

# **Evidence That Young Children Are Falling Through the Safety Net: Policy Implications of Hunger and Poor Health in Pennsylvania**

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## **Abstract**

Hunger is still lurking in Pennsylvania. But it can be addressed and treated by policymakers and legislators. This paper gives an overview of the empirical evidence that federal and state policymakers have a direct impact on the health and wellbeing of young children through the statewide implementation of safety net programs such as the Food Stamp Program, Women, Infants and Children Supplemental Nutrition Program, and Low Income Heat and Energy Assistance. Food insecurity, known as the lack of access to enough food for an active and healthy life, is strongly associated with increased hospitalizations, poor child health, developmental risk and maternal depression. The Philadelphia GROW Project research in Philadelphia demonstrates that food insecurity and its negative health consequences are prevalent and damaging to the lives of children and their parents in the Commonwealth. The continuing food insecurity in Philadelphia and Pennsylvania is having a damaging affect not only on the wellbeing of young children, but also on the purse strings of Pennsylvania. Policymakers and legislators have the opportunity to turn this trend around with sound, evidence-based decision making as they carry out their legislative agendas. We end this paper with recommendations for how key decision-makers can have an immediate and lasting impact on improving the lives of low-income families with young children.

## Introduction

Despite the existence of federal and state nutrition programs, hunger is still lurking in Pennsylvania. But it can be addressed and treated. One cannot see hunger with the naked eye, and it may not even manifest as underweight or overweight, but it does have very tangible effects on the body, the psyche, emotional wellbeing, and developmental potential of children and adults. The U.S. Department of Agriculture (USDA) developed a term more than a decade ago to capture this non-visible but harmful form of food deprivation. This term is “food insecurity.” Food insecurity is the lack of access to enough nutritious food for an active and healthy life due to economic constraints (Nord et al. 2007). Food insecurity is particularly dangerous for infants and toddlers because children are in the critical stage of neurological, social, and physical development during their first three years (Shonkoff 2003). Even the slightest interruption in nutritional intake can derail short and long-term development (Chilton et al. 2007; Cook and Frank 2008; Rose-Jacobs et al. 2008; Walker et al. 2007). In turn, this can cost the United States’ health and education system billions of dollars (Brown et al. 2007). The human suffering and the economic burden of food insecurity deserve greater attention from policymakers and legislators. There is now up-to-date research that can be utilized for evidence-based decision-making to prevent food insecurity and poor health in the years to come.

Legislators and policymakers can intervene to address household food insecurity through sound legislation and administrative actions that support low-income families in multiple ways that go well beyond food assistance programs and food program set asides. This paper describes how household food insecurity is associated with increased rates of reported fair and poor health, with higher rates of developmental risk among Pennsylvania infants and toddlers, and with greatly increased risk of maternal depressive symptoms. Maternal depressive symptoms are important to consider as they have powerful effects on the health and development of the child, as well as the earning potential of mothers. We review the research on these issues, explain the ongoing research from the Philadelphia GROW Project, and we describe policy recommendations that call for increased attention to income support programs such as Food Stamps, Temporary Assistance to Needy Families, and Medicaid, as well as deliberate and sustained action to

continue to recognize and treat families with young children at risk for food insecurity.

The most up-to-date work on household food insecurity research in Pennsylvania, and the basis of these results and policy recommendations, comes from the Philadelphia GROW Project ([www.growproject.org](http://www.growproject.org)) which works with parents, scientists, and policymakers to improve early childhood nutrition and to prevent food insecurity among very young children and their families. Our work is coordinated among three endeavors: 1) The GROW Clinic, a multidisciplinary clinic for children with failure to thrive, or undernourished children; 2) The Children's Sentinel Nutrition Assessment Program ([www.c-snap.org](http://www.c-snap.org)), a national multi-site research study that investigates the impact of public policies on the health and wellbeing of young children; and 3) Advocacy related to both research and clinical service.

We suggest that each major city in the Commonwealth develop their own project similar to the GROW Project so that: 1) All children with a diagnosis of clinical undernutrition are provided with best practice, fully reimbursed multidisciplinary treatment; so that 2) Each city tracks, responds and seeks to prevent household food insecurity for households with young children; and so that 3) both of these areas of activity are readily available to translate to policymakers who rely on evidence to make decisions.

Addressing and preventing household food insecurity makes economic sense. Household food insecurity has been estimated to cost the nation \$90 billion a year for increased health-care costs, reduced worker productivity, lost educational attainment, and the cost of maintaining emergency feeding programs. The State of Pennsylvania ranks in the top five states as having the highest expenditures associated with food insecurity (Brown et al. 2007). Using legislation and policymaking decisions to intervene on household food insecurity will not only help to improve the health of children in low-income families, but it will also save the Commonwealth significant economic costs.

