

Mar 31st, 11:30 AM - 12:45 PM

The Influence of Neighborhood Characteristics on the Existence of Asthma in Children

Elizabeth Adejuyigbe

University of New Hampshire - Main Campus

Follow this and additional works at: <http://digitalcommons.providence.edu/auchs>

 Part of the [Community Health Commons](#), [Demography, Population, and Ecology Commons](#), [Environmental Public Health Commons](#), [Medicine and Health Commons](#), [Place and Environment Commons](#), and the [Respiratory Tract Diseases Commons](#)

Adejuyigbe, Elizabeth, "The Influence of Neighborhood Characteristics on the Existence of Asthma in Children" (2012). *Annual Undergraduate Conference on Health and Society*. 2.

<http://digitalcommons.providence.edu/auchs/2012/panelb2/2>

This Event is brought to you for free and open access by the Conferences & Events at DigitalCommons@Providence. It has been accepted for inclusion in Annual Undergraduate Conference on Health and Society by an authorized administrator of DigitalCommons@Providence. For more information, please contact mcaprio1@providence.edu, hposey@providence.edu.

The Influence of Neighborhood Characteristics on the Existence of Asthma in Children

By: Elizabeth Adejuyigbe

Faculty Mentor: Dr. Robert McGrath

University of New Hampshire
Department of Health Management and Policy
3/29/2012

The Influence of Neighborhood Characteristics on the Existence of Asthma in Children

Chronic illnesses in children are a growing health care burden in the United States. With about 15 to 18 percent of U.S. children living with chronic illnesses (Barlow and D.R), asthma remains the most common chronic pediatric illness, affecting more than 7.1 million children under 18 in 2010 (Asthma). Asthma has become much more common in recent decades in the United States with more than 8.5% of children diagnosed with asthma in 2009, which is over a 100% increase from past decades (Asthma in Children). Hospitalization from asthma is also a serious concern since it is the third leading cause of hospitalization among children under the age of 15 (Akinbami). The need to reduce the prevalence of asthma is important not only because of its growth among the population, but because it can also be a life-threatening disease and reported deaths due to asthma have been increasing over the past couple of years (Wright and S.V)

Chronic diseases have further been shown to affect the psychosocial well-being of children. The combination of the presence of physical symptoms and the need for disease management routine, are likely to interfere with many aspects of daily of the children (Barlow and D.R). It is the leading cause of absenteeism from school in children and this could be attributed to the need for regular treatments, illness flares and or hospitalizations (Barlow and D.R). Due to this absenteeism, education can be disrupted, and children physically and psychologically begin to detract from their peers and this can result in feelings of isolation and having to struggle to continue with schoolwork (Barlow and D.R). There are varied factors that contribute to disparities in the health children. Generally, health has been characterized as being influenced by four factors; individual characteristics (genetics), socio-demographic characteristics (race, age), socio-economic factors (income, education, employment), and environmental characteristics (pollution) (Hines).

Evidence further suggests that the presence of certain socio-economic factors including poverty, unemployment, underemployment, limited social capital substandard housing, and high crime or violence exposure rates can lead to chronic stress regardless of the individual's personal risk factors (Wright and S.V). While studies these associations are known, what is less clear is the role of socio-cultural factors, specifically the role of neighborhood characteristics on health. Literature confirms that housing conditions, and the environmental exposures that come along them, are strongly related to the economic status of those who live there (Wright and S.V). According to a study that showed a positive correlation between SES and the characteristics of the neighborhood, socioeconomic health inequalities are an issue in the United States (Beard, Cerda and Blaney). Previous studies on health and the social environment have focused more on social inequality in exposure. Additionally, research has found that the relationship between low SES neighborhood's and health does not simply result from exposure to increased levels of neighborhood stressors, but that higher neighborhood exert a protective effect from these stressors and this in turn decreases their susceptibility to diseases (Beard, Cerda and Blaney).

