The Impacts of Increasing Household Energy Prices on Health and Health Care Costs in New York State

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NYSERDA/LIFE Regional Meeting

New York City, NY

April 29, 2015

CHILDREN'S HealthWatch

BOSTON MEDICAL CENTER
EXCEPTIONAL CARE. WITHOUT EXCEPTION.

BU School of Medicine

Children's HealthWatch

- Non-partisan network of pediatric & public health researchers → research & policy center
- MISSION: Improve health & development of young children→ public policies → alleviate family economic hardships
  - Hunger (Food Insecurity)
  - Unstable Housing (Housing Insecurity)
  - Keeping Heat or Lights on (Energy Insecurity)
- Provide policy makers with evidence to develop policies that protect young children's health and development

Where our data come from:

Emergency Departments and Primary Care Clinics in Boston, Baltimore, Philadelphia, Little Rock and Minneapolis.

- A household survey
- Interviews - caregivers with children 0 to 4 years old
  - "invisible" group
  - critical growth and development window

PEDIATRICS

OFFICIAL JOURNAL OF THE AMERICAN ACADEMY OF PEDIATRICS

A Brief Indicator of Household Energy Security: Associations With Food Security, Child Health, and Child Development in US Infants and Toddlers

John T. Cook, Deborah A. Frank, Patrick H. Casey, Ruth Rose-Jacobs, Maureen M. Black, Mariana Chilton, Stephanie Ettinger deCuba, Danielle Appugliese, Sharon Coleman, Timothy Heeren, Carol Berkowitz and Diana B. Cutts

Pediatrics 2008;122;e867-e875

DOI: 10.1542/peds.2008-0286

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://www.pediatrics.org/cgi/content/full/122/4/e867

American Academy of Pediatrics

DEDICATED TO THE HEALTH OF ALL CHILDREN™

CHILDREN'S HealthWatch

- Conduct empirical research,
- Publish it in peer-reviewed journals,
- Translate it into policy oriented materials,
- Communicate research results to academics, advocates, policy makers, the public

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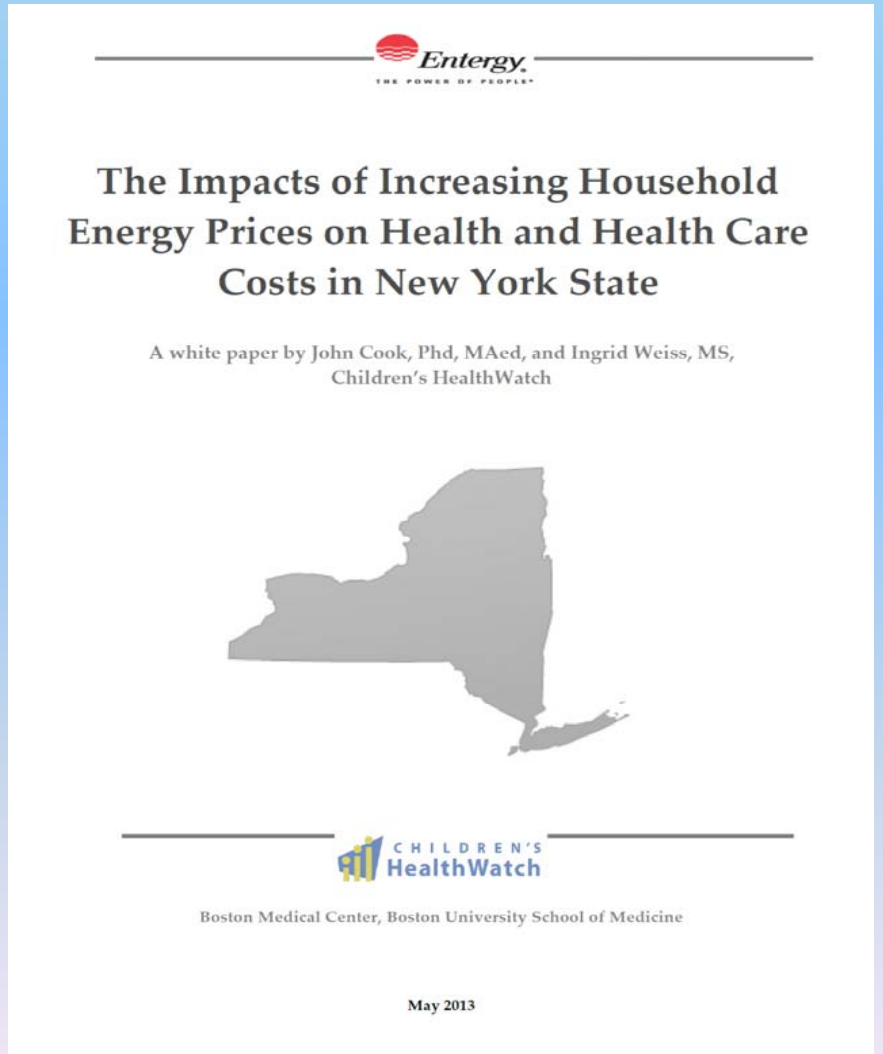
Use evidence from empirical research results to:

- Inform actionable policy decisions
- Support policy recommendations



Entergy.
THE POWER OF PEOPLE

The Impacts of Increasing Household Energy Prices on Health and Health Care Costs in New York State

A white paper by John Cook, Phd, MAed, and Ingrid Weiss, MS, Children's HealthWatch

CHILDREN'S HealthWatch

Boston Medical Center, Boston University School of Medicine

May 2013

Overview

CHILDREN'S HealthWatch

Impacts of Increasing Household Energy Prices on Health and Health Care Expenditures in New York

1. Projected trend in household energy prices,
2. How household energy can affect members' health,
3. How adverse health outcomes translate into health services utilization and health care expenditures,
4. How increasing energy prices impact child and elderly health.

Energy Insecurity is Linked to Adverse Child Health and Developmental Outcomes

Young children (under age 4 years) in energy-insecure families also are more likely to:

- Have been hospitalized since birth,
- Have their health status reported as “fair/poor” versus “excellent/good”,
- To have parents report significant developmental concerns.

Source: Cook J, Frank D, Casey P, Black M, Chilton M, Ettinger De Cuba S, Appugliese D, Coleman S, Heeren T, Berkowitz C, Cutts D. A Brief Indicator of Household Energy Security: Associations with Food Security, Child Health and Child Development in U.S. Infants and Toddlers. *Pediatrics* 2008;122;e867-e875.

Energy Insecurity Also is Linked to Other Family Hardships

Children in energy-insecure families are more likely to:

- Live in food-insecure households,
- To live with child food insecurity, a more severe level of food insecurity.

Source: Cook J, Frank D, Casey P, Black M, Chilton M, Ettinger De Cuba S, Appugliese D, Coleman S, Heeren T, Berkowitz C, Cutts D. A Brief Indicator of Household Energy Security: Associations with Food Security, Child Health and Child Development in U.S. Infants and Toddlers. *Pediatrics* 2008;122;e867-e875.

Food Insecurity and Hunger Also are Linked to Adverse Child Health Outcomes

Children in food-insecure families are more likely to:

- Have been hospitalized since birth,
- Have their health status reported as "fair/poor" versus "excellent/good",**
- Have parents report concerns indicating risk of developmental problems,
- Have iron deficiency anemia,
- Have anemia without iron deficiency.

1. Cook JT, Frank DA, Berkowitz C, Black MM, Casey PH, Cutts DB, Meyers AF, Zaldivar N, Skalicky A, Levenson SM, Heeren T, Nord M. Food Insecurity is Associated with Adverse Health Outcomes Among Human Infants and Toddlers. *J Nutr*, June 2004; 134:1432-1438.
2. Skalicky A, Meyers A, Adams W, Yang Z, Cook J, Frank DA. Child Food Insecurity and Iron Deficiency Anemia in Low-Income Infants and Toddlers in the United States. *Maternal and Child Health*; Nov 2005, 19:1-9.

Food Insecurity and Hunger are Linked to Adverse Maternal Health Outcomes

Children in households with "child food insecurity" are more likely to:

- Have mothers who report having depressive symptoms,
- Have mothers who report their own health as "fair/poor",**
- Have mothers with unhealthy weight status,
- Have mothers with chronic diseases, e.g., diabetes.

1. Casey P, Goolsby S, Berkowitz C, Frank D, Cook J, Cutts D, Black MM, Zaldivar N, Levenson S, Heeren T, Meyers A, and the C-SNAP Study Group. Maternal Depression, Changing Public Assistance, Food Security, and Child Health Status. *Pediatrics,* 2004; 113(2): 298-304.
2. Laraia BA. Food Insecurity and Chronic Disease. *Adv. Nutr.* 4: 203–212, 2013.

**NOTE: Meaning of Self-rated Health Status

In the US, according to Census Bureau data:

- Of all children (ages <18 years) with "fair or poor" health status in 2010:
  - 61.6% had 3 or more medical care provider visits,
  - 26.2% spent at least one night in the hospital.
- Of all children with "excellent, very good, good" health status in 2010:
  - Only 28.0% had 3 or more medical care provider visits,
  - Only 4.2% spent at least one night in the hospital.

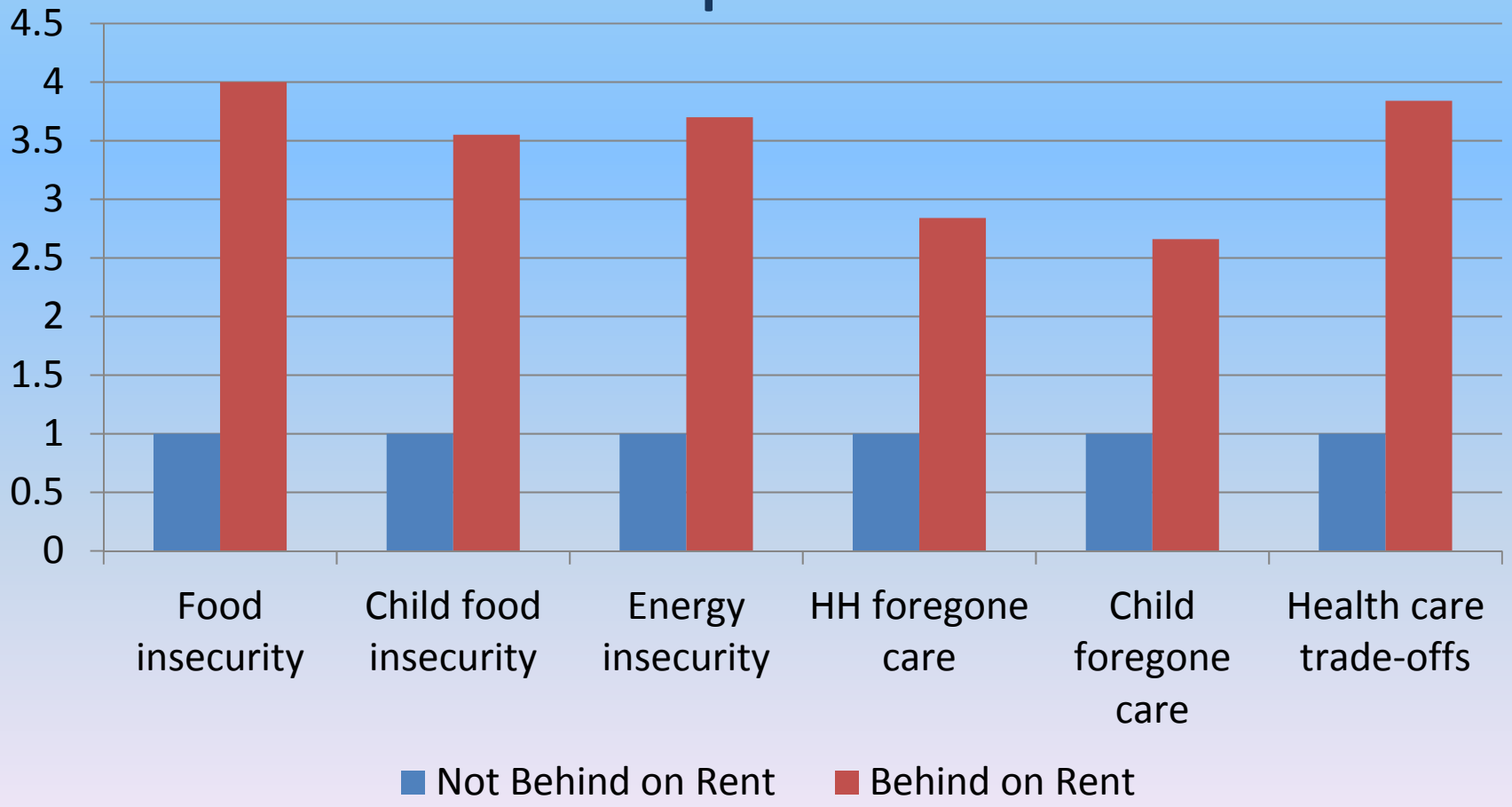
In 2012, the average cost for non-birth related pediatric hospital stays was $11,143 (AHRQ, H-CUPnet Kid's Inpatient Database).