### **The Definition and Prevalence of Household Food Insecurity**

Food insecurity, as the lack of access to nutritious food for an active and healthy life, contains at least two dimensions of food deprivation.

The first dimension relates to the quantity of food (is there enough?); and the second dimension includes the concept of adequate food for an active and healthy life (is the food of sufficient quality?). The dimensions are captured in an 18-point scale, which asks questions about access, quantity, and quality of food, and the experience of hunger. Examples of the USDA questions are included below in Table 1.

**Table 1: Examples of Food Insecurity Questions Relating to Children**

<p><i>“Which of the following statements was true for you in the last 12 months?”</i></p> <ol style="list-style-type: none"><li>1) “We relied on only a few kinds of low-cost food to feed our children because we were running out of money to buy food.”</li><li>2) “We couldn’t feed our children a balanced meal, because we just couldn’t afford that.”</li><li>3) “The children were not eating enough because we just couldn’t afford enough food.”</li></ol> <p style="text-align: center;"><i>Previous three items include: “Was that often, sometimes, or never true for you in the last 12 months?”</i></p> <ol style="list-style-type: none"><li>4) “In the last 12 months, did you ever cut the size of any of the children’s meals because there wasn’t enough money for food?”</li><li>5) “In the last 12 months, were the children ever hungry but you just couldn’t afford more food?”</li><li>6) “In the last 12 months, did any of the children ever skip a meal because there wasn’t enough money for food?”</li><li>7) <i>(If “yes” to previous question)</i> “How often did this happen - almost every month, some months but not every month, or in only 1 or 2 months?”</li></ol>
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According to the responses in the 18-item interview, households are categorized within a specific food security status suggesting varying levels of nutritional deprivation. The levels of food insecurity addressed in this paper are “Household Food Insecurity” and “Child Food Insecurity.” Household food insecurity includes attention to anyone in the household, but does not address a particular individual within the

household. It is therefore a composite measure that captures the minimal level of risk for nutritional deprivation.

Child food insecurity is measured at the individual level, and is often considered to be the most severe form of food insecurity. Research has shown that parents generally protect their own children from experiencing food insecurity or hunger (Nord and Hopwood 2007; Hamelin et al. 1999). When the parents can no longer shield their children from hunger, the deprivation can have serious consequences as it penetrates the protective abilities of the adults in the household.

The United States government research on food insecurity research focuses on food expenditures and “diversion of financial resources” (Rose 1999) that go towards such expenses as housing, utilities, and car payments (Rose 1999). Thus, food insecurity is strongly correlated with income. Food insecurity is also associated with poor nutritional intake (Rose and Oliveira 1997).

Nationally, the most updated research carried out by the USDA Economic Research Service reported that in 2006, 11.9% of the United States population, or 35.5 million people, had experienced food insecurity at some point during the year, and that 17.2%, or 12.6 million children lived in households that had reported food insecurity. Racial, ethnic and gender disparities in the prevalence rates of household food insecurity are a critical concern. Female-headed households have a prevalence rate that is three times that of the national average (30.4% vs. 10.9%) (Nord et al. 2007). Nationally, effects of food insecurity among households with children is even more pronounced when race/ethnicity are considered. According to the USDA, the prevalence of food insecurity in households with children in 2006 was highest among Black families with 26.4% of families experiencing food insecurity at some point during the year. In the same year, Hispanic families experienced a food insecurity rate of 23.8%. These rates are twice the rate of food insecurity among white households with children (11.3%) (Nord et al. 2007). As shown above, households with children are at greater risk for experiencing household food insecurity, as the prevalence rates for households with children are at least 6% above the national average. These prevalence rates and the disparities among these rates of food insecurity have not changed since the year 2000.

### **Making the Case for Pennsylvania: Relationships Between Food Insecurity and Wellbeing**

The overall prevalence rate of household food insecurity in Pennsylvania is 13.3% (Nord et al. 2007). This is close to the national average. A recent report published by Feeding America shows that in Pennsylvania 16.8% of children under the age of 18 lived in food insecure households in 2006 (Cook 2007). Stated differently, one in six children in Pennsylvania exhibits an increased risk of poor health, poor physical development, and limited school readiness because of a lack of adequate food.

The problem of food insecurity is even more pronounced in Philadelphia, the state's largest urban city. It is difficult to get local rates of household food insecurity without concerted effort and substantial funding to glean a representative sample. The survey instrument that measures food deprivation with a very limited measure is the Community Health Data Base (CHDB) of the Philadelphia Health Management Corporation. The CHDB is a community household phone survey of residents in Southeastern Pennsylvania that is carried out every two years. It "oversamples" low income and elderly households in order to gauge *true population* levels of health-related information. The survey includes only one question taken from the USDA Household Food Insecurity Short Form (consisting of six questions) (Blumberg et al. 1999). The question asked is: "Did you ever have to cut the size of your meals because you did not have enough money to buy food?" Responses to this question have been used by advocates in the Philadelphia area as an indicator for "risk" of food insecurity. For Philadelphia, the population-based prevalence rate of food insecurity among all households is 13.6%, or 151,200 individuals. For females, it is slightly higher, and for households with children, the prevalence rate for 2006 was 16.5% (Community Health Database 2006).

