The Influence of Caregiver's Psychosocial Status on Childhood Asthma and Obesity

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I have no existing conflict of information to disclose

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Asthma and Obesity in the United States

- Childhood asthma and obesity are both complex public health problems that have emerged within the past 2 decades in the United States.
  - Asthma rates doubled between 1980 and 1995
  - Obesity* rates tripled between 1980 and 2000

*BMI ≥ 95th percentile adjusted for age and sex

Childhood Asthma Prevalence 1980-1995

TABLE 3. Estimated number of persons with self-reported 12-month or current asthma, by year, sex, race, ethnicity, age, and region — National Health Interview Survey, United States, 1980–2004

Characteristic	12-Month prevalence					Current prevalence			
	1980	1985	1990	1995	2000*	2001	2002	2003	2004
Sex									
Male	3,344,000	3,863,000	4,741,000	6,688,000	NA	8,580,000	8,461,000	8,213,000	8,937,000
Female	3,414,000	4,748,000	5,570,000	8,190,000	NA	11,701,000	11,565,000	11,623,000	11,608,000
Race†									
White	5,795,000	7,425,000	8,544,000	12,199,000	NA	15,868,000	15,458,000	15,175,000	15,855,000
Black	861,000	1,119,000	1,413,000	2,217,000	NA	3,003,000	3,331,000	3,280,000	3,376,000
Other	102,000§	68,000§	353,000	461,000	NA	1,410,000	1,237,000	1,381,000	1,313,000
Race¶									
White	NA	NA	NA	NA	NA	15,663,000	15,210,000	14,976,000	15,636,000
Black	NA	NA	NA	NA	NA	2,915,000	3,261,000	3,187,000	3,233,000
Other races NTA	NA	NA	NA	NA	NA	1,702,000	1,555,000	1,673,000	1,676,000
Ethnicity**									
Hispanic or Latino	426,000	559,000	770,000	1,534,000	NA	2,008,000	1,727,000	2,199,000	2,124,000
Not Hispanic or Latino	6,332,000	8,053,000	9,541,000	13,344,000	NA	18,273,000	18,299,000	17,637,000	18,421,000
Age									
<18 yrs	2,185,000	2,997,000	3,725,000	5,294,000	NA	6,320,000	6,063,000	6,213,000	6,187,000
≥18 yrs	4,574,000	5,615,000	6,586,000	9,583,000	NA	13,961,000	13,963,000	13,623,000	14,358,000
Age group (yrs)									
0–4	369,000	661,000	840,000	1,227,000	NA	1,128,000	1,181,000	1,177,000	1,120,000
5–14	1,496,000	1,720,000	2,270,000	3,215,000	NA	4,033,000	3,743,000	3,859,000	3,701,000
15–34	2,148,000	2,855,000	2,898,000	4,467,000	NA	6,048,000	5,761,000	5,687,000	5,616,000
35–64	1,998,000	2,339,000	3,220,000	4,715,000	NA	7,115,000	7,408,000	7,140,000	7,679,000
≥65	747,000	1,036,000	1,082,000	1,253,000	NA	1,957,000	1,933,000	1,972,000	2,429,000
Region									
Northeast	1,426,000	1,861,000	1,929,000	2,942,000	NA	4,373,000	4,336,000	4,136,000	3,903,000
Midwest	1,503,000	1,924,000	2,651,000	3,399,000	NA	4,988,000	4,897,000	5,288,000	5,206,000

