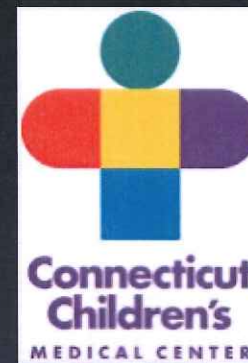


# Making Connections: Kids' Nutrition and Mental Health



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CT Children's Mental Health Task Force



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# CT Children and Mental Health

Location	Data Type	2007	2011 - 2012
Connecticut	Number	115,000	125,000
	Percent	16%	17%

Children ages 2 to 17 with a parent who reports that a doctor has told them their child has autism, developmental delays, depression or anxiety, ADD/ADHD, or behavioral/conduct problems.

Health.

U.S. Department of Health and Human Services, Health Resources and Services Administration, Maternal and Child Health Bureau, National Survey of Children's

State-level data from the National Survey of Children's Health 2012 (NSCH).

# Contributing Factors....

Maternal prenatal distress and poor nutrition:  
mutually influencing risk factors affecting  
infant neurocognitive development

Monk C et al. Journal of Child Psychology and Psychiatry 54:2 (2013), pp

115-130



# Fetal and Early Brain Development

- Nutrients and growth factors regulate brain development
- Rapidly developing brain vulnerable to nutrient insufficiency
- Certain nutrients have greater effects on brain development than do others:

- protein, energy (CHO), certain fats, iron, zinc, copper, iodine, selenium, vitamin A, choline, DHA and folate

Georgieff et al. 2007

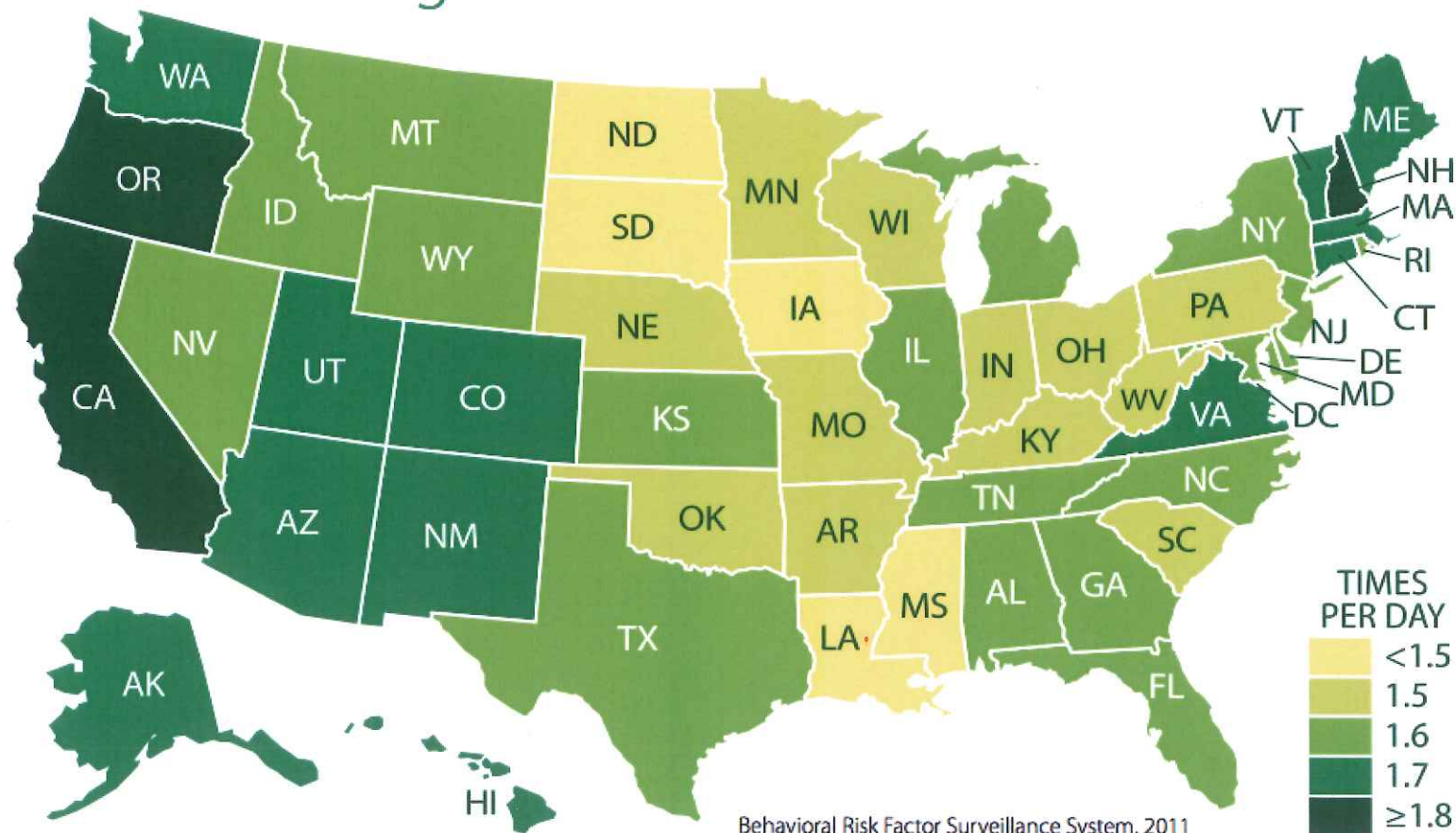
- *Translation: mom's pregnancy diet should include lean meats, fish, nuts, and low-fat dairy; variety grains including whole grains; vegetables and fruits*
- *The maternal diet "programs" a child's development and risk for disease*

Black et al. 2008

# Do CT moms “Veggie Up?”..

CDC State Indicator Report on F/V 2013

Median **Daily Vegetable Intake**  
Among Adults in the United States



Behavioral Risk Factor Surveillance System, 2011

# Infancy, Childhood, and Adolescence

- Marked by rapid physical growth and development that may require varying or specific nutrition needs and feeding patterns
- Every child's and adolescent's health and development depends on good nutrition
- Disruption in appropriate nutrient intake may have lasting effects on growth potential and developmental achievement



# Normal Infancy, Childhood, Adolescence

- **Infants:** Breast-feeding on demand remains the ideal form of feeding for healthy babies born at term. Commercially prepared formulas are healthy alternatives
- **Age 6 months- 1 yr:** Child should be exposed to a variety of solids, one at a time
- **Age 1-3:** Food intake influenced by family eating patterns and role modeling; child needs to be exposed to a wide variety of foods to “gear up” the taste buds
- **Ages 4-10:** Intakes may be less than recommended for iron, calcium, vitamins A, D and C. In most cases deficiencies are unlikely, as long as the energy and protein intakes are adequate, and a *variety of foods*, including fruit and vegetables, are eaten.

