

Pediatric Obesity

Diana Hu, MD

MCH Consultant: NAIHS

Diana Hu, MD FAAP

MCH consultant:NAIHS

Chief Clinical Consultant in Pediatrics:NAIHS

Staff Pediatrician

Tuba City Regional Health Care Corporation

Has worked in pediatrics on Navajo Area for
> 2 decades.



Learning Objectives

- Participants will understand new research on the contributing factors to the increase in childhood obesity over the last 20 years.
- Participants will be able to identify new treatment modalities.
- Participants will be able to identify new prevention strategies on national, tribal, and local levels.
- Participants will identify strategies that can be used in their own practice setting and communities.

Disclosure

- I have no financial affiliations to disclose as a conflict of interest regarding this presentation.
- I work for the government...

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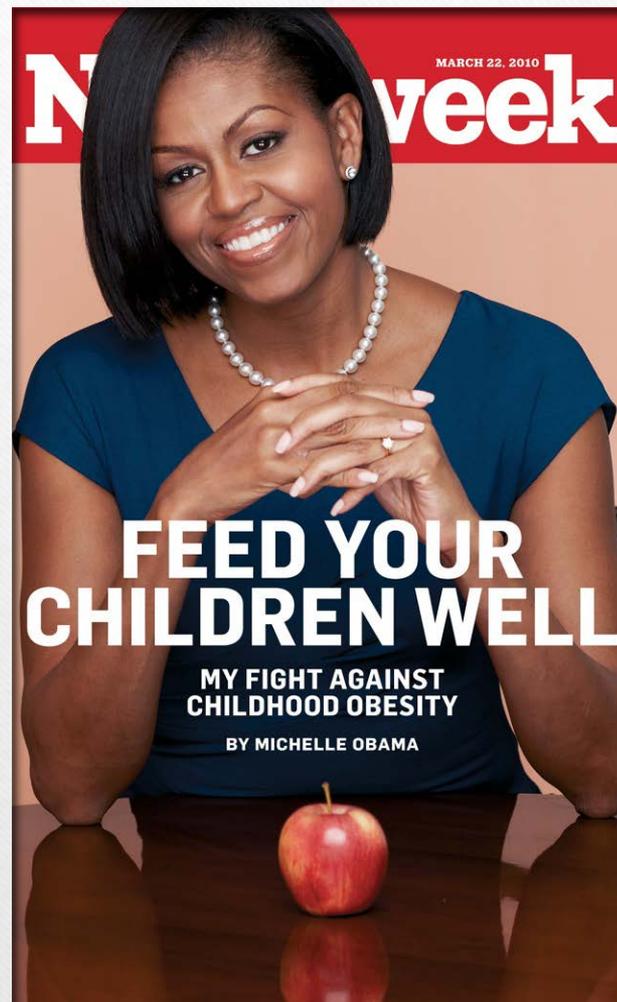
I have set a goal to solve the problem of childhood obesity within a generation so that children born today will reach adulthood with a healthy weight.

”

President Barack Obama in the Executive memorandum
establishing a Task Force on Childhood Obesity

Feb. 9, 2010

Michelle Obama's Efforts

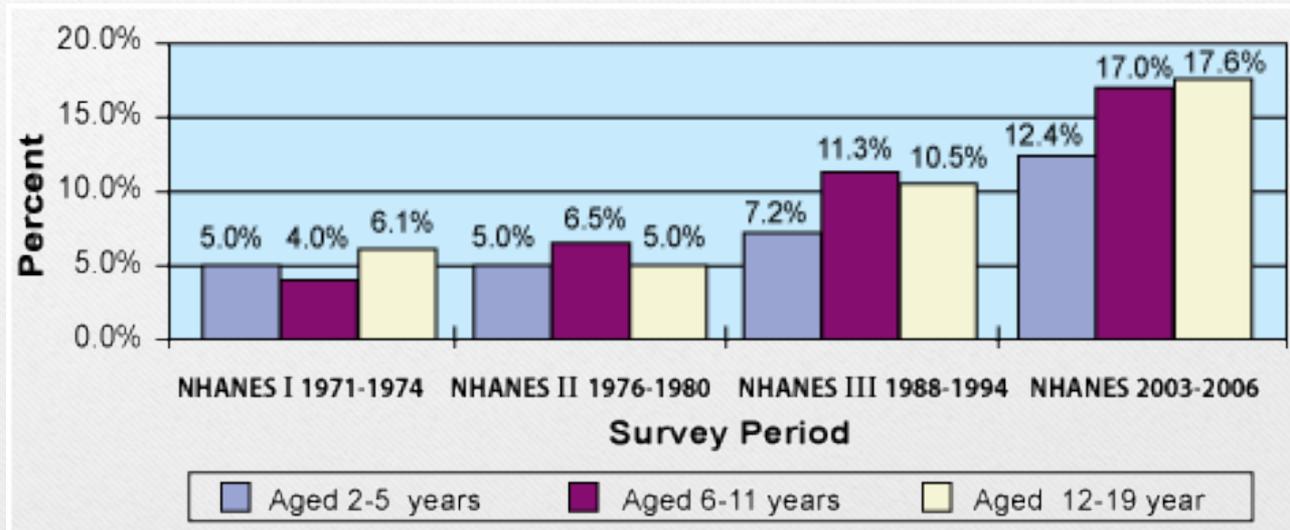


“Let’s Move!”

Definitions

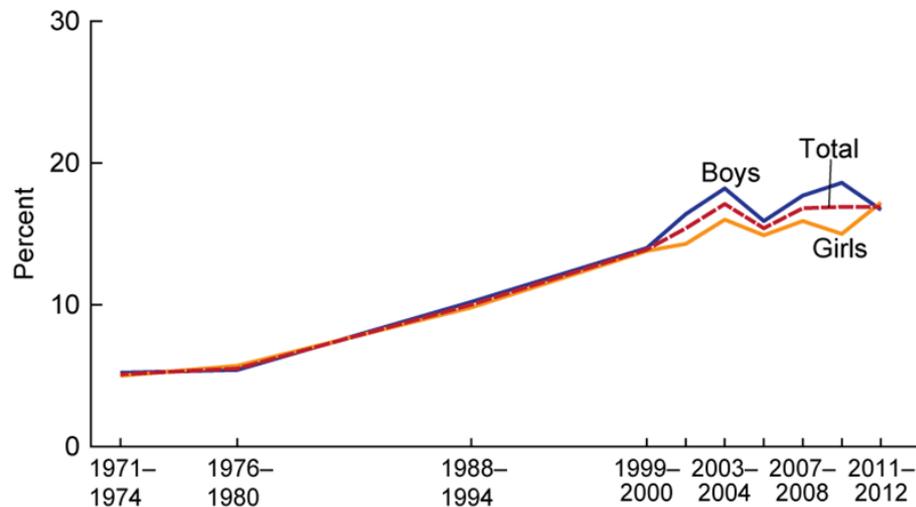
- BMI: Body Mass Index = $\text{weight}/(\text{height})(\text{height})$
- Adult Definitions:
 - Overweight: BMI 25-29.9
 - Obesity: BMI > 30
- Pediatric Definitions:
 - Obesity(Overweight): BMI for age > 95th percentile
 - Overweight/(At risk for overweight): BMI for age > 85th percentile