In the United States, associations between SES and asthma prevalence, morbidity, and mortality are known, but data shows significant disparities in individuals with asthma based on geographic differences among cities and even neighborhoods within cities (Wright and S.V, 3). A study in the urban city of Chicago was conducted to determine the effect of positive socio-environmental community factors on childhood asthma prevalence using positive community factors, such as social capital, economic potential, and community amenities (Gupta, Zhang and Sharp). In this study, it was discovered that asthma prevalence was significantly lower in areas with socio-environmental factors like libraries, churches, that are believed to enrich a community (Gupta, Zhang and Sharp). A cause of these differences in health factors might be that some neighborhoods within these cities are socially harmful which in turn, relate to increased experience of psychosocial stress and increased susceptibility that could asthma morbidity (Wright and S.V, 1).

The difference in the rate of asthma prevalence by geographic location is also compounded by minority status. The areas with higher prevalence of asthma are composed of a large proportion of minority or low-income residents (Valet, Perry and TV). This burden is more prevalent in children from urban and low socioeconomic neighborhoods and according to research, African American children are more likely to live in these neighborhoods (Hines). According to CDC estimates, chronic illnesses are higher among minority children than in Caucasian populations with eight percent in comparison to five percent respectively (Asthma). The prevalence, and hospital and emergency room use related to asthma is higher in African American children (Miller, 2)

Other factors that can indirectly affect a person's susceptibility to asthma need to be considered. As stated earlier, there is a link between neighborhood characteristics and well-being and in turn, physical health. According to a previous study by Wright, violence exposure is related to asthma morbidity (Wright and S.V, 8). This doesn't mean just by being exposed to violence you are more susceptible to asthma, rather it means that living in a community with a clear social disadvantage like this influences psychosocial conditions that do get into the body and increase the degree of chronic stress (Wright and S.V). This correlation is based on the notion that neighborhoods without collective efficacy, result in exposure to violence that leads to psychological stress, which in turn leads to psychological disruption and increased host susceptibility. Like a domino effect, the combination of these results in an individual's development of asthma (Wright and S.V) Other community-level environmental factors like collective efficacy, community structural factors, and neighborhood safety can affect a persons' psychosocial wellbeing, and in turn increase morbidity. There has been extensive research into the proximate risk factors for asthma but still asthma remains a major burden in the United States especially in children (Wright and S.V, 10). These previous findings have led to assumptions that risk factors are randomly distributed across communities while in fact, there have been observed wide geographic and socio-demographic variation in the expression of asthma (Wright

and S.V). Given this, a multi-level approach to identifying risk factors of asthma other than proximate genetic and environmental factors is needed. Since asthma is a leading chronic illness especially in children (Asthma: The Young and the Breathless), knowledge of its cause from a perspective that is dissected from the individual and sociocultural perspective as discussed earlier, is critical as these neighborhood features can be modified.

METHODS

This paper seeks to understand the role of neighborhood characteristics and their influence on the presence of asthma using data from the 2006-2007 National Survey of Children's Health. This survey asks questions about 11 topics pertaining to the overall well-being of a child, including neighborhood characteristics, health and functional status, and demographic characteristics. Answers to these surveys were retrieved from random-digit sampling of 1700 households with children. The NSCH used random-digit-dialing methods to gather information on children under the age of 18. Researchers attempted to sample approximately 1700 households in each of the 50 states and the District of Columbia, and a total of 91,642 surveys were completed. One child 0-17 years of age who was randomly selected from all children in each household and a parent or guardian (herein parents) who knew about the child's health and health care were surveyed about that child's health and health care experiences.

Variables

1) Outcome Variable

The outcome variable used was whether a child has or has ever had asthma. Parents were asked: "has a doctor or other health care provider ever told you that the selected child has asthma?" If a parent reported that their child was ever diagnosed with asthma, they were then asked, "Does the child have asthma now?" Children whose parents answered 'yes' to both questions were classified as having asthma.

2) Predictor Variables

The predictor variables included neighborhood characteristics created by the NSCH. The NSCH examines four types of neighborhood characteristics: neighborhood amenities, neighborhood condition, neighborhood support, and perceived safety. Neighborhood amenities were defined by how many “important” neighborhood characteristics the child’s neighborhood has. The survey asked if the neighborhood in which each child lived had sidewalks, a park and/or playground, a recreation center or a library. Neighborhood condition was determined by the amount of detracting elements the neighborhood has. It asked if the neighborhood in which the child lived in had any litter on the streets, rundown housing, vandalism; broken windows/graffiti. Neighborhood support was determined if the child lived in a “neighborhood where people help each other out, a neighborhood where people watch out for each other's children, a neighborhood where there are people that parents can count on, and also a neighborhood where there are other trustworthy adults”. In regards to perceived safety, the parents were asked about their perception of safety in the community and how often they felt safe in their community.