# Normal Infancy, Childhood, Adolescence

- **"Tween-teen":** Nutrient needs of individual teenagers differ greatly, and food intake can vary enormously from day to day. Those with deficient or excessive intakes one day may well compensate on the next. In this period of life, several nutrients are at greater deficiency risk including iron and calcium.

Note\*\*\*Childhood and adolescence are the two most important times for building bone mass to prevent osteoporosis later in life. Kids need a lot of vitamin D, calcium, and phosphorus as their bones grow. . Many kids do not get even the minimum amount of these nutrients. Ages 9-18 need about 1300 mg Calcium per day.

(Example Combo: 1 Yogurt 8 oz = 200-400 mg.; 2 Milk 8 oz about 600 mg. 1 Calcium fortified OJ (8 Oz) about 300=~1200-1300).

Variety is key. Many succumb to peer pressure to eat high fat, high calorie, nutrient deficient foods. The National Health Institute (NIH) has said that low calcium intake in our kids is now a major health concern.



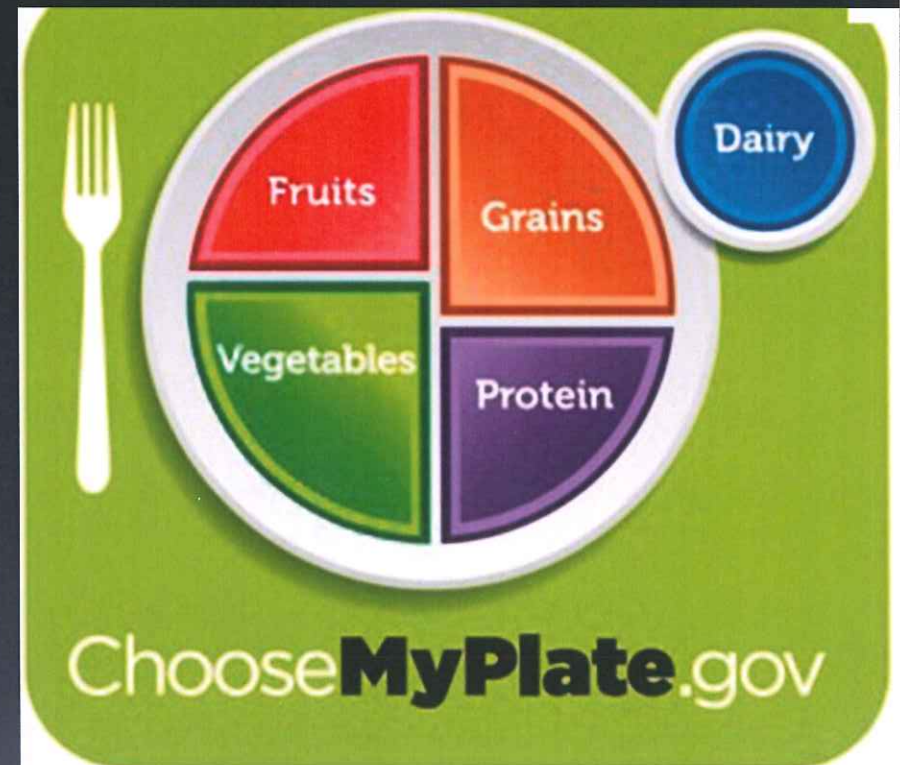
# Color, Variety and Moderation Rule

2005



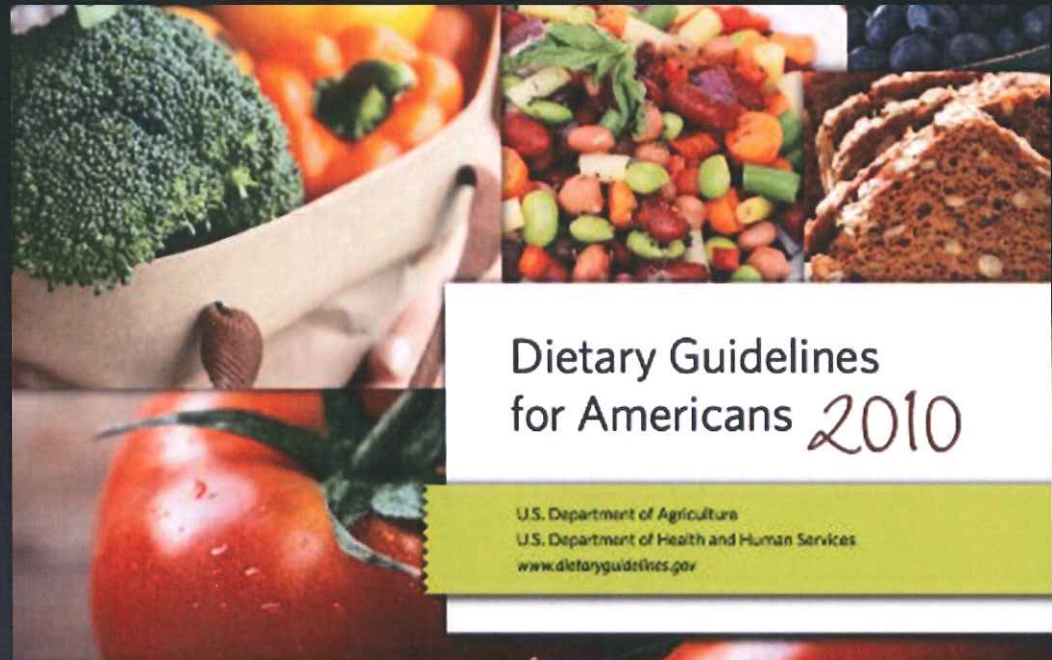
MyPlate replaced MyPyramid . Mixed reviews on both.....

