Maternal Ratings of Child Health and Child Obesity, Variations by Mother's Race/Ethnicity and Nativity

Elizabeth H. Baker

University of Alabama at Birmingham

Claire E. Altman

Rice University

Maternal Ratings of Child Health and Child Obesity, Variations by Mother's Race/Ethnicity and Nativity

ABSTRACT

Maternal ratings of child health (MRCH) reflect not only child's actual health, but also the mother's perception of what contributes to poor child health. This study examines whether cultural orientations among immigrant mothers may be a risk factor for child obesity by examining the associations between MRCH and child obesity by mother's nativity focusing on Hispanic-origin children using the Early Childhood Longitudinal Study, Kindergarten cohort (ECLS-K) kindergarten-eighth grade waves (n=40,087). Our findings indicate that child obesity did not influence MRCH for foreign-born Hispanic mothers, especially among less acculturated mothers. However, among native-born white, black, and Hispanic mothers, child obesity is associated with a lower likelihood of excellent MRCH after controlling for socioeconomic, family characteristics, and other indicators of child health. Cultural orientations that prefer heavier children or are unlikely to associate child obesity with poor child health may contribute to the higher levels of obesity found among children of immigrants.

Maternal Ratings of Child Health and Child Obesity, Variations by Mother's Race/Ethnicity and Nativity

INTRODUCTION

An understanding of the future health profile of the United States must incorporate immigrants and their children given their size and predicted growth. The demographic importance of children of immigrants (COI) has grown sharply as one in four children now has at least one foreign born parent and this is projected to rise to 30 percent by 2020 (1). Past research has consistently shown that COIs in the U.S. experience advantageous early childhood health on birth outcomes, prenatal health, and maternal health behaviors compared to children of natives (CONs), despite their socioeconomic disadvantages (2-6). This is especially true among Hispanic-origin COIs (2, 3).Yet, recent research questions the extension of this health advantage into early and middle-childhood for COIs. For instance, COIs are more likely to be overweight or obese than CONs (7, 8).

Cultural orientations brought with immigrants from their countries of origins are thought to promote healthier behaviors and shield immigrants from the potentially deleterious U.S. health environment. These orientations are cited as potential mechanisms contributing to more favorable child health outcomes (3, 5) (9-12). These include healthier prenatal and perinatal exposures and healthier nutritional content of traditional diets (13-15). However, stronger cultural orientations that promote infant health including lower prenatal substance use and breastfeeding may be replaced by cultural orientations that result in worse early and middle child health including parenting practices and large family sizes (16).

One potential source of information about a mother's cultural orientation towards health comes from maternal ratings of child health (MRCH). MRCH reflects not only child's actual

health, but also the mother's cultural orientation and perception of what contributes to poor child health. Additionally, MRCH are a commonly used indicator of child health and correspond to actual measures of health (17).If certain child health conditions such as obesity are viewed as more (or less) serious by different groups based on shared cultural characteristics, it is likely that these views will be reflected in MRCH for children with these conditions.

However, the extent to which MRCH reflect a child's weight status, specifically for Hispanic-origin COIs has not been examined. Not only is obesity an important health indicator for young children with a range of comorbidities and a high degree of tracking into adolescence and early adulthood, Hispanic children have high prevalence rates (18).

Past research indicates that foreign-born Hispanic mothers are less likely to assess their child's health as excellent or good compared to native-born Hispanic mothers (19). Furthermore, Hispanic mothers are less accurate in their perception of their child's weight than other race/ethnic groups (20) and parents of heavy children consistently underestimate their child's weight (21, 22). Additionally, qualitative research on Hispanic immigrant mothers, especially less acculturated immigrant mothers, demonstrates that they are less likely to view child obesity as a health concern and that these orientations are related to origin country norms (23, 24). In this context, lower parental acculturation may contribute to a greater likelihood to maintain cultural orientations associating child fatness with better child health.

