

# The Association of Childhood Asthma With Parental Employment and Welfare Receipt

**LAUREN A. SMITH, MD, MPH**  
**JULIET L. HATCHER, MSPH**  
**RICHARD WERTHEIMER, PHD**

**Objective:** to assess the association of childhood asthma with parental employment and welfare receipt, which has not been studied.

**Method:** We analyzed cross-sectional data on 13 371 children younger than 18 from the 1997 National Health Interview Survey, a nationally representative stratified probability sample of the US noninstitutionalized population. Single-parent (n=3907) and 2-parent families (n=9464) were analyzed separately. Families with children younger than 6 and families with incomes below the federal poverty level (FPL) were also analyzed separately. The main outcome measures were full-time parental employment and welfare receipt.

**Results:** Compared to single parents of nonasthmatic children younger than 6, single parents of young children with asthma were more likely to be employed less than full time (adjusted odds ratio [OR] 2.1, 95% confidence interval [CI], 1.4-3.2). This relationship was also evident among single-parent families with incomes below FPL (adjusted OR 2.8, 95% CI, 1.2-6.5). Parental employment among 2-parent families with young children was similar regardless of child's asthma status. Two-parent families with young asthmatic children were more likely to have received welfare for at least 1 parent (adjusted OR 2.6, 95% CI, 1.5-4.6). Single-parent families of asthmatic children were also more likely to have received welfare (adjusted OR 1.4, 95% CI, 1.1-1.7).

**Conclusion:** Children's asthma is associated with reduced parental employment among single parents and increased welfare receipt among single- and 2-parent families. These associations with children's asthma may have implications for policy makers interested in increasing employment and decreasing welfare use. (*JAMWA*. 2002;57:11-15)

Asthma is recognized as one of the most prevalent chronic childhood illnesses, resulting in substantial morbidity.<sup>1-3</sup> Studies of the societal impact of childhood asthma have generally focused on health care costs or child functioning<sup>2,4,5</sup> and have only minimally explored its relationship to parental employment.<sup>6</sup> Given the amount of parental time invested in caring for asthmatic children,<sup>7-9</sup> it might be expected that children's asthma could interfere with full-time parental employment, especially among poor families who are less likely to have flexible work hours or sick leave.<sup>10</sup> Because of the possible effect on employment, children's asthma might also increase welfare receipt. It is important to explore the relationship of children's asthma and parental employment because the recent welfare legislation emphasized moving welfare recipients into employment, and child health is often cited by recipients as a barrier to employment.<sup>11-14</sup> To consider these questions, we conducted a cross-sectional analysis of the relationship between children's asthma, parental employment, and welfare receipt using data from the 1997 National Health Interview Study (NHIS).<sup>15</sup>

## Methods

**Data Source.** The NHIS is an annual survey of the civilian, noninstitutionalized population conducted by the US Bureau of the Census for the National Center for Health Statistics (NCHS) to

collect data on the US population's health.<sup>15</sup> In the 1997 NHIS, detailed health information was collected for a sample child randomly selected from each of the 14 290 households with children younger than 18, 1615 of whom had been diagnosed with asthma. NCHS assigned weights to account for nonresponse and sampling design and to allow for calculation of nationally representative estimates. Single-parent and 2-parent families were categorized by the number of adults living with the index child and included biological, adoptive, foster, or stepparents.

**Statistical Analyses.** The primary predictor variable was a sample child's diagnosis of asthma, defined as having ever been diagnosed with asthma by a doctor or other health professional. The primary outcome variables were full-time parental employment and welfare receipt. Full-time employment was defined as 1 parent (single-parent families) or both parents (2-parent families) working 35 or more hours in the prior week. Welfare receipt was defined as at least 1 parent receiving income from Aid to Families with Dependent Children or general assistance in the prior year. Because caring for young children imposes different demands on parents, families with children younger than 6 were analyzed separately. Respondents younger than 18 were not asked about their work hours, so the present analyses were limited to families with parents 18 years old or older at the time of the interview. Analyses were carried out separately for single- and 2-parent families and were limited to those families with at least 1 parent present and with complete information for all relevant variables (n=3907 single-parent families and 9464 2-parent families).

