

The consumer and indoor aeroallergen control

Key words: Consumer, aeroallergen control, manufacturer, dust prevention

The estimated prevalence of asthma and allergic rhinoconjunctivitis in some developed countries exceeds 30%,^{1,2} and various studies suggest that indoor allergen exposure accounts for the increase in these diseases. Individuals in developed countries spend more than 90% of their time indoors, and, as allergen inducers, indoor allergen exposure is more important than outdoor allergen exposure. A dose-response relationship has been established between exposure and sensitization for mite, cockroach, cat, and dog allergens.³ Sensitization to mites (*Dermatophagoides* spp), German cockroach (*Blattella germanica*), American cockroach (*Periplaneta americana*), rat (*Rattus norvegicus*), and mouse (*Mus musculus*) are associated with asthma in North American cities.³ However, cats and dogs are the most important sources of indoor allergens in northern Scandinavia and in the US mountain states.^{4,5}

Because there is abundant scientific evidence that allergen avoidance effectively ameliorates allergic symptoms, medical and lay health professional organizations have recommended various guidelines for allergic subjects encouraging use of certain techniques and products for optimal indoor allergen avoidance.^{3,6} Allergen avoidance products are widely advertised and can be purchased directly from the manufacturer, from a retail store, or through the Internet. Among such products are bed encasings, vacuum cleaners and bags, face masks, filters for air conditioning systems, central and room air purifiers, acaricides, and "dust-free" toys. The effectiveness of many of these products to improve indoor air quality and decrease allergen exposure has not been scientifically established.⁷ Most manufacturers do not document the efficacy, cost-effectiveness, and time-related limitations of their products. The print and electronic media also disseminate advertisements attesting to the worthiness of air conditioning duct cleaning and the use

Abbreviation used

ASHRAE: American Society of Heating, Refrigerating, and Air Conditioning Engineers

of their bedding encasings that contain "antibacterial agents effective in eliminating dust mites" or "anti-dust mite fibers for eliminating allergy-causing insects" without providing the data to support their claims. Thus, in spite of all the available information about indoor allergen control, the consumer is not given sufficient information from the physician or is without a rational basis to decide what is or what is not effective in controlling and decreasing indoor allergen exposure.

Vinyl covers are commonly used to encase pillows and mattresses and box springs. However, because they are impermeable to air, they are hot and uncomfortable. Perhaps this is a major reason for the lack of compliance with conventional allergen covers because fewer than one third of allergic subjects for whom bed covers are prescribed actually use them.⁸

Air purifiers also are available in a wide range of prices and models and are promoted for routine use everywhere, although Tovey and Marks⁷ indicate that air purifiers are not, in and of themselves, an appropriate solution for indoor allergen control and clinical benefits are not documented. Therefore, although they are not recommended for allergic subjects, especially if more effective control measures have not been instituted in the home, they are widely used by the allergic consumer. So too are "ionizers," for which there are no studies to provide scientific evidence or efficacy for anything.

Vaughan et al, in this issue of the Journal, describe standardization techniques used to assess the effectiveness and leakage of vacuum cleaners and bags for Fel d 1 and conclude that allergen leakage was reduced in vacuum cleaner systems studied compared with those studied in 1993.⁹ However, they suggest that vacuum cleaners and bags need further improvement because some Fel d 1 leakage occurs in all systems, that their methods of testing allergen leakage with Fel d 1 should be applied to all vacuum cleaners and bags recommended for allergic subjects, and that long-term studies with vacuum cleaners are necessary to ascertain whether day-to-day use affects their efficacy.

In a study published in 1999 these same authors also demonstrated that fabrics with a pore size of 6 μ m still permit air exchange and impair passage of both group 1 mite and Fel d 1 cat allergens.¹⁰ However, information about the pore size of most permeable encasings is currently not provided to the consumer, leaving the consumer with no information about material pore size and

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Supported by the Division of Allergy and Immunology, Joy McCann Culverhouse Airway Disease Research Center, Department of Internal Medicine, College of Medicine, and the James A. Haley Veterans Administration Hospital, Tampa, Fla.

Received for publication Aug 5, 1999; accepted for publication Aug 17, 1999.

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J Allergy Clin Immunol 1999;104:914-6.