This study examines whether cultural orientations among immigrant mothers may be a risk factor for child obesity by examining the associations between MRCH and child obesity by mother's nativity focusing on Hispanic-origin children. To do so, this research uses a nationally representative, longitudinal dataset, the Early Childhood Longitudinal Study, Kindergarten cohort (ECLS-K), which follows children from kindergarten to eighth grade. Past research has

relied on non-probabilistic, small, regional, and/or cross-sectional samples. ECLS-K also contains clinical measures of child's height and weight to determine obesity. Additionally, we examine whether MRCH vary by race/ethnicity and nativity for other indicators of child health. This is done to confirm that cultural orientations influence the way immigrant mothers associate child obesity with child health, rather than immigrant mothers assess child health differently than native-born mothers. Understanding how mothers view child obesity in relation to child health and how this varies by nativity and acculturation will provide valuable information on how to design and target interventions and prevention programs for the large and growing COI population.

METHODS

Data Source and Participants

This study uses the ECLS-K which began by assessing a cohort of kindergarteners in the U.S. in 1998 (n=19,170), and followed them through first grade (n=16,730), third grade (n=14,470), fifth grade (n=11,350), and eighth grade (n=9,360) (25) and contains measured height and weight and parental assessments of child health. Attrition reflects natural sample design and children lost to follow-up. The baseline sample was selected using a three-stage probability-sampling design to ensure national and regional geographical representativeness. Our analytical sample is limited to children whose biological mothers responded to the parent survey in all waves (93.2% of the sample) and who were present in the spring of first grade or latter waves when questions pertaining to parent's place of birth were asked (87%). We further limit to children whose mother is a native born non-Hispanic white, non-Hispanic black, Hispanic, or foreign born Hispanic (86.9% of the sample). Lastly, an additional, 18% of respondents are missing on other key study variables leaving a final sample of 40,087.

Outcome variable

Maternal ratings of child health are measured in all five waves of data collection. Mothers are asked, "Would you say (child)'s health is: excellent, very good, good, fair, or poor?" This variable is dichotomized as excellent (=1) and not excellent (=0). Additional analyses examined ordinal measures of health using the full range of responses provided to parents and produced substantively similar results.

Independent variables

Child obesity is the primary independent variable. Obesity is determined based on measured height and weight of the children at each grade and is transformed into body mass index (BMI), weight (kg)/height (m)^2. Obesity is defined as a BMI at or above the 95th percentile using the U.S. Centers for Disease Control reference population and procedures (26) that account for developmental differences in growth by age and gender. Lagged and concurrent measures of obesity were both examined. Concurrent measures of obesity were better predictors of MRCH than lagged measures.

Mother's ethnicity/nativity is determined by mother's report of birth place and mother's reports of race/ethnicity. Race/ethnicity is referred to only as ethnicity. Mothers are considered foreign-born if they are born outside the U.S. and native-born if they are born inside the U.S. The variables are combined and coded as native-born non-Hispanic white (NBNHW), reference group, native-born non-Hispanic black (NBNHB), native-born Hispanic (NBH), and foreign-born Hispanic (FBH). Additionally, we separate the foreign-born mothers by U.S. duration into two groups, less than 10 years and 10 or more years to examine acculturation. We focus on mothers instead of fathers because mothers are often primarily responsible for the feeding and caretaking of children and are overwhelmingly the respondent to the parent survey. By restricting

the sample to biological mothers, we ensure that changes in the assessment of child health are not due to different people assessing the child's health.

Control variables associated with child health include demographic (child's age and gender), socioeconomic status (a composite measure of family socioeconomic status, number of siblings, and food security), family characteristics (mother's age, marital status, employment status, and the child's care arrangements), and child health indicators based on mother's reports (activity level, disability status, vision difficulty, birth weight, last doctor's visit, and born premature). Gender, birth weight and premature status are time-constant variables. Socioeconomic status was not measured in first grade and child care arrangements are not asked in eighth grade. In these instances the variable is lagged and represents the response from the previous survey. Table 1 presents the study variables for the full sample and by MRCH.

Data Analysis

In order to utilize all waves of data, general linear mixed modeling with a binary distribution is employed. This allows for a random intercept for each individual. Model 1 contains mother's ethnicity/ nativity, child obesity and the demographic controls. The second model includes the controls; socioeconomic and family characteristics, and the other indicators of child health. The final model includes the interaction between mother's ethnicity/nativity and child obesity. Additionally, we test several alternative models to examine whether the association between MRCH and other indicators of child health vary by mother's ethnicity/nativity. This is done by comparing fit statistics across models that include interaction terms between mother's ethnicity/nativity and indicators of child health.