2010



# Dietary Guidelines for Americans '10

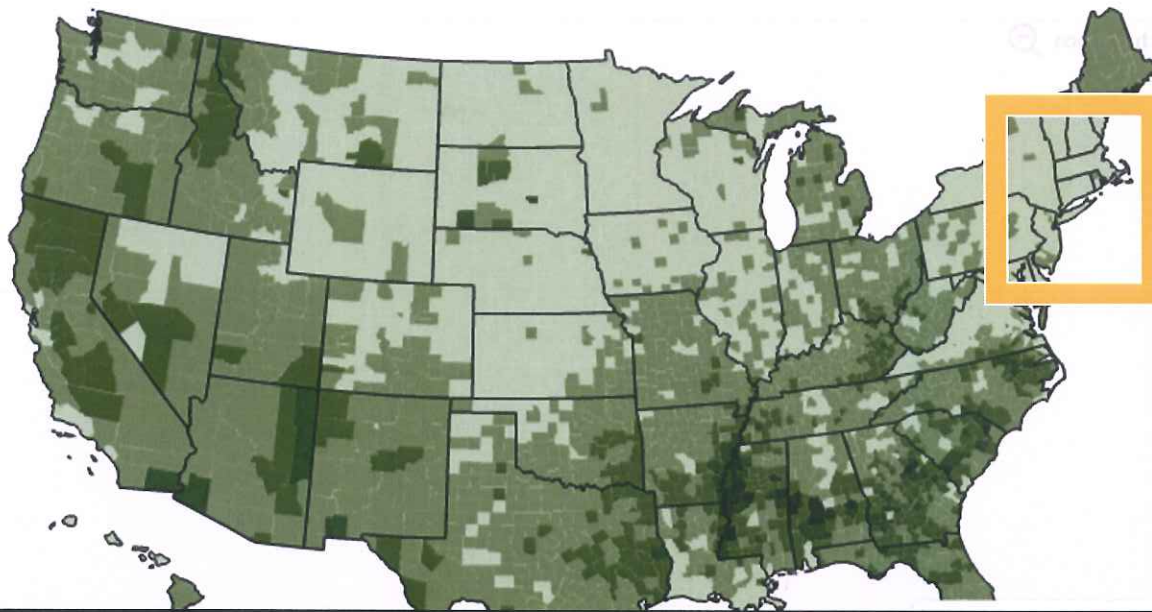
- ★ “Total diet” approach to achieve good health and optimal functionality across the life span
- ★ Energy balanced and nutrient-dense.
- ★ Not rigid
- ★ Flexible approach that takes into consideration individual tastes and food preferences
- ★ *Focus on increasing the intake of healthier, nutrient-dense foods, while decreasing the use of foods high in solid fats and added sugars, sodium, and refined grains that continue to be connected to chronic disease pathology*



[www.cnpp.usda.gov/dgas2010-policydocument.htm](http://www.cnpp.usda.gov/dgas2010-policydocument.htm)  
[www.dietaryguidelines.gov](http://www.dietaryguidelines.gov)  
<http://www.health.gov/dietaryguidelines/2015.asp>

