



# Determinants of Overweight in Children with Asthma: Chicago Initiative to Raise Asthma Health Equity



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## Abstract

**Rationale:** A growing literature suggests that asthma and overweight status co-occur in US children although the reasons remain unclear. This study explores the relationship of childhood asthma, demographics, and caregiver factors to overweight status in a community sample of children with asthma.

**Methods:** During an in-person cross-sectional interview, 557 caregivers of children with persistent asthma reported demographics, child's asthma morbidity [symptoms (past 2 weeks), hospitalizations, and ED/urgent care visits (both past year)]. Child height and weight were measured and adjusted BMIs > 85<sup>th</sup> percentile were considered overweight. Caregiver factors included Center for Epidemiologic Study Depression Scale, stressful life events (past 6 months), self-perceived general health, and caregiver diagnosis of asthma.

**Results:** Children were 41% female, mean age 10.5 years, 25% Hispanic, 58% African-American/non-Hispanic, and 56% overweight. Caregivers were 94.1% female, mean age 38.3 years. Logistic regression indicated children with asthma were more likely to be overweight if their caregiver reported 1) more stressful life events (OR=1.04, p=.03), 2) worse health status (good vs. excellent/very good OR=1.62, p=.01 and fair/poor vs. excellent/very good OR=2.36, p=.01), 3) and a caregiver without asthma diagnosis (OR=0.66, p=.04). Once controlling for caregiver factors, child's asthma morbidity was not related to overweight status.

**Conclusions:** The context of caregivers lives, not children's asthma morbidity, was associated with having an overweight child. Findings suggest that within an asthma population, childhood overweight may be influenced by caregiver stress, asthma, and perceived health status.

## Background and Objectives

- The relationship between asthma and overweight in children is not understood. Few studies have considered individual factors and socio-ecological factors together.
- What child and caregiver characteristics are associated with asthmatic children being overweight?

## Methods

### Setting and Design:

- Population proportionate sampling Chicago elementary schools to identify household members with asthma
- Cross-sectional survey, face-to-face interview with caregivers of children with asthma

### Inclusion:

- N=557 8-14 year olds with doctor diagnosed asthma requiring medication at least 8 weeks in the past 12 mos
- Caregiver primarily spoke English & agreed interviews over 2 yrs

### Measurements on Caregiver:

- Self report age, income, education, asthma, & general health
- CESD (depression) and CRISYS (life events)

## Methods - Continued

### Measurements on Children:

- Height and weight measured. Children above 85<sup>th</sup> BMI percentile for age and gender considered overweight (OW).
- Age, gender, ethnicity reported by caregiver
- Asthma morbidity (consistent with persistent asthma):
  - >4 symptom days/last 14 (yes/no)
  - >1 symptom night/last 14 (yes/no)
  - >1 exacerbation/last 12 mos (yes/no)

### Analyses:

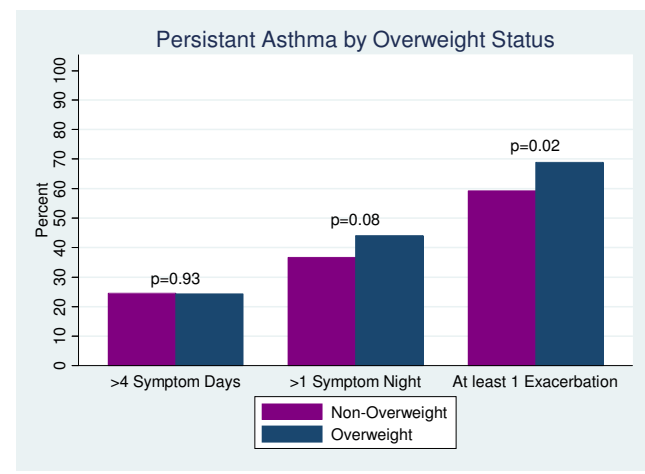
- T-tests, Chi-square analyses
- Multiple logistic regression predicting OW, clustered by school
  - Child & CG characteristics modeled separately, then combined
  - Variables chosen based on theory & only removed to see effect on other variables. All remained in the final model.