Among households with children, the racial and ethnic disparities in food insecurity seen at the national level also exist in the Philadelphia area, with 22.3% of Latino households with children reporting having cut a meal versus 16.5% of black and 10.4% of white households (see Table 2, following page).

**Table 2. Example Health Characteristics of Philadelphia Households with Children**

**By 200% of Federal Poverty Line and by Status of “Cutting a Meal”  
(Indicator of Risk for Food Insecurity)  
Representative of All Philadelphia Residents**

*Source: GROW Project Analysis of Community Health Data Base, PHMC, June 2006*

	<b>All Philadelphians Regardless of Income*</b>			<b>Below 200% Poverty*</b>		
<b>Variable</b>	<b>Did Not Cut Meal N=1100 84.4%</b>	<b>Cut Meal due to lack of Money N=203 15.6%</b>	<b>P Value</b>	<b>Did Not Cut Meal N=514 75.3%</b>	<b>Cut Meal due to lack of Money N=168 24.7%</b>	<b>P Value</b>
<b>Race/ethnicity</b>						
Black	47.9%	51.2%		55.3%	53.8%	
Latino	17.5%	27.1%	<.0001^	25.9%	30.2%	.4710
White	34.6%	21.7%		18.9%	16.0%	
<b>Adult Diagnosed with a Mental Health Condition</b>	12.6%	21.3%	.0010^	15.6%	22.6%	.0360^
<b>Adult was Sick but Did Not Seek Care Due to Cost</b>	8.1% <sup>5</sup>	37.2%	<.0001^	9.9%	35.1%	<.0001^
<b>Adult Self-Rated Health Fair/Poor</b>	18.6%	46.4%	<.0001^	26.1%	48.2%	<.0001^

\* Balancing weights used to determine appropriate population-based percentages  
^ P value indicates that the differences rates are statistically significant at the alpha < .05

Latino and black households are disproportionately burdened by food insecurity. This is likely due the disproportionate burden of the experience of poverty. When the all-Philadelphia population-based sample is restricted only to those living at 200% of the federal poverty line and below, the racial and ethnic disparities in risk for food insecurity almost disappear; the differences become statistically insignificant. Among low-income families, the rates for whites, Latinos and blacks hover in a common zone between 21% and 27%. In summary, there are disparities by race and ethnicity among all of the households with

children at risk for food insecurity in Philadelphia and nationally due to the higher overall prevalence poverty among African American and Latino households. Overall, however, these racial and ethnic disparities of differences within these populations become statistically insignificant in this Philadelphia dataset. It is likely, then, that the poor (not a particular racial/ethnic group) are disproportionately burdened by food insecurity.

On the other hand, between those who were at risk for food insecurity and those who were not at risk, the differences in health conditions did *not* disappear when restricted to the low-income population. In Table 2 (previous page), we show that among those who had cut a meal due to lack of money were almost two times more likely to report their health as fair/poor than households who had not cut a meal (48.2% vs. 26.1%). Adults from households with children that had cut a meal reported significantly higher rates of having a diagnosis of a mental health condition compared to those who had no reported food problems (22.6% vs. 15.6%). Finally, among those that had cut a meal, the rate of reporting on having been sick, but not seeking medical care due to cost, was three times higher than those households that did not cut a meal (35.1% vs. 9.9%). Each of these differences in health conditions was statistically significant. As this population-based Philadelphia data show, risk of food deprivation is an important risk factor to consider when measuring lack of access to care and poor health outcomes.

### **Making the Case for Children: Food Insecurity, Child Health and Development**

Everything from cognitive development, fine and gross motor skill development, to educational attainment and psychosocial disorders are linked to a child's nutritional status. Overall, scientific research demonstrates that the lack of an adequate, nutritious diet can have long lasting effects upon a child's developing mind and body (Rose-Jacobs et al. 2008; Cook and Frank 2008; Walker et al. 2007).

The Philadelphia GROW Project participates in the national multi-site study entitled the Children's Sentinel Nutrition Assessment Program (C-SNAP). As a multi-site study of families who have children under the age of three, the C-SNAP study demonstrates that children who lived in



households that are identified as food insecure were two times more likely to have reported fair/poor health, and were 30% more likely to be hospitalized than children who were in food secure households (Cook et al. 2004). Children who are food insecure are more likely to have delayed cognitive abilities, behavioral issues, psychosocial dysfunction, and continuing poor health as they mature into adulthood (Cook et al. 2006).

