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Risk and Protective Factors Associated with Prevalence of VLFS in Children among Children of Foreign-Born Mothers

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This research was reviewed and approved by the Boston University Medical Center Institutional Review Board via amendment to the following ongoing IRB protocol:

Title of Study: Children's HealthWatch - Child and household outcomes in relation to public policy and economic conditions
Protocol Number: H-31703

Abstract:

This research examined VLFS in children among households with foreign-born (FB) mothers compared to US-born mothers through three research questions: Is mother's foreign-born status (FBS) associated with VLFS in children, and can association be explained by mothers' socio-demographic characteristics? Are FB mothers more or less likely to receive nutrition or non-nutrition assistance benefits, or work for pay than US-born mothers? Do mothers' FBS, or protective/risk factors associated with FBS, modify associations of negative economic shocks and hardships with VLFS in children? Data are on approximately 44,000 mother-child (ages<48 Mos.) dyads collected from household surveys administered under a "sentinel surveillance" system over 1998-2012 at teaching hospitals and clinics in seven US cities. Bivariate and multivariate logistic regression models tested study hypotheses. Mothers' FBS is strongly positively associated with VLFS in children after controlling for available risk and protective factors. FB mothers are less likely to receive SNAP and non-nutrition assistance (TANF, LIHEAP or housing subsidies), but more likely to receive WIC and to be employed than US-born mothers. FB mothers are no more likely to report negative reasons for not receiving SNAP or TANF, or losing jobs or decreasing work hours than US-born, and reported "immigration concerns" rarely. No need/chose not to participate are most frequently reported reasons for not receiving SNAP and TANF; pregnancy/maternity leave and "market conditions" for lost jobs and decreased work hours. Economic shocks and hardships are positively associated with VLFS in children, but Mothers' FBS does not interact with shocks and hardships to modify those associations.

Executive Summary

Very low food security (VLFS) in children, the most severe level of food insecurity measured by the US Food Security Survey Module, is a concern because even less severe levels of food insecurity have been associated with adverse physical and mental health outcomes in children.[i,] [ii] VLFS in children is also referred to as "child hunger" and is generally what is meant when decision-makers express their desire or intention to reduce or eliminate child hunger, as in Section 141 of the Healthy, Hunger-Free Kids Act of 2010. Yet partly because the condition of VLFS in children is relatively rare (approximately 1.1% in the national population in 2011)[iii], little research has focused on it and it is not well understood. The research reported here hopes to add to our understanding of VLFS in children by examining its associations with mothers' foreign-born status (FBS).

Using data on approximately 44,900 mother-child dyads from the ongoing Children's HealthWatch clinical data collection activity in seven US cities, designed as a "sentinel surveillance" system, we attempt to answer three questions:

1. Is mothers' FBS associated with VLFS in children, and can the associations be explained by mothers' socio-demographic characteristics?

2. Are foreign-born (FB) mothers more or less likely to receive nutrition or non-nutrition assistance benefits, or to work for pay, than US-born mothers?

3. Do mothers' FBS, or protective and risk factors associated with FBS, moderate or exacerbate (modify) associations of negative economic shocks and hardships with VLFS in children?

This research found that VLFS in children is strongly associated with mothers' FBS, and that even after controlling for available socio-demographic characteristics of mothers, households with FB mothers have odds of VLFS in children more than 3 times as great as households with US-born mothers (Adjusted Odds Ratio = AOR = 3.36, 95% CI; 2.61, 4.32), even after controlling for research site, mothers' race/ethnicity, marital status, educational attainment, employment status, and age, and whether other adults in the household are employed, and the total number of adults in the household. The results highlighted the fact that socio-demographic characteristics can act s either risk or protective factors depending on their state or level. Examples include mothers' race/ethnicity, marital status, educational attainment, and age, and number of adults in the household, and whether other adults in the household besides the mother are employed.

Results of multivariate logistic regressions in the study indicate that, after controlling for relevant covariates, FB mothers in these data are less likely than US-born mothers to receive SNAP (AOR = 0.38, 95% CI; 0.35, 0.40) and non-nutrition assistance (any one or more of TANF, LIHEAP or housing subsidies; AOR = 0.33, 95% CI; 0.30, 0.35), but more likely to receive WIC (AOR = 1.37, 95% CI; 1.26, 1.48). Results also indicate that FB mothers are more likely than US-born mothers to be employed (AOR = 1.11, 95% CI; 1.04, 1.18).

While we hypothesized that FB mothers not receiving nutrition or non-nutrition assistance would be more likely to report negative reasons for not receiving them (e.g., burdensome application process, mistreatment during the application process, or "immigration concerns"), the data did not support that hypothesis. FB mothers were no more likely than US-born mothers to report negative reasons for non-receipt, and an unexpectedly small proportion of FB mothers reported "immigration concerns" as the reason for non-receipt. While the possibility of under-reporting of negative reasons, and over-reporting of lack of need or desire to receive assistance, is suggested by the high prevalence of food insecurity among households with FB mothers compared to US-born mothers, we are unable to test that with these data.

The results also indicate that FB mothers are not more likely than US-born mothers to report negative reasons for losing a job or having their work hours reduced, and less than 1.0% of FB mothers report "immigration issues" as a reason for either losing a job or having work hours decreased. The most prevalent reason reported by both FB and US-born mothers for losing a job or having work hours decreased is "pregnancy/maternity leave", though more FB mothers losing jobs report this reason (60%) than US-born mothers (36%), while a greater proportion of US-born mothers having work hours decreased (41%) report it than FB mothers (35%) (all differences in proportions are significant with $P < 0.01$).

We found that economic shocks and family hardships are significantly positively associated with VLFS in children both in households with FB and US-born mothers, but we did not find significant interactions between mothers' FBS and economic shocks(job loss, work hours

decreased, forced tradeoffs between medical care and other necessities) or household hardships (energy insecurity or housing insecurity) in these data.

In sub-analyses we found that length of stay (LOS) in the US influences the associations between mothers' FBS and VLFS in children, with weaker associations among households with mothers whose LOS >10 years than among households with mothers whose LOS <5 years. This may be due to policies governing eligibility for SNAP by non-citizens, e.g., the "5-year rule" prohibiting most non-citizens who have lived in the US for less than 5 years from receiving SNAP. It may also be related to place-related human capital accumulation.

In a separate sub-analysis, we categorized FB mothers countries of origin into five language groups based on the primary language spoken in the country of origin (Anglophone, Spanish speaking, Haitian, Somalian, Other). Using that "language group" variable as a predictor in a multivariate logistic regression model with VLFS in children as the outcome (and data on FB mothers only), we found that households with FB mothers from Spanish speaking and Haitian (but not Somalian) language countries had significantly greater odds of VLFS in children than households with FB mothers from Anglophone countries, after controlling for available covariates. The result for Somalian FB mothers is likely due to the Somali's refugee/asylee status that includes access to nutrition and non-nutrition assistance for most FB mothers from Somalia.

Results from this research indicate that VLFS is strongly positively associated with mothers' FBS, but those associations are more complex than we had previously understood on the basis of extant evidence. The results suggest that FB mothers can have socio-demographic

characteristics that act as either risk or protective factors for VLFS in children depending on their precise nature. Findings suggest that FB mothers may be more actively engaged in the labor force and less reliant on nutrition and non-nutrition assistance (with the notable exception of WIC) than US-born mothers. These results suggest potentially fruitful possibilities for policies that can help to reduce VLFS in children. However they also indicate that, to be effective, policies will have to take into account mothers' FBS.

Introduction

Food insecurity has been a persistent public health and policy concern for the U.S. population since its annual measurement began in 1997.[iv, v] Food insecurity at even the lowest levels of severity has been associated with health problems that can impair quality of life, reduce productivity and increase health care costs.[vi, vii, viii] Of special interest, however, is very low food security (VLFS) in children, the most severe level of food insecurity detectable by the Food Security Survey Module (FSSM), indicated by raw scores of 5-8 affirmed items on the 8-item Child Food Security Scale (CFSS). That category of food insecurity is indicative of notable repeated or extensive resource-constrained reductions in food intake by children in households where they are present, and reflects conditions consistent with what has historically been referred to as "child hunger".

This research project used data collected by Children's HealthWatch, an ongoing clinical research center based at Boston Medical Center, from predominantly low-income mothers of young children (ages <48 months) in clinics or Emergency Departments (EDs) of teaching hospitals in five U.S. cities (Baltimore, Boston, Little Rock, Minneapolis, and Philadelphia) from 1998 to 2012, to examine associations between mothers' foreign-born status (FBS) and VLFS in their children. The study also attempted to ascertain whether identifiable socio-demographic characteristics of foreign-born mothers can act as either protective factors or risk factors that influence the likelihood of VLFS among their children (Appendix Figure A2).

Several recent studies have made major progress in overcoming problems of endogeneity or selection bias in assessing relationships between participation in the Supplemental Nutrition Assistance Program (SNAP) and food insecurity.[ix, x, xi] That and other recent research has

confirmed the importance of SNAP as a major deterrent to food insecurity in recipient populations, and highlights the potential importance of real or imagined factors that may prevent eligible food-insecure households from applying for and receiving SNAP benefits.

A complex history of changes in laws and rules governing eligibility of foreign-born persons, immigrants, and non-citizens for SNAP benefits led the USDA Food and Nutrition Service to develop extensive guidance on SNAP eligibility among non-citizens.[xii] Because of SNAP's importance in preventing and reducing food insecurity, and the potential for confusion among foreign-born mothers regarding their and their citizen children's eligibility for SNAP and other forms of assistance[1], we also assessed whether foreign-born mothers in these data are more or less likely to receive SNAP and other nutrition or non-nutrition assistance benefits than U.S.-born mothers, and whether factors related to mothers' FBS are perceived as barriers to program eligibility.

Earnings from work are a primary source of the money households need to buy food. Working for pay is also a factor that can affect eligibility for SNAP and other forms of assistance in either positive or negative ways. Moreover, mothers' FBS may influence whether they work for pay, the kinds of work they are able to obtain, and the wages they are able to receive. Consequently, we examined whether foreign-born mothers in our data are more or less likely to be working for pay than U.S.-born mothers, and whether they perceive their FBS as a deterrent to working for pay.

[1] More than 97% of children of foreign-born mothers in the Children's Healthwatch data are themselves U.S.-born citizens.

Economic shocks and family hardships have been positively associated with food insecurity in households with children in several studies.[xiii, xiv, xv] We tested whether economic shocks in the form of job loss, reduction of work hours, or unplanned medical expenses, and the family hardships of housing insecurity or energy insecurity, are associated with VLFS in children in our data. We also used models with interaction terms to examine whether mothers' FBS (or socio-demographic characteristics related to FBS) modified the effects of these economic shocks and family hardships on VLFS in children.

The primary goal, specific aims, and hypotheses for this research are listed just below.

Goal and Key Research Questions

The goal of the proposed project is to examine the occurrence of VLFS among young children of foreign-born mothers compared to similar children of U.S.-born mothers through three primary research questions:

1) **Aim #1:** Is mother's foreign-born status (FBS) associated with VLFS in children, and can the association be explained by mothers' socio-demographic characteristics? In a set of logistic regression models we will test whether protective and risk factors related to mothers' demographic characteristics explain associations of maternal FBS with VLFS in children. We will use multivariate logistic regression to test the following hypotheses:

   a) ***Hypothesis 1.1*:** Children with foreign-born mothers have significantly greater odds of experiencing VLFS in children than do similar children whose mothers are U.S.-born,

before controlling for any confounding factors. This model establishes the baseline case, and confirms results of preliminary analyses with the full, updated analytic dataset.

b) ***Hypothesis 1.2*****:** Mothers' protective factors (e.g., married, presence of more than one adult in the family, and more than one employed adult in the household) are negatively associated with VLFS in children, and controlling for these protective factors will increase the positive association between mothers' FBS and VLFS in children.

c) ***Hypothesis 1.3*****:** Mothers' risk factors (e.g., lower educational level, lower English proficiency, lower earnings) are positively associated with VLFS in children, and control of these factors will reduce association of mothers' FBS with VLFS in children.

2) **Aim #2:** Are foreign-born mothers more or less likely to receive nutrition or non-nutrition assistance benefits, or to work for pay than are U.S.-born mothers (The survey asks the mother/respondent whether "she or her child" currently or previously receive each type of assistance; so mother/child dyad is the unit of analysis)? Is mothers' FBS perceived as a barrier to program eligibility, or to working for pay? Among women apparently eligible for but not receiving assistance, do foreign-born mothers report different reasons for not participating, e.g., perceived immigration issues, eligibility issues, or application burdens?

a) ***Hypothesis 2.1:*** Foreign-born mothers are less likely to report receiving nutrition or non-nutrition assistance, or working for pay (tested separately) than are U.S.-born mothers.

b) ***Hypothesis 2.2:*** Among those not receiving nutrition or non-nutrition assistance, foreign-born mothers compared to U.S.-born mothers are more likely to report negative reasons, e.g., burdensome application process, mistreatment at application process, or "immigration concerns," rather than positive reasons such as "over income."

c) ***Hypothesis 2.3:*** Among those reporting either not working for pay, or reducing work hours, foreign-born mothers are more likely to report negative reasons, e.g., being discharged/fired/laid off, poor hours/pay, or "immigration concerns" as reasons for not working, losing a job or reducing hours than are U.S.-born mothers.

3) **Aim #3:** Do mothers' FBS, or protective and risk factors associated with FBS, moderate or exacerbate associations of negative economic shocks and hardships with VLFS in children?

a) ***Hypothesis 3.1*****:** Economic shocks (e.g., job loss, assistance benefit loss) and family hardships (e.g., housing insecurity, energy insecurity and adverse healthcare trade-offs) are positively associated with VLFS in children.

b) ***Hypothesis 3.2:*** Mothers' FBS interacts with, or modifies the effects of, negative economic shocks and family hardships to increase their positive associations with VLFS in children among children of foreign-born mothers.

c) ***Hypothesis 3.3:*** Controlling for risk factors associated with mothers' FBS will reduce or eliminate the interaction between mothers' FBS and negative economic shocks and family hardships in their associations with VLFS in children.

d) ***Hypothesis 3.4*****:** Controlling for protective factors associated with mothers' FBS (demographic and assistance factors separately) will increase the interaction between mothers' FBS and negative economic shocks and family hardships.

Research Methods

Overview: We used univariate descriptive statistics and bi-variate associational measures (Chi-Square statistics for categorical variables, ANOVA for continuous variables) to describe the data and depict unadjusted differences in primary outcomes of interest among subgroups defined by the main predictor or independent variable (Appendix Tables 1a-1c). We used both bi-variate and multivariate logistic regression models to test hypotheses, adjusting for potential confounders indicated by existing research, theory or correlations with both predictors and outcomes in current analyses.

Aim #1: To test Hypothesis 1.1 (whether children of FB mothers generally have greater odds than children of US-born mothers of living in households with VLFS in children in these data), and to establish a baseline model, we initially estimated a simple bi-variate logistic regression model controlling for no covariates, measuring the unadjusted association of mothers FBS with VLFS in children. To test Hypothesis 1.2 (whether mothers' demographic characteristics that could act as protective factors against VLFS in children, e.g., being married or partnered, having more adults in the household, more than one employed adult in the household are negatively associated with VLFS), we estimated an additional set of models, first adding covariates for mothers' demographic characteristics that cannot be changed through behavior or policy changes (e.g., research site, mothers' age, and mothers' race/ethnicity). We then added covariates to the models that can be changed either by mothers' (or someone else's) behavior or policy changes. These included marital status, education attainment, employment, number of adults in the household, whether there are any other adults besides the mother in the household employed, receipt of SNAP, or receipt of WIC. Our interest in each model was

whether controlling for characteristics hypothesized as protective against VLFS would result in significantly higher odds of VLFS in children of FB mothers compared to children of US-born mothers.

Similarly, to test Hypothesis 1.3, we estimated a set of models with mothers' FBS as predictor and VLFS in children as outcome, adding covariates hypothesized to be risk factors likely to increase the odds of VLFS in children. Several such risk factors are in fact negative or inverse versions of factors hypothesized to be protective when present (or when at a higher amount or level), e.g., umarried/unpartnered marital status, lower educational attainment, mothers' age, unemployed, lower number of adults in the household, not receiving SNAP or WIC, and English language proficiency, and length of residence in the US. Some of these potential risk/protective factors may be only partially under the mothers' control or accessible by choice, e.g., employment, wage level, and eligibility for nutrition and non-nutrition assistance if the mother is an unauthorized immigrant. Another factor that seems to play an important role, though the precise mechanism through which it acts is not completely clear (and likely heterogeneous among the immigrant population), is length of stay in the US.

We categorized FB mothers into one of three length of stay (LOS) categories derived from mothers reported place of birth, date of entry into the US and interview date as follows: LOS <5 years, LOS = 5-10 years, and LOS >10 years. The numbers and proportions of FB mothers in each LOS category vary somewhat but not greatly, with the largest proportion (41.0%) in the US 5-10 years, followed by newer immigrants whose LOS is <5 years (33.0%), and the longer-term here >10 years (26.1%) (Table 1). Those with the shortest LOS have the highest prevalence of VLFS in

children in these data (3.37%), followed by those with LOS 5-10 years (2.97%). Mothers with the longest LOS have the lowest prevalence of VLFS in children at 2.48%. The patterns of prevalence of the other categories of food insecurity also decline as the LOS categories increase.

Table 1: Food Security Status of Children Ages <48 Months By Mother's Foreign-Born Status and Length of Stay of Foreign-Born Mothers

	Total	Household & Child High FS	Household Low FS; Child High FS	Household Very Low FS; Child High FS	Child Low FS	Child VLFS
US-born Mothers	28,859 71.33%	23,701 82.13%	2,604 9.02%	468 1.62%	1,901 6.59%	185 0.64%
***(% of all FBM*)**	*(33.0%)*					
FMB LOS <5 Years	3,823 9.45%	2,229 58.30%	528 13.81%	50 1.31%	887 23.20%	129 3.37%
(% of all FBM)	*(41.0%)*					
FBM LOS 5-10 Years	4,752 11.74%	2,971 62.52%	509 10.71%	31 0.65%	1,100 23.15%	141 2.97%
(% of all FBM)	*(26.1%)*					
FBM LOS >10 Years	3,026 7.48%	2,170 71.71%	277 9.15%	20 0.66%	484 15.99%	75 2.48%
(Total FBM)	***(11,601*)**	**(7,370)**	**(1,314)**	**(101)**	**(2,471)**	**(345)**
Total	**40,460** **100%**	**31,071** **76.79%**	**3,918** **9.68%**	**569** **10.81%**	**4,372** **10.81%**	**530** **1.31%**

Source: Children's HealthWatch Data. Some data on LOS are missing.

One of the ways LOS of immigrants in the US can influence food security is through differential effects on access to nutrition assistance benefits. Though there is some variation across states in policies on eligibility for nutrition assistance, Federal laws and rules permit many non-citizens to apply for and receive SNAP and WIC, and require states to accept their applications. In addition to the standard eligibility requirements that US citizens must meet, there are some time-related conditions among the additional conditions that most "qualified aliens" need to

meet in order to receive SNAP. These include residing in the US for at least 5 years, or evidence of at least 40 quarters of qualified employment. These conditions could be influenced by LOS in the US. There are also groups of "qualified aliens" who do not have to meet such additional conditions, including certain refugees, asylees, victims of trafficking, Cuban and Haitian immigrants, Amerasians, and members of certain Highland Laotian tribes, and some other Asian entrants[xvi] While race/ethnicity and presence of any non-citizens in a household have been found negatively associated with SNAP participation, other factors may have greater influence.[xvii] Yet from the above it seems likely that LOS could influence some FB mothers' decisions to apply for SNAP, and affect eligibility for those who do apply.

Table 2: Receipt of SNAP and WIC Among children Ages <48 Months By Mother's Foreign-Born Status and Length of Stay of Foreign-Born Mothers, with Average Monthly SNAP Benefit Amount for SNAP Recipients.

Assistance Program	US-born Mothers	FMB LOS <5 Years	FBM LOS 5-10 Years	FBM LOS >10 Years	Overall Total
% Receiving SNAP	56.39%	23.64%	26.54%	31.25%	47.90%
Mean SNAP Benefit ($/mo)	*$82.78*	*$56.89*	*$62.92*	*$73.61*	*$79.58*
% Receiving WIC	78.07%	85.17%	87.03%	86.62%	80.36%

Source: Children's HealthWatch Data. Some data on LOS are missing.

Based on these differences across LOS categories, we stratified the data on FB mothers by LOS category and estimated separate models with mothers' FBS indicated by a four-level multinomial variable whose categories include each of the LOS categories (as in Tables 1 and 2). We initially compared FB mothers in each of the LOS categories to US-born mothers, then compared mothers among the three LOS categories to further clarify whether there are

significant differences in the influence of protective and risk factors among the three LOS subgroups.

As a final way of looking at the influence of risk and protective factors that might influence the association between mothers' FBS and VLFS in children, we stratified the data on mothers' FBS and estimated models with the full set of protective and risk covariates included in each. This enabled us to get another view of how these factors influenced the relationship of mothers' FBS differently in the two groups.

Aim 2: To test Hypothesis 2.1, we estimated four logistic regression models, each with mothers' FBS as predictor, but with SNAP receipt, WIC receipt, non-nutrition assistance (any one or more of: housing subsidy, TANF, or LIHEAP) receipt, and whether the mother worked for pay as outcome variables. The covariates included in the three models of assistance benefit receipt were the same as those included in the final models used to test Hypothesis 1.3 above. In the model of mother's working for pay, the covariates were the same with the obvious exception of mothers' employment. Table 3 shows prevalence of receipt of nutrition and non-nutrition benefits by mothers FBS. Prevalence of WIC receipt is high for both groups, and highest in FB mothers.