Bivariate analyses and multiple logistic regression were performed using SUDAAN software to account for the complex sampling design and weighting scheme of NHIS.<sup>16</sup> Factors that could potentially confound the relationship between

Dr. Smith is an assistant professor in the Department of Pediatrics of Boston University School of Medicine, and Ms. Hatcher is a research analyst and Dr. Wertheimer is a senior research associate, both at Child Trends, Inc, in Washington, DC.

**Table 1. Demographic Characteristics of Single- and Two-Parent Families of Asthmatic and Nonasthmatic Children\***

	Single-Parent Families (n=3907)			Two-Parent Families (n=9464)		
	Asthmatic (n=525)	Non- asthmatic (n=3382)	P Value	Asthmatic (n=1001)	Non- asthmatic (n=8463)	P Value
Parent(s) employed less than full-time, %	53.9	49.8	.13	64.8 <sup>†</sup>	64.6 <sup>†</sup>	.95
Welfare receipt in past year, %	28.8	23.4	.02	3.7	2.8	.23
Race/ethnicity, %			.005			.64
Non-Hispanic white	46.7	46.6		73.2	72.9	
Non-Hispanic black	37.9	32.3		8.3	7.8	
Hispanic	12.8	17.7		13.0	14.3	
Other	2.6	3.4		5.4	5.1	
Number of older minor children, %			.08			.07
0	77.2	73.6		73.1	69.2	
1	16.7	16.0		18.3	20.2	
2 or more	6.2	10.4		8.6	10.6	
Family income, % <sup>‡</sup>						
Less than FPL	47.4	42.2	.16	10.2	11.4	.35
Parent education <12 years, %	28.2	26.0	.46	Mother: 13.0 Father: 14.5	Mother: 14.9 Father: 16.0	.13 .23
Parent birthplace – United States, %	91.4	86.4	<.001	Mother: 87.9 Father: 85.5	Mother: 83.0 Father: 82.7	<.001 .03
Female single parent, %	92.5	90.2	.110	...	...	
Parent age, mean	35.0	34.5	.25	Mother: 37.2 Father: 39.9	Mother: 35.9 Father: 38.5	<.001 <.001
Child age, mean	9.2	8.7	.07	10.0	8.1	<.001

\*Data source: National Center for Health Statistics (1997).

<sup>†</sup>One or both parents worked less than full time.

<sup>‡</sup>Because of missing values, the distribution of family income listed here is based on 3289 single-parent families and 8147 2-parent families. Families with missing values for income were not excluded from the remainder of the table. These families accounted for 15.8% (unweighted) of the single-parent families and 13.9% (unweighted) of the 2-parent families in this table. FPL indicates federal poverty level.

child's asthma and parental employment or welfare receipt were included in the multivariate models based on a review of the literature.<sup>17-23</sup> These models controlled for race-ethnicity (non-Hispanic white, non-Hispanic black, Hispanic, other); number of older minor children in the family (0, 1, 2, 3 or more); sample child age (0-5, 6-11, 12-17 years); parental age (18-22, 23-27, 28-54, 55 or older); parental education (less than high school diploma, high school diploma/GED, associate's degree, bachelor's degree or higher); and parental birthplace (US, non-US). Models of single-parent families adjusted for the gender of the parent and those for 2-parent families included parental variables for both mother and father. Each variable in the model was evaluated for important confounding of the asthma-outcome relationship (10%

or greater change in the estimated odds ratios [OR]) and for a significant relationship with the outcome ( $p < .05$ ). Variables indicating residence in a metropolitan statistical area (MSA) and low-birthweight status of the sample child were excluded because they were neither important confounders nor predictors of the outcome. All models were run both with and without an interaction term between asthma and sample child age, allowing calculation of age-specific estimates as well as summary estimates across age groups. This study was approved by the Institutional Review Board of Boston University School of Medicine.