Source: O'Hara B, Caswell K. Health Status, Health Insurance, and Medical Services Utilization: 2010. *Household Economic Studies,* Current Population Reports, P70-133RV, July 2013.

Affordability: Behind Closed Doors

- Being <u>behind on rent</u> is strongly associated with negative child and maternal health outcomes
  - Hospitalizations since birth
  - Fair/poor health
  - Serious underweight
  - Maternal fair/poor health
  - Maternal depressive symptoms

Being behind on rent – strong indicator of other household hardship

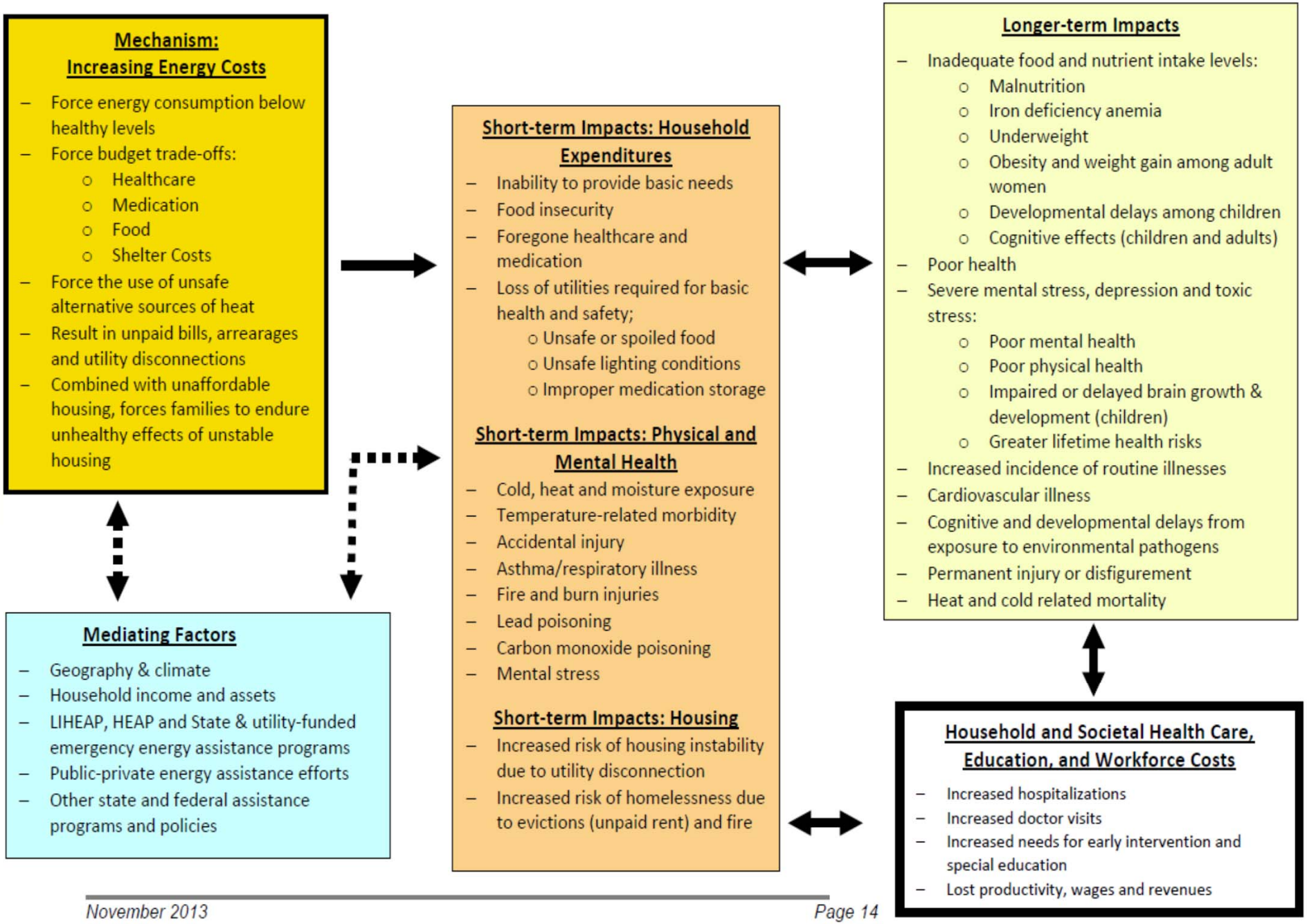


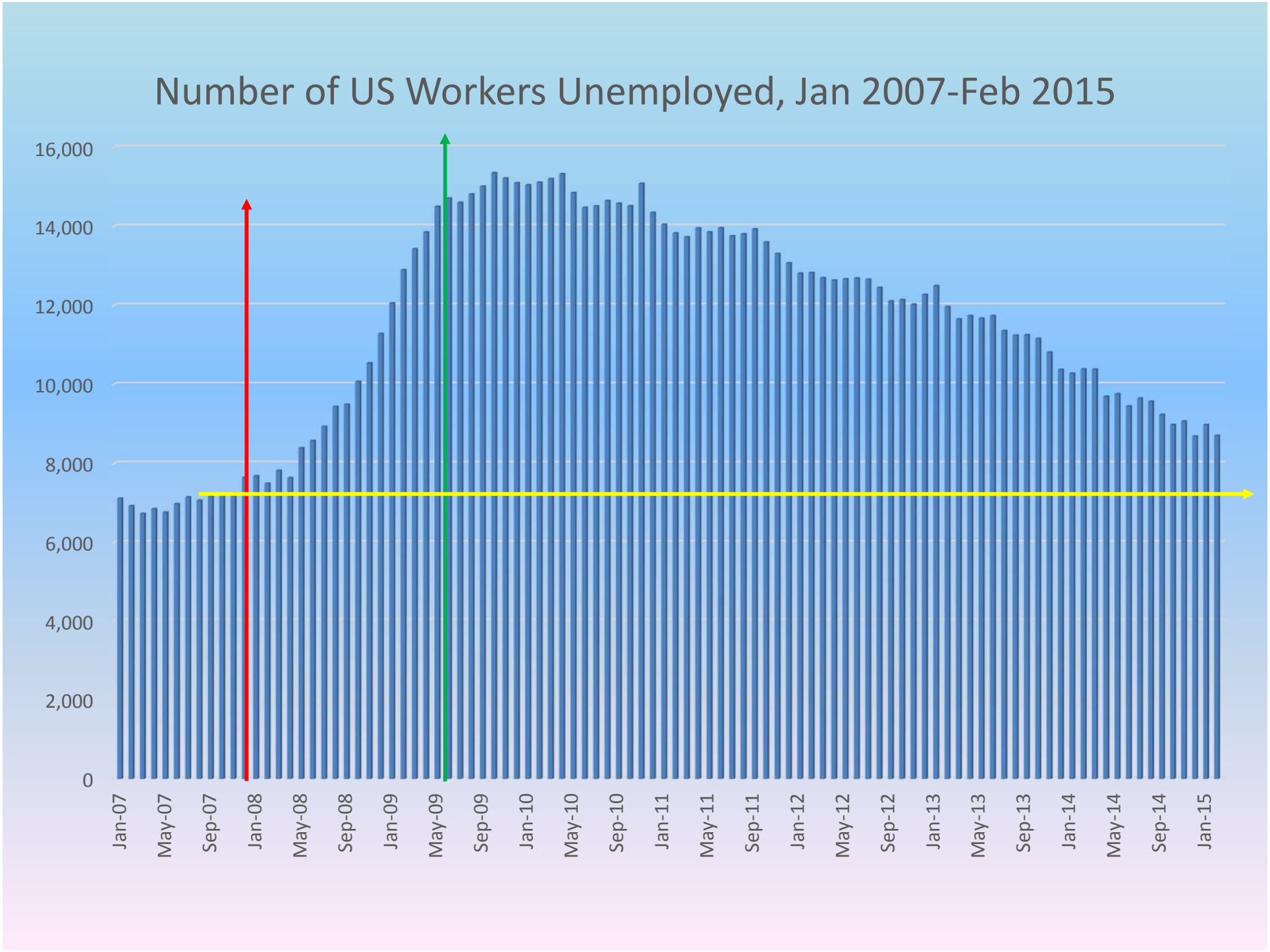
Cutts et al. In preparation.

R_x for Hunger: Energy Security

- Energy assistance can free up resources for food & other necessities
- Children in homes with LIHEAP (compared to those on waitlist)
  - More likely food secure
  - Less likely underweight
  - More likely a “well” child

Figure 1: Pathways of Potential Health-Related Non-Energy Impacts of High Household Energy Costs




Number of US Workers Unemployed, Jan 2007-Feb 2015
16,000
14,000
12,000
10,000
8,000
6,000
4,000
2,000
0
Jan-07
May-07
Sep-07
Jan-08
May-08
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Sep-14
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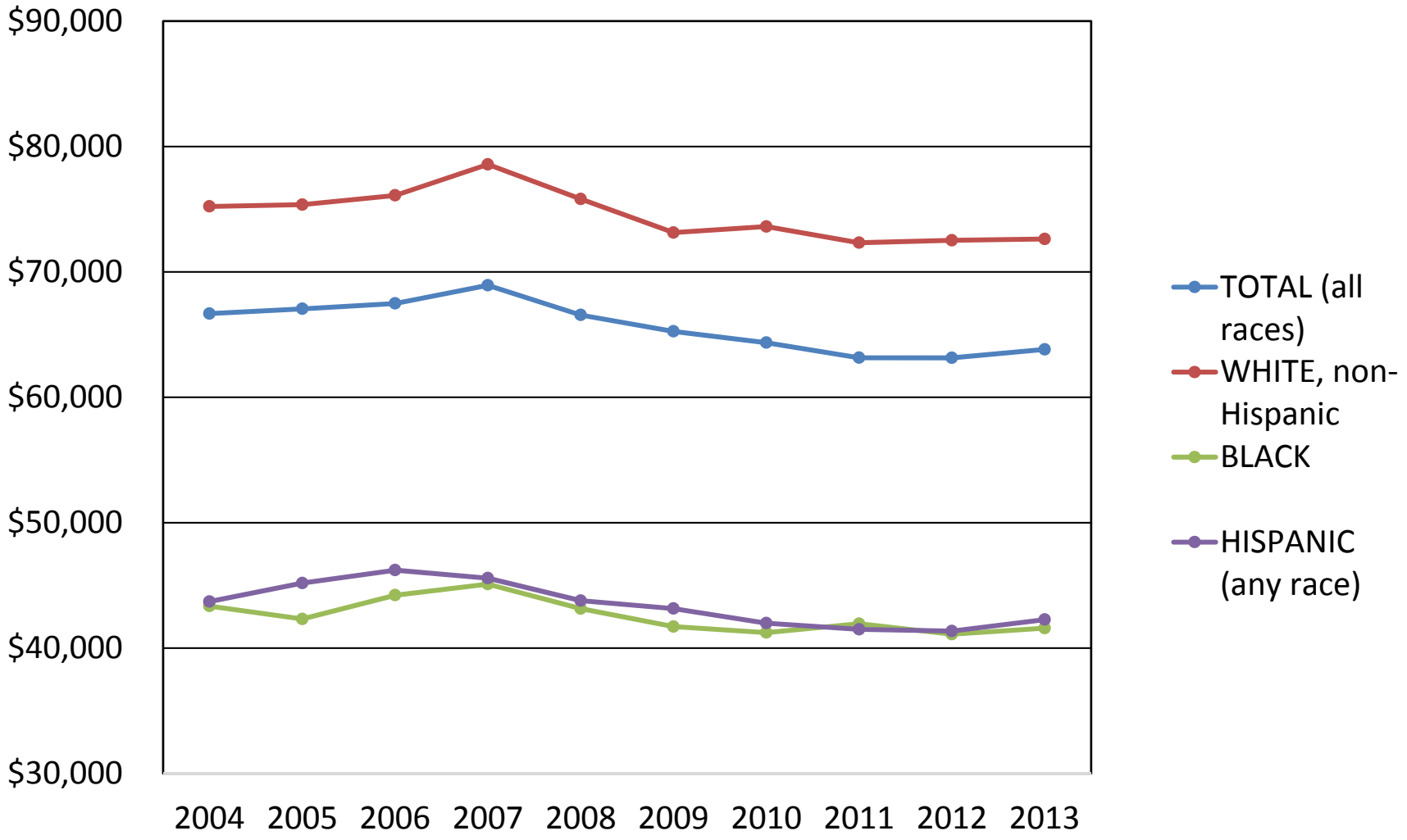
Median Income (in 2013 dollars) by Race/Ethnicity, 2004-2013