Compared to children in food secure homes, school-age children in food insecure homes were more likely to have seen a psychologist, have lower grades, and were reported to have greater difficulty interacting with their peers (Alaimo et al. 2001). A more recent study has shown that even the mildest forms of food insecurity are associated with poor performance on standardized tests in reading and mathematics (Jyoti et al. 2005).

Food insecurity is thus an important factor in a child's performance in school, and later, a significant factor in their earning potential. For this reason, it is important to intervene in a child's life early on, before they reach school age. The national C-SNAP study has found that infants and toddlers who lived in households that reported food insecurity had a 1.73 times greater odds of developmental risk than infants and toddlers in households that were food secure. These findings remain consistent even after controlling for other factors such as mother's educational attainment, child's medical history, and child's birth weight. Developmental risk is an indicator of delayed emotional cognitive, physical, and social abilities necessary for a child's full developmental potential (Rose-Jacobs et al. 2008).

Researchers in education and economics have demonstrated that by the time a child reaches kindergarten, if they are behind in reading readiness, it is already almost too late for the child to catch up with their peers (Heckman 2007, 2004). In Philadelphia the educational attainment of the children should be of serious concern, as one in three children is already behind in reading preparedness by the time they reach kindergarten (Blue Ribbon Commission 2007). While there are many social and emotional factors associated with readiness for school, one particular factor – household food insecurity – is preventable.

Research on the welfare support systems demonstrates that the Food Stamp Program, the Women, Infants, and Children's Supplemental

Nutrition Program (WIC), housing subsidies, and heating assistance can have a positive impact on protecting children from nutritional deprivation and from poor health.

The C-SNAP study has also shown that children who were in families that received WIC benefits compared to eligible families who did not receive WIC had better reported health, and were also less likely to be underweight (Black et al. 2004). When a child is underweight compared to other children their age, the risk for poor health and development are far greater (Walker et al. 2007; Chilton et al. 2007). Similar results are found for food stamp receipt. The C-SNAP study found that families who were cut off (sanctioned) from food stamp benefits in the previous year of being interviewed were more likely to be food insecure and to experience higher rates of fair/poor health compared to families whose food stamp receipt was stable [Neault et al. 2004; Frank and C-SNAP Study Group 2006; Children's Sentinel Nutrition Assessment Program (C-SNAP) 2007].

Other income support programs, over and above the food assistance programs, can also assist in protecting a child's health and food insecurity status. Families that received housing subsidies, compared to children in households that were on a waiting list or had not received subsidies but were eligible, showed overall healthier weights for age (Meyers et al. 2005). Such research shows that food insecurity is intricately related to housing stability and child wellbeing (Kushel et al. 2006). Similarly, families that received energy assistance in the form of the Low Income Heat and Energy Assistance Program (LIHEAP) demonstrated better nutritional wellbeing than children in eligible households that did not receive LIHEAP assistance. Those that did not receive LIHEAP but were eligible had higher odds of being hospitalized compared to children whose households received LIHEAP assistance. This interplay between LIHEAP and child health as it relates to food insecurity demonstrates that families often must trade off paying for food or paying for heat, and that intermittent exposure to unheated or half-heated homes can be associated with illness to the point of hospitalization (Frank et al. 1996; Frank et al. 2006). In addition, if a child does not have proper nutritional intake, their bodies are less capable of fighting off infection (Bhaskaram 2002).

Overall, this research provides compelling evidence that federal, state, and city programs and policies can have a strong impact on the health and wellbeing of young children.

### **Making the Case for Mothers: Food Insecurity and Maternal Depression**

The relationship between food insecurity and mental health has also received a great deal of attention in the past decade. A groundbreaking study by Alaimo demonstrated that, after controlling for income, education, and health status, household food insecurity was related to increased risk for dysthemia and suicidal ideation among adolescents (Alaimo et al. 2002). The relationship is similar among mothers of young children.

Food insecure women have described experiences of alienation and anxiety, coupled with worries about losing their children and family strife (Hamelin et al. 2002; Hamelin et al. 1999). In a nationally representative sample in Canada, individuals from food insecure households reported higher odds of depression and stress (Vozoris and Tarasuk 2003). Among homeless or poorly-housed women in Massachusetts, food insecurity was associated with higher rates of post-traumatic stress disorder due to adverse childhood experiences (Weinreb et al. 2002). Among African-American women who chronically utilize food pantries in Philadelphia, anxiety, violence and stress were strongly associated with the experience of hunger (Chilton and Booth 2007).

Other C-SNAP studies demonstrate household food insecurity is associated with a 260% increased risk for maternal depressive symptoms (Casey et al. 2004; Zaslów et al. 2008; Bronte-Tinkew et al. 2007). Maternal depression is central to the health and wellbeing of young children, as it is associated with greater probability of poor development, and behavioral and emotional problems in children (Williams and Carmichael 1991; Beardslee 1989; Zuckerman and Beardslee 1987; Downey and Coyne 1990; Petterson and Albers 2001). These associations of poor child development, poor child health and problematic behavior are generally due to disordered parent-child interactions, ineffective parenting, or to marital distress (Reis 1988;

Leadbeater and Bishop 1996; Hall and Farel 1988; Chavkin and Wise 2002; Romero et al. 2002).

