Author's response to reviews

Title: Mitigation of asthma triggers in indoor air: An inter-comparison of ventilation/filtration options for residences

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Author's response to reviews: see over
Dear Dr. Ozonoff:

Thank you for your letter this week regarding our manuscript referenced above that was submitted for possible publication in *Environmental Health*. I appreciate the opportunity to address the principal comments expressed by the reviewers of our manuscript.

One topic of primary concern is the validity of the CONTAM indoor air quality used in our analysis. CONTAM was developed over many years by the National Institute of Standards and Technology (NIST). Performance of CONTAM has been evaluated extensively by researchers from NIST, the U.S. Environmental Protection Agency, and other organizations. Simulation of inter-zonal air flow, ventilation rates, and concentrations of gaseous and aerosol pollutants with CONTAM was considered in those performance evaluations.\(^1\text{,}^2\text{,}^3\text{,}^4\text{,}^5\) The model was determined to perform satisfactorily in all cases. For instance, Emmerich et al. 2000 conducted a validation experiment in which the effectiveness of air cleaners was tested. In this report, the authors determined that the measured particle levels were within 30% of values modeled with CONTAM, a finding of special relevance to our application of the model. To address the concerns raised by the reviewers, I suggest revising our manuscript to include (1) a concise summary of the model performance studies in the Methods section and (2) a brief discussion of the implications of the model performance studies on our findings in the Discussion section.

A second concern raised by the reviewers related to a prior study of indoor air cleaners completed by our team. That manuscript on an empirical study of air cleaners in a full-size test home was in peer review at the time that we submitted the present paper to *Environmental Health*. Since then the test home study was accepted for publication in the *Journal of the Air and Waste Management Association (AWMA)* (SEE ATTACHED). The paper that will appear in

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\(^1\) Emmerich, S., et al. (2000). Measurement and Simulation of the IAQ Impact of Particle Air Cleaners in a Single-Zone Building. Gaithersburg, MD, National Institute of Standards and Technology.


AWMA contains detailed results from our experimental evaluation of single-pass removal efficiencies and first-order removal rates for numerous particle sizes effected by various portable and in-duct air cleaning devices in an instrumented test home. Removal efficiency and rate data for each of the air cleaning technologies measured in that study were used as inputs to the modeling study submitted to your journal. Thus, our CONTAM simulations of bioaerosol and ETS control by air cleaners are grounded in empirical size-specific measurements. I believe that the addition of a more complete description of the relevance of our prior work to the paper submitted to *Environmental Health* would provide the clarity to this topic sought by the reviewers.

Finally, one reviewer expressed concern about the source of the funding for our work in relation to findings. The empirical data on removal efficiency and rates used in our modeling paper were based on our prior measurements of an in-duct air cleaner manufactured by Trane Residential Systems. However, any in-duct system with the same particle-size specific removal efficiency or any portable system with an equivalent clean air delivery rate would have approximately the same effectiveness as the Trane system that we modeled. The comment from Reviewer 3 suggests that point should be stated more explicitly in the paper. I suggest adding that point to the discussion section of a revised version of the paper.

I hope that this letter addresses your immediate concerns regarding our manuscript. Upon your request, I look forward to providing a revised manuscript to you for further consideration, along with a detailed response to each comment provided by the reviewers. Please contact me if you wish to obtain any further information about our research.

Sincerely,

Ted Myatt, Sc.D.