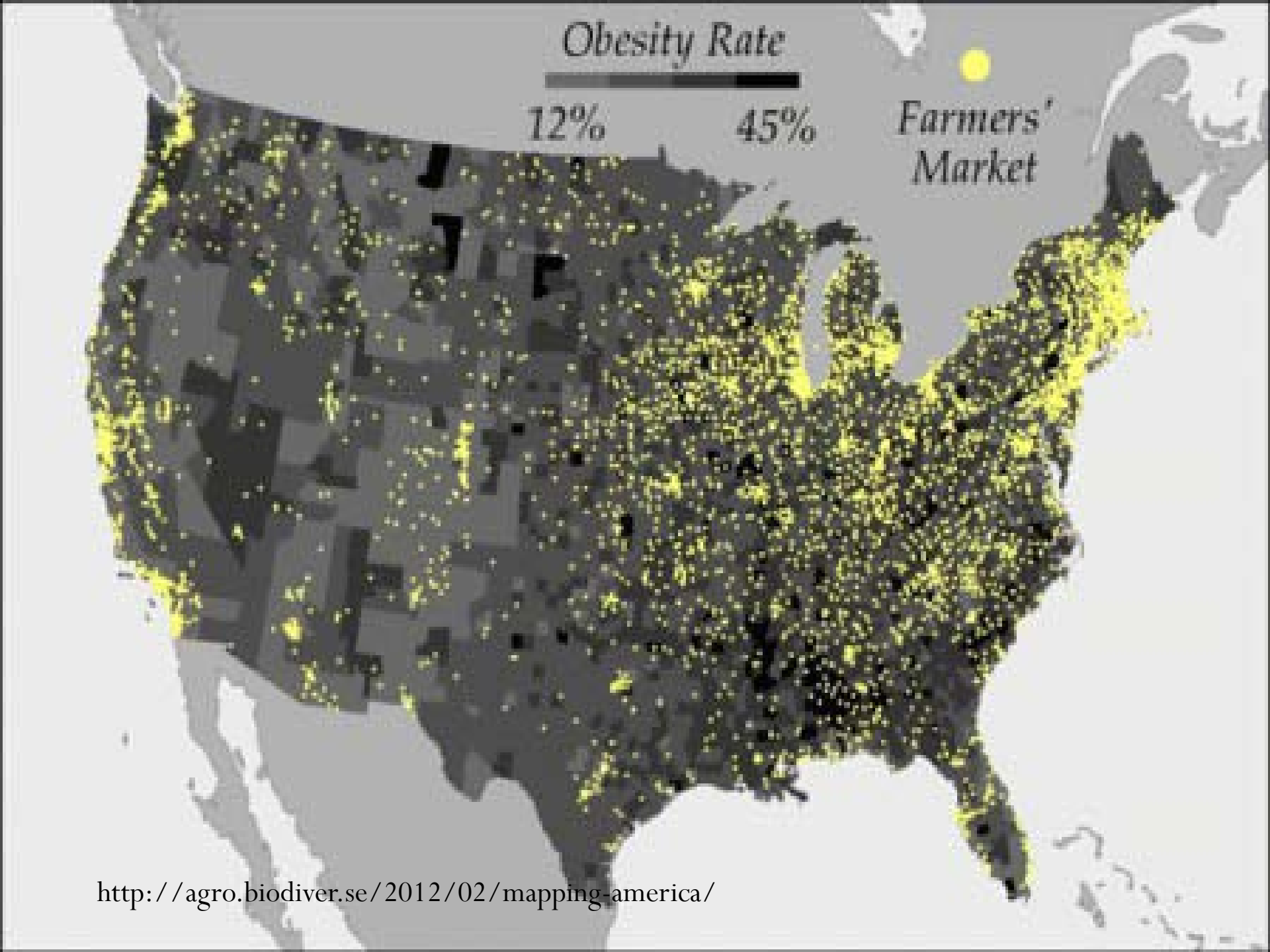
Environment

- Where a child lives, goes to school and plays has a significant impact on his or her health.
- Today's food and physical activity environment make it hard to be healthy. For example:
  - Lack of physical activity in schools (e.g., no PE or recess)
  - Car-focused world – active transport (e.g., walking or biking) is not easy
  - Lack of available and affordable fresh fruits and veggies
  - Massive marketing of unhealthy food and beverages
  - Overabundance of energy-dense, nutrient-poor foods

2007–2009 County Obesity Prevalence Among Low-Income Children Aged 2 to 4 Years



http://www.cdc.gov/obesity/childhood/data.html



http://agro.biodiver.se/2012/02/mapping-america/

Genetics and Environment

- Genes influence susceptibility
- Environment influences outcome

Importance of the Intrauterine Environment

- Barker "thrifty phenotype"
  - Reduced birth weight associated with increased insulin resistance, increased cardiovascular disease, diabetes and central adiposity
    - Hales et al Br Med Bull 2001;60;:5-20
    - Veening MA et al J Clin Endocrinol Metab 2002;87(10) 4657-4661
    - Oken E et al Obes Res 2003;11;496-506.
  - Infants with "restricted" intrauterine environment born into an energy rich environment increased risk

Importance of the Intrauterine Environment

- Infants of obese mothers and infants of diabetic mothers are at increased risk for later obesity and diabetes
    - Dabelea D et al J Pediatr Endocrinol Metab 2001;14(8) 1085-1091
- Insulin receptor expression and insulin sensitivity from intrauterine live may be a "mismatch" to needs of extrauterine life.
    - Frankel N Diabetes 1980;29;1023-1035

Risk for Obesity/Environmental Impact

- Vulnerable periods for increasing obesity
  - Infancy, ? Puberty, Pregnancy, Stress, Ageing
- Intrauterine risk for obesity
  - Maternal smoking, maternal diabetes, maternal obesity
- Genetic predisposition modified by environment

What does this mean for us?

- Longer lifespan may lead to greater gene-environment mismatch
- Environmental information can change inheritance
- Disease risk is maximized by "mismatch" between "predicted' and actual environment
- Profound connection between genome and environment

