

Editorial

Cockroach allergy and urban asthma

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The article in this month's *Journal* by Rabito et al¹ provides evidence that cockroach extermination can be accomplished in urban homes and that cockroach numbers can be reduced for a year. This finding is not new,^{2,3} but they also show that disease control in asthmatic children living in these homes is improved, and this is new. They emphasize that placing insecticidal baits in the home is statistically more effective than letting families pursue their own pest control, but the difference was surprisingly small, and I would emphasize that both strategies led to a striking and prolonged reduction in cockroach infestation. Their most important finding is that this single intervention was associated with a statistically significant improvement in asthma morbidity. A *post hoc* analysis suggested that children sensitized to cockroach drove most of these changes.

These findings are both scientifically and practically important. Scientifically, the data strengthen the argument that indoor allergen exposure is causally related to asthma morbidity. In 1964, Austin Bradford Hill, an epidemiologist who helped prove that cigarette smoking had serious health effects, proposed a set of criteria to prove that an association of an environmental exposure with disease is a causal relationship.⁴ Allergy to indoor environmental allergens has fulfilled many of these requirements. What has been missing (or unconvincing) is what Bradford Hill called "experiment": reducing exposure to an environmental stress reduces disease or, in our specific case, reducing exposure to indoor allergens reduces asthma morbidity. This is a critical gap that has made environmental control a low priority in the clinical setting; because medication provides an effective control of asthma morbidity, who needs to add another complex and questionably effective treatment?

Clinical trials of the effects of reducing various indoor allergens other than cockroach have had disappointing results. House dust mite has been the target of many trials, with minimal effects on asthma morbidity.^{5,6} This might be expected from the difficulty of adequately reducing exposure to an allergen source that lives on human detritus in bedding and fabrics.

Animal allergens are carried on very small particles that remain airborne and adhere to surfaces and fabrics, making them stubbornly persistent for a year or more after a pet is removed.⁷ Clinical trials have been inconclusive.⁸ A recent trial of mouse allergen⁹ found no clinical effect despite a 46% reduction of

Mus m 1 levels in settled dust. A *post hoc* analysis of children in homes with greater than 90% reduction in mouse allergen showed significant symptomatic improvement, suggesting that more effective intervention strategies might be successful.

Earlier studies of interventions in urban homes show that symptoms slowly improve over the course of 6 months to a year.^{10,11} However, interventions in these studies have been complex, being directed at multiple allergens and pollutants, and it is difficult to dissect the contribution of cockroach extermination.¹² In addition, cockroach numbers are rapidly reduced in these studies,^{2,3} and numbers stay low for 6 to 12 months, as found by Rabito et al,¹ whereas symptoms improve gradually over 6 months to a year.

If cockroach numbers can be reduced within a month, why should it take so long for symptomatic improvement? The most obvious answer is that cockroach allergen is found in high concentrations in the debris composed of body parts and excretions found in the cracks and crevices where large numbers of the insects hide, as well as in their secretions that contaminate the walls, floors, and contents,¹³ and therefore it takes months to reduce exposure significantly, even with careful housecleaning.²

Given that the data in the article by Rabito et al¹ are important, how convincing are they? There are design weaknesses. The greatest is that the study was unblinded; the same personnel who visited the homes frequently to treat them and assess cockroach infestation also interviewed them almost monthly to assess the outcome. Investigator bias could have modified outcome assessment. A less important gap is that Table I lists baseline environmental data for only 77 of the 102 families, despite 1 entry criterion being cockroach infestation. The article does not include data for asthma-related outcomes, only the results of statistically modelled comparisons of treatment and control groups, and therefore we are not able to evaluate the timing of the effect or its magnitude. There is no CONSORT diagram, and therefore we have no details of participant flow. Despite these issues, the article is important and provides guidance for future studies.

The practical importance of the findings is that this might provide a public health treatment for asthma that does not depend on medication. Previous efforts to provide environmental treatment for low-income inner-city residents have been moderately successful but involve complex, difficult, and expensive regimens^{10,11,14} that are hardly likely to be adopted by cash-strapped cities. The article by Rabito et al¹ suggests that providing cockroach baits or perhaps just encouraging families to use insecticides on their own might be just as effective in reducing asthma morbidity as more complex strategies but at much lower cost. Given the excessive asthma morbidity seen in urban children, this would be a significant public health measure. If for no other reason than to benefit these children, the study should be repeated.

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