Controls

Variables were included to control for socio-demographic and socio-economic factors such as age, race, gender, income relative to the poverty level, the highest level of parental education and the child’s level of comorbidities, or the number of other chronic conditions the child has.

ANALYSIS

This analysis utilized Stata 11. Only children who had all the information for our variables of interest (child has asthma) were included; Data were weighted to compensate for the complex sampling of the survey. Some components of the predictor variables were combined together in order to make coding easier, and have a more precise analysis. Bivariate analyses were conducted between the outcome variable, (whether or not a child had asthma), and both the predictor variables and controls. Multi-

variate analysis was then conducted using logistic regression on all the predictor and control variables on the outcome variable. Statistical significance is reported for differences and Odds Ratios with $P < .05$.

In order for the results to be more accurate, the likelihood that one of the predictor variables would influence the others had to be reduced. For this reason, the multi-variate regression analysis consisted of six different models. Model 1 consisted of all the control variables, excluding one category in each that had more than one category. Model 2 was conducted using all the variables in Model 1 and all but one category in the support variable. Model 3 was made up of all the variables in Model 1, and one of the categories of the safety variable. Model 4 included all the variables from Model 1 and one of the categories of the amenities variable. In Model 5, all the variables in Model 1 and one of the categories of the detracting variable were included. The last model, Model 6 was composed of all the control factors in Model 1, and both support and detracting elements variables. Although these variables had already been tested, as will be discussed later, these were the only two variables that showed a significant effect on the outcome variable, whether a child has asthma. Analyzing both of them in a sixth model would provide a more reliable result as it takes into account the relative effect that each of these variables have.

RESULTS

Table 1: Univariate Subpopulation Analysis

OUTCOME	Percentage N=86,543
Does the child currently have asthma	
No	90.91
Yes	9.09
PREDICTORS	
Supportive neighborhoods	
Do not live in supportive neighborhoods	16.43
Live in supportive neighborhoods	83.57
Neighborhood Safety	
Never/ Sometimes Safe	13.57
Usually/Always Safe	86.43
Neighborhood amenities	
Fewer than 3 amenities	37.11
3 amenities	25.08
4 amenities	48.25
Detracting neighborhood elements	
At least 1	28.6
No detracting element	71.4
CONTROLS	
Race	
Hispanic	19.47
White non-Hispanic	57.39
Black non-Hispanic	14.14
Multi-racial	9.01
Highest Level of Parental Education in Household	
Less than high school	8.68
12 years, high school graduate	23.16
More than High School	68.16
Gender	
Male	51.15
Female	48.85
Other Chronic Conditions	
No other condition	83.66
One or more other condition	16.34
Age	
Mean Age	8.63

Table 1 above is a descriptive overview of the sample used in this study. The weighted analysis of the entire subpopulation reveal that and estimated 9.09% (7,867) of children in the United States had

asthma. Of these children, 16.43% did not live in supportive neighborhoods and more than one-third of these children live in neighborhoods with fewer than three of the amenities asked in the survey. Out of the sample, 24,751 children lived in a neighborhood with at least one of the detracting neighborhood elements that is shown to relate to poor health status. In regards to the control variables, the results reveal that there were more males than females, and that most of the children were white and non-Hispanic. The mean age of the children was 8.63. Relative to chronic conditions, 83.66% of children did not have any other chronic condition.

