

## HEALTHY HOMES UNIVERSITY I FINDINGS (2005-2008)

*The data presented below will be published in the May/June 2011 Healthy Homes supplement of Public Health Reports.*

### Summary

Evaluation results from Healthy Homes University I (HHU I) showed that families completing the program had statistically significant improvements in asthma knowledge, self-reported cleaning habits and in-home environmental conditions. Among asthma knowledge gains, most noteworthy was that one-third of caregivers became aware that cockroaches are asthma triggers. The most notable gain in self-reported cleaning habits pertained to the frequency of vacuuming, especially upholstered furniture. The most impressive environmental improvement was the increase in the percentage of households in which the subject child was using pillow and mattress covers designed to control dust mites. These items were provided by the Program and required minimal behavior change by families.

Consistent with the changes described above, there were statistically significant caregiver-reported reductions in pediatric asthma severity. The number of days that subject children were negatively impacted by their asthma decreased at least 50% by all of our measures. Thus, not only were children experiencing symptoms less frequently, their asthma was impacting them less, specifically with missed school days and reducing physical activity. In addition, the percentage of households seeking medical care for their child's asthma substantially decreased for each of our three measures: emergency department visits, hospitalizations and all other acute unscheduled medical visits. When viewed in conjunction with the fairly modest improvements in knowledge, cleaning behavior and home environments, these reductions were striking.

Our Program was designed on this premise and staff made four in-home visits with most of the participating households. One key to program success that studies have cited is the effectiveness of outreach workers. This is important because they are the connection between the program design and human subjects. Specific characteristics that are vital to outreach worker effectiveness include empathy, subject matter expertise, and persistence. While we did not gather quantitative data evaluating our staff, one indication of their effectiveness in gaining participant trust and buy-in is that 81% of families who received the baseline visit remained in the Program for the full six months.

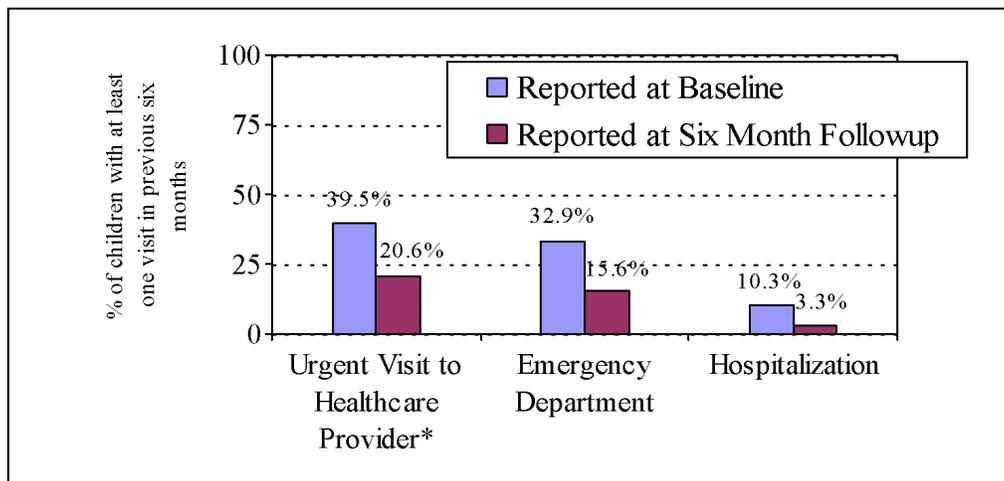
### Characteristics of Subject Children

The median age of enrolled HHU children (n=243) was seven years and there were slightly more males than females. About one quarter of children were reported by their caregivers as multi-racial and 10% as Hispanic. For one quarter of the households, no other children lived in the home. Slightly more than half (56%) rented their property. Median income was \$16,640 and 81% were Medicaid-enrolled households. The biological father did not reside within 87% of the households.

### Medical Care Visits for Asthma

Caregivers were asked in baseline and six-month surveys if the subject child had visited an emergency department or been hospitalized overnight for asthma in the previous six months. They were subsequently asked if, besides these events, the child had seen a healthcare provider for asthma in the past six months in which the visit was unscheduled (i.e., not scheduled more than 24 hours before the visit). The figure below illustrates caregiver responses for the three types of medical care queried. For each measure, the proportion of households that sought medical care for the child's asthma decreased substantially -- 48% for unscheduled visits to a healthcare provider, 53% for emergency department visits and 68% for hospitalizations. All three reductions were statistically significant ( $p < .0001$ ).

Percentage of Subject Children Who Sought Medical Care for Asthma Six Months Prior to Baseline and Six Months Prior to Six Month Visit by Type of Medical Care Received



\* Excluded from this category were emergency department visits and hospitalizations. These visits were considered “urgent” because they were not scheduled more than twenty-four hours before.

### Asthma Severity

Caregivers reported monthly frequencies for subject children experiencing negative health effects due to asthma. For each of the listed indicators of asthma impact, the number of monthly occurrences reported at six months was less than reported at baseline, and all improvements were statistically significant. The reductions ranged from 51% (wheezing first thing in the morning) to 71% (missed school due to asthma).