### Results

**Demographics.** Demographic characteristics of the sample population are shown in Table 1. Of the 13 371 children, 1526

had been diagnosed with asthma by a health professional. Single-parent families were more likely than 2-parent families to include a sample child diagnosed with asthma (13.7% v 10.8%). Race/ethnicity, parental birthplace, and welfare receipt differed significantly ( $p < .05$ ) between those with and without asthmatic children among single-parent families. Parental birthplace, mean parental age, and child age were significantly different between 2-parent families with and without asthmatic children.

**Parental Employment.** Bivariate analyses suggest that the association of child's asthma with parental employment differs by family composition and age of the child (Table 2). When all minor children were considered, single- and 2-parent families showed similar employment rates regardless of child's asthma

status. However, single parents of young children with asthma were more likely to be employed less than full-time than were parents of young children without asthma (75.1 % v 58.4%). In contrast, the employment rates among 2-parent families with young children did not differ by child's asthma status.

Multivariate analyses were performed to adjust for potentially confounding factors that might influence employment and welfare receipt (Table 2). Gender, age, and education of the parent and age of the child were found to be significant predictors of employment for single-parent families. After controlling for these and other potentially confounding factors, there was still a strong and significant association between asthma among young children and less than full-time employment among single parents (adjusted OR, 2.1, 95% confidence interval [CI], 1.4-3.2). There was no association between child's asthma and parental employment before or after controlling for potential confounding factors for 2-parent families.

To determine if the association of child's asthma with less than full-time employment was present for single-parent families with incomes below the federal poverty level (FPL) or who had received welfare, subgroup analyses were performed. As with single parents overall, poor single parents of young children with asthma were more likely to be less than fully employed than were parents of nonasthmatic children (adjusted OR 2.8, 95% CI, 1.2-6.5). The adjusted OR for single-parent families receiving welfare and with young children were similar in magnitude to those calculated for families regardless of welfare status (adjusted OR 2.3, 95% CI, 0.7-7.7), but the results did not reach statistical significance.

Unadjusted OR for 2-parent families with young children indicated no significant associations between child's asthma and employment for families below the FPL (unadjusted OR 1.4, 95% CI, 0.3-6.7) or for families receiving welfare (unadjusted OR 1.6, 95% CI, 0.3-9.5).

#### **Child's Asthma and Welfare Use.**

After adjusting for demographic factors, welfare receipt was associated with child's asthma for both single- (adjusted OR 1.4, 95% CI, 1.1-1.7) and 2-parent

**Table 2. Less than Full Time Employment of Parents of Children With and Without Asthma, by Family Composition, Child Age, Poverty Status, and Welfare Receipt\***

	<b>Employed Less than Full Time, %</b>	<b>Crude OR (95% CI)</b>	<b>Adjusted OR (95% CI)<sup>†</sup></b>	<b>P Value</b>
<b>All parents</b>				
Children, age 0-17 years				
Single parents				
Child w/ asthma	53.9	1.2 (1.0-1.5)	1.2 (1.0-1.5)	.07
Child w/o asthma	49.8			
Two parents <sup>‡</sup>				
Child w/ asthma	64.8	1.0 (0.9-1.2)	1.1 (0.9-1.3)	.18
Child w/o asthma	64.6			
Children, age 0-5 years				
Single parents				
Child w/ asthma	75.1	2.1 (1.4-3.2)	2.1 (1.4-3.2)	<.001
Child w/o asthma	58.4			
Two parents <sup>‡</sup>				
Child w/ asthma	70.8	1.0 (0.7-1.4)	1.0 (0.7-1.5)	.91
Child w/o asthma	71.0			
<b>Families below poverty</b>				
Children, age 0-17 years				
Single parents				
Child w/ asthma	80.6	1.5 (0.9-2.5)	1.5 (0.9-2.4)	.14
Child w/o asthma	73.1			
Children, age 0-5 years				
Single parents				
Child w/ asthma	90.3	2.9 (1.2-7.0)	2.8 (1.2-6.5)	.02
Child w/o asthma	76.2			
<b>Welfare recipients</b>				
Children, age 0-17 years				
Single parents				
Child w/ asthma	90.1	1.5 (0.7-2.8)	1.4 (0.7-2.6)	.36
Child w/o asthma	86.2			
Children, age 0-5 years				
Single parents				
Child w/ asthma	94.1	2.5 (0.8-7.9)	2.3 (0.7-7.7)	.17
Child w/o asthma	86.4			