Table 3: Prevalence of Receipt of Nutrition and Non-Nutrition Assistance By Mothers' FBS

Assistance Program	Overall	US-Born Mothers	FB Mothers
SNAP	48.7%	57.7%	27.6%
WIC	***80.2%***	***77.8%***	***85.9%***
Housing Subsidy	24.9%	28.4%	16.9%
TANF	27.1%	32.7%	14.0%
LIHEAP	18.1%	21.7%	10.0%

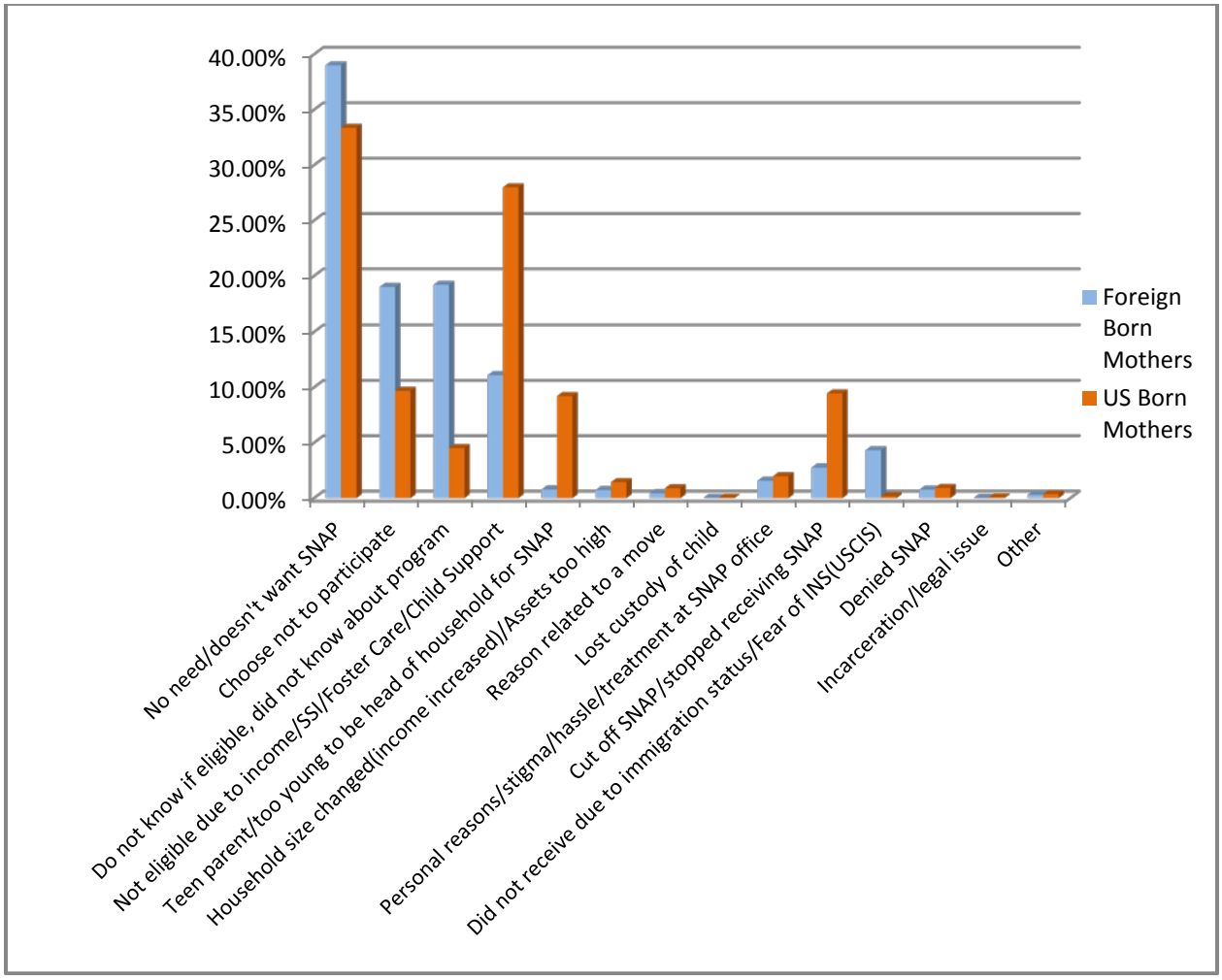
In examining Hypothesis 2.2, we used data from follow-up questions asked of respondents who report that they are not presently receiving SNAP, WIC or TANF. The entire questionnaire is read to respondents from laptop computer screens, including follow-up questions when appropriate, and responses selected or entered by the interviewer. We categorized the reasons available for selection by mothers for not receiving SNAP or TANF as "positive" or "negative" based on our informed judgment. Reasonable people may disagree with our categorizations, and we note that not all reasons are unambiguously positive or negative, but might be one or the other depending on the respondent's exact circumstances. The reasons for not receiving SNAP and proportions of FB and US-born mothers affirming each are shown in Table 4, and depicted graphically in Figure 1. Reasons for not receiving TANF are shown in Table 5 and depicted graphically in Figure 2.

Table 4: Response options read to mothers who report that they are not receiving SNAP when asked what is the reason why they are not receiving it,* with percent affirmed by FBS.

Reasons for Not Receiving SNAP	Foreign Born Mothers	US Born Mothers
No need/doesn't want SNAP	39.00%	33.36%
Choose not to participate	19.05%	9.68%
Do not know if eligible, did not know about program	19.25%	4.51%
Not eligible because of income/SSI/Foster Care/Child Support	11.08%	27.99%
Teen parent/too young to be head of household for SNAP	0.77%	9.20%
Household size changed(leading to income increase)/Assets too high	0.72%	1.43%
Reason related to a move	0.44%	0.89%
Lost custody of child	0.02%	0.03%
Personal reasons/stigma/bureaucratic hassle/treatment at SNAP office	1.56%	1.97%
Cut off SNAP/stopped receiving SNAP	2.75%	9.44%
Did not receive due to immigration status/Fear of INS(USCIS)	4.31%	0.16%
Denied SNAP	0.76%	0.92%
Incarceration/legal issue	0.00%	0.08%
Other	0.30%	0.36%

*An open-ended "other" option is also available. Responses may be abbreviated/paraphrased here.

Figure 1: Proportions of mothers reporting alternative reasons for not receiving SNAP, by mothers' FBS*.



* An open-ended "other" option is also available. Responses may be abbreviated/paraphrased here.

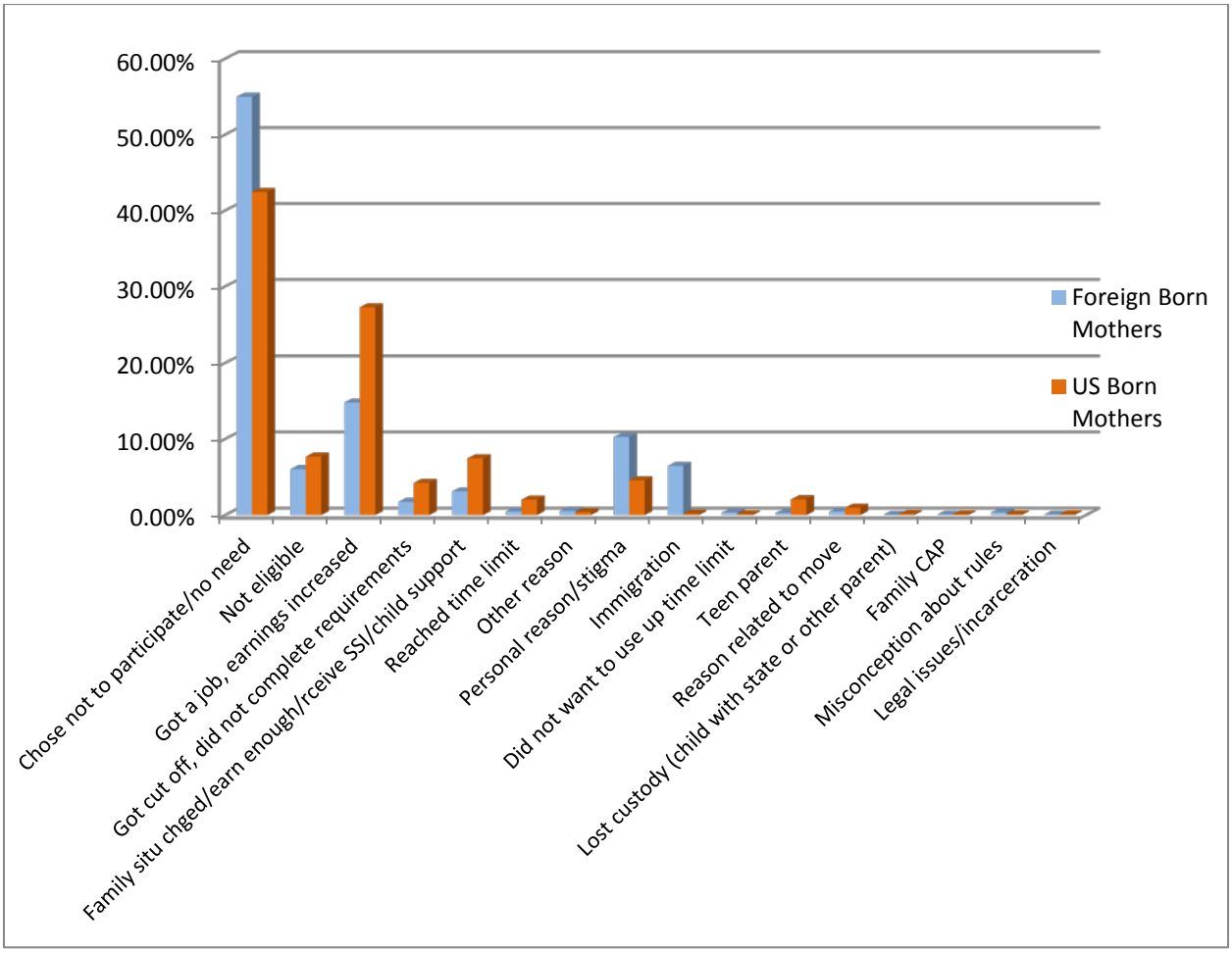
Table 5: Response options read to mothers who report that they are not receiving TANF when asked what is the reason why they are not receiving it,* with percent affirmed by FBS.

Reasons for Not Receiving TANF	Foreign Born Mothers	US Born Mothers
Chose not to participate/no need	54.99%	42.45%
Not eligible	6.03%	7.68%
Got a job, earnings increased	14.79%	27.33%
Got cut off, did not complete requirements	1.73%	4.23%
Family situ chged/earn enough/rceive SSI/child support	3.11%	7.46%
Reached time limit	0.50%	2.03%
Other reason	0.57%	0.38%
Personal reason/stigma	10.26%	4.56%
Immigration	6.45%	0.20%
Did not want to use up time limit	0.33%	0.13%
Teen parent	0.26%	2.07%
Reason related to move	0.47%	0.96%
Lost custody (child with state or other parent)	0.03%	0.16%
Family CAP	0.06%	0.11%
Misconception about rules	0.36%	0.13%
Legal issues/incarceration	0.06%	0.11%

The program is referred to as "cash assistance", "welfare", or the state's name. An open-ended "other" option is available. Reasons may be abbreviated or paraphrased here.

Though mothers do have the options of providing reasons for not receiving WIC, given the high prevalence of receipt of WIC by both the FB (85.9%) and US-born (77.8%)mothers in these data, and the higher prevalence among FB, we did not tabulate and compare reasons for not receiving WIC. Moreover, follow-up questions are not available for receipt of housing subsidies and LIHEAP.

Figure 2: Proportions of mothers reporting alternative reasons for not receiving TANF, by mothers' FBS*.



We tabulated frequencies of reasons given by FB and US-born mothers for not receiving SNAP and TANF, and compared them using X-Squared statistics. We suspect under-reporting of immigration concerns as a reason for not receiving SNAP or TANF by FB mothers, and possible over-reporting of "chose not to participate" and "no need". The high prevalence of food insecurity among households with FB mothers (36.3% reported food insecurity at some level of severity compared to only 18.3% of US-born mothers) seems inconsistent with the higher

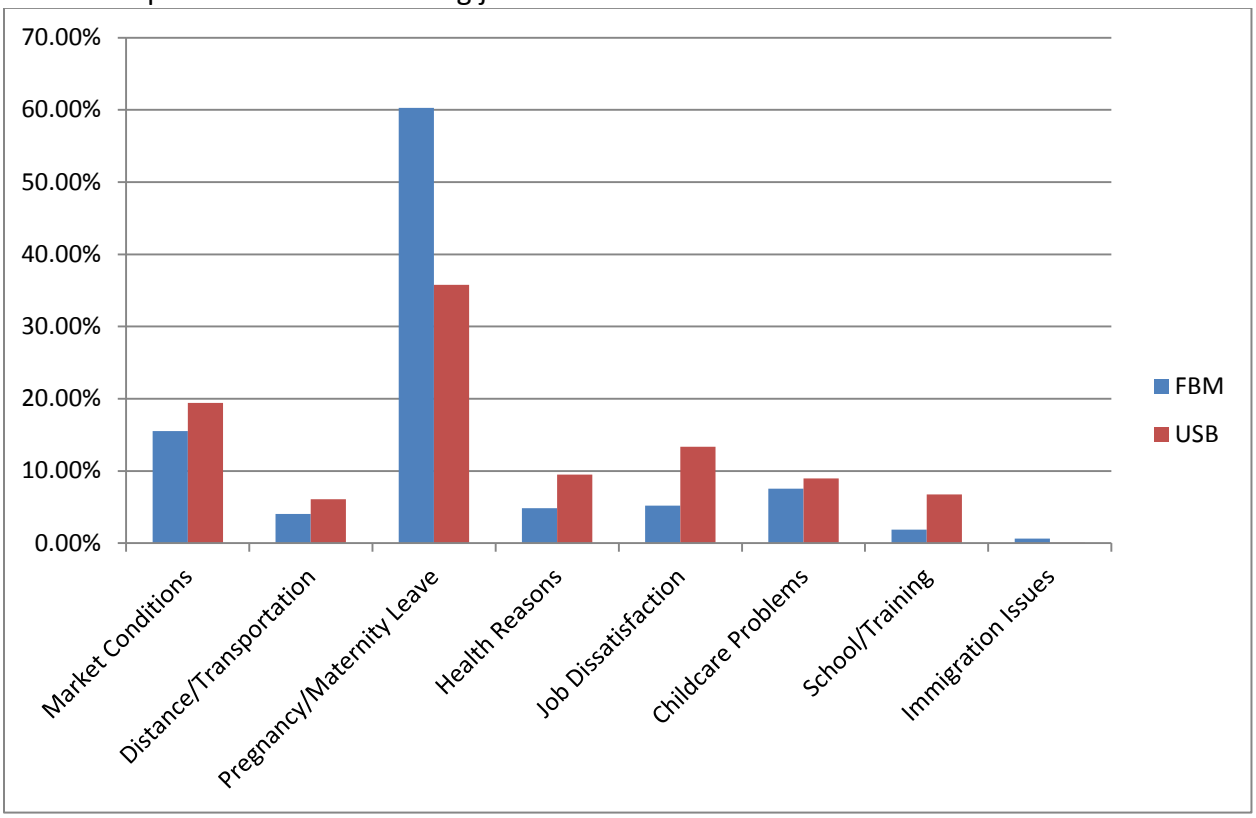
proportion of FB mothers reporting "choose not to participate" or "no need" (58% of FB mothers compared to 43% of US-born mothers).

To test Hypothesis 2.3, we stratified the data into two groups; mothers reporting they were not working for pay at the time of interview, and those reporting they were. From the mothers reporting they were working at the time of interview, we selected those who reported their work hours had been reduced over the previous year. From those reporting they were not working at the time of interview we selected those reporting they had lost a job within the previous year. We tabulated the reasons mothers indicated for either having lost a job or had their work hours reduced (separately), and compared the proportions of FB and US-born mothers selecting each reason. Proportions of FB and US-born mothers selecting each reason for losing a job are shown in Table 6 (and Figure 3 below). Note that we aggregated reasons likely to be related to conditions in the economy into a "market conditions" category for simplification.

Table 6: Mothers' reported reasons for losing a job within the previous year, of those not working at time of interview, by FBS.

Reasons for Losing Job in Previous Year	**Foreign Born Mothers**	**US Born Mothers**
	Percent	Percent
Market Conditions (*Includes any one of the following: Laid off, Job was temporary/seasonal, Discharged/fired, Employer bankrupt, Employer sold business, Business was slow*)	15.52%	19.43%
Distance/Transportation	4.06%	6.10%
Pregnancy/Maternity Leave	60.28%	35.78%
Health Reasons	4.87%	9.52%
Job Dissatisfaction	5.20%	13.37%
Childcare Problems	7.55%	8.98%
School/Training	1.87%	6.77%
Immigration Issues	0.65%	0.04%

Figure 3: Prevalence of job loss within previous year among FB and US-born mothers by reported reasons for losing jobs.



Two notable things appear in Table 6 (and Figure 3)that are contrary to our expectations; the proportion of FB mothers reporting "immigration issues" as the reason for losing a job is unexpectedly low, and the proportion reporting "pregnancy/maternity leave" is high, and noticeably higher than for US-born mothers (60.3% *vs* 35.8%). Since a criterion for mothers being approached for interview is that they are accompanying a child under age 48 months, and the mean ages of children in these data are 11.7 months and 13.3 months for FB and US-born mothers respectively, we expected the proportion of all mothers reporting

"pregnancy/maternity leave" to be high, and for the proportion of FB mothers to be somewhat higher, but did not expect it to be as much higher.

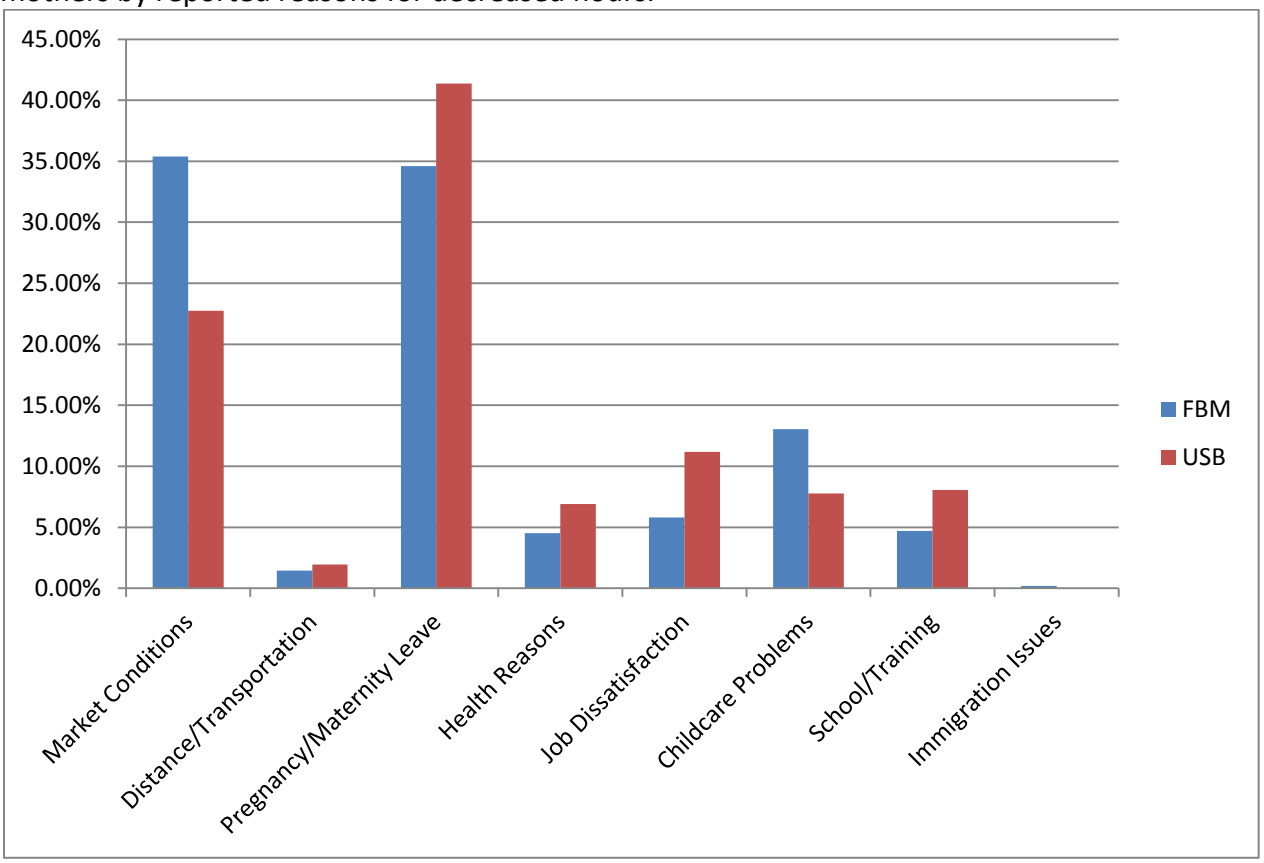
The proportion of FB mothers in the data reporting they were unemployed at the time of interview is higher (65.7%) than the proportion of US-born mothers (59.6%), but the proportion of FB mothers reporting losing a job within the previous year (24.1%) is somewhat lower than for US-born (29.9%) (Appendix Table 1b). This suggests a higher proportion of FB mothers may be "longer-term" unemployed, or choosing not to work. The notably higher proportion of FB mothers reporting "pregnancy/maternity leave" as the reason for losing a job might suggest higher fertility rates among FB mothers, yet the average number of children per household is the same for both groups of mothers (2.4 children/household) (Appendix Table 1b). Moreover, the average age of FB mothers (28.0 years) is significantly higher than for US-born (24.8 years), suggesting larger numbers of children per household, *ceteris paribus*, than for US-born mothers. Overall, these data suggest lower fertility among FB mothers, and higher rates of unemployment, or choosing not to participate in the labor force and to remain at home. This is also consistent with the higher proportion of FB mothers reporting "any employed adults" in the household (87.9%) compared to US-born mothers (72.8%) (Appendix Table 1b).