Prevalence of Obesity in 2 to 19 year-olds, NHANES data



Trends

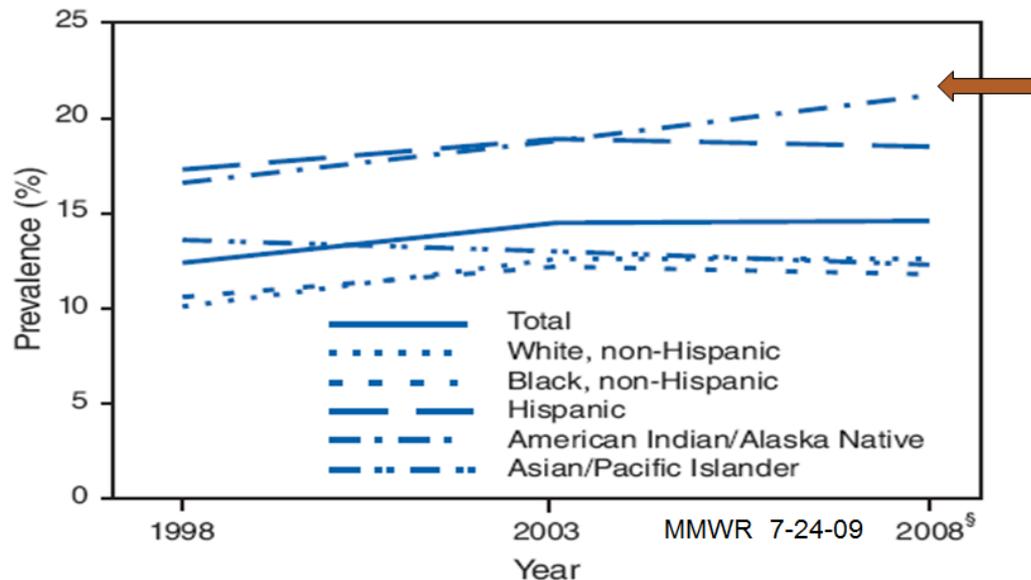
Figure. Trends in obesity among children and adolescents aged 2–19 years, by sex: United States, selected years 1971–1974 through 2011–2012



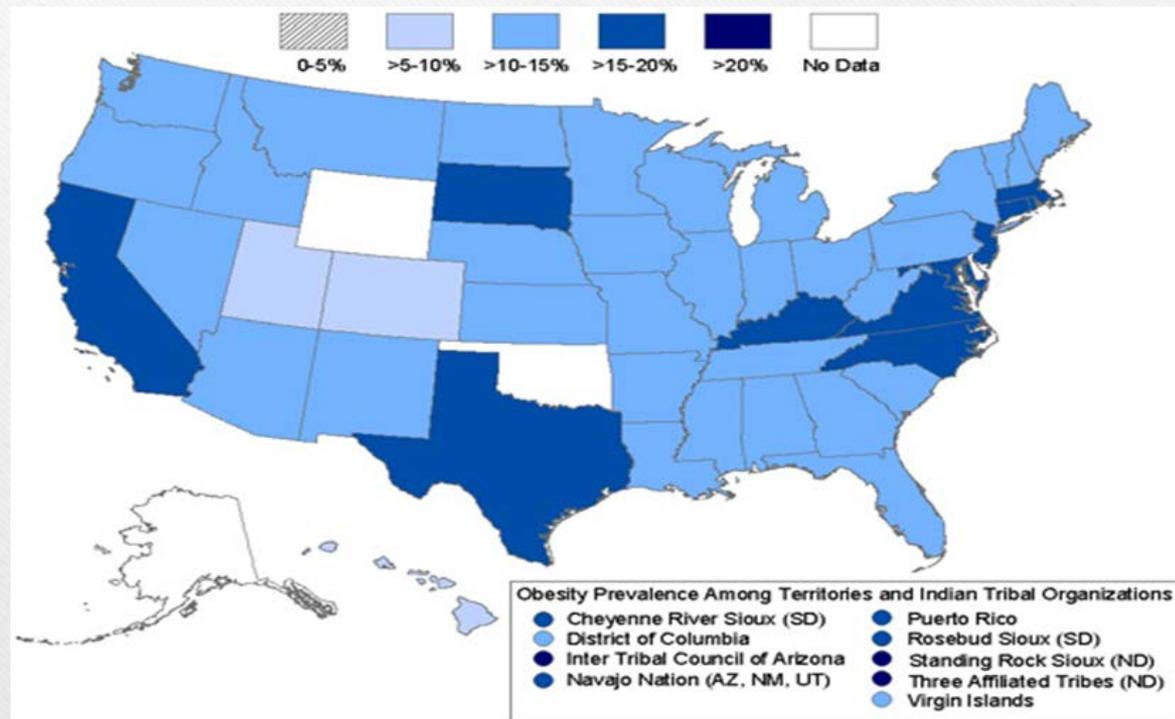
NOTE: Obesity is body mass index greater than or equal to the sex- and age-specific 95th percentile from the 2000 CDC Growth Charts.
SOURCE: CDC/NCHS, National Health and Nutrition Examination Surveys 1971–1974; 1976–1980; 1988–1994; 1999–2000, 2001–2002, 2003–2004, 2005–2006, 2007–2008, 2009–2010, and 2011–2012

Change in Obesity Prevalence

Change in obesity* prevalence during 1998--2003 and 2003--2008 among children aged 2--4 years, by race/ethnicity -- Pediatric Nutrition Surveillance System, United States, 1998-2008



2009 State Prevalence Among Low-Income Children Aged 2 to 4 Years



Medical Complications of Overweight in Childhood

- Type 2 DM/IGT
- Obstructive Sleep Apnea
- Obesity Hypoventilation Syndrome
- Hypertension
- Hyperlipidemia
- Hepatic Steatosis
- Cholelithiasis
- Early Menarche
- PCOS
- SCFE
- Osteoarthritis of the knee
- Asthma

Psychosocial Complications of Overweight in Childhood

- Depression
- Diminished Self Esteem
- Diminished Body Image
- Stigmatization/Victimization
- Lower Socioeconomic Status

Obesity in Childhood

- What is predictive of overweight in children?
- What correlates with eventual overweight in adulthood?
- Parental weight vs. child's weight.

Who has the Highest Risk of being Overweight/Obese as an Adult?

- Infants: LGA or SGA, IDM
- Toddlers: born to obese parents
- Children: by age 5, BMI > 95th percentile
- Children born in poverty, food insecurity
 - Parents with lower educational attainment
 - Casino openings and reduction in obesity
- Native American children?

What do we Know Contributes to Pediatric Overweight? (1)

- Genetics: specific cloned mutations
 - Leptin
 - Leptin receptors
 - Melanocortin receptor 4
 - Proopiomelanocortin: red hair, adrenal insufficiency, obesity
 - Alpha melanocyte stimulating hormone

What do we Know Contributes to Pediatric Overweight? (2)

- Genetics: family characteristics:
 - Predictor of adult overweight at age 3: parental BMI – 3 times higher risk at all ages if parent is overweight
 - Predictor of adult overweight at age 5: child's BMI
 - Twin studies:
 - Similar response to diet manipulations
 - Similar BMI even when raised in separate environments

Early Infancy Determinants of Obesity

- Breast feeding vs. bottle feeding
- Maternal diabetes
- SGA vs. LGA
- Epigenetics?
 - Chronic stress/Adverse Childhood experiences?