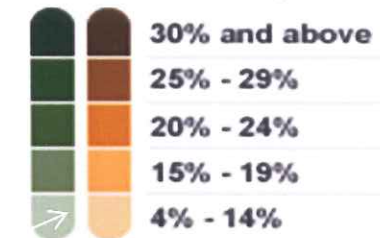
NEW DGA due 2015





## Bigger Issues Affecting Mental Health: Food Insecurity/USA/CT/'10

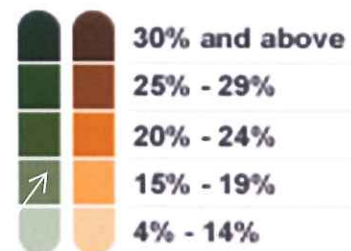
### Food Insecurity Rates



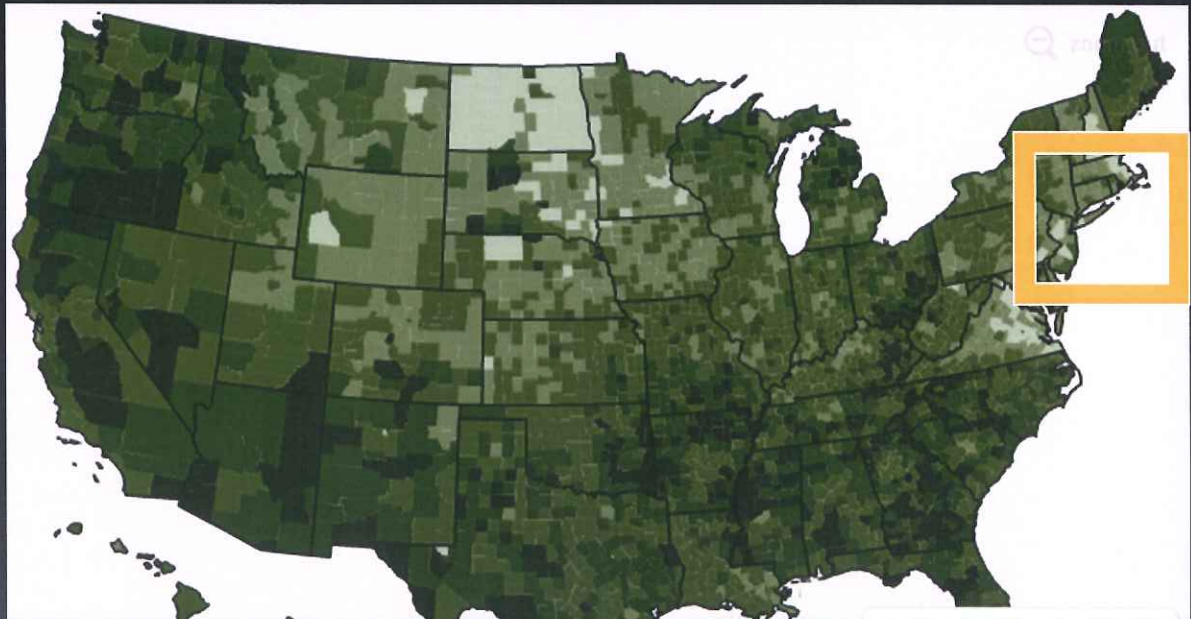
Adult AVG 1 in 10

[www.feedingamerica.org/hunger-in-america/hunger-studies/map-the-meal-gap.aspx](http://www.feedingamerica.org/hunger-in-america/hunger-studies/map-the-meal-gap.aspx)

### Child Food Insecurity Rates



Kids AVG 1 in 5





# Connecticut



-Nearly 1 in 11 Connecticut citizens have food insecurity

*"... inability to acquire or consume an adequate or sufficient quantity of food in socially acceptable ways, or the uncertainty that one will be able to do so.."*

-Dietary quality suffers

-In 2011, 24.5 percent of adults in the state were obese  
(CDC, 2011)

-A 2012 report revealed 37% of preschool kids in Hartford were obese  
(UConn Ctr Pub Health & Health Policy, 2012)

-By 2030, the obesity rate in Connecticut could reach 46.5 percent  
(*F as in Fat Report*. 2013. [www.healthyamericans.org](http://www.healthyamericans.org))

Data: USDA/End Hunger CT 2012  
[www.endhungerct.org](http://www.endhungerct.org)

SNAP/Food Stamp Program (FY 2012)*	
Average Monthly Participation (Individuals)	403,466
Change in Participation in last 5 Years	79.0%
Average Monthly Benefit per Person	\$143.89
Participation Rate of Eligible Persons (FY 2010)	78%
Rank Among States	26
Participation Rate of Eligible Working Poor (FY 2010)	62%



HUNGER  
IN AMERICA

EN ESPAÑOL

HOW WE  
FIGHT HUNGER

NEED  
HELP?

GET  
INVOLVED

TAKE  
ACTION

WAYS  
TO GIVE

## HUNGER IN AMERICA AMERICA

Hunger Facts

Hunger In Your Community

Impact of Hunger

Hunger Research

Map the Meal Gap

Child Food Insecurity

Hunger Study 2014

Hunger Study 2010

Hunger's New Staple

Spotlight on Senior Health

Hispanic/Latino Hunger

In Short Supply: Everyday  
Essentials



Make a Donation ▶

Join the  
Community ▶

## HUNGER STUDY 2014



### HUNGER STUDY 2014, RESULTS COMING IN SUMMER 2014!

The *Hunger in America* study series is the nation's largest and most comprehensive insight into charitable food distribution in the United States. Conducted quadrennially by Feeding America since 1993, the Hunger Studies provide statistically-valid data on our food distribution network and the people Feeding America serves. This, in turn, helps charitable feeding organizations develop programs that best support individuals facing hunger. The results also inform the public policy discourse so that federal nutrition programs can better serve those in need.

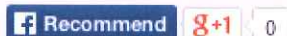
The next iteration of the *Hunger in America* study, *Hunger in America 2014*, will be released in Summer 2014. This iteration of the study will be the most comprehensive to date and includes a variety of features that were included for the very first time:

- Data was collected from clients **electronically**, using a touchscreen tablet
- The client survey was available in **5 languages**: English, Spanish, Mandarin, Russian, and Vietnamese
- Clients were also asked about their **health, veteran status, and any coping strategies** they may use
- The study was **expanded to include all agencies and programs**, not solely emergency feeding programs like pantries, shelters, and kitchens. This will give us additional insight into supplemental feeding programs, such as those for seniors and children.

While the final results are still being analyzed and summarized by our research vendors, [Westat](#) and [the Urban Institute](#), data collection concluded in August 2013 and there are some exciting highlights to report:

- More than **34,000 agencies provided information** about their services and programs, including food distribution and non-food, referral, or outreach services.
- In an effort to increase the accuracy and diversity of the findings, **over 12,500 programs were visited to survey clients**. This is more than twice as many programs as were visited in the previous study released in 2010.
- More than **60,000 clients shared information** about their story and circumstances.

Check back in Summer 2014 to see the final results from *Hunger in America 2014*. To learn more about the results from the last *Hunger in America* study, released in 2010, [click here](#).





# Why Does Hunger Matter?

- A basic need: Maslow's Hierarchy... food, shelter, warmth. Lower needs must be satisfied before progressing to higher level growth needs
- Social morality
- Food ethics
- We are increasing service models for food...room service, self serve, home delivery, meat trucks, food trucks, 7-Elevens, etc
- Root causes of hunger
  - Inadequate education
  - Lack of jobs; low paying jobs (earning \$10.10 an hour for 40 hours a week, 52 weeks a year, produces a yearly gross income of \$21,008)
  - Unable to break the cycle of poverty



## Food Insecurity/Poor Dietary Quality Connections to Mental Health

- A consistent body of evidence documents the detrimental influence of both protein-calorie malnutrition (Levitsky et al 1995; Georgieff et al 2--7) and micronutrient deficiencies on CNS development and function (Lozoff et al 2006; Rao et al 200), and the development of neurotransmitter systems (Beard et al 2003).
- Many of the nutrients documented as influencing brain development are also associated with mental health problems: [ Folate (Alpert et al 1997), Essential Fatty Acids (Appleton et al 2006), and Iron (Corwin et al 2003)]

