

PO Box 100296
Gainesville, FL 32610-0296

REFERENCES

1. Sheikh A, Smeeth L, Hubbard R. There is no evidence of an inverse relationship between T_H2 -mediated atopy and T_H1 -mediated autoimmune disorders: lack of support for the hygiene hypothesis. *J Allergy Clin Immunol* 2003;111:131-5.
2. Eisenbarth GS. Type 1 diabetes mellitus: a chronic autoimmune disease. *N Engl J Med* 1986;314:1360-8.
3. Atkinson MA, Maclaren NK. The pathogenesis of insulin-dependent diabetes mellitus. *N Engl J Med* 1994;331:1428-36.
4. Braun-Fahrlander C, Riedler J, Herz U, Eder W, Waser M, Grize L, et al. Environmental exposure to endotoxin, atopy and asthma in school-aged children. *N Engl J Med* 2002;347:869-77.

doi:10.1067/mai.2003.1649

Reply

To the Editor:

We are grateful to Dr Huang¹ for his observations on our article.² In response, we would like to reiterate that to minimize the possible effect of information bias, we chose not to rely on recall of atopic disease for the primary analysis and instead used a more objective contemporaneous definition that was based on skin prick test results. Regarding the relationship between atopic diseases and autoimmune disease history, there was, as we discussed in the article, likely to have been some ascertainment bias, which might have resulted in the observed positive association in our secondary analysis examining the relationship between atopic and autoimmune disease history.

Huang raises a number of concerns regarding the possibility of misclassification of those with a history of autoimmune disease. In relation to his point about the misclassification of type 1 and type 2 diabetes, we believe that this is likely to have happened in only a very few cases. This is because our definition of type 1 diabetes was based on current use of insulin but no use of oral diabetic drugs; the vast majority of people with diabetes treated only with insulin are likely to have type 1 disease. Misclassification of those with rheumatoid arthritis is also unlikely because there was a specific question asked in the NHANES III survey with the explicit aim of differentiating between rheumatoid arthritis and osteoarthritis. Although not all thyroid disease is autoimmune in origin, the large majority is, and any misclassification errors are therefore likely to be relatively few and are, as a consequence, unlikely to have altered the conclusions.

We do, however, concur with Huang that in our study we were focusing on adult outcomes in the relationship between T_H1 - and T_H2 -mediated disorders. Changes in the relationship between these conditions could well have occurred before the survey, but studying these would, as the author states, require a long-term cohort follow-up study from an early age.

Aziz Sheikh, MD, MSc, MRCP, MRCPa
Liam Smeeth, MD, MSc, MRCPb

^aDepartment of Community Health Sciences
University of Edinburgh

20 West Richmond Street
Edinburgh EH8 9DX
United Kingdom

^bDepartment of Public Health Sciences
St George's Hospital Medical School
Cranmer Terrace
London SW17 0RE
United Kingdom

REFERENCES

1. Huang SW. Is the "hygiene hypothesis" being challenged? *J Allergy Clin Immunol* 2003;112:461-2.
2. Sheikh A, Smeeth L, Hubbard R. There is no inverse relationship between T_H2 -mediated atopy and T_H1 -mediated autoimmune disorders: lack of support for the hygiene hypothesis. *J Allergy Clin Immunol* 2003;111:131-5.

doi:10.1067/mai.2003.1650

High-efficiency particle arrest vacuums and cat allergen exposure

To the Editor:

The recent article by Gore et al¹ in the April issue of the Journal presents data that demonstrate significant disparity between field and experimental chamber vacuuming, regardless of whether new high-efficiency particle arrest (HEPA) or older microfilter-containing vacuum cleaners were used. On the basis of these differences, the authors conclude that the best advice to cat owners is to remove the cat from the home. Several concerns about the methodology and the authors' interpretation of the data require clarification.

First, the experimental chamber used a finite amount of cat allergen (36 mg), and the room air was continuously being filtered with a HEPA filter, which might in part explain the differences between the 2 test conditions. Second, the authors do not clearly delineate baseline cat allergen levels in the carpets of field homes being tested, the cleaning practices of the residents over time, or other housing characteristics, all of which might have affected the results. If baseline cat allergen levels in the homes were significantly greater than in the experimental chamber, dispersion of allergen into the air by the vacuuming process itself could have been significantly increased well above airborne levels in the experimental chamber.

The authors conclude that HEPA vacuum cleaners are inadequate as an intervention in cat-sensitized homeowners and that the treatment of choice is removal of the cat from the home.¹ Although no one would dispute this latter statement, most clinical allergists recognize the futility of this recommendation. Approximately one third of the US population owns a cat, and most atopic individuals refuse to comply when asked to remove the cat from the home.² Therefore clinicians need to develop alternative ways in which cat-sensitized individuals can coexist with their pets. The data presented by Gore et al¹ reveal important insights into real-life exposures that can only be resolved by means of further remediation-health outcome studies. van der Heide et al³ previously demonstrated that multiple interventions (bedding encasements

and HEPA air cleaners) were successful in reducing allergen levels and airway hyperresponsiveness. This suggests that multiple interventions (ie, removal of carpets from the bedroom, keeping the cat out of the bedroom, HEPA filter in the bedroom, bedding encasements, and frequent vacuuming with a HEPA vacuum) might be effective in reducing allergen load and improving clinical outcomes.² It should also be pointed out that allergic patients are often instructed to have other members of the home perform vacuum cleaning or, if they have to vacuum, to wear a mask and leave the room for 1 to 2 hours until airborne dust settles.

