

A digital scale display showing 85.0 lb, with a pair of feet on the scale.

85.0 lb

Obesity: What's the Big Idea

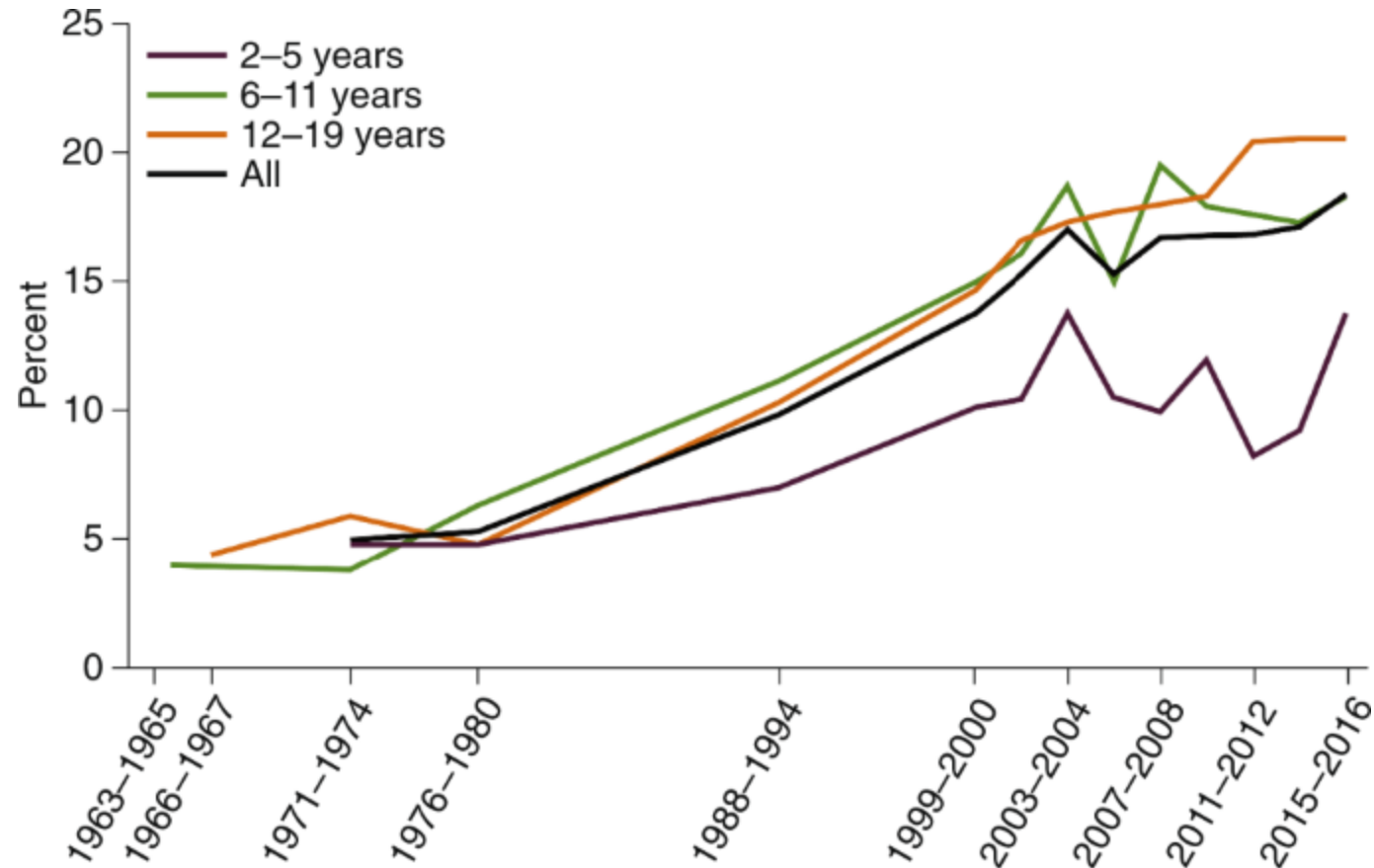
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Chief of the Division of General Pediatrics

2021

Trends in prevalence of childhood obesity in the US from 1963-2016



Fryar, C. D., Carroll, M. D. & Ogden, C. L. *Prevalence of Overweight, Obesity, and Severe Obesity Among Children and Adolescents Aged 2–19 Years: United States, 1963–1965 Through 2015–2016* (National Center for Health Statistics, 2018); Caprio, Santoro, Weiss, *Nature Metabolism*. March 2020