SGA (IUGR) and LGA

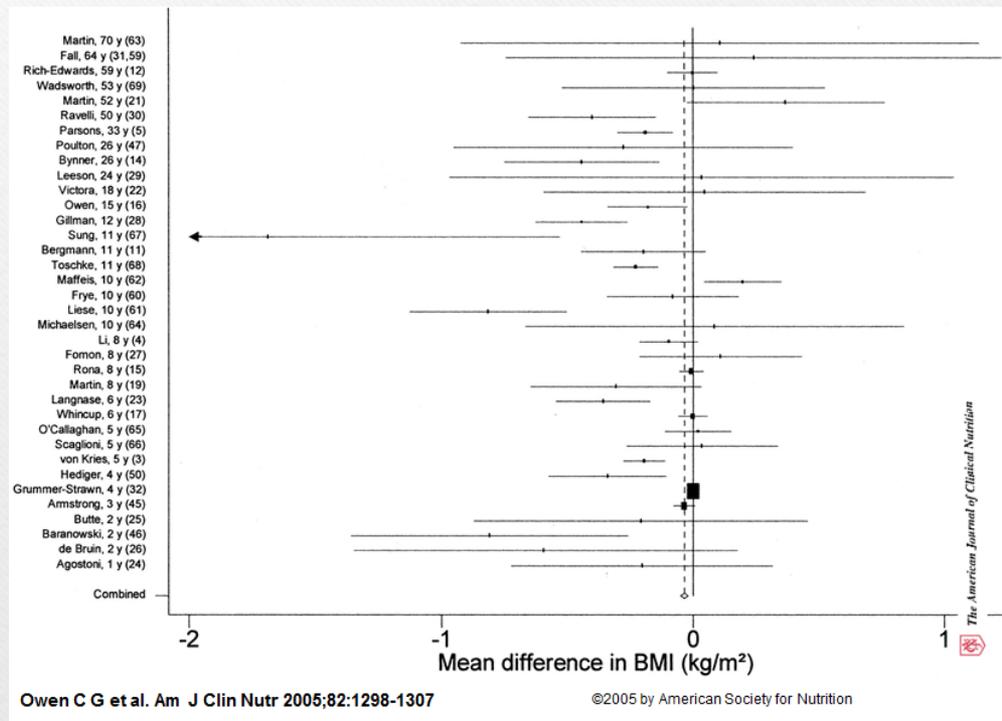
- SGA infants: may be associated with rapid catch up growth in infancy and increased fat mass carried throughout life?
- LGA infants: in utero over nutrition and persistent increased fat mass (Risk increases with presence of maternal DM).
- Diabetic environment: epigenetics or overnutrition?
 - Confounding factor: maternal/parental BMI.

Breastfeeding and Obesity

Breastfeeding and Obesity (1)

- Learned Behaviors:
 - Innate satiety vs. Overfeeding to meet a goal.
 - Breast milk flavor variety increases likelihood of acceptance of a variety of foods later in life.
- Physiology:
 - Leptin responsiveness.
 - Increased adipocytes in response to increased protein load in formula.
 - Increased plasma insulin in formula fed infants.
- Confounding Variables: maternal lifestyle.

Breastfeeding and Obesity (2)



Breastfeeding and Obesity (3)

- Positive effect of breast feeding on BMI was:
 - Decreased by 50% when controlled for maternal BMI (18 studies).
 - Decreased to null when controlled for subject age, maternal BMI, maternal smoking (10 studies), and maternal SES (28 studies).

(Subset of 11 studies where information on all 3 available)

Relationship between Breastfeeding and Obesity

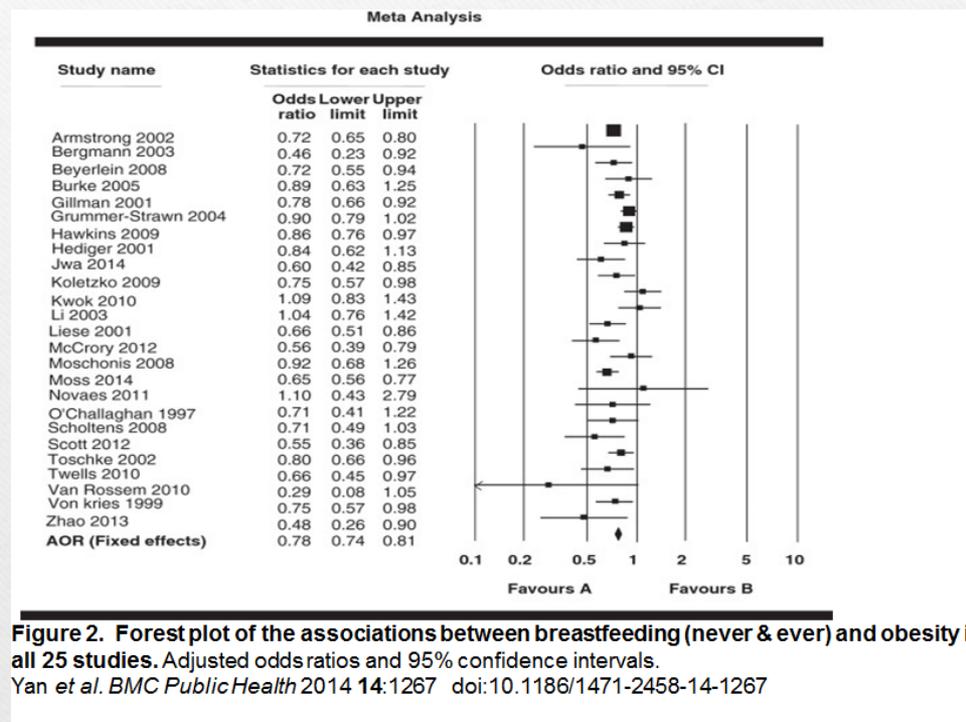
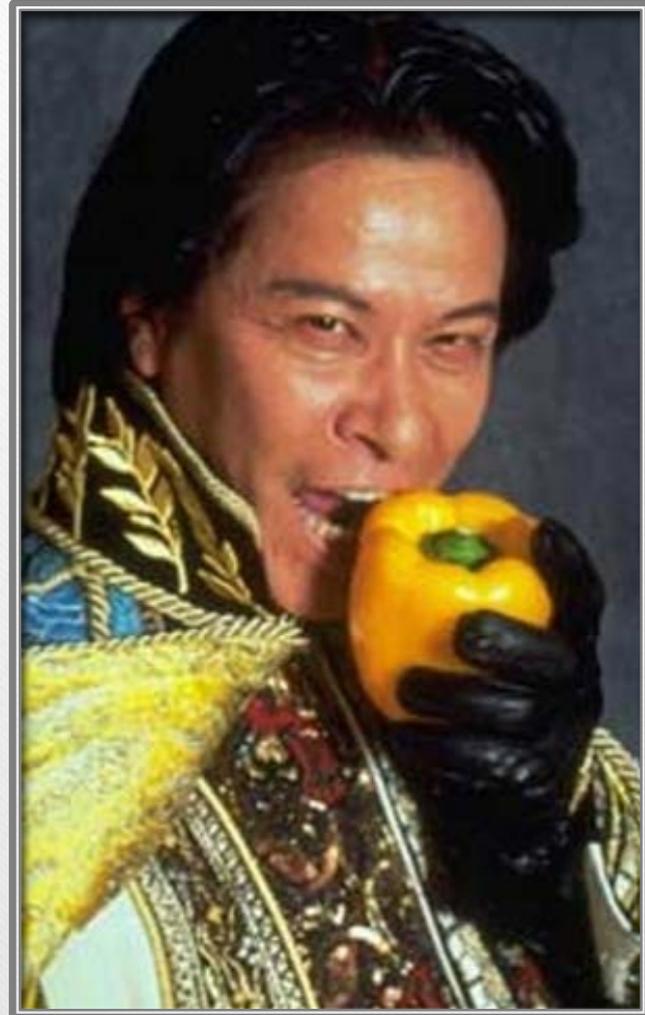


Figure 2. Forest plot of the associations between breastfeeding (never & ever) and obesity in all 25 studies. Adjusted odds ratios and 95% confidence intervals.
 Yan *et al. BMC Public Health* 2014 **14**:1267 doi:10.1186/1471-2458-14-1267

“Tell me what you eat –
I will tell you who you are.”

