Chicago Community-Based Asthma Intervention Trial: Feasibility of Delivering Peer Education in an Inner-City Population
Victoria Persky, Lenore Coover, Eva Hernandez, Alicia Contreras, Julie Slezak, Julie Piorkowski, Luke Curtis, Mary Turyk, Viswanathan Ramakrishnan and Peter Scheff

*Chest* 1999;116;216-223
DOI: 10.1378/chest.116.suppl_2.216S

This information is current as of July 29, 2005

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://www.chestjournal.org/cgi/content/full/116/suppl_2/216S
SUMMARY

Our findings showed asthma redesign met a substantial number of our objectives. Overall ALOS declined significantly without increasing either early ED visits or early readmissions. We were able to shift some patients from the PICU and the ED to the observation unit. Although the ED remained the primary source of admissions, the modest decline in ED admissions represents a trend in the right direction. In our institution, redesign was a positive step toward treating asthma in a more appropriate and cost-effective setting. We believe that our model can be replicated for other specialties and in other institutions for standardized, high-quality, and more-efficient treatment of patients.

REFERENCES

4 Mayo PH, Richman J, Harris HW. Results of a program to reduce admissions for adult asthma. Ann Intern Med 1990; 112:864–871

The most effective means of educating children with asthma and their families has not been clearly demonstrated in previous studies. Peer education is uniquely suited to the complex problems encountered in underserved populations. The purpose of this study was to show the feasibility of delivering a peer education program for children with asthma and the effect of the program on indoor allergen levels in an inner-city population in Chicago. Overall, the program was well received. Baseline allergen levels were consistent with some previous studies in showing low levels of mite allergens and high levels of cockroach allergens, with 79.6% of samples having levels > 8 U/g. A total of 28.2% of samples had cat allergen levels > 2 μg/g, although only 9.7% of homes had cats, confirming previous reports that cat allergen is ubiquitous. Mold levels were seasonal, with the highest levels in the summer. Results from this study suggest that intervention programs should focus more on elimination of cockroaches than was previously appreciated, while minimizing the use of pesticides, and on identification of the sources of cat allergen. Structural and psychosocial issues in homes need to be addressed in future studies. This study has demonstrated the feasibility of delivering peer education in a inner-city population and highlighted the need for comprehensive intervention strategies addressing complex issues facing underserved neighborhoods. (CHEST 1999; 116:216S–223S)

Abbreviations: ANOVA = analysis of variance; Der f1 = Dermatophagoides farinae allergen; Der p1 = Dermatophagoides pteronyssinus allergen; ELISA = enzyme-linked immunosorbent assay; NCICAS = National Cooperative Inner City Asthma Study

Previous studies have suggested that asthma morbidity is affected by the level of indoor allergens in the home. Several groups have noted that dust mite sensitivity is related to the prevalence of asthma and that the levels of mite allergens in the environment are related to skin test positivity as well as symptoms. Sporik et al found that exposure to > 10 μg/g of Dermatophagoides pteronyssinus at the age of 1 year was significantly associated with the development of asthma by 11 years of age. Prevalence of asthma has also been associated with greater skin test sensitivity to cat and mold allergens, with self-reported exposure to dampness and molds, and with exposure to in utero, as well as to passive, smoke. The National Cooperative Inner City Asthma Study (NCICAS) noted generally low levels of nites and high

Chicago Community-Based Asthma Intervention Trial*

Feasibility of Delivering Peer Education in an Inner-City Population

Victoria Persky, MD; Lenore Coover, MSN; Eva Hernandez, MSN; Alicia Contreras, MA; Julie Slezak, MS; Julie Piorkowski, MPH; Luke Curtis, MS; Mary Turyk, MPH; Viswanathan Ramakrishnan, PhD; and Peter Scheff, PhD

