Building the Foundations of Child Health: Addressing the Triple Nutritional Threat of Obesity, Food Insecurity and Hunger

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Foundations of child health

- **Sound, appropriate nutrition**
  - Health-promoting food intake beginning with mother's pre-conception nutritional status

- **Stable, responsive, and nurturing relationships**
  - Provide young children positive interactions with adults that enhance development

- **Safe, supportive physical, chemical, and built environments**
  - Children need safe environments to support active, safe exploration
Foundations of Child Health are Rooted in the Socioecological Model

- Community
  - Cultural/Religious
  - Safety
  - School physical activity
  - Advertising
  - Injury prevention
- Family
  - Media
  - Intrauterine Environment
  - Parenting
  - Parent education
  - Parental Health
  - Domestic Violence
  - SES
  - Gender
  - Age
  - Race
  - Genetics
  - Literacy
  - School Achievement
  - Recreational facilities
  - School
- Child
  - Nutrition
  - Parent Lifestyle
  - Early care
  - Access to medical/dental care
  - Access to healthy Nutrition
- Social Connections
  - School nutrition
  - Domestic Violence
  - SES
  - Early care
Children’s Nutritional Needs

“an adequate diet for children...one that contains an appropriate density of nutrients, is sufficiently diverse that it supplies adequate but not excessive amounts of nutrition, is palatable and culturally acceptable, affordable and available year round and overall supports normal growth and development.”

Double Burden

- Obesity and undernutrition have been seen as separate and sometime opposing entities.
- However these two conditions coexist globally, nationally and locally and even within families and individuals.
- The dual burden of under and overnutrition occurring simultaneously within a population is referred to as the double burden of malnutrition.

Obesity
Percent children with Obesity 2011

Map 1 of 3: Percentage of U.S. youth grades 9-12 who consumed fruit two or more times per day and vegetables three or more times per day, by state – Youth Risk Behavior Surveillance System, 2007

Percent of people aged 15 years and older who engaged in sports or exercise activities on an average day, by region, 2003-06

http://www.bls.gov/spotlight/2008/sports/
450 12oz soda/person in one year

140 kcal/soda = 63,000 kcal/year = 170 kcal/day = 16 lbs/year
Health Consequences of Childhood Obesity

Burden of non communicable disease

- Type 2 diabetes
- Hypertension
- Nonalcoholic fatty liver disease
- Dyslipidemia
- Upper Airway Obstruction
- Sleep Apnea Syndrome
- Blount’s Disease
- Polycystic ovary syndrome
- Obesity related emergencies
- Depression/anxiety
Adapted from K. K. Davison & L. L. Birch, *Obesity Reviews* 2001;2:159-171

Child risk factors (shown in upper case lettering) refer to child behaviors associated with the development of overweight. Characteristics of the child (shown in italic lettering) interact with child risk factors and contextual factors to influence the development of overweight (i.e. moderator variables). This review is organized around child risk factors and the influence of child family, and community characteristics is discussed for each child risk factor.
Food Insecurity
Food Insecurity

- Stomach aches
- Colds
- Frequent hospitalization
- Anemia
- Headaches
- Chronic conditions
- Anxiety
- Depression
- Difficulties in school

Child Food Insecurity Rates by State in 2011

Child food insecurity is widespread, with the highest rates appearing in the South and the West.

Source: Feeding America 2012.
Food Insecurity

- "the limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways."

- "Very low food security," the most severe level measured by the survey, is characterized by irregular meals and inadequate food intake, as determined by caregivers

  - U.S. Department of Agriculture
  http://www.childtrends.org/?indicators=food-insecurity#sthash.VXI2ws3z.dpuf
The Cost of Hunger

Annual cost burden of hunger in the US $167.5 billion.