Environmental Shifts and Energy intake

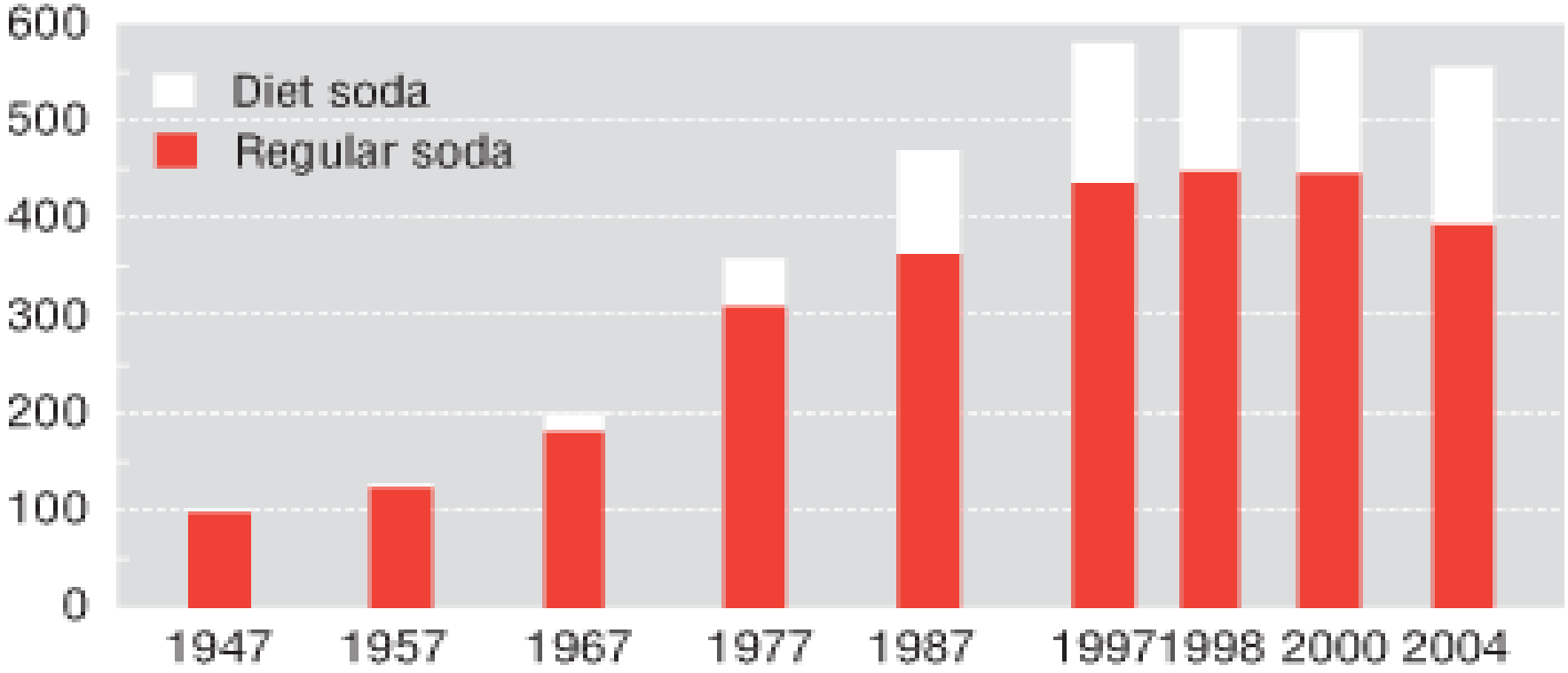
- Modest increases in energy not compensated by activity can result in large weight gain over time.
- 150 kcal/d excess intake = 15lbs/year
- Common causes of increased caloric intake
  - Snacking
  - Increased portions
  - Fast food
  - Beverages
  - Limited variety
  - Multiple caretakers

Nutritional Environment

- Children are increasingly consuming food away from home
  - Fast food, soft drinks, increased portion sizes, snacks
  - Higher fat, sugar, carbohydrate
    - Nielson SJ et al Trends in energy intake in U.S. Between 1977 and 1996;similar shifts seen across age groups. Obes Res 2002;10;370-378.

Figure 1

Annual soft drink production in the United States (12-oz. cans/person)



Sources: USDA Economic Research Service (1947–87); Beverage Digest (1997–2004).

450 12oz soda/person in one year

140kcal/soda = 63,000 kcal/year= 170kcal/day = 16lbs /year

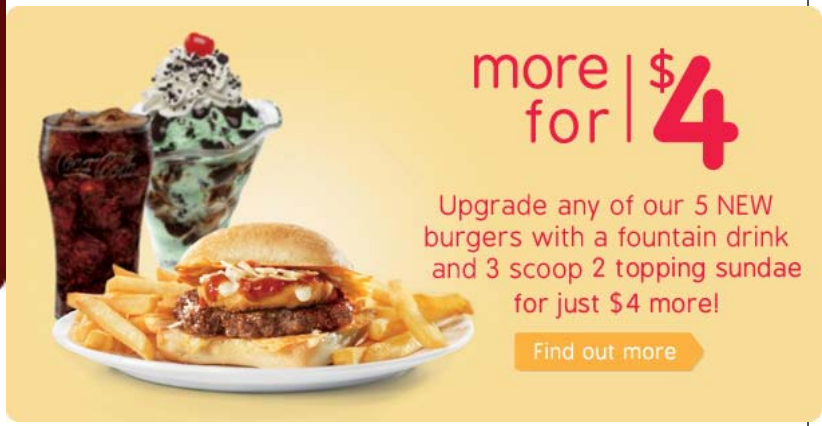

Milk
PEPSI
PEPSI
PEPSI
PEPSI
BARCELONA
BARCELONA


new
extra value menu™
McCafé
Try it today


FOOD - EXIT 59
BURGER KING
TACO BELL
SHONEY'S
McDonald's
Kentucky Fried Chicken
Wendy's


BURGER KING


$10 ANY PIZZA CARRYOUT
ANY SIZE AND ANY TOPPINGS
CARRYOUT NOW »
LIMITED TIME OFFER. ADDITIONAL CHARGE FOR STUFFED CRUST AND ADDITIONAL CHEESE.


more for | $4
Upgrade any of our 5 NEW burgers with a fountain drink and 3 scoop 2 topping sundae for just $4 more!
Find out more

Bagel

Calorie difference: **210 calories**

3-inch diameter
140 calories

6-inch diameter
350 calories

Cheeseburger

Calorie difference: **257 calories**

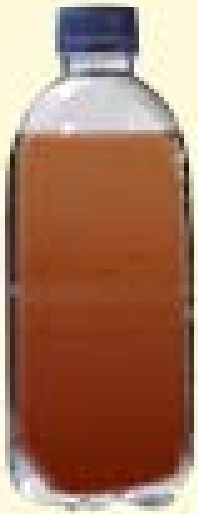
333 calories

590 calories

Soda

Calorie difference: **165 calories**

6.5 ounces
85 calories

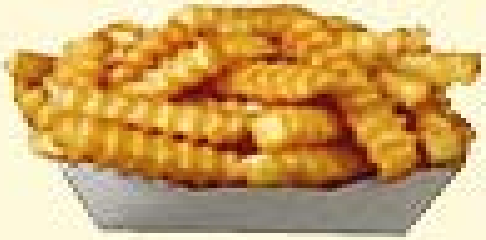


20 ounces
250 calories

French Fries

Calorie difference: **400 calories**

2.4 ounces
210 calories



6.9 ounces
610 calories

http://nutritiontranslator.files.wordpress.com/2011/05/portions-have-changed.jpg

Television

- Television
  - 2005 American children 2-11 yrs averaged 3 hours 19 minutes/day
  - African American children watched 30% more TV than white children
    - Nielsen Media Research. 2000 Report on Television. New Your, NY; A C Nielsen Co 2000
  - Positive association with obesity
    - Dietz W et al Do we fatten our children at the television set? Obesity and television viewing in children and adolescents. Pediatrics 1985;75;807-812.


life
Honey Graham Oh's
CAP'N CRUNCH
Incredible Berry Crunch!
Lucky Charms
CRUNCH
Berry Lucky Charms
OATMEAL CRISP
Honey Nut Chex
NEW BERRY
Cinnamon Toast Crunch
Whole Grain
Reese's Puffs
Kix
Total
Honey Smacks
Mini-Wheats
Trix
Mini-Wheats
CORN FLAKES
NEW!
Eggo
Cinnamon Toast
Apple Jacks
Raisin Bran
FAMILY SIZE
Whole Grain
Honey Nut Cheerios
FROOT LOOPS
Cheerios
Special K
Incredible Berry Crunch!
Lucky Charms
CRUNCH
Berry Lucky Charms
life
Honey Graham Oh's
CAP'N CRUNCH

Television

- Impact
  - Displaces physical activity
  - Snacking while viewing
  - Food advertisements
  - Use during mealtime-poor food consumption patterns

Physical Activity Patterns

The 2007 National Youth Risk Behavior Survey (high school students)

- 65% did not meet recommended levels of physical activity.
- 46% did not attend physical education classes.
- 70% did not attend physical education classes daily.
- 35% watched television 3 or more hours per day on an average school day.
- 25% played video or computer games or used a computer for something that was not school work for 3 or more hours per day on an average school day.