Table 2: Bivariate Subpopulation Analysis

	Asthma	
	No N= 78,676	Yes N =7867
Supportive neighborhoods***		
Do not live in supportive neighborhoods	15.91	21.62
Live in supportive neighborhoods	84.09	78.38
Neighborhood Safety***		
Never/ Sometimes Safe	13.22	17.05
Usually/Always Safe	86.78	82.95
Neighborhood amenities		
Fewer than 3 amenities	26.83	25.02
3 amenities	25.1	24.86
4 amenities	48.06	50.12
Detracting neighborhood elements***		
At least 1	27.95	35.11
No detracting element	72.05	65.89

As shown above, Table 2 shows the relationship between the outcome variable and the predictor variables. The results indicate that neighborhood support, neighborhood safety, and detracting neighborhood elements are all significantly related to whether or not a child has asthma. Among the 7,867 children that have asthma, 21.62% of them lived in non-supportive neighborhoods as opposed to

15.91 percent of non-asthmatics. Children with asthma were also more likely to feel unsafe (17.05 percent) than children without asthma (13.22 percent). The results also revealed that when compared to children that do not have asthma, 35.1 percent of children with asthma live in neighborhoods with at least one detracting element compared to 27.95 percent of those who do not have asthma. .

Table 3: Multivariate Regression Analysis

Variables	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Age	1.03***	1.03***	1.03***	1.03***	1.03***	1.03***
Hispanic	0.91	0.89	0.90	0.90	0.90	0.89
Black, non-hispanic	1.94***	1.98***	1.92***	1.91***	1.91***	1.88***
Multi-Racial, non-hispanic	1.28*	1.27*	1.27**	1.27*	1.26*	1.25*
Female	0.80***	0.79***	0.79***	.80***	.80***	.79***
100% to 199% of federal poverty level	0.85	0.86	0.85	0.84	0.86	0.87
200%-399% above federal poverty level	0.77**	0.79**	0.78**	0.77**	0.80*	0.81
400% and over federal poverty level	0.91***	0.92***	0.91***	0.91***	0.92**	0.93**
Highest parent education level = high school graduate	1.25	1.24	1.25	1.24	1.25	1.24
Highest parent education level = more than high school	1.09	1.09	1.10	1.08	1.10	1.10
At least 1 other chronic condition	2.37***	2.35***	2.37***	2.38***	2.35**	2.34***
Supportive neighborhood		0.83*				0.86
Always/usually safe neighborhood			0.94			
At least 1 neighborhood amenity				0.89		
No detracting element					0.82**	0.84*
F test	44.03	40.74	40.83	40.51	42.13	39.17

* p ≤ .05

** p ≤ .001

*** p ≤ .0001

The multi-variate regression analysis shown in Table 3 shows how each of the predictor variables affect how much more likely a child is to have asthma when the socio-demographic factors are taken into

account. As mentioned earlier, each of the models analyzed were only based on one of the predictor variables, except Model 6, which was analyzed using neighborhood support and detracting neighborhood elements since they had been the only two significant variables in their individual models. In Model 3 when neighborhood safety is taken into account, the results show that children who live in neighborhoods that had supportive neighbors were 17 percent less likely to have asthma in comparison to those who live in neighborhoods that did not have supportive neighbors ($p \leq .05$). Models 2 and 4 show that no significant relationship exists between safety and asthma or neighborhood amenities and asthma. However, when examining Model 5, we find that children in neighborhoods with at least one detracting element were about two times more likely to have asthma in comparison to those who live in neighborhoods with no detracting elements ($p \leq .01$). Model 6 combines the significant factors from Models 2 and 5. Results show that neighborhood support is taken into account its impact is no longer significant, yet those children in neighborhoods with no detracting elements are still 16% less likely to have asthma. Interestingly, the coefficient for has a comorbid condition decreases when detracting elements is added, yet increases again when both neighborhood support and detracting elements are considered in the model.

DISCUSSION

Among the predictor variables used, two proved to be significant when analyzed without the influence of other predictor. One of these significant variables is detracting neighborhood elements. In Model 5, we find that children in neighborhoods with at least one detracting element were significantly about two times more likely to have asthma in comparison to those who live in neighborhoods with no detracting elements. This corresponds with prior research conclusions as Wright's which is that community structural factors can affect a persons' psychosocial wellbeing, and in turn increase morbidity. In this instance, the community structural factors used were detracting elements. These consisted of litter on the streets, rundown housing, vandalism, broken windows or graffiti. Each of these

are characteristics that could have a negative effect on a person's wellbeing, hence increasing the likelihood that a child living in a neighborhoods at least one of these would have asthma.