Costs associated with charity, chronic illness, psychosocial dysfunction, diminished learning and economic productivity


Food Insecurity

- 21% U.S. children lived in households that were food-insecure at some point during 2013
- 1% experienced the most severe level of need, where food intake is reduced, regular eating patterns are disrupted

http://www.childtrends.org/?indicators=food-nsecurity#sthash.VXI2ws3z.dpuf
Food Insecurity in Households

Percentage of households reporting each indicator of food insecurity, by food security status, 2011

- Worried food would run out
- Food bought did not last
- Could not afford balanced meal
- Cut size of meal or skipped meal
- Cut or skipped meal in 3+ months
- Ate less than felt should
- Hungry but did not eat
- Lost weight
- Did not eat whole day
- Did not eat whole day, 3+ months

PERCENTAGE OF PEOPLE PER COUNTY WHO ARE FOOD INSECURE

FOOD INSECURITY EXISTS EVERYWHERE

CHILDREN ARE AT HIGHER RISK

FOOD INSECURITY RANGE

4% - Slope County, North Dakota
33% - Humphreys County, Mississippi
6% - Bowman County, North Dakota
41% - Zavala County, Texas
Figure 1

Percentage of Children (0-17) in Food-Insecure Households: Selected Years, 1995-2013

1Either adults or children or both were food insecure. At times they were unable to acquire adequate food for active, healthy living for all household members because they had insufficient money and other resources for food.

## Participation in Federal food programs

### Participation of food-insecure households in selected Federal food and nutrition assistance programs, 2011

<table>
<thead>
<tr>
<th>Program</th>
<th>Share of food-insecure households that participated in the program during the previous 30 days&lt;sup&gt;1,2&lt;/sup&gt;</th>
<th>Share of households with very low food security that participated in the program during the previous 30 days&lt;sup&gt;1,2&lt;/sup&gt;</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>SNAP&lt;sup&gt;3&lt;/sup&gt;</td>
<td>40.1</td>
<td>42.5</td>
<td></td>
</tr>
<tr>
<td>Free or reduced-price school lunch</td>
<td>32.2</td>
<td>26.5</td>
<td></td>
</tr>
<tr>
<td>WIC&lt;sup&gt;4&lt;/sup&gt;</td>
<td>11.2</td>
<td>8.6</td>
<td></td>
</tr>
<tr>
<td>Any of the three programs</td>
<td>57.2</td>
<td>56.0</td>
<td></td>
</tr>
<tr>
<td>None of the three programs</td>
<td>42.8</td>
<td>44.0</td>
<td></td>
</tr>
</tbody>
</table>

<sup>1</sup> Based on an analysis of data on food security using the U.S. Department of Agriculture’s (USDA) 2011-2013 American Community Survey Public Use Microdata Sample (ACS-PUMS).

<sup>2</sup> Based on posted data from the U.S. Department of Agriculture’s (USDA) Food and Nutrition Service (FNS). See notes for more details.

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Coleman-Jensen et al Household Food Security in the United States in 2011
Child Health and Food Insecurity

- Parent-reported poorer health and developmental risk
  - More frequent stomach aches, headaches, colds, hospitalizations, anemia and chronic conditions
  - More anxiety, depression, school difficulties
  - More difficulty with interpersonal skills, self control, attentiveness, flexibility and persistence
    - Howard LL. Does food insecurity at home affect non cognitive performance at school? A longitudinal analysis of elementary school classroom behavior. 2010 Economics of Education Review 20, 157-176
- Infants more likely to have insecure attachments and perform more poorly on cognitive assessments
  - Zaslow M et al. Food security during infancy; Implications for attachment and mental proficiency in toddlerhood. 2009 Maternal and Child Health Journal 13(1) 66-80
- Adolescents more likely to experience dysthymia and have suicidal ideation
Double Burden

- Obesity, under nutrition seen as separate, sometimes opposing entities
- These two conditions coexist globally, nationally, locally — even within families and individuals
- The dual burden of under and over nutrition occurring simultaneously within a population is referred to as the double burden of malnutrition

“Nutritional Landscape”

- Misaligned Food Supply
- Inadequate dietary access
- Poor dietary quality

- Undernutrition

- Nutritional risk

- Micronutrient Deficiencies

- Hunger/Food Insecurity

- Lack of Healthy Lifestyle Skills

- Obesity
Food Insecurity and Obesity

Today, however, the picture of food insecurity is increasingly an overweight or obese child consuming a poor-quality diet.