J.A. Brillat-Savarin,
French Gastronomer
(motto of the Iron Chef)



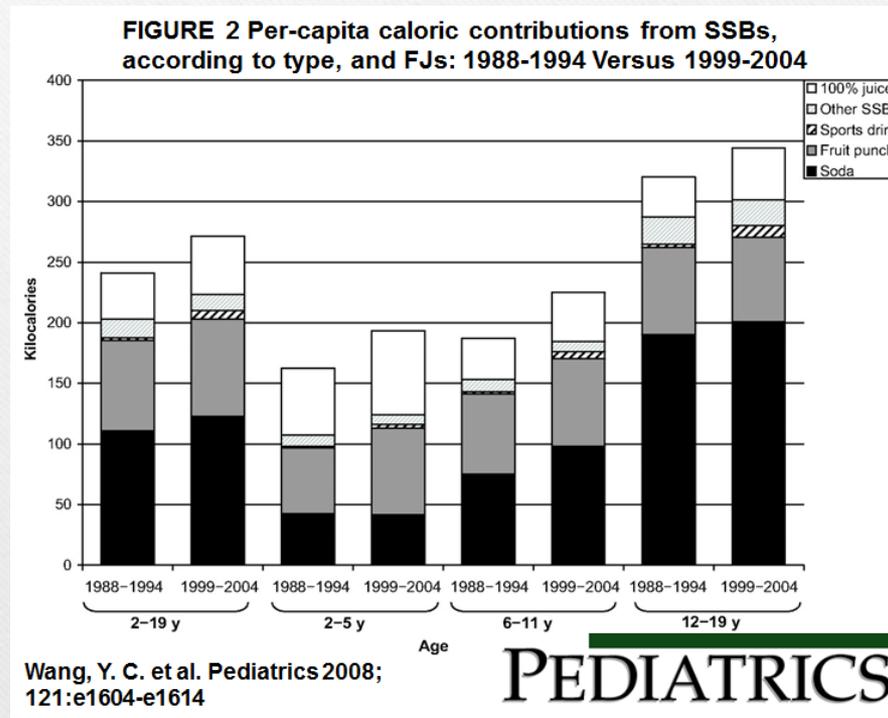
What do we Think Contributes to Pediatric Overweight?

- Dietary Issues:
 - Increased Sweetened Beverage Consumption.
 - Increased Caloric Density of Foods.
 - Fast foods and meals purchased outside the home tend to be more energy dense, have larger portions, and are often consumed with sugar sweetened beverages.
 - Food Availability/Food Insecurity.

Other Possible Contributors

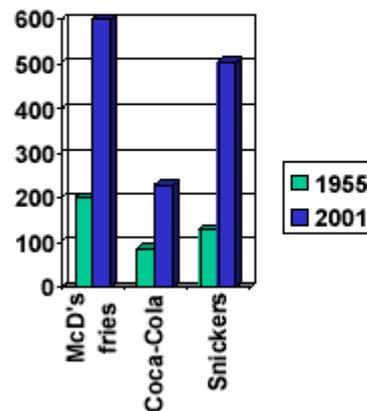
- Changes in the Food Composition:
 - Increased portion size
 - High fructose corn syrup
 - Antibiotic exposure:
 - In the food chain:
 - Use in livestock as growth stimulant.
 - Intrapartum or early infancy exposure.
 - Effect on gut microbiome?

Caloric Contributions



Increasing Portion Sizes

Portion Sizes Are Increasing
Calorie changes of single serving foods
(1955 to 2001)



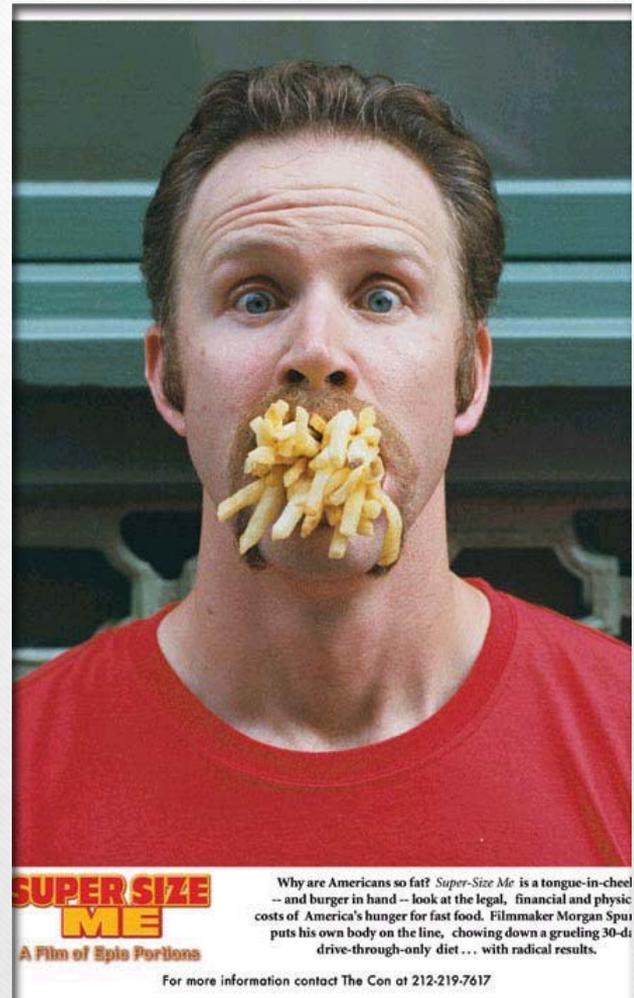
- McDonalds Fries
 - from 2.3 to 6.9 oz
 - 200 to 610 calories
- Coca-Cola
 - from 6.5 oz to 20 oz
 - 86 to 230 calories
- Snickers
 - from 1.1 oz to 3.7 oz
 - 130 to 505 calories
- from 416 to 1,345 calories