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its capacity to prevent aeroallergen passage. In addition, when such products are good allergen barriers, there have been no long-term studies to assess the duration of effectiveness of such fabrics under use.

Guideliness and experimentally standardized cost-effective techniques for products and procedures are essential for manufacturers to establish efficacy of their allergen control products. A national medical organization, such as the American Academy of Allergy, Asthma, and Immunology or a lay organization, should become a consumers' advocate in this important area. They should establish such guidelines and experimental techniques to verify the efficacy of products and procedures, and after such verification approve them with their stamp of approval. When the consumers recognize this imprimatur, they will understand that the product or procedure is reliable and worthy of purchase, and physicians will instruct their allergic patients to look for this stamp of approval (Fig 1).

Such precedent exists: the American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE) is an international organization of more than 50,000 members organized for the purpose of advancing the technology of heating, ventilation, air conditioning, and refrigeration for the consumer. ASHRAE writes standards that set uniform methods of testing and rating all such equipment, and most manufacturers of these products indicate that theirs are approved by ASHRAE. The Emergency Case Research Institute is another nonprofit health services research organization and a collaborative center of the World Health Organization. It is also committed to analysis of the safety, efficacy, and cost-effectiveness of health care technology and procedures. For example, they approve products such as air purifiers, assisted ventilation equipment, catheters, pacifiers, and other items. Another example is *Consumer Reports*, which gives consumers an evaluation of the quality of many products, exemplified by their tests of effectiveness of vacuum cleaners recommended for allergic subjects with ultrafine particles of silica sand and talcum powder.¹¹ Although the methods used discriminate one vacuum cleaner and bag from another, the testers extrapolate their results to pollen grains, not important indoor allergens, which have an average size of 30 μm , much larger than mite, cockroach, cat and dog allergens. Although these results are of some value to the consumer, they are not reflective of the cleaner's capacity to filter most indoor allergens.

It is critical to establish standards of quality for indoor allergen control products and procedures and give the consumer assistance to accept only what is effective. There is scientific evidence to establish such standards for encasings, vacuum cleaners and bags, and filtration systems. Techniques need to be developed for other products or procedures promoted by industry in the name of dust control. For example, there are no known standards to determine whether duct cleaning is effective, and duct cleaning is a multimillion dollar business.

An organization such as the American Academy of Allergy, Asthma, and Immunology can play a crucial role

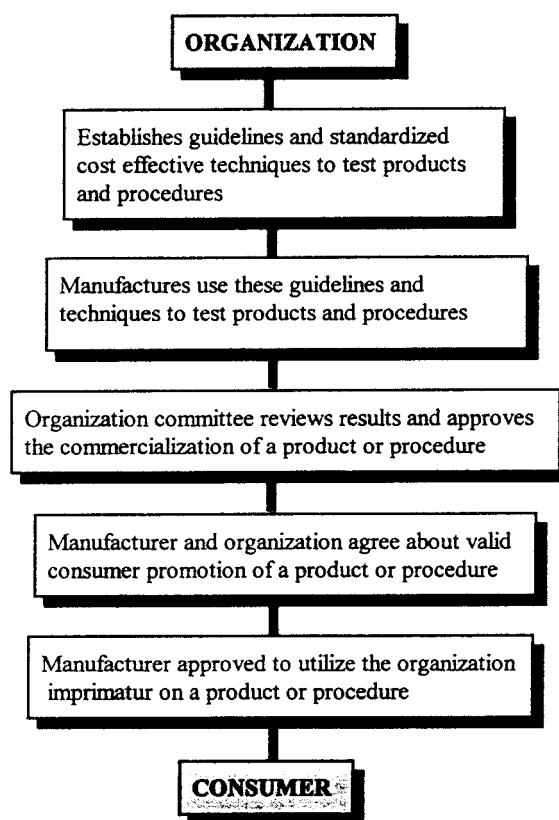


FIG 1. Proposed method to assist consumer with indoor environmental control.

in helping the consumer who has allergic diseases by developing standard techniques for products and procedures used for indoor aeroallergen control, publishing patient brochures on valid antiallergic measures, including in its website a section where the consumer can find advice about what is and what is not effective, and placing its imprimatur on products and procedures shown to be effective.

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