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## Black and Hispanic perceptions of asthma medication in the School Inner City Asthma Study

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### Introduction

Racial/ethnic minorities suffer a disproportionate rate of asthma morbidity<sup>1</sup>. We aimed to determine racial/ethnic differences in perception of asthma medications between caregivers of black and Hispanic school children enrolled in the school inner city asthma study (SICAS). Furthermore, we investigated whether these beliefs were associated with asthma morbidity.

### Methods

SICAS is a prospective, observational study of home and school environments related to asthma morbidity in inner-city school children<sup>2</sup>. Questionnaires completed by caregivers of enrolled students with asthma elicited self-identified race/ethnicity, perception of asthma control, attitudes toward asthma medications, and asthma symptoms. Analysis was limited to black and Hispanic subjects as <5% of participants were white. The study was approved

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by the Boston Children's Hospital Investigational Review Board. Subject assent and parental consent was obtained for all subjects prior to enrollment.

Univariate analysis examined the associations of race/ethnicity on reported asthma control (4-week recall), belief that asthma medications can be effective, belief the child receives too much medication, worry about side effects, report medications "do not really work", alternative remedy use, and modification of drug therapy due to these concerns. Multivariate models evaluated the perception of asthma control and medication attitudes with race if univariate p-value  $\leq 0.05$ , adjusting for age, gender and potential sociodemographic characteristics if associated with the outcome ( $p < 0.2$ ) and confounding to the main effect.

Quantitative assessment of asthma morbidity was measured as the maximum number of asthma symptom days<sup>2</sup>, defined as the largest of the following variables in the 2 weeks prior to the baseline survey; 1) daytime wheezing, chest tightness, or cough 2) days on which child had to slow down or discontinue play activities due to wheezing, chest tightness, or cough 3) nights with wheezing, chest tightness, or cough leading to disturbed sleep. Associations between attitudes toward medication and asthma morbidity were tested by Wilcoxon rank sum.

## Results

Race was reported in 268 subjects: 15(4%) white, 120(34%) black, 133(38%) Hispanic, and 83(31%) mixed or other. The average age was 7.8 years, and 46% were female. There was no difference in perception of asthma control between blacks and Hispanics. However, caregivers of Hispanic children were 4.9 times as likely to report the child was on too much medication compared to blacks. Furthermore, Hispanic caregivers tended to be less confident medications could control the child's asthma, more likely to worry about side effects, report medications did not work, use alternative remedies, and cut back on asthma medications for these concerns (Table 1). After adjusting for age, gender, and caregiver education, Hispanics remained significantly more likely to believe the child was taking too much medication (odds ratio (OR) 4.9, 95% confidence interval(CI) 1.7–14.0,  $p=0.003$ ).

Negative perceptions of asthma medications were significantly associated with greater asthma symptoms days. Report of "child gets too much medication" was associated with greater asthma symptom days (median = 4 (IQR: 2,7) vs 1 (IQR: 0,3) days,  $p < 0.001$ ), as was true for worry about side effects (median = 3 (IQR: 0,5) vs 1 (IQR: 0,3) days,  $p=0.005$ ), and feeling the drugs weren't effective (median = 3 (IQR: 0,5) vs 1 (IQR: 0,3) days,  $p=0.007$ ). There was no difference in asthma symptoms by alternative remedy use (median = 2 (IQR: 0,4) vs 1 (IQR: 0,4),  $p=0.4$ ).

## Discussion

We demonstrate that caregivers of Hispanic children were almost five times as likely to be concerned their child takes too much medicine and that medication concerns were strongly and consistently associated with poor asthma control. While race, medication perception, and asthma control have been described separately, this study found the associations of

Hispanic ethnicity, negative medication beliefs, and increased asthma symptoms within the same carefully studied cohort of inner-city school children with asthma.

Our findings are consistent with prior studies demonstrating lower expectations and higher worry about minority children's asthma<sup>3</sup>, particularly Hispanic caregiver heightened concern over medication use<sup>3</sup>. Hispanic ethnicity was associated with the belief that the child receives too much medication independent of caregiver education, income, or Medicaid status suggesting racial/ethnic identification is the key influence on attitudes. These findings support underuse of controller medication by minority populations is independent of sociodemographic factors<sup>4,5</sup>. Medication concerns may be a key modifiable risk factor for suboptimal controller medication use<sup>6</sup> as they directly influence adherence<sup>7</sup>, and could be the target of counseling interventions to improve outcomes.

Additionally, we demonstrate that negative beliefs around medication are associated with poor asthma control. Parental concern over medications may lead to poor adherence<sup>8</sup> and thereby control<sup>9</sup>, though similar findings have been found independent of adherence<sup>10</sup>. In this context, the causal relationship may be bidirectional—parents of symptomatic children may have less confidence in the benefit:risk of prescribed medications. This bears further investigation.

Despite standardization of asthma care and efforts to improve minority access to healthcare, racial, ethnic, and cultural disparities in asthma persist<sup>1</sup>. The findings presented here highlight the racial/ethnic differences in perception of asthma medication and the effect of negative medication perceptions on asthma control.

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Table 1

Racial/Ethnic Differences in Caregiver Perception of Asthma/Asthma Medications

Caregiver reported perception of asthma medications	Hispanic	Black	Odds Ratio	95% CI <sup>1</sup>	P-value <sup>2</sup>
Rates asthma as well controlled	73% (94)	76% (91)	0.9	0.5–1.6	0.7
Believes asthma drugs can be effective	89% (106)	95% (108)	0.5	0.1–1.3	0.2
Feels child gets too much medicine	17% (20)	5% (5)	4.1	1.4–14.7	0.005
Worries about side effects	26% (34)	18% (21)	1.6	0.8–3.2	0.1
→ <i>Of those</i> , cut back on the medicine because concern over side effects	53% (19)	43% (9)	1.5	0.4–5.1	0.6
Feels the meds don't work	22% (25)	16% (17)	1.5	0.7–3.2	0.3
→ <i>Of those</i> , stopped giving the medicine because they felt not working	25% (6)	18% (3)	1.5	0.3–11.2	0.7
Used alternative therapies over past 3 months	21% (28)	13% (16)	1.7	0.8–3.6	0.1
→ <i>Of those</i> , used alternative therapies INSTEAD of prescribed medicine	33% (9)	25% (4)	1.5	0.3–8.2	0.7

<sup>1</sup> CI: Confidence Interval<sup>2</sup> Fisher exact test