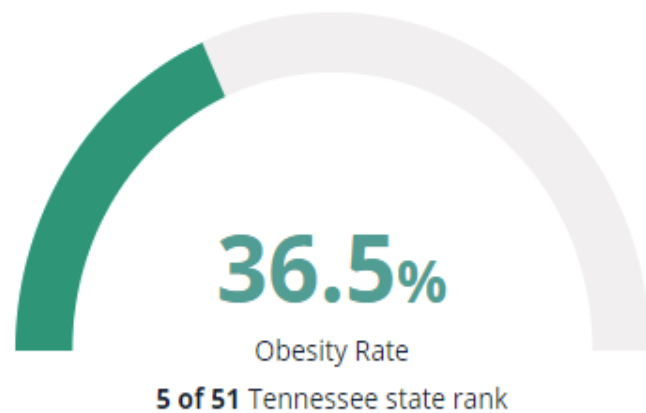
What's changed from the 1960s-2020s
Obesogenic environment



Children ages 10-17



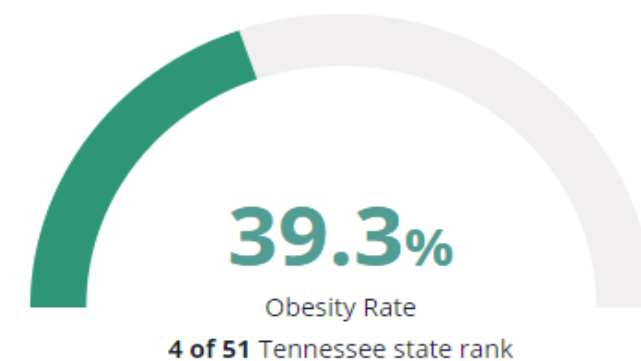
Adults



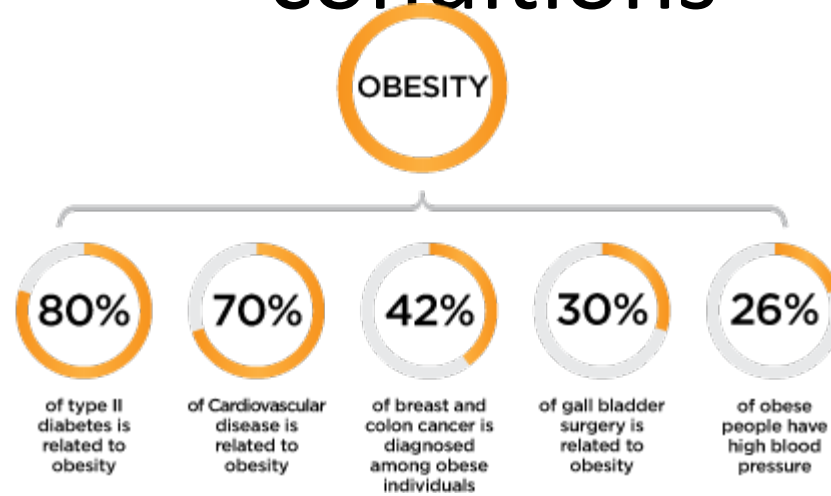
Adults with Diabetes



Adults with Hypertension



Obesity is associated with common chronic conditions

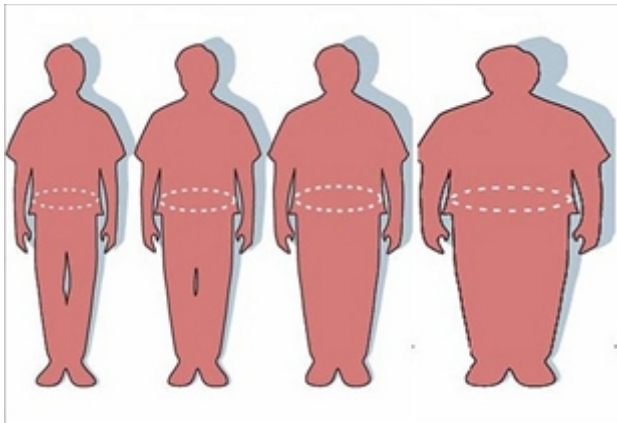


Biological contributions

Behavioral contributions

Socio-cultural contributions

Environmental contributions



Timing of Exposures and Duration of Exposure

Childhood Obesity as a Chronic Disease

- Obese children and adolescents are about 5 x more likely to be obese in adulthood than those who were not obese
 - 55% of obese children stay obese as adolescents
 - 80% of obese adolescents stay obese as adults
 - 70% will remain obese over age 30

Impact of Childhood Obesity: Healthcare Costs

- Health: **Childhood obesity** is estimated to cost \$14 billion annually in direct health expenses. **In adults** the costs are between \$147-210 billion/year. If the current prevalence continues, the cost will rise to between \$861-957 billion by 2030.
- **In 2014 in TN, additional health care costs for obesity was \$2.49 billion dollars**
- If adult obesity rates could decrease from 40% to 2009's average of 27%, \$500 million in healthcare costs/year could be saved.