Policy interventions related to access to health insurance coverage have shown substantial effectiveness in reducing risk for prolonged maternal depression (Kahn et al. 1999; Murray et al. 2003; Bramesfeld et al. 2006; Melfi et al. 1999; Melfi et al. 2000). But policy interventions related to maternal depression and food insecurity interplay are not limited to health care access, and sustained access behavioral health care treatment, but also to such food programs as the WIC program. The C-SNAP study has demonstrated that not only does the WIC program show an association with healthier weights and reported health in very young children, but it is also associated with a decreased risk of maternal depressive symptoms (Casey et al. 2004).

Overall, while the effects of food insecurity can be devastating to the health and development of young children, and to the depression of their mothers, there are policy interventions that could mitigate the effects. To begin with, however, it is important to consider the magnitude of the associations between household food insecurity and poor health at our local level.

### **Food Insecurity in Philadelphia — Results from the Philadelphia GROW Project**

The Philadelphia GROW Project participates in the multi-site Children's Sentinel Nutrition Assessment Program (C-SNAP) study, carrying out research in the emergency department of St. Christopher's Hospital for Children. In Philadelphia, our GROW Project results show that, over the course two and a half years of data collection (February 2005 - June 2007), 13% of young children requiring emergency care live in food insecure homes.

#### **Methodology**

The Children's Sentinel Nutrition Assessment Program – Philadelphia (C-SNAP) conducts emergency room interviews at St. Christopher's Hospital for Children in Northeast Philadelphia. Four to six days per week, interviewers approach families with children who are less than 36 months old. Infants that are critically ill or injured are

excluded from approaches. In order to qualify for the interview, the caregiver must have knowledge about the child's household and have not participated in a C-SNAP interview in the previous six months. Interviews are carried out in both English and Spanish. Institutional Review Board approval was granted by Drexel University and St. Christopher's Hospital for Children.

For this study, the sample included families without private health insurance. Of the 2,061 interviewed over 14 months, 246 (11.9%) received private insurance or had an unknown insurance status. Our restriction to those without private insurance serves as a proxy for low income, as those on Medicaid or public insurance qualify with certain low-income criteria, and those without insurance are generally low-income, underemployed or ineligible for reasons such as immigration status. There were 115 (5.6%) participants who were not born in the United States. These were excluded from the analysis because of the variability and uncertainty of their eligibility for public assistance programs. Between January 2005 and June 2007, 1,694 families with young children fit the criteria for this study.

The C-SNAP interview survey includes a variety of measures of demographic information such as race/ethnicity, educational status, employment and household participation in public assistance programs. It also asks questions about children's health, household food security, maternal depressive symptoms, and parental assessment of their child's development. The U.S. Food Security Scale is a reliable, valid, 18-item scale score that measures household food security over the previous year (Bickel et al. 2000). Households are defined as food insecure if they answer more than three responses to the 18 questions in the affirmative, acknowledging the lack of available, nutritious foods or if they could not afford food (Nord et al. 2006). The Parents' Evaluations of Developmental Status (PEDS) is a screening instrument approved by the American Academy of Pediatrics and validated for children aged four months to seven years to determine an array of developmental areas (Glascoe 2000; Brothers et al. 2008). Eight developmental areas are assessed including language, fine and gross motor skills, behavior, self-help, school, and social/emotional development using the following responses: yes, no, or a little. Scores are determined based upon the age of the child. Respondent depressive scores (most often mothers) were calculated after asking three questions using an instrument that has 100%

sensitivity, 88% specificity, and 66% predictive value (Kemper and Babonis 1992). If the respondent answered “yes” to two of the three questions, the depression score was marked as positive. At the end of the interview, the child’s weight and length are recorded and verified using the computer system in the emergency room at St. Christopher’s Hospital for Children.

### **Data Analysis**

For univariate analysis of categorical variables we utilized chi-square tests; for numeric variables we used unpaired t-tests and Mann-Whitney U tests. The statistical level employed for each was  $p \leq 0.05$  to determine associations between variables. To assess the association between household food insecurity and poor child health, developmental risk, and maternal depressive symptoms, we conducted logistic regressions using SPSS version 15. Confidence intervals were set at 95%. Based on results of the univariate chi-square analyses, and based on evidence in the literature, the following variables were controlled in the logistic regression analyses: maternal age, race/ethnicity, breastfeeding, and infant birth weight.