RESULTS

Table 2 presents percentage obese among those with excellent MRCH by mother's ethnicity/nativity and child's grade. NBNHW mothers followed closely by NBH mothers, are consistently less likely to rate their obese children as having excellent health. Conversely, FBH mothers, especially the more acculturated are the most likely to rate their obese children as having excellent health. This is contrary to the research expectation that less acculturation results in a greater likelihood to rate obese children as healthy. This may be because these mothers were more likely to rate their child's health as excellent overall and this group had higher child obesity at every grade compared to those with less acculturated FBH mothers. There is a noteworthy cross-over in acculturation when children are the oldest (eighth grade), where less acculturated mothers are more likely to rate their obese children as having excellent health compared to more acculturated mothers. NBNHB mothers are more likely to rate their obese children as having excellent health as their children age. This change coincides with a dramatic increase in obesity for this group as they age (not shown).

Next, these patterns are examined using multivariate general linear mixed models. The odds ratios (OR) and 95% confidence intervals (CI) predicting excellent MRCH are presented in Table 3. Model 1 contains the demographic variables, mother's ethnicity/nativity, and child obesity. We find that children of FBH mothers with 0-9 years of U.S. duration are the least likely to report excellent health relative to children of NBNHW women (OR: 0.22, 95% CI 0.18, 0.28). Additionally, mothers in the other ethnic/nativity groups are also are less likely to report excellent child health relative to NBNHW mothers children (OR: 0.39, 95% CI 0.34, 0.44 for NBNHB, OR: 0.57, 95% CI 0.48, 0.67 NBH, and OR: 0.36, 95% CI 0.30, 0.42 for FBH mothers with 10 or more years of U.S. duration). Focusing on children of Hispanic mothers, we see that increasing acculturation is associated with a greater likelihood to rate their child's health as

excellent. Obese children have 0.47 (95% CI 0.43, 0.52) the log odds of having excellent health compared to non-obese children. Model 2 includes the controls; socioeconomic and family characteristics and other indicators of child health, which are strongly related to excellent MRCH. Family socioeconomic status and mother's age are positively associated with the log odds of excellent MRCH (OR: 1.57, 95% CI 1.48, 1.67 and OR: 1.01, 95% CI 1.00, 1.02, respectively). Additionally, married mothers, mothers who work part-time, and food secure children are more likely to have excellent MRCH relative to single mothers, mothers who are not employed, or food insecure children (OR: 1.18, 95% CI 1.03, 1.35, OR: 1.09, 95% CI 1.00, 1.19, and OR: 1.45, 95% CI 1.28, 1.64, respectively). Children who have relative care have 0.88 (95% CI 0.81, 0.97) the log odds of having excellent MRCH compared to children who only received parental care. Examining the indicators of child health, we find that increases in a child's activity level are associated with increased odds of excellent MRCH (OR: 1.32, 95% CI 1.27, 1.37). Disabled children or children with vision difficulty are less likely to have excellent MRCH relative to non-disabled children or children without vision difficulties (OR: 0.73, 95% CI 0.67, 0.79 and OR: 0.84, 95% CI 0.76, 0.93, respectively). Low birth weight children are less likely and high birth weight children are more likely to have excellent MRCH relative to normal birth weight children (OR: 0.82, 95% CI 0.69, 0.98, and OR: 1.20, 95% CI 1.06, 1.37). Premature children are also less likely to have excellent MRCH (OR: 0.82, 95% CI 0.73, 0.92) and children who have gone to the doctor in the last six months are less likely to have excellent MRCH relative to children who have not gone to the doctor in the last two years (OR: 0.76 95% CI: 0.62, 0.93). Including these controls reduced disparities in excellent MRCH by mother's ethnicity/nativity.