Similarly, for the group of mothers reporting they were working at time of interview, we selected those reporting that their work hours had decreased over the previous year. The reasons why work hours were decreased are the same as for losing a job, also with "market conditions" aggregated into one category. The proportions of FB & US-born mothers reporting each reason are shown in Table 7 and Figure 4 below.

Table 7: Mothers' reported reasons for decreased work hours within the previous year, of those working at time of interview, by FBS.

Reasons for Losing Job in Previous Year	Foreign Born Mothers	US Born Mothers
	Percent	Percent
Market Conditions (*Includes any one of the following: Laid off, Job was temporary/seasonal, Discharged/fired, Employer bankrupt, Employer sold business, Business was slow*)	35.39%	22.74%
Distance/Transportation	1.45%	1.96%
Pregnancy/Maternity Leave	34.60%	41.38%
Health Reasons	4.53%	6.91%
Job Dissatisfaction	5.80%	11.19%
Childcare Problems	13.04%	7.76%
School/Training	4.71%	8.07%
Immigration Issues	0.18%	0.00%

Figure 4: Prevalence of work hours decreased within previous year among FB and US-born mothers by reported reasons for decreased hours.



Several notable differences appear when the reasons for losing a job are compared with reasons for having hours decreased (Tables 6 and 7). While a higher proportion of US-born mothers than FB report "market conditions" as the reason for losing a job, the reverse is true for decreased work hours; a significantly larger proportion of FB mothers report "market conditions" as a reason for decreased hours than US-born mothers. A similar reversal appears in the other of the two most prevalent reasons reported by both groups as reasons for both job loss and reduced work hours; a significantly larger proportion of US-born mothers than FB report "pregnancy/maternity leave" as a reason for decreased hours than FB mothers. Among US-born mothers, "job dissatisfaction" was reported as the reason for both job loss and decreased work hours by the third highest proportions after "market conditions" and "pregnancy/maternity leave. For FB mothers "childcare problems" was the third most prevalent reason reported for both job loss and decreased hours. As with job loss, "immigration issues" was not reported by FB mothers as a reason for decreased work hours, as might be expected.

Aim #3:

In testing Hypothesis 3.1, we looked at unadjusted logistic regression models for association between VLFS and several variables representing economic shocks and household hardships. The hardships we examined included household housing insecurity (measured by an ordinal indicator validated by Children's HealthWatch previously[xviii]), household energy insecurity (also measured by an indicator validated by Children's HealthWatch[xix], and mothers' reports of times within the previous year in which the family was forced to make tradeoffs between paying for health care or other necessities (e.g., food, or rent). The economic shocks we examined include losing a job and having one's work hours reduced. We looked at these unadjusted models first

in the entire dataset, then stratified the data by mothers' FBS and examined them separately among US-born and FB mothers.

To test Hypothesis 3.2 we estimated logistic regression models with VLFS in children as outcome, each of the hardships and economic shocks as predictors, and included an interaction term with mothers' FBS interacted with each of the predictors. The hypotheses that mothers' FBS would interact with the negative economic shocks and family hardships was not supported by the tests, however. There were no statistically significant interactions between mothers' FBS and any of the negative economic shocks or family hardships.

Data

Data for this research are from existing Children's HealthWatch survey data on mother-child dyads with public or no health insurance (private insurance implies higher income levels). We have collected data on impacts of economic conditions and public policies on the well-being of very young low-income children for about 14 years at urban teaching hospitals and clinics in seven cities (Baltimore, Boston, Little Rock, Los Angeles, Minneapolis, Philadelphia, and Washington, DC; Los Angeles and Washington, DC sites are currently inactive) in a continuous time series of cross-sectional interviews.

This data collection activity was designed as a "sentinel surveillance" system intended to identify any adverse health outcomes resulting from the 1996 welfare reform law (PRWORA). The teaching hospitals where data collection sites were established are all "hospitals of last resort" committed to not refusing care because a patient or patient's family is unable to pay for health care. Consequently, these hospitals (including their outpatient clinics) serve

predominantly low-income populations, considered to be especially vulnerable to adverse health impacts anticipated as a result of changes to both cash and nutrition assistance programs under PRWORA. The children whose caregivers are interviewed and their families comprise, in effect, a "sentinel sample" likely to reflect adverse health effects arising from policy changes before and at higher rates than the general population. This is the “canaries in the coal mine” form of sentinel surveillance; monitoring disease rates in a particularly vulnerable sub-population to detect notable change before it impacts the general population. However the "general population" in this case is the general population of at-risk low-income families with young children.

Trained interviewers are scheduled at each research site during peak patient flow periods and approach all adult caregivers of children ages <48 months being presented for care (identified from the Emergency Department or clinic log). Interviews are conducted via computer assisted face-to-face interview in private settings during patient wait periods. Caregivers are not interviewed if they speak a language other than English, Spanish, or (in Minneapolis only) Somali, if they say they are not knowledgeable of the child's household, or if they refuse to provide consent for any reason (Appendix Figure 1). In these data, 92% of caregivers are the reference child’s biological mother (data not shown). The remaining 8% includes biological fathers, other relatives (e.g., grandmothers and aunts), and foster parents. For this research only female adult caregivers are included, almost all of whom are the children's biological mothers. For simplification, we will refer to the children's adult female caregivers as their "mothers" for the remainder of this report.

In the Children's HealthWatch data, 82.8% of all children have some form of public health insurance (mostly Medicaid), and 6.3% have no health insurance. Among all children in the dataset categorized as living in households with very low food security (VLFS) in children, 97.5% are in families that have either public health insurance (89.6%) or no insurance (7.9%). Thus, consistent with our historic practice, we omitted all surveys of mother/child dyads with private health insurance.

As of December 31, 2012, there were 44,919 children in the dataset (with public or no health insurance); 34,281 (76.3%) had high food security on both the adult/household scale and the child scale, while 10,638 (23.7%) lived in households with some level of food insecurity. Overall, of the total 44,919 children, 4,413 (9.8%) were in households that had low adult/household food security but high child food security, 662 (1.5%) in households with very low adult/household food security but high child food security, 4,966 (11.1%) in households with low food security on the child scale, and 597 (1.3%) in households that had VLFS in children on the child scale (Appendix Table 1a). We update the data every six months, and have added an average of 45 VLFS children/year over the period that we have been collecting data.

Referring to Appendix Table 1a, the majority of children in households with VLFS in children were interviewed in Boston (32.2%) and Minneapolis (38.7%). Boston Medical Center is the "hospital of last resort" for low-income and indigent patients in the greater Boston area, and Hennipen County Medical Center in Minneapolis serves a similar role for that city. In Boston there are large Haitian and Latino populations, and in Minneapolis there are large Somali and Latino populations. Many of the Somali residents in the Minneapolis area are refugees or

asylees who were granted access to public nutrition and non-nutrition assistance as a result of their status. However we are not aware of other immigrant populations in these data for whom that is true.

The top ten countries of origin for foreign-born (FB) mothers in the Children's HealthWatch data are shown in Table 1 below. Just over 81% of all FB mothers in the data were born in these 10 countries. The next 10 countries of origin (Nigeria, Columbia, Trinidad, Ethiopia, Liberia, "Africa", Viet Nam, Phillipines, Brazil, and Peru, in descending order by number of mothers from each country) yielded another 9%, and the third 10 countries yielded only an additional 3.3% combined. Spanish-speaking countries in the top 10 countries of origin were the source for approximately 60% of all the foreign-born mothers in the data.

Overall, 1.3% of all children in the Children's HealthWatch data live in households with VLFS in children. Among children with U.S.-born mothers the prevalence of VLFS in children is 0.63%; among children of foreign-born (FB) mothers the prevalence is 2.96%. Children of mothers born in the top 4 countries of origin in the data (Mexico, Somalia, El Salvador, and Haiti, in which 62.1% of all FB mothers were born) live in households with prevalence of VLFS in children of 3.56%, 2.13%, 2.73% and 4.31% respectively. Two-thirds (66.7%) of all children in the Children's HealthWatch data living in households with VLFS in children have FB mothers.

Table 8: Number and Percent of Foreign Born Mothers in the Children's HealthWatch Data from the Top Ten Countries of Origin

Country	Number of Foreign-Born Mothers	Percent of Foreign-Born Mothers	Cumulative Number	Cumulative Percent
Mexico	5,010	37.2%	5,010	37.2%
Somalia	1,234	9.2%	6,244	46.4%
El Salvador	1,136	8.4%	7,380	54.8%
Haiti	977	7.3%	8,357	62.1%
Dominican Republic	615	4.6%	8,972	66.6%
Ecuador	590	4.4%	9,562	71.0%
Cape Verde	499	3.7%	10,061	74.7%
Guatemala	350	2.6%	10,411	77.3%
Honduras	289	2.2%	10,700	79.5%
Jamaica	259	1.9%	10,959	81.4%

Overall, 30% of mothers in these data are foreign born (Appendix Table 1b). The vast majority of FB mothers identify as Hispanic (62.9%) or Non-Hispanic Black (32.5%) with just 2.2% identifying as Non-Hispanic White, and 3.3% "other". FB mothers in the data are older on average than US-born mothers (mean age = 28.0 yrs *vs* 24.8 yrs), less likely to have at least a high-school education (55.8% versus 71.2%), and are less likely to be employed at time of interview (34.3% *vs* 40.4%). However, FB mothers are also less likely to have lost a job within the past year (24.1% *vs* 29.9%). Among caregivers who were employed at the time of interview, a slightly (though statistically significantly) larger percentage of FB mothers reported having their work hours reduced during the previous year than did US-born mothers 21.9% *vs* 19.3%). A significantly larger proportion of FB mothers than US-born reported that there was at least one adult in their household employed (87.9% *vs* 72.8%).

A larger proportion of FB than US-born mothers report being married or "partnered" at the time of interview (64.2% *vs* 30.3%), and while the average number of children reported in their

households by FB and US-born mothers is the same (2.4 children per household), the average number of adults reported present in their households by FB mothers is significantly greater (2.6 adults vs 2.1). This larger average number of adults in FB mothers' households is consistent with a measure of "crowding or doubling up for economic reasons" that is part of a housing security indicator validated by Children's HealthWatch in these data. On that measure, 54.2% of FB mothers report crowding or doubling up compared to 32.6% of US-born mothers.

Other research has found some characteristics of foreign-born or immigrant mothers, or aspects of their family situations, protective against child food insecurity or hunger.[xx, xxi, xxii] The higher percentage of FB mothers reporting being "married/partnered" (64.2% *vs* 30.3%), higher prevalence of breastfeeding among children of FB mothers (84.5% *vs* 43.7%), lower prevalence of maternal depressive symptoms among FB mothers (19.3% *vs* 26.3%), and the larger average number of adults in the households of FB mothers (average 2.6 *vs* 2.1) all could influence the prevalence of VLFS in children in households with FB mothers. It is also notable that the prevalence of low birth weight (LBW), though still high, is lower among children of FB mothers than US-born mothers in these data (10.1% *vs* 15.8%).

Receipt of most nutrition and non-nutrition assistance differed among households of children of FB and US-born mothers in these data. Households of only 27.6% of children with FB mothers received SNAP compared to 57.7% of households with US-born mothers. Similar differences were reported for housing subsidies (16.9% *vs* 28.4%), LIHEAP (10.0% *vs* 21.7%), and TANF (14.0% *vs* 32.7%) by FB vs US-born mothers respectively. A notable exception to this pattern is WIC. The prevalence of receipt of WIC was actually statistically significantly higher

among FB mothers than among US-born, with 85.9% of FB mothers reporting receiving WIC either for themselves or the reference child, compared to 77.8% of US-born mothers.

Prevalence of other family hardships (in addition to food insecurity) also differed among households with FB versus US-born mothers. Only 42.2% of FB mothers reported stable housing on a measure of housing insecurity validated by Children's HealthWatch in these data, compared to 62.2% of US-born mothers. In this three category ordinal indicator, moderate housing insecurity is indicated by crowding (based on HUD criteria) or doubling up with another family for economic reasons. As reported above, 54.2% of FB mothers reported this condition compared to 32.6% of US-born. The most severe level of housing instability is indicated by residential mobility, with households moving 2 or more times within the past year categorized as severely housing insecure. A smaller percentage of FB mothers reported this condition than US-born mothers (3.6% *vs* 5.2%).

On an indicator of household energy insecurity (HEI), a larger proportion of FB mothers reported having no problems with household energy than US-born mothers. Moderate energy insecurity, indicated by receiving a threat (written or otherwise) of shutoff of electricity or threatened refusal to deliver fuel for failure to pay bills on time, was reported by 7.6% of FB mothers compared to 13.7% of US-born. Severe energy insecurity, indicated by actual shutoff of electricity or refusal to deliver fuel was reported by 13.7% of FB mothers compared to 15.7% of US-born.

On an ordinal indicator of "cumulative family hardship" created by categorizing food security, housing security and energy security each at three levels of severity (secure,

moderately insecure, severely insecure), assigning "scores" of 0, 1, or 2 to these categories for each hardship, and summing those scores over the three hardships, a smaller proportion of households with FB mothers than US-born scored "no hardship", meaning they had no identifiable level of insecurity on any of the three hardships (27.6% *vs* 38.7%). Greater proportions of households with FB mothers were scored as having "moderate hardship" and "severe hardship" than households with US-born mothers (63.5% *vs* 55.4% and 8.9% *vs* 5.8% respectively).

Several questions on the survey questionnaire ask mothers whether their families are forced to make undesirable tradeoffs between paying for health care (seeing a care provider or receiving prescription medications) and obtaining other necessary goods or services. On a composite variable constructed by combining responses to these questions, which we have viewed as indicative of unplanned or unanticipated health care problems, a smaller percentage of FB mothers than US-born mothers reported undesirable healthcare tradeoffs (6.8% *vs* 9.4%).

An earlier study by Children's Healthwatch found that newly-arrived immigrants are at higher risk of food insecurity than those whose length of stay in the US is longer.[xxiii] In its Guidance on Non-citizen Eligibility for SNAP, the Food and Nutrition Service lists several reasons why some foreign-born immigrants are not eligible to receive SNAP, and suggests other reasons why non-citizen immigrants who are eligible might mistakenly believe they are not. For example the law requires that non-eligible non-citizen parents of US-born citizen children must be allowed to apply for SNAP for their eligible children without penalty or risk to their immigration status. However, some FB parents might not be aware of that requirement, or they

may be aware but still not trust that they would not be deported or otherwise harmed if they applied for their children. The longer a FB mother stays in the US, the more likely she is to obtain accurate information, and develop a clear understanding of her rights under the law.

Other criteria for non-citizen eligibility for SNAP are related to the length of time an immigrant has resided in the US, or had gainful employment in the US. A complicated set of criteria are related to whether a non-citizen has resided in the US for more than five years and/or had gainful employment for 40 quarters. These and other eligibility criteria, particularly time- and age-related criteria, affecting foreign-born persons' eligibility for SNAP are more likely to be resolved and/or fully understood the longer they have resided in the US. Moreover, a host of place or location-specific human capital is accumulated by immigrants the longer they reside in a particular area. All these factors suggest that length of stay (LOS) may be an important factor in FB mothers ability to avoid VLFS in children.

We stratified the FB mothers in the data into three LOS groups with those in the US for less than five years in one group, those living in the US from five to ten years in a second, and those in the US for more than ten years in a third group. Mothers of about 9% of all children in the data have lived in the US for less than 5 years, 12% for 5-10 years, and 8% for more than 10 years (Appendix Table 1c). Viewed as percentages of all FB mothers in the data, 32% of FB mothers have LOS < 5 years, 41% have LOS 5-10 years, and 27% have LOS > 10 years.

Some notable differences across FB mothers in these three LOS groups include higher mean ages for mothers with longer LOS (mean ages 26.2, 28.0, and 30.0 years respectively), and for their children (10.1 mos., 12.2 mos., and 13.1 mos.); smaller proportions with less than high

school educations the longer the LOS (47.4%, 46.2%, and 36%); somewhat smaller proportion "married/partnered" in the >10 years LOS group (59.4%) compared to both the <5 years (65.2%) and the 5-10 years groups (65.9%); larger proportions of FB mothers employed the longer the LOS (26.7%, 34.9%, and 42.6% respectively); lower proportions whose work hours had been decreased, or who had lost a job in the previous year (25.3%, 23.2%, 18.0%, and 27.6%, 25.1%, 21.2% over the three LOS categories, respectively); higher proportions receiving SNAP (24.4%, 27.7%, and 33.3%), LIHEAP (7.6%, 9.8% and 13.6%), and housing subsidy (12.1%, 17.8%, and 22.8%) the longer their LOS, but not TANF (15.2%, 12.6%, AND 15.7%), or WIC (85.0%, 86.9%, and 85.0%) respectively.

There are several notable differences related to housing over the three LOS groups. As just noted, the proportions receiving housing subsidies are higher the longer the LOS, but so are the proportions who are homeowners (6.0%, 11.1%, and 16.9% respectively). These two trends are accompanied by increases in the proportions of households with FB mothers that are categorized as having stable housing as their LOS increases (32.5%, 42.5%, and 53.2% respectively). This increase in proportions reporting stable housing largely reflects declines in proportions of each longer LOS group reporting being crowded or doubled up due to economic reasons (63.0%, 54.2%, and 43.9% respectively), though the proportions with two or more residential moves also decline (4.5%, 3.3%, and 2.9% respectively).

However, this pattern of improvement with longer LOS does not appear in energy insecurity. There the proportions with no energy problems decline as LOS increases (81.8%, 78.5%, 73.6%), reflecting increasing proportions receiving threats of electricity shutoff or

refusal of fuel delivery for failure to pay bills on time (4.9%. 7.8%, 10.8%), as well as actually having their electricity shutoff or fuel delivery refused (13.3%, 13.7%, 15.6% respectively). The net results of these improving housing security conditions and worsening energy security conditions, together with trends in food security (not yet described) over the three LOS groups, however, is a pattern of improving cumulative family hardship scores as LOS increases. The proportion of households with FB mothers with no cumulative hardships increases as LOS increases (22.2%, 26.6%, 33.9% respectively), with improvements in both moderate and severe cumulative hardships over the three LOS groups (67.3%, 64.4%, and 58.4% respectively for moderate, and 10.4%, 9.0%, and 7.7% respectively for severe).

One final set of notable differences across the three LOS groups includes proportions of single-parent households, changes in prevalence of breastfeeding, and age composition of households. The proportions of FB mothers reporting not being married/partnered declines very slightly over the first two LOS groups, but increases in the longest LOS group (34.8%, 34.1%, and 40.6% respectively). The proportion of FB mothers who breastfeed their child declines as their LOS increases (88.2%, 85.6%, and 79.4% respectively). This could be related to the large increases in proportions of FB mothers being employed as their LOS increases (26.7%, 34.9%, and 42.6% respectively). As one would expect, the average number of children per household reported by FB mothers in the three LOS groups increases (2.1 children, 2.4 children, and 2.7 children/household, respectively). Given the differences in housing conditions, particularly the proportions crowded or doubled up for economic reasons, over the three LOS groups, it is not surprising that the average number of adults per household reported by FB

mothers also declines over the three LOS groups (2.8 adults, 2.5 adults, and 2.3 adults/household respectively).

In all there are approximately 200 different "countries of origin" reported by the FB mothers in these data. However, as discussed above (Table 1), more than 81% of all FB mothers come from the top ten countries. We categorized all countries of origin by major language group, including Spanish, Haitian, Somali, Anglophone, and Other (Table 2). The majority of FB mothers are from Spanish language countries (62.2%), with smaller proportions from Haiti (a mix of French and Creole), Somali, Anglophone countries, and Other (Portuguese - Brazil and Cape Verde - and a large number of different non-English European, Asian and African languages).

Table 9: Foreign-born Mothers Categorized By Major Language Groups

Language Group	**Number of FB Mothers in Each Language Group**	**Percent of All FB Mothers in Each Language Group**
Spanish Speaking Countries	8348	62.2%
Haitian	977	7.3%
Somali	1234	9.2%
Anglophone Countries	1198	8.9%
Other*	1658	12.4%
Total	13,415	100%

*Other includes Portuguese (Brazil, Cape Verde), and a large number of different European, Asian and African languages other than English or Spanish.

The three "snapshots" of the Children's HealthWatch data presented in Appendix Tables 1a, 1b, and 1c, by food security category, by mothers' FBS, and by FB mothers' length of stay, together with the information in Tables 1 and 2 above, illustrate why these data are particularly well-suited to model the associations of mothers FBS, and characteristics of FB mothers, with VLFS in children.

Results

Aim #1: Is mother's foreign-born status (FBS) associated with VLFS in children, and can the association be explained by mothers' socio-demographic characteristics?

Hypothesis 1.1: In an initial unadjusted (bivariate) logistic regression model with mother's FBS as predictor (independent variable) and VLFS in children as the outcome (dependent variable), and no covariates, households with FB mothers have odds of VLFS in children 4.79 times as great as those with US-born mothers (Table R1, Model 1). This model establishes a baseline against which to compare results from other models adjusting for expanding sets of mothers' characteristics that may be either risk or protective factors for VLFS in children.