# Food Insecurity/Poor Dietary Quality Connections to Mental Health

- A statistically robust association exists between household FI and developmental risk during the first 3 years of life, when brain growth is rapid (Rose-Jacobs et al 2008)
- The effects of food insecurity, operating through maternal mental health and parenting behaviors, predict child outcomes in 2 major domains: social and emotional development and cognitive development (Zaslów M et al. 2008)
- Nutritional deficiencies rarely occur in isolation from other bio-ecologic and psychosocial risks factors such as economic stress, chronic illness, low social support, or unstable life circumstances
- The possibility exists that in two parent households, food insecurity affects depression and parenting in both parents
- One pathway could involve changes in serotonin, a mood regulator linked to depression (Lucki 1998).
- Synthesis of serotonin depends, in part, on intake of foods containing the amino acid tryptophan (Christensen L 1996) and vitamin B-6 (Leklem et al 1996)

## Food Insecurity/Poor Dietary Quality Connections to Mental Health

- The increased risk of depression for children of depressed mothers may also reflect impairments in mother-child interaction patterns that occur when mothers are depressed (Foreman DM 2002; Lovejoy et al 2000)
- Evidence from longitudinal studies suggests that maternal depression undermines infant growth, rather than the reverse order of maternal depression occurring as a reaction to infants' growth faltering (Anoop et al 2004; Rahman et al 2004).
- Findings suggest that maternal depression and maternal nutritional deficiencies can increase the risk of inadequate or inappropriate parenting, which can then increase a child's risk of both nutritional deficiencies and mental health problems



*“understanding the impact of nutritional deficiencies on cognitive development and function requires going beyond just direct nutrition-brain pathways “*

Theodore D Wachs Professor, Psychological Sciences, Purdue University

# Wachs' Multi-Dimensional Models

- Incorporating contextual and behavioral characteristics that are linked to nutritional deficiencies

# Child Behavior Disorders

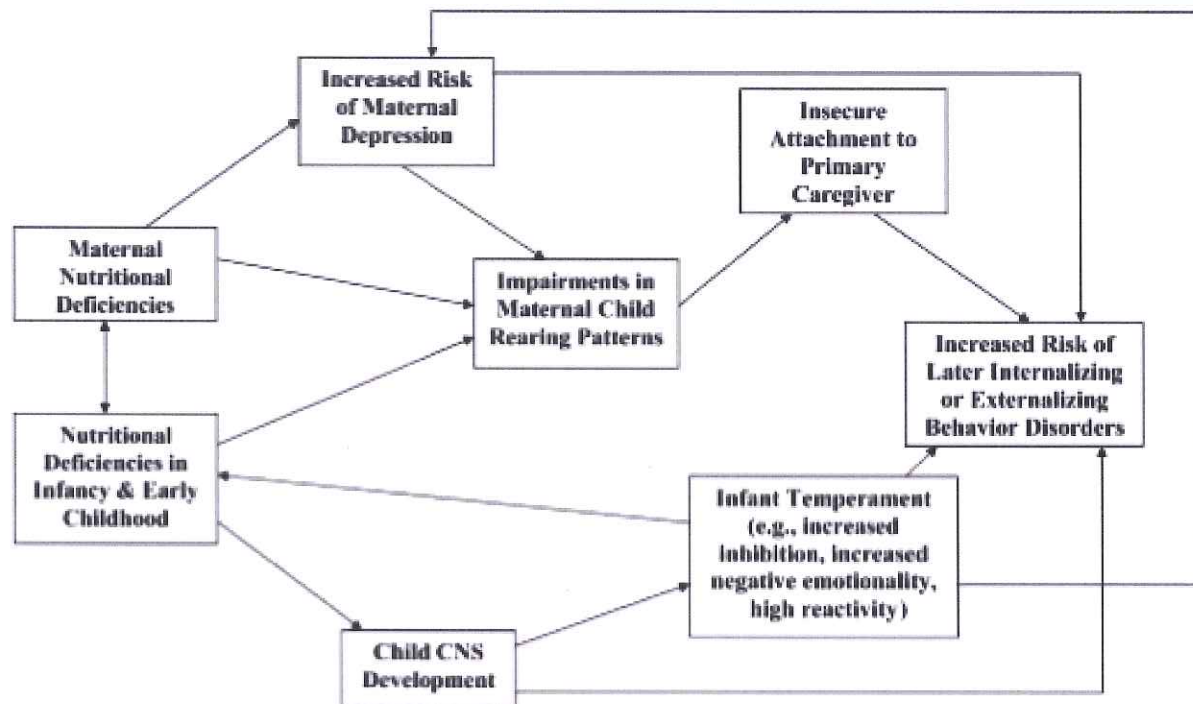


FIGURE 2. Multiple pathways linking nutrition to child behavior disorders. CNS, central nervous system.

Wachs T. Models linking nutritional deficiencies to maternal and child mental health. Am Jour Clin Nutr 2009. pp. 9355.



# Attachment

- Early healthy attachments have a long-lasting impact on personality, behavior, and intimate relationships (US Dept HHS Report. Infant Attachment: What We Know, 1991)
- Virtually no evidence exists that directly relates the quality of maternal nutritional status to offspring attachment
- Inadequate maternal nutrition is not the only pathway through which nutrition can influence a child's risk of insecure attachment
- Quality of caregiver-infant interactions is bidirectional and reflects reciprocal interactions as infants and caregivers respond to one another (Wachs 2009)
- Poorly nourished infants may be less likely to elicit the types of maternal interactions that can translate into secure attachments

(Grantham-McGregor 1984; Rahmanifar et al 1993; Meeks et al 1999)

# Temperament

- A growing body of evidence links nutritional deficiencies in infancy to characteristic patterns of infant temperament (Wachs 2009)
- From newborns through 5 y of age, children with iron deficiency have a pattern of temperament characterized by increased inhibition or wariness, increased irritability or negative emotionality, and lower levels of positive affect, sociability, and reactivity (Lozoff et al 2007; Wachs 2005).
- Lower activity levels, reactivity, alertness, self-regulation, sociability, and more negative emotionality have been reported for children with mild-to-moderate deficiencies in protein-energy or B vitamin intake (Wachs 2009).
- The link between nutrition, temperament, and children's behavioral problems is based on a consistent body of evidence documenting that individual variability in infant temperament is related to later increased risk of behavioral problems in children (Guerin DW et al 2003; Nigg JT 2003).