Model 3 includes the interactions between mother's ethnicity/nativity and child obesity. Interactions of obesity with mother's ethnicity/nativity demonstrate that FBH mothers, especially those with the least acculturation, are more likely to rate their obese child as healthy compared to NBNHW mothers. Among the native-born groups, the influence does not vary across ethnicity. For ease of interpretations, Figure 1 predicts excellent MRCH by mother's ethnicity/nativity and child's obesity by using linear combinations of the conditional main effects and interactions. Within ethnic/nativity groups, obese children are less likely to have excellent MRCH except among children of FBH mothers. For this group of children, there is virtually no difference in excellent MRCH by child obesity. This is especially true among FBH mothers with the least acculturation. Additionally, the ethnicity/nativity disparities in excellent MRCH are much larger among non-obese children than obese children.

Table 4 presents AIC and BIC model fit statistics for alternative models predicting excellent MRCH to determine whether other indicators of child health and excellent MRCH vary by mother's ethnicity/nativity. Smaller AIC and BIC indicate better model fit. All models include the full set of covariates and all models are compared to the base model, which includes the full set of covariates, but no interactions. We find that the model that interacts mother's ethnicity/nativity with child obesity results in the best model fit according to the AIC. All of the alternative specifications have worse model fit and none of the interactions reach statistical significance. However, according to the more conservative BIC model fit statistic, the base model (without interactions) fits the data the best. This is most likely due to the non-significant interactions of child obesity for children with NBNHB and NBH mothers and the BIC penalizes model fit when non-significant terms are included in the model. Based on the models and fit statistics, only the relationship between obesity and MRCH varies by mother's ethnicity/nativity

highlighting that obesity may be a distinct health indicator that is viewed differently among FBH mothers. For all other health indicators FBH mothers were just as likely to respond to a health risk indicator in their ratings of child health as native-born mothers.

DISCUSSION

We examined patterns of excellent MRCH and variations in MRCH by mother's ethnicity/nativity and indicators of child health, focusing on difference between NBNHW, NBNHB, NBH, and FBH mothers by acculturation. Our findings indicate that for indicators of child health, excellent MRCH only varies by mother's ethnicity/nativity for child obesity. Among FBH mothers, child obesity did not influence MRCH and this is especially true among less acculturated mothers. FBH mothers did not rate obese and non-obese children differently in their likelihood of having excellent health. However, among the other ethnic/nativity groups, mothers were less likely to rate obese children as having excellent health relative to mothers with non-obese children. This pattern held after accounting for differences in socioeconomic characteristics, family characteristics, and other indicators of child health.

Past research has indicated that children of immigrants are more likely to be obese or overweight than children of natives, despite their more favorable early maternal health and health behaviors associated with obesity (7, 8). The cultural orientations of immigrant mothers that promote better health and health behaviors among their children are often cited as contributing to their more favorable health. Yet, cultural orientations that are protective in the first year of life may give way to less healthful orientations concerning child's nutrition and appropriate body size in middle childhood (21, 23, 24). The results presented suggest that FBH mothers do not associate their child's obesity with global ratings of their child's health. This may be due to cultural orientations that view larger children as healthier. Or they might indicate the difficulty

that foreign-born mothers face when identifying their obese children as obese. We argue that cultural orientations are likely the factor contributing to this overall difference in associating child obesity with child health as the other indicators of child health on MRCH did not vary by mother's ethnicity/nativity.

While this is the first project to use nationally representative longitudinal data to examine the association between MRCH and child obesity by mother's race/ethnicity and nativity, it is not without limitations. First, a sizeable percent of the study population is lost due to attrition and non-response. Unfortunately, questions related to mother's place of birth are only asked at the first grade wave when roughly 86.9% of the sample is already lost to follow-up. Nonetheless, some of the loss of subjects over time is due to sample design and not attrition. For example, among children who changed schools between waves, only a subsample is followed. Preliminary analyses suggest that these data are missing at random, thus list wise deletion is an appropriate method to handle missing data (27, 28). Additionally, general linear mixed models use maximum likelihood estimation allowing us to include data points for all children when they were interviewed and does not require us to limit our sample to only children who were present in all the waves of the data utilized in this project. Lastly, the other indicators of child health besides child obesity rely on mother's reports instead of clinical measures. COIs are less likely to receive health care than CONs; this may lead to under-reporting on indicators of poor child health. We include a measure of health care access, child's most recent doctor visit, to help account for this difference.