Impact of Childhood Obesity: Economic Costs

- Obesity-related job absenteeism cost \$4.3 billion annually
- Employees who are obese miss more work from short-term absences and long-term disability than employees who are non-obese
- Employers pay higher life insurance premiums and pay out more for worker's compensation for employees who are obese than those who are not.

Impact of Childhood Obesity: National Security



Nearly **1 in 4** young adults are too heavy to serve in our military

Overweight/Obesity among active duty service members has risen 73% between 2011-2015.

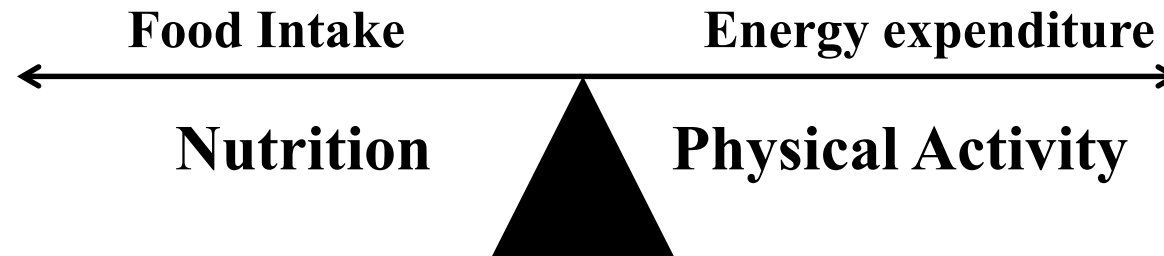
Unfit to serve: Obesity is Impacting National Security.

Why is this so hard?

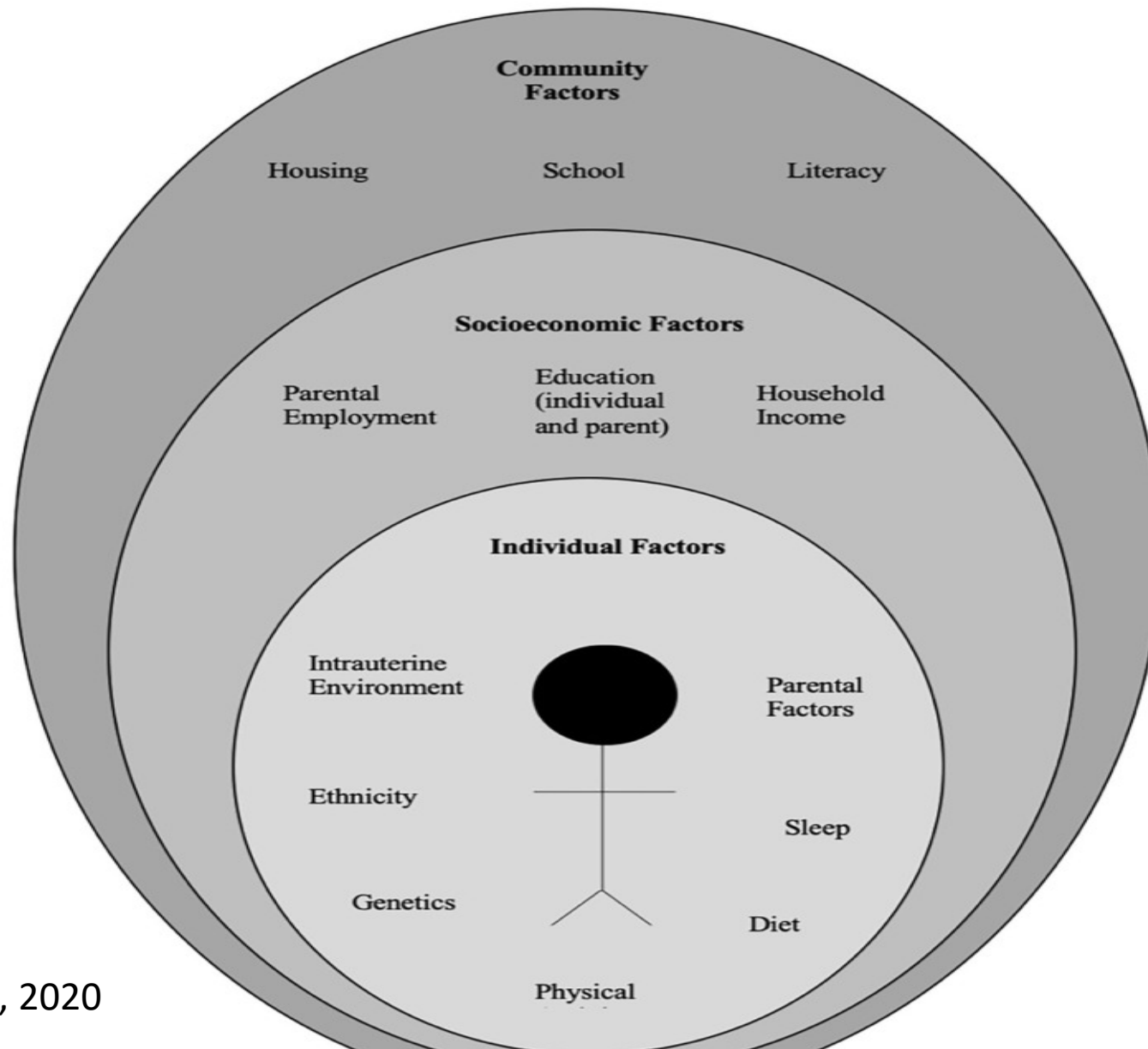
Ultraprocessed foods are cheaper and taste good; High calories, low nutrients