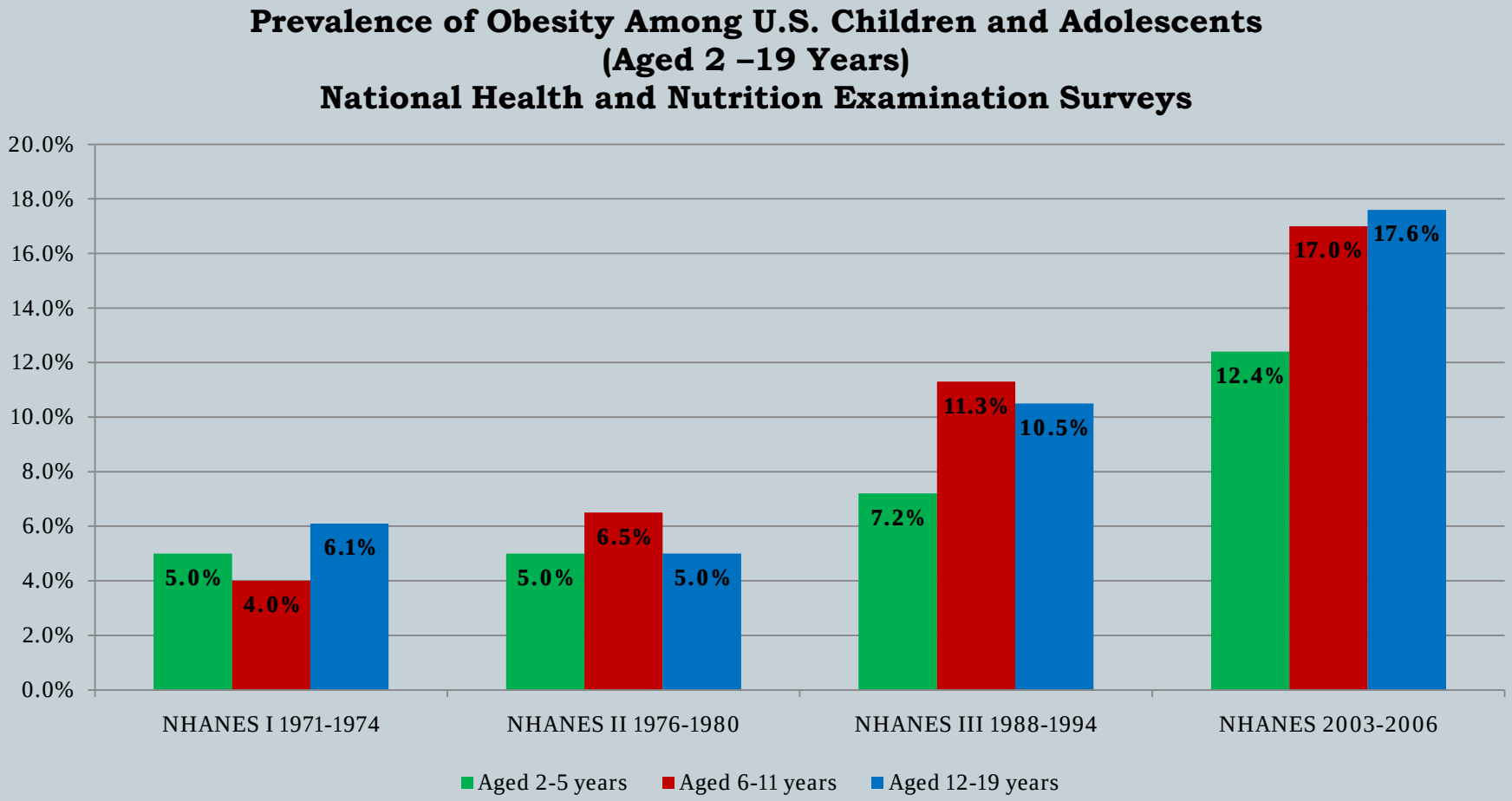
Age	[1980]	[1985]	[1990]	[1995]
<18 yrs	2,185,000	2,997,000	3,725,000	5,294,000

* The estimate is unreliable because the relative standard error of the estimate is 30%–50%. All other relative standard errors are <30%.

† Race categorized according to the 1997 revision of Statistical Policy Directive No. 15, Race and Ethnic Standards for Federal Statistics and Administrative Reporting. Race categories "white" and "black" are comprised of persons who indicated only a single race group. "Other races NTA (not tabulated above)" includes Asian, American Indian and Alaskan Native, Native Hawaiian and Other Pacific Islander, persons reporting more than one race, and persons reporting their race as something other than those listed here or above. It is not possible to apply the 1997 revisions to the race categorizations to years before 1997; therefore, data were not available.