Children of immigrants, especially those of Hispanic origin, represent a large and growing segment of the U.S. population and are especially at risk for developing obesity (18). This research indicates that children of foreign-born Hispanic mothers are less likely to have excellent

MRCH and that child obesity, an indicator of poor child health, is not associated with MRCH for this population. While past research has demonstrated that mothers in general are likely to underestimate the health risks associated with child obesity (21, 22) , this is appears to be especially true for foreign born Hispanic mothers. Additionally, individuals are more likely to change health degrading behaviors if they connect those behaviors to poor health outcomes (29). Parents are responsible for the health and well-being of their children. Family health behaviors such as diet and physical activity may aid in preventing or intervening in childhood overweight but require parents to recognize the health risks of obesity (20, 21, 30). Future interventions aimed at reducing child obesity among this population should also focus on educating mothers about the dangers of child obesity as well as recognizing when their child is obese.

References

1. Passel JS. Demography of immigrant youth: past, present, and future. The Future of Children 2011;21(1):19-41.

2. Mendoza FS. Health disparities and children in immigrant families: a research agenda. Pediatrics 2009;124(Suppl 3):s187-s195.

3. National Research Council. Children of Immigrants: Health, Adjustment, and Public Assistance. Washington, D.C.: National Academy Press; 1999.

4. Lara M, Gamboa C, Kahramanian MI, Morales LS, Bautista DE. Acculturation and Latino health in the United States: a review of the literature and its sociopolitical context. Annual Review of Public Health 2005;26:367-397.

5. Hamilton ER, Cardoso JB, Hummer RA, Padilla YC. Assimilation and Emerging Health Disparities among New Generations of U.S. Children. Demographic Research 2011;25:783-818.

6. Padilla YC, Hamilton ER, Hummer RA. Beyond the epidemiological paradox: the health of Mexican-American children at age five. Social Science Quarterly 2009;90(5):1072-1088.

7. Van Hook J, Baker E. Big Boys and Little Girls: Gender, Acculturation, and Weight among Young Children of Immigrants. Journal of Health and Social Behavior 2010;51(2):200-214.

8. Van Hook J, Landale NS, Hillemeier MM. Is the United States bad for children's health? Risk and resilience among young children of immigrants. Washington, DC: Migration Policy Institute; 2013.

9. Palloni A, Arias E. Paradox lost: explaining the Hispanic adult mortality advantage. Demography 2004;41(3):385-415.

10. Jasso G, Massey DS, Rosenzweig MR, Smith JP, Kuczmaski RJ, Ogden CL, et al. Immigrant health: selectivity and acculturation. In: Anderson NB, Bulatao RA, Cohen B, editors. Critical Perspectives on Racial and Ethnic Differences in Health in Late Life. Washington, D. C.: National Academies Press; 2004. p. 227-266.

11. Chiswick B, Lee YL, Miller P. Immigrant selection systems and immigrant health. Contemporary Economic Policy 2008;26(4):555-578.

12. Mulvaney-Day N, Alegria M, Sribney W. Social cohesion, social support, and health among Latinos in the United States. Social Science & Medicine 2007;64(2):477-495.

13. Akresh IR. Dietary assimilation and health among Hispanic immigrants to the United States. Journal of Health and Social Behavior 2007;48(4):404-417.

14. Donato KM, Duncan EM. Migration, social networks, and child health in Mexican families. Journal of Marriage and Family 2011;73(4):713-728.

15. Neuhouser ML, Thompson B, Coronado G, Solomon C. Higher Fat Intake and Lower Fruit and Vegetables Intakes are Associated with Greater Acculturation among Mexicans Living in Washington State. J Am Diet Assoc 2004;104(1):51-57.

16. Fuller B, Bein E, Bridges M, Halfon N, Jung S, Rabe-Hesketh S, et al. Maternal practices that influence Hispanic infants' health and cognitive growth. Pediatrics 2010;125(2):e324-e332.