Up to 80% of children don't get the recommended amount of PA



1 in 6-8 children in TN don't know where their next meal is coming from



Lifecourse Approach to Understanding and Intervening upon Pediatric Obesity

Pregnancy

Infancy and
Toddlerhood

Preschool

Elementary

Adolescence



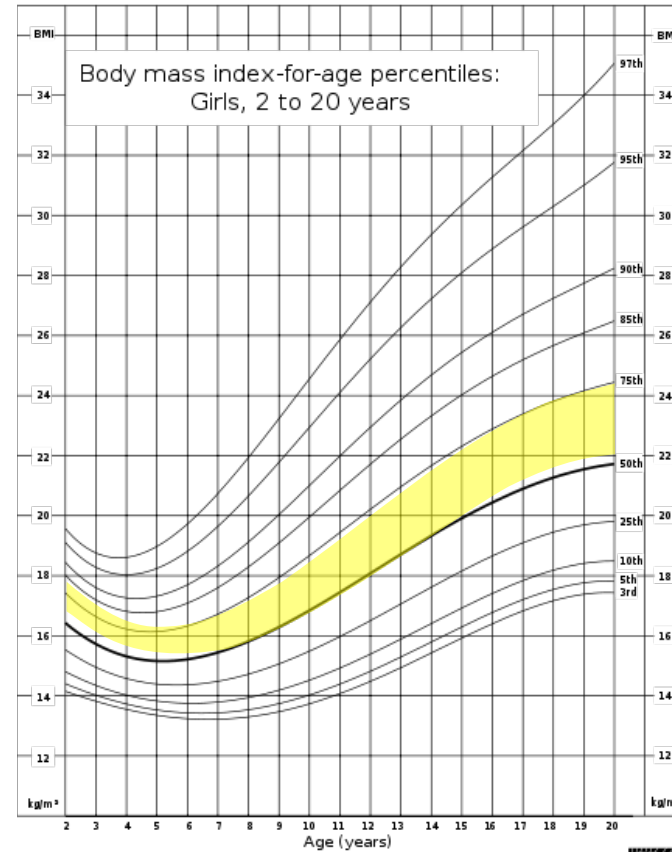
Pregnancy (1)