Walkability and The Built Environment

Traditional Grid Design (circa 1900)

Curvilinear Loop Designs & Beginning of Cul-De-Sacs (approx. 1930 – 1950)

Conventional Cul-De-Sac Design (since 1950)

http://4.bp.blogspot.com/_4tYuaX5IsjQ/S5C43eHos-I/AAAAAAAAAGE/dD1ktBs08LU/s400/walking_dog_with_car.jpg

http://www.cyburbia.org/gallery/data/500/gridstyles_thumb.jpg

http://baby-stroller-reviews.org/wp-content/uploads/2011/03/Kolcraft-Contours-Lite-Strollera.jpg

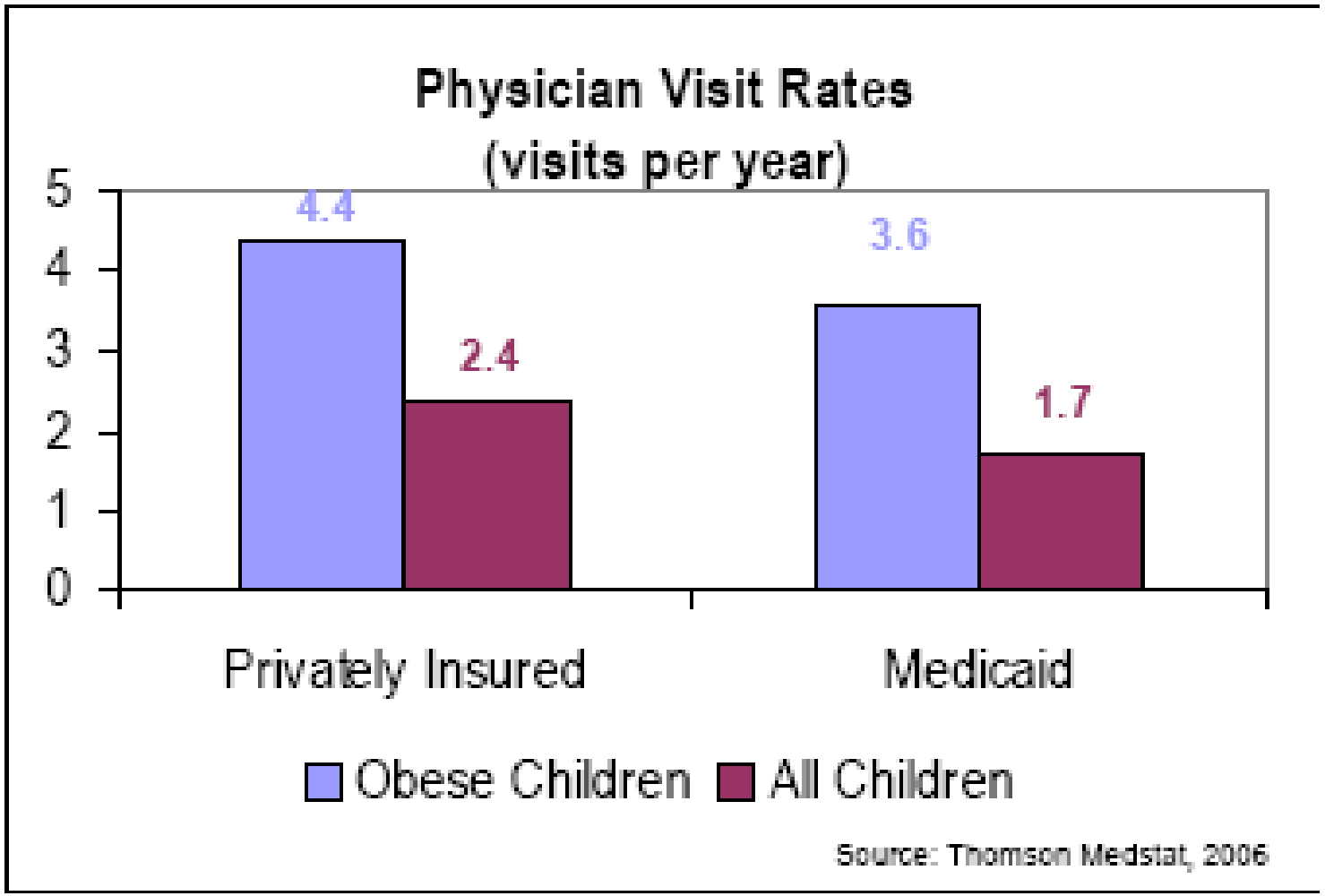
Summer

- Obese children who responded to a fitness, lifestyle school program relapsed over the summer
  - Age 12 (55% females, 45% males) BMI 30.8
  - Mean body fat (DEXA) increased 1.3%
  - Mean VO_{2max} decreased 3.2 ml/dl/min
  - Fasting insulin increased 6.1 uIU/ml
- Changes in 3 months of summer completely reversed effects of 1 year school intervention
  - Carrel AL et al School Based Fitness Changes Are Lost During the Summer Vacation Arch Pediatr Adolescent Med 2007 ;161;561-571.

Obesity Trajectory

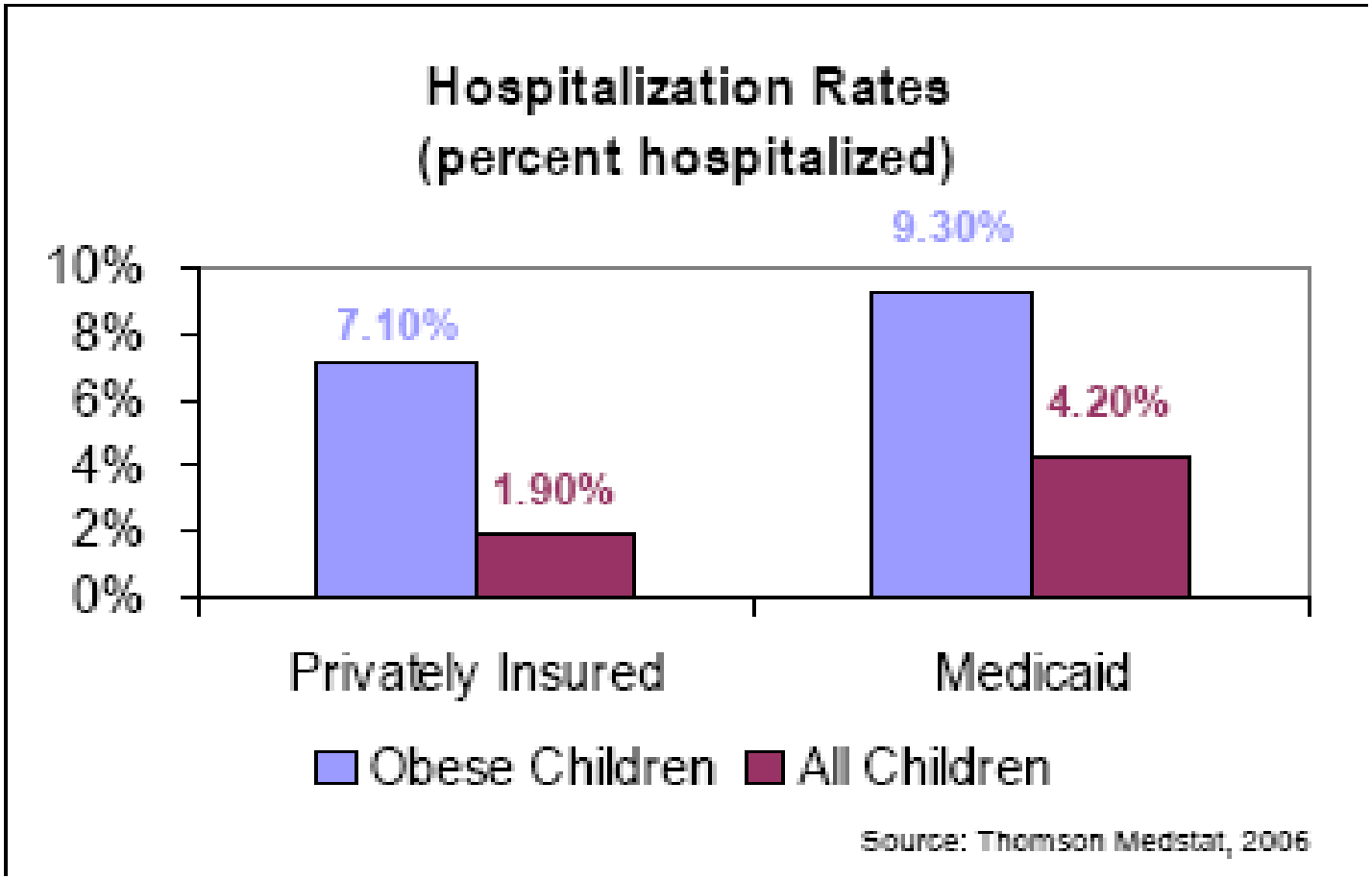
- Phase I- steady increase in childhood obesity
- Phase II – emergence of serious obesity related comorbidities
- Phase III- medical complications lead to life threatening disease – death in middle age
- Phase IV – Acceleration of obesity epidemic by transgenerational transmission
    - Childhood obesity--the shape of things to come.Ludwig DS.
    - N Engl J Med. 2007 Dec 6;357(23):2325-7.