17. Case A, Paxson C. Mothers and others: who invests in children's health? J Health Econ 2001;20(3):301-28.

18. Ogden CL, Carroll MD, Curtin LR, Lamb MM, Flegal KM. Prevalence of high body mass index in US children and adolescents, 2007-2008. Journal of the American Medical Association 2010;303(3):242-249.

19. Schmeer KK. Early childhood economic disadvantage and the health of Hispanic children. Social Science & Medicine 2012;75(8):1523-1530.

20. Boutelle K, Fulkerson JA, Neumark-Sztainer D, Story M. Mothers' perceptions of their adolescents' weight status: are they accurate? Obesity Research 2004;12(11):1754-7.

21. Jackson J, Strauss CC, Lee AA, Hunter K. Parents' accuracy in estimating child weight status. Addict Behav 1990;15(1):65-8.

22. Etelson D, Brand DA, Patrick PA, Shirali A. Childhood Obesity: Do Parents Recognize This Health Risk? Obesity Research 2003;11(11):1362-1368.

23. Rosas LG, Harley KG, Guendelman S, Fernald LCH, Mejia F, Eskenazi B. Maternal perception of child weight among Mexicans in California and Mexico. Maternal and Child Health Journal 2010;14(6):886-894.

24. Crawford P, Gosliner W, Anderson C, Strode P, Samuels S, Carroll AM, et al. Counseling Latina mothers of preschool children about weight issues: suggestions for a new framework. Journal of the American Dietetic Association 2004;104(3):387-394.

25. Statistics NCfE. Early Childhood Longitudinal Program (ECLS). In. Washington, D. C.: Institute of Education Sciences, U. S. Department of Education; 2009.

26. Kuczmarski RJ, Ogden CL, Guo SS, Grummer-Strawn LM, Flegal KM, Mei Z, et al. 2000 CDC growth charts for the United States: methods and development. Vital Health Statistics 11 2002(246):1-190.

27. Allison P. Missing Data. Statistical Horizons 2011.

28. Acock A. Working with missing values. Journal of Marriage and Family 2005;67(4):1012-1028.

29. Link BG, Phelan JC. Social Conditions as Fundamental Causes of Disease. Journal of Health and Social Behavior 1995;35(Extra Issue):80-94.

30. Eckstein KC, Mikhail LM, Ariza AJ, Thomson JS, Millard SC, Binns HJ, et al. Parents' perceptions of their child's weight and health. Pediatrics 2006;117(3):681-90.

Table 1. Means and Percentage of the Study Variables by Mother's Rating of Child's Health as Excellent, Early Childhood Longitudinal Study Kindergarten Cohort, 1997-2007, Kindergarten, 1st, 3rd, 5th, and 8th Grade Waves

	NB non-Hispanic white	NB non-Hispanic black	NB Hispanic	FB Hispanic, U.S. duration 10 or +	FB Hispanic, U.S. duration < 10 years	Total
Excellent health	57.2	43.1	46.8	39.4	35.2	52.7
% Obese	9.9	17.9	12.3	24.8	23.5	11.9
Mother's ethnicity/nativity						
NB non-Hispanic white	100.0	---	---	---	---	70.1
NB non-Hispanic black	---	100.0	---	---	---	12.2
NB Hispanic	---	---	100.0	---	---	6.9
FB Hispanic, U.S. duration >= 10 years	---	---	---	100.0	---	6.4
FB Hispanic, U.S. duration < 10 years	---	---	---	---	100.0	4.5
Child's gender						
Male	51.2	49.0	50.6	50.7	52.9	50.9
Female	48.8	51.0	49.4	49.3	47.1	49.1
Child's age	114.5	113.2	112.5	113.8	113.9	114.1
Child Obese	14.3	20.6	18.1	26.7	22.7	16.5
Sociodemographic and family characteristics						
Socioeconomic status	0.2	-0.4	-0.2	-0.5	-0.7	0.0
Number of siblings	1.4	1.7	1.6	1.8	1.8	1.5
Mother's age	37.5	33.9	34.4	37.4	33.5	36.6
Mother's marital status						
Single	4.9	39.1	13.3	12.0	10.9	10.3
Married	80.3	39.7	67.7	73.5	79.7	74.0
Divorced, separated or widowed	14.8	21.3	19.0	14.4	9.3	15.6