The most effective means of educating children with asthma and their families has not been clearly demonstrated in previous studies. Peer education is uniquely suited to the complex problems encountered in underserved populations. The purpose of this study was to show the feasibility of delivering a peer education program for children with asthma and the effect of the program on indoor allergen levels in an inner-city population in Chicago. Overall, the program was well received. Baseline allergen levels were consistent with some previous studies in showing low levels of mite allergens and high levels of cockroach allergens, with 79.6% of samples having levels > 8 U/g. A total of 28.2% of samples had cat allergen levels > 2 μg/g, although only 9.7% of homes had cats, confirming previous reports that cat allergen is ubiquitous. Mold levels were seasonal, with the highest levels in the summer. Results from this study suggest that intervention programs should focus more on elimination of cockroaches than was previously appreciated, while minimizing the use of pesticides, and on identification of the sources of cat allergen. Structural and psychosocial issues in homes need to be addressed in future studies. This study has demonstrated the feasibility of delivering peer education in an inner-city population and highlighted the need for comprehensive intervention strategies addressing complex issues facing underserved neighborhoods. (CHEST 1999; 116:216S–223S)

Abbreviations: ANOVA = analysis of variance; Der f1 = Dermatophagoides farinae allergen; Der p1 = Dermatophagoides pteronyssinus allergen; ELISA = enzyme-linked immunosorbent assay; NCICAS = National Cooperative Inner City Asthma Study

Previous studies have suggested that asthma morbidity is affected by the level of indoor allergens in the home. Several groups have noted that dust mite sensitivity is related to the prevalence of asthma and that the levels of mite allergens in the environment are related to skin test positivity as well as symptoms. Sporik et al found that exposure to > 10 μg/g of Dermatophagoides pteronyssinus at the age of 1 year was significantly associated with the development of asthma by 11 years of age. Prevalence of asthma has also been associated with greater skin test sensitivity to cat and mold allergens, with self-reported exposure to dampness and molds, and with exposure to in utero, as well as to passive, smoke. The National Cooperative Inner City Asthma Study (NCICAS) noted generally low levels of nites and high

*From the Epidemiology and Biostatistics and the Environmental and Occupational Health Science Divisions of the School of Public Health (Dr. Persky, Ms. Coover, Hernandez, Contreras, Slezak, Piorkowski, Mr. Curtis, Ms. Turyk, Drs. Ramakrishnan, and Scheff), University of Illinois at Chicago, and Erie Family Health Center (Dr. Persky, Ms. Hernandez, and Contreras), Chicago, IL.

Funded by the Otho S.A. Sprague Memorial Institute.

Correspondence to: Victoria Persky, MD, Epidemiology/Biostatistics and Environmental and Occupational Health Science Division, School of Public Health, University of Chicago, 2121 Taylor St, Room 508, Chicago, IL 60612
levels of cockroaches in inner-city homes. They found increased asthma symptoms and hospitalizations in children who were both allergic to cockroaches and whose homes had high levels of cockroaches.15

The effects of various interventions that have been used for the control of indoor environmental asthma triggers are unclear. Frequent dusting, carpet removal, and use of plastic mattress covers have been used to decrease exposure to mites, as well as to cat and cockroach allergens.16,17 In addition, repair of water leaks and use of air conditioning and dehumidifiers have been used to reduce mold levels. Additional intervention strategies have included vacuuming mattresses weekly, laundering blankets at least once a fortnight and sheets weekly in hot water, replacing feather pillows with synthetic filling, removing quilts and eider downs, vacuuming carpets several times a week and upholstery fortnightly, and removing soft toys and pets.18,19