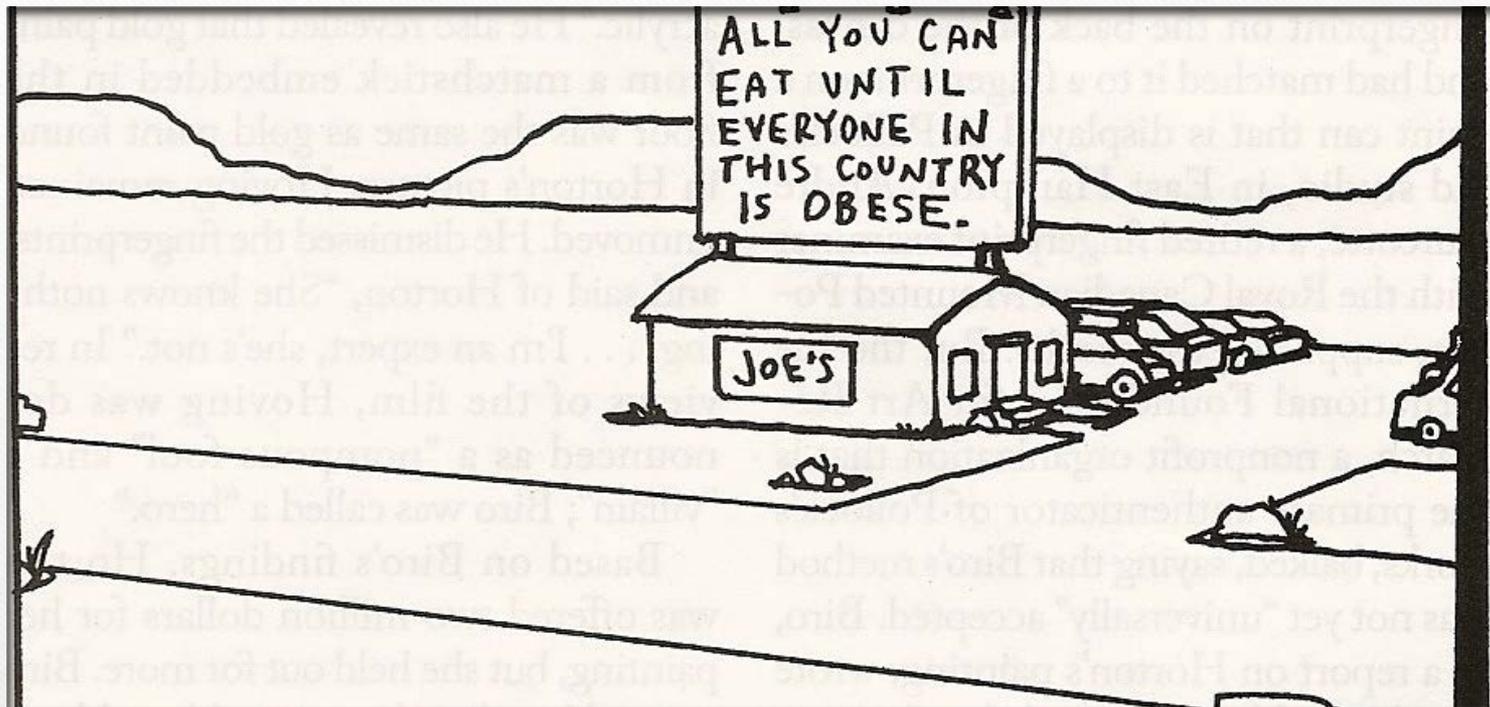
Nutrition Action Healthletter 2001

Portion Size

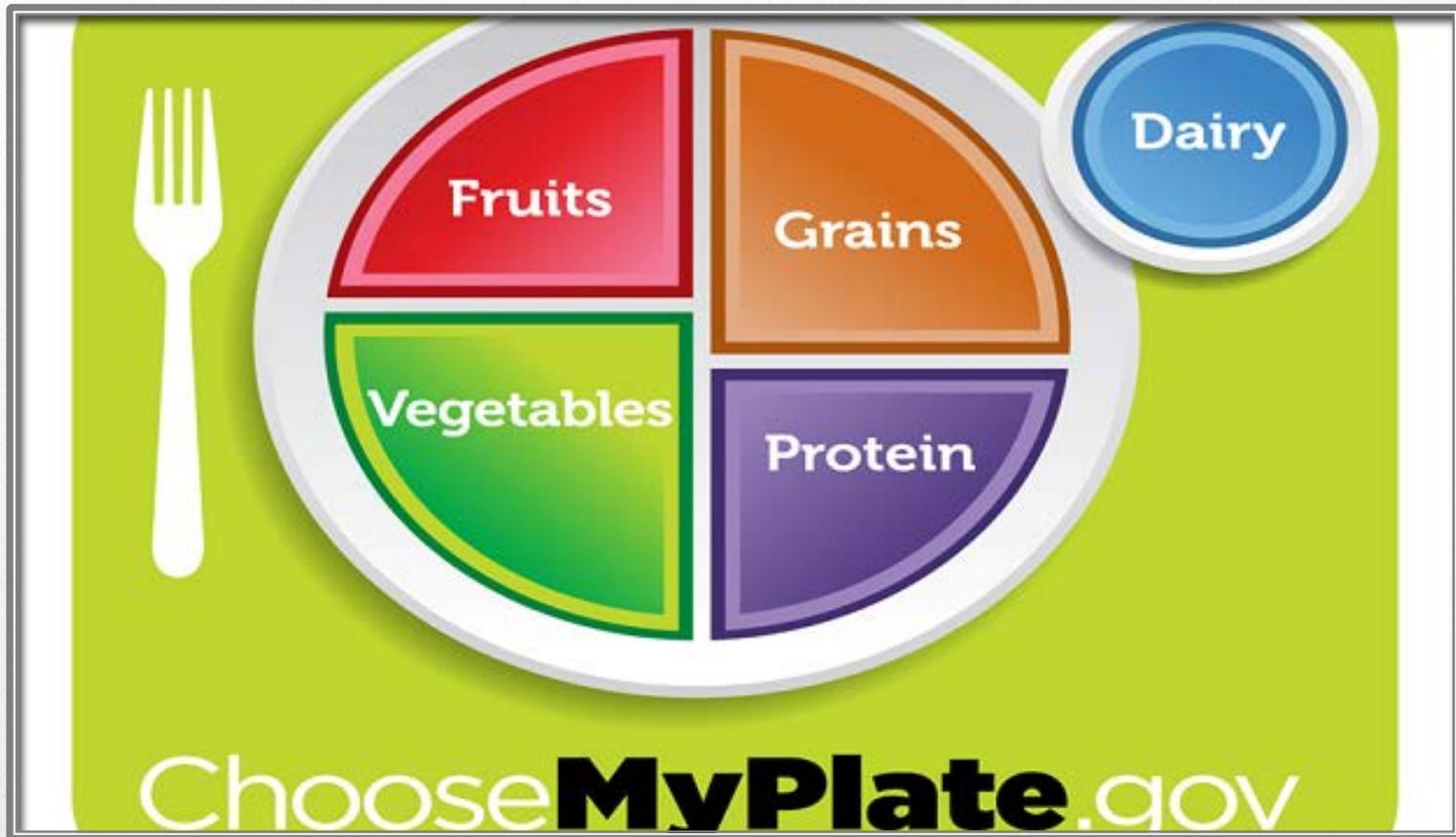
- Super Sizing:
 - Learned behavior to eat it all.
 - Economics of fast food.
 - Food Insecurity:
 - Overly restrictive feeding behaviors by parents increases overeating between meals.