\*Data source: National Center for Health Statistics (1997). Sample child families without at least one resident parent (n=487) and with parents under age 18 (n=36) were excluded. Families with missing values for one or more relevant variables (n=396) were excluded from those analyses for which they had incomplete information.

<sup>†</sup>Adjusted for race/ethnicity, number of older children, parental age, parental education, parental birthplace, and child age. Models for single-parent families also adjusted for parental gender.

<sup>‡</sup>One or both parents worked less than full time.

families of all children and, especially, of young children (adjusted OR 2.6, 95% CI, 1.5-4.6) (Table 3). Given the possibility of an association between parent's and child's asthma due to hereditary factors, shared environment, or chance,<sup>24,25</sup> we analyzed whether parent's asthma confounded the relationships between child's asthma and parental employment or welfare receipt. Parental limitation in activity due to a respiratory illness was

identified as a proxy for significant parental asthma and was associated with less than full-time employment for single- and 2-parent families. Its addition to the model did not change either the magnitude or the significance of the associations between child's asthma and parental employment. Respiratory limitation was not a significant predictor of welfare use and did not change the adjusted OR presented above.

**Table 3. Welfare Receipt Among Single- and Two-Parent Families With Children With and Without Asthma, by Family Composition and Child's Age\***

	<u>Welfare Receipt, %</u>	<u>Crude OR (95% CI)</u>	<u>Adjusted OR (95% CI)<sup>†</sup></u>	<u>P Value</u>
Children, age 0-17 years				
Single parents				
Child w/ asthma	28.8	1.3 (1.1-1.7)	1.4 (1.1-1.7)	.015
Child w/o asthma	23.4			
Two parents <sup>‡</sup>				
Child w/ asthma	3.7	1.3 (0.9-2.0)	1.5 (1.0-2.3)	.03
Child w/o asthma	2.8			
Children, age 0-5 years				
Single parents				
Child w/ asthma	43.9	1.7 (1.1-2.6)	1.5 (0.9-2.5)	.11
Child w/o asthma	31.5			
Two parents <sup>‡</sup>				
Child w/ asthma	10.0	2.7 (1.5-4.7)	2.6 (1.5-4.6)	<.001
Child w/o asthma	4.0			

\*Data source: National Center for Health Statistics (1997).

<sup>†</sup>Adjusted for race/ethnicity, number of older children, parental age, parental education, parental birthplace, and child age. Models for single-parent families also adjusted for parental gender.

<sup>‡</sup>One or both parents received welfare benefits in prior year.

## Discussion

Our analysis indicates that asthma in young children is associated with decreased likelihood of full-time parental employment and increased welfare receipt. Not surprisingly, overall rates of full-time employment and welfare use varied considerably based on family composition. Yet, having a child with asthma was associated with increased welfare use for both single- and 2-parent families. These results are consistent with studies in which parents report that a child's chronic illness poses a barrier to parental employment.<sup>14</sup> This is the first analysis that links a specific childhood illness with actual parental employment to our knowledge.