Highest rates of obesity are found in people with the lowest incomes.

Among poor populations, 7 times as many children have obesity as are underweight.


The challenge for low-income families in today's modern food environment is not obtaining enough food, but rather having dependable access to high-quality food.

An estimated 16.7 million youth younger than 18 years do not consistently know when, or how adequate, their next meal will be.

Coexistence of Food insecurity and obesity

Food insecure and low-income people are especially vulnerable to obesity due to the additional risk factors associated with poverty, including:

- Limited resources
- Lack of access to healthy, affordable foods
- Fewer opportunities for physical activity
- Cycles of food deprivation and overeating
- High levels of stress
- Greater exposure to marketing of obesity-promoting products
- Limited access to health care
Limited Resources and Lack of Access to Healthy Affordable Foods

- Lack of full service grocery stores and farmer’s markets
  - Reliance on corner/convenience stores
- Greater density of fast food
- Cost differential between healthy (nutrient dense) and unhealthy food (energy dense/nutrient poor)
- Poorer quality healthy food
  - Andreyeva T et al. Availability and prices of foods across neighborhoods The case of New Haven CN 2008 Health Affairs 27(5) 1381-1388
Fewer Opportunities for Physical Activity

- Fewer parks, green spaces, bike paths, and recreational facilities

- Crime, traffic and unsafe play spaces

- Expense and transportation to participate in sports

- Low income students spend less time being active in PE and have less recess
  - Barros R et al. School recess and group classroom behavior. 2009 Pediatrics 123(2) 431-436
Cycles of Food Deprivation and Overeating

- **Metabolic consequences of cycles of over and under consumption**
  - Alaimo K et al Low family income and food insufficiency in relation to overweight in U S Children is there a paradox? 2001 Arch Ped Adol Med 155(10) 1161-1167
  - Dietz W Does hunger cause obesity? Pediatric 95(5) 766-767

- **Maternal food restriction leading to obesity**
  - McIntyre L et al Do Low income mothers compromise their nutrition to feed their children? 2003 Canadian Med Assoc J 168. 686-691
High Levels of Stress

- Financial and emotional stress
  - Food insecurity, low wage work, difficulty paying bills, inadequate and long distance transportation, neighborhood violence

Greater Exposure to Obesity Promoting Products

- Fast food, sugary beverages, television shows, video games
  - Kumanyika S et al Targeting interventions for low income and ethnic populations 2006 Future of Children 16(1) 187-207
Strategies to improve nutrition

Correcting Basic Undernutrition
- Education
- Dietary modification
- Food provision
- Supplementation and fortification
- Consensus needs to be built around approaches to scale up coverage and delivery strategies to reduce disparities and provide equitable access.
- Strategies to address food insecurity and poverty alleviation are key

Obesity prevention and Treatment
- Adult and child health education
- Family Systems change
- Lifestyle modification
- Interaction with clinical care
- Access to healthy affordable food
- Opportunity and access to physical activity

Neighborhoods

Correcting Basic Undernutrition

- Improve transportation to healthy food sources
- Decrease unhealthy food options
- Lower cost of healthy foods
- Alter existing shopping patterns

Obesity prevention and treatment

- Ability to walk to school
- Child friendly neighborhoods
- Neighborhood culture (active or inactive)
- Faith based initiatives
- Access to health care providers and services

Sadler et al Int J Env Res Pub Health 2013 Aug 10(8) 3325-2246
Employers/Workplace

Correcting Basic Undernutrition

- Increase income eligibility for food assistance programs
- Increase adult full time employment
- Increase eligibility for households with disabled adult
- Increase high school completion for adults in household