The most effective means of educating children with asthma and their families in underserved populations is not well established. Most of the previous intervention programs used professionals to educate20,21 and case-manage22 families with asthmatic children. Few of the studies have targeted modification of the home environment. Changes of factors in the home are often complicated, necessitating on-site assessment and creative solutions to complex social problems that affect the ability of families to make suggested modifications. There is an increasing body of evidence supporting the role of peer educators in health promotion. Peer educators are culturally sensitive and more efficient in transmitting the necessary knowledge, and therefore more cost-effective.23,24 There are only a few studies, however, examining the role of peer education in asthma management.23,24 The limited data from those studies suggest that they are more effective in education than in medication management. Families of asthmatic children are frequently responsive to peer educators in their own homes and feel comfortable discussing the real issues facing them regarding modification of asthma risk factors. The purpose of this study was to show the feasibility of a peer educator program and the effectiveness of peer education on modifying levels of indoor allergens in an inner-city Chicago population previously shown by our group to have high rates of asthma prevalence, morbidity, and mortality.25–28 Data collection is almost complete in the study. This paper describes the overall methods and baseline allergen data. Subsequent papers will present the results of the intervention.

Materials and Methods

Recruitment, Training, and Supervision of Educators

Peer educators were recruited from parents of children with asthma who were enrolled in the 20 Head Start sites and community agencies in the West Town and Humboldt Park communities served by Erie Family Health Center on the West Side of Chicago. The Directors of the Head Start programs were asked to recommend parents who were responsible and interested in asthma. Ten women were referred for the training. At that time, we discussed the benefits of the learning experience, and the fact that we would hire only three persons for the first study. Participants were not reimbursed for the initial training. One of the women we initially hired withdrew during the first year for personal reasons, and over the next year we held two more training sessions for a total of 13 women. From those 13, we hired 2 women, 1 of whom also withdrew for personal reasons. The initial training consisted of 5 half-day sessions over a 1-week period. The curriculum focused on asthma knowledge, environmental triggers, how to approach families, and basic information about the interventions. During the initial training, candidates were assessed by the project staff for their commitment and ability to work with other families in a home visit setting. At completion of the initial training, all women who attended were given certificates. Potential educators were asked to provide resumes, letters of recommendations, and a statement of their goals before undergoing interviews by the study investigators. Those who were hired then underwent several more weeks of training specific to the project. This included how to assess environmental triggers in the home environment, the availability and accessibility of community resources, how to work with families in a nonthreatening fashion, role playing, the importance of confidentiality and children’s rights, how to handle acute psychosocial issues that might arise, how to give asthma presentations in the community and schools, methods of collecting dust and air samples for allergen measurements, and methods of randomization and additional data collection. Personal growth and professional goals were also included and continue to be part of the project. During the study, the educators have had ongoing training and support. They have been supervised daily by an on-site master’s degree level coordinator, as well as with weekly and biweekly meetings with three of the study investigators (including the principal investigator, a physician, and two co-principal investigators, an asthma nurse educator and a psychiatric nurse). All three of these investigators have also been available through 24-h beepers to assist with unexpected emergencies when they arise.

Overall Study Design

The project was designed as a randomized trial of 60 families residing in a low-income neighborhood on the West Side of Chicago. Half of the families received intensive intervention during the first 6 months of the study and half during the second 6 months of the study. Home assessments were made at baseline, at the 6-month visit, and after 1 year. Recruitment and intervention occurred during a 2.5-year period. The initial dropout rate was somewhat higher than anticipated, primarily because of families that moved or had unanticipated time constraints. As a result, a total of 70 families were recruited, of whom 62 completed the first visit and 52, the second visit, and 49 families so far have finished the trial.

Intervention

The intervention program consisted of a minimum of four visits, each with clearly delineated goals. The first visit was primarily to establish a rapport with the family and explain the purpose of the study. For families randomized to receive early intervention, the major issues in asthma prevention were discussed. The second visit comprised a detailed home assessment, collection of air and dust samples, and a chance to answer any questions that may have arisen in the interim. The educator and caretaker walked through each room noting the presence or absence of potential allergens or irritants, such as presence of pets, form of ventilation, amount of dust, type of heating and stove, type of carpets and rugs, upholstered furniture, stuffed
toys, mattress and furniture covers, presence of air conditioning and dehumidifiers, airflow, smokers in the home, humidity, mold, and use of pesticides and other chemicals in the house. Educational material was left after the second visit. Between the second and third visits, the peer educator developed a management plan for the family, taking into consideration the strength of the family system. The objectives of each plan were generally similar. Differences in implementation reflected variations in social and family support structures. It was understood that the plan had to be realistic and cost-effective and that it might be instituted in stages over several months. The plan was reviewed by the nurse and, rarely, revised if there was a problem.