### **Results**

In the sample of 1,694 infants and their parents, 13% (N=268) reported household food insecurity (see Table 3, following page). Prevalence of household food insecurity among the top three race/ethnic groups in the sample (white, black, and Latino) did not differ statistically ( $p = .6510$ ). Although the sample does not indicate a significant difference in food insecurity between race/ethnic groups, it is important to highlight that among the general population (without consideration of income), differences in food insecurity between racial/ethnic groups exist in Philadelphia, as seen previously in Table 2 (page 61).

**Table 3. Characteristics of Household Food Insecurity Identified at St. Christopher's Hospital for Children**

<i>C-SNAP-Philadelphia Sample January 2005 - June 2007. N=1,694</i>			
<b>Variable</b>	<b>Food Secure Households N=1,426 69.2%</b>	<b>Food Insecure Households N=268 13.0%</b>	<b>P Value</b>
<b>Mother's Age in Years: Mean (SD)</b>	24.71 (6.114)	25.45 (6.518)	.0360+ <sup>^</sup>
<b>Mother Marital Status:</b>			
Married	14.5%	11.2%	.1570
Single	85.5%	88.8%	
<b>Race/ethnicity:*</b>			
Black	36.2%	33.5%	
Latino	52.0%	55.0%	.6510
White	11.8%	11.5%	
<b>Maternal Education</b>			
Incomplete High School	33.3%	44.++6%	
Complete High School/GED	38.8%	34.8%	.1610
College Graduates	22.9%	20.6%	
<b>Child Health Insurance:</b>			
Public	97.8%	98.5%	.4700
None	2.2%	1.5%	
<b>Mean Child Age Months (SD)</b>	14.3 (9.81)	14.3 (9.37)	.9600++
<b>Low Birth Weight (&lt;2500 grams)</b>	13.1%	12.5%	.7930
<b>Child Breastfed</b>	34.5%	41.8%	.0220 <sup>^</sup>
<b>Household Participation in Public Assistance:</b>			
TANF	42.1%	56.0%	<.0010 <sup>^</sup>
Food Stamps	58.5%	68.5%	<.0020 <sup>^</sup>
WIC	81.2%	86.6%	.0370 <sup>^</sup>
Subsidized Housing	11.4%	14.5%	.1750
Subsidized Child Care	17.8%	17.9%	.9700
Note: All tests were Chi-Square Test unless otherwise indicated.			
+ Mann Whitney U test, ++ Unpaired t-test.			
* The Race/Ethnicity category only includes the top three races/ethnicities within the C-SNAP Philadelphia sample and does not include mixed-Hispanic or Asian populations due to the small sampling of those populations.			
<sup>^</sup> Statistical tests indicate a significant relationship between the variable and food insecurity among the C-SNAP-Philadelphia sample.			

There was not a statistically significant difference in marital status between the food secure and the food insecure mothers. There also were no significant differences between the groups on health insurance status (public insurance or no insurance), or child’s birthweight. Those families that were food insecure were more likely to breastfeed, compared to the food secure households: 41.8% and 34.5% respectively,  $p = .0220$ . Overall, households that reported food insecurity reported higher rates of participation in TANF, food stamps, and WIC, as expected. There were no differences overall in the utilization of subsidized housing and child care.

**Table 4. Multiple Logistic Regression on Household Food Insecurity, Reported Child Health, and Maternal Depressive Symptoms**

<i>C-SNAP-Philadelphia Sample: January 2005 - June 2007</i>			
<b>Outcome</b>	<b>Adjusted Odds Ratio</b>	<b>95% Confidence Interval</b>	<b>P Value</b>
<b>Multiple Logistic Regression*</b>			
<b>Reported Child Health Fair/Poor</b>			
Household Food Secure	1.00	referent	referent
Household Food Insecure	1.49	(1.04, 2.11)	<b>.028<sup>^</sup></b>
<b>Developmental Risk (PEDS)**</b>			
Household Food Secure	1.00	referent	referent
Household Food Insecure	1.83	(1.31, 2.55)	<b>.000<sup>^</sup></b>
<b>Maternal Depressive Symptoms</b>			
Household Food Security	1.00	referent	referent
Household Food Insecure	3.07	(2.31, 4.09)	<b>.000<sup>^</sup></b>
* All multiple logistic regression analyses controlled for birth weight, race, breastfeeding, and maternal age to predict child health, developmental risk, or maternal depressive symptoms.			
**PEDS is the Parents’ Evaluation of Developmental Status.			
<sup>^</sup> Indicates significance $p < .05$ .			



Results of the multiple logistic regressions shown in Table 4 (page 70) reveal that food insecurity is significantly associated with a child's reported health status, parental report of developmental risk, and reported maternal depressive scores after controlling for race/ethnicity, maternal age, breastfeeding, and birthweight. Among the households that were food insecure, parents were 1.49 times more likely to report their child in fair or poor health than those parents living in food secure households ( $p = .0280$ ). In other words, for children in food insecure households, there was a 49% greater risk of being reported to be in fair or poor health. Young children who were in households that reported food insecurity were 1.83 times more likely to be at risk for developmental delay than children in food secure homes (adjusted odds ratio 1.83,  $p < .0001$ ). Finally, mothers who lived in food insecure households were three times more likely to report maternal depressive symptoms than mothers who lived in food secure households ( $p < .0001$ ).