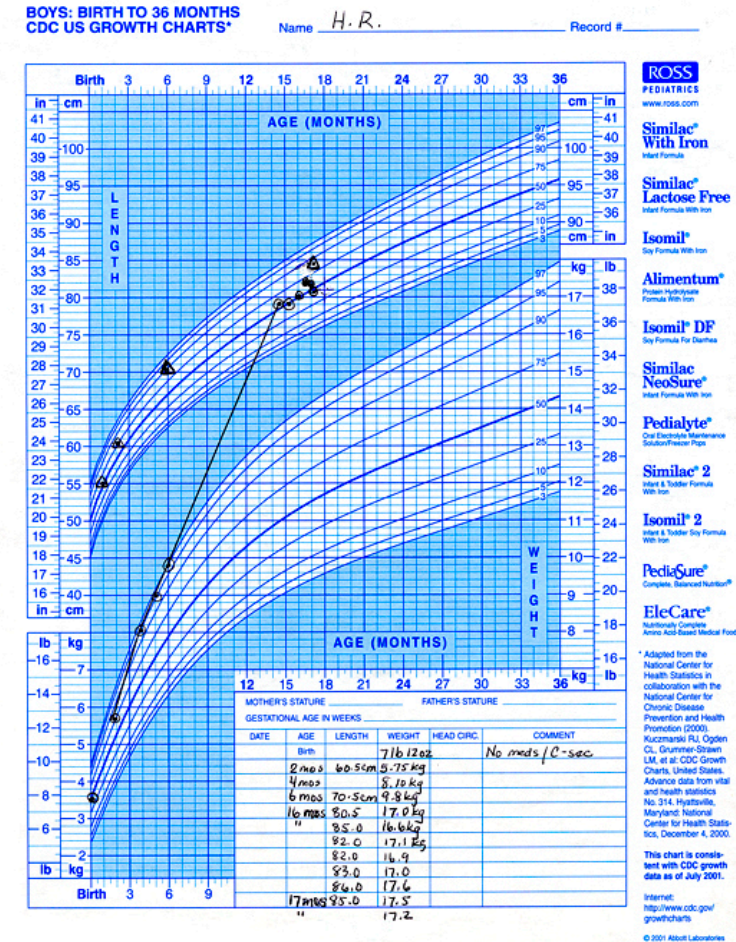


Infancy and Toddlerhood (2)

Which baby is more at risk for obesity and later Type 2 Diabetes?



Published May 20, 2000.
SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).
SAFER • HEALTHIER • PEOPLE



Rapid weight gain without concomitant growth in height during **the first three months of infancy** is linked with reduced insulin sensitivity in early adulthood, ages 18-24 years.

Leunissen RW, Kerkhof GF, Stijnen T, Hokken-Koelega A. Timing and tempo of first-year rapid growth in relation to cardiovascular and metabolic risk profile in early adulthood. *JAMA*. Jun 3 2009;301(21):2234-2242.

Associations
with rapid
weight gain
in the first 2
years of life
and later
obesity

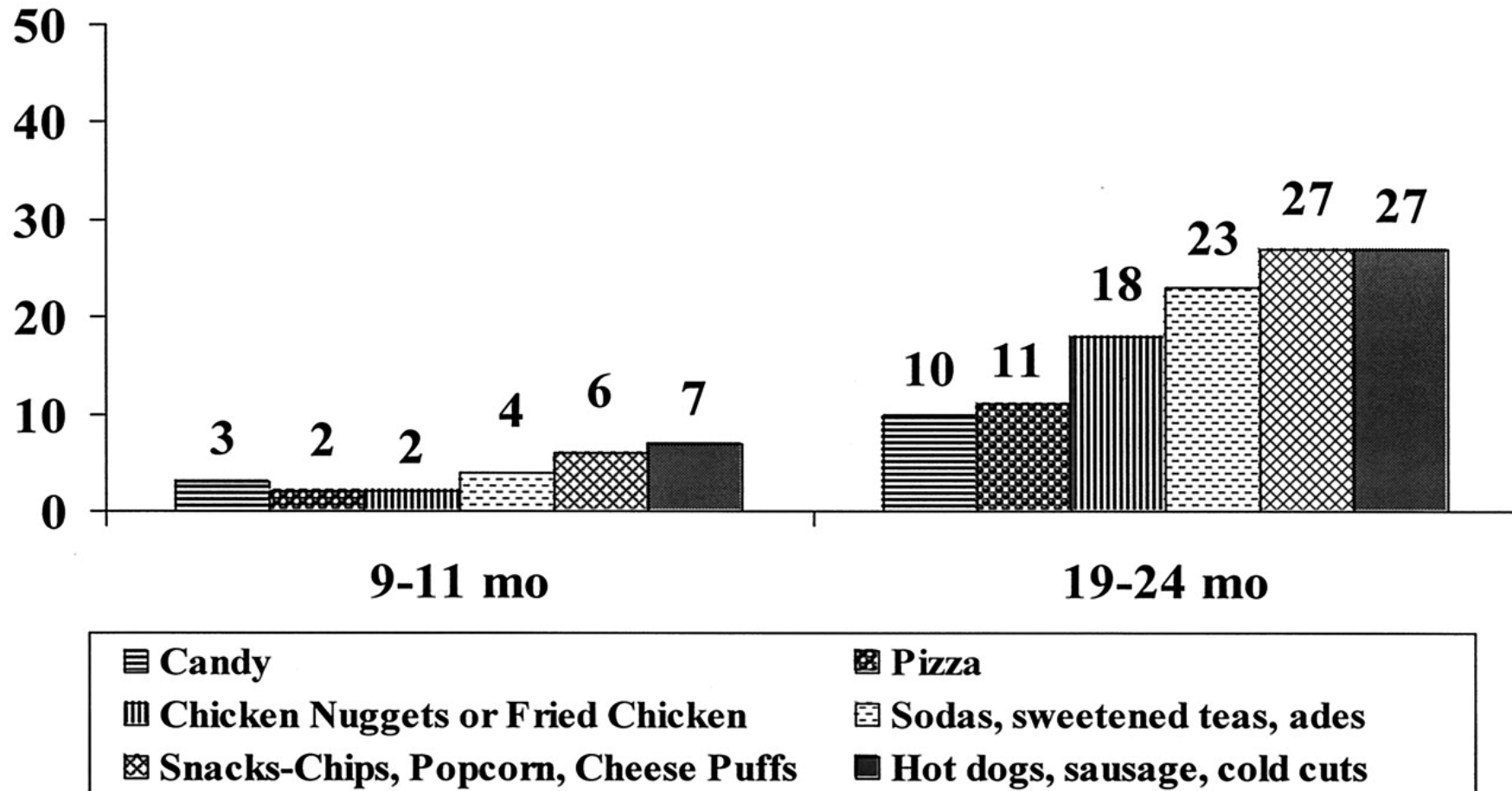
- Rapid infant growth in the first 24 months has an increased odds of obesity at
 - Age 5 (OR: 2.08, 95% CI: 1.84-2.34)
 - Age 10 (OR: 1.75, 95% CI: 1.53-2.00)
- These associations were the highest if 2 or more centiles were crossed by 6 months of life.