Obesity prevention and treatment

- Health benefits
- Wellness programs
- Healthier work environments
- Activity opportunities
- Marketing of healthier choices
Schools and Childcare

Correcting Basic Undernutrition

- Increase participation in school lunch program
- Increase breakfast in class
- Increase nutritional quality of after school snack
- Consider alternate venues for summer feeding programs
- Identify infants with undernutrition

Obesity prevention and treatment

- Vending machine snacks and beverages
- School meals
- Physical education
- Fund raising
- Health education
- Built environment
- Time constraints
Interventions

- **Community level**
  - “Built environment”, parks, playgrounds, sidewalks, safety
  - Availability of community and activity nutrition and activity resources
    - Food banks, fresh produce, Boys and Girls Club, YMCA, community sports
  - Employer support for nutrition and activity
  - Community group educational and program efforts

- **State and National policy**
  - Healthy Hunger-Free Kids Act
  - WIC
  - SNAP
  - Head Start
Advice for Pediatricians

DOI: 10.1542/peds.2015-3301

- Know your communities resources for food, housing, literacy, early education etc.
- Ask about food insecurity
  - “Within the past 12 months we worried whether our food would run out before we got money to buy more”
  - “Within the past 12 months the food we bought just didn’t last and we didn't have money to get more.”
- Ensure eligible families are participating in federal nutrition programs (WIC, SNAP, summer feeding)
- Screen for key poverty related health conditions
  - asthma, obesity, dental caries, injuries, mental health diagnosis, HIV infections, and tobacco exposure etc.
Brains, Bodies, Genomes Change in Response to Toxic Stress

- Activation of stress response essential for successful adaptation to short-term stress
- Individuals have physiologic, biologic, genetic responses to toxic stress, which affect lifelong health
  Long-term activation linked to increased cardiovascular disease, diabetes, hypertension, cancer

http://jme.endocrinology-journals.org/content/49/2/R61/F2.expansion.html
The United States has one of the highest child poverty rates among industrialized nations. And the poverty rate is increasing. Many American households are struggling, creating a real educational challenge for far too many students.

**Percentage of children in poverty***

* Ages birth (0 years) – 17 years

![Map showing the percentage of children in poverty for 2000 and 2012](http://aftnj.org/wp-content/uploads/2014/02/Children-Poverty-MAPS-REV2.png)

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**Source:** U.S. Census
Race and Ethnicity Magnify Effects of Poverty

Child poverty rates by race/ethnicity, 2008

- White: 11%
- Black: 35%
- Asian: 15%
- American Indian: 31%
- Other: 17%
- Hispanic: 31%

© National Center for Children in Poverty (www.nccp.org) Who Are America’s Poor Children?: The Official Story
“Raising the value of the child to society”
AAP Vision Statement
Human capital

- Encompasses the acquired knowledge, intelligence, common sense, personal abilities and talents housed within a particular person.

- For children’s welfare and outcomes, human capital is generally measured at the family level.

Ethical Framework from the Child’s Perspective

- Establishes value for human relationships that effect children
  - relates to social relationships in the family, institutions, communities, and among peers
  - that positively influence the health and well-being of children
- The higher the social capital the better health outcomes for children

Zolotor A, Runyan D. Pediatrics. 2006;117(6). Available at: www.pediatrics.org/cgi/content/full/117/6/e1124
Social Capital – Family

- **Interior social capital**
  - Relationships between parents/families and their children
  - Time, efforts, resources and energy that parent/families invest in their children.
  - Family structure
  - Quality of parent child relations
  - Adult’s interest in the child
  - Parents’ monitoring of the child’s activities
  - Extended family exchange and support.