### Discussion

Local data on infants and toddlers and their mothers in Philadelphia demonstrate that the overall percentage of household food insecurity among households that utilize the emergency department of St. Christopher's Hospital for Children is at 13%, that food insecurity is strongly associated with an increased rate of fair/poor child health, developmental risk, and maternal depressive symptoms. What is happening in Philadelphia is similar to the national trends in food insecurity and poor child health, developmental risk and depression. Maternal depression also compounds the negative effects that food insecurity and poverty already have on children (Pettersson and Albers 2001). These associations remain consistent after controlling for several variables known in the food insecurity literature as having potential confounding effects such as birthweight, maternal education level, and insurance status.

There are several plausible explanations for these associations. Food insecure infants and toddlers primarily live in poverty where their parents may struggle to not only provide housing, health care, and child care, but also adequate nutrition for their children. Lack of access to adequate, quality food in Philadelphia's poor neighborhoods may also exacerbate poor health outcomes for these infants (Chilton 2004; Chilton et al. 2004;

Chilton and DaCosta 2008). Moreover, poor nutrition caused by food insecurity can limit a child's ability to fight off infections, and maintain overall good health (Cook et al. 2004; Cook et al. 2006; Casey et al. 2001; Skalicky et al. 2006). Maternal depression may be related to inability to work and sustain gainful employment at a living wage, which in turn could negatively affect a woman's potential to purchase enough healthy food for her household (Zaslow et al. 2008).

Childhood hunger is a preventable condition. Our results suggest that it is damaging the developmental trajectories of Philadelphia's youngest children, and truncating the potential of their parents.

Legislators and policymakers can have a profound impact if they intervene early in a child's life. Nobel Laureate James Heckman and his team have shown that the best investments in human potential are those made in the earliest years of life. The highest return on investment early in life is found in greater academic achievement, improved health and reduced cost to the health system, and better earning potential (Heckman 2006). Investment through social programs at early ages literally "multiplies" skills (Heckman 2007).

There are interventions that help mitigate the effects of food insecurity such as: The Federal Food Stamp Program, Medicaid, the Supplemental Nutrition Program for Women, Infants, and Children (WIC), and Head Start Programs. For example, food stamps helped reduce the child poverty gap by almost 20% in 2004 (United States Department of Agriculture 2005). Children who receive food stamps were 26% less likely to be food insecure than those children who are eligible but did not receive food stamps (Lee et al. 2006). Children enrolled in Medicaid who also utilized food stamps from birth have lower health care costs associated with anemia and severe undernutrition (Lee et al. 2006). Families who received food stamp assistance between kindergarten and first grade demonstrated better examination results on standardized math tests compared to families who stopped receiving food stamp benefits (Frongillo et al. 2006).

Food assistance and income support programs are sound investments. For every dollar spent on food stamps, almost two dollars are spent in the local economy. The beneficial effects of WIC have been shown to save direct and indirect medical costs from \$1.71 to \$3.00 for every dollar spent on WIC (Devaney and Schirm 1993). Enrollment in

these programs can improve infant health outcomes and can begin to break the cycle of poverty. These programs provide families assistance with access to food and intervention programs that can help facilitate infant development.

While food stamps provide essential support to families – especially young children – they still cannot provide enough protection against food insecurity and poor nutrition. Our most recent “Real Cost of the Healthy Diet research” where we surveyed 16 stores in the Philadelphia area according to the Thrifty Food Plan (TFP) food lists, reveals that even if a family was receiving the maximum allotment of food stamp dollars based on the supposed cost of the “thrifty food plan” families would be short on average \$192 dollars per month, or \$2,300 dollars per year. That is, what the TFP of the food stamp program supposes is \$1 worth of food, is actually 74 cents worth of food. With the rising cost of food and fuel, this will likely get worse (Chilton and Cook 2008). Despite, and perhaps in consideration of some of the weaknesses of the safety net programs, there are several things that state legislators and policymakers can do to intervene for low-income families at nutritional risk.

### **Recommendations for Legislative and Administrative Intervention**

Policy change to improve the health of infants and toddlers requires focus on issues of food insecurity, as well as economic security and access to health care. Each of these recommendations can have immediate and long-term impacts on the health and wellbeing of children, as young children are in the most important and critical stage of development where a boost in nutrition access, or in mental health care access can have a magnified impact on a child’s present and future and health.

#### **Economic Support Programs**

- The Pennsylvania Department of Labor and Industry should continue to work to continue to increase the minimum wage. This would increase buying power, and increase access to nutritious food for the whole family. This is urgent especially because of the steep rise in the costs of fuel and food.