Taveras, 2011. Archives of Pediatrics and Adolescent Medicine.

Nutrition

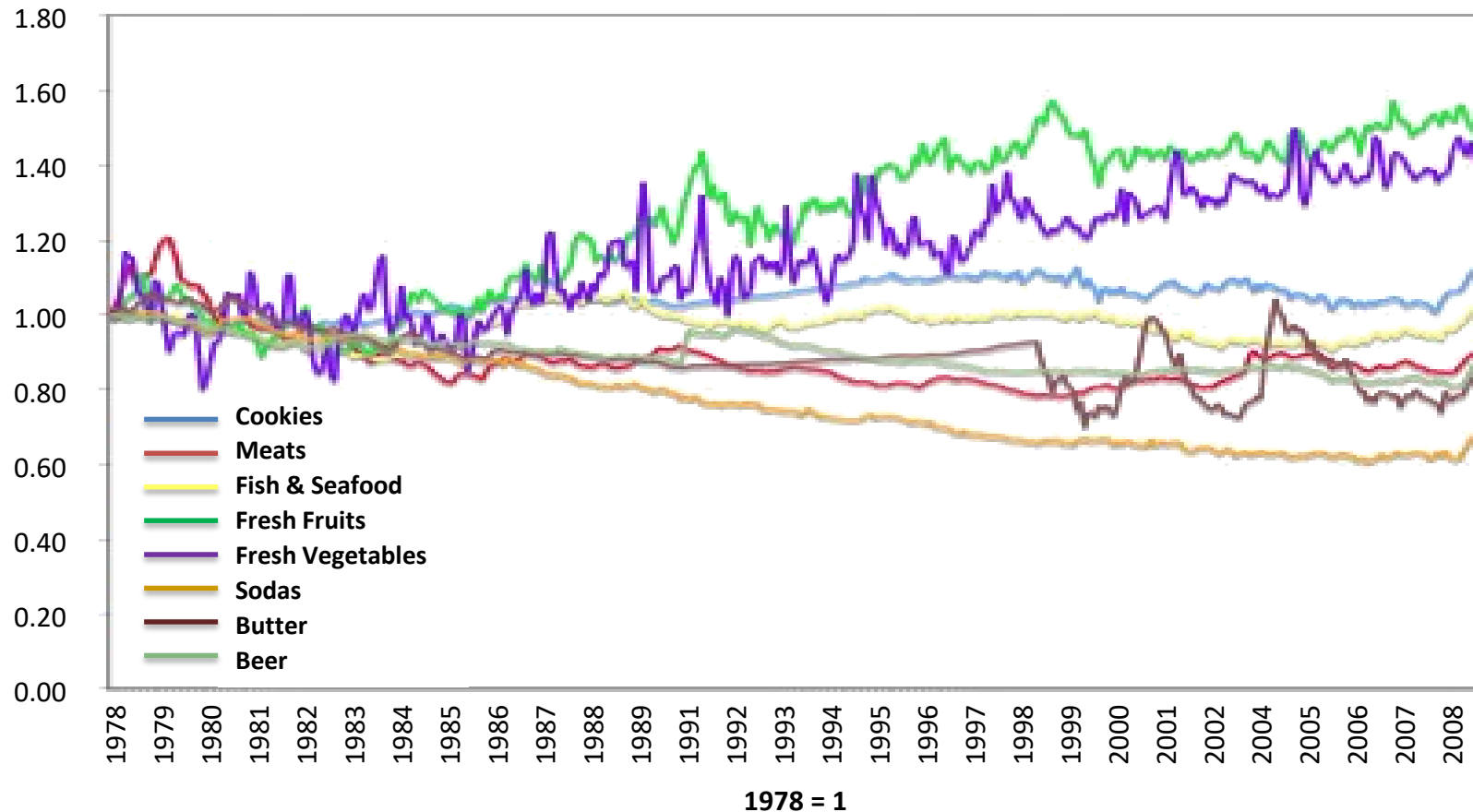
Common Diet in Early Childhood in the US