Consumer Price Index for Necessary Goods & Services, 2005-2014 (1982-84=100)

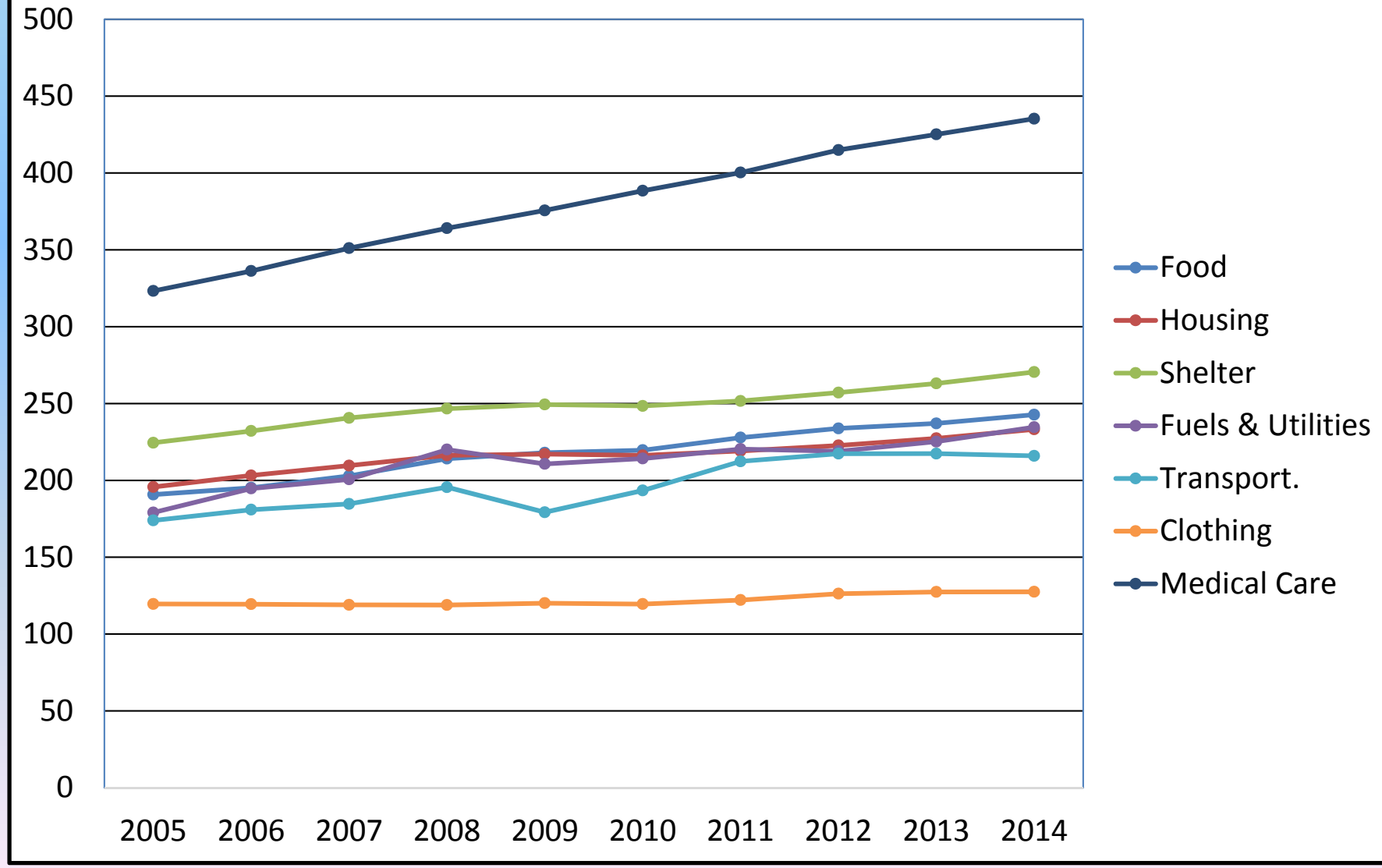
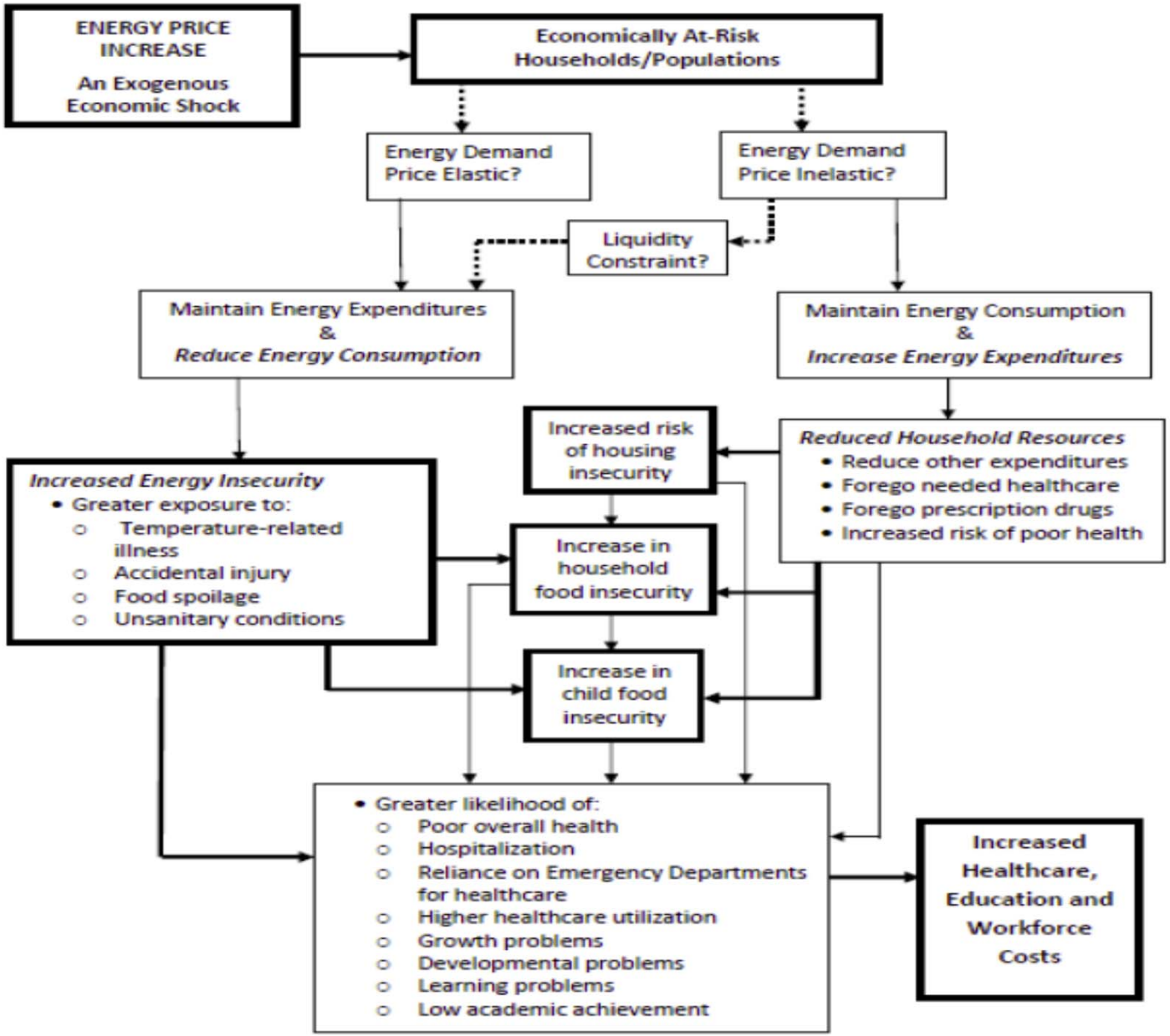


Exhibit 1: Possible responses to increases in energy prices, depending on price elasticity of demand for residential energy.



CHILDREN'S HealthWatch

We are concerned about the health of our children because:

"The future of any society depends on its ability to foster the healthy development of the next generation."

Center On The Developing Child, Harvard University

Extreme Temperatures Stress the Body

- **Cold**: Chill, discomfort, frostbite, **hypothermia**
  - ✓House fires, carbon-monoxide poisoning, unsafe travel conditions, power outages, floods after snow & ice melt, food insecurity
- **Heat**: Sunburn, heat rash, heat edema, dehydration, syncope, heat cramps, heat exhaustion, **heat stroke**
  - ✓Power outages, food spoilage, vector-borne disease, food insecurity

Those most at risk for cold and heat problems are:

- ***Infants and young children***
- ***The elderly***
- Overweight people
- Homeless
- Those who work/exercise inside/outside in the heat or cold
- People who are ill or taking medicines

Seasonal Variation in Wt/Age in a Pediatric Emergency Room: An Early Heat or Eat Study

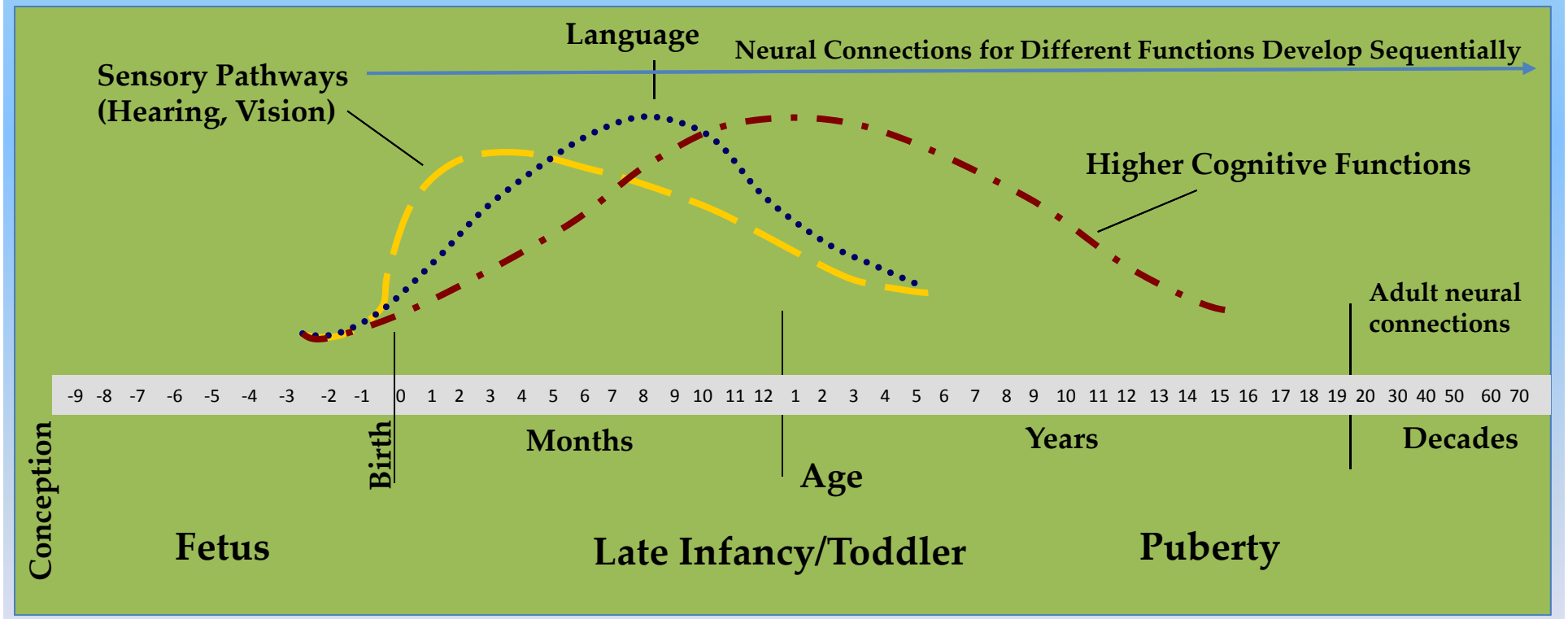
Exposure	Subjects	Outcome	Results	P Value
Presenting during 3 mos. following the coldest month of the year	Children ages 6-24 months presenting at Boston City Hospital ED	% of Children With Wt/Age Below the 5th Percentile	A significant increase in prevalence of low Wt/Age followed the coldest month	
July 1989-June 1990	Min Mean Temp=21.7F	Mean =9.6% for next 3 Mos.	Mean =6.6% for Rest of Yr.	P = 0.002
July 1990-June 1991	Min Mean Temp=29.4F	Mean =8.3% for next 3 Mos.	Mean =6.5% for Rest of Yr.	P = 0.049
July 1991-June 1992	Min Mean Temp=31.0F	Mean =8.4% for next 3 Mos.	Mean =6.6% for Rest of Yr.	P = 0.064