** The 1997 revision of Statistical Policy Directive No. 15, Race and Ethnic Standards for Federal Statistics and Administrative Reporting changed the ethnicity category name from "Hispanic" to "Hispanic or Latino," but the definition of persons in that category remained the same.

Childhood Obesity 1971-2006



http://www.cdc.gov/obesity/childhood/prevalence.html

Children with both Asthma and Obesity

- Increased prevalence over the same time period
- Disproportionately affect racial/ethnic minorities
- Disproportionately affect the economically disadvantaged
- Rates of obesity appear to be higher among children with asthma
- Rates of asthma appear to be higher among children with obesity

1.Lucas SR, Platts-Mills TAE. Paediatric asthma and obesity. *Paediatric Respiratory Reviews*. 2006;7:233-238.

2.Ross KR et al. Obesity and Obesity related co-morbidities in a referral population of children with asthma. *Pediatric Pulmonology*. 2009; 44:877–884 .

3. Romieu I, Mannino DM, Redd SC, McGeehin MA. Dietary intake, physical activity, body mass index, and childhood asthma in the third national health and nutrition survey (NHANES III). *Pediatr Pulmonol* 2004;38:31–42.

4.Gold DR, Damokosh AL, Dockery DW, Berkey CS. Body-mass index as a predictor of incident asthma in a prospective cohort of children. *Pediatr Pulmonol* 2003;36:514–521.

Impact of Overweight on Asthma

- Overweight children with asthma experience more severe symptoms than their normal weight counterparts
  - Increased medication and emergency department use
  - Wheezing
  - More missed school days
  - Longer hospital stays
  - Lower pulmonary function
  - Worse quality of life

1.van Gent R, et al. Quality of life in children with undiagnosed and diagnosed asthma. Eur J Pediatr 2007; 166 (8):843-8.

2.Belamarich PF, et al. Do obese inner-city children with asthma have more symptoms than nonobese children with asthma? Pediatrics 2000; 106 (6):1436-41.

3.Carroll CL, et al. Childhood obesity increases duration of therapy during severe asthma exacerbations. Pediatr Crit Care Med 2006; 7 (6):527-31.

Caregiver Psychosocial Status

- A handful of published research suggests that maternal stress and depression may be associated independently with asthma and with overweight -- an equal number fails to find an association.

1. Surkan PJ, Kawachi I, Peterson KE. Childhood overweight and maternal depressive symptoms. *J Epidemiol Community Health.* 2008;62(5):e11.

2.Shalowitz MU. Advancing analytic methods to understand asthma control and disease morbidity. *Journal of Allergy and Clinical Immunology*. 2008 122(3):496-499.

3.Bartlett SJ, Krishnan JA, Riekert KA, Butz AM, Malveaux FJ, Rand CS. Maternal Depressive Symptoms and Adherence to Therapy in Inner-City Children With Asthma. *Pediatrics.* February 1, 2004 2004;113(2):229-237.

4.Weil CM, Wade SL, Bauman LJ, Lynn H, Mitchell H, Lavigne J. The Relationship Between Psychosocial Factors and Asthma Morbidity in Inner-City Children With Asthma. *Pediatrics.* 1999;104(6):1274-1280.

5.Garasky S et al. Family stressors and child obesity. *Social Science Research. 2009;*38:755–766.

The Question

- In a sample of children with asthma, to what extent do childhood overweight and caregiver psychosocial status contribute to asthma control and asthma severity?

Chicago Initiative to Raise Asthma Health Equity

- Screened 62,005 children in schools 2003-2004
- 561 child/caregiver dyads were recruited
- Eligibility Criteria:
  - Child between 8 and 14 years old
  - Physician or nurse diagnosed asthma
  - Living in Chicago
  - One caregiver fluent in English
  - Child required use of asthma medication for at least 8 weeks of the prior 12 months

CHIRAH
Chicago Initiative to Raise Asthma Health Equity

Variables Collected – Child and Caregiver

- Child Variables
  - Asthma Symptoms
  - Acute asthma exacerbations
  - Interference from asthma
  - Pulmonary function
  - BMI
  - Controller Medication Use
- Caregiver Variables
  - Asthma and smoking
  - Depression symptoms
  - Perceived Stress
  - Asthma specific social support

NAEPP EPR-3 Asthma Outcomes

- Asthma Control ➔ The degree to which the manifestations of asthma are minimized by therapeutic intervention and the goals of asthma therapy are met.