Percentage of infants consuming low nutrient/energy dense foods at least once per day.



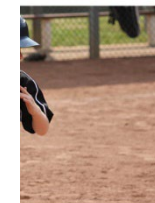
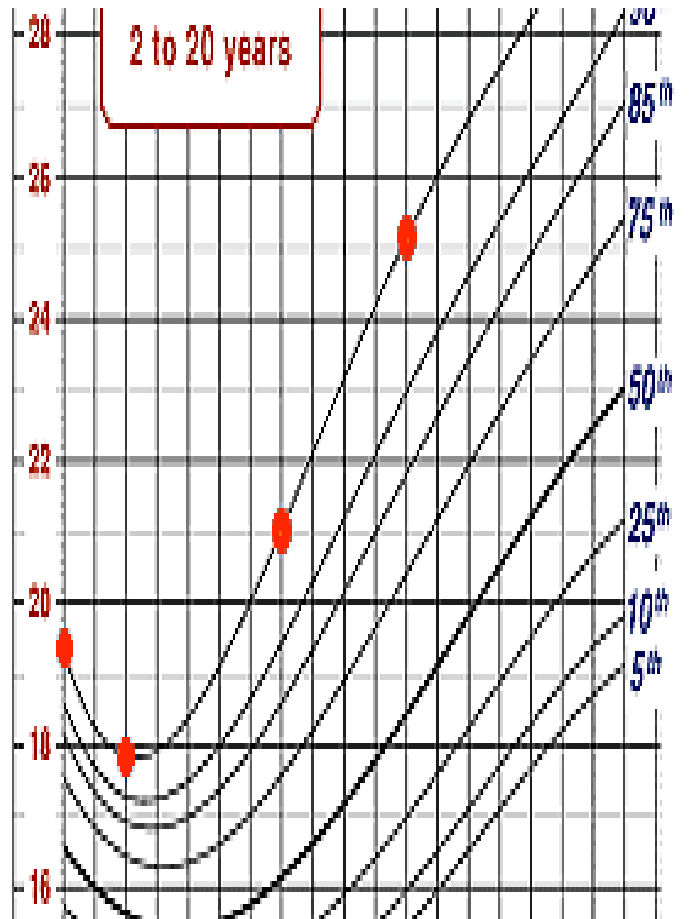
Nutrition

Prices of *Foods* and *Beverages*, Inflation adjusted
(taxes included)



Source: BLS, via Haver

Preschool (3)



Children who have physically active parents are 6 times more likely to be physically active. Physical activity improves insulin sensitivity and reduces blood pressure.

Physical Environment associated with Physical Activity

- Less Physical Activity
 - Fewer free physical activity resources, such as parks and playgrounds
- More Physical Activity
 - Access to physical activity resources such as neighborhood trails
 - Proximity of exercise facilities to one's home

Estabrooks PA, Lee RE, Gyurcsik NC. Resources for physical activity participation: does availability and accessibility differ by neighborhood socioeconomic status?