Source: Frank DA, et al. Seasonal Variation in Weight-for-Age in a Pediatric Emergency Room. Public Health Reports, July/August 1996, 111:366-371.

Human Brain Development

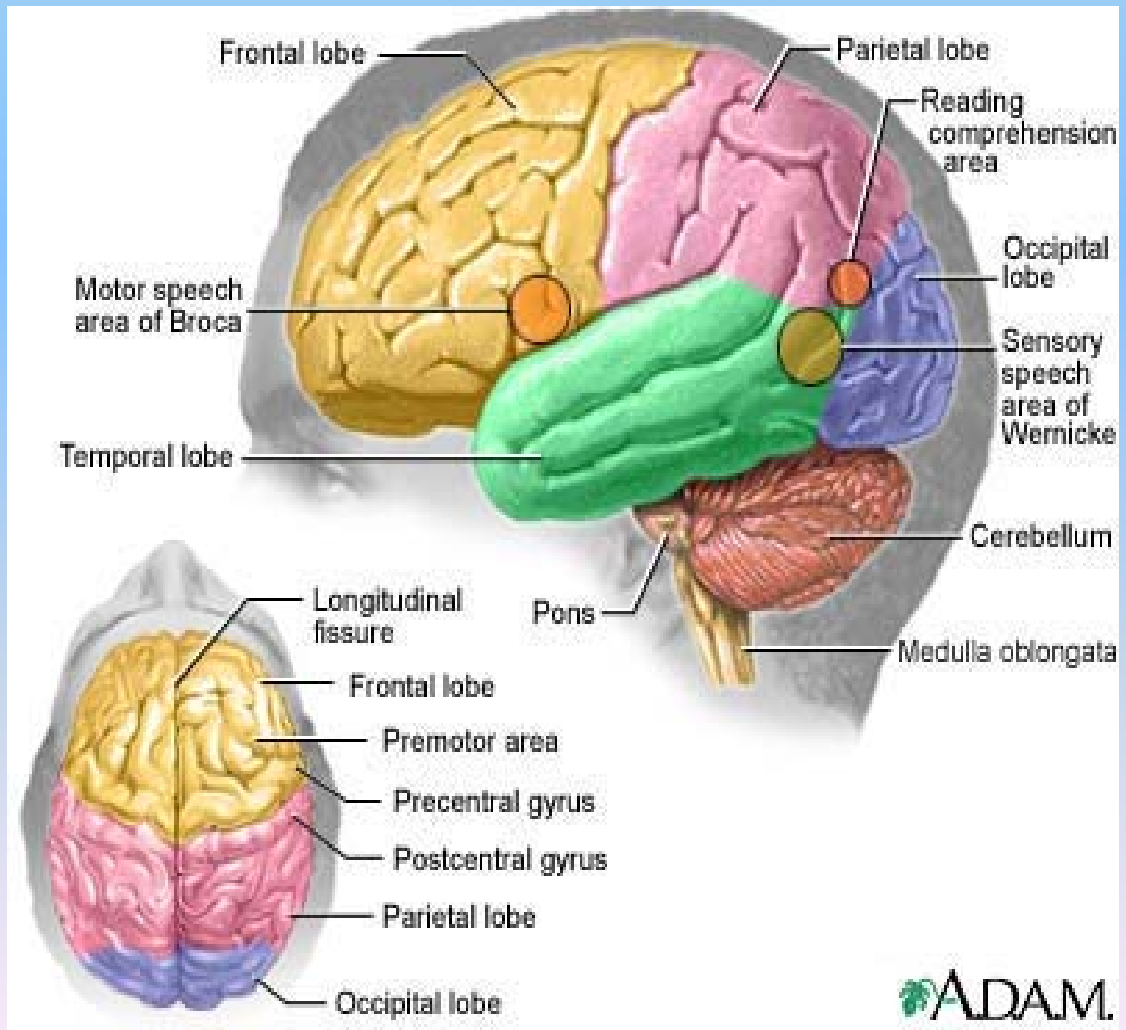
Most Vulnerable Period: Birth – Age 4 Yrs

Synapse formation, neural networks – "brain architecture"

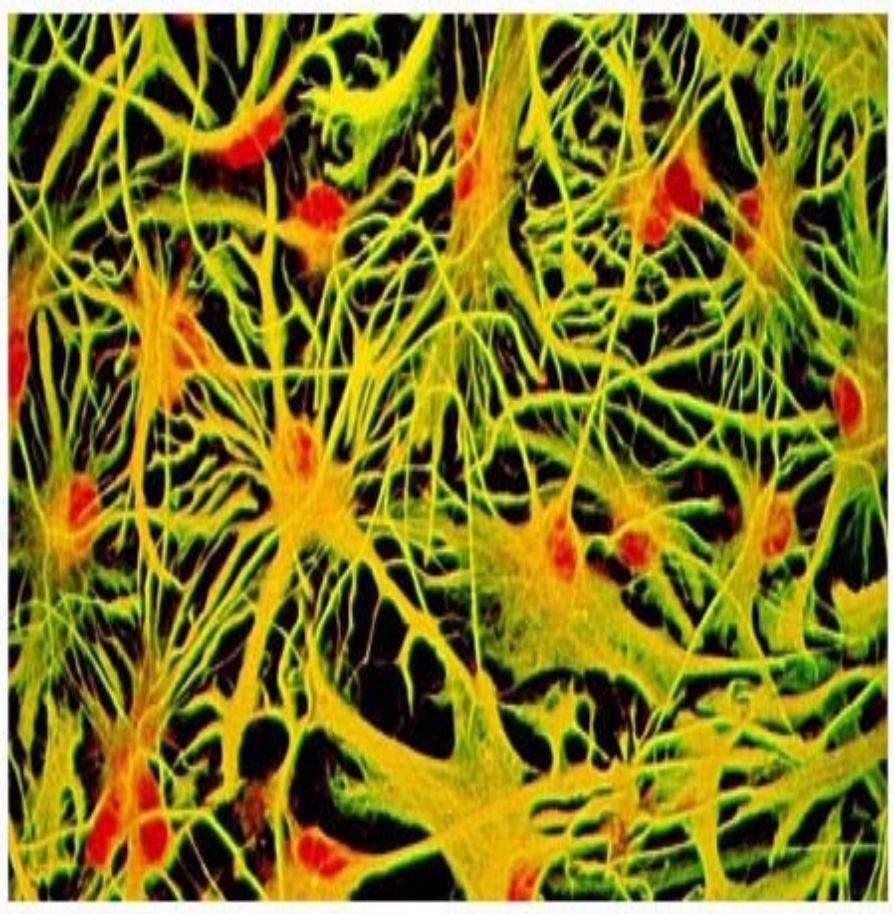


Source: Thompson & Nelson, 2000

Brain architecture is laid down during the first three years of life



Brain architecture is physical structure, interconnections, & neural networks



Brain “architecture” is physical structure, and interconnections. There are about 100 billion cells in the brain.

It is influenced by many factors, including those associated with stress related to poverty, food, housing, and energy insecurity.

The first 3 years of life largely set the trajectory of cognitive development, school readiness, academic achievement, and educational attainment.

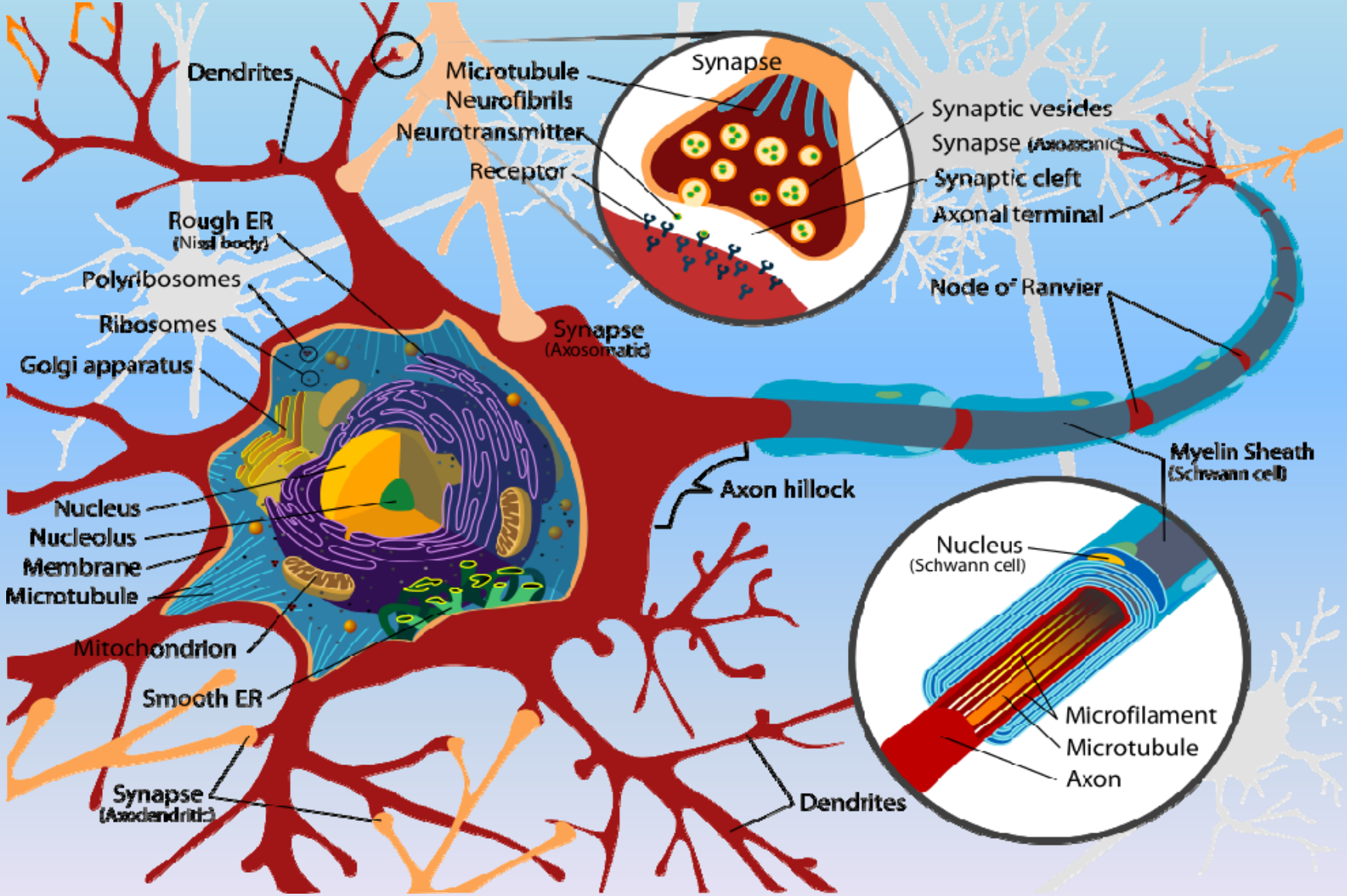
Toxic stress can damage brain architecture!