Super Size





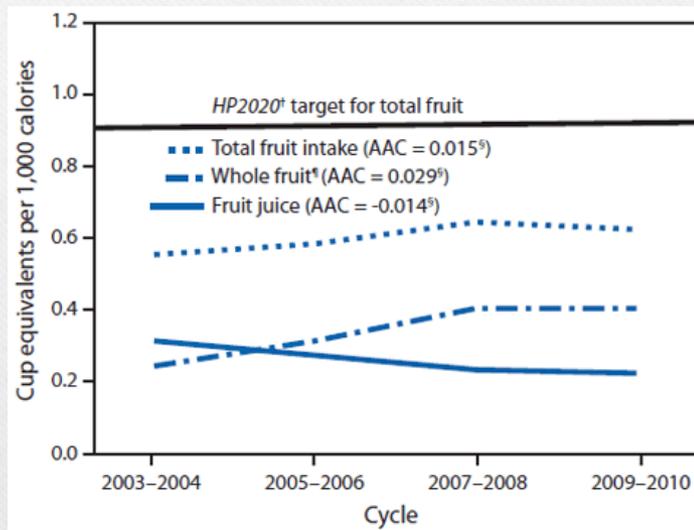
All You Can Eat



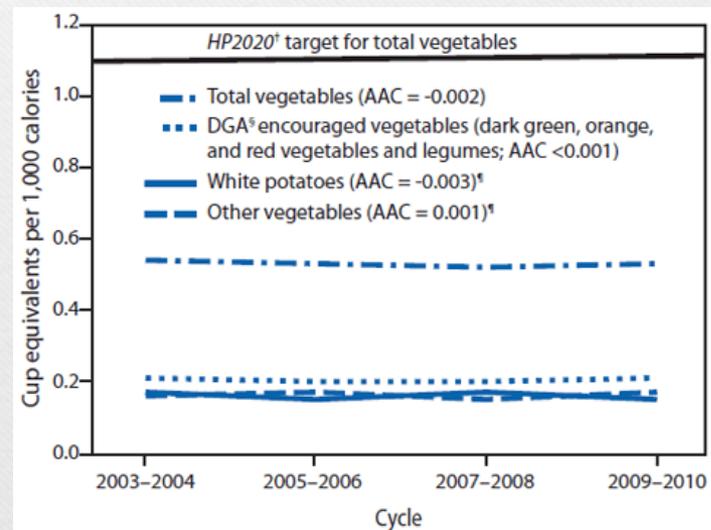
My Plate

Daily Intake of Fruit and Vegetables

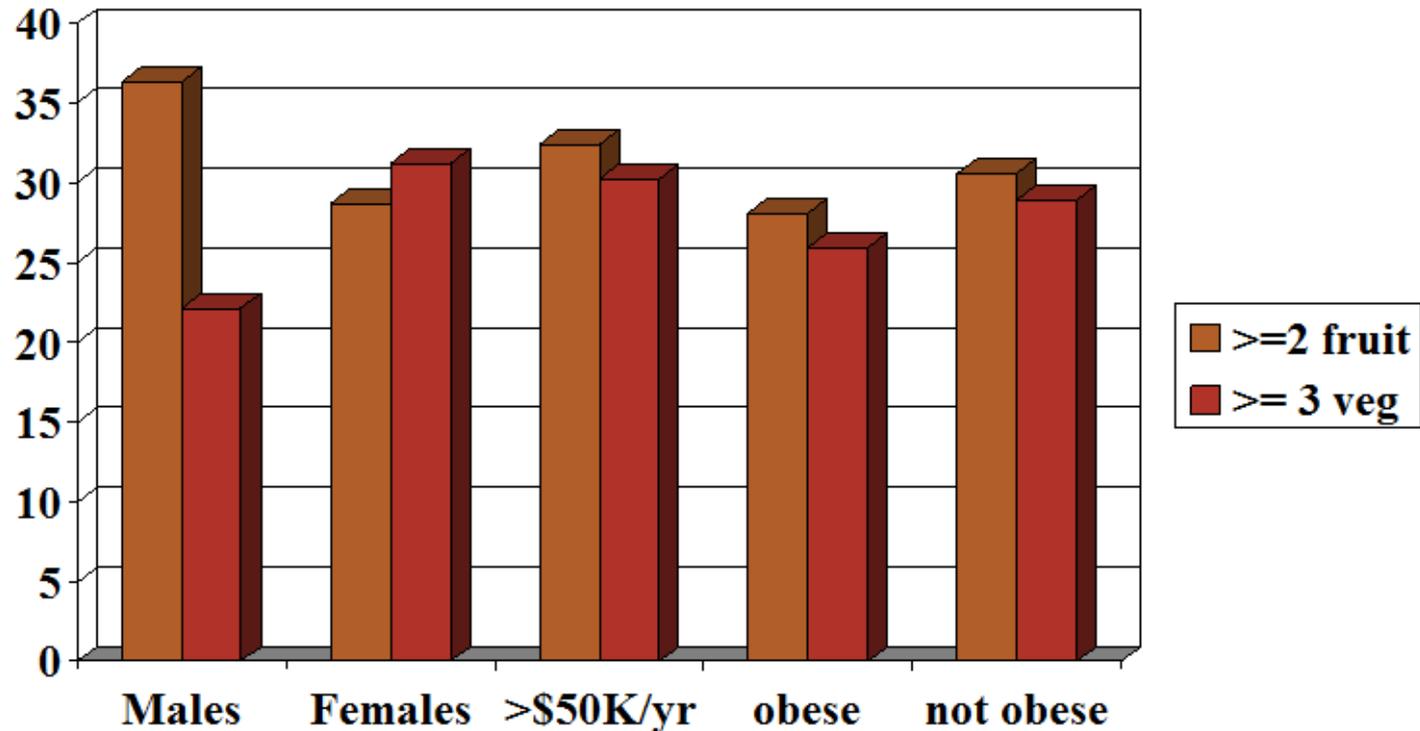
Mean daily intake of fruit in cup-equivalents per 1,000 calories among children aged 2–18 years — National Health and Nutrition Examination Survey, United States, 2003 to 2010*



Mean daily intake of vegetables in cup-equivalents per 1,000 calories among children aged 2–18 years — National Health and Nutrition Examination Survey, United States, 2003 to 2010*



Fruits and Vegetables US Adult Consumption - 2005



HP 2010 goal- 75% ≥ 2 fruit/d, 50% ≥ 3 veg/d

MMWR 56: (10) 213-215 March 16,2007

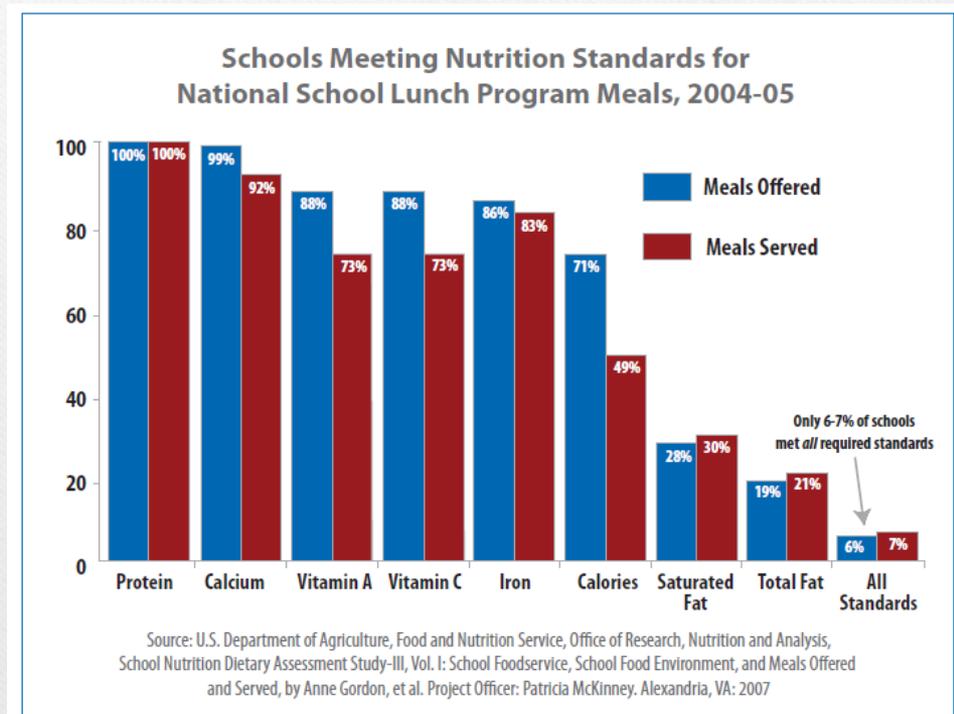
Is it More Expensive to Eat Healthy?

- Seven studies listed addressing this issue:
 - Varying methodology, recall issues
- Conflicting results:
 - Consideration of cost per calorie versus nutritional value of food purchased
 - Cochrane review: **SUBSIDIES** or reduced pricing of fruits and vegetables increases purchasing/consumption:
 - Especially in at risk populations: low income, obese

Role of School Based Nutrition Programs

- Children with lower SES and higher risk of food insecurity are more likely to receive two out of three meals per day through a school based nutrition program:
 - Economics
 - Use of commodity foods/USDA supplied foods:
 - Non perishable /pre-prepared foods
 - Food acceptance by students

Schools Meeting Nutrition Standards



School Lunch Programs

- 2010 Healthy Hunger Free Kids act.
- Improved standards for school lunch and breakfast programs:
 - Multiple studies looking at fruit and vegetable selection, consumption, and overall food waste in different age groups.
 - Increased fruit selection.
 - No change in vegetable selection:
 - Increased vegetable consumption.

