Asthma Prevalence in Inner City Schools: Chicago Initiative to Raise Asthma Health Equity

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Abstract

Rationale: Asthma is one of the most common chronic illnesses in public and private inner city schools. This study seeks to characterize the variability and determine whether school level factors are associated with asthma prevalence in schools.

Methods:
To recruit children with asthma for this cross-sectional study, surveys were distributed to 105 elementary and middle schools in Chicago to be filled out by the students parents. Rates for self reported asthma diagnosis by a doctor or nurse, proportion of respondents who were male, and mean respondent age were calculated for each of the 105 schools. Information on income (% free or reduced school lunch) and ethnicity (% African American(AA)) were obtained from the Chicago Public Schools (n=78) and the Archdiocese of Chicago (n=27) for the school year screened.

Results:
Of the 78.9% completed surveys returned (48,917/62,005), 47,549 had complete asthma information and were included in this analysis. Asthma diagnosis ranged from 6.7% to 25.8% across schools. Prevalence was associated with schools that had: 1) higher proportion of AA students (p<.001) and 2) higher free or reduced lunch enrollees (p=.001). Multivariate analysis indicated asthma was more prevalent in schools with more AA (p<.001) and male (p=.03) students (R^2=.71). Income, age, and type of school (Public vs. Archdiocese) were not associated with the prevalence of asthma.

Conclusions: Findings suggest large variations in asthma prevalence among Chicago elementary schools. Further research is needed to understand what school level factors are associated with asthma prevalence. This may provide insight into which schools with limited health resources to target for intervention.

Background and Objectives

- Asthma is a common chronic illness in childhood & Chicago has one of highest asthma mortality rates in the US.
- Little research has been done looking at asthma rates in schools.
- What school level factors are associated with asthma prevalence?

Methods

Setting and Design:

- Data obtained while recruiting subjects for Chicago Initiative to Raise Asthma Health Equity (CHIRAH), a longitudinal cohort study.
- Population proportionate sampling of Chicago elementary schools identified 132 schools, 105 participated.
- Surveys distributed during the 2003-4 and 2004-5 school years. 48,917 (78.9%) completed surveys returned.
- 47,549 (97.2%) surveys complete asthma info included.

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Methods – Continued

Measures:

School survey (Filled out by parent/legal guardian):

- Age & gender of child
- Asthma: Brief Pediatric Asthma Survey (BPAS, Wolf 2003)

  Diagnosed: Dr or nurse ever told you child has asthma?

Calculated mean age, %male, % diagnosed, response rate by school.

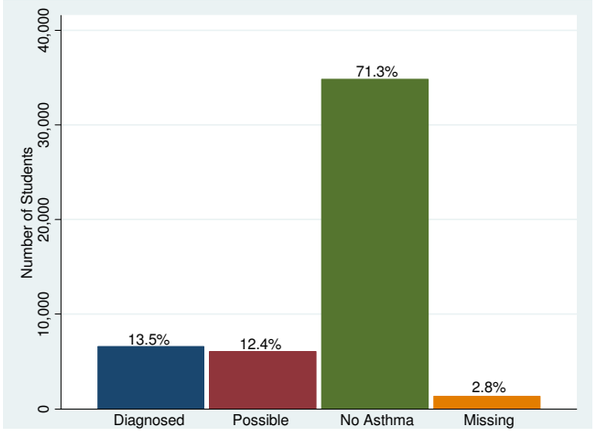
School data (Obtained from schools):

- School type: Chicago Public Schools (CPS) or Archdiocese of Chicago Schools (ACS)
- Low income: % of students on free/reduced lunch program
- Ethnicity: % African American students

Analyses:

- T-tests to compare school characteristics between Chicago Public (CPS) and Archdiocese of Chicago Schools (ACS).
- Univariate linear regression to determine relationships with % diagnosed
- All variables mentioned were included in the multivariate linear regression model.

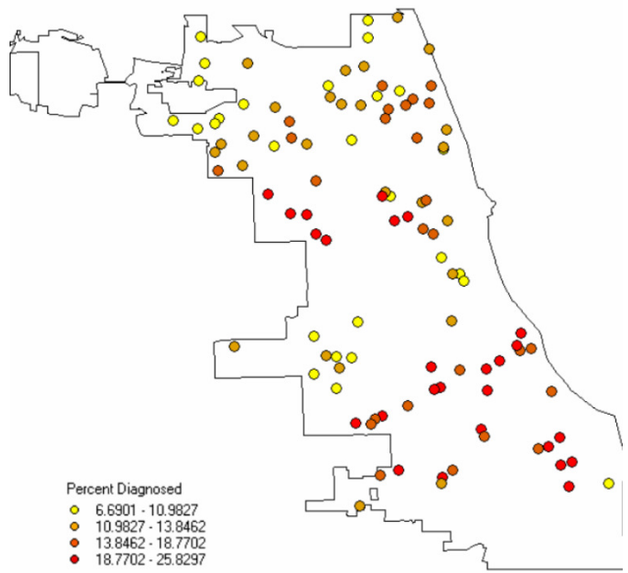
Results – Overall Asthma Rates



Results – School Characteristics

	All Schools (n=105) Mean(sd)	CPS (n=78) Mean(sd)	ACS (n=27) Mean(sd)	P-value
% Diagnosed	14.9(4.9)	15.4(4.9)	13.4(4.5)	0.07
% African American	**38.3(42.2)**	**44.6(42.0)**	**19.8(37.8)**	**0.01**
% Free/Red Lunch	**65.7(31.2)**	**77.2(23.4)**	**32.6(27.3)**	**<0.001**
Mean age, years	9.0(0.7)	9.0(0.6)	9.0(0.7)	0.64
% Male	48.7(3.8)	48.6(3.8)	48.8(3.6)	0.81
Response rate, %	**79.8(11.3)**	**77.4(10.9)**	**86.7(9.4)**	**<0.001**

Results – Asthma Rates by School



Results – Univariate Regression

- Schools with higher % AA students and % on free/reduced lunch, and lower response rates had higher asthma rates (p<0.001).
- Mean age, % male students, & type of school were not significantly related to with diagnosed asthma (p<0.05).

Results – Multivariate Regression

	Beta Coefficient	Standard Error	P value	95% CIs
%African American	**0.101**	**0.008**	**<0.001**	**0.085 – 0.116**
%Free/Red School Lunch	0.002	0.012	0.886	0.022 – 0.025
Mean age	-0.532	0.423	0.212	1.373 – 0.308
%Male	**0.174**	**0.077**	**0.027**	**0.020 – 0.328**
Archdiocese	0.417	0.806	0.606	-1.182 – 2.016
Response rate, %	0.011	0.030	0.726	-0.049 – 0.071

- Schools with a higher percentages of African American & male students have higher rates of diagnosed asthma.
- % Free/reduced lunch, school type, and response rate effects disappear once control for age, gender, & race/ethnicity.

Limitations

- Surveys self-report and limited amount of school data available.
- Multilevel models using individual student data could account for variability within schools.

Conclusions

- Findings suggest large variations in asthma prevalence among Chicago schools.
- Further research is needed understand how other school factors (e.g., spatial and environmental) could affect this.
- May provide insight into which schools to target for intervention.

Reference: Wolf RL, Berry CA, Quinn K. Development and validation of a brief pediatric screen for asthma and allergies among children. Ann Allergy Asthma Immunol 2003; 90:500-7.