- Asthma Severity ➔ The intrinsic intensity of the disease process. This variable is most easily measured in patients who are not receiving long-term control therapy.

NAEPP/EPR-3 Guidelines Defined Outcome

- Children who took controller medications in the last 14 days were in **control analyses** (degree to which symptoms are minimized by intervention)
  - Well Controlled
  - Not Well Controlled
  - Poorly Controlled
- Other children classified into **severity group** (intrinsic intensity of asthma without control)
  - Intermittent/mild
  - Moderate/severe persistent

Results - Demographics

- Of the 531 child/caregiver dyads…
  - 303 African American
  - 136 Hispanic/Latino
  - 92 Other (84 White, 8 Asian)
- Children
  - Mean Age: 10.6 ± 1.8 years
  - 223 (42%) girls
  - 48% Private Insurance, 49% Medicaid/State, 3% Uninsured
  - 193 (36.4%) Obese (adjusted BMI $\geq 95^{th}$ percentile)

Results – Demographics CONT'D

- Caregivers
  - Mostly female (94%)
  - Mean age: 38.1 ± 8.1 years
  - 20% College graduates, 70% High school graduates, 10% less than high School education
- Sample was largely low income ~50% reported combined household income below $30,000 / year
- 237 included in severity analysis (no controller medication in prior 14 days) while remaining 294 were included in control analysis.

Bivariate Analyses – Control and Severity

- Obese children had significantly higher rates of poorly controlled asthma (p=0.02)
- Hispanic/Latino and African American children had more poorly controlled asthma (p<0.001)
- Well controlled asthma was associated with being older (p=0.003)
- Lower caregiver education and higher depressive symptoms associated with severe asthma (p=0.02 and p=0.006)

Asthma Control – Logistic Regression Models

	Model 1: Child Variables Only		Model 2: Child and Caregiver Variables	
Variable	**OR**	**95% CI**	**OR**	**95% CI**
Child Characteristics				
Obese	1.92	(1.23-3.00)**	1.89	(1.17-3.05)**
Age	0.80	(0.70-0.91)**	0.79	(0.69-0.90)**
Race				
African American-non Hispanic	3.17	(1.68-5.99)**	2.16	(1.05-4.46)*
Caregiver Characteristics				
Perceived Stress Scale			1.09	(1.01-1.18)*

OR=Odds Ratios adjusted for all variables shown; CI= Confidence Interval; * p<.05, ** p<.01. Only significant results shown.

Asthma Severity – Logistic Regression Models

	Model 1: Child Variables Only		Model 2: Child and Caregiver Variables	
Variable	**OR**	**95% CI**	**OR**	**95% CI**
Child Characteristics				
Race				
Hispanic/Latino	2.51	(1.04-6.09)*	1.92	(0.69-5.34)
African American-non Hispanic	2.33	(1.04-5.23)*	1.89	(0.76-4.70)
Caregiver Characteristics				
Want More Asthma Support			2.07	(1.06-4.05)*

OR=Odds Ratios adjusted for all variables shown; CI= Confidence Interval; * p<.05, ** p<.01.

Limitations

- Medication and adherence were not objectively measured
- The asthma specific social support measure has not been psychometrically described.
- Cross-sectional design in a disease that waxes and wanes
- Provides no information on causality

Conclusions

- Childhood asthma outcomes are embedded within the context of a child's environment
- Childhood obesity, caregiver stress, and lack of caregiver social support were all identified as factors aggravating asthma outcomes in children
- There are numerous barriers preventing providers from intervening on these caregiver issues
- Multifaceted action at many social levels will be required to decrease disparities and create significant improvements in childhood asthma care

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