Obesity: Physician visit rates



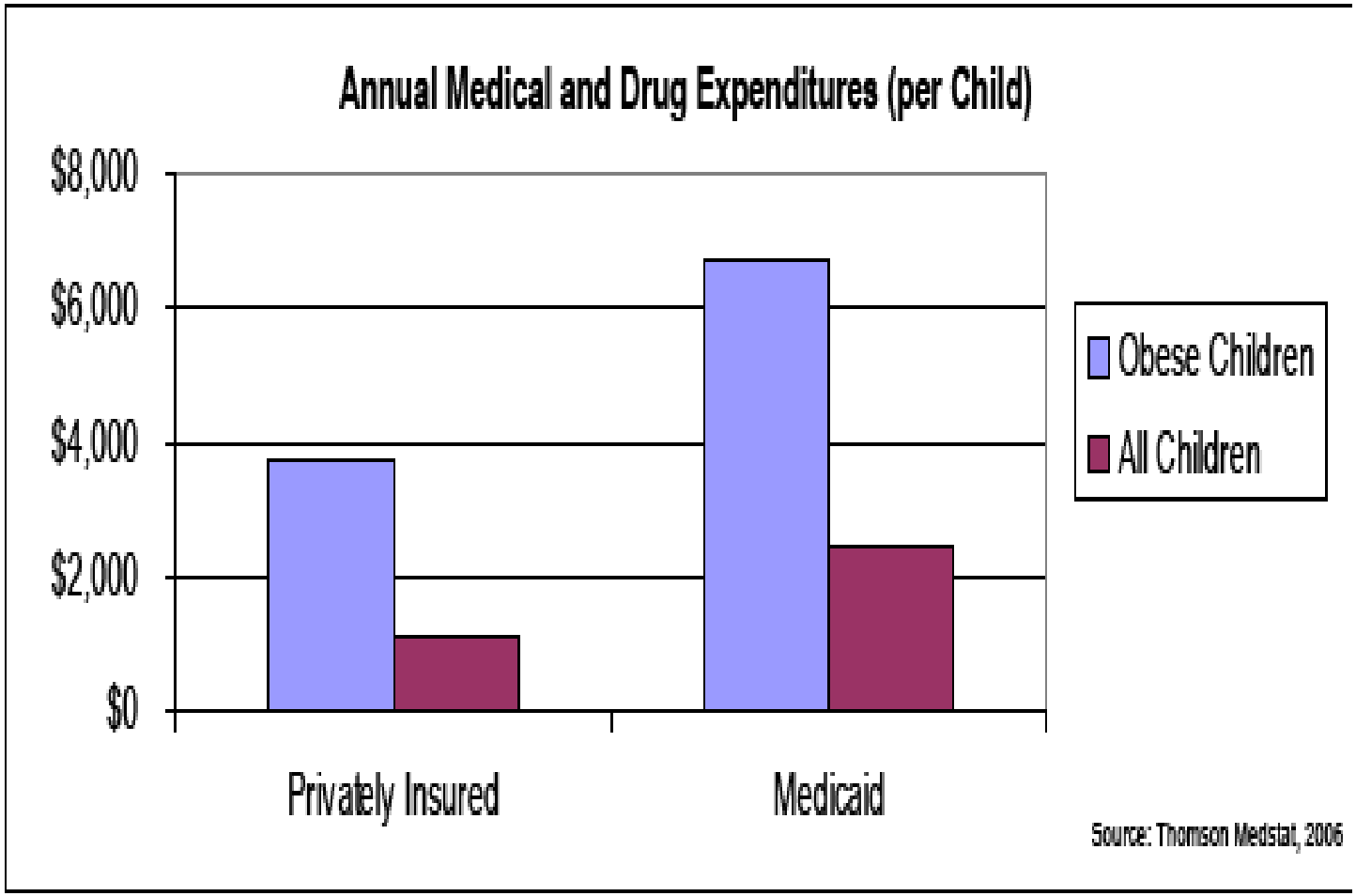
http://www.medstat.com/pdfs/childhood_obesity.pdf