#### Changes in Asthma Severity<sup>1</sup> - Baseline vs. Six Months

Impact of Asthma on Subject Child	N <sup>2</sup>	Median Change in Number of Days/Nights <sup>3</sup>	P-value
Had wheezing first thing in the morning	227	0	na
Woke up because of wheezing or tightness in chest or a cough	231	- 2	<.0001
Had shortness of breath because of asthma	230	- 3	<.0001
Had wheezing or tightness in the chest or cough	236	- 4	<.0001
Had to slow down or stop play or activities because of asthma, wheezing, tightness in chest, or cough	236	- 2	<.0001
Missed preschool or school because of asthma	141	0	na

1. Severity was measured in terms of the number of occurrences within the past 30 days.

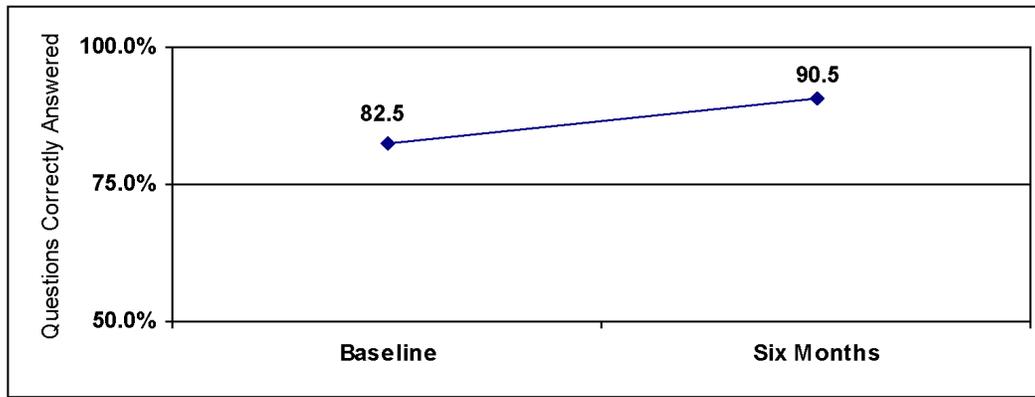
2. Number of families used in the comparison (i.e., that had non-missing data pre and post).

3. Value listed is the number reported at six months minus the number reported at baseline.

### Asthma knowledge

Caregivers were asked 37 mostly true-false/agree-disagree questions that included identification of specific asthma triggers, appropriate ways to respond to asthma attacks, and effects of asthma on daily living. Overall, respondents answered an average of three more questions correctly at six months than at baseline thereby improving their overall score from 82.5% to 90.5% (p<.0001). Scores improved for 83% of caregivers, while 10% showed no change and 7% scored worse.

#### Overall Improvement by Caregivers on Asthma Knowledge Questionnaire



### Environmental Risk Factors

Households demonstrated improvement for most of the environmental risk factor measures. While there was no statistically significant change in the percentage of households that had indoor pets, fewer allowed pets in the child's bedroom ( $p < .05$ ). Also, substantially fewer caregivers reported evidence of mold in the home ( $p < .0001$ ). There was no measurable change in the reported evidence of cockroaches, but there was a decrease in the reported evidence of mice or rats ( $p < .01$ ). Fewer households allowed stuffed toys in the child's bedroom ( $p < .0001$ ). There was some reduction in exposure to tobacco smoke, either within the home or by anyone caring for the child ( $p < .005$ ).

High Efficiency Particulate Air (HEPA) room filters and mattress/pillow covers designed to control dust mites were rarely present in the subject children's bedrooms at baseline. These items were among the Basic and Custom products supplied or installed by HHU staff. Among the listed environmental changes, the largest increase occurred in the prevalence of pillow and mattress covers ( $p < .0001$ ).

#### Selected Environmental Risk Factors - Changes Between Baseline and Six Months

Risk Factor	N*	% of Homes with Factor		P-value
		Baseline	Six Months	
Stuffed toys in child's room	240 <sup>1</sup>	68.3	48.3	<.0001
Home has indoor feathered or furry pets <i>Pets allowed in subject child's bedroom</i>	242 <sup>1</sup> 99 <sup>1</sup>	43.8 59.6	44.6 50.5	not sig <.05
Mold has been seen or a musty odor has been smelled in the subject child's room (past 30 days)	241 <sup>1</sup>	8.7	5.4	not sig
Mold has been seen or a musty odor has been smelled in the rest of the home (past 30 days)	239 <sup>1</sup>	58.2	38.9	<.0001
Evidence of cockroaches inside the home (past 30 days)	243 <sup>1</sup>	7.0	5.8	not sig
Evidence of mice or rates inside the home (past 30 days)	242 <sup>1</sup>	19.8	12.8	< .01
Someone has smoked inside the home (past week)	243 <sup>1</sup>	21.8	14.4	<.005
Anyone who takes care of the subject child smoke	240 <sup>1</sup>	51.3	43.8	<.005
Carpeting or rugs in child's room	141 <sup>2</sup>	82.3	78.7	not sig
No HEPA in child's room	145 <sup>2</sup>	98.6	77.9	<.0001
Mattress cover for controlling dust mites not used/available	141 <sup>2</sup>	96.5	15.6	<.0001
Pillow cover for controlling dust mites not used/available	141 <sup>2</sup>	97.9	9.9	<.0001

\* Number of families used in the comparison (those with missing data were excluded). These N's may differ from those listed in Table X (Environmental Baseline info) due to this restriction.

1. Based on caregiver self-report data.

2. Based on HHU staff visual assessments.

## **Cost-Benefit Analysis**

A cost-benefit analysis of the program showed that the net present value of the HHU program is approximately \$1,849,309.83 over a benefit period of five years. Cost-savings were realized from the reduction in emergency department visits and hospitalizations, as well as a reduction in missed caregiver work days.