Table R1: Results from logistic regression models with Mother's Foreign Born Status as the predictor and Very Low Food Security (VLFS) in Children as the outcome;* with increasing sets of mother's characteristics as covariates in each model

Predictor	**Outcome**	**Covariates**
Mother's Foreign Born Status	**VLFS in Children**	**As Indicated**
Model 1	4.79 (4.02, 5.72) p<0.001	None
Model 2	3.53 (2.85, 4.36) p<0.001	Site Only
Model 3	2.64 (2.06, 3.37) p<0.001	Site, mother's ethnicity, and mother's age
Model 4	2.93 (2.27, 3.78) p<0.001	Site, mother's ethnicity, mother's age, marital status, and educational attainment
Model 5	2.94 (2.27, 3.79) p<0.001	Site, mother's ethnicity, mother's age, marital status, educational attainment, and employment status

* Mother-child dyads with private health insurance were excluded. VLFS is entered as a dichotomous variable, with VLFS as one category and all other categories of food security combined as the second.

Hypotheses 1.2 & 1.3: In Model 2, after adjusting for research site, households with FB mothers still have odds of VLFS in children 3.53 times as great as households with US-born mothers. Controlling for mothers' race/ethnicity and age (Model 3) further reduces the association between mothers' FBS and VLFS in children, with the odds of VLFS in children for households with FB mothers only 2.64 times as great as for households with US-born mothers. This suggests that mothers' race/ethnicity and/or age may represent risk factors for VLFS in children. Controlling also for mothers' marital status and educational attainment, the odds of VLFS in households with FB mothers increases somewhat, suggesting these may be protective factors, however adding mothers' employment status does not change the odds ratio.

A version of Model 5 from Table R1 above, estimated on the updated dataset, with data collected between June 30, 2012 and December 31, 2012 added, is summarized in Table R2 below, showing odds ratios, 95% confidence intervals and P-values for all covariates. After controlling for site, mothers' age, race/ethnicity, marital status, educational attainment, and employment status, households with FB mothers still have odds of having VLFS in children 3.04 times as great as households with US-born mothers.

Our final version of these risk and protective factor models appears in Table R3, with covariates indicating whether there are other employed adults in the household besides the mother, and the number of adults in the household added. After controlling for site, mothers' race/ethnicity, marital status, educational attainment, employment status, age, whether there are other employed adults in the household, and total number of adults in the household, those households with FB mothers still have odds of VLFS in children 3.36 times as great as those with

US-born mothers. Changes in the magnitude of the adjusted odds ratio for association between mothers' FBS and VLFS in children as covariates are added to these models, and the magnitude of AORs in the final model in Table R3, are consistent with the hypotheses that some of the mothers' socio-demographic characteristics are risk factors for VLFS in children while others are protective factors.

Table R2: Results from logistic regression models with Mother's Foreign Born Status as the predictor and Very Low Food Security (VLFS) in Children as the outcome;* controlling for mother's socio-demographic factors

	Child VLFS (n=529)	**P-value**
Foreign Born Mothers (controlling for covariates below)	**AOR = 3.04 (955 CI; 2.38, 3.88)**	**<0.001**
Site		
Little Rock (ref)	1.00	
Baltimore	1.56 (0.95, 2.56)	0.08
Boston	2.07 (1.36, 3.16)	<0.001
Los Angeles	2.64 (1.59, 4.37)	<0.001
Minneapolis	2.16 (1.41, 3.31)	<0.001
Philadelphia	1.08 (0.64, 1.83)	0.77
Washington, DC	0.84 (0.36, 1.99)	0.69
Mother's Ethnicity		
White|Non Hispanic (ref)	1.00	
Hispanic	2.57 (1.50, 4.40)	<0.001
Black|Non Hispanic	2.19 (1.30, 3.70)	0.003
Other	1.45 (0.66, 3.16)	0.36
Unmarried or partnered	1.68 (1.38, 2.04)	<0.001
Educational attainment		
Post High School (ref)	1.00	
Never or some HS	1.54 (1.19, 1.99)	0.001
High School	1.20 (0.93, 1.56)	0.16
Mother not Employed	1.26 (1.03, 1.53)	0.03
Mother's age	1.06 (1.04, 1.07)	<0.001

* Mother-child dyads with private health insurance were excluded. VLFS is entered as a dichotomous variable, with VLFS as one category and all other categories of food security combined as the second.

Table R3: Final Model; Results from logistic regression models with Mother's Foreign Born Status as the predictor and Very Low Food Security (VLFS) in Children as the outcome;* controlling for mother's socio-demographic characteristics

	Child VLFS (n=512)	**P-value**
Foreign Born Mother (Controlling for covariates below)	**AOR = 3.36 (95% CI; 2.61, 4.32)**	**<0.001**
Site		
Little Rock (ref)	1.00	
Baltimore	1.55 (0.94, 2.57)	0.09
Boston	1.95 (1.28, 2.97)	0.002
Los Angeles	2.55 (1.53, 4.23)	<0.001
Minneapolis	2.04 (1.33, 3.13)	0.001
Philadelphia	0.97 (0.57, 1.67)	0.92
Washington, DC	0.67 (0.27, 1.67)	0.39
Mother's Ethnicity		
White|Non Hispanic (ref)	1.00	
Hispanic	2.67 (1.53, 4.65)	<0.001
Black|Non Hispanic	2.13 (1.24, 3.65)	0.01
Other	1.48 (0.67, 3.26)	0.33
Married/partnered	0.67 (0.54, 0.84)	<0.001
Educational Attainment		
Post High School (ref)	1.00	
Never or some HS	1.54 (1.19, 2.01)	0.001
High School	1.20 (0.92, 1.56)	0.17
Mother Employed	0.62 (0.48, 0.79)	<0.001
Mother's Age	1.06 (1.04, 1.07)	<0.001
Other Adults Employed In HH	0.67 (0.51, 0.87)	0.003
Number of Adults in HH		
One (ref)	1.00	
Two	0.89 (0.69, 1.16)	0.40
3 or more	0.92 (0.70, 1.22)	0.56

* Mother-child dyads with private health insurance were excluded. VLFS is entered as a dichotomous variable, with VLFS as one category and all other categories of food security combined as the second.

To shed additional light on how mothers' socio-demographic characteristics might function as protective or risk factors for VLFS in children, we stratified the data by mothers' FBS and estimated the final model on each subset of the data separately. The results (Table R4 and R5) indicate that among US-born mothers race/ethnicity continues to have a significant positive association with VLFS in children (is a risk factor), while among FB-mothers the association between race/ethnicity and VLFS in children is marginal at most in these data. Similarly, mothers' being married/partnered continues to be significantly negatively associated with VLFS in children among FB mothers, though it is not among US-born mothers.

Table R4: Final Model with Data Stratified by Mothers' FBS; US-Born Mothers Only

	Child VLFS (n=165)	**P-value**
Site		
LR (ref)	1.00	
Baltimore	1.60 (0.92, 2.79)	0.10
Boston	1.50 (0.86, 2.62)	0.16
LA	3.53 (1.37, 9.06)	0.01
Minn	2.84 (1.65, 4.89)	<0.001
Philadelphia	1.24 (0.65, 2.36)	0.51
Washington DC	12.80 (1.58, 103.5)	0.02
Mother's Ethnicity		
White|Non Hispanic (ref)	1.00	
Hispanic	2.08 (1.00, 4.33)	0.05
Black|Non Hispanic	2.63 (1.42, 4.87)	0.002
Other	2.47 (1.02, 6.01)	0.05
Married/partnered	1.10 (0.73, 1.66)	0.66
Educational attainment		
Post High School (ref)	1.00	
Never or some HS	1.19 (0.77, 1.83)	0.43
High School	1.13 (0.77, 1.67)	0.53
Mother Employed	0.49 (0.33, 0.72)	<0.001
Mother's age	1.07 (1.05, 1.09)	<0.001
Others Employed In HH	0.58 (0.37, 0.90)	0.01
Adults in HH		
one	1.00	
two	0.79 (0.53, 1.18)	0.24
3 or more	0.74 (0.45, 1.21)	0.22

Lower educational attainment continues to be positively associated with VLFS in children among FB mothers while the association is not significant among US-born mothers. Both mothers' employment and having additional adults in the household who are employed continue to be negatively associated with VLFS in children in both subgroups, and mothers' age continues to have a small but significant positive association with VLFS in children. The number of adults in the household is not associated with VLFS in children in either subgroup.

If we consider factors that are positively associated with VLFS in children as risk factors, and those that are negatively associated with the condition as protective factors, these results suggest that after controlling for the other factors in the models in Tables R4 and R5, mothers being employed, and having other adults in the household employed, are protective factors against VLFS, and higher age of mothers is a risk factor for VLFS in children in both subgroups. Higher levels of educational attainment, and being married/partnered, seem to be protective against VLFS among FB mothers, but not US-born mothers. Mothers' race/ethnicity being either Hispanic or non-Hispanic Black seems to be a risk factor for VLFS in children among US-born mothers, but not among FB mothers. And higher mothers' age seems to be a significant but relatively minor risk factor for VLFS in children in both subgroups.

Table R5: Final Model with Data Stratified by Mothers' FBS; FB Mothers Only

	Child VLFS (n=347)	p-value
Site LR (ref) Baltimore Boston LA Minn Philadelphia Washington DC	 1.00 1.71 (0.34, 8.46) 2.57 (1.17, 5.62) 2.53 (1.12, 5.69) 1.96 (0.91, 4.23) 1.04 (0.35, 3.16) 0.55 (0.17, 1.75)	 0.51 0.02 0.02 0.09 0.94 0.31
Mother's Ethnicity White|Non Hispanic (ref) Hispanic Black|Non Hispanic Other	 1.00 2.45 (0.77, 7.81) 1.63 (0.51, 5.21) 0.45 (0.07, 2.70)	 0.13 0.41 0.38
Married/partnered	0.60 (0.47, 0.77)	<0.001
Educational attainment Post High School (ref) Never or some HS High School	 1.00 1.89 (1.34, 2.68) 1.32 (0.92, 1.89)	 <0.001 0.13
Mother Employed	0.69 (0.48, 0.97)	0.03
Mother's age	1.05 (1.03, 1.06)	<0.001
Others Employed In HH	0.74 (0.52, 1.06)	0.10
Adults in HH one two 3 or more	 1.00 0.96 (0.67, 1.38) 0.98 (0.68, 1.42)	 0.82 0.92

Sub-analysis of Mothers' Language Groups

A potential risk factor that we were unable to control for directly in the models above is difficulty with the English language, indicated by language of interview, as a potential source of difficulties dealing with administrative matters conducted in English. This might apply to

applications for nutrition or non-nutrition assistance, or other social supports, or just navigating day-to-day business transactions. However, though we know which interviews are conducted in English and Spanish, we discovered that an unknown number of interviews conducted in Somali were translated on-site by interpreters, but not recorded as administered in Somali. This raised doubts about our ability to accurately determine which specific interviews were actually conducted in Somali, and the potential for interjecting an unknown amount of measurement error in estimates based on individual records of language of interview.

In an effort to conservatively approximate a variable indicating potential language difficulties, we categorized mothers' countries of origin into five "language groups". These include Anglophone (countries in which the primary language is English, even if other languages or dialects are also spoken), Spanish speaking (Latin American countries, and others in which the primary language is Spanish), Haitian (Haiti was the only Francophone country of origin, so we simply used the term Haitian), Somali, and "other" (primarily Portuguese speaking countries, together with a long list of Asian, European, and African countries where English is not the primary language). These groupings and the numbers and proportions of FB mothers in each are shown in Table 9 above (in the Data Section).

Bivariate logistic regressions using the full dataset comparing VLFS in children among households with US-born mothers to VLFS in children in households with mothers from each of the five language group categories indicate that households with mothers from countries in any of the language groups have greater odds of VLFS in children than households with US-born mothers. The odds of VLFS in children are greater for households with mothers from Haiti and

Spanish-speaking countries than for households with mothers from countries in the other language groupings (Table R6, top set of results).

When the same bivariate logistic regressions are estimated using only data on households with FB mothers, comparing VLFS in households with mothers from Anglophone countries to households with mothers from countries in the other language groupings, only households with mothers from Haiti and Spanish-speaking countries have greater odds of VLFS in children than households with mothers from Anglophone countries (Table R6, lower set of results). While the language-group categories are not a perfect a perfect proxy for difficulties with English language, they do indicate that not having English as a primary language may be a risk factor for VLFS in children among FB mothers.

Table R6: Results of Unadjusted Logistic Regression Models with Mothers' Country of Origin Language Group as Predictor and VLFS in Children as Outcome; Estimated Using the Entire Dataset and FB Mothers Only

Estimated Using the Entire Dataset		
Country of Origin	**Child VLFS (n=597)**	**P-value**
US-Born	1.00	
Anglophone	3.07 (1.99, 4.75)	<0.001
Spanish Speaking	5.29 (4.40, 6.37)	<0.001
Haitian	7.43 (5.32, 10.36)	<0.001
Somalian	3.11 (2.03, 4.77)	<0.001
Other	3.36 (2.34, 4.83)	<0.001
Estimated using FB Mothers Only		
Country of Origin	**Child VLFS (n=398)**	**P-value**
Anglophone	1.00	
Spanish Speaking	1.72 (1.12, 2.65)	0.01
Haitian	2.42 (1.45, 4.03)	<0.001
Somalian	1.01 (0.57, 1.80)	0.97
Other	1.09 (0.64, 1.86)	0.74

Very similar results emerge when we estimate a version of the final multivariate logistic regression model (Table 5R above) with mothers' language group as predictor and VLFS in children as the outcome, omitting mothers' race/ethnicity which is highly correlated with the language groups (as is research site to a lesser degree). After controlling for the other socio-demographic factors in the model, households with mothers from Haiti and Spanish-speaking countries still have significantly greater odds of VLFS in children than those with mothers from Anglophone countries. Figures 5 and 6 below complement and inform these results.

Table R7: Results of Multivariate Logistic Regression with Mothers' Country of Origin Language Group as Predictor and VLFS in Children as Outcome (FBM Only)

	Child VLFS (n=347)	**P-value**
Foreign Born Mother		
Anglo	1.00	
Spanish Speaking	2.20 (1.31, 3.72)	0.003
Haitian	2.55 (1.43, 4.55)	0.002
Somali	1.11 (0.56, 2.22)	0.76
Other	1.13 (0.61, 2.09)	0.70
Site		
LR (ref)	1.00	
Baltimore	1.94 (0.39, 9.66)	0.42
Boston	2.46 (1.19, 5.41)	0.03
LA	2.51 (1.12, 5.66)	0.03
Minn	2.07 (0.96, 4.48)	0.06
Philadelphia	1.02 (0.34, 3.10)	0.97
Washington DC	0.57 (0.18, 1.77)	0.32
Married/partnered	0.59 (0.46, 0.76)	<0.001
Educational attainment		
Post High School (ref)	1.00	
Never or some HS	1.93 (1.36, 2.75)	0.001
High School	1.31 (0.91, 1.87)	0.14
Mother Employed	0.66 (0.46, 0.94)	0.02
Mother's age	1.05 (1.03, 1.06)	<0.001
Others Employed In HH	0.74 (0.51, 1.05)	0.09
Adults in HH		
one	1.00	
two	0.91 (0.64, 1.31)	0.62
3 or more	0.91 (0.63, 1.31)	0.61

Figure 5: Receipt of Nutrition Benefits by Mother's Country/Language of Origin

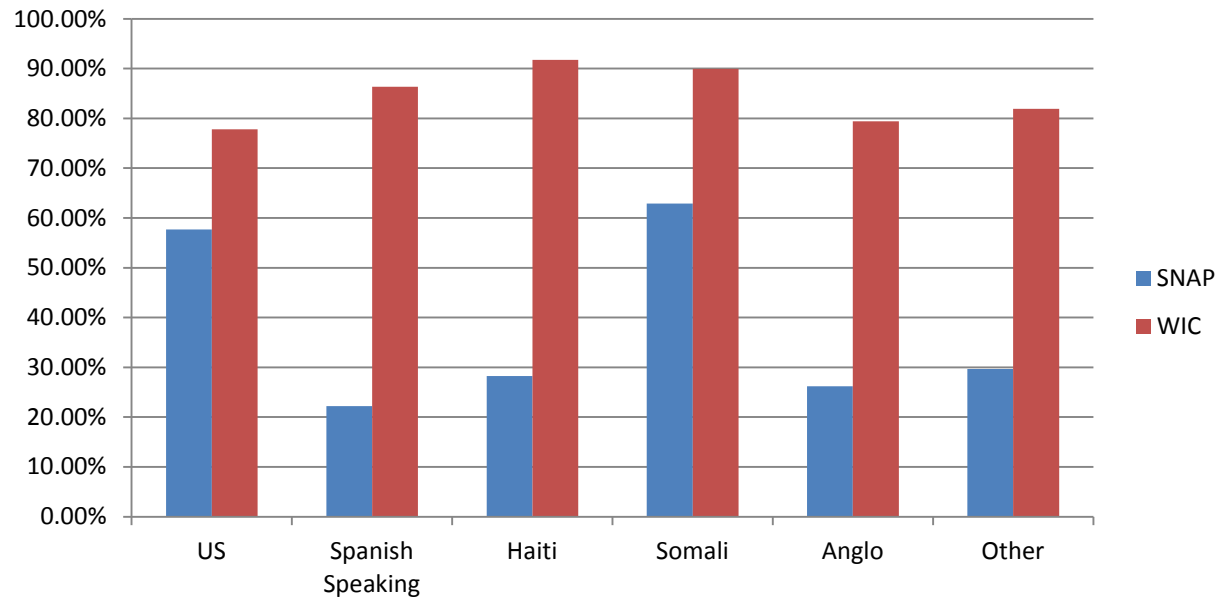
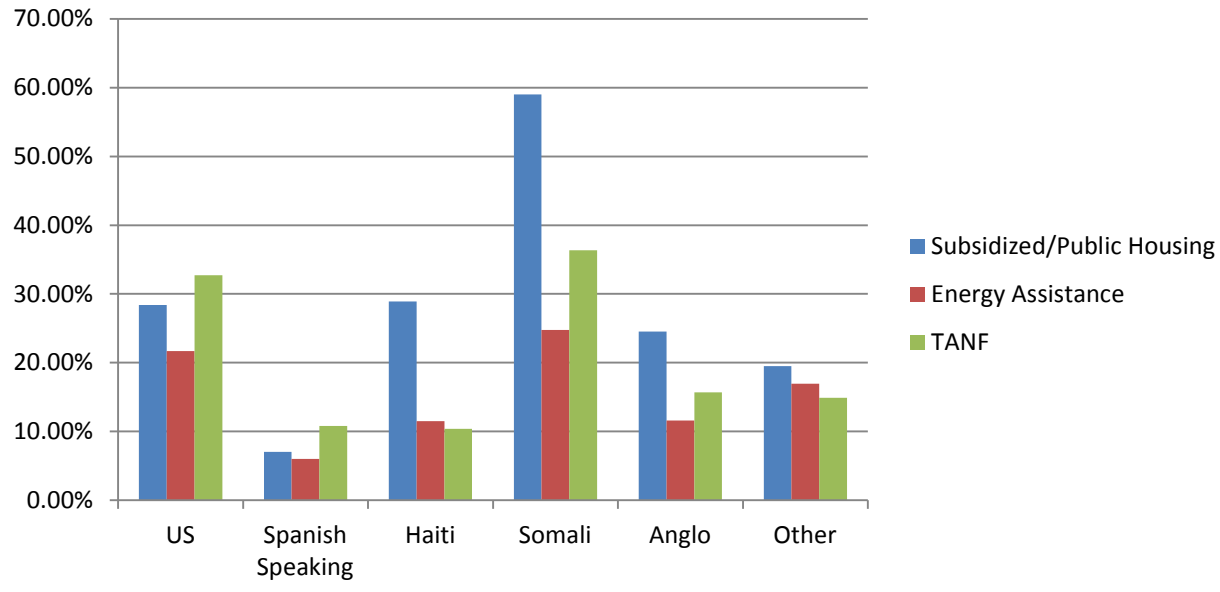


Figure 6: Receipt of Non-Nutrition Benefits by Mother's Country/Language of Origin



Sub-analysis of FB mother' length of stay (LOS) in the US

In bivariate comparisons, a number socio-demographic characteristics of FB mothers that seem potentially to be protective or risk factors for VLFS in children are related to the mothers' length of stay LOS) in the US (Appendix Table 1c, and Tables 1 and 2 in the Research Methods section). We re-estimated the set of five logistic regression models shown in Table R1 above using a four-category multinomial predictor variable whose categories include US-born with FB mothers divided into three groups by their LOS in the US (LOS <5 Years, LOS 5-10 Years, and LOS >10 Years).

In each of the seven models in Table R8, the Adjusted Odds of VLFS in children is highest in the LOS <5 Years group, intermediate in the LOS = 5-10 Years group, and lowest in the LOS >10 Years group, though the 95% confidence intervals around the AORs continue to overlap across all three categories in each model (albeit only slightly in a few instances across the first and third groups).

In logistic regression models using only the FB mothers, and comparing the intermediate LOS and longest LOS groups to those with the shortest LOS (Table R9), the odds of VLFS in children are lower in the two longer LOS groups in all models, but only statistically significantly lower when comparing the group with the shortest LOS to the group with the longest. These results suggest that some factors related to LOS reduce the odds of VLFS in children, and that LOS may be a protective factor for VLFS in children.