Intervention strategies included dust control, removal of pets, elimination of carpets, if possible, washing of bedding, decreasing humidity and mold, removal of feather pillows and stuffed toys, covering of mattresses and upholstered furniture, general cleaning practices, and the use of Integrated Pest Management for cockroach control. This approach emphasized aggressive insect control through housekeeping, identification of sources of roaches, selective use of boric acid under refrigerators and baits, such as Combat, and cost-effective structural changes, such as caulking around leaky faucets and repair of areas that allow access of insects and rodents. In cases in which families had difficulty removing pets and stuffed toys from the house, they were encouraged to remove them from the child’s room or to keep the toys in plastic bags. Behavior modification was strongly encouraged, and parents were active partners during the intervention period. In two cases, the educators were effective in working with parents to convince landlords to institute more extensive repairs where needed. All families were given mattress covers and peak flowmeters, along with instructions for their use. For families containing smokers, the smokers were encouraged not to smoke in the home. The plan was discussed with the family at the third visit, and modifications were developed and implemented between the third and fourth visits. During the fourth visit, the importance of emergency medical plans, as well as communication with health-care providers and school staff, was addressed. Repeat home assessments and collections of air and dust samples were made at 6 and 12 months.

Families randomized to serve as controls for the first 6 months received a detailed home assessment and collection of air and dust samples at the second visit, and were then contacted monthly by telephone until they entered active intervention at 6 months. From that point, they followed the intervention program from the second intervention visit, as described above.

Families for the program were recruited from the Head Start sites in West Town and Humboldt Park, as well as from Erie Family Health Center, a community-based health center serving the area. Before the initiation of the trial, the program was piloted with 17 Head Start families. Before randomization, families met with the educator at the site of recruitment to establish rapport before going into the home; the study was explained and they signed informed consent. Subsequent visits by the educator were in the family’s home. The results were shared with the participants and with their health-care providers, with the participants’ permission.

Dust and Air Collection and Analysis

Dust samples were collected at baseline, 6 months, and 12 months from the child’s mattress, living room floor, and bedroom floor using standardized data collection methods. These were collected with a handheld portable vacuum cleaner with disposable vacuum bags for a 1.0-m² area for the living room and bedroom floor samples, and a 0.25-m² area of the mattress. Dust was transferred from the disposable bags to plastic bags, frozen at −20°C and stored for subsequent measurement of allergens. Analyses of dust mites Dermatophagoides pteronyssinus and Dermatophagoides farinae (Der p1 and Der f1), cockroach (Blatella germanica), and cat (Fel d1) allergens were performed under the supervision of Dr. Peter Scheff at the University of Illinois School of Public Health. Dust was screened with a 650-μm filter. The samples were extracted in phosphate-buffered saline solution and analyzed with the sandwich–enzyme-linked immunosorbent assay (ELISA) method of Chapman et al.20,21 and Pollart et al.22 Monoclonal antibodies and allergens were purchased from the University of Virginia. Standard allergen dilution curves and blanks were run on each day of ELISA analysis. For each sample, allergen concentrations were determined from interpolation of the standard allergen absorbance curves. For each panel of ELISA dust assays, four blank samples were run to determine blank and detection limit absorbance values. The detection limit varied with each batch and was set at two SDs of the blank absorbance values. Surface dust concentrations are presented as a bulk dust concentration (micrograms per gram or units per grain). For quality control, two types of split samples were obtained. The first involved separating dust samples into two separate samples for analysis. Mean coefficients of variation were 0.230 (n = 6) for Der f1, 0.448 (n = 5) for Der p1, 0.347 (n = 6) for cat antigen, and 0.242 (n = 8) for cockroach antigen. The second type of split sample involved different aliquots for the same dust–phosphate-buffered saline solution test tube; this measured variation in the ELISA itself. Mean coefficients of variation for these samples were 0.059 (n = 9) for Der f1, 0.095 (n = 5) for Der p1, 0.117 (n = 13) for cat antigen, and 0.087 (n = 5) for cockroach antigen.