Obesity: Hospitalization Rates



http://www.medstat.com/pdfs/childhood_obesity.pdf

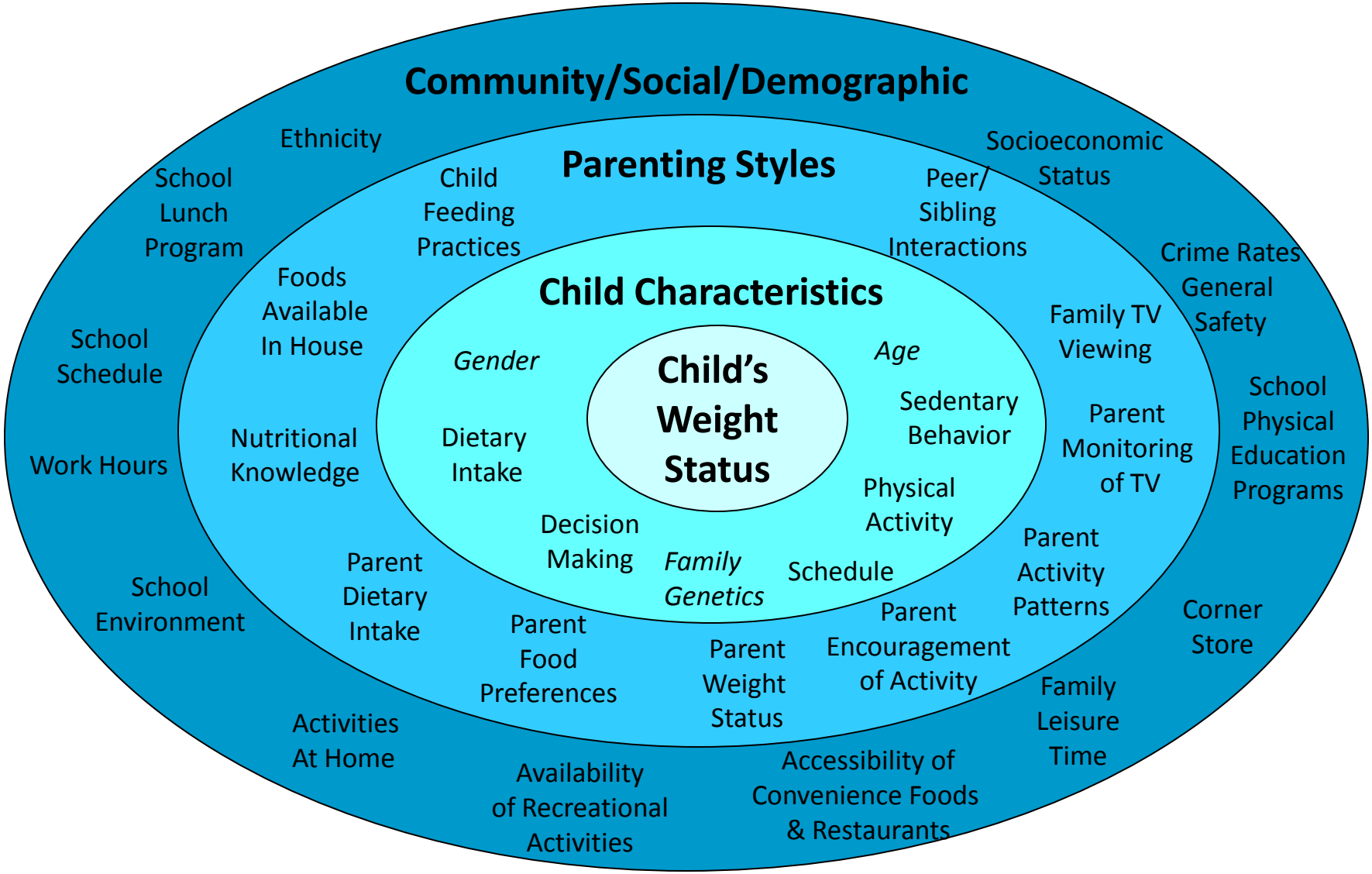
Cost of Obesity



http://www.medstat.com/pdfs/childhood_obesity.pdf

Case Study of a 12-Year-Old Girl

- At the 12-year well check a mother reports her daughter's increasing comments about her weight and being "fat."
- BMI = 23, 90th percentile for a 12 year-old girl
- Identified as overweight

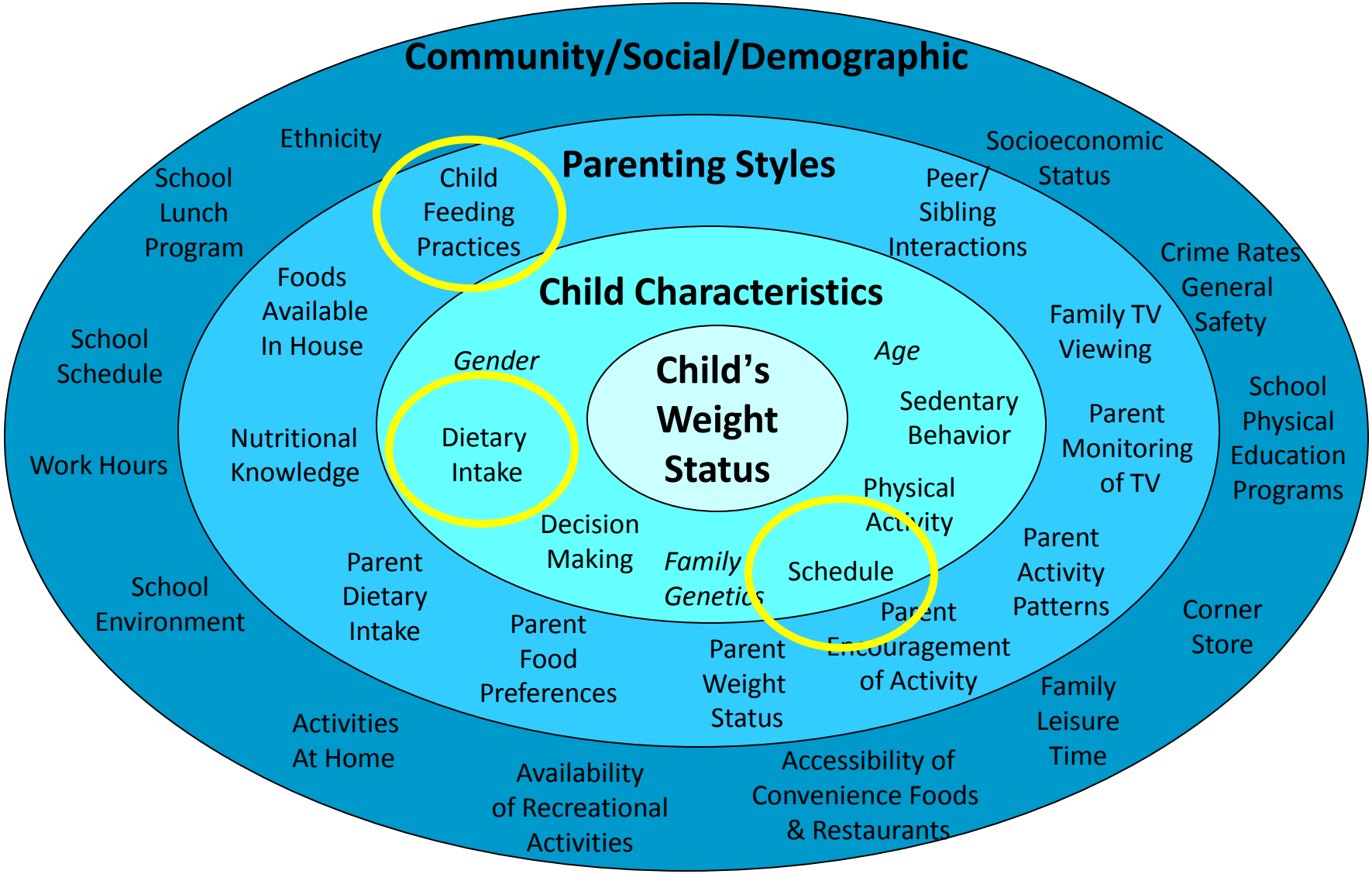

Community/Social/Demographic
Ethnicity
Socioeconomic Status
School Lunch Program
Crime Rates General Safety
School Schedule
School Physical Education Programs
Work Hours
School Environment
Corner Store
Activities At Home
Availability of Recreational Activities
Accessibility of Convenience Foods & Restaurants
Family Leisure Time
Parenting Styles
Child Feeding Practices
Peer/ Sibling Interactions
Foods Available In House
Family TV Viewing
Parent Monitoring of TV
Nutritional Knowledge
Parent Dietary Intake
Parent Food Preferences
Parent Weight Status
Parent Encouragement of Activity
Parent Activity Patterns
Child Characteristics
Gender
Age
Dietary Intake
Sedentary Behavior
Physical Activity
Decision Making
Schedule
Family Genetics
Child's Weight Status

12-Year-Old Girl: Dietary Patterns

Behavioral Perspective

- Skips breakfast (no time)
- Eats pretzel and juice for lunch (not hungry for a regular lunch)
- After school – soda and snack food (poor choices)
- Dinner – Family eats out 3x/week (too busy to cook)
- Bedtime – Cereal (eating while watching TV)

•Yellow circles = behavioral perspective (dietary patterns)