## Characteristics of Sample

	Overweight N=313	Non-Overweight N=244	P-value
<b>CHILDREN</b>			
Age (mean)	10.6 (10.4-10.8)	10.5 (10.3-10.8)	0.91
Gender(% male)	58.5 (53.0-64.0)	59.0 (53.0-65.2)	0.90
Ethnicity (%)			
Hispanic	25.6 (20.7-30.4)	25.0 (19.5-30.4)	0.08
AA/non-Hisp	60.4 (54.9-65.8)	53.3 (47.0-59.6)	0.02
White/Other	14.1 (10.2-17.9)	21.7 (16.5-26.9)	*
<b>CAREGIVERS</b>			
Age (mean)	37.7 (36.8-38.5)	38.9 (37.9-40.0)	0.07
Income (%)			
<\$15,000	21.4 (16.8-26.0)	19.7 (14.6-24.7)	*
\$15-\$30,000	28.4 (23.4-33.5)	26.6 (21.1-32.2)	0.94
\$30-\$50,000	19.8 (15.4-24.2)	17.2 (12.4-22.0)	0.84
>\$50,000	30.4 (25.2-35.5)	36.5 (30.4-42.6)	0.26
Education (%)			
<HS	13.4 (9.6-17.2)	12.7 (8.5-16.9)	*
HS/GED grad	70.3 (65.2-75.4)	64.8 (58.7-70.8)	0.92
College Degree	16.3 (12.2-20.4)	22.5 (17.3-27.8)	0.22
Have asthma (%)	35.6 (30.2-40.9)	38.9 (32.8-45.1)	0.42
General Health (%)			
Excellent/Very Good	30.0 (24.9-35.1)	43.4 (37.2-49.7)	*
Good	41.2 (35.7-46.7)	37.7 (31.6-43.8)	0.02
Fair/Poor	28.8 (23.7-33.8)	18.9 (13.9-23.8)	0.001
CES-D (mean)	14.5 (12.1-14.9)	13.5 (12.1-14.9)	0.30
Total # stressors (mean)	9.3 (8.6-10.0)	7.9 (7.2-8.6)	0.004

\* reference category

## Results – Overweight vs. Non



## BIVARIATE RESULTS SUMMARY:

- Overweight children more likely to...**
- have an exacerbation in the last year
  - be African American than White/Other
  - have caregivers with worse general health
  - have caregivers with more life stressors
- ...than non-overweight children (p<0.05).**
- Symptom days & nights did not differ between groups.

## Results – Multivariate

### CHILD MODEL

Controlling for age, gender, day and night symptoms:

- Exacerbation remained significant at p<0.05 level (OR=1.41, 95% CI 1.02-1.97).
- AA continued to differ from White/Other (OR=1.59, 95% CI 1.05-2.41)

### CAREGIVER MODEL

- Caregiver asthma NS until control for general health. CG with asthma less likely have overweight child (OR=0.68, 95% CI: 0.47-0.99)
- Only slight change in caregiver effects after adding child characteristics (see Child & Caregiver Model table for approximate estimates).

## Results – Multivariate Regression

### CHILD AND CAREGIVER MODEL

	Odds Ratio	95% CI	P-value	
<b>CHILDREN</b>				
Symptom days	0.80	0.46-1.35	0.39	
Symptom nights	1.16	0.80-1.70	0.43	
Exacerbation	1.20	0.84-1.69	0.31*	
Age	1.02	0.92-1.12	0.71	
Gender	M v. F	1.01	0.76-1.36	0.92
Race/Ethnicity				
Hispanic v Other	1.25	0.68-2.30	0.46	
AA/non-Hisp v other	1.36	0.84-2.22	0.21*	
<b>CAREGIVERS</b>				
Age	0.99	0.96-1.01	0.27	
Income				
\$15-\$30,000 v <\$15,000	0.88	0.51-1.54	0.66	
\$30-\$50,000 v <\$15,000	1.16	0.63-2.15	0.63	
>\$50,000 v <\$15,000	1.09	0.61-1.95	0.78	
Education				
HS grad v <HS	1.10	0.66-1.84	0.72	
College Degree v <HS	0.92	0.42-2.00	0.82	
Have asthma	0.66	0.45-0.97	0.04**	
General Health				
Good vs Exc/VG	1.62	1.11-2.35	0.01**	
Fair/Poor Hlth Exc/VG	2.36	1.26-4.39	0.01**	
CES-D	0.99	0.97-1.01	0.25	
Total # stressors	1.04	1.00-1.08	0.03**	

\* No longer significant  
\*\* p<0.05

## Conclusions

- Overweight children are more likely to be AA and have exacerbation, controlling for age, gender, and symptom days and nights.
- Once caregiver characteristics were added, child effects went away.
- Children of caregivers with worse general health, more stressors and without asthma were more likely to be overweight.
- Caregiver results remained consistent when controlling for child characteristics.

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