Airborne fungi were collected outdoors, and in the kitchen and bedroom with one-stage bioaerosol samplers (N-6; Andersen; Atlanta, GA), containing 400 air-jet holes and having a cut point of 0.8 μm. Air pumps connected to the Andersen samplers had a calibrated flow of 35 L/min. The Andersen samplers were loaded with malt extract agar media. After collection, the fungal plates were incubated at 25°C for 5 to 7 days and counted for viable fungi with a magnifying glass. A preliminary 2- to 3-day count was made and used as an estimate of total fungi in cases in which the plates were badly overgrown at 4 to 6 days. The colony forming units per cubic meter was calculated by taking an average of the two bioaerosol counts divided by the volume of air sampled. On samples containing 20 viable colonies per plate, a count correction factor was used to account for undercounting of spores caused by two or more fungal propagules entering the same hole.33 Fungal colonies were then examined with a 100 to 400× microscope and classified to genera with the help of standard fungal references.34,35 On plates for which the count correction factor was used, it was assumed that all of the fungal genera were equally viable and able to compete for space in cases in which two or more spores were entered into the same Andersen hole.33

Data Analysis

Dust antigens and fungi distributions were transformed to a natural log scale for statistical analysis. Geometric mean dust antigen and fungi values were calculated for each collection location (kitchen, bedroom, bed) and each bi-monthly period. Because no samples were obtained in September, averages for September-October include samples from October only. For analysis, zero values for fungi were assumed to be the lowest observed value in the data set. For fungi, zero values were therefore assumed to be 20 cfu/m²; for dust samples, zero values were assumed to be 0.001 μg/g for cat, 0.001 μg/g for Der p1, 0.0004 μg/g for Der f1, 0.0004 μg/g for total mite, and 0.12 U/g for cockroach antigen. Multiple pairwise differences between mean values were examined using analysis of variance (ANOVA) with the least significance difference method. Percentages were
generated for dust antigen values above thresholds thought to increase risk for symptoms\(^3\) (2 µg/g for Der p1, Der f1, and cat antigen and 8 U/g for cockroach antigen) and for whether fungal cultures produced identifiable colonies. Differences between collection locations were examined using \(\chi^2\) tests.

**Results**

The basic demographics of the 62 families who completed baseline visits are given in Table 1. Approximately half of the families were recruited from Erie Family Health Center and half from the neighborhood Head Start sites. Forty-one of the children with asthma were boys and 21 were girls. Ethnicity and race were mixed, with 12 African-American, 24 Puerto Rican, 25 Mexican, and 1 non-Hispanic white families. Twenty-one families had pets; 6 had cats. Twenty-six families had one or more smokers in the home, with 9 families having more than one smoker. Baseline allergen measurements are given in Tables 2, 3 and Figures 1–3. Levels of mite allergens were low: geometric mean was 0.023 µg/g for Der f1 and 0.047 µg/g for Der p1 with 3.3% of samples > 2 µg/g for Der f1 and 5.5% of samples > 2 µg/g for Der p1. Levels of cockroach antigen, however, were quite high, with 79.6% of samples > 8 U/g. A total of 28.2% of the samples had cat allergen > 2 µg/g, with 45.9% of homes having at least one sample > 2 µg/g, although only six, or 9.7%, of the homes had cats. Mean levels of Der p1 and total mite antigens were significantly higher on the bed than on the living room floors. Total mite antigens were also significantly higher on the bed than on the bedroom floor. There were no other significant differences by site for the dust antigen levels. Total mean fungi levels varied from 385 cfu/m\(^3\) in the kitchen to 445 cfu/m\(^3\) in the bedroom. The most common fungi were *Penicillium*, *Cladosporium*, and *Aspergillus*. Overall cockroach allergen peaked in May and June (p < 0.05 for differences in mean levels for May-June vs all other seasons), cat levels peaked in May and June (p < 0.05 for May-June vs January-February, March-April, and October), and mold levels peaked in July-August (p < 0.05 for mean levels in July-August vs January-February, March-April, and November-December). Der p1 peaked in January-February and May-June, but there were no significant seasonal variations in Der f1 or in total mite antigens (not shown).