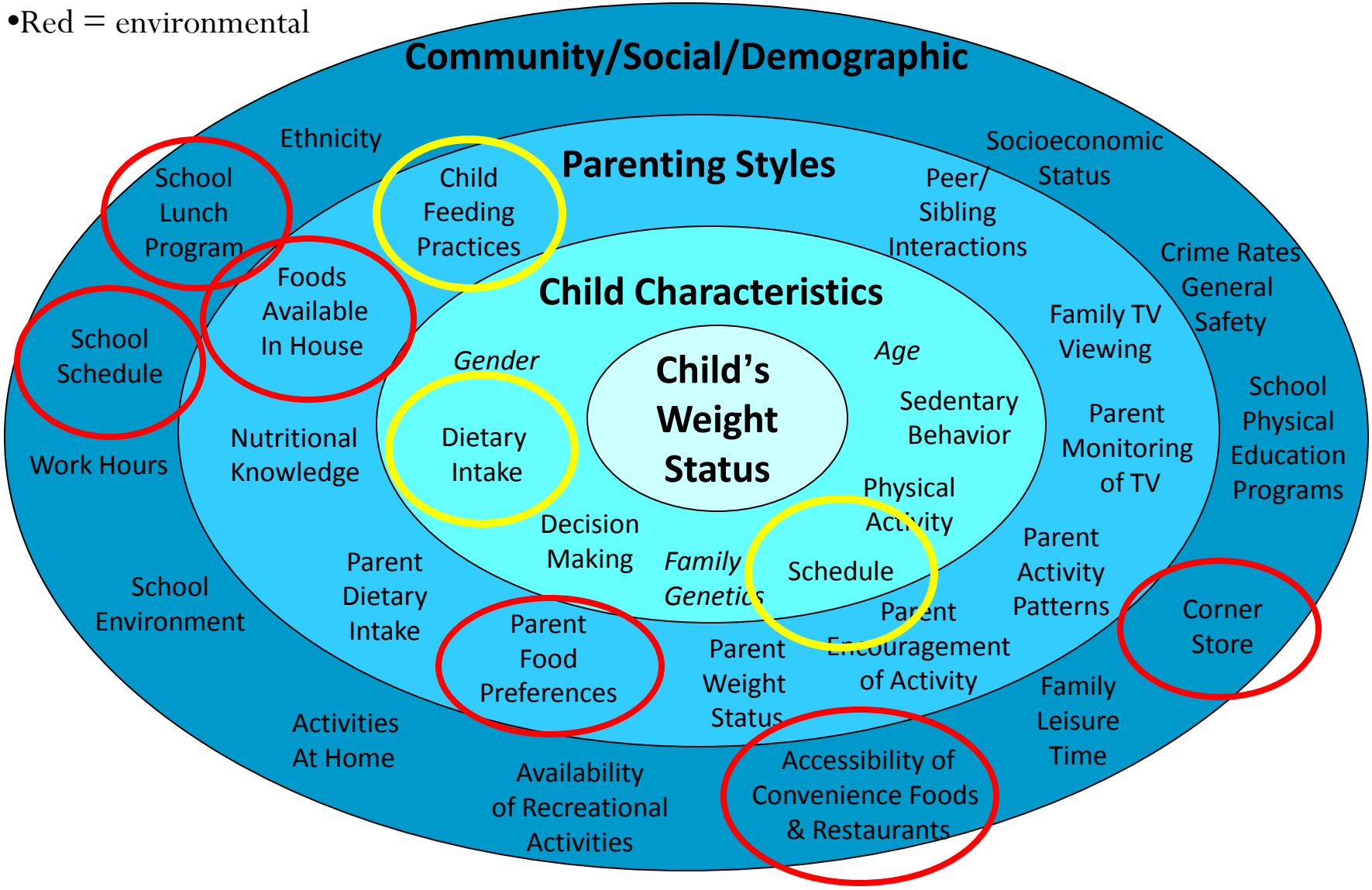


12-Year-Old Girl: Dietary Patterns

Environmental Perspective

- Skips breakfast (school start time/availability of school breakfast)
- Eats pretzel and juice for lunch (school lunch)
- After school – soda and snack food (corner store)
- Dinner – Family eats out 3x/week (fast food availability)
- Bedtime – Cereal (TV in bedroom)

•Yellow circles = behavioral perspective (dietary patterns)
•Red = environmental

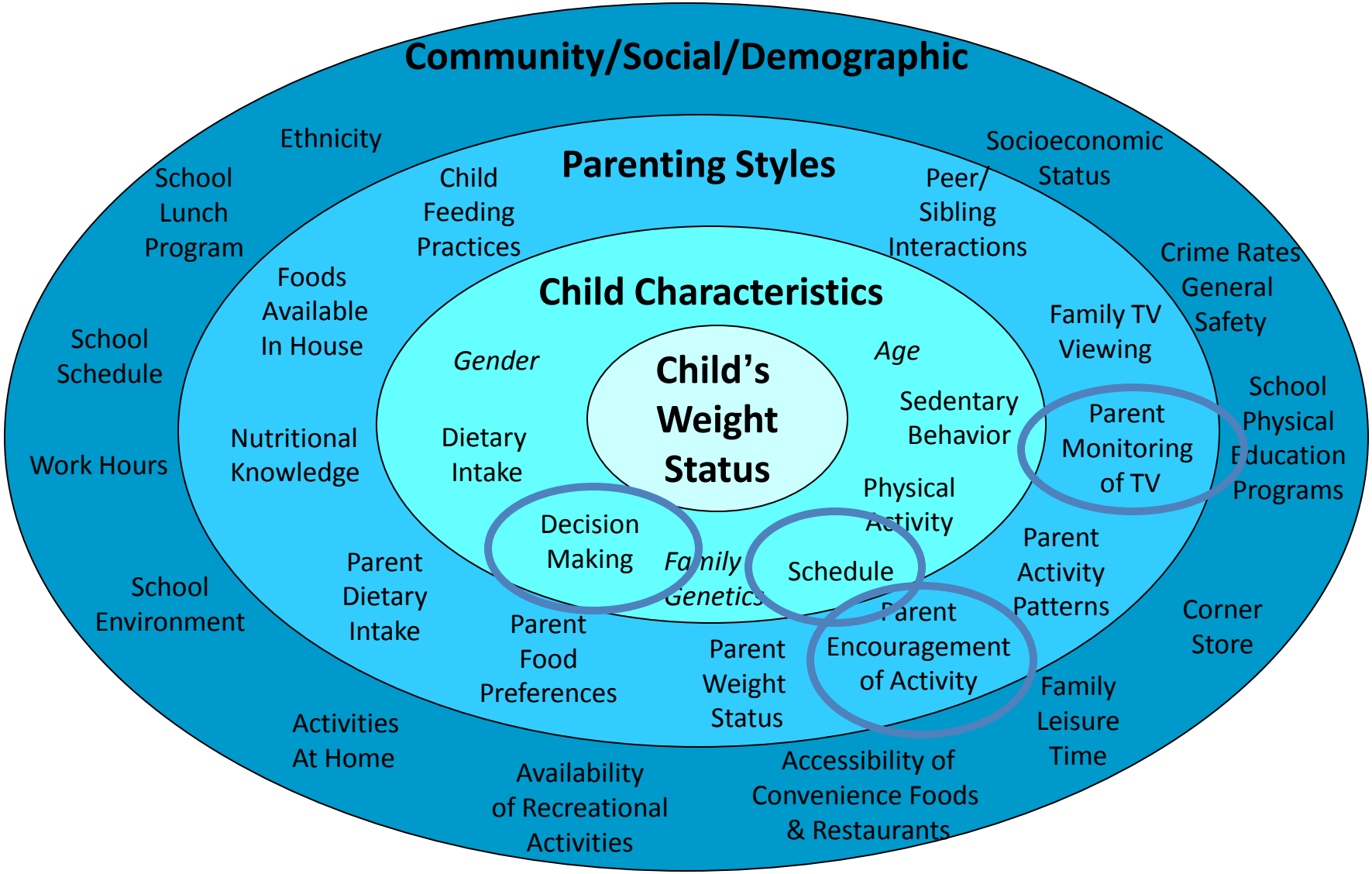


12-Year-Old Girl: Physical Activity Patterns

Behavioral Perspective

- No outdoor time (doesn't want to go outside)
- Computer, IM etc.: 3 hours/day (nothing else to do)
- Homework: 2 hours/day (prefers not to do homework at study period)
- Weekends: "TV all the time" (doesn't know what to do if not watching TV)
- Extracurricular activity: cheerleading 2x/week

•Yellow circles = behavioral perspective (physical activity)