Stress is a natural response to changes and challenges in our environment

- Stress can be mild, and lead to important learning – we can learn from stress
- Moderate stress – can go either way, can learn from it, or it can be harmful
- **Toxic stress** – chronic mild-to-moderate stress, or acute short-term intense stress

Toxic stress can damage the brain architecture of young, developing children!

- **Though the presence of consistently supportive adults can buffer children from toxic stress' harm.**

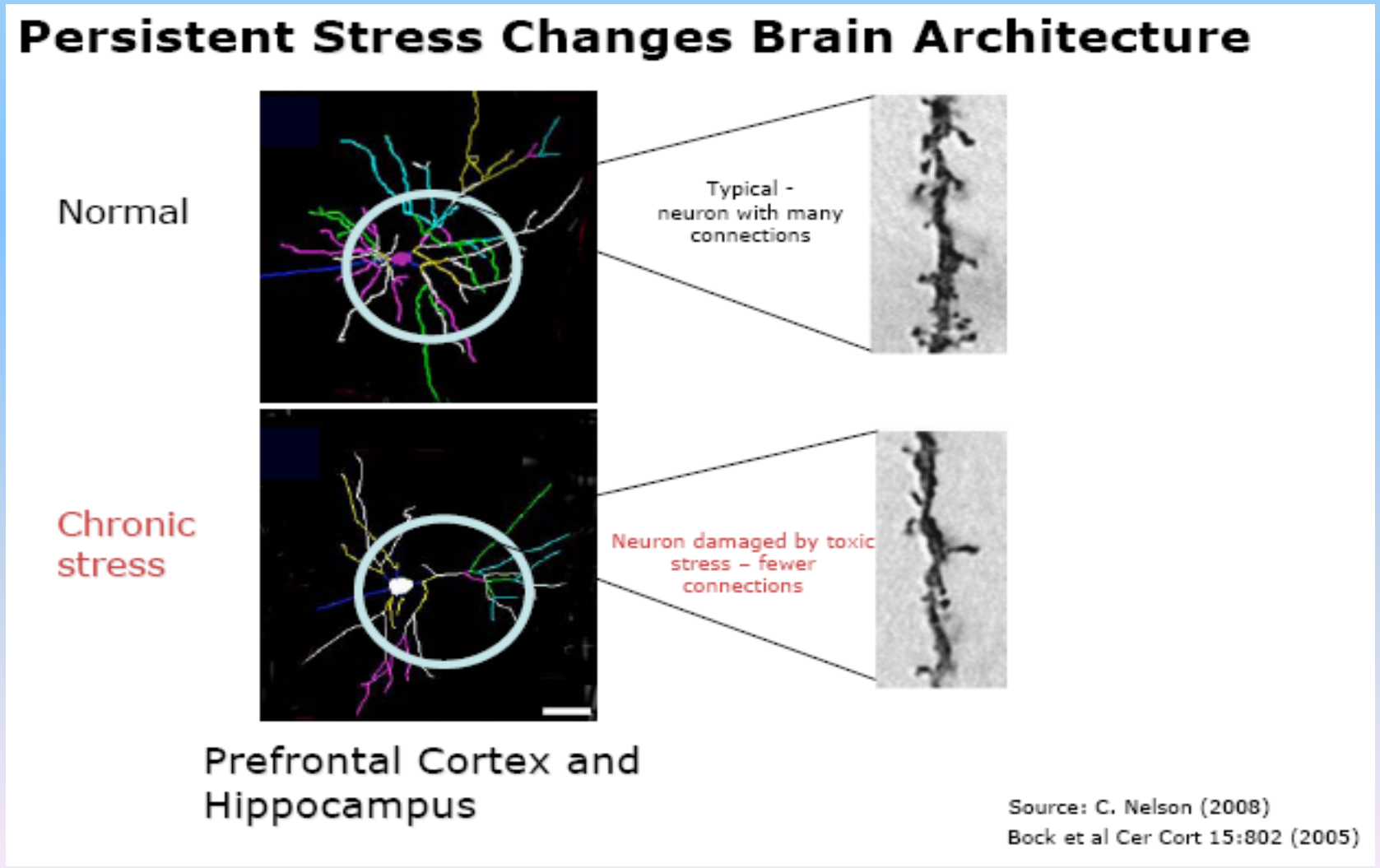


Source: Wikimedia Commons, by Mariana Ruiz Villarreal (LadyofHats), Hamburg, Germany, used with gratitude.

Toxic Stress and Allostatic Load

- Allostasis is an alternative view to homeostasis, acknowledging the accumulation of stress hormones and their by-products in the "system" over time as a result of toxic stress.
- Allostatic load is the cumulative "wear and tear" on body systems resulting from over-activation of the stress response, and accumulation of circulating glucocorticoids and their by-products.
- Allostatic load can involve adverse impacts on immune system functioning, hyper-sensitivity to external stimuli, inappropriate response to stress, attention-deficit hyperactivity disorders, and life-threatening disease later in life.

Animal research indicates that brain architecture is harmed by “toxic” stress



Toxic Stress and Immune Function

- The hypothalamic-pituitary-adrenal (HPA) axis is activated in response to stress - increases level of stress hormones (e.g., cortisol, adrenaline, ACTH) → help the body mobilize resources to respond to stress.
- HPA axis activation – for example, by stress –also increases susceptibility to infectious disease.
- So toxic stress also affects development and calibration of the neuroendocrine-immune (NEI) network in the prenatal and early childhood periods.

Toxic Stress and Related Processes

- **Biological embedding:** process by which individuals' previous experiences and environments systematically alter their health and functioning across the life span.
- **Plasticity:** iterative process by which experience shapes the brain; as it is exposed to new experiences, they in turn, shape brain structure and function; applies to both positive and negative experience.
- **Nutrition Programming:** potential lifelong impacts of a mother's nutrition and health during pregnancy on her child's development and health.

Toxic Stress and Related Processes

- **Epigenetics and the epigenome**: As a child grows and develops, chemical reactions activate and deactivate parts of the genome at strategic times. Epigenetics is the study of these chemical reactions and the factors that influence them.
- **The epigenome:** Dynamically responds to the environment; stress, diet, behavior, toxins, and other factors regulate and change gene expression.
- **Epigenetic inheritance:** An unconventional finding; parent's experiences, in the form of epigenetic tags, can be passed down to future generations.

So what does all this mean, and why does it matter?

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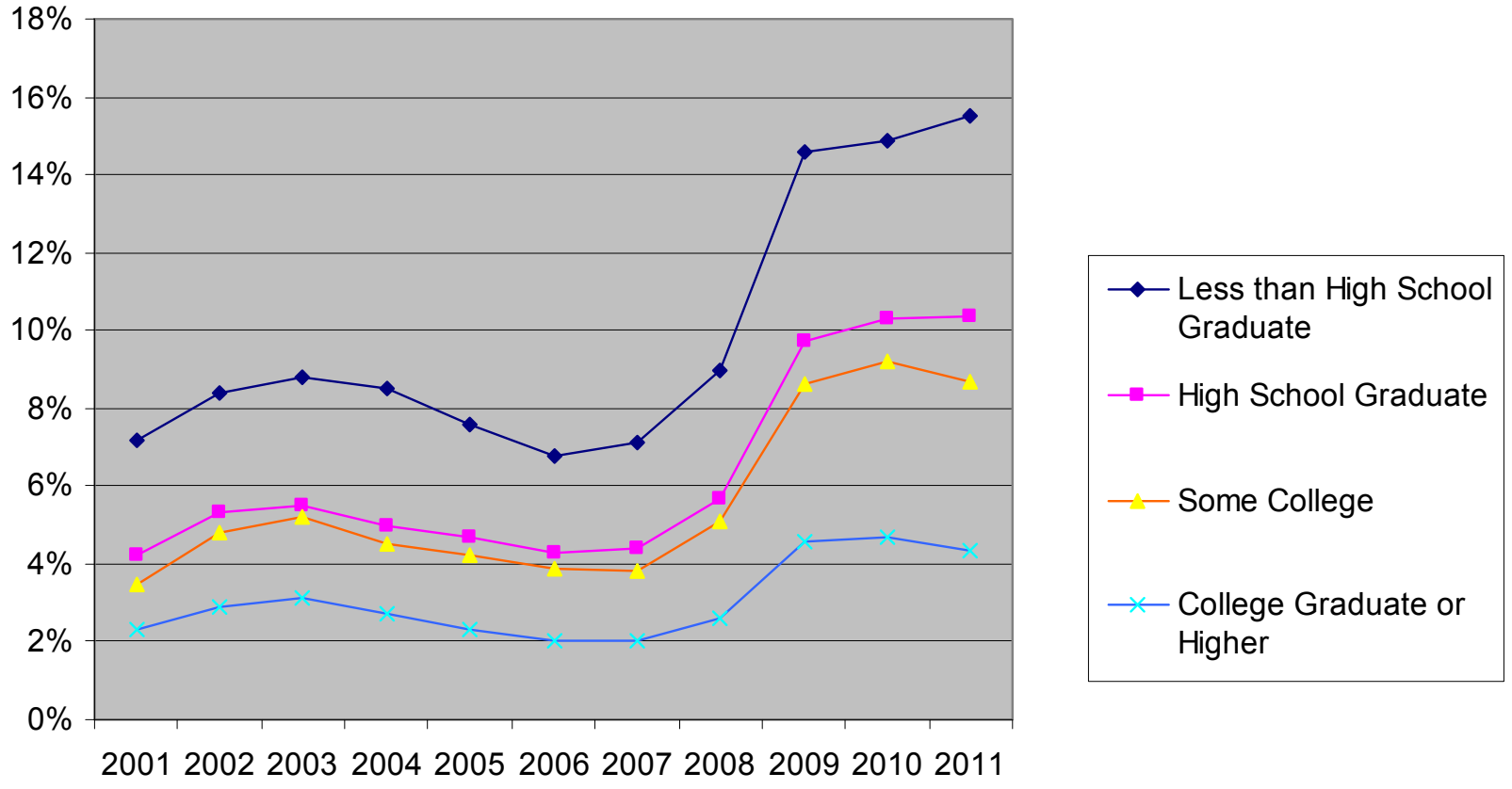
- Toxic Stress, allostatic load, damage to children's brain architecture, biological embedding of adverse childhood experiences, nutrition programming *in utero*, negative plasticity of brain development, epigenetics, and heritability of adverse epigenetic changes are all factors that can perpetuate the harmful effects of energy, housing, and food insecurity over generations.
- These processes can limit and damage the health of children and families, and of communities, for generations.
- **They profoundly impact human capital development; cognitive development, school readiness, academic achievement, educational attainment, workforce preparedness, fulfillment of human potential, and lifetime earnings.**