Table 1 (continued). Means and Percentage of the Study Variables by Mother's Rating of Child's Health as Excellent, ECLS-K, 1997-2007, Kindergarten, 1st, 3rd, 5th, and 8th Grade Waves

	NB non-Hispanic white	NB non-Hispanic black	NB Hispanic	FB Hispanic, U.S. duration 10 or +	FB Hispanic, U.S. duration < 10 years	Total
Mother's employment status						
Mother not employed	25.0	21.5	26.5	35.0	51.3	26.5
Works >= 35 hrs/wk	48.5	64.3	55.2	48.2	34.0	50.2
Works < 35 hrs/wk	26.5	14.3	18.3	16.8	14.6	23.3
Food secure	94.2	85.3	91.1	85.5	80.5	91.7
Child care						
Parental only	63.1	47.9	56.3	61.8	70.7	61.1
Relative	14.2	26.3	26.2	21.2	14.8	16.9
Non-relative	8.1	4.5	4.8	5.2	4.5	7.1
Center	13.0	19.1	11.7	9.6	8.8	13.2
Other	1.6	2.2	1.0	2.2	1.3	1.7
Child Health						
Activity level	2.5	2.6	2.6	2.4	2.4	2.5
Disabled	19.6	14.7	20.7	13.8	10.9	18.3
Vision difficulty	16.3	16.8	18.2	13.8	14.5	16.3
Birth weight						
Low	6.5	14.1	9.0	6.1	8.4	7.7
Normal	80.3	79.0	82.7	83.7	80.3	80.5
High	13.2	6.9	8.3	10.2	11.3	11.8
Last doctor's visit						
More than 2 years	50.4	56.6	55.6	53.0	51.0	51.7
Less than 6 months	36.9	33.2	31.1	30.0	30.0	35.3
6 months to 1 year	10.9	8.8	11.0	13.7	14.4	11.0
1 year to 2 years	1.8	1.4	2.3	3.4	4.6	2.0
Premature birth	18.4	19.9	17.8	15.4	15.1	18.3
Observations	29,023	4,294	2,628	2,559	1,757	40,087

Table 2. Percent Obese Among those with Excellent MRCH by Mother's Ethnicity/nativity Early Childhood Longitudinal Study, Kindergarten Cohort, 1998-2007

	Kinder-garten	First Grade	Third Grade	Fifth Grade	Eighth Grade
White non-Hispanic, native born	9.4	9.1	11.8	10.0	9.5
Black non-Hispanic, native born	13.2	11.8	19.3	21.6	24.6
Hispanic, native born	9.8	13.6	14.9	13.3	10.3
Hispanic, U.S. duration 10 or more years	20.8	17.8	26.1	25.6	28.3
Hispanic, U.S. duration 0-9 years	22.9	24.1	26.9	28.8	23.9

Table 3. General Linear Mixed Models Predicting Mother Rated Child's Health as Excellent, Early Childhood Longitudinal Study Kindergarten Cohort, 1997-2007, Kindergarten, 1st, 3rd, 5th, and 8th Grade Waves