Since we know that many non-citizens are not eligible for SNAP, we included receipt of SNAP as a covariate in Model 7 in Table R8. Though controlling for SNAP receipt does lead to slightly

higher odds of VLFS in children in all three LOS categories (suggesting receipt of SNAP may be protective against VLFS in children), the change does not appear to be statistically significant judging by the continued overlap of the 95% confidence intervals around the AORs.

Finally, for a different view of whether LOS is associated witn VLFS in children, we stratified the data by SNAP receipt and estimated a model with mothers' FBS as predictor of VLFS in children (outcome), using only households receiving SNAP (Table R10, Model 1, comparable to Model 5 in Table R8). While the AORs for VLFS in children are noticeably lower in the version of this model estimated on SNAP recipient households only, this could be a result of changed statistical power, or some other unmeasured factor. Also, adding the average amount of SNAP benefits per person received by the household as an additional covariate in that model (Table R10, Model 2) had negligible effect on the adjusted odds of VLFS in children.

Table R8: Results of Multivariate Logistic Regression with Mothers' FBS as Predictor and VLFS in Children as Outcome (FB mothers stratified into three groups by LOS in the US)

Child VLFS	US BORN Mother	FBM*: LOS <5 years	FBM: LOS =5 to 10 years	FBM: LOS >10 years	Covariates
Model 1	1.00	5.41 (4.31, 6.80) p<0.001	4.74 (3.80, 5.91) p<0.001	3.94 (3.00, 5.17) p<0.001	None
Model 2	1.00	4.02 (3.10, 5.21) p<0.001	3.55 (2.76, 4.56) p<0.001	2.93 (2.18, 3.93) p<0.001	Site Only
Model 3	1.00	3.24 (2.43, 4.33) p<0.001	2.72 (2.05, 3.61) p<0.001	1.76 (1.25, 2.48) p=0.001	Site, Mother's Ethnicity, and Mother's age
Model 4	1.00	3.67 (2.73, 4.95) p<0.001	3.08 (2.30, 4.13) p<0.001	1.98 (1.40, 2.80) p<0.001	Site, Mother's Ethnicity, Mother's age, marital status, and Educational attainment
Model 5	1.00	3.61 (2.68, 4.87) p<0.001	3.09 (2.31, 4.15) p<0.001	2.01 (1.42, 2.85) p<0.001	Site, Mother's Ethnicity, Mother's age, marital status, and Educational attainment and employment
Model 6	1.00	3.70 (2.74, 5.00) p<0.001	3.13 (2.33, 4.21) p<0.001	2.05 (1.44, 2.90) p<0.001	Site, Mother's Ethnicity, Mother's age, marital status, Educational attainment, employment, and WIC receipt
Model 7	1.00	3.78 (2.78, 5.13) p<0.001	3.24 (2.40, 4.37) p<0.001	2.11 (1.48, 2.99) p<0.001	Site, Mother's Ethnicity, Mother's age, marital status, Educational attainment, employment, WIC receipt and SNAP receipt (y/n)

Table R9: Results of Logistic Regression Models with FB Mothers' LOS in the US as Predictor and VLFS in Children as Outcome; FB Mothers Only.

Child VLFS	FBM*: LOS <5 years	FBM: LOS 5 to 10 years	FBM: LOS >10 years	Covariates
Model 1	1.00	0.88 (0.69, 1.12) p=0.28	0.73 (0.55, 0.97) p=0.03	None
Model 2	1.00	0.88 (0.69,1.13) p=0.32	0.73 (0.54, 0.98) p=0.04	Site Only
Model 3	1.00	0.84 (0.65, 1.08) p=0.18	0.54 (0.39, 0.75) p<0.001	Site, Mother's Ethnicity, and Mother's age
Model 4	1.00	0.84 (0.65, 1.08) p=0.18	0.54 (0.39, 0.75) p<0.001	Site, Mother's Ethnicity, Mother's age, marital status, and Educational attainment
Model 5	1.00	0.86 (0.66, 1.11) p=0.24	0.56 (0.40, 0.77) p<0.001	Site, Mother's Ethnicity, Mother's age, marital status, and Educational attainment and employment

Table R10: Results of Logistic Regression Models with Mothers' FBS as Predictor and VLFS in Children as Outcome Estimated Using Data from SNAP Recipients Only, and including Monthly Amount of SNAP Benefit per Person Received as a Covariate

Child VLFS	US BORN Mother	FBM*: LOS <5 years	FBM: LOS 5 to 10 years	FBM: LOS >10 years	Covariates
Model 1	1.00	2.97 (1.79, 4.93) p<0.001	3.07 (1.95, 4.85) p<0.001	2.63 (1.59, 4.36) p<0.001	Site, Mother's Ethnicity, Mother's age, marital status, and Educational attainment and employment
Model 2	1.00	2.92 (1.76, 4.87) p<0.001	3.04 (1.93, 4.81) p<0.001	2.63 (1.59, 4.36) p<0.001	Site, Mother's Ethnicity, Mother's age, marital status, and Educational attainment, employment, and SNAP amount per person per month

Aim #2: Are FB mothers more or less likely to receive nutrition and non-nutrition assistance, or to work for pay than US-born mothers? Is mother's FBS perceived as a barrier to program eligibility, or to working for pay? Among women apparently eligible for but not receiving assistance, do FB mothers report different reasons for not participating?

Hypothesis 2.1: To test the hypothesis that FB mothers are less likely to report receiving nutrition or non-nutrition assistance, or working for pay (tested separately), than US-born mothers, we estimated a set of four logistic regression models with mothers' FBS as predictor in all four, with outcomes dichotomous variables indicating whether the mother-child dyad received 1) SNAP, 2) WIC, or 3) any one or more of the following three non-nutrition assistance programs; housing subsidy, LIHEAP, or TANF, and 4) whether mothers reported working for pay. In the models with SNAP, WIC, and non-nutrition benefits as outcomes we included the same control variables as in the final model testing whether mothers' FBS is associated with VLFS in children, controlling for potential risk and protective factors (Table R3, above).

After controlling for research site, mothers' race/ethnicity, marital status, education level, employment status, and age, and whether there are other adults in the household who are employed, and the number of adults in the household, FB mother-child dyads have odds of receiving SNAP 62% lower than US-born mother-child dyads (Table R11). However the results for receipt of WIC are very different. Controlling for the same covariates, FB mother-child dyads have odds of receiving WIC 37% greater than US-born mother-child dyads (Table R12). Results for receipt of non-nutrition assistance are very similar to those for SNAP; adjusting for the same

covariates, FB-mothers have odds of receiving any form of non-nutrition assistance 67% lower than US-born mothers (Table R13).

Table R11: Results from Logistic Regression Model with Mothers FBS as Predictor and SNAP Receipt as Outcome, Adjusting for Listed Covariates.

	SNAP Receipt	**p-value**
Foreign Born Mother (Controlling for covariates below)	0.38 (0.35, 0.40)	<0.001
Site		
LR (ref)	1.00	
Baltimore	0.95 (0.88, 1.02)	0.21
Boston	0.84 (0.78, 0.90)	<0.001
LA	0.40 (0.34, 0.46)	<0.001
Minn	0.95 (0.88, 1.03)	0.19
Philadelphia	1.77 (1.63, 1.93)	<0.001
Washington DC	0.17 (0.12, 0.24)	<0.001
Mother's Ethnicity		
White|Non Hispanic (ref)	1.00	
Hispanic	1.13 (1.04, 1.23)	0.003
Black|Non Hispanic	1.71 (1.59, 1.83)	<0.001
Other	1.52 (1.33, 1.74)	<0.001
Married / partnered	0.83 (0.79, 0.88)	<0.001
Educational attainment		
Post High School (ref)	1.00	
Never or some HS	1.37 (1.29, 1.46)	<0.001
High School	1.31 (1.24, 1.39)	<0.001
Mother Employed	0.25 (0.24, 0.27)	<0.001
Mother's age	1.03 (1.02, 1.03)	<0.001
Others Employed In HH	0.39 (0.37, 0.42)	<0.001
Adults in HH		
one	1.00	
two	0.57 (0.53, 0.60)	<0.001
3 or more	0.49 (0.46, 0.52)	<0.001

Table R12: Results from Logistic Regression Model with Mothers FBS as Predictor and WIC Receipt as Outcome, Adjusting for Listed Covariates.

	WIC Receipt	**p-value**
Foreign Born Mother (controlling for covariates below)	1.37 (1.26, 1.48)	<0.001
Site		
LR (ref)	1.00	
Baltimore	1.93 (1.77, 2.10)	<0.001
Boston	2.08 (1.92, 2.25)	<0.001
LA	1.91 (1.62, 2.25)	<0.001
Minn	1.66 (1.53, 1.81)	<0.001
Philadelphia	1.83 (1.67, 2.00)	<0.001
Washington DC	1.45 (1.14, 1.85)	0.003
Mother's Ethnicity		
White|Non Hispanic (ref)	1.00	
Hispanic	1.45 (1.32, 1.59)	<0.001
Black|Non Hispanic	1.26 (1.17, 1.36)	<0.001
Other	0.89 (0.77, 1.03)	0.10
Married/partnered	0.94 (0.89, 1.01)	0.07
Educational attainment		
Post High School (ref)	1.00	
Never or some HS	1.41 (1.31, 1.51)	<0.001
High School	1.28 (1.20, 1.36)	<0.001
Mother Employed	0.80 (0.75, 0.86)	<0.001
Mother's age	0.99 (0.99, 1.00)	<0.001
Others Employed In HH	0.95 (0.88, 1.03)	0.21
Adults in HH		
one	1.00	
two	1.12 (1.05, 1.21)	0.002
3 or more	1.13 (1.05, 1.23)	0.002

Table R13: Results from Logistic Regression Model with Mothers FBS as Predictor and Non-Nutrition Assistance Receipt as Outcome, Adjusting for Listed Covariates.

	Non-Nutritional Benefit	**p-value**
Foreign Born Mother (controlling for covariates below)	0.33 (0.30, 0.35)	<0.001
Site		
LR (ref)	1.00	
Baltimore	1.99 (1.81, 2.18)	<0.001
Boston	6.42 (5.87, 7.01)	<0.001
LA	1.51 (1.29, 1.76)	<0.001
Minn	3.38 (3.08, 3.71)	<0.001
Philadelphia	5.07 (4.59, 5.60)	<0.001
Washington DC	1.15 (0.86, 1.54)	0.35
Mother's Ethnicity		
White|Non Hispanic (ref)	1.00	
Hispanic	1.16 (1.05, 1.28)	0.003
Black|Non Hispanic	2.48 (2.28, 2.70)	<0.001
Other	1.81 (1.55, 2.12)	<0.001
Married/partnered	0.62 (0.59, 0.66)	<0.001
Educational attainment		
Post High School (ref)	1.00	
Never or some HS	1.69 (1.57, 1.81)	<0.001
High School	1.39 (1.30, 1.48)	<0.001
Mother Employed	0.21 (0.20, 0.23)	<0.001
Mother's age	1.01 (1.00, 1.01)	0.04
Others Employed In HH	0.38 (0.35, 0.41)	<0.001
Adults in HH		
one	1.00	
two	0.60 (0.56, 0.65)	<0.001
3 or more	0.54 (0.50, 0.58)	<0.001

Table R14: Results from Logistic Regression Model with Mothers FBS as Predictor and Whether Mother Works for Pay as Outcome, Adjusting for Listed Covariates.

	Employed	**p-value**
Foreign Born Mother (controlling for covariates below)	1.11 (1.04, 1.18)	0.001
Site		
LR (ref)	1.00	
Baltimore	0.71 (0.66, 0.77)	<0.001
Boston	0.63 (0.59, 0.68)	<0.001
LA	0.49 (0.43, 0.55)	<0.001
Minn	0.41 (0.38, 0.45)	<0.001
Philadelphia	0.71 (0.66, 0.77)	<0.001
Washington DC	1.40 (1.16, 1.68)	<0.001
Mother's Ethnicity		
White|Non Hispanic (ref)	1.00	
Hispanic	0.97 (0.89, 1.05)	0.40
Black|Non Hispanic	1.28 (1.20, 1.37)	<0.001
Other	0.91 (0.80, 1.04)	0.17
Married/partnered	0.98 (0.93, 1.04)	0.53
Educational attainment		
Post High School (ref)	1.00	
Never or some HS	0.31 (0.29, 0.33)	<0.001
High School	0.62 (0.59, 0.65)	<0.001
Mother's age	1.02 (1.02, 1.02)	<0.001
Adults in HH		
one	1.00	
two	0.87 (0.82, 0.92)	<0.001
3 or more	0.75 (0.70, 0.79)	<0.001

Interestingly, though in bivariate descriptive data (Appendix Table 1b) a smaller proportion of FB mothers than US-born report being employed in these data, after controlling for the covariates in Table R14, FB mothers actually have odds of being employed 11% greater than US-born mothers. The average number of adults per household with a FB mother (2.6/Hhld) is higher than for those with a US-born mother (2.1/Hhld) (Appendix Table 1b), and higher

numbers of adults in the household seems to be negatively associated with FB mothers' odds of employment (Table R14).

Hypothesis 2.2: To test whether FB mothers not receiving nutrition or non-nutrition assistance are more likely to report negative reasons for not receiving them than US-born mothers who do not receive assistance, we tabulated the reasons selected by respondents who reported not receiving the assistance programs under question, and categorized them as either positive or negative on the basis of logic and our informed judgment. We used X-Squared statistics to test whether the larger proportions of FB mothers or US-born mothers selecting the positive or negative reasons are statistically significantly larger (Table R15).

Table R15: Response options for mothers reporting they do not receive SNAP, when asked why they are not receiving it, with percent affirmed by FBS.

Reasons for Not Receiving SNAP	Foreign Born Mothers	US Born Mothers	X-Sqr P-value
No need/doesn't want SNAP **(Positive)**	39.00%	33.36%	<0.01
Choose not to participate **(Positive)**	19.05%	9.68%	<0.01
Do not know if eligible, did not know about program **(Negative)**	**19.25%**	4.51%	<0.01
Not eligible because of income/SSI/Foster Care/Child Support **(Positive)**	11.08%	27.99%	<0.01
Teen parent/too young to be head of household for SNAP **(Negative)**	0.77%	**9.20%**	**<0.01**
Household size changed(leading to income increase)/Assets too high **(Positive)**	0.72%	1.43%	<0.01
Reason related to a move **(Negative)**	0.44%	**0.89%**	**<0.01**
Lost custody of child **(Negative)**	0.02%	**0.03%**	**NS**
Personal reasons/stigma/bureaucratic hassle/treatment at SNAP office **(Negative)**	1.56%	**1.97%**	**<0.05**
Cut off SNAP/stopped receiving SNAP **(Negative)**	2.75%	**9.44%**	**<0.01**
Did not receive due to immigration status/Fear of INS(USCIS) **(Negative)**	**4.31%**	0.16%	<0.01
Denied SNAP **(Negative)**	0.76%	**0.92%**	**NS**
Incarceration/legal issue **(Negative)**	0.00%	**0.08%**	**N/A***
Other	0.30%	0.36%	NS

Four responses are positive, nine are negative, and "Other" is unknown.
*Sparse cells (frequencies <5) prohibit calculation of X-Squared statistics.

Of the four responses categorized as positive, a significantly larger proportion of FB mothers selected two (No need/doesn't want SNAP, and Choose not to participate), and a significantly larger proportion of US-born mothers selected two (Not eligible because of income, etc., and Household size changed, leading to income, etc. increase) (Table R15). Of the nine reasons categorized as negative, larger proportions of FB mothers selected only two (Do not know if eligible, did not know about program, and Did not receive due to immigration status/Fear of INS). Large proportions of both FB (39.0%) and US-born (33.4%) mothers selected "No need/do not want SNAP", a reason categorized as positive, and the proportion of FB mothers choosing it was statistically significantly greater. A significantly larger proportion of US-born mothers selected "Not eligible because of income, etc.", a positive reason, and a significantly larger proportion of FB mothers selected "Choose not to participate", also considered positive. And a significantly larger proportion of FB mothers selected "Immigration status/fear of INS", as expected, though that proportion (4.3%) is not large (Table R15).

Overall, this hypothesis is not supported by the data on reasons for not receiving SNAP. FB mothers do not seem more likely to report negative reasons for not receiving SNAP in these data. It is possible that the large, and statistically significantly larger, proportions of FB mothers than US-born mothers, selecting "No need/do not want SNAP" and "Choose not to participate", may be masking under-reporting of other negative reasons, though we have no way to test that. The high prevalence of these two responses does not seem consistent with the higher prevalence of food insecurity overall, and particularly the higher prevalence of low food security and VLFS in children of FB mothers than US-born mothers.

Respondents are not asked to provide reasons why they do not receive LIHEAP or housing subsidies, however they are asked why they do not receive TANF. The reasons for not receiving TANF available for selection are somewhat different than those for SNAP, though several options are very similar. Our approach to analyzing the reasons for not receiving TANF was also similar to that used for SNAP (Table R16).

Table R16: Response options read to mothers reporting they were not receiving TANF when asked why they were not receiving it, with percent selected by FBS.

Reasons for Not Receiving TANF	Foreign Born Mothers	US Born Mothers	X-Sqr P-value
Chose not to participate/no need **(Positive)**	54.99%	42.45%	<0.01
Not eligible **(Positive)**	6.03%	7.68%	<0.01
Got a job, earnings increased **(Positive)**	14.79%	27.33%	<0.01
Got cut off, did not complete requirements **(Negative)**	1.73%	**4.23%**	<0.01
Family situation changed/earn enough/receive SSI/child support **(Positive)**	3.11%	7.46%	<0.01
Reached time limit **(Negative)**	0.50%	**2.03%**	<0.01
Other reason	0.57%	0.38%	N/A
Personal reason/stigma **(Negative)**	**10.26%**	4.56%	<0.01
Immigration **(Negative)**	**6.45%**	0.20%	<0.01
Did not want to use up time limit **(Negative)**	**0.33%**	0.13%	<0.05
Teen parent **(Negative)**	0.26%	**2.07%**	<0.01
Reason related to move **(Negative)**	0.47%	**0.96%**	<0.01
Lost custody (child with state or other parent) **(Negative)**	0.03%	**0.16%**	**N/A***
Family CAP **(Negative)**	0.06%	**0.11%**	**N/A***
Misconception about rules **(Negative)**	**0.36%**	0.13%	<0.01
Legal issues/incarceration **(Negative)**	0.06%	**0.11%**	**N/A***

*Sparse cells (frequencies <5) prohibit calculation of X-Squared statistics.
Four reasons are positive, eleven are negative, and "Other" is unknown.

Of the four reasons categorized as positive, a significantly larger proportion of FB mothers selected only one; "Chose not to participate/do not need". This reason was selected by 55% of FB mothers and 42.4% of US-born mothers (Table R16). Significantly larger proportions of US-

born mothers selected the three other positive reasons (not eligible, got a job and earnings increased, and family situation changed/earnings increased). Of the eleven reasons categorized as negative, significantly larger proportions of FB mothers selected four (personal reason/stigma, immigration concerns, did not want to use up time limit, and misconception about rules), and larger proportions of US-born mothers selected four (got cut off/did not complete requirements, reached time limit, teen parent, and reason related to a move). For the three remaining negative reasons valid comparisons could not be made due to sparse cells.

As with reasons for not receiving SNAP, the hypothesis that FB mothers are more likely to report negative reasons for not receiving TANF is not supported by these data (Table R16). It does not appear that FB mothers selected significantly more negative reasons than US-born mothers. Based on the large proportion of FB mothers (55%) selecting "chose not to participate/do not need" as their reason for not receiving TANF, it also seems likely that FB mothers (and perhaps US-born mothers, 42.4%of whom also selected this reason) may have under-reported negative reasons.

Hypothesis 2.3: To test whether larger proportions of FB mothers reporting losing a job or having work hours decreased over the previous year reported negative reasons for such changes, we used a similar approach as with SNAP and TANF above, with one notable exception. We condensed a set of six reasons that all refer to adverse job market conditions or situations largely external to the mother herself into one reason we label "market conditions". The underlying reasons comprising this category include 1) laid off, 2) job was temporary/seasonal, 3) discharged/fired, 4) employer bankrupt, 5) employer sold business, 6)

business is slow. We categorized this composite "market conditions" reason as negative, along with five of the remaining seven reasons (Table R17). The one reason categorized as positive is "school/training". The resulting list of eight reasons, six negative, one positive, and one ambiguous, apply to both job loss and reduced work hours. The ambiguous reason, selected most often by both groups as the reason for job loss, and by US-born mothers most often for decreased work hours, is "pregnancy/maternity leave".

Table R17: Response options read to mothers reporting they lost a job in the previous year when asked why they lost it, with percent selected by FBS.

Reasons Lost Work in Past Year	Foreign Born Mothers	US Born Mothers	X-Sqr P-value
Market Conditions **(Negative)**	15.52%	**19.43%**	**<0.01**
Distance/Transportation **(Negative)**	4.06%	**6.10%**	**<0.01**
Pregnancy/Maternity Leave **(*Unknown*)**	**60.28%**	35.78%	***<0.01***
Health Reasons **(Negative)**	4.87%	**9.52%**	**<0.01**
Job Dissatisfaction **(Negative)**	5.20%	**13.37%**	**<0.01**
Childcare Problems **(Negative)**	7.55%	**8.98%**	**0.046**
School/Training (Positive)	1.87%	**6.77%**	**<0.01**
Immigration Issues **(Negative)**	0.65%	0.04%	**N/A***

*Sparse cells (frequencies <5) prohibit calculation of X-Squared statistics. Of 8 reasons, 6 are negative, 1 is positive, and 1 is unknown. Market conditions include: laid off, job was temporary/seasonal, discharged/fired, employer bankrupt, employer sold business, business is slow.