BUSINESS CYCLE REFERENCE DATES		DURATION IN MONTHS			
Peak	Trough	Contraction	Expansion	Cycle	
Quarterly dates are in parentheses		*Peak to Trough*	*Previous trough to this peak*	*Trough from Previous Trough*	*Peak from Previous Peak*
	December 1854 (IV)	--	--	--	--
June 1857(II)	December 1858 (IV)	18	30	48	--
October 1860(III)	June 1861 (III)	8	22	30	40
April 1865(I)	December 1867 (I)	32	46	78	54
June 1869(II)	December 1870 (IV)	18	18	36	50
October 1873(III)	March 1879 (I)	65	34	99	52
March 1882(I)	May 1885 (II)	38	36	74	101
March 1887(II)	April 1888 (I)	13	22	35	60
July 1890(III)	May 1891 (II)	10	27	37	40
January 1893(I)	June 1894 (II)	17	20	37	30
December 1895(IV)	June 1897 (II)	18	18	36	35
June 1899(III)	December 1900 (IV)	18	24	42	42
September 1902(IV)	August 1904 (III)	23	21	44	39
May 1907(II)	June 1908 (II)	13	33	46	56
January 1910(I)	January 1912 (IV)	24	19	43	32
January 1913(I)	December 1914 (IV)	23	12	35	36
August 1918(III)	March 1919 (I)	7	44	51	67
January 1920(I)	July 1921 (III)	18	10	28	17
May 1923(II)	July 1924 (III)	14	22	36	40
October 1926(III)	November 1927 (IV)	13	27	40	41
August 1929(III)	March 1933 (I)	43	21	64	34
May 1937(II)	June 1938 (II)	13	50	63	93
February 1945(I)	October 1945 (IV)	8	80	88	93
November 1948(IV)	October 1949 (IV)	11	37	48	45
July 1953(II)	May 1954 (II)	10	45	55	56
August 1957(III)	April 1958 (II)	8	39	47	49
April 1960(II)	February 1961 (I)	10	24	34	32
December 1969(IV)	November 1970 (IV)	11	106	117	116
November 1973(IV)	March 1975 (I)	16	36	52	47
January 1980(I)	July 1980 (III)	6	58	64	74
July 1981(III)	November 1982 (IV)	16	12	28	18
July 1990(III)	March 1991(I)	8	92	100	108
March 2001(I)	November 2001 (IV)	8	120	128	128
December 2007 (IV)	June 2009 (II)	18	73	91	81
Average, all cycles:					
1854-2009 (33 cycles)		17.5	38.7	56.2	56.4*
1854-1919 (16 cycles)		21.6	26.6	48.2	48.9**
1919-1945 (6 cycles)		18.2	35.0	53.2	53.0
1945-2009 (11 cycles)		11.1	58.4	69.5	68.5

* 32 cycles
** 15 cycles

Why Impacts of Energy Insecurity on Child Health and Development Matter

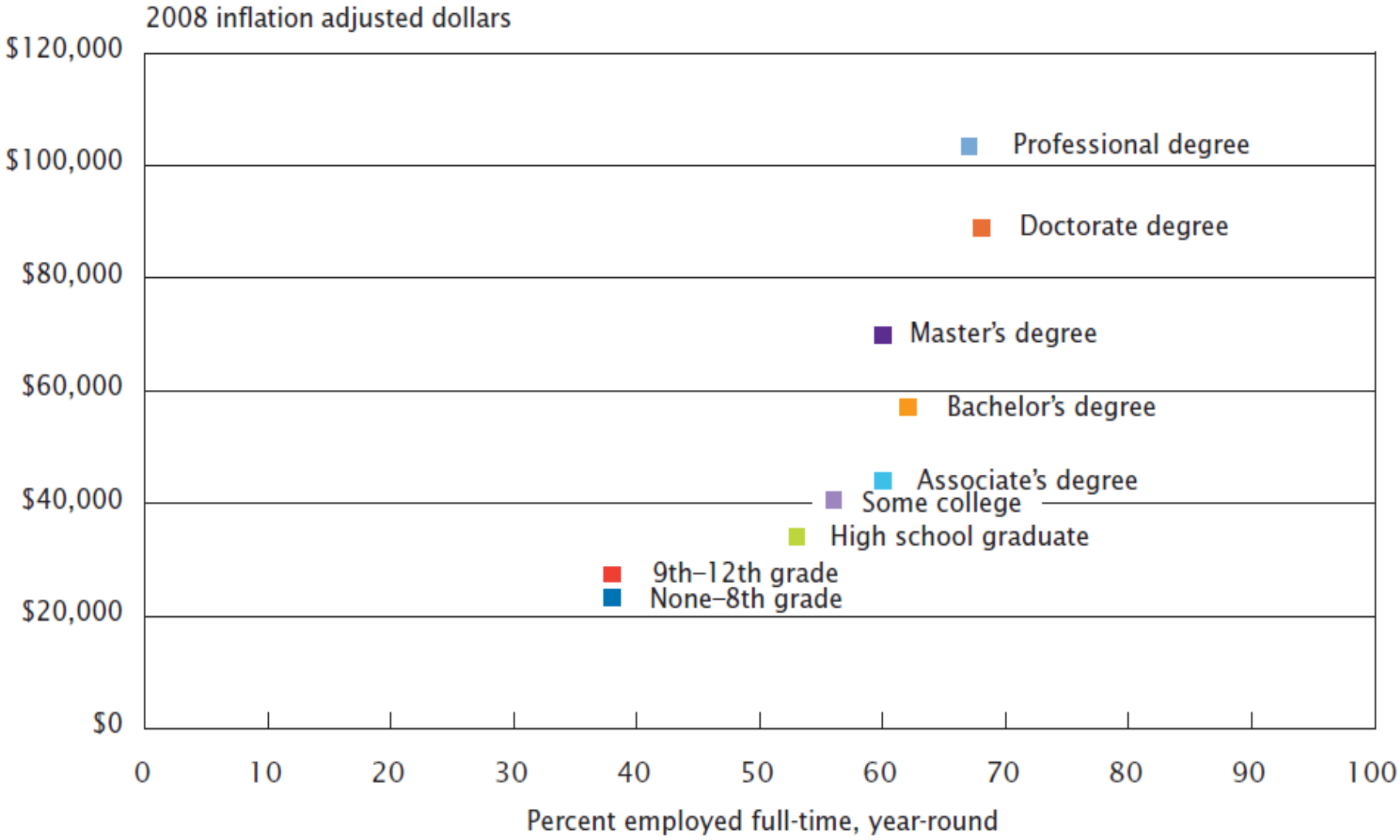
National Unemployment Rate, Persons Ages 25 Years and Above by Education Level Attained



Source: U.S. Bureau of Labor Statistics, CPS unemployment data.

Figure 2.

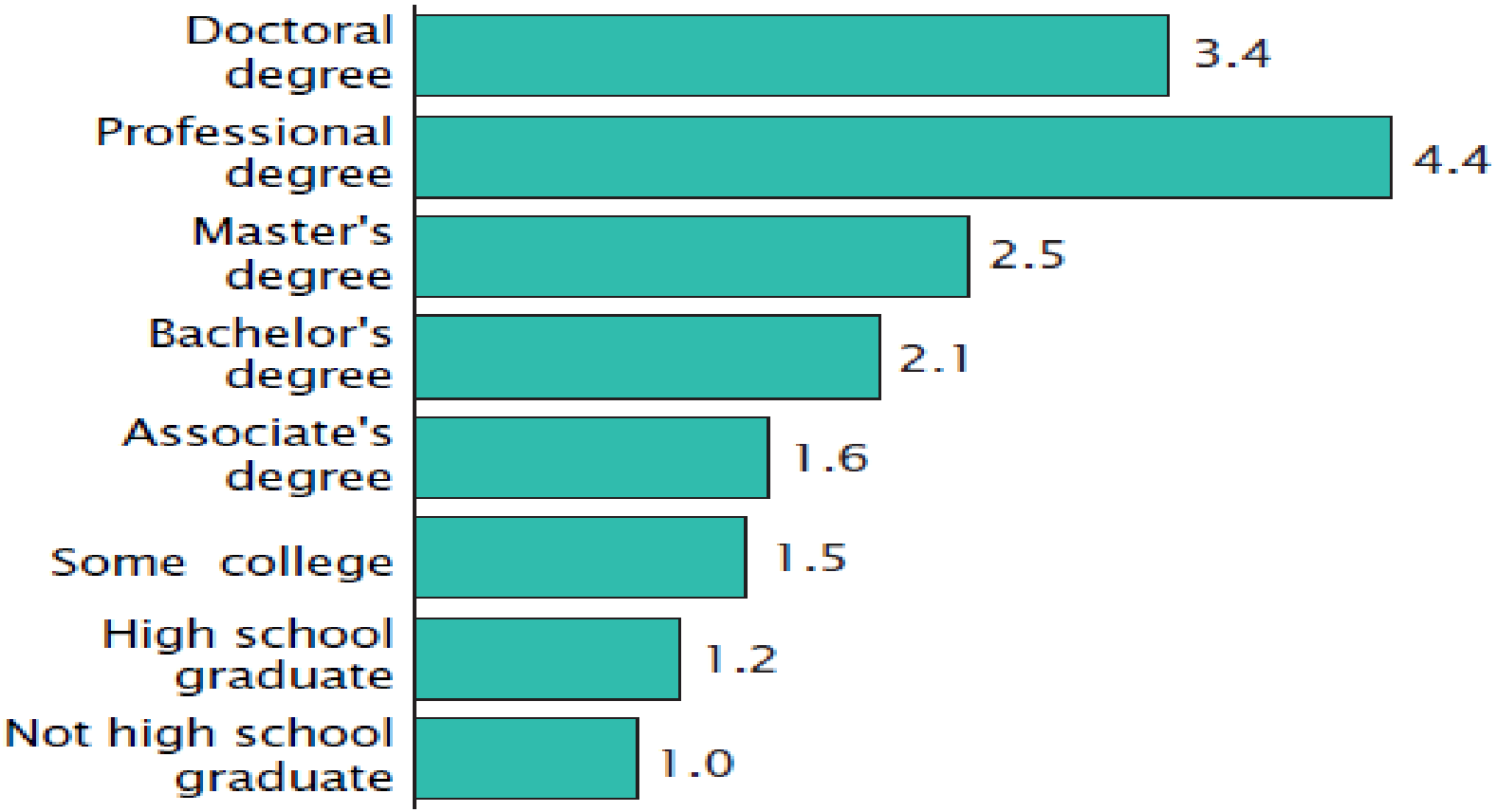
Education, Work Status, and Median Annual Earnings



Source: U.S. Census Bureau, American Community Survey, 2006–2008.

Synthetic Work-Life Earnings Estimates for Full-Time, Year-Round Workers by Educational Attainment Based on 1997–1999 Work Experience

(In millions of 1999 dollars)



Source: U.S. Census Bureau, Current Population Survey, Annual Social and Economic Supplement, 1998 to 2000.

Household Energy Insecurity is Linked to Food Insecurity

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Outcomes	Energy Secure (n=6,385; 66%)	Moderate Energy Insecurity: Shutoff Threatened (n=1,043; 11%)	Severe Energy Insecurity: Heat with Cooking Stove/Shutoff/ Unheated/cooled Days (n=2,293; 23%)	P value
Household Food Insecurity (yes/no)	1.00	2.37 (1.78, 3.16) P < 0.01	3.06 (2.46, 3.81) P < 0.01	P < 0.01
Child Food Insecurity (yes/no)	1.00	1.79 (1.13, 2.72) P < 0.01	3.46 (2.56, 4.67) P < 0.01	P < 0.01

Source: Cook JT, Frank DA, Casey PH, et al. A Brief Indicator of Household Energy Security: Associations with Food Security, Child Health, and Child Development in US Infants and Toddlers. *Pediatrics*, 2008, Oct, 122(4):e867-e875.

Household Energy Insecurity is Linked to Child Health & Development

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Outcomes	Energy Secure (n=6,385; 66%)	Moderate Energy Insecurity: Shutoff Threatened (n=1,043; 11%)	Severe Energy Insecurity: Heat with Cooking Stove/Shutoff/ Unheated/cooled Days (n=2,293; 23%)	P value
Child Health Fair/poor	1.00	1.34 (1.08, 1.68) P = 0.01	1.36 (1.15, 1.61) P < 0.01	P < 0.01
Hospitalized Since Birth (yes/no)	1.00	1.22 (1.03, 1.45) P = 0.02	1.02 (0.89, 1.17) P = 0.74	P = 0.07
PEDS Significant Concerns	1.00	1.00 (0.71, 1.41) P = 0.99	1.82 (1.38, 2.39) P < 0.01	P < 0.01

Source: Cook JT, Frank DA, Casey PH, et al. A Brief Indicator of Household Energy Security: Associations with Food Security, Child Health, and Child Development in US Infants and Toddlers. *Pediatrics*, 2008, Oct, 122(4):e867-e875.