“

Eat food. Not too much. Mostly
plants.

”

- Michael Pollen, “In Defense of Food”

What do we Know Contributes to Pediatric Overweight? (3)

- Physical Activity:
 - More sedentary activity:
 - Television
 - At meals, in the bedroom
 - Other screen activities
 - Less physical activity:
 - PE in schools
 - Non school activity:
 - Recreation versus competition
 - Access and safety
 - Transportation

Television and Obesity

- More than 5 hours of screen time statistically associated with 4.6 times increased risk of overweight (1990 data).
- Presence of TV in bedroom associated with increased risk in teens and preschoolers.
- Increased screen time associated with higher caloric density food choices, increased snacking:
 - TV during meals associated with increased calorie consumption.

Physical Activity



Sedentary vs. Active

Sedentary	kcal	Active	kcal
Recline for 30 min of phone calls	4	Stand for 3 10-min phone calls	20
Wait 30 min for pizza delivery	15	Cook for 30 min	25
Buy presliced vegetables	0	Wash, slice, chop vegetables 15 min	10-13
Let dog out the back door	2	Walk dog for 30 min	125
Let cashier unload shopping cart	2	Unload full shopping cart	6
Shop online 1 h	30	Shopping mall, walk 1 h	145-240
Sit and listening to lecture 1 h	30	Give lecture	70
Use car wash 1x/mo	18	Wash and waxing car, 1 h/mo	300
Take elevator up 3 flights	0.3	Walk up 3 flights	15
Use a lawn service	0	Garden and mow 30 min/wk	360

“

If it was easy, everyone would
be doing it!

”

- Tom Hanks as Jimmy Dugan, team manager,
to Geena Davis as Dottie Hinson

“A League of Their Own”

Treatment of Childhood Obesity

- Identify who is affected;
- Lifestyle interventions:
 - Primary care: behavioral motivational interviewing.
 - Tertiary care: obesity treatment programs.
- Drugs.
- Bariatric surgery.

Treatment of Childhood Obesity (cont.)

- Identify children who are overweight:
 - Use of BMI curves.
 - Dynamic vs. static situation.
- Teachable moments:
 - Motivational interviewing.

Behavioral Motivational Interviewing

- Motivation scale.
- Readiness for change.
- Brief interventional technique.

Motivational Interviewing

- Are you concerned about your weight?
- How willing are you to make a change?
 - What would it take to make you more motivated (increase in number scale)?
- What are you willing to change?
- Set achievable goals (e.g., 5-2-1-0).
- If they aren't interested, **JUST WALK AWAY!**
 - Resist the temptation to fire a parting shot....
 - But emphasize your concern, readdress another visit.

Bariatric Surgery

- More effective than any of the other programs:
 - Gold standard is 50-60% of excess weight lost.
- Data on kids does not exist but has been used in teens.
- BMI > 50 or BMI > 40 with comorbidity.
- Tanner 4 or 5.
- Failure of at least 6 months of intensive diet and exercise management.

Bariatric Surgery (cont.)

- Multiple Techniques
 - Roux en Y anastomoses with gastric stapling: malabsorption and restriction
 - Laparoscopic gastric banding: restriction
 - Newer techniques: removable space occupying devices in the stomach.
- Safety
- Cost: many insurance companies don't cover

“

An ounce of prevention is
worth a pound of cure.

”

- Benjamin Franklin

Strategies

- Need to attack the myths:
 - Healthy food tastes bad or costs more.
 - Exercise is work.
 - Teens and children don't have to worry about being unhealthy until they grow up.
- Make a campaign that involves youth in the planning.
- Use media to promote:
 - Social media.

Irony?



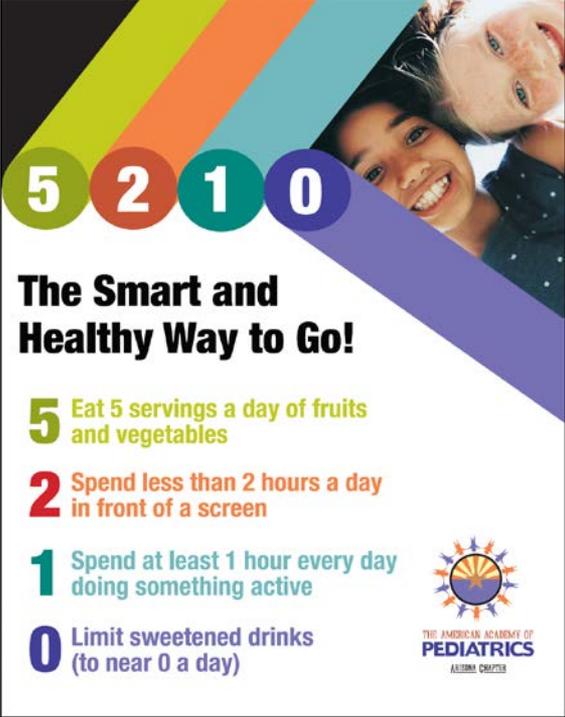
Advocacy

- Individual level:
 - Your patient.
 - Your family and friends.
- Community Level:
 - School.
 - Workplace:
 - Your hospital or clinic.
 - Community programs.
- State or National Level.

Individuals vs. Societal Change

- Clinical intervention with patient/clients:
 - Limited range of impact.
 - Potential High impact on individual.
- Group intervention (esp. with weight loss; like DPP program).
- Environmental changes:
 - Recreation/exercise venues:
 - Safety.
 - Accessibility.
 - Food deserts.
 - Schools.

5 – 2 – 1 – 0



5 2 1 0

The Smart and Healthy Way to Go!

- 5** Eat 5 servings a day of fruits and vegetables
- 2** Spend less than 2 hours a day in front of a screen
- 1** Spend at least 1 hour every day doing something active
- 0** Limit sweetened drinks (to near 0 a day)

THE AMERICAN ACADEMY OF PEDIATRICS
ACADEMY CHAPTER

Prescription for Healthy Living

- Health care providers are an important influence on the choices patients make.
- Health care providers may be the only ones willing to address this issue directly.
- Gives the patient a clear directive of what to do.

Rx for Healthy Active Living

R_x for Healthy Active Living

Name _____ Date _____

Ideas for Living a Healthy Active Life

- 5** Eat at least 5 fruits and vegetables every day.
- 2** Limit screen time (for example, TV, video games, computer) to 2 hours or less per day.
- 1** Get 1 hour or more of physical activity every day.
- 0** Drink fewer sugar-sweetened drinks. Try water and low-fat milk instead.

My Goals (choose one you would like to work on first)

- | | |
|---|--|
| <input type="checkbox"/> Eat _____ fruits and vegetables each day. | <input type="checkbox"/> Get _____ minutes of physical activity each day. |
| <input type="checkbox"/> Reduce screen time to _____ minutes per day. | <input type="checkbox"/> Reduce number of sugared drinks to _____ per day. |

Patient or Parent/Guardian signature

Doctor signature

From Your Doctor

American Academy of Pediatrics
DEDICATED TO THE HEALTH OF ALL CHILDREN™



FVR_x – Fruit and Vegetable RX

- Pilot programs for low income families:
 - Food deserts.
- Providers write “prescriptions” for fruit and vegetable consumption:
 - “Healthy Bucks” or subsidized prices at farmer’s markets or other local grocers.
- Win-win:
 - Increased fruit and veg consumption.
 - Increased purchasing for small volume farmers.
- Does this create sustainable behavior change?

Environmental Interventions (1)

- School environment:
 - School nutrition:
 - Food service:
 - Salad bars, ethnic foods.
 - Pouring contracts/vending machines.
 - Parties/fund raisers.
 - Nutrition education in science courses.
 - Increase MVPA in school setting.
 - Schools as venues for MVPA after hours.