In summary, the conclusions by Gore et al¹ should be tempered by real-life clinical situations. Researchers must recognize that all-or-none recommendations are not always practical. A more reasonable conclusion would be to recommend multiple intervention approaches that might reduce cat allergen exposure.

Jonathan A. Bernstein, MD
University of Cincinnati College of Medicine
231 Albert Sabin Way, ML#563
Cincinnati, OH 45267-0563

REFERENCES

1. Gore RB, Durrell B, Bishop S, Curbishley L, Woodcock A, Custovic A. High-efficiency particulate arrest-filter vacuum cleaners increase personal cat allergen exposure in homes with cats. *J Allergy Clin Immunol* 2003;111:784-7.
2. Bernstein JA. Allergic rhinitis and asthma: the role of allergen avoidance. *J Respir Dis* 2002;23:572-80.
3. Van der Heide S, Kauffman HF, Dubois AE, de Monchy JG. Allergen reduction measures in houses of allergic asthmatic patients: effects of air cleaners and allergen-impermeable mattress covers. *Eur Respir J* 1997;10:1217-23.

doi:10.1067/mai.2003.1669

Reply

To the Editor:

In Dr Bernstein's response¹ to our article on high-efficiency particle arrest filter vacuum cleaning,² he argues that baseline allergen exposure in the experimental chamber could have been much lower than baseline levels in the homes with cats and that had cat allergen reservoir levels been measured, a different interpretation of the data might have been made. This argument reinforces the point we made in the article: allergen exposure in the experimental chambers has been used as an unofficial gold standard on the basis of which recommendations are made to patients. However, its single role must only be to assess the allergen leak from a vacuum cleaner. Baseline values in the experimental chamber will be lower than those in homes with cats: the walls and the air of the chamber are cleaned between tests. This is necessary for the experimental chamber to serve as a robust model for assessing vacuum cleaner leakage. Comparison should not be made between baseline exposures in the home and those in the experimental chamber.

Dr Bernstein states that multiple interventions could be effective in improving clinical outcomes. There is little evidence that even a combination of different measures has a beneficial effect if asthmatic patients with pet allergy refuse to remove the pet to which they are sensitized. In a study of allergen exposure reduction with the pet in situ,³ the combined use of air cleaners in bedrooms together with mattress and pillow covers and cat exclusion from the bedroom resulted in no improvement in any clinical parameter, despite a reduction of around one third in airborne cat allergen. A recent study in our unit demonstrated only a small clinical effect in asthmatic patients with pet allergy living in homes with pets after the use of air filtration units in both bedroom and living room.⁴ Furthermore, compliance with multiple interventions must be considered: carpet removal, partial pet exclusion, twice weekly pet washing, and mask wearing are onerous. Without compliance with other measures, the purchase of an expensive vacuum cleaner would be ill advised. We agree that the vacuuming process itself could represent part of the problem.

On the basis of current best evidence, we concluded that "cat removal remains the best advice to cat allergic patients who experience symptoms upon exposure and who wish to reduce their exposure."² Some adults will want to take this advice or to take it on behalf of their children. Half-hearted measures resulting in a modest reduction in allergen exposure are unlikely to result in clinical improvement. Currently, none of the proposed interventions for allergen reduction with pets in situ seems effective enough when a constant source of allergen remains present in the home. We should be giving the best possible advice to our patients, and it is up to them to make the decision whether to comply with this advice. To compare this with another environmental intervention, we do not recommend smokers to give up tobacco a little bit but counsel them strongly to stop smoking altogether.

Robin B. Gore, MD, MRCP
North West Lung Centre
Wythenshawe Hospital
Southmoor Rd
Manchester M28 1FT
United Kingdom

REFERENCES

1. Bernstein JA. High-efficiency particulate arrest vacuums and cat allergen exposure. *J Allergy Clin Immunol* 2003;112:462-3.
2. Gore RB, Durrell B, Bishop S, Curbishley L, Woodcock A, Custovic A. High-efficiency particulate arrest-filter vacuum cleaners increase personal cat allergen exposure in homes with cats. *J Allergy Clin Immunol* 2003;111:784-7.
3. Wood RA, Johnson EF, van Natta ML, Chen PH, Eggleston PA. A placebo-controlled trial of a HEPA air cleaner in the treatment of cat allergy. *Am J Respir Crit Care Med* 1998;158:115-20.
4. Francis H, Fletcher G, Anthony C, Pickering C, Oldham L, Hadley E, et al. Clinical effects of air filters in homes of asthmatic adults sensitized and exposed to pet allergens. *Clin Exp Allergy* 2003;33:101-5.

doi:10.1067/mai.2003.1670