TABLE 4 Adjusted Outcomes by LIHEAP Participation

Variable	Does not Receive Home Energy Assistance ($n = 5925$)	Receives Home Energy Assistance ($n = 1149$)	95% CI	*P*
Mean *z* weight/age	−0.033	0.076	NA	.01
At nutritional risk for growth problems[a]	1.23	1.00	1.00–1.52	.05
Hospitalizations since birth	1.02	1.00	0.86–1.20	.84
Acute hospital admission (Boston and Little Rock EDs, $n = 4445$)	1.32	1.00	1.00–1.74	.05
At risk for overweight[b] (2–3 years olds only, $n = 691$)	0.83	1.00	0.46–1.49	.52

Multivariate analyses are adjusted for site of interview, year of measurement, race/ethnicity of caregiver, birthplace of mother (US born versus immigrant), mother's marital status, employment status, child's low birth weight, household food security status, and receipt of other assistance program benefits (subsidized housing, WIC, TANF, or food stamps). Age of child was included as a covariate in the model for "hospitalizations since birth". NA indicates not applicable.

[a] <5th percentile weight-for-age or <10th percentile weight-for-height.

[b] >95th percentile BMI-for-age.

Frank DA, Neault NB, Skalicky A, Cook JT, Wilson JD, Levenson S, Meyers AF, Heeren T, Cutts DB, Casey PH, Black MM, Zaldivar N, Berkowitz C, and C-SNAP Study Group. Heat or Eat: Low Income Home Energy Assistance Program and Nutritional and Health Risk Among Children Under 3 Years Old. Pediatrics*. 2006;118:1293-1302.*

Heat or Eat? Cold-Weather Shocks and Nutrition in Poor American Families

A study reported in 2003 used Consumer Expenditure Survey (CEX) and National Health and Nutrition Examination Survey(NHANES) data to compare food expenditures by “poor” and “non-poor” households during exceptionally cold months, finding:

- Both poor and non-poor households increased fuel expenditures in response to unusually cold weather (by $37 and $53 on average respectively, in 1982-84 dollars).
- Poor families also reduced food expenditures by roughly the same amount as their increase in fuel expenditures, whereas richer families just increased food expenditures.
- Poor parents and their children spend less on and eat less food during cold-weather budgetary shocks.

Source: Bhattacharya J, DeLiere T, Haider S, Currie J. Heat or Eat? Cold Weather Shocks and Nutirtion in Poor American Families. *Am J Public Health. 2003;93:1149–1154.*

Seasonal Variation in Food Insecurity is Associated with Heating and Cooling Costs among Low-Income Elderly Americans

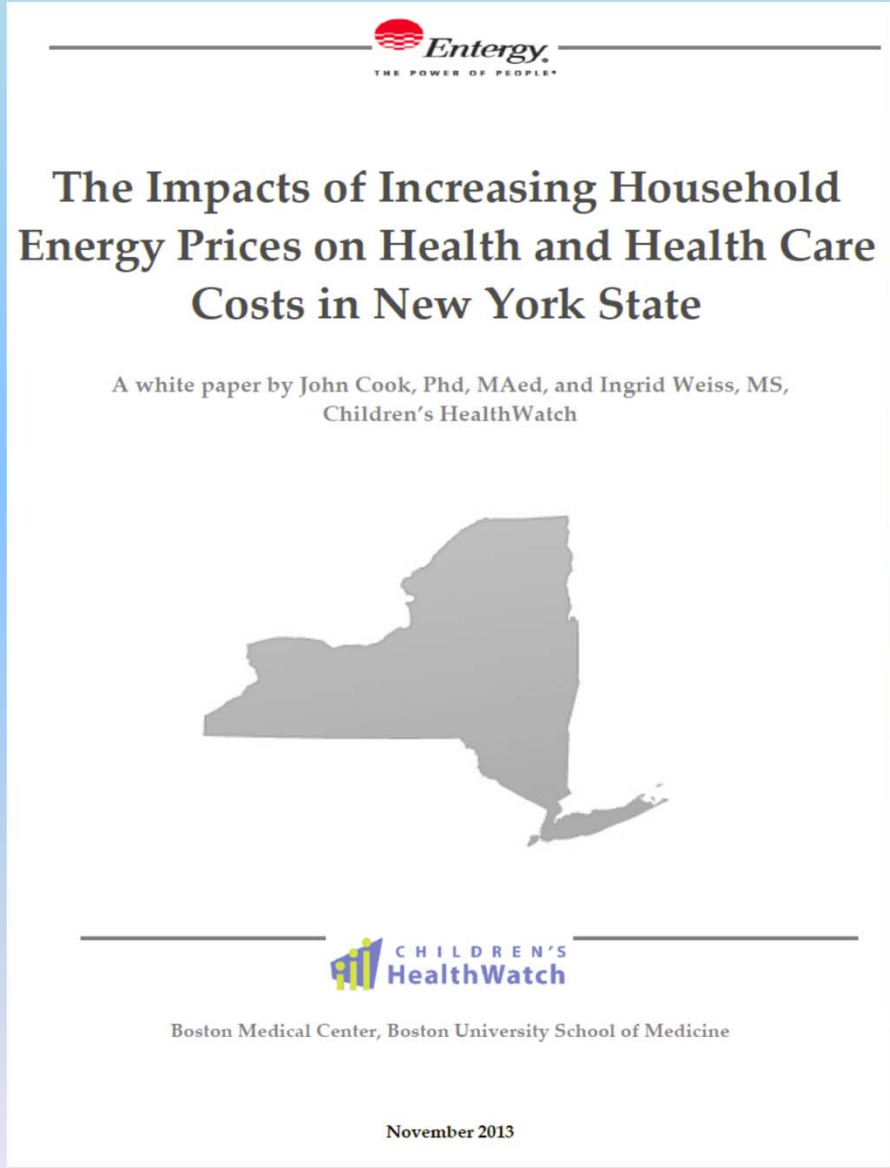
- In high-cooling states, the odds of food insecurity with hunger for poor elderly-only households were 27% higher in the summer than in the winter (***cool or eat***).

- In high-heating states the pattern was reversed for such households; the odds of food insecurity with hunger were 43% lower in the summer (***heat or eat***).

Source: Nord M, Kantor LS. Seasonal variation in food insecurity is associated with heating and cooling costs among low-income elderly Americans. J Nutr, November 2006. 136:2939-2944.

A simulation of:

1. Increasing household energy prices' effects on prevalence of energy insecurity,
2. Increasing household energy insecurity's impacts on health in children and elderly?
3. Effects on utilization of health care services,
4. Effects on expenditures for select health care services,
   - ➢ Hospitalizations
   - ➢ Ambulatory visits



CHILDREN'S HealthWatch

Three Household Energy Price Increase Scenarios for New York

- EPS1 = 1.0% per year average increase in composite household energy prices
- EPS2 = 2.0% per year average increase in composite household energy prices
- EPS3 = 3.0% per year average increase in composite household energy prices

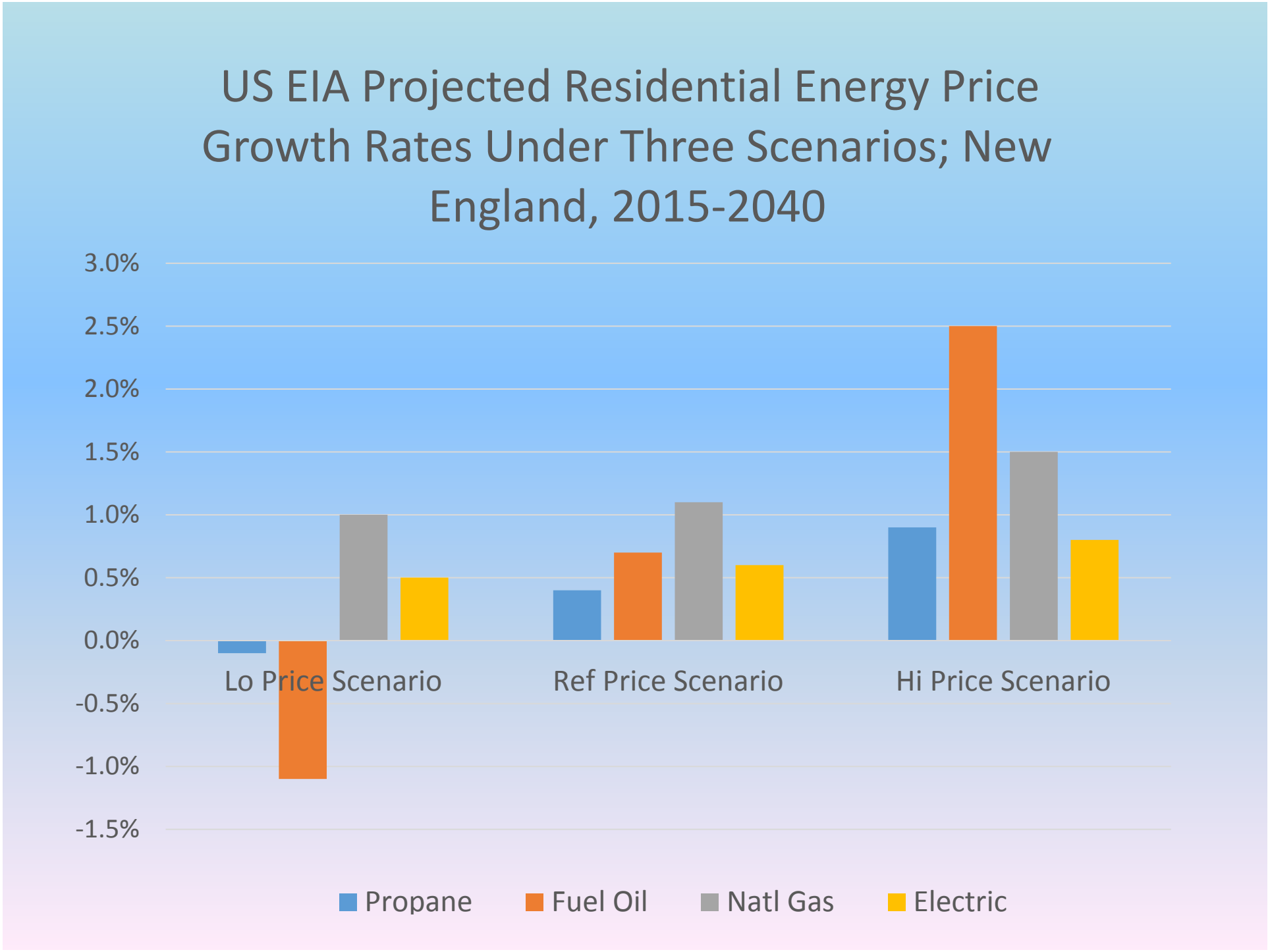

US EIA Projected Residential Energy Price Growth Rates Under Three Scenarios; New England, 2015-2040
3.0%
2.5%
2.0%
1.5%
1.0%
0.5%
0.0%
-0.5%
-1.0%
-1.5%
Lo Price Scenario
Ref Price Scenario
Hi Price Scenario
Propane
Fuel Oil
Natl Gas
Electric

Exhibit 9: Total estimated and projected annual added costs for hospital care and physician and clinical services attributable to assumed energy price increase scenarios among children and elderly combined for New York State