# Summary

- Available evidence documents that early nutritional deficiencies can result in insecure attachments and inhibited or “difficult” temperament patterns in infancy and childhood
- Both insecure attachments and inhibited or difficult temperament patterns, in turn, can significantly increase the risk of later adjustment disorders
- Having an inhibited or difficult temperament may increase an infant’s risk of less adequate nutrition

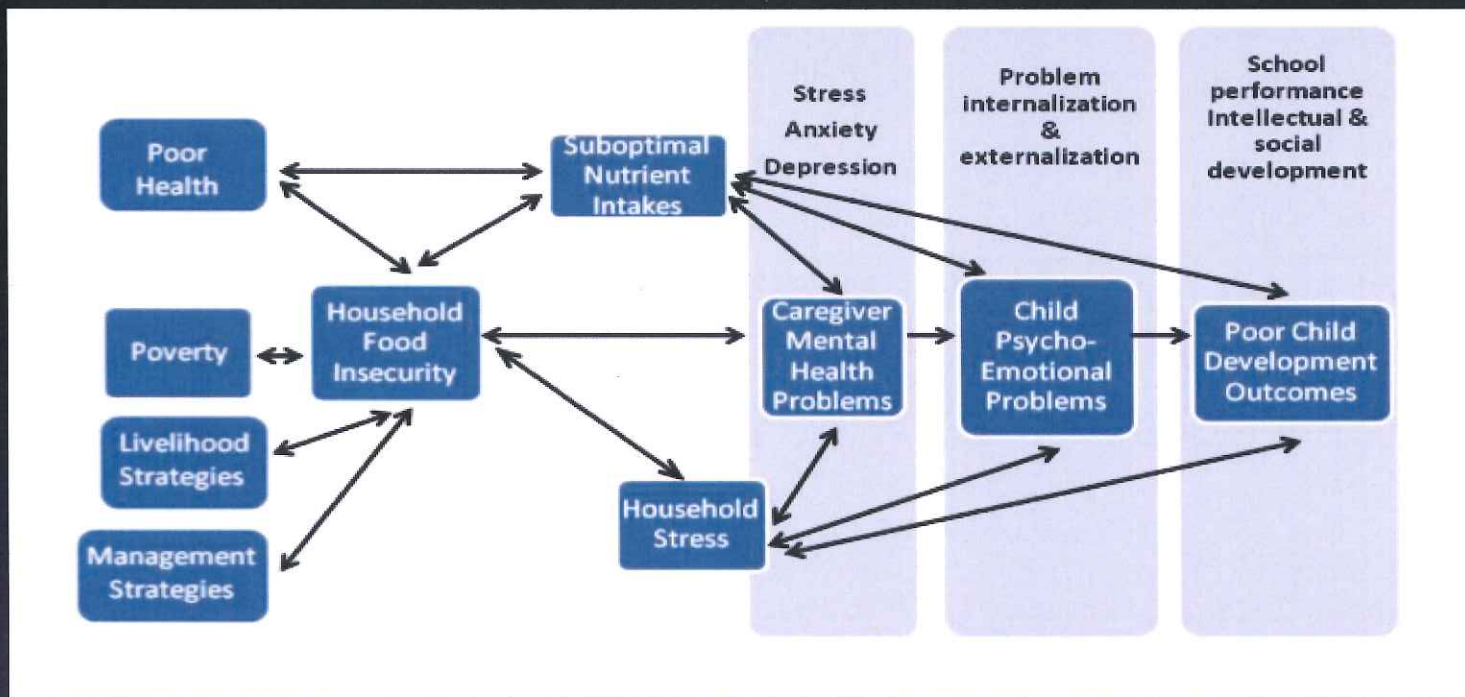


# Interesting Study

Interventions that improve WOMEN'S mental health may also contribute to decreasing the burden of food insecurity and impact on next generation

Maria Melchior et al. Mental Health Context of Food Insecurity: a Representative Cohort of Families With Young Children  
*Pediatrics* 2009; 124; e564

Rafael Perez-Escamilla: Yale School of Public Health  
Rodrigo Pinheiro de Toledo Vianna: Yale Visiting Professor from Brazil  
2012: Food Insecurity and the Behavioral and Intellectual  
Development of Children: A Review of the Evidence