Data collection is still continuing in the study, and the results of the intervention will be presented in a subsequent paper. Overall, the study has been well received by the participants. Dropouts since the first visit have been few and primarily related to families moving. To date, in 16 of the 26 families that have smokers, the smokers are no longer smoking in the child’s home. One person has quit completely and one decreased to less than one cigarette a day. Many of the families feel that their child’s symptoms have improved as a result of the intervention. The study has also been personally beneficial to the educators. One of our peer educators recently left to attend nursing school. Another, without previous employment or high school diploma, has obtained her general equivalency diploma during employment with us and has proved to be such a strong leader that she has been promoted to supervisor on two recently funded trials. Three of the families who finished this study were identified by the study staff as potential educators. They also found the process so rewarding for their families that they volunteered for the training for a more recent trial, and two are now hired as peer educators for that study. Health-care providers whose patients were in the study have benefited from increased communication with their patients and greater understanding of factors affecting their management. In several instances, psychosocial issues, as well as unusual exposure, such as the existence of several birds in the home, were identified and addressed by the educators working with the provider.

**Discussion**

Allergen levels demonstrated here are similar to those seen in the NCICAS study\(^5\) of inner-city United States populations and different from those seen in other populations.\(^30,37\) A high percentage of homes had cockroach antigen and a low percentage had mite antigen above NCICAS thresholds. The fact that cat allergen was above the NCICAS threshold in a large number of families that did not have cats also is consistent with previous literature\(^38\) and suggests that the allergen may be transmitted on clothing and therefore may be difficult to eradicate.

**Table 1—Demographic Characteristics of Families in the Study**

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>No. of Families</th>
</tr>
</thead>
<tbody>
<tr>
<td>Site of recruitment</td>
<td></td>
</tr>
<tr>
<td>Erie Family Health Center</td>
<td>33</td>
</tr>
<tr>
<td>Head Start Sites</td>
<td>29</td>
</tr>
<tr>
<td>Sex of children with asthma</td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>41</td>
</tr>
<tr>
<td>Female</td>
<td>21</td>
</tr>
<tr>
<td>Pets</td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>21</td>
</tr>
<tr>
<td>No</td>
<td>40</td>
</tr>
<tr>
<td>No. of smokers in the home</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>36</td>
</tr>
<tr>
<td>One</td>
<td>17</td>
</tr>
<tr>
<td>Two</td>
<td>8</td>
</tr>
<tr>
<td>Three</td>
<td>0</td>
</tr>
<tr>
<td>Four</td>
<td>1</td>
</tr>
<tr>
<td>Race/ethnicity</td>
<td></td>
</tr>
<tr>
<td>African American</td>
<td>12</td>
</tr>
<tr>
<td>Puerto Rican</td>
<td>24</td>
</tr>
<tr>
<td>Mexican</td>
<td>25</td>
</tr>
<tr>
<td>Non-Hispanic white</td>
<td>1</td>
</tr>
<tr>
<td>Age of child with asthma, yr</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>11</td>
</tr>
<tr>
<td>5</td>
<td>19</td>
</tr>
<tr>
<td>6</td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td>8</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td>4</td>
</tr>
<tr>
<td>11</td>
<td>2</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
</tr>
<tr>
<td>13</td>
<td>2</td>
</tr>
</tbody>
</table>
The higher levels of mite antigens on beds is also consistent with previous literature and suggests that mattress covers should be effective.