Table R18: Response options read to mothers reporting their work hours decreased in the previous year when asked why they decreased, with percent selected by FBS.

Reasons Lost Work in Past Year	Foreign Born Mothers	US Born Mothers	X-Sqr P-value
Market Conditions **(Negative)**	35.39%	22.74%	**<0.01**
Distance/Transportation **(Negative)**	1.45%	1.96%	**NS**
Pregnancy/Maternity Leave **(*Unknown*)**	34.60%	41.38%	***<0.01***
Health Reasons **(Negative)**	4.53%	6.91%	**0.04**
Job Dissatisfaction **(Negative)**	5.80%	11.19%	**<0.01**
Childcare Problems **(Negative)**	13.04%	7.76%	**<0.01**
School/Training (Positive)	4.71%	8.07%	<0.01
Immigration Issues **(Negative)**	0.18%	0.00%	**N/A***

*Sparse cells (frequencies <5) prohibit calculation of X-Squared statistics. Of 8 reasons, 6 are negative, 1 is positive, and 1 is unknown. Market conditions include: laid off, job was temporary/seasonal, discharged/fired, employer bankrupt, employer sold business, business is slow.

Voluntarily stopping work to accommodate a pregnancy or birth could be a mother's personal choice covered by her legal rights, or it could be an adverse event, however we cannot distinguish the motives or circumstances on the basis of information available. The Family and Medical Leave Act (FMLA) guarantees "eligible employees of covered employers" up to 12 weeks of unpaid leave for the birth or placement of a child for adoption or foster care. The FMLA also requires group health benefits to be maintained during the leave as if employees continued to work instead of taking leave. And employees are also entitled to return to their same or an equivalent job at the end of their FMLA leave.[xxiv]

In general, to be an eligible employee, the employee must:

1. Work for a covered employer (one that employed 50 or more employees during 20 or more calendar workweeks in either the current or preceding calendar year);
2. Have been employed by the employer for at least 12 months;
3. Meet the hours of service requirement during the 12-month period immediately preceding the leave (at least 1,250 hours); and
4. Work at a worksite where 50 or more employees are employed by the employer within 75 miles of that worksite.

Covered employers include:

1. Public agencies, including local, State, and Federal employers, and local education agencies (schools); and
2. Private sector employers who employ 50 or more employees for at least 20 workweeks in the current or preceding calendar year – including joint employers and successors of covered employers.

The FMLA comprises a complex set of laws, and a large number of complicated rules and regulations. There are a large number of points in the Act related to maternity leave that FB mothers could find difficult to interpret, assuming they are aware of the FMLA and its general purpose and provisions. There are also numerous aspects of the Act and its provisions and

eligibility criteria that could specifically exclude some FB mothers from eligibility, or could be either misinterpreted or misrepresented to exclude them, either intentionally or otherwise. Consequently we are unable to characterize "pregnancy/maternity leave" as a positive or negative reason for losing a job or having work hours decreased. If the mother is an "eligible employee" of a "covered employer" she has a legal right to take up to 12 weeks of unpaid maternity leave, as well as unpaid leave to deal with medical complications arising from a pregnancy, and to return to work at the end of that period. But we have insufficient information to determine the nature of situations underlying mothers' choices of this reason.

It is worth noting that a large majority (60.3%) of FB mothers selected "pregnancy/maternity leave" as their reason for losing or stopping work in the past year, compared to a smaller, though still large, proportion of US-born mothers (35.8%), and that this reason was also selected by nearly comparably large proportions of mothers as the reason for decreased hours. However, in the latter case, the prevalence of selection is reversed; a significantly larger proportion of US-born mothers (41.4%) selected "pregnancy/maternity leave" as the reason for decreased hours than did FB mothers (34.6%). A similar reversal occurs in the proportions of mothers selecting "market conditions". A significantly larger proportion of US-born mothers selected "market conditions" (19.4%) as their reason for losing a job than did FB mothers 15.5%), but a larger proportion of FB mothers (35.4%) selected "market conditions" as the reason for reduced work hours than US-born mothers (22.7%). Similarly with "childcare problems". A significantly larger proportion of US-born mothers (9.0%) selected this reason for losing a job than FB mothers (7.6%), but a larger proportion of FB mothers (13.0%) selected it as the reason for decreasing hours than did US-born mothers (7.8%).

Though there are notable differences in the reasons FB mothers and US-born mothers selected for losing jobs and decreasing work hours, there is little support for the hypothesis that FB mothers are more likely to select negative reasons. Part of the reason for this stems from the nature of the question and response alternatives; 6 of the 8 reasons are categorized as negative, while one is ambiguous, and only one is positive. While significantly larger proportions of US-born mothers selected this positive reason ("school/training") for both job loss and decreased hours than did FB mothers, the proportions are relatively small in either case. So here, as with reasons for not receiving SNAP and TANF, our hypotheses that FB mothers would be more likely to report negative reasons for losing jobs or decreased hours is not substantially supported by the data. A larger proportion of FB mothers (35.4%) than US-born mothers (22.7%) report negative "market conditions" as the reason for decreasing hours, but a larger proportion of US-born mothers (19.4%) report this reason for job loss than FB mothers (15.5%). Thus while there are notable and interesting differences across the two groups in the reasons they report for losing jobs and decreasing work hours, there does not seem to be support for the hypothesis that FB mothers report more negative reasons.

Aim #3: Do mothers' FBS, or protective and risk factors associated with FBS, moderate or exacerbate associations of negative economic socks and hardships with VLFS in children?

Hypothesis 3.1: Though results from our examination of reported reasons for losing a job or having work hours decreased suggested that mothers' FBS could be modifying the association of the economic shocks (job loss and decreased work hours) with VLFS in children, when we

estimated models and included interaction terms, interacting mothers' FBS with the economic shocks and hardships, none of the interaction terms were significant (Table R19).

Table R19: Summary of Results From Models Including Interactions of Mothers' FBS with Economic Shocks and Family Hardships.

Mothers' Foreign Born Status, Interacted with each of the Following:	Interaction Term P-value
Lost Job in past year	0.15
Decreased hours in past year	0.29
Energy Insecurity	0.81
Housing Insecurity	0.37
Tradeoffs due to medical cost	0.83

In unadjusted logistic regression models of associations of economic shocks (job loss, decrease in work hours), and family hardships (energy insecurity, housing insecurity, and tradeoffs due to medical costs) with VLFS in children, all shocks and hardships are significantly positively associated with VLFS in children, except job loss (Table R20). However when the data are stratified by mothers' FBS and the unadjusted models estimated using data on US-born mothers and FB mothers separately, job loss in data on US-born mothers is significantly positively associated with VLFS in children, but decreased work hours is not. In unadjusted models estimated using data on FB mothers only, however, the reverse is true; job loss is not significantly associated with VLFS in children, but decreased work hours are (Table R22).

We suspect that there may be some degree of effect modification occurring in these relationships that was not picked up by our interaction models, and that additional multivariate

models adjusting for other covariates might expose it. We will pursue this, and other additional modeling, before drafting the planned journal manuscripts.

Table R20: Results of Unadjusted Logistic Regressions of Economic Shocks and Family Hardships on VLFS in Children, using the Entire Dataset.

Predictors	Child VLFS OR (95%CI)	P-value
Lost Job in past year	1.06 (0.81, 1.40)	0.67
Decreased hours in past year	2.24 (1.47, 3.40)	<0.001
Energy Insecurity	3.47 (2.86, 4.22)	<0.001
Housing Insecurity	2.65 (2.22, 3.18)	<0.001
Tradeoffs due to medical cost	4.66 (3.40, 6.39)	<0.001

*Each row contains results from a separate bivariate model.

Table R21: Results of Unadjusted Logistic Regressions of Economic Shocks and Family Hardships on VLFS in Children, US-born Mothers Only.

Predictors	Child VLFS OR (95%CI)	P-value
Lost Job in past year	1.53 (0.99, 2.37)	0.05
Decreased hours in past year	1.56 (0.75, 3.22)	0.23
Energy Insecurity	4.00 (2.91, 5.49)	<0.001
Housing Insecurity	1.79 (1.33, 2.42)	<0.001
Tradeoffs due to medical cost	5.00 (3.25, 7.68)	<0.001

*Each row contains results from a separate bivariate model.

Table R22: Results of Unadjusted Logistic Regressions of Economic Shocks and Family Hardships on VLFS in Children, FB Mothers Only.

Predictors	Child VLFS OR (95%CI)	P-value
Lost Job in past year	1.01 (0.70, 1.46)	0.94
Decreased hours in past year	2.52 (1.49, 4.27)	<0.001
Energy Insecurity	4.20 (3.27, 5.40)	<0.001
Housing Insecurity	2.14 (1.69, 2.70)	<0.001
Tradeoffs due to medical cost	5.36 (3.34, 8.61)	<0.001

*Each row contains results from a separate bivariate model.

All three household hardships (household energy insecurity, household housing insecurity, and tradeoffs due to medical costs) are positively associated with VLFS in children in the full dataset and in the two stratified subgroups.

Hypotheses 3.3 and 3.4: Since we did not find significant interactions in the models we estimated, we will not report on results of multivariate modeling hypothesized to change those interactions. However we believe it would be potentially fruitful to pursue this question further, with additional modeling to further clarify the question of interactions, particular regarding associations of losing a job or having work hours decreased with VLFS in children. In the interest of completing this report, and submitting it on schedule, we will postpone that modeling, and plan to pursue it as we prepare journal manuscripts.

Discussion

The first aim of this research was to try to determine whether mothers' Foreign-Born Status (FBS) is associated with very low food security (VLFS) in children, and if so, why? We hypothesized that children with foreign-born (FB) mothers have significantly greater odds of experiencing VLFS in children, that FB mothers may have socio-demographic characteristics that act as either risk factors or protective factors for VLFS in children, and that controlling for those risk or protective factors in multivariate statistical models would lead to either reductions or increases in the association between mothers' FBS and VLFS in children.

We used data from the Children's HealthWatch ongoing sentinel surveillance data collection activity described in detail above. Overall, 30% of the analytic dataset is comprised by mother-child dyads that include a foreign-born (FB) mother, and those dyads with FB mothers include exactly two-thirds (66.7%) of all those in the data living in households with VLFS in children. Since the reference child in all cases is under 48 months of age, we know that all households with VLFS in children in the data have at least one child under age four years. The average number of children in households in the data, both those with FB mothers and those with US-born mothers, is 2.4 children.

Our first hypothesis was strongly supported by the data and analytic results. In a bivariate logistic regression model with mothers' FBS as predictor and VLFS in children as outcome, children with FB mothers had odds of VLFS in children 4.79 times as great as children with US-born mothers (Table R1) . Adjusting for research site reduced the adjusted odds ratio (AOR) to 3.53, and adjusting for site and mothers' age and race/ethnicity reduced it to 2.64, indicating

that mother's age and race/ethnicity are likely risk factors for VLFS in children. Further adjusting for mothers' marital status and education attainment increased the AOR back up to 2.93, but adjusting for mothers' employment did not change it further (2.94).

Continuing to add covariates considered to be either risk or protective factors led to the final model in Table R3, where, after controlling for research site, mothers' race/ethnicity, marital status, educational attainment, employment, and age, and whether there are other adults in the household who are employed, and the total number of adults in the household, households with FB mothers still have odds of VLFS in children 3.36 times as large as households with US-born mothers (confirming Hypotheses 1.2 and 1.3). This process also highlights the fact that most of the socio-demographic risk factors are negations of or different levels of what can be protective factors in their positive form, or at the right levels. Thus race/ethnicity seems to be a risk factor if it is either Hispanic, or Non-Hispanic Black, but protective if it is Non-Hispanic White. The same is true of mothers' marital status, educational attainment, employment status, age, whether other adults in the household are employed, and number of adults in the household.

A different view of how these socio-demographic factors operate is provided by stratifying the data on mothers' FBS and estimating the final model with data from each of the subgroups. In those models (Tables R4 and R5), mothers' race/ethnicity only has statistically significant association with VLFS in children among US-born mothers, and mothers' marital status only among FB mothers. Educational attainment also seems to be associated with VLFS in children differently in the two groups, with significant association among FB mothers, but not among

US-born. This may be due to the particular range of educational attainment in each group, or factors related to labor force participation in each subgroup.

Mothers' Country of Origin Language Group: We were unable to test English language proficiency, or difficulties with English language, directly due to limitations discovered in records of language of individual interviews. As an alternative approach, in a sub-analysis, we categorized FB mothers' countries of origin by their major language groups and assigned those categories to the mothers (Table R6). We found that households with FB mothers' in each of the resulting five language groups had higher odds of VLFS in children than those with US-born mothers, and the Haitian and Spanish speaking subgroups had the highest. Comparing the other language groups to the Anglophone group, we found that the Spanish speaking and Haitian groups have significantly higher odds of VLFS in children than the Anglophone group, but not the Somalians or the residual, "Other" group. Estimating the final multivariate logistic regression model from Table R3 using data on FB mothers only, with this language group variable as predictor, and with mothers' race/ethnicity omitted, yields very similar results after controlling for the other covariates in the model (Table R7). These results are consistent with a hypothesis that difficulty with, or lack of proficiency with, English language is a risk factor for VLFS in children, though it may also be reflecting other characteristics of the subgroups as well.

Mothers' Length of Stay in the US: In a second sub-analysis we considered the influence that FB mothers' length of stay (LOS) in the US might have on the association between mothers' FBS and VLFS in children. Our interest in this factor comes both from the implications of LOS for

assimilation and acquisition of place-related or place-specific human capital, but also its implications for eligibility for SNAP.

When we re-estimated the set of models used to examine whether FB mothers socio-demographic characteristics acted as risk or protective factors for VLFS in chidren, but with FB mothers indicated by a three category LOS variable (LOS <5 years, LOS = 5-10 year, and LOS > 10 years), we found that the risk and protective nature of FB mothers' socio-demographic characteristics have different effects on the association with VLFS in children depending on how long the mother has resided in the US (Table R8). We found significant differences in the associations between mothers' FBS and VLFS in children among the group with longest LOS and the group with shortest LOS, with households with FB mothers in the US more than 10 years having significantly lower odds of VLFS in children than those in the US less than 5 years (Table R9). This may be due in part to the "5-year rule" that prohibits most non-citizens from receiving SNAP until after they have lived in the US for at least five years. It may also be a function of greater accumulation of place-related human capital. When we estimated the final model using data from SNAP recipient households only, and with mothers' FBS indicated using the three LOS categories (Table R10), the results do not show the same pattern of decreasing AORs as LOS increases, even when the average per person amount of SNAP benefits is controlled for. These results are consistent with a hypothesis that greater access to SNAP by households with FB mothers who have resided in the US longer may be protective against VLFS in children.

Aim #2: All the socio-demographic characteristics in the final multivariate logistic regression model (Table R3) are correlated with household income, and it is well known that household income is negatively correlated with food insecurity generally. But we also know that some low-income households are able to remain food secure, while other households with incomes well above the poverty level become food insecure. Among the many factors that are not in the final model in Table R3 is public policies that may also influence VLFS in children and its association with mothers' FBS, and whether mothers are working for pay.

Our second aim was to answer the question whether FB mothers are more or less likely than US-born mothers to receive nutrition or non-nutrition assistance, the primary public policy vehicles for addressing food insecurity and other household hardships, or to work for pay. To address this question we estimated a set of multivariate logistic regression models with mothers' FBS as predictor and with receipt of SNAP, WIC, or any one of three non-nutrition assistance programs (TANF, LIHEAP, housing subsidy), and whether the mother was working for pay at time of interview as outcomes. We included the same set of covariates as in the final model in Table R3 above.

We found that FB mothers have significantly lower odds of receiving SNAP than US-born mother, significantly higher odds of receiving WIC, and significantly lower odds of receiving any of the non-nutrition assistance programs included (TANF, LIHEAP, housing subsidy). And surprisingly, after adjusting for the covariates in the final model, FB mothers also have higher odds of being employed than US-born mothers. Thus Hypothesis 2.1 is only partially confirmed by these data. FB mothers are less likely than US-born mothers to report receiving SNAP and

non-nutrition assistance, but are not less likely to report receiving WIC, or working for pay than US-born mothers.

This combination of results is consistent with an interpretation that FB mothers have a higher level of engagement in the labor force, and lower reliance on nutrition and non-nutrition assistance overall (except for WIC, a nutrition and health program targeted specifically for the pregnant and lactating women and children under 5 years of age) than US-born mothers, but they and the other working adults in their households are not able to earn enough to avoid having significantly higher odds of VLFS in children than households with US-born mothers. While surely an over-simplification, omitting many other important factors, this is not an inaccurate interpretation of these results.

Hypothesis 2.2, that FB mothers not receiving nutrition of non-nutrition assistance are more likely to report negative reasons, e.g., burdensome application process, mistreatment in the application process, or "immigration concerns" instead of positive reasons such as "over income," received little support from our analysis. Though we suspect there may be errors in some of the reporting by FB mothers of reasons for not receiving SNAP or TANF, with under-reporting of some negative reasons, and over-reporting of "no need/do not want SNAP" and "choose not to participate", we have no way of testing that.

Based on data on respondents choices of reasons for not receiving SNAP, FB mothers are more likely than US-born mothers to report "did not know if eligible, did not know about the program" and "did not receive due to immigration status/fear of INS", but not more likely to report any of the nine other reasons we categorized as negative, including "personal

reasons/stigma/bureaucratic hassle/treatment at SNAP office". A surprisingly small proportion of FB mothers (4.3%) reported "immigration concerns" as the reason they do not receive SNAP, while 39% reported "no need/do not want SNAP" and 19% reported "choose not to participate." About 12% of FB mothers reported positive reasons indicating their income or assets were too high for them to be eligible.

Neither did larger proportions of FB mothers report negative reasons for not receiving TANF than US-born mothers, though larger proportions did report "personal reason/stigma", "immigration concern", "did not want to use up time limit", and "misconception about rules." By far the most frequently reported reason among FB mothers was "chose not to participate" (55%). However larger proportions of US-born mothers also reported four negative reasons, so there were not larger proportions of FB mothers reporting negative reasons overall.

The proportions of FB mothers reporting negative reasons for losing a job in the previous year, or for having their work hours decreased over the previous year, were also not greater than the proportions of US-born mothers reporting negative reasons. A much larger proportion of FB mothers than US-born reported "pregnancy/maternity leave" as the reason for losing a job (60% *vs* 36%), but a larger proportion of US-born mothers reported that as their reason for having work hours cut (42% vs 35%). A somewhat smaller proportion of FB mothers reported "market conditions" as the reason for losing a job, but a larger proportion of FB mothers reported this reason for having their work hours decreased. Less than 1.0% of FB mothers reported "immigration issues" as the reason for either losing a job or having work hours cut.

Again, there may be misreporting by FB mothers of some negative reasons for losing jobs or having work hours decreased, particularly "immigration issues", but we cannot test that. So overall, the hypotheses that FB mothers are more likely to report negative reasons for either not receiving nutrition or non-nutrition assistance, or for losing a job or having work hours decreased, were not supported by these data. There may be reporting error in all of these areas, but we have no way of measuring it.

Aim #3: Our results provide support for the hypothesis that economic shocks and family hardships (specifically job loss, loss of work hours, housing insecurity, energy insecurity, and adverse healthcare-related tradeoffs) are positively associated with VLFS in children. However we did not find any significant interactions of mothers FBS with these shocks and hardships. And this prevented us from being able to test hypotheses 3.3 and 3.4, both of which are related to testing whether risk or protective factors for VLFS in children might increase or decrease the interaction between mothers FBS and the economic shocks and hardships and its effect modification.

We believe there may be some effect modification occurring that we were not able to show, around differences in responses by FB and US-born mothers to job loss and decreases in work hours, and intend to pursue these further as we prepare journal manuscripts for submission.

Conclusion

In this research we found that mothers' foreign-born status (FBS) is significantly associated with VLFS in children, and that households with foreign-born (FB) mothers and at least one child under the age of 4 years have significantly greater odds of having VLFS in children than similar households with US-born mothers. We also found that certain socio-demographic characteristics of FB mothers can act as either protective or risk factors for VLFS in children, depending on their status or level. These include mothers' race/ethnicity, marital status, educational attainment, employment status, and age, and whether there are other adults in the household who are employed, and the total number of adults in the household. However, after controlling for all these factors in multivariate logistic regression models, households with FB mothers still have odds of VLFS in children more than 3 times as high as similar households with US-born mothers.

We found that the length of time FB mothers have been in or resided in the US influences the association between their FBS and VLFS in children, and that this may be due to policies that restrict access to assistance programs by non-citizens who have lived in the US for less than five years, especially SNAP. We also found that households with FB mothers have significantly lower odds of receiving SNAP than households with US-mothers, but greater odds of receiving WIC. Also, households with FB mothers have significantly lower odds of receiving non-nutrition assistance, including TANF, LIHEAP, and housing subsidies. But after adjusting for relevant covariates, FB mothers have greater odds of being employed than US-born mothers.

The reasons that FB mothers who were not receiving nutrition and non-nutrition assistance at time of interview report for not receiving those benefits are not significantly different from the

reasons US-born mothers who are not receiving them report, contrary to our expectation. Large proportions of both FB and US-born mothers who either lost a job or had their work hours reduced in the previous year report "pregnancy/maternity leave" as the reason. And an unexpectedly low proportion of FB mothers report "immigration issues" as a reason for losing a job or having work hours decreased. Higher than expected proportions of both FB and US-born mothers report not needing or wanting assistance.

In an effort to assess the influence of difficulty with the English language on associations between mothers' FBS and VLFS in children, we categorized our data by country of origin language group, and found that households with FB mothers from Anglophone countries have significantly lower odds of VLFS in children than those with mothers from Spanish-speaking countries or Haiti, but not Somalia. This view of our data also highlights the Somali households in our data who have very high rates of receipt of nutrition and non-nutrition assistance because of their refugee/asylee status, and likely protects them somewhat from VLFS in children.