### **Nutrition Programs**

- Ensure every last food stamp dollar is utilized. The Department of Welfare could step up efforts to increase enrollment in food stamps by providing more venues through which to determine eligibility. Food stamp outreach could be performed at city health centers and hospitals, and in locations that reach citizen children of immigrants and other eligible immigrant families.
- Bolster the amount of food stamps families can receive by increasing access to the Low Income Home Energy Assistance (LIHEAP). If a family is deemed eligible for LIHEAP, the calculation for their food stamp allotment will increase. New York and Massachusetts are doing this already. Pennsylvania could follow suit.
- The appropriate state agencies should ensure that food stamp and WIC offices have extended operating hours to accommodate working families.
- Consider supplementing the food stamp dollar. For instance, New York City is implementing “health bucks,” where for every \$5 spent on produce, the food stamp recipient receives an extra food stamp dollar from the city. This enhances money spent on healthier foods, and increases purchasing power.
- Ensure that all eligible day care centers are receiving the federal entitlement benefits of the Child and Adult Care Food Program (CACFP). This can be done by increasing outreach to child care agencies and ensuring they have the tools necessary to apply for CACFP benefits.

### **Access to Income Support Programs**

- The Department of Welfare should enhance outreach and marketing of the COMPASS system (Commonwealth of Pennsylvania Access to Social Services) to make it widely available and known to all social service and health care agencies within the state.
- The Department of Welfare should consider categorical eligibility for a variety of programs – that is: if a family is eligible for TANF and food stamps, they should automatically be considered eligible for other programs administered by DPW. The burden of

administrative paperwork, and need for documentation should also be minimized, especially since DPW already has access to multiple databases that contain income and other essential financial information.

- The Department of Welfare and the governor should ensure that all LIHEAP dollars get to the families with young children who need these federal subsidies the most for the full extent of the cold season, and should consider keeping LIHEAP open all year round as do other states.

### **Health Care Settings and Early Intervention**

- The state and city health departments can remove barriers to mental health care for mothers of young children by integrating behavioral and mental health programs into primary care settings.
- The Department of Welfare and city health departments should collaborate more effectively to reduce wait times between positive screen for depression and access to the first appointment with a mental health care provider.
- Ensure that early intervention programs, such as ChildLink and Elwyn, have the training necessary to ask about and respond to needs related to food insecurity and parents' participation in the food stamp and WIC programs.
- Encourage all Medicaid-participating pediatricians to ask if a parent needs help with buying food, and ensure proper food stamp and WIC outreach.

### **Incorporate Statewide Data Tracking System for Food Insecurity and Undernutrition**

- The Department of Health should expand their mandate for growth screening and data management tracking for school age children to *all children* to include children in child care and pre-school.
- The Department of Health should collaborate with other agencies to integrate the USDA Food Security Short Form (Blumberg et al. 1999) into an annual state tracking system on the health and wellbeing of young children.

- Consider expanding the state supported Kindergarten Initiative, which seeks to teach kindergarteners about farms and healthy food, to younger children in preschools and day care centers.

#### **Coordinate Efforts Across State Agencies**

- The Governor's Inter-Agency Council on Food and Nutrition was created to address poor nutrition and related conditions of poverty. The Council consists of representatives from six executive agencies: Aging, Agriculture, Community and Economic Development, Education, Health, and Public Welfare. This council currently has no funded staff to administrate the work of this Council, nor report on the implementation of recommendations found in the Governor's Blue Print to End Hunger, 2007. We recommend ensuring that there is a fully funded, full-time staff person and sufficient funding 1) to allow this group to carry out its mandate; and 2) for the public to participate in the development of related programs so that they can hold Pennsylvania legislators accountable for improving the health and nutritional wellbeing of young children.

#### **Conclusion**

This study shows that food insecurity and infant development is a concern not just for those in public health or medicine, but also for policymakers that can improve the immediate health and well-being of the youngest residents in Pennsylvania. Our research shows that food insecurity is also significantly associated with a child's health status, child development, and maternal depression. Public health, medical, and economic research have made tremendous strides within the past decades to understand the complex nature of poverty, poor nutrition and health status. There is no one easy solution to breaking the cycle of poverty and poor child health, but there are known interventions that can mitigate and prevent household food insecurity. Food stamps and other nutrition programs such as WIC, CACFP, LIHEAP, housing assistance and cash assistance act together as a health buffer for small, developing children. Nutrition programs and income support programs are an excellent federal and state investment. They not only help to close the poverty and education gap, but they also facilitate the physical, cognitive, social, and cognitive development of children. Investing in young children now will

make the Commonwealth a state that can enjoy the benefits of having helped young children who are alive and developing before our very eyes, and the benefits of having promoted their full potential and capabilities.

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