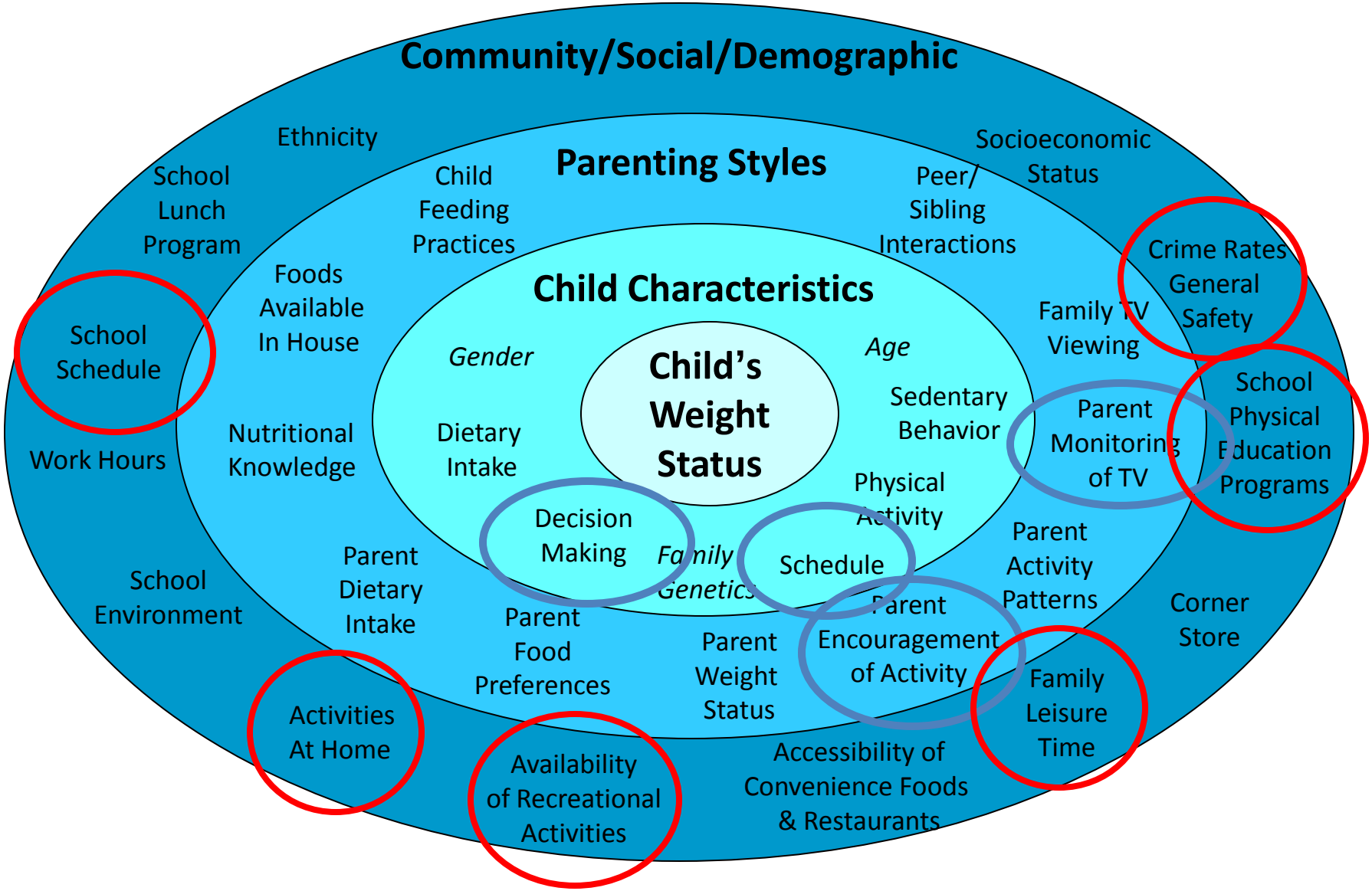


12-Year-Old-Girl: Physical Activity Patterns

Environmental Perspective

- No gym this session (school schedule)
- No recess (school schedule)
- No outdoor time (neighborhood safety)
- Computer, IM etc.: 3 hours/day (family entertainment environment)
- Homework 2 hours/day (family scheduling)
- Weekends “TV all the time” (family activity)
- Extracurricular activity Cheerleading 2x/week

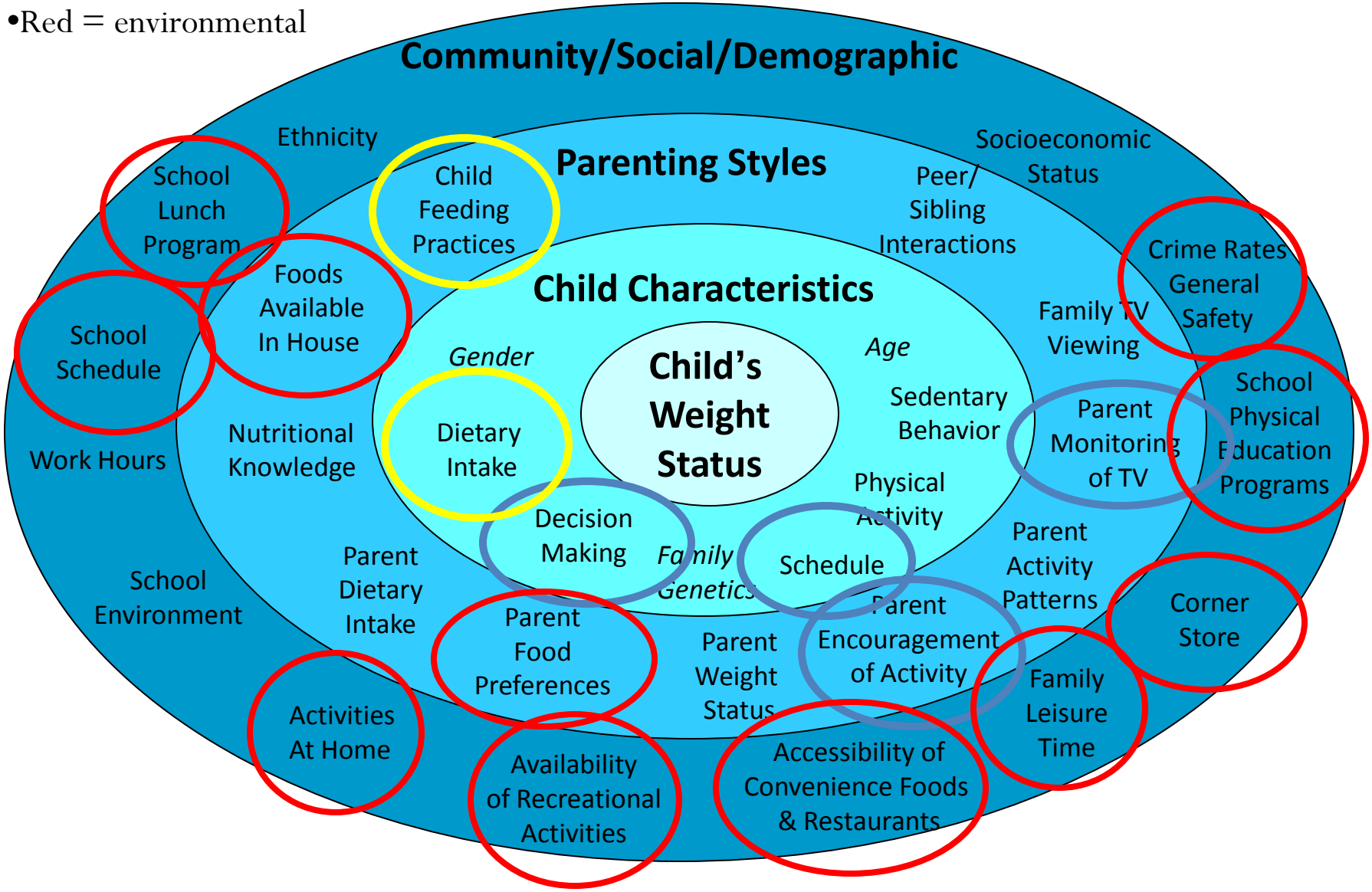
- Yellow circles = behavioral perspective (physical activity)
- Red = environmental



Obesity in the Context of this 12-Year-Old's Environment

- Interaction of environment and behavior is critical
- Making healthy decisions only works when there are safe and affordable healthy options readily available in the environment
- The next slide highlights all the factors that influence this 12-year-old's food and physical activity environments

- Yellow circles= behavioral perspective (dietary) and
- behavioral perspective (physical activity)
- Red = environmental



Socio-Ecological Model

- **Behavior is influenced at all levels.**
- **Effective programs must be comprehensive, addressing all levels.**

What is "Health Promotion"?