The hospitals and clinics at our seven research sites serve somewhat different populations, though all serve predominantly low-income households. We know there is a large Haitian population in the Boston area, and a large Somali population in Minneapolis. Many of the Haitians and most all the Somalis are refugees or asylees granted refugee status or asylum in the US for political reasons. FB mothers in these two groups have relationships to nutrition and non-nutrition assistance that are different than those of FB mothers from countries in the Spanish speaking, and the Anglophone groups.

The hospital in Little Rock is a Children's Hospital serving the greater Little Rock area, but also drawing patients from throughout the state. The Baltimore and Philadelphia sites serve primarily African American families, while both the Los Angeles and Washington, DC sites served primarily Latino families. And both the Minneapolis and Boston sites also serve large Latino populations; mainly from El Salvador and other Central and South American countries in Boston, and from Mexico and Central America in Minneapolis. The Latino population in Little Rock also has grown at a very rapid rate over the past decade. Consequently, Spanish speaking or Latino families comprise the largest proportion of households with FB mothers in our data.

Contrary to our expectations, we did not find that mothers' FBS interacts with economic shocks and hardships to modify their effects on VLFS in children. This raises, or leaves unanswered, some questions about the range of mechanisms through which mothers' FBS influences VLFS in children. We identified a set of socio-demographic characteristics of FB mothers that appear to act as risk and protective factors for VLFS in children, but even after controlling for these, households with FB mothers still have significantly higher odds of VLFS in children than similar US-born households. There is more that we need to understand about why that is the case.

This research has emphasized for us the necessity of interpreting the findings from this study and others in light of concrete realities "on the ground", and the risks of attempting to understand conditions as complex as very low food security in children and its relationship to mothers' FBS purely on the basis of abstract data alone. We have learned a tremendous amount about VLFS in children in the course of conducting this research, but there is still much more that we need to learn about it. We are extremely grateful for the support that enabled us

to conduct this research, and we hope to be able to follow up on this study with further research on this very important subset of food-insecure children. And we believe our unique dataset will allow us to do that.

However, it seems even more certain to us now than when we began this study that "ending childhood hunger" or "cutting childhood hunger in half" or any such lofty goal with respect to very low food security in children is unlikely to succeed unless special consideration is given to children of foreign-born mothers.

Appendix

Figure A1: Analytic Sample Selection

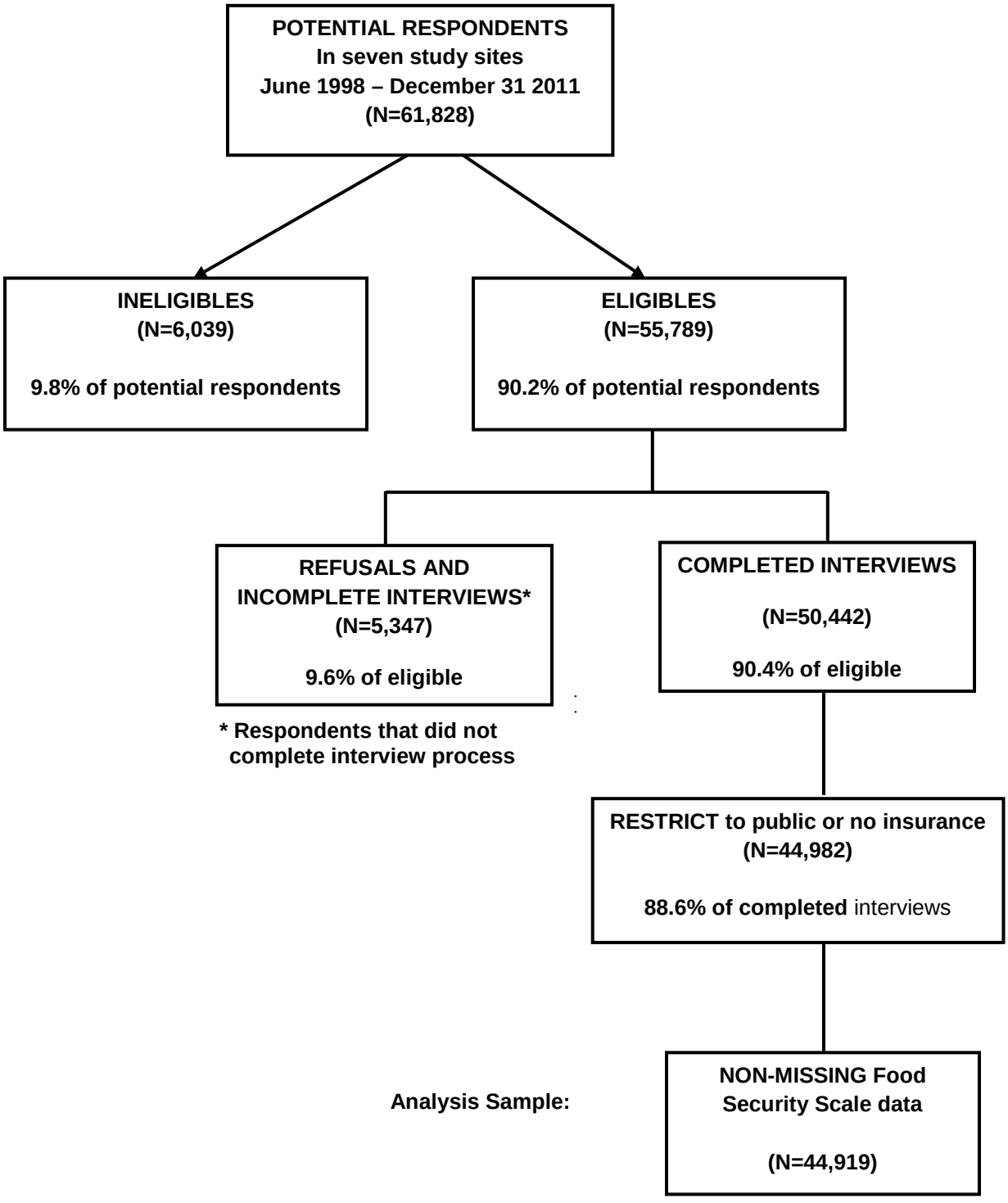
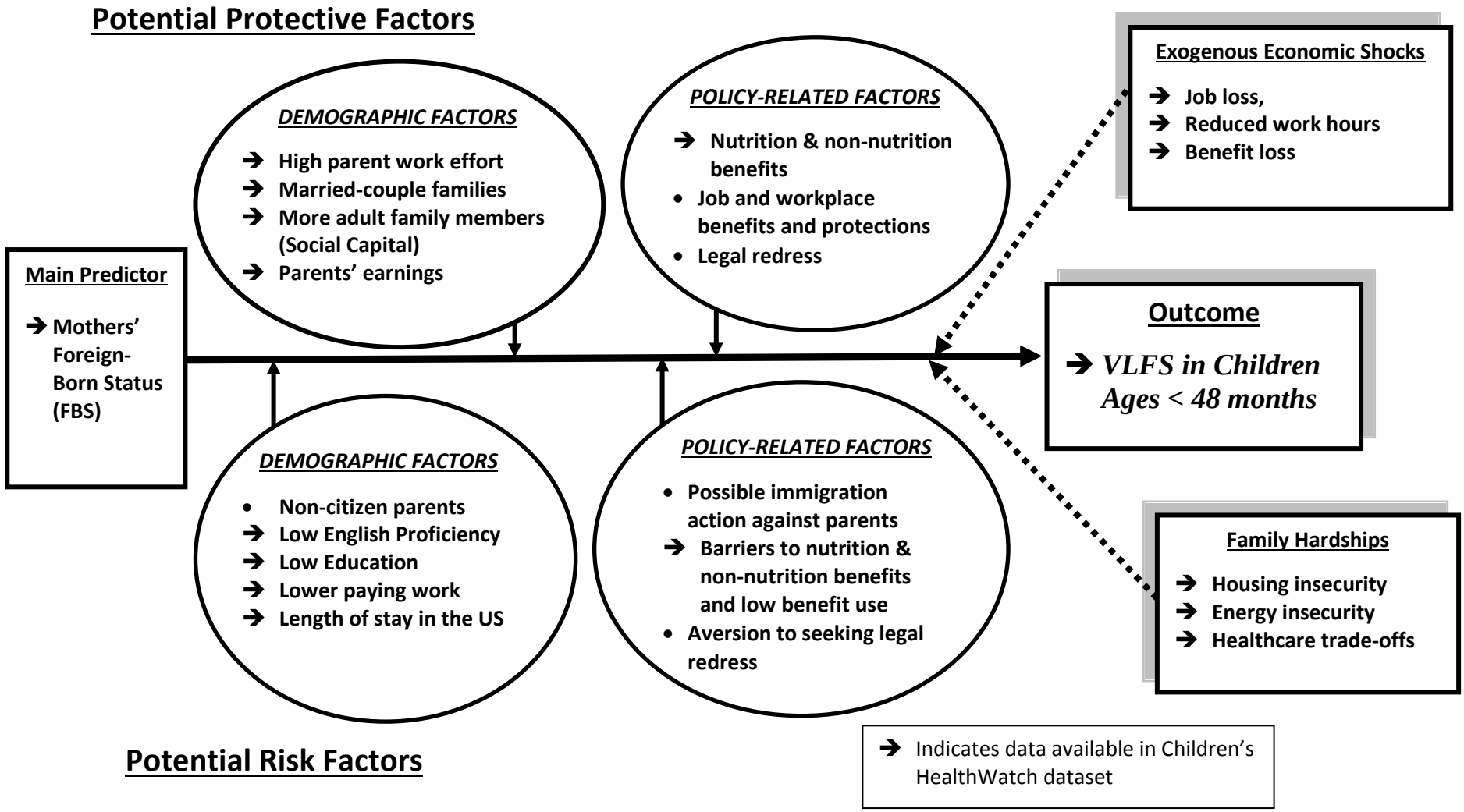


Figure A2: Conceptual Framework for the Research



Appendix Table 1a: Children's HealthWatch Data through Dec 2012
Characteristics By Food Security Status*
June 1998 to Dec 31 2012

Variable/Question	Response	Overall	Child and HH Food Secure	HH Low FS and Child Secure	HH Very Low FS and Child Secure	Child Low FS	Child Very Low FS	p-value
		N=44,919	34,281 (76.3%)	4,413 (9.8%)	662 (1.5%)	4,966 (11.1%)	597 (1.3%)	
Site	Baltimore	6667 (14.8%)	5480 (16.0%)	568 (12.9%)	99 (15.0%)	475 (9.6%)	45 (7.5%)	<.0001
	Boston	10837 (24.1%)	8271 (24.1%)	1152 (26.1%)	211 (31.9%)	1011 (20.4%)	192 (32.2%)	
	Little Rock	8488 (18.9%)	7027 (20.5%)	764 (17.3%)	141 (21.3%)	524 (10.6%)	32 (5.4%)	
	Los Angeles	1722 (3.8%)	1366 (4.0%)	99 (2.2%)	4 (0.6%)	200 (4.0%)	53 (8.9%)	
	Minneapolis	10451 (23.3%)	6729 (19.6%)	1136 (25.7%)	90 (13.6%)	2265 (45.6%)	231 (38.7%)	
	Philadelphia	6045 (13.5%)	4953 (14.4%)	574 (13.0%)	107 (16.2%)	375 (7.6%)	36 (6.0%)	
	Washington DC	709 (1.6%)	455 (1.3%)	120 (2.7%)	10 (1.5%)	116 (2.3%)	8 (1.3%)	
Mother Foreign-Born Status	1=US born	31394 (70.0%)	25645 (75.0%)	2865 (65.0%)	546 (82.5%)	2139 (43.1%)	199 (33.3%)	<.0001
	2=Immigrant	13429 (30.0%)	8554 (25.0%)	1540 (35.0%)	116 (17.5%)	2821 (56.9%)	398 (66.7%)	
Child Gender	Female	20979 (46.7%)	15975 (46.6%)	2150 (48.7%)	303 (45.8%)	2277 (45.9%)	274 (45.9%)	0.0565
	Male	23940 (53.3%)	18306 (53.4%)	2263 (51.3%)	359 (54.2%)	2689 (54.1%)	323 (54.1%)	
Child Age Month	N Mean (Std Dev) Median (25th, 75th)	44982 12.8 (10.6) 10.2 (4, 20)	34281 12.8 (10.6) 10.2 (4, 20)	4413 12.8 (10.7) 10.1 (4, 19)	662 12.0 (10.3) 9.0 (4, 18)	4966 12.9 (10.6) 10.3 (4, 20)	597 13.1 (10.1) 11.2 (4, 20)	0.3083
Mother Ethnicity	1=Hispanic	13701 (30.6%)	9086 (26.6%)	1528 (34.8%)	164 (24.9%)	2614 (52.9%)	309 (52.1%)	<.0001
	2=Black|Non Hispanic	23178 (51.8%)	18627 (54.6%)	2183 (49.6%)	324 (49.2%)	1795 (36.3%)	249 (42.0%)	
	3=White|Non Hispanic	6258 (14.0%)	5166 (15.1%)	555 (12.6%)	143 (21.7%)	374 (7.6%)	20 (3.4%)	
	4=Other	1578 (3.5%)	1246 (3.7%)	131 (3.0%)	28 (4.2%)	158 (3.2%)	15 (2.5%)	

Appendix Table 1a: Children's HealthWatch Data through Dec 2012
Characteristics By Food Security Status*
June 1998 to Dec 31 2012

Variable/Question	Response	Overall	Child and HH Food Secure	HH Low FS and Child Secure	HH Very Low FS and Child Secure	Child Low FS	Child Very Low FS	p-value
Married/Partnered	0=no	26660 (59.5%)	20776 (60.8%)	2607 (59.2%)	437 (66.0%)	2495 (50.4%)	345 (58.0%)	<.0001
	1=yes	18140 (40.5%)	13412 (39.2%)	1797 (40.8%)	225 (34.0%)	2456 (49.6%)	250 (42.0%)	
Caregiver Education	1=never/Ele/some high	14910 (33.4%)	10696 (31.3%)	1572 (35.8%)	209 (31.6%)	2153 (43.8%)	280 (47.4%)	<.0001
	2=High school	17749 (39.7%)	13869 (40.6%)	1643 (37.4%)	224 (33.9%)	1811 (36.8%)	202 (34.2%)	
	3=TechSchool/CollegeGrad/Master	12035 (26.9%)	9567 (28.0%)	1179 (26.8%)	228 (34.5%)	952 (19.4%)	109 (18.4%)	
Mother Age	N Mean (Std Dev) Median (25th, 75th)	41370 25.8 (5.9) 25.0 (21, 29)	31392 25.4 (5.8) 24.0 (21, 29)	4123 26.2 (5.9) 25.0 (22, 30)	616 25.0 (5.4) 23.5 (21, 28)	4638 27.6 (6.2) 27.0 (23, 32)	542 28.7 (6.2) 28.0 (24, 33)	<.0001
Caregiver Employment	1=Yes	17285 (38.6%)	13833 (40.5%)	1563 (35.6%)	206 (31.2%)	1510 (30.6%)	173 (29.2%)	<.0001
	2=No	27473 (61.4%)	20341 (59.5%)	2830 (64.4%)	455 (68.8%)	3427 (69.4%)	420 (70.8%)	
Child Breastfed	1=Yes	24979 (55.8%)	17976 (52.7%)	2716 (61.7%)	391 (59.1%)	3471 (70.3%)	425 (71.8%)	<.0001
	2=No	19747 (44.2%)	16152 (47.3%)	1688 (38.3%)	271 (40.9%)	1469 (29.7%)	167 (28.2%)	
Depression Screen	1=yes	9264 (24.3%)	5735 (19.8%)	1381 (36.4%)	336 (56.4%)	1558 (36.7%)	254 (52.2%)	<.0001
	2=No	28875 (75.7%)	23288 (80.2%)	2411 (63.6%)	260 (43.6%)	2683 (63.3%)	233 (47.8%)	
SNAP	0=Does not receive Food Stamps	22899 (51.4%)	17547 (51.6%)	1960 (44.8%)	252 (38.2%)	2812 (57.1%)	328 (55.2%)	<.0001
	1=Receives Food Stamps	21686 (48.6%)	16484 (48.4%)	2418 (55.2%)	407 (61.8%)	2111 (42.9%)	266 (44.8%)	
Current Subsidized Housing	1=yes	9789 (24.9%)	7492 (25.0%)	1082 (27.9%)	178 (30.7%)	913 (21.2%)	124 (23.3%)	<.0001

Appendix Table 1a: Children's HealthWatch Data through Dec 2012
Characteristics By Food Security Status*
June 1998 to Dec 31 2012

Variable/Question	Response	Overall	Child and HH Food Secure	HH Low FS and Child Secure	HH Very Low FS and Child Secure	Child Low FS	Child Very Low FS	p-value
	2=no	29464 (75.1%)	22469 (75.0%)	2796 (72.1%)	401 (69.3%)	3389 (78.8%)	409 (76.7%)	
LIHEAP	1=yes	6653 (18.1%)	4984 (17.8%)	769 (21.1%)	102 (19.8%)	697 (17.2%)	101 (19.3%)	<.0001
	2=no	30029 (81.9%)	22972 (82.2%)	2872 (78.9%)	413 (80.2%)	3350 (82.8%)	422 (80.7%)	
TANF	0=no	32601 (72.9%)	25006 (73.3%)	3020 (68.7%)	414 (62.9%)	3741 (75.7%)	420 (70.7%)	<.0001
	1=yes	12111 (27.1%)	9111 (26.7%)	1379 (31.3%)	244 (37.1%)	1203 (24.3%)	174 (29.3%)	
WIC	0=no	8827 (19.8%)	6970 (20.5%)	824 (18.8%)	120 (18.2%)	827 (16.8%)	86 (14.5%)	<.0001
	1=yes	35810 (80.2%)	27104 (79.5%)	3559 (81.2%)	539 (81.8%)	4102 (83.2%)	506 (85.5%)	
Low Birthweight	0=no	37629 (85.9%)	28730 (85.8%)	3682 (85.0%)	554 (85.0%)	4167 (87.0%)	496 (87.2%)	0.0540
	1=yes	6199 (14.1%)	4753 (14.2%)	652 (15.0%)	98 (15.0%)	623 (13.0%)	73 (12.8%)	
Housing Insecurity	0=Stable Housing	23841 (56.2%)	19515 (60.1%)	2075 (50.0%)	270 (45.5%)	1803 (38.6%)	178 (32.8%)	<.0001
	1=Less Severe	16603 (39.1%)	11730 (36.1%)	1815 (43.7%)	243 (40.9%)	2519 (54.0%)	296 (54.6%)	
	2=Severe	1993 (4.7%)	1240 (3.8%)	259 (6.2%)	81 (13.6%)	345 (7.4%)	68 (12.5%)	
Energy Insecurity	0=No Energy Problems	25165 (72.8%)	20232 (77.5%)	2069 (58.3%)	256 (44.9%)	2424 (61.9%)	184 (44.0%)	<.0001
	1=Less Severe-threatened	4150 (12.0%)	2910 (11.2%)	603 (17.0%)	103 (18.1%)	480 (12.2%)	54 (12.9%)	
	2=Severe-shut off/unheated/cooking stove	5237 (15.2%)	2954 (11.3%)	877 (24.7%)	211 (37.0%)	1015 (25.9%)	180 (43.1%)	

Appendix Table 1a: Children's HealthWatch Data through Dec 2012
Characteristics By Food Security Status*
June 1998 to Dec 31 2012

Variable/Question	Response	Overall	Child and HH Food Secure	HH Low FS and Child Secure	HH Very Low FS and Child Secure	Child Low FS	Child Very Low FS	p-value
Cumulative Risk	0=Stable Housing	11775 (35.7%)	11775 (47.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)	<.0001
	1=Less Severe	19009 (57.6%)	13134 (52.4%)	2932 (87.0%)	414 (79.6%)	2362 (64.7%)	167 (43.8%)	
	2=Severe	2201 (6.7%)	152 (0.6%)	438 (13.0%)	106 (20.4%)	1291 (35.3%)	214 (56.2%)	
Homeowner	1=yes	5292 (12.3%)	4357 (13.2%)	384 (9.2%)	38 (6.4%)	476 (10.1%)	37 (6.8%)	<.0001
	2=no	37660 (87.7%)	28579 (86.8%)	3783 (90.8%)	560 (93.6%)	4230 (89.9%)	508 (93.2%)	
HealthCare Tradeoffs	0=no	17331 (91.2%)	13416 (94.2%)	1701 (84.6%)	266 (73.5%)	1817 (83.0%)	131 (69.7%)	<.0001
	1=yes	1663 (8.8%)	829 (5.8%)	310 (15.4%)	96 (26.5%)	371 (17.0%)	57 (30.3%)	
Caregiver had decreased hrs	0=no	10050 (80.2%)	8143 (81.6%)	886 (74.6%)	132 (77.2%)	827 (74.6%)	62 (64.6%)	<.0001
	1=yes	2486 (19.8%)	1831 (18.4%)	301 (25.4%)	39 (22.8%)	281 (25.4%)	34 (35.4%)	
Caregiver Lost Job	0=no	17285 (77.8%)	13833 (78.3%)	1563 (76.3%)	206 (70.5%)	1510 (76.1%)	173 (79.7%)	0.0011
	1=yes	4918 (22.2%)	3828 (21.7%)	485 (23.7%)	86 (29.5%)	475 (23.9%)	44 (20.3%)	
Any Employed Adults	0=no	21957 (51.0%)	16123 (49.1%)	2366 (55.5%)	380 (60.1%)	2765 (58.2%)	323 (58.0%)	<.0001
	1=yes	21056 (49.0%)	16693 (50.9%)	1894 (44.5%)	252 (39.9%)	1983 (41.8%)	234 (42.0%)	
SNAP Sanction	0=no	21686 (93.8%)	16484 (94.6%)	2418 (93.1%)	407 (93.3%)	2111 (89.3%)	266 (91.7%)	<.0001
	1=yes	1424 (6.2%)	938 (5.4%)	180 (6.9%)	29 (6.7%)	253 (10.7%)	24 (8.3%)	
TANF Sanction	0=no	11967 (94.7%)	9014 (95.4%)	1358 (93.2%)	239 (95.6%)	1183 (91.0%)	173 (93.0%)	<.0001
	1=yes	676 (5.3%)	436 (4.6%)	99 (6.8%)	11 (4.4%)	117 (9.0%)	13 (7.0%)	

*Chi-Square testing utilized for categorical variables, Anova for continuous.
Private insurance excluded.