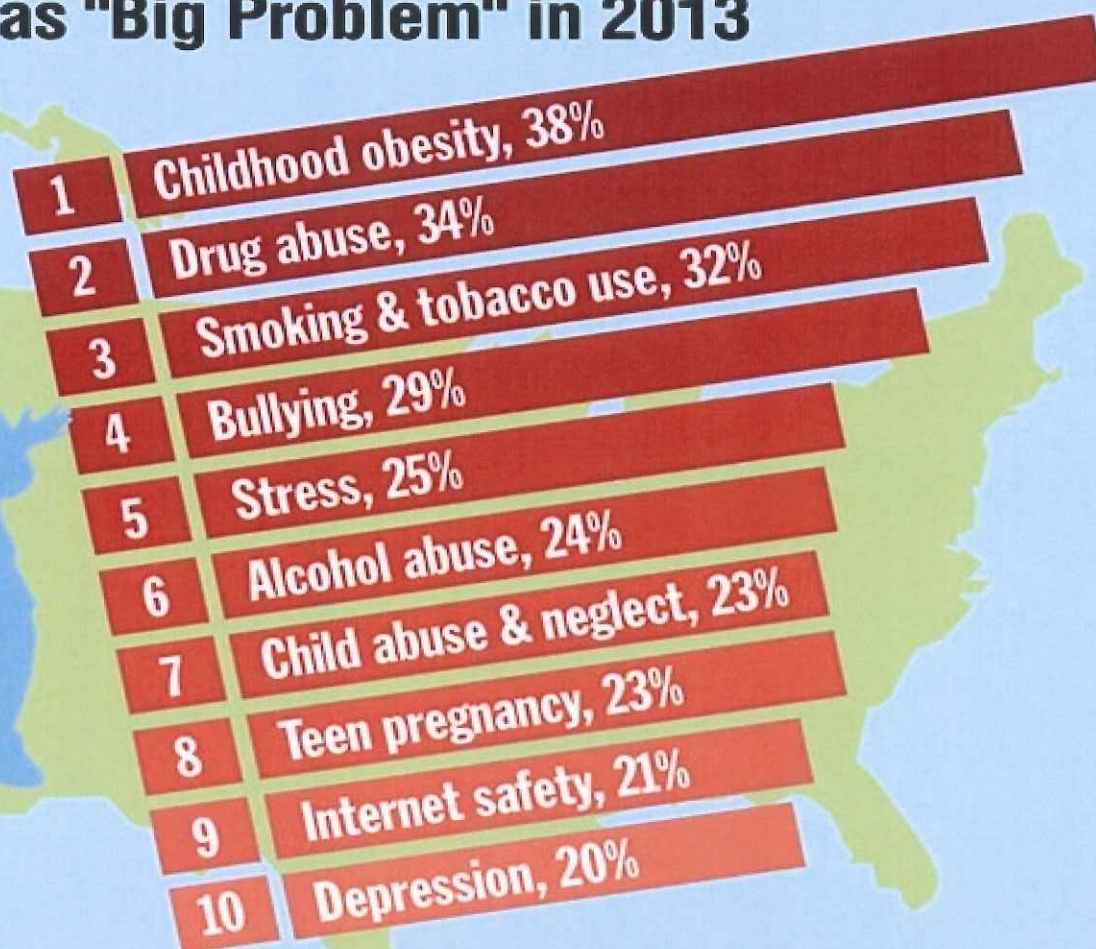
Synthesis: family support services are necessary to learn to cope constructively with the stressor of HFI and its mental health sequelae. Recommendation to offer mental health services to families exposed to HFI is strongly supported by qualitative data. Food insecure families should have improved access to food and nutrition assistance programs. Programs such as Head Start and WIC may be ideally poised to help address the negative consequence of HFI on the development of children. Improved access to mental health and child development programs as well as to food assistance programs is likely to improve the development and well-being of children at risk of living or living in food insecure households.

# Clinical Implications





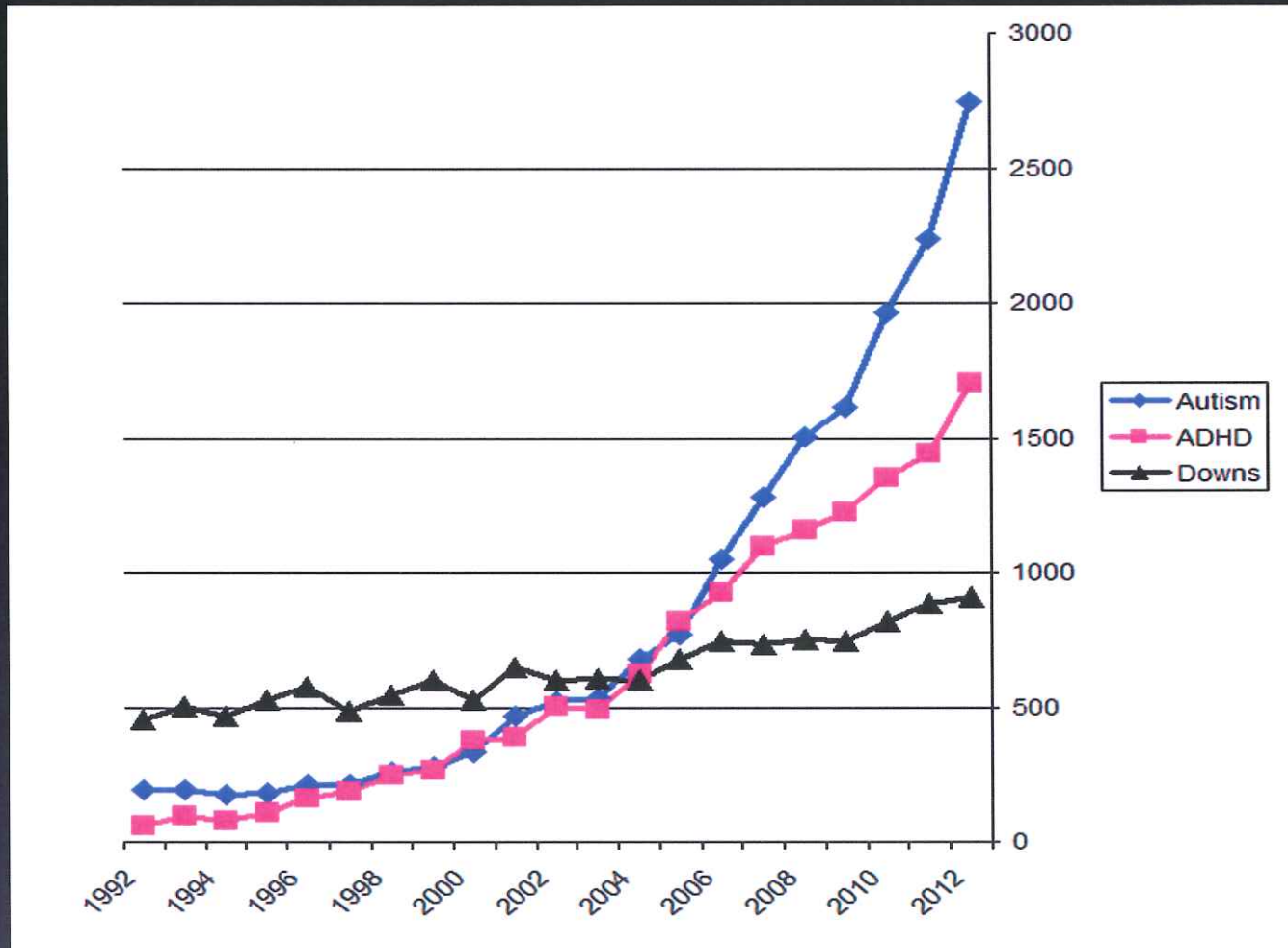
**Figure 1. Top 10 U.S. Children's Health Concerns, Percent Rated as "Big Problem" in 2013**



Source: C.S. Mott Children's Hospital National Poll on Children's Health, 2013.