The strong association between parental employment and asthma in young children suggests that there is something unique about caring for a young child with asthma. Parents of young children are more likely to be responsible for all of the outpatient management of the disease,<sup>7-9</sup> which may interfere with consistent employment. Older children may be more capable of managing their own medications. The association of child's asthma and less than full-time employment among single parents of young children highlights the importance of child care that can accommodate children

requiring medications, if parents of young children with asthma or other chronic health conditions are expected to work. These findings are particularly important for low-income families because childhood asthma is disproportionately concentrated among such families and they are less likely to find employment that offers sick or flexible leave to care for a sick child.<sup>10,20</sup> Additional studies should also investigate the relationship between parental employment and other chronic childhood conditions, including multiple conditions, to assess the true impact of the observed association.

This study has 3 important methodological limitations. First, we cannot conclude that there is a causal relationship between children's asthma and parental employment or welfare use because of the cross-sectional design of the study. Although we have hypothesized that the interference of children's asthma with parental employment explains our findings, it is possible that unemployment results in children's asthma through increased risk of poverty and associated exposures. However, this would not explain the persistent association of children's asthma and employment regardless of income. Second, although we attempted to control for

parents' asthma, because our proxy measure (activity limitation due to a respiratory illness) was imprecise, it is possible that parents' asthma still confounds the association between children's asthma and employment. However, this would not explain the stronger association among young children's parents, who are not more likely to have asthma than parents of older children. Third, because several comparisons were made, it is possible that some associations were statistically significant based on chance alone; however, only 2 independent hypotheses were tested for each family structure, so this is likely not a major concern.

These results do not reflect the effects of welfare reform, because the data were collected before full implementation. Policy makers focusing on the 2002 reauthorization of the welfare legislation need to consider that welfare recipients with chronically ill children will face challenges in complying with welfare reform's work requirements and so may be more vulnerable to sanctions or benefit terminations for noncompliance. Some states offer work exemptions and time limit extensions based on parental or family member disability,<sup>26</sup> but recent work indicates that parental knowledge and use of these provisions are limited.<sup>27</sup> Although these data cannot address whether it is more beneficial to families of children with asthma for the parents to work or stay at home, they do suggest the importance of further exploration of the relationship between chronic childhood illnesses and parental employment and welfare use. State and federal policy makers need such data to create reasonable employment and welfare policies for families of chronically ill children. ■

The authors would like to thank Howard Bauchner, MD; Kristin Moore, PhD; Paul H. Wise, MD, MPH; and Barry Zuckerman, MD, for their helpful review of the manuscript. We also thank Suzann Eshleman, MA, for programming assistance and Michelle C. Villarta, MA, and Heather Smith for assistance in preparing the manuscript. This study was supported by the National Institute of Allergy and Infectious Diseases, National Institutes of Health (grant # 3 UO1 AI39769-03S1) and the Joel and Barbara Alpert Endowment for the Children of the City. The opinions expressed are those of the authors and do not necessarily reflect those of the funding agencies or the National



Center for Health Statistics, which is the source for the initial data.