Conclusions about the effects of season on allergen levels must be viewed with caution in light of the relatively small number of samples collected each month. The seasonal nature of molds, with peaks in the late summer, however, has been reported in other studies. The suggestion that cockroach allergen may peak in May and June has not been found before and warrants further study. Our failure to find consistent seasonal effects on mites is not consistent with our previous study nor with some of the previous literature and may reflect the very low levels of mites found in the study.

These data imply that intervention strategies in inner city populations need to focus more than has been previously appreciated on cockroach control, on minimizing the use of pesticides, and on identifying possible sources of cat allergen. During the course of the study, it has also become apparent that, in a subset of homes, substantial structural problems in the housing unit may limit the effectiveness of traditional intervention approaches. When possible, families have adopted cost-effective strategies, such as caulking around leaks. In some cases, however, more extensive changes are necessary. The program was successful in convincing at least two landlords to institute changes, but this is not always feasible, and several of our families have moved to improve the environment for their children and are applying the knowledge gained in this project to their new living arrangement. As we gain more experience with housing conditions in the inner city, more extensive legislative and political action may be necessary to decrease exposure to asthma triggers.

Several issues have become apparent in this project that deserve mention. Half of the families that dropped out of the study did so before the first visit, in part...
because they moved, but in part because they did not appreciate the length of time involved in the intervention. Neither demographics (age, sex, years with asthma, language spoken at home), nor overall indexes of severity, such as lifetime asthma hospitalization rates or asthma-related emergency department visit rates in...
the last year, predicted who would drop out of the study. As a result of the early dropouts, we are delaying randomization in our current trials until the second visit, with more success. The mobility of our population was anticipated at the beginning of the study and, to some extent, was addressed by the overrecruitment. This issue is less important in our current trials in which the primary end points are asthma morbidity rather than home allergen levels. Finally, the seasonality apparent in the allergen levels was controlled in part by the randomized study design, but will also be addressed in the final data analysis.

Overall, the project has demonstrated that peer education focused on modification of the home environment in inner-city populations is feasible. The program has been well received by educators and families and has demonstrated that education through community residents can be beneficial both for the educators and participants. The upward mobility of our educators suggests that programs like these may be useful transitions from unemployment to other job opportunities.

The involvement by our participants has generally been positive, with two of the participants currently peer educators in other studies. Presentations in the community have also been well received and have alerted residents to issues related to asthma, not just environmental. The project has involved many Head Start and community agencies in the area and has contributed to overall awareness and knowledge about the disease in the targeted community.

In conclusion, this project has shown the feasibility of a peer educator program focused on modification of the home environment in an inner-city population. The baseline allergen levels presented here suggest that intervention programs must focus more than previously appreciated on elimination of cockroaches while minimizing the use of pesticides and on identification of the sources of cat allergen. Structural and psychosocial issues in homes need to be addressed in future intervention programs.

ACKNOWLEDGMENT: We are grateful to Ms. Cheryl Byers and the Head Start Programs in Chicago for their help in designing and implementing this project.

REFERENCES
5 Harving H, Korsgaard J, Dahl R. House-dust mites and associated environmental conditions in Danish homes. Allergy 1993; 48:106–109
18 Marks GB, Tovey EB, Green W, et al. The effect of changes in house dust mite allergen exposure on the severity of asthma. Clin Exp Allergy 1994; 25:114–118
40 Li DW, Kendrick B. A year-round comparison of fungal spores in indoor and outdoor air. Mycologia 1995; 87:190–195
41 Targonski PV, Persky WV, Ramakrishnan V. Effect of environmental molds on risk of death from asthma during the pollen season. J Allergy Clin Immunol 1995; 95:953–961