Sallis JF, Hovell MF, Hofstetter CR, et al. Distance between homes and exercise facilities related to frequency of exercise among San Diego residents. *Public Health Rep.*

Local Impact: Paradigm Shifts and Policies



Preschool age children need 60-90 minutes of moderate-to-vigorous physical activity/day

Paradigm Shift: Family Programming in Metro Nashville Parks and Recreation



Parents need at least 30 minutes/day



School Age |

Early Overweight/Obesity Clinical Intervention

- Screening and intensive behavioral interventions for obesity in children >6 years can lead to improved weight status.
- Intensive behavioral interventions with a total of 26 hours delivered over 2-12 months results in weight loss.
- Multiple components required: counseling on diet, increasing physical activity, reducing sedentary behavior, and addressing behavior change.



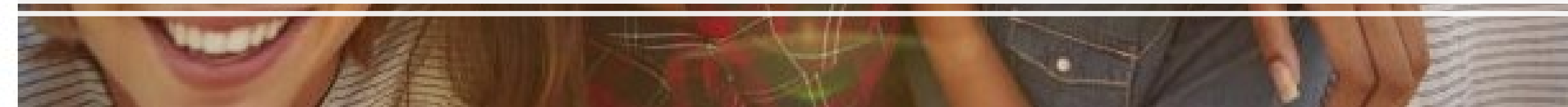
Behavior is Shaped by Environment: Health in Context

- Built environment: Neighborhood and community made infrastructure and environmental context that affects our interaction with the environment.
 - Green Space
 - Sidewalks
 - Traffic Density and Speed
 - Crime





Adolescence



Overweight/Obesity in Late Adolescence Highly Correlated with Adult Heart Disease

- Overweight : 3 times as likely to develop heart disease in their 30s-40s
- Obese : 7 times as likely as likely to develop heart disease in their 30s-40s.

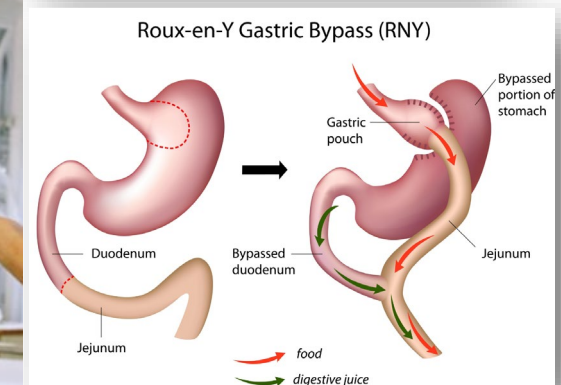
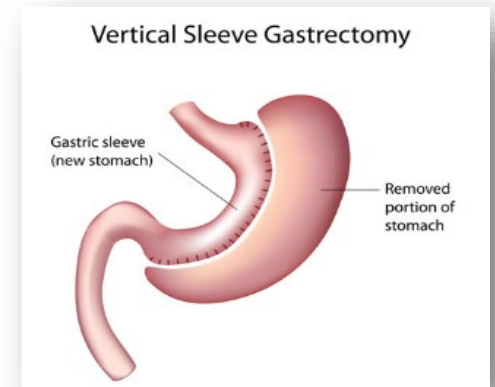
The Evidence: Bariatric Surgery for Adolescents with Severe Obesity

N= 242 at five US Centers, 13-19 years at the time of surgery

3 years later:

- mean weight decreased by 27%;
- remission of type 2 diabetes in 95%;
- remission of abnormal kidney function by 86%,
- remission of elevated blood pressure 74%,
- remission of dyslipidemia by 66%

Inge NEJM 2016



Bariatric Surgery for Severely Obese Adolescents

What is the optimal timing? Earlier is better to reduce associated chronic diseases and their effects. Disease remission higher.

Only successful long-term treatment option for adolescents with severe obesity

Risks exist: nutritional deficiencies (need to take multivitamins bid)

Levers for Change to Address Childhood Obesity



Developmental Age	Lever
Pregnancy	High quality, affordable, accessible food
Infancy and Toddlerhood	High quality, affordable accessible food
Preschool	Support parks and recreation programs and sites for accessible physical activity, built environment safety, High quality, affordable accessible food
School- age	Insurance coverage of clinical care for early obesity interventions; daily physical activity in school (at least 30min/day); school meal food quality
Adolescence	Insurance coverage of bariatric surgery, starting earlier depending on associated chronic conditions; school meal food quality; daily physical activity in school (at least 30 min/day).