## References

- Centers for Disease Control and Prevention. Surveillance for asthma—United States 1960-1995. *MMWR*. 1998;47:1-28.
- Halfon N, Newacheck PW. Childhood asthma and poverty: Differential impacts and utilization of health services. *Pediatrics*. 1993;91:56-61.
- Weiss KB, Wagener DK. Changing patterns of asthma mortality: Identifying target populations at risk. *JAMA*. 1990;264:1683-1687.
- Newacheck PW, Halfon N. Prevalence, impact, and trends in childhood disability due to asthma. *Arch Pediatr Adolesc Med*. 2000;154:287-293.
- Weitzman M, Gortmaker S, Sobol AM, Perrin JM. Recent trends in the prevalence and severity of childhood asthma. *JAMA*. 1992;268:2673-2677.
- Diette GB, Markson L, Skinner EA, Nguyen TTH, Algatt-Bergstrom P, Wu AW. Nocturnal asthma in children affects school attendance, school performance, and parents' work attendance. *Arch Pediatr Adolesc Med*. 2000;154:923-928.
- Gibson NA, Ferguson AE, Aitchison TC, Paton JY. Compliance with inhaled asthma medication in preschool children. *Thorax*. 1995;50:1274-1279.
- Ferguson AE, Gibson NA, Aitchison TC, Paton JY. Measured bronchodilator use in preschool children with asthma. *BMJ*. 1995;310:1161-1164.
- Leickly FE, Wade SL, Crain E, Kruszon-Moran D, Wright EC, Evans RI. Self-reported adherence, management behavior, and barriers to care after an emergency department visit by inner city children with asthma. *Pediatrics*. 1998;101:917-918.
- Heymann SJ, Earle A, Egleston B. Parental availability for the care of sick children. *Pediatrics*. 1996;98:226-230.
- Temporary Assistance for Needy Families Program (TANF); Final Rule*. Washington, DC: US Department of Health and Human Services, Administration for Children and Families; 1999.
- Tracking Recipients After They Leave Welfare: Summaries of State Follow-up Studies*. Washington, DC: National Governors' Association, National Conference of State Legislatures, American Public Welfare Association; 1998.
- Olson K, Pavetti L. *Personal and Family Challenges to the Successful Transition from Welfare to Work*. Washington, DC: The Urban Institute; 1997.
- Danziger S, Corcoran M, Danziger S, et al. Barriers to work among welfare recipients. *Focus*. 1999;20:31-35.
- National Center for Health Statistics. *Data File Documentation, National Health Interview Survey, 1997 (machine readable data file and documentation)*. Hyattsville, Md: National Center for Health Statistics; 2000.
- Shah BV, Barnwell BG, Bieler GS. *Sudaan User's Manual. Release 7.5*. Research Triangle Park, NC: Research Triangle Institute; 1997.
- Costa DL. From mill town to board room: The rise of women's paid labor. *J Econ Perspect*. 2000;14:101-122.
- Killingsworth MR. Female labor supply: A survey. In: Ashenfelter O, Layard R, eds. *Handbook of Labor Economics*. Amsterdam: North-Holland; 1986:103-204.
- Pancavel J. Labor supply of men. In: Ashenfelter O, Layard R, eds. *Handbook of Labor Economics*. Amsterdam: North-Holland; 1986:3-102.
- Weitzman M, Gortmaker S, Sobol A. Racial, social, and environmental risks for childhood asthma. *Am J Dis Child*. 1990;144:1189-1194.
- Miller JE. The effects of race/ethnicity and income on early childhood asthma prevalence and health care use. *Am J Public Health*. 2000;90:428-430.
- Aligne CA, Auinger P, Byrd RS, Weitzman M. Risk factors for pediatric asthma: Contributions of poverty, race, and urban residence. *Am J Respir Crit Care Med*. 2000;162:873-877.
- Ball TM, Castro-Rodriguez JA, Griffith KA, Holberg CJ, Martinez FD, Wright AL. Siblings, day-care attendance, and the risk of asthma and wheezing during childhood. *N Engl J Med*. 2000;343:538-543.
- Young S, Souef PN, Geelhoed GC, Stick SM, Turner KJ, Landau LI. The influence of a family history of asthma and parental smoking on airway responsiveness in early pregnancy. *N Engl J Med*. 1991;324:1168-1173.
- Sherman CB, Tosteson TD, Tager IB, Speizer FE, Weiss ST. Early childhood predictors of asthma. *Am J Epidemiol*. 1990;132:83-95.
- TANF: Selected Provisions of State Plans*. Washington, DC: Administration for Children and Families, US Department of Health and Human Services; 1999.
- Smith LA, Wise PH, Wampler N. Knowledge of welfare reform program provisions among families of chronically ill children. *Am J Public Health*. In press.