	Model 1		Model 2		Model 3	
	OR	95% CI	OR	95% CI	OR	95% CI
Intercept	2.03	(1.83, 2.24)	0.45	(0.32, 0.65)	0.46	(0.32, 0.65)
Child's age	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)	1.00	(1.00, 1.00)
Child's gender						
(Female)						
Male	0.88	(0.81, 0.96)	0.87	(0.80, 0.94)	0.87	(0.80, 0.95)
Mother's race/ethnicity and nativity						
(Native born non-Hispanic white)						
Native born non-Hispanic black	0.39	(0.34, 0.44)	0.62	(0.54, 0.72)	0.61	(0.53, 0.71)
Native born Hispanic	0.57	(0.48, 0.67)	0.75	(0.64, 0.88)	0.76	(0.64, 0.90)
Foreign born Hispanic, U.S. duration 10 or more years	0.36	(0.30, 0.42)	0.53	(0.45, 0.63)	0.48	(0.40, 0.58)
Foreign born Hispanic, U.S. duration 0-9 years	0.22	(0.18, 0.28)	0.39	(0.32, 0.48)	0.33	(0.26, 0.41)
Child Obese	0.47	(0.43, 0.52)	0.54	(0.49, 0.59)	0.49	(0.44, 0.55)
X Native born non-Hispanic black					1.13	(0.85, 1.49)
X Native born Hispanic					0.98	(0.69, 1.38)
X Foreign born Hispanic, U.S. duration 10 or more years					1.54	(1.11, 2.14)
X Foreign born Hispanic, U.S. duration 0-9 years					2.05	(1.37, 3.08)
Sociodemographic and family characteristics						
Socioeconomic status			1.57	(1.48, 1.67)	1.57	(1.48, 1.66)
Number of siblings			1.01	(0.97, 1.04)	1.01	(0.97, 1.04)
Mother's age			1.01	(1.00, 1.02)	1.01	(1.00, 1.02)
Mother's marital status						
(Single)						
Married			1.18	(1.03, 1.35)	1.17	(1.03, 1.34)
Divorced, separated or widowed			1.00	(0.87, 1.16)	1.01	(0.87, 1.17)
Mother's employment status						
(Mother not employed)						
Works 35 or more hours a week			1.01	(0.93, 1.11)	1.02	(0.93, 1.11)
Works less than 35 hours a week			1.09	(1.00, 1.19)	1.10	(1.00, 1.20)
Food secure			1.45	(1.28, 1.64)	1.45	(1.28, 1.64)

Continued on the next page

Table 3 (cont.). General Linear Mixed Models Predicting Mother Rated Child's Health as Excellent, ECLS-K, 1997-2007, Kindergarten, 1st, 3rd, 5th, and 8th Grade Waves

	Model 1	Model 2	Model 3
Child care			
(Parental only)			
Relative		0.87 (0.80, 0.95)	0.87 (0.80, 0.95)
Non-relative		0.98 (0.87, 1.11)	0.98 (0.87, 1.11)
Center		0.93 (0.84, 1.02)	0.93 (0.85, 1.03)
Other		0.93 (0.74, 1.16)	0.93 (0.74, 1.17)
Child Health			
Activity level		1.32 (1.27, 1.37)	1.31 (1.26, 1.36)
Disabled		0.73 (0.67, 0.79)	0.73 (0.67, 0.79)
Vision difficulty		0.84 (0.76, 0.93)	0.83 (0.75, 0.92)
Birth weight		0.82 (0.69, 0.98)	
Low			0.82 (0.69, 0.97)
(Normal)			
High		1.20 (1.06, 1.37)	1.20 (1.06, 1.37)
Last doctor's visit			
More than 2 years			
Less than 6 months		0.76 (0.62, 0.93)	0.78 (0.63, 0.95)
6 months to 1 year		1.09 (0.89, 1.33)	1.11 (0.90, 1.35)
1 year to 2 years		1.13 (0.91, 1.40)	1.15 (0.93, 1.42)
Premature birth		0.82 (0.73, 0.92)	0.82 (0.73, 0.92)
AIC	48,932.4	48,016.9	48,001.9
BIC	48,998.7	48,237.9	48,252.5

n=40,087

Table 4. Model Fit Statistics for Mother Rated Child's Health as Excellent, Early Childhood Longitudinal Study Kindergarten Cohort, 1997-2007, Kindergarten, 1st, 3rd, 5th, and 8th Grade Waves[1]

	AIC	BIC
Base Model	48,016.9	48,237.9 *
Race/ethnicity and nativity interacted with indicators of child health		
Obesity	48,001.9 *	48,252.5
Activity level	48,020.8	48,271.4
Disabled	48,018.9	48,269.4
Vision difficulty	48,020.6	48,271.1
Birth weight	48,027.9	48,307.9
Premature	48,084.0	48,327.2
Last doctor's visit	48,028.9	48,338.3

* Indicates best fitting model; smaller AIC or BIC indicates better model fit.

[1] All models include the full set of controls: sociodemographic characteristics, family characteristics, and other indicators of child health.

Figure 1. Log Odds Mother Rates Child's Health as Excellent by Mother's Ethnicity/nativity, and Child's Obese Status