"**Health promotion and disease prevention** are the aggregate of all purposeful activities **designed to improve personal and public health through a combination of strategies**" – *including the competent implementation of behavior change strategies, health education, health protection measures, risk factor detection, supportive policy and environmental change, health enhancement and health maintenance.*

- From the *Report of the 1990 Joint Committee on Health Education Terminology*

What Is Primary Prevention?

- **Primary Prevention** – aimed at behavior change to increase prevalence of healthy behaviors, and decrease prevalence of unhealthy conditions related to those risk factors
  - **Secondary Prevention** – aimed at reducing severity or duration of existing health problems
    - **Tertiary Prevention** – aimed at reducing consequences or disability resulting from diseases

CDC MAPPS Strategies

- Developed by the U.S. Centers for Disease Control and Prevention (CDC)
- Developed from review of programs that worked
- Utilize the *Guide to Community Preventive Services*—"what works to promote community health"

www.thecommunityguide.org

Recommended MAPPS Strategies

Media / Social Mktg.	Access to Healthy Options	Point of Decision Prompts	Price Disincentives/Incentives	Social Support / Services
•Counter-marketing	•Tobacco-free campuses •Enforce and expand Clean Indoor Air Act	•Restrict point of purchase tobacco advertising as allowed under federal law •Enforce product placement behind counters	•Tax equity for cigars and smokeless tobacco products	•Maintain DE Quitline and other cessation services
•Promote healthy food and drink choices •Counter-marketing against unhealthy choices	•Attract markets to "food deserts" •Farmers' Markets •Provide healthier choices in child care, schools, and workplaces •Menu labeling •Community gardens •Local farm to institution projects •Changing procurement policies to obtain healthier choices.	•Encourage retailers to improve product placement of healthy food choices	•Provide incentives to retailers to offer healthier food choices •Establish excise tax of sugar-added drinks like soda and energy drinks	•Support breast feeding through policy change and maternity care practices •Expand school nutrition programs •Weight loss support groups
•Promote increased physical activity as fun and healthy •Promote walking and cycling •Promote public transit •Design campaigns to encourage less television watching and other "screen time" •Share the Road and safe driving campaigns to encourage safe bicycling.	•Develop safe, attractive and accessible places for activity •Fully implement "Complete Streets" •Develop or complete Rails to Trails and other trails •Make state more "bikable," •Ensure crime-free parks with adequate crime prevention measures •Provide bike lockers, bike racks and other facilities to encourage bicycling	•Stairwell prompts near elevators in office buildings; with improved, safe and clean stairwells. •Signage for neighborhood destinations in walkable, mixed-use neighborhoods. •Signage for walking trails and bike lanes.	•Reduce prices for parks and recreational facilities to encourage more use. •Incentives for active transit •Subsidize memberships in recreational facilities	•Safe Routes to Schools •Challenge programs and organized walking/bicycling groups •After school programs for community residents •Neighborhood watch or community policing programs to ensure street and part safety.

Plans for Action Already Exist

Examples of Delaware Plans:

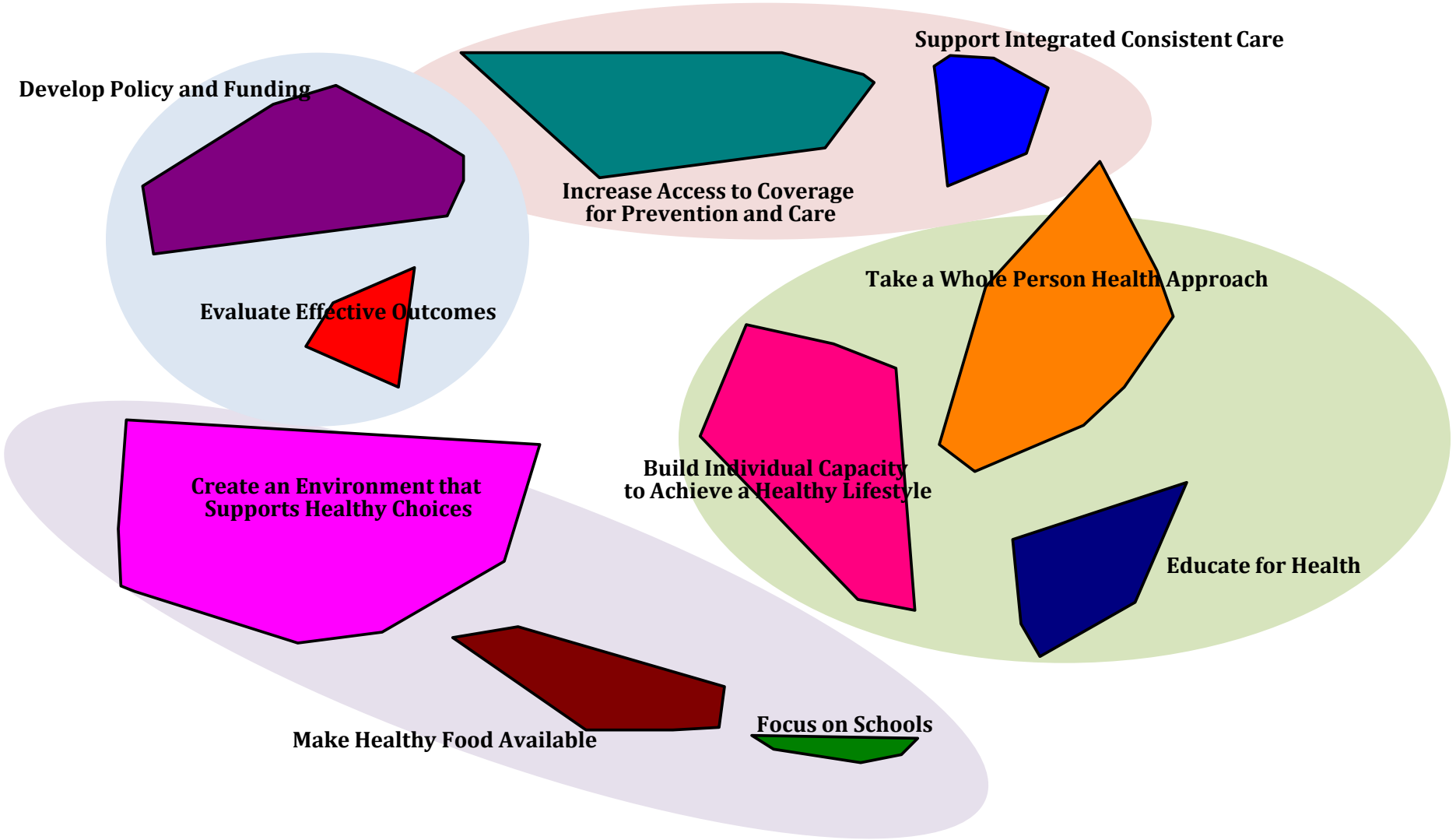
CDC Documents:

Governor's Council on Health Promotion and Disease Prevention

The Council's charge:

"A Council on Health Promotion and Disease Prevention is hereby established and its members are charged to advise the Governor and executive branch state agencies on the development and coordination of strategies, policies, programs and other actions state-wide to promote healthy lifestyles and prevent chronic and lifestyle-related disease."

Revisiting the Emerging Structure: A "Regions" Perspective



Making Healthy Choices Throughout Life

Aging

Staying Active; healthy food choices

Get recommended screenings

Making or supporting healthy policies

Mid-Life

Staying Active

Wise choices re: tobacco, alcohol/drugs

Parents

Being positive role models to children

Participating in PE, athletics

Students

Limiting screen time: games and TV

Mother's Diet Exercise, Smoking

Mothers

Choice of Breast Feeding

Prenatal

DELAWARE HEALTH AND SOCIAL SERVICES
Division of Public Health
Health Promotion and Disease Prevention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