The second variable that was significant was neighborhood support. In Model 2, its analysis showed that children who lived in non-supportive neighborhoods were about 2 times as likely to have asthma in comparison to those that lived in supportive neighborhoods. Support in this case is determined by how the parents or guardians of the children felt about their neighbors. It asked whether they helped each other out, watched out for each other's children, trusted each other. The result of this analysis like the detracting element supports Wright's conclusion that collective efficacy/cohesion does influence a person's health as it is related to making sure the neighborhood is conducive to living peacefully. Living in a neighborhood without collective efficacy resulting in neighborhood disorder, a child is more likely to be psychologically stressed and therefore more likely to be susceptible to morbidity like asthma. This possibility changes though when the neighborhood has detracting elements in addition to lack of neighborhood support in Model 6.

A couple of the control variable seemed to be significant in influencing asthma as well. First, as the age of the child increases, the more likely they are to have asthma. In addition, children that were black non-Hispanic and multiracial non-Hispanic were almost two times more likely to have asthma in comparison to children who were white. This supports prior literature, which assumes that these children are more likely to have access to health care because of these races generally having lower income, and living in poor neighborhoods. Children whose family income was 200% to 400% above the federal poverty level were 10 to thirty percent less likely to have asthma in comparison to those who lived below the federal poverty level. This result does make sense since families with incomes below federal poverty level are less likely to live in neighborhoods with good environmental or housing quality. They are also less likely to have access to good health care as they might probably not have health care insurance or even the health care resources in their neighborhood. Comorbidity also seemed to be very

significant in influencing asthma in children, with all $P \leq 0.0001$. According to the analysis, children with comorbidities are two times more likely to have asthma when compared to children who have no other illnesses except when there are the neighborhood has at least one detracting element.

Although most of these findings were significant, there were some limitations to this study. Most of the questions asked in the survey were based on the parent or guardians perception of their neighborhood. Whether or not the reality of the conditions of these neighborhoods is what the parents perceive, cannot be determined.

CONCLUSION

Prior to beginning this study, I hypothesized that neighborhood characteristics do influence the existence of asthma in children. After conducting the study, we can conclude of all the neighborhood characteristic variables we used, only neighborhood support and detracting elements seemed to influence the existence of asthma in children. The results from this study indicate that promoting collective efficacy in neighborhoods and communities will reduce the existence of asthma in children. Another conclusion implied by the results is that eliminating detracting elements in neighborhoods and communities will reduce the prevalence of asthma in children. For this reason, more emphasis needs to be put on eliminating litter on the streets, renovating rundown housing, and enforcing policies to reduce vandalism and graffiti in neighborhoods and communities. With these done, there should be a reduction in the prevalence of asthma in children.

REFERENCES

1. Akinbami, Lara. "NCHS Health E-Stat." 6 April 2010. *Centers for Disease Control*. Document. 14 November 2011.
2. "Asthma." 2011. *American Lung Association*. 15 November 2011.
<<http://www.lung.org/associations/states/colorado/asthma/Asthma.html#who>>.
3. "Asthma." 2010. *American Lung Association*. 5 December 2011.
<<http://www.lung.org/assets/documents/publications/solddc-chapters/asthma.pdf>>.
4. "Asthma in Children." February 2009. *The Merck Manual Home Health Handbook*. Document. 10 December 2011.
5. "Asthma: The Young and the Breathless." 1 May 2005. *Psychology Today*. Document. 14 December 2011.
6. Barlow, J.H and Ellard D.R. "The psychological well-being of children with chronic disease, their parents and siblings; an overview of teh research evidence base." *Child: Care, Health and Development* (2006): 1-14. Document.
7. Beard, John, et al. "Neighborhood Characteristics and Change in Depressive Symptoms Among Older Residents of New York City." *American Journal of Public Health* (2009): 2-8. Document.
8. Gupta, Ruchi, et al. "The Protective Effect of Community Factors on Childhood Asthma." *Journal of Allergy and Clinical Immunology* (2009): 1-8. Document.
9. Hines, Annette Baker. "Asthma: A Health Disparity Among African American Children." *Journal of Pediatric Nursing* (2011): 3-9. Document.
10. Wright, J.Rosalind and Subramanian S.V. "Advancing a Multilevel Framework for Epidemiologic Research on Asthma Disparities." *CHEST* (2007): 1-15. Document.