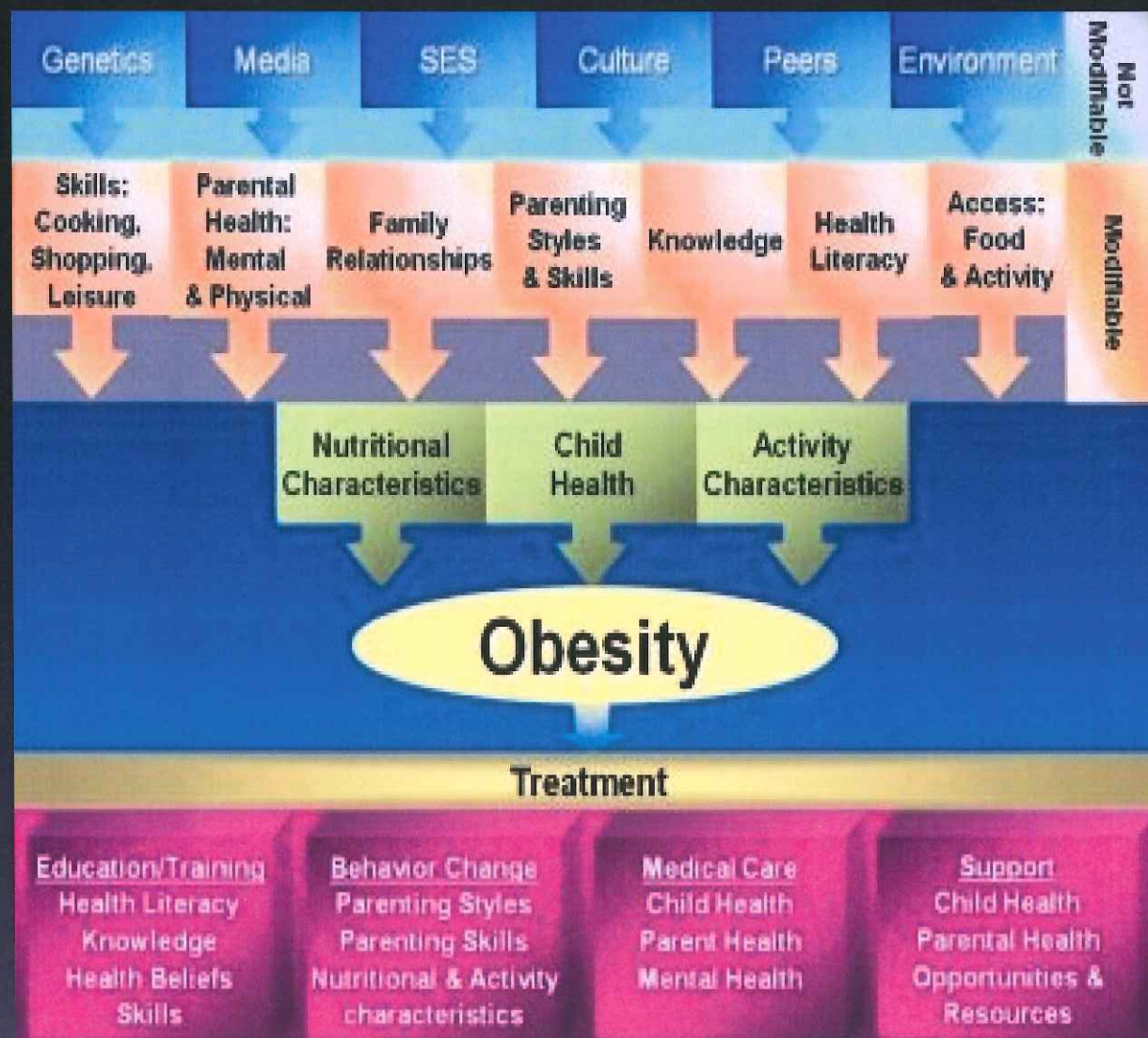


# Disease with Psych component





# Obesity





# Bullying

- Children with ADHD and depression more likely to be victimized
- Children with conduct disorder or oppositional defiant disorder more likely to bully other children

Zablotsky B. The association between bullying and the psychological functioning of children with autism spectrum disorders. 2013. J Dev Behav Pediatr. 34(1)

# The Story of One Fat

- DHA – from fish
- Pregnant woman does not eat fish
- Supplement not at right dose
- Infant born with low stores
- Mom breastfeeds with low stores

# DHA continued

- Without enough DHA
  - Child has inability to stay on task
  - Decreased word recognition
  - Decreased reading
  - Increased aggression



# Case Study 1

- Depressed Mother and effect on child
  - Adolescent Mom
  - Lack of interaction with child
  - Inappropriate food (Cheeto's, Juice)

# Case Study 2

- Food Insecure child
  - ADD, angry
  - Mom criticizing his size, his eating patterns
  - Cheap fast food; lack of cooking skills
  - Video games, inadequate sleep, no place to be physically active
  - Bullying

# Case Study 3

- Inability to follow through on rec's
  - Role of poverty
  - Inadequate foods
  - Increasing role of soup kitchens feeding families
  - Foods high in carbohydrate and meat/protein but lacking milk, fresh fruits and vegetables



# The Poverty Menu

- Chicken wings and/or Vienna Sausage
- Large portions Ramen noodles; mostly rice (few beans)
- Canned green beans
- Juice/Kool-ade
- (Sometimes milk at the beginning of the month)
- Above is perfect menu for Type 2 Diabetes; hypertension

# What to Do?

- Quick fixes:
  - Reimburse complete vitamins with minerals
  - Reimburse DHA
  - Encourage schools to provide physical activity-  
before and after school
  - Reimburse RD nutrition counselling in Medicaid

# What to do long term?

- Address poverty in children
- Address food insecurity
- Address environment > community gardens >  
Knox Foundation model
- Support pregnant and new mothers

# Thank You!

Questions?