Environmental Interventions (2)

- Community Environment:
 - Physical activity promotion.
 - Create opportunities.
 - Create venues.
 - Support for healthy food sources:
 - Farmer's markets.
 - Community gardens.
 - Alternative "fast food."
 - Food displays in stores (choice architecture).
 - Eliminate "food deserts."

Healthy Food Sources



Healthy Food Sources (cont.)



Increased Activity



Increased Activity (cont.)



Environmental Interventions (3)

- National Environment:
 - Changes in WIC program.
 - Changes in commodities program.
 - Changes in food stamp program: not!
 - School nutrition regulations: SB 12,965 Calif.
 - School activity bill: SB 19 Texas.
 - Soda/snack tax: Calif.

Navajo Nation Legislation

- Healthy Dine' Nation Act of 2014:
 - 2% additional sales tax on foods with “minimal or no nutritional value” and sweetened beverages.
 - Elimination of 5% sales tax on healthy foods: fresh fruits and vegetables, seeds, nuts, nut butters, and water.
 - Dine' Community Advocacy Alliance.
 - Dine' Food Sovereignty Coalition.
 - NAIHS Special diabetes program.

Task Force Report on Childhood Obesity



SOLVING THE PROBLEM OF CHILDHOOD OBESITY WITHIN A GENERATION

White House Task Force on Childhood Obesity
Report to the President

MAY 2010



Task Force Report

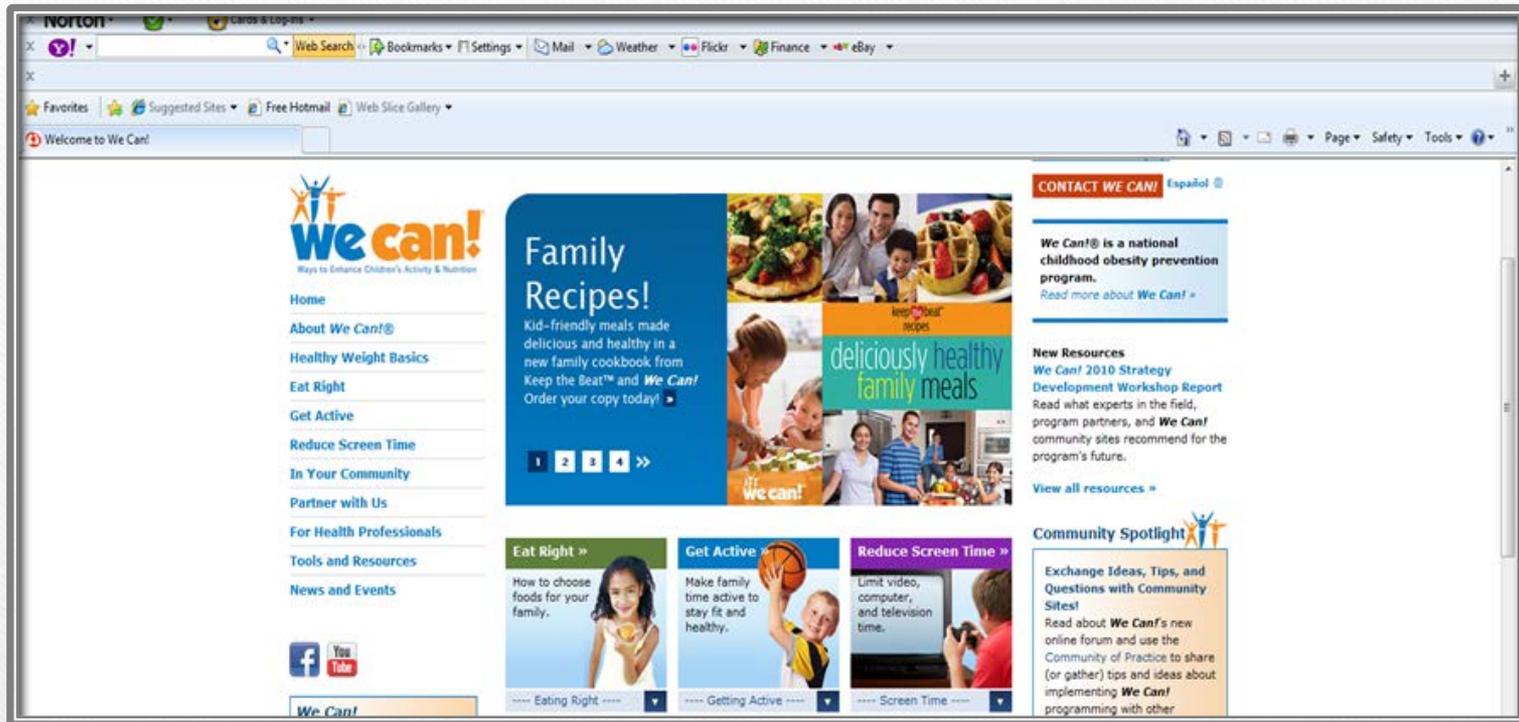
- 70 recommendations for change in 5 target areas:
 - Early childhood
 - Empowering parents and caregivers
 - School nutrition
 - Access to healthy and affordable food
 - Increasing physical activity
- 17 recommendations for school nutrition programs.
- 17 recommendations for school and community physical activity programs.

Four Goals of the Obama Program

- Ensuring access to healthy, affordable food.
- Increasing physical activity in schools and communities.
- Providing healthier food in schools.
- Empowering parents with information and tools to make good choices for themselves and their families.

Let's Move Website

The screenshot shows the homepage of the Let's Move website. At the top left is the logo "LET'S MOVE" with a red silhouette of a person jumping, and the tagline "America's Move to Raise a Healthier Generation of Kids". To the right are navigation links: HOME, BLOG, ABOUT LET'S MOVE, and SIGN UP FOR EMAIL UPDATES. Below these is a search bar with the text "Search LetsMove.gov" and a "GO" button. A central navigation bar contains five colored buttons: "Learn the Facts" (orange), "Eat Healthy" (green), "Get Active" (purple), "Take Action" (teal), and "Join Us" (red). Below the navigation bar is a breadcrumb trail: Home • Learn the Facts • The Epidemic of Childhood Obesity. The main content area features a large image of children in yellow shirts looking at a bowl of food, with the text "Learn the Facts" overlaid. To the left of this image is a sidebar with a red apple icon and links: "The Epidemic of Childhood Obesity", "Getting Started: What is Obesity?", and "Health Problems & Childhood Obesity". To the right of the main image are three smaller boxes: "WHAT'S NEW" with a "GET E-MAIL UPDATES" link, "White House Task Force on Childhood Obesity" with a "Report to the President" link and "VIEW REPORT" button, and "Healthy Food IN SCHOOLS" with a "SIGN UP" link. At the bottom of the main content area is the text "Learn the Facts" and a quote: "The physical and emotional health of an entire generation and the economic".



We Can! Website

What Can We Do?

- Measure the BMI:
 - Tell the family and child what the BMI is, and graph at every well child visit.
- Reinforce the 5-2-1-0 prevention message in all venues.
- Use motivational interviewing:
 - Readiness to change.
- Identify resources for families:
 - In your practice, on line, at your referral sites, in your community.

Advocacy (cont.)

- Develop nutritional guidelines for families of low income:
 - Identify food sources in communities that are food deserts.
- Engage hospital, school, and community partners to develop programs for healthy living:
 - Be a resource inside and outside of your workplace:
 - Engage colleagues to make internal change:
 - Breastfeeding support in the workplace, vending machines, hospital activities.
 - Educate policy makers.
 - Walk the talk!

Results