	Total Added Hospitalization Costs: New York State (2010 $1,000s)			Total Added Physician and Clinical Services Costs: New York State (2010 $1,000s)			Total Added Costs for Hospitalizations plus Physician and Clinical Services: New York State (2010 $1,000s)		
	EPS1	EPS2	EPS3	EPS1	EPS2	EPS3	EPS1	EPS2	EPS3
2011	7,717	15,512	23,384	4,977	10,004	15,081	12,694	25,515	38,466
2012	15,790	31,898	48,332	10,134	20,474	31,022	25,924	52,372	79,354
2013	24,223	49,183	74,903	15,475	31,421	47,853	39,698	80,604	122,757
2014	33,021	67,390	103,161	21,001	42,860	65,610	54,022	110,250	168,771
2015	42,190	86,544	133,171	26,716	54,801	84,326	68,906	141,345	217,498
2016	51,876	106,959	165,449	32,728	67,479	104,380	84,603	174,438	269,828
2017	61,990	128,475	199,781	38,970	80,766	125,592	100,960	209,241	325,373
2018	72,541	151,123	236,250	45,446	94,677	148,008	117,986	245,800	384,258
2019	83,532	174,931	274,938	52,158	109,229	171,674	135,691	284,160	446,611
2020	94,972	199,932	315,932	59,111	124,438	196,636	154,083	324,371	512,568
2021	107,164	226,788	360,322	66,438	140,601	223,387	173,601	367,388	583,709
2022	119,873	255,029	407,417	74,037	157,512	251,631	193,909	412,542	659,049
2023	133,107	284,694	457,324	81,911	175,194	281,427	215,018	459,887	738,751
2024	146,874	315,820	510,154	90,065	193,665	312,833	236,940	509,485	822,987
2025	161,181	348,448	566,020	98,503	212,947	345,912	259,684	561,394	911,932
2026	175,541	381,540	623,283	106,938	232,430	379,697	282,479	613,970	1,002,979
2027	190,389	416,057	683,543	115,624	252,674	415,120	306,013	668,731	1,098,663
2028	205,731	452,036	741,722	124,566	273,699	449,059	330,297	725,735	1,190,781
2029	221,575	489,514	801,125	133,767	295,525	483,554	355,342	785,039	1,284,679
2030	237,928	528,533	863,453	143,230	318,172	519,643	381,158	846,705	1,383,096
2031	250,952	560,547	914,804	151,071	337,444	550,500	402,023	897,991	1,465,304
2032	264,092	593,171	967,666	158,981	357,083	582,264	423,073	950,255	1,549,931
2033	277,348	626,418	1,022,085	166,961	377,097	614,964	444,309	1,003,515	1,637,049
2034	290,721	660,299	1,078,106	175,011	397,493	648,627	465,732	1,057,792	1,726,732
2035	304,211	694,827	1,135,777	183,132	418,279	683,281	487,344	1,113,106	1,819,058
2036	317,693	729,072	1,194,664	191,248	438,889	718,666	508,941	1,167,961	1,913,330
2037	331,284	759,933	1,255,251	199,429	457,433	755,072	530,713	1,217,366	2,010,322
2038	344,984	791,365	1,317,587	207,677	476,320	792,529	552,661	1,267,685	2,110,116
2039	358,796	823,378	1,381,724	215,991	495,556	831,068	574,787	1,318,934	2,212,792
2040	372,719	855,984	1,447,714	224,373	515,148	870,721	597,092	1,371,132	2,318,435

Exhibit 13: Total estimated and projected annual added costs for hospital care and physician and clinical services attributable to assumed energy price increase scenarios among children and elderly combined for New York City

	Total Added Hospital Care Costs, New York City (2010 $1,000s)			Total Added Physician and Clinical Services Costs, New York City (2010 $1,000s)			Total Added Costs for Hospital Care and Physician and Clinical Services, New York City (2010 $1,000s)		
	EPS1	EPS2	EPS3	EPS1	EPS2	EPS3	EPS1	EPS2	EPS3
2011	3,393	6,820	10,282	2,326	4,675	7,048	5,719	11,495	17,330
2012	6,971	14,082	21,338	4,757	9,611	14,562	11,728	23,693	35,900
2013	10,736	21,798	33,197	7,296	14,814	22,561	18,031	36,612	55,758
2014	14,690	29,979	45,893	9,943	20,291	31,062	24,633	50,271	76,955
2015	18,837	38,639	59,457	12,700	26,051	40,087	31,537	64,691	99,544
2016	23,084	47,596	73,624	15,530	32,020	49,530	38,614	79,616	123,153
2017	27,497	56,988	88,617	18,459	38,257	59,490	45,956	95,245	148,107
2018	32,077	66,826	104,469	21,490	44,769	69,988	53,567	111,596	174,457
2019	36,828	77,123	121,214	24,623	51,564	81,043	61,450	128,688	202,257
2020	41,750	87,891	138,884	27,860	58,649	92,677	69,610	146,540	231,562
2021	46,884	99,220	157,641	31,212	66,053	104,945	78,096	165,273	262,586
2022	52,203	111,061	177,424	34,672	73,765	117,843	86,875	184,826	295,266
2023	57,708	123,427	198,270	38,243	81,796	131,395	95,951	205,223	329,665
2024	63,402	136,333	220,222	41,926	90,152	145,625	105,328	226,484	365,847
2025	69,289	149,791	243,322	45,721	98,842	160,560	115,010	248,633	403,881
2026	75,032	163,084	266,413	49,394	107,359	175,381	124,427	270,442	441,794
2027	80,927	176,850	291,519	53,151	116,151	191,196	134,078	293,001	482,715
2028	86,975	191,103	325,521	56,993	125,226	210,649	143,968	316,329	536,171
2029	93,179	205,855	361,139	60,921	134,590	230,984	154,100	340,445	592,123
2030	99,540	221,118	398,432	64,936	144,250	252,233	164,476	365,368	650,665
2031	105,400	235,430	434,681	68,685	153,421	272,954	174,085	388,850	707,635
2032	111,352	250,104	472,251	72,486	162,809	294,408	183,838	412,913	766,660
2033	117,396	265,151	511,186	76,339	172,420	316,620	193,735	437,571	827,806
2034	123,535	280,578	551,531	80,246	182,258	339,615	203,780	462,836	891,146
2035	129,768	296,393	593,334	84,206	192,329	363,418	213,974	488,722	956,752
2036	135,665	315,681	634,484	88,040	203,802	387,102	223,705	519,483	1,021,585
2037	141,621	337,371	676,884	91,913	216,291	411,508	233,534	553,662	1,088,392
2038	147,637	359,499	720,574	95,825	229,032	436,658	243,462	588,531	1,157,233
2039	153,714	382,073	765,593	99,777	242,031	462,575	253,492	624,104	1,228,168
2040	159,852	405,102	811,982	103,770	255,293	489,282	263,622	660,395	1,301,264

Exhibit 10: Estimated Net Present Value of Annual Additional Health Care Costs over 2011-2040 Attributable to Three Energy Price Increase Scenarios at Select Discount Rates: New York State (in Millions of 2010 Dollars)

Discount Rates		Net Present Value Estimates (30-Yr Projection Period)	Net Present Value Estimates (15-Yr Projection Period)
1.0%	EPS1	$6,926	$1,687
	EPS2	$15,389	$3,562
	EPS3	$25,127	$5,648
2.0%	EPS1	$5,671	$1,522
	EPS2	$12,572	$3,211
	EPS3	$20,500	$5,089
4.0%	EPS1	$3,881	$1,248
	EPS2	$8,561	$2,629
	EPS3	$13,921	$4,160
6.0%	EPS1	$2,729	$1,032
	EPS2	$5,989	$2,171
	EPS3	$9,709	$3,430

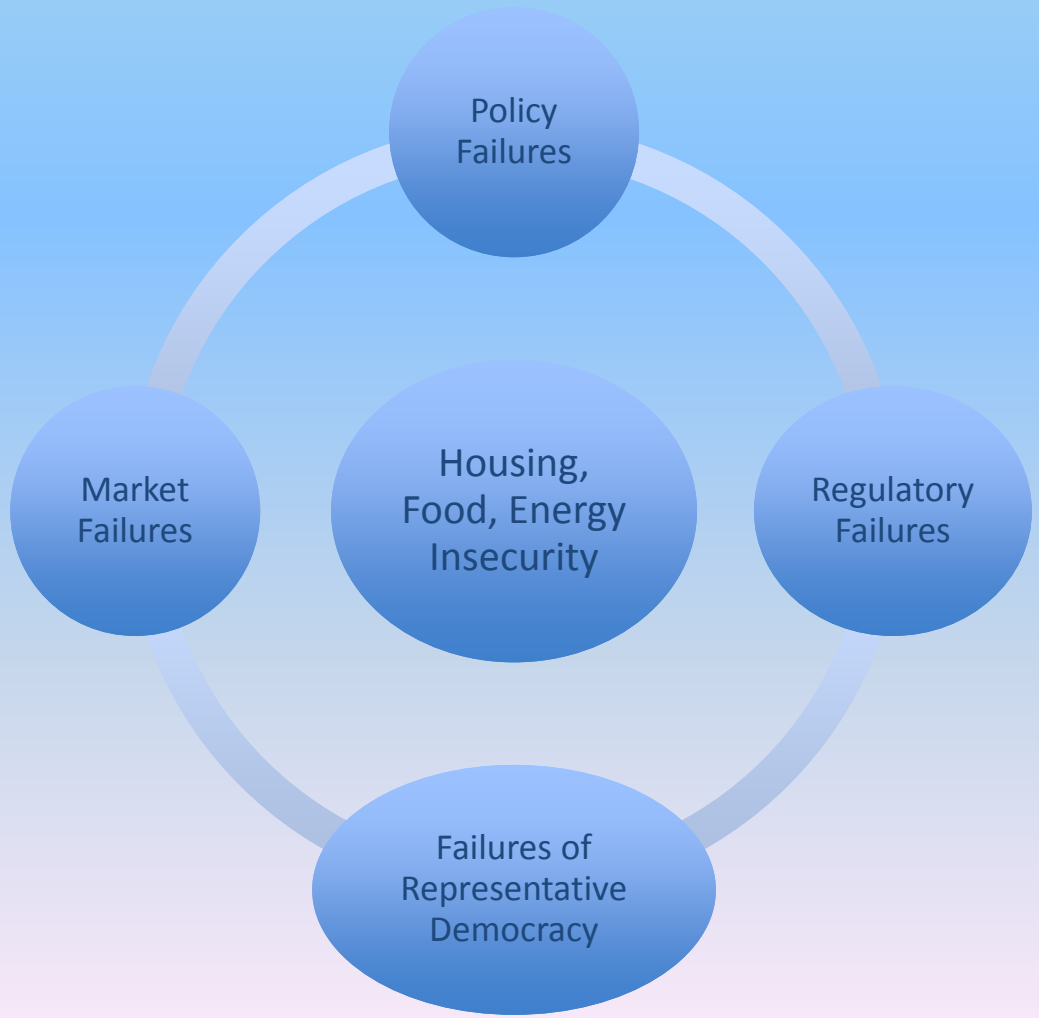
Exhibit 14: Estimated Net Present Value of Annual Additional Health Care Costs over 2011-2040 Attributable to Three Energy Price Increase Scenarios at Select Discount Rates: New York City (in Millions of 2010 Dollars)

Discount Rates	Scenario	Net Present Value Estimates (30-Yr Projection Period)	Net Present Value Estimates (15-Yr Projection Period)
1.0%	EPS1	$3,052	$758
	EPS2	$6,893	$1,601
	EPS3	$12,473	$2,538
2.0%	EPS1	$2,501	$684
	EPS2	$5,627	$1,444
	EPS3	$10,122	$2,288
4.0%	EPS1	$1,714	$561
	EPS2	$3,828	$1,183
	EPS3	$6,801	$1,871
6.0%	EPS1	$1,207	$465
	EPS2	$2,676	$977
	EPS3	$4,694	$1,544

OK, this is interesting… but what can I do with this information? Well, consider this:

- Strong physical infrastructures; strong bridges, buildings, roads, parks, bike paths, trains, buses, subways, libraries, schools, ports, housing stock, utilities, are all part of the foundation for a strong, healthy public, & strong, healthy communities, and,
- Strong social infrastructures; fire departments, faith-based institutions, police departments, PTOs, civic organizations, mutual aid societies, private food assistance – food banks, food pantries, food rescue – disaster relief, public food, housing, & energy assistance – SNAP, WIC, CACFP, school meals, summer feeding, etc., housing subsidies, LIHEAP, legal aid, are also essential parts of the foundation for a strong, healthy public & communities. They enable all of us to be healthy and to prosper. They are for all of us, and we all benefit from them, whether we use them or not.

Energy, food, and housing insecurity are results of systemic failures, not individuals' or families' failures



WE ARE ALL IN THIS TOGETHER!
Thank you!

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