National Institute for Occupational Safety and Health/Center for Disease Control and Prevention is to be commended for supporting and participating in the investigation.

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Authors' Response

To the Editor:

We appreciate the opportunity to respond to the comments by Drs Liss and Sussman. Their suggestion that this study[1] was difficult to complete and is unlikely to be replicated is very accurate.

The study protocol included a number of steps that were taken in an attempt to avoid potential limitations that may have hampered the strength of conclusions from previous similar studies.[2] We included a preintervention phase of adequate duration to document a current incidence rate of sensitization to latex. To increase accuracy in evaluating sensitization, every skin-prick test (SPT) to latex and controls was performed by the same individual in duplicate. In addition, each result was evaluated by a second investigator, after transfer of the ink outline of the wheal and flare to paper.

The longitudinal data obtained from this study permitted an evaluation of the effectiveness of the glove intervention. The outcome event in the study was the conversion of subjects from SPT-positive to SPT-negative, and vice versa. The interval of time during which the conversion occurred was determined. Such data are often referred to as grouped survival data. We used a time-to-event data-analysis approach to estimate the rates of conversion; and to test the significance of differences in conversion rates between the pre- and postintervention periods. After the intervention, new latex sensitization rates declined 16-fold, and 25% of previously sensitized employees reverted to negative SPTs.

We agree with comments that despite a careful design, there remained some limitations to the study. Postintervention, skin testing was only available for two-thirds of the cohort. However, we used historical employee turnover rates in each hospital to allow us to calculate the appropriate number of participants, so that at the conclusion of study there remained sufficient statistical power for meaningful comparisons. In addition, because of the longitudinal nature of the study, it was not necessary to enroll the entire cohort of employees. This design allowed us to identify important differences in employee turnover that occurred between nonsensitized and sensitized workers.

The authors of the letter mentioned the nine Bradford-Hill[3,4] criteria (strength of association; temporality; consistency; theoretical plausibility; coherence; specificity in the causes; dose–response relationship; experimental evidence; and analogy) for determining cause and effect in epidemiology studies. Our study showed a strong dose–response relationship between the measured latex antigen exposures and the likelihood of latex sensitization; the SPT reaction is quite specific for antibody to latex-related antigens; and importantly, the prospective nature of this study adds the element of temporality to the arguments for causality.

We believe this study provides confirmation that the dramatic rise of latex allergy in health care workers was due to latex antigen exposure from powdered latex gloves. What remains uncertain is whether exclusive use of powder-free latex gloves with low allergen will completely eliminate symptomatic latex allergy in health care. The rare sensitization we observed after the intervention could have been related to the cumulative exposure before the intervention or because of continued allergen exposure even from gloves with diminished allergen content and minimal potential to generate aeroallergen.

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