- **Exterior social capital**
  - Family’s interactions and relationships with the surrounding community

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Community social capital

- High community social capital
  - Embedded in surrounding social networks, comprised of both immediate and extended family supports,
  - Participate in local social institutions
- Levels of trust and safety are perceived to be higher
- Medical home
  - Family centered care
    - Psychosocial and environmental screening
    - Bright Futures

Economic capital

- Total amount of household income that the family has to invest in the wellbeing of its members
- Amount of investment of society in children
  - Poverty impacts every level of child well being and health

Rates of return to human capital investment initially setting investment to be equal across all ages

Rate of return to investment in human capital

Preschool programs

Schooling

Opportunity cost of funds

Job training

Preschool School Post-school

Rates of return to human capital investment initially setting investment to be equal across all ages

James Heckman
Environmental Capital

- Effect of physical, chemical and social environment
  - Food insecurity
  - Unhealthy food
  - Injury
  - Violence
  - Bullying/Teasing
  - Neighborhood safety
Educational Capital

- Access to early, quality education
- Education for children with special health care needs
- Harlem Children’s Zone

Personal Capital

- Investment in the health and well-being of an individual over his or her life course—from infancy through adulthood
- Invokes the value of equity and non-discrimination
Children with high social capital

- Function positively in areas of
  - general wellbeing, including mental and physical health
  - educational attainment
  - formal labor-market participation

Ethical Values from Perspective of the Child

- Autonomy
- Beneficence
- Non maleficence
- Social justice
- Providing children a voice and listening to them
- Best interests of the child
- Survive and develop
- Nondiscrimination

Autonomy

- Do children feel that they are respected, heard and taken seriously?
- Is there respect for language, culture, and religion?
- Is there abolition of traditional practices likely to be prejudicial to a child’s health?
- Do children consider themselves participants in decision making regarding their future?
- Is there freedom from discrimination?
- Is there right to privacy and information?
Autonomy

- Is there respect for physical and personal integrity
- Is there freedom from all forms of violence, torture, or other cruel inhuman, or degrading treatment
- Is there due process in the law
- Is there recognition of the importance of treating the child with respect within the justice system
- Is there a right not to be detained arbitrarily

Council on Community Pediatrics and Committee on Native American Child Health

Benificence

- Promotion of a child’s best interests
- Life, survival, and development
- Best possible health and access to health care
- Education
- Play
- Family life or alternative care
- Family reunification
- Fullest social inclusion for disabled children
- Support for parents to ensure protection of children’s rights

FROM THE AMERICAN ACADEMY OF PEDIATRICS:
Council on Community Pediatrics and Committee on Native American Child Health

Nonmaleficence

- Protection from abuse and exploitation
- Protection from armed conflict
- Protection from harmful drugs
- Protection from trafficking
- Rehabilitative care after abuse or neglect

FROM THE AMERICAN ACADEMY OF PEDIATRICS:
Council on Community Pediatrics and Committee on Native American Child Health
Health Equity and Children's Rights
Social Justice

- Access to healthy housing
- Child-friendly neighborhood development
- Land use that considers the best interest of children
- Access to recreational facilities
- Convenient and affordable transportation - access to health care, healthy food sources
- Sufficient education resources
- Freedom from hunger

FROM THE AMERICAN ACADEMY OF PEDIATRICS: Council on Community Pediatrics and Committee on Native American Child Health

Health Equity and Children’s Rights
Social Justice

- Freedom from gender discrimination
- Required resources for disabled children
- Adequate hospital budgets
- Access to quality prekindergarten and early learning resources
- Child- and infant-friendly hospitals-physical and emotional environment
- Appropriate physician reimbursement-payment for prevention, counseling, telephone, internet
- Safe workplace conditions for adolescents-developmentally appropriate training

FROM THE AMERICAN ACADEMY OF PEDIATRICS:
Council on Community Pediatrics and Committee on Native American Child Health
Health Equity and Children’s Rights
Pediatricians Role

- Identify and respond to clinical issues resulting from:
  - a family’s lack of access to basic needs (financial capital),
  - detrimental environmental exposures, lack of food, poor nutrition (environmental capital),
  - inadequate educational services for children (educational capital)
  - a child’s poor sense of self-efficacy and lack of a vision for the future (personal capital).