96 records are missing data.

Percents are column percents within variables/questions.

Appendix Table 1b: Children's HealthWatch Data through Dec 2012 Characteristics By Mothers Foreign-Born Status* June 1998 to Dec 31 2012					
Variable/Question	**Response**	**Overall**	**US Born Mother**	**Foreign Born Mother**	**p-value**
	Total	**44,885**	**31423 (70%)**	**13462 (30%)**	
Site	Baltimore	6663 (14.8%)	6511 (20.7%)	152 (1.1%)	<.0001
	Boston	10830 (24.1%)	6490 (20.7%)	4340 (32.2%)	
	Little Rock	8487 (18.9%)	7939 (25.3%)	548 (4.1%)	
	Los Angeles	1727 (3.8%)	583 (1.9%)	1144 (8.5%)	
	Minneapolis	10437 (23.3%)	4296 (13.7%)	6141 (45.6%)	
	Philadelphia	6030 (13.4%)	5569 (17.7%)	461 (3.4%)	
	Washington DC	711 (1.6%)	35 (0.1%)	676 (5.0%)	
Child Gender	F	20956 (46.7%)	14645 (46.6%)	6311 (46.9%)	0.5938
	M	23929 (53.3%)	16778 (53.4%)	7151 (53.1%)	
Child Age Mos	N Mean (Std Dev) Median (25th, 75th)	44885 12.8 (10.6) 10.2 (4, 20)	31423 13.3 (10.6) 10.8 (4, 21)	13462 11.7 (10.4) 8.9 (3, 18)	<.0001
Mother Ethnicity	1=Hispanic	13709 (30.7%)	5269 (16.8%)	8440 (62.9%)	<.0001
	2=Black|Non Hispanic	23162 (51.8%)	18939 (60.5%)	4223 (31.5%)	
	3=White|Non Hispanic	6254 (14.0%)	5954 (19.0%)	300 (2.2%)	
	4=Other	1575 (3.5%)	1126 (3.6%)	449 (3.3%)	
Married/Partnered	0=no	26648 (59.5%)	21851 (69.7%)	4797 (35.8%)	<.0001
	1=yes	18131 (40.5%)	9514 (30.3%)	8617 (64.2%)	
Caregiver Education	1=never/Ele/some high	14917 (33.4%)	9039 (28.8%)	5878 (44.2%)	<.0001
	2=High school	17735 (39.7%)	13054 (41.6%)	4681 (35.2%)	

Appendix Table 1b: Children's HealthWatch Data through Dec 2012 Characteristics By Mothers Foreign-Born Status* June 1998 to Dec 31 2012					
Variable/Question	**Response**	**Overall**	**US Born Mother**	**Foreign Born Mother**	**p-value**
	3=TechSchool/CollegeGrad/Masters	12022 (26.9%)	9270 (29.6%)	2752 (20.7%)	
Mother Age	N Mean (Std Dev) Median (25th, 75th)	41342 25.8 (5.9) 25.0 (21, 29)	28952 24.8 (5.6) 24.0 (21, 28)	12390 28.0 (6.1) 27.0 (23, 32)	<.0001
Caregiver Employment	1=Yes	17257 (38.6%)	12682 (40.4%)	4575 (34.3%)	<.0001
	2=No	27470 (61.4%)	18688 (59.6%)	8782 (65.7%)	
Child Breastfed	1=Yes	24993 (55.9%)	13665 (43.7%)	11328 (84.5%)	<.0001
	2=No	19712 (44.1%)	17636 (56.3%)	2076 (15.5%)	
Depression Screen	1=yes	9264 (24.3%)	7174 (26.3%)	2090 (19.3%)	<.0001
	2=No	28861 (75.7%)	20111 (73.7%)	8750 (80.7%)	
SNAP	0=Does not receive SNAP	22855 (51.3%)	13195 (42.3%)	9660 (72.4%)	<.0001
	1=Receives SNAP	21678 (48.7%)	17999 (57.7%)	3679 (27.6%)	
Current Subsidized Housing	1=Yes	9783 (24.9%)	7774 (28.4%)	2009 (16.9%)	<.0001
	2=No	29442 (75.1%)	19585 (71.6%)	9857 (83.1%)	
LIHEAP	1=Yes	6642 (18.1%)	5529 (21.7%)	1113 (10.0%)	<.0001
	2=No	29981 (81.9%)	19940 (78.3%)	10041 (90.0%)	
TANF	0=no	32554 (72.9%)	21045 (67.3%)	11509 (86.0%)	<.0001
	1=yes	12105 (27.1%)	10227 (32.7%)	1878 (14.0%)	

Appendix Table 1b: Children's HealthWatch Data through Dec 2012 Characteristics By Mothers Foreign-Born Status* June 1998 to Dec 31 2012					
Variable/Question	**Response**	**Overall**	**US Born Mother**	**Foreign Born Mother**	**p-value**
WIC	0=no	8814 (19.8%)	6931 (22.2%)	1883 (14.1%)	<.0001
	1=yes	35773 (80.2%)	24301 (77.8%)	11472 (85.9%)	
Low Birthweight	0=no	37624 (85.9%)	26006 (84.2%)	11618 (89.9%)	<.0001
	1=yes	6188 (14.1%)	4877 (15.8%)	1311 (10.1%)	
Housing Insecurity	0=Stable Housing	23794 (56.1%)	18386 (62.2%)	5408 (42.2%)	<.0001
	1=Less Severe (CROWDING/DOUBLED)	16600 (39.2%)	9651 (32.6%)	6949 (54.2%)	
	2=Severe	1989 (4.7%)	1532 (5.2%)	457 (3.6%)	
Energy Insecurity	0=No Energy Problems	25124 (72.8%)	17712 (70.6%)	7412 (78.7%)	<.0001
	1=Less Severe-threatened	4143 (12.0%)	3428 (13.7%)	715 (7.6%)	
	2=Severe-shut off/unheated/cooking stove	5231 (15.2%)	3937 (15.7%)	1294 (13.7%)	
Cumulative Risk	0= No Risk	11740 (35.7%)	9250 (38.7%)	2490 (27.6%)	<.0001
	1=Less Severe	18978 (57.7%)	13243 (55.4%)	5735 (63.5%)	
	2=Severe	2198 (6.7%)	1395 (5.8%)	803 (8.9%)	
Homeowner	1=Yes	5268 (12.3%)	3839 (12.9%)	1429 (11.0%)	<.0001
	2=No	37635 (87.7%)	26032 (87.1%)	11603 (89.0%)	
HealthCare Tradeoffs	0=no	17306 (91.2%)	13002 (90.6%)	4304 (93.2%)	<.0001
	1=yes	1663 (8.8%)	1347 (9.4%)	316 (6.8%)	
Caregiver had decreased hrs	0=no	10012 (80.1%)	7746 (80.7%)	2266 (78.1%)	0.0023

Appendix Table 1b: Children's HealthWatch Data through Dec 2012 Characteristics By Mothers Foreign-Born Status* June 1998 to Dec 31 2012					
Variable/Question	**Response**	**Overall**	**US Born Mother**	**Foreign Born Mother**	**p-value**
(among working CGs)	1=yes	2484 (19.9%)	1850 (19.3%)	634 (21.9%)	
Caregiver Lost Job	0=no	17257 (71.5%)	12682 (70.1%)	4575 (75.9%)	<.0001
(among nonworking CGs)	1=yes	6872 (28.5%)	5417 (29.9%)	1455 (24.1%)	
Any Employed Adults	0=no	9727 (22.6%)	8168 (27.2%)	1559 (12.1%)	<.0001
	1=yes	33250 (77.4%)	21910 (72.8%)	11340 (87.9%)	
SNAP Sanction	0=no	21678 (93.8%)	17999 (93.9%)	3679 (93.4%)	0.1830
	1=yes	1423 (6.2%)	1162 (6.1%)	261 (6.6%)	
TANF Sanction	0=no	11961 (94.7%)	10120 (94.8%)	1841 (94.1%)	0.2102
	1=yes	675 (5.3%)	559 (5.2%)	116 (5.9%)	
Number of children in home	N Mean (Std Dev) Median (25th, 75th)	44708 2.4 (1.4) 2.0 (1, 3)	31295 2.4 (1.4) 2.0 (1, 3)	13413 2.4 (1.4) 2.0 (1, 3)	0.6014
Number of Adults in home	N Mean (Std Dev) Median (25th, 75th)	44647 2.2 (1.1) 2.0 (1, 3)	31267 2.1 (1.0) 2.0 (1, 2)	13380 2.6 (1.3) 2.0 (2, 3)	<.0001

*Chi-Square testing utilized for categorical variables, Anova for continuous.

Private insurance excluded.

34 records are missing data.

Percents are column percents within variables/questions.

Table 1c: Children's HealthWatch Data through Dec 2012 Characteristics By Mothers Foreign-Born Status and Length of Stay in the United States* June 1998 to Dec 31 2012							
Variable/Question	**Response**	**Overall**	**US Born Mother**	**FBM LOS<5 years**	**FBM LOS 5 to 10 years**	**FBM LOS >10 years**	**p-value**
		43,861	**31423 (71.6%)**	**3980 (9.1%)**	**5090 (11.6%)**	**3368 (7.7%)**	
Site	Baltimore	6648 (15.2%)	6511 (20.7%)	39 (1.0%)	44 (0.9%)	54 (1.6%)	<.0001
	Boston	10647 (24.3%)	6490 (20.7%)	1151 (28.9%)	1592 (31.3%)	1414 (42.0%)	
	Little Rock	8468 (19.3%)	7939 (25.3%)	119 (3.0%)	224 (4.4%)	186 (5.5%)	
	Los Angeles	1612 (3.7%)	583 (1.9%)	231 (5.8%)	375 (7.4%)	423 (12.6%)	
	Minneapolis	9779 (22.3%)	4296 (13.7%)	2139 (53.7%)	2371 (46.6%)	973 (28.9%)	
	Philadelphia	6013 (13.7%)	5569 (17.7%)	66 (1.7%)	179 (3.5%)	199 (5.9%)	
	Washington DC	694 (1.6%)	35 (0.1%)	235 (5.9%)	305 (6.0%)	119 (3.5%)	
Child Gender	F	20491 (46.7%)	14645 (46.6%)	1818 (45.7%)	2435 (47.8%)	1593 (47.3%)	0.1784
	M	23370 (53.3%)	16778 (53.4%)	2162 (54.3%)	2655 (52.2%)	1775 (52.7%)	
Child Age Mos	N Mean (Std Dev) Median (25th, 75th)	43861 12.9 (10.6) 10.2 (4, 20)	31423 13.3 (10.6) 10.8 (4, 21)	3980 10.1 (9.6) 7.1 (2, 16)	5090 12.2 (10.6) 9.3 (3, 19)	3368 13.1 (10.8) 10.4 (4, 21)	<.0001
Mother Ethnicity	1=Hispanic	13005 (29.8%)	5269 (16.8%)	2516 (63.4%)	3327 (65.6%)	1893 (56.5%)	<.0001
	2=Black|Non Hispanic	22911 (52.5%)	18939 (60.5%)	1249 (31.5%)	1529 (30.1%)	1194 (35.7%)	
	3=White|Non Hispanic	6232 (14.3%)	5954 (19.0%)	86 (2.2%)	96 (1.9%)	96 (2.9%)	
	4=Other	1530 (3.5%)	1126 (3.6%)	117 (2.9%)	122 (2.4%)	165 (4.9%)	
Married/Partnered	0=no	26323 (60.1%)	21851 (69.7%)	1380 (34.8%)	1730 (34.1%)	1362 (40.6%)	<.0001
	1=yes	17444 (39.9%)	9514 (30.3%)	2590 (65.2%)	3345 (65.9%)	1995 (59.4%)	
Caregiver Education	1=never/Ele/some high	14432 (33.0%)	9039 (28.8%)	1865 (47.4%)	2322 (46.2%)	1206 (36.0%)	<.0001

Table 1c: Children's HealthWatch Data through Dec 2012 Characteristics By Mothers Foreign-Born Status and Length of Stay in the United States* June 1998 to Dec 31 2012							
Variable/Question	**Response**	**Overall**	**US Born Mother**	**FBM LOS<5 years**	**FBM LOS 5 to 10 years**	**FBM LOS >10 years**	**p-value**
	2=High school	17378 (39.8%)	13054 (41.6%)	1263 (32.1%)	1865 (37.1%)	1196 (35.7%)	
	3=TechSchool/CollegeGrad/Master	11858 (27.2%)	9270 (29.6%)	805 (20.5%)	838 (16.7%)	945 (28.2%)	
Mother Age	N Mean (Std Dev) Median (25th, 75th)	40455 25.7 (5.9) 25.0 (21, 29)	28952 24.8 (5.6) 24.0 (21, 28)	3668 26.2 (5.8) 25.0 (22, 30)	4731 28.0 (5.7) 27.0 (24, 32)	3104 30.0 (6.4) 30.0 (25, 35)	<.0001
Caregiver Employment	1=Yes	16923 (38.7%)	12682 (40.4%)	1051 (26.7%)	1760 (34.9%)	1430 (42.6%)	<.0001
	2=No	26786 (61.3%)	18688 (59.6%)	2890 (73.3%)	3285 (65.1%)	1923 (57.4%)	
Child Breastfed	1=Yes	24160 (55.3%)	13665 (43.7%)	3499 (88.2%)	4336 (85.6%)	2660 (79.4%)	<.0001
	2=No	19528 (44.7%)	17636 (56.3%)	470 (11.8%)	730 (14.4%)	692 (20.6%)	
Depression Screen	1=yes	9136 (24.5%)	7174 (26.3%)	632 (20.0%)	766 (18.5%)	564 (20.5%)	<.0001
	2=No	28192 (75.5%)	20111 (73.7%)	2535 (80.0%)	3365 (81.5%)	2181 (79.5%)	
SNAP	0=Does not receive SNAP	22056 (50.7%)	13195 (42.3%)	2978 (75.6%)	3652 (72.3%)	2231 (66.7%)	<.0001
	1=Receives SNAP	21468 (49.3%)	17999 (57.7%)	961 (24.4%)	1396 (27.7%)	1112 (33.3%)	
Current Subsidized Housing	1=Yes	9658 (25.2%)	7774 (28.4%)	438 (12.1%)	792 (17.8%)	654 (22.8%)	<.0001
	2=No	28664 (74.8%)	19585 (71.6%)	3191 (87.9%)	3669 (82.2%)	2219 (77.2%)	
LIHEAP	1=Yes	6583 (18.4%)	5529 (21.7%)	244 (7.6%)	416 (9.8%)	394 (13.6%)	<.0001
	2=No	29229 (81.6%)	19940 (78.3%)	2969 (92.4%)	3824 (90.2%)	2496 (86.4%)	
TANF	0=no	31652 (72.5%)	21045 (67.3%)	3353 (84.8%)	4429 (87.4%)	2825 (84.3%)	<.0001

Table 1c: Children's HealthWatch Data through Dec 2012 Characteristics By Mothers Foreign-Born Status and Length of Stay in the United States* June 1998 to Dec 31 2012							
Variable/Question	**Response**	**Overall**	**US Born Mother**	**FBM LOS<5 years**	**FBM LOS 5 to 10 years**	**FBM LOS >10 years**	**p-value**
	1=yes	11994 (27.5%)	10227 (32.7%)	602 (15.2%)	639 (12.6%)	526 (15.7%)	
WIC	0=no	8687 (19.9%)	6931 (22.2%)	591 (15.0%)	664 (13.1%)	501 (15.0%)	<.0001
	1=yes	34890 (80.1%)	24301 (77.8%)	3357 (85.0%)	4389 (86.9%)	2843 (85.0%)	
Low Birthweight	0=no	36758 (85.8%)	26006 (84.2%)	3370 (88.9%)	4447 (90.9%)	2935 (89.3%)	<.0001
	1=yes	6094 (14.2%)	4877 (15.8%)	421 (11.1%)	445 (9.1%)	351 (10.7%)	
Housing Insecurity	0=Stable Housing	23383 (56.5%)	18386 (62.2%)	1219 (32.5%)	2080 (42.5%)	1698 (53.2%)	<.0001
	1=Less Severe	16067 (38.8%)	9651 (32.6%)	2366 (63.0%)	2648 (54.2%)	1402 (43.9%)	
	2=Severe	1954 (4.7%)	1532 (5.2%)	169 (4.5%)	162 (3.3%)	91 (2.9%)	
Energy Insecurity	0=No Energy Problems	24510 (72.5%)	17712 (70.6%)	2100 (81.8%)	2911 (78.5%)	1787 (73.6%)	<.0001
	1=Less Severe-threatened	4107 (12.2%)	3428 (13.7%)	127 (4.9%)	290 (7.8%)	262 (10.8%)	
	2=Severe-shut off/unheated/cooking stove	5167 (15.3%)	3937 (15.7%)	341 (13.3%)	509 (13.7%)	380 (15.6%)	
Cumulative Risk	0= No Risk	11528 (35.8%)	9250 (38.7%)	543 (22.2%)	952 (26.6%)	783 (33.9%)	<.0001
	1=Less Severe	18543 (57.5%)	13243 (55.4%)	1644 (67.3%)	2307 (64.4%)	1349 (58.4%)	
	2=Severe	2152 (6.7%)	1395 (5.8%)	255 (10.4%)	323 (9.0%)	179 (7.7%)	
Homeowner	1=Yes	5170 (12.3%)	3839 (12.9%)	229 (6.0%)	550 (11.1%)	552 (16.9%)	<.0001
	2=No	36739 (87.7%)	26032 (87.1%)	3601 (94.0%)	4390 (88.9%)	2716 (83.1%)	
HealthCare Tradeoffs	0=no	16904 (91.1%)	13002 (90.6%)	902 (92.7%)	1714 (92.6%)	1286 (93.1%)	0.0002
	1=yes	1650 (8.9%)	1347 (9.4%)	71 (7.3%)	136 (7.4%)	96 (6.9%)	

Table 1c: Children's HealthWatch Data through Dec 2012
Characteristics By Mothers Foreign-Born Status and Length of Stay in the United States*
June 1998 to Dec 31 2012

Variable/Question	Response	Overall	US Born Mother	FBM LOS<5 years	FBM LOS 5 to 10 years	FBM LOS >10 years	p-value
Caregiver had decreased hrs	0=no	9828 (80.1%)	7746 (80.7%)	460 (74.7%)	882 (76.8%)	740 (82.0%)	<.0001
	1=yes	2435 (19.9%)	1850 (19.3%)	156 (25.3%)	267 (23.2%)	162 (18.0%)	
Caregiver Lost Job	0=no	16923 (71.4%)	12682 (70.1%)	1051 (72.4%)	1760 (74.9%)	1430 (78.8%)	<.0001
	1=yes	6790 (28.6%)	5417 (29.9%)	400 (27.6%)	589 (25.1%)	384 (21.2%)	
Any Employed Adults	0=no	9645 (23.0%)	8168 (27.2%)	495 (13.1%)	519 (10.6%)	463 (14.2%)	<.0001
	1=yes	32379 (77.0%)	21910 (72.8%)	3276 (86.9%)	4400 (89.4%)	2793 (85.8%)	
SNAP Sanction	0=no	21468 (93.8%)	17999 (93.9%)	961 (94.3%)	1396 (92.6%)	1112 (93.3%)	0.1392
	1=yes	1412 (6.2%)	1162 (6.1%)	58 (5.7%)	112 (7.4%)	80 (6.7%)	
TANF Sanction	0=no	11851 (94.7%)	10120 (94.8%)	591 (96.1%)	628 (91.9%)	512 (94.5%)	0.0052
	1=yes	668 (5.3%)	559 (5.2%)	24 (3.9%)	55 (8.1%)	30 (5.5%)	
Number of children in home	N Mean (Std Dev) Median (25th, 75th)	43689 2.4 (1.4) 2.0 (1, 3)	31295 2.4 (1.4) 2.0 (1, 3)	3962 2.1 (1.4) 2.0 (1, 3)	5074 2.4 (1.3) 2.0 (1, 3)	3358 2.7 (1.4) 2.0 (2, 3)	<.0001
Number of Adults in home	N Mean (Std Dev) Median (25th, 75th)	43630 2.2 (1.1) 2.0 (1, 3)	31267 2.1 (1.0) 2.0 (1, 2)	3948 2.8 (1.4) 2.0 (2, 4)	5064 2.5 (1.2) 2.0 (2, 3)	3351 2.3 (1.1) 2.0 (2, 3)	<.0001

*Chi-Square testing utilized for categorical variables, Anova for continuous.

Private insurance excluded.

1058 records are missing data.

Percents are column percents within variables/questions.

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