

A Different Type of Second Wave: A Predicted Increase in Personal Protective Equipment–Related Allergic Contact Dermatitis as a Result of Coronavirus Disease 2019

To the Editor:

The enhanced protective measures enacted during the SARS-CoV-2 (severe acute respiratory syndrome coronavirus 2) coronavirus disease 2019 (COVID-19) pandemic have resulted in the increased use of personal protective equipment (PPE) by both health care workers (HCWs) and population at large. Gloves, face masks, gowns, and other PPE, once reserved for only certain “high-risk” medical encounters, have now become commonplace in hospital and everyday community settings. Although these preventive measures are beneficial to mitigating COVID-19 spread, we predict that increased and prolonged skin exposure to known sensitizers in gloves, face masks/shields, and other PPE will lead to a surge in PPE-related allergic contact dermatitis cases in the months to come.

Such a phenomenon is not without precedence. In a comparable situation in 1987, the Centers for Disease Control and Prevention responded to the human immunodeficiency virus epidemic

and rising incidence/detection of other blood-borne diseases by implementing the “Universal Blood and Body Fluid Precautions” or “Universal Precautions.” These precautions expanded the use of PPE in health care settings to prevent HCWs from exposure to increasingly prevalent blood-borne pathogens.¹ After its implementation, the use of natural rubber latex gloves by HCWs rose by approximately 1,000% between 1987 and 1996.² Data from the North American Contact Dermatitis Group show a sharp increase in the prevalence of allergic contact dermatitis to rubber accelerator chemicals, particularly carbamate mix and thiuram mix, found in natural and synthetic rubber gloves in the years immediately after the implementation of universal precautions (Fig. 1).^{3–6} Mirroring this rise was a stark increase in the prevalence of immediate-type hypersensitivity reactions to natural rubber latex proteins among HCWs and their patients.²

Accordingly, we predict a similar surge in PPE-related allergic contact dermatitis as a direct result of PPE COVID-19 precautions. Skin damage secondary to the PPE use during the COVID-19 pandemic is already being reported in the popular press, and HCWs are not likely to be the only ones affected. Broad community use of PPE creates a markedly larger exposed population, and even with

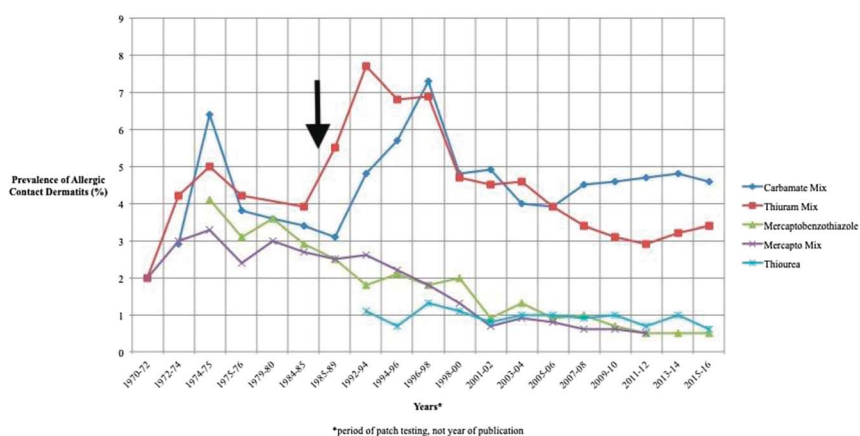


Figure 1. North American Contact Dermatitis Group patch test results for select rubber accelerator chemicals (carbamate mix, thiuram mix, mercaptobenzothiazole, mercapto mix, and thiourea) from 1970 to 2016. The arrow approximately indicates the release of the Centers for Disease Control and Prevention's “Universal Precautions” in 1987.

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the relaxing of social distancing requirements, PPE use will most likely continue to linger in the community, if not to expand even more as businesses begin to reopen with new PPE guidelines/requirements. This risk is compounded by the fact that not only is use of PPE increased but also is the duration of use. Increased duration of PPE use not only allows for prolonged exposure time to allergens but also leads to increased sweating that reduces the protective properties of the skin barrier while also acting to increase the release of thiuram and carbamate chemicals in rubber gloves, allowing for increased allergen penetration.⁷

History has shown allergic contact dermatitis to be a lagging indicator of change in exposure secondary to infectious outbreak policy changes, and we expect the COVID-19 pandemic to be no different. With an already high use of PPE, which is only likely to continue in the months ahead, dermatologists should prepare to offer increased guidance and treatment of these resultant skin reactions.

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Comparison of Allergic Contact Sensitization Prevalence Between Children and Adults: A 10-Year Retrospective Study

To the Editor:

Allergic contact dermatitis (ACD) was once thought to affect mainly adults. However, up to 20% of children with dermatitis may have ACD.¹ Children are more exposed to different products than adults, leading to unique sensitization profiles.¹ The aim of this study was to compare ACD frequencies between children and adults patch tested at the Massachusetts General Hospital.

Patients with suspected ACD, evaluated between January 1, 2007, and December 31, 2016, were patch tested with the North American Baseline Series (Chemotechnique, Vellinge, Sweden) at the Massachusetts General Hospital Contact Dermatitis Clinic. Patient information was extracted retrospectively from electronic records. Patch testing techniques were in accordance with the International Contact Dermatitis Research Group recommendations.² Patch tests remained in place for 48 hours and were evaluated after 72 or 96 hours. Reactions were interpreted as possible, probable, definite, past, or unknown relevance. Possible, probable, definite, and past relevance were considered relevant positive patch test (RPPT) reactions.³ Patients were stratified by age: children (younger than 18 years) and adults (18 years or older) for comparison of RPPT using a 2-tailed χ^2 test or Fisher exact test, where appropriate. Statistical analyses were performed using SAS 9.4 (SAS Institute Inc, Cary, NC). $P < 0.05$ was considered statistically significant. The Partners Institutional Review Board approved this study.

A total of 2373 patients (79 children and 2294 adults) were included in the study. In patch-tested children, the mean (SD) age was 12.4 (4.2) years, and the median age was 14 years. The number of children by age group was 10 (12.7%) in 0 to 5 years old, 17 (21.5%) in 6 to 11 years old, and 52 (65.8%) in 12 to 17 years old. Forty-three children (54.4%) and 652 adults (38.4%) had a history of atopic dermatitis (AD). One or more positive patch test (PPT) reactions were observed in 48 children (60.7%) and 1379 adults (60.1%), and 1 or more RPPT reactions were observed in 38 children (48.1%) and 1085 adults (47.9%). Thirty-five children (43.0%) and 1119 adults (48.8%) had a final diagnosis of ACD. Sensitization frequencies are shown in Table 1. In children, PPT and RPPT frequencies were highest with nickel (26.3%/15.8%), cobalt (15.3%/6.9%), and methylisothiazolinone (12.5%/12.5%). In adults, PPT and RPPT frequencies were highest with nickel (19.5%/13.2%), fragrance mix I (14.9%/14.4%), and balsam of Peru (13.8%/12.3%). The RPPT% was more prevalent for lanolin and less prevalent for fragrance mix I and balsam of Peru in children ($P < 0.05$).

We found that children and adults have similar prevalence of ACD, consistent with previously published data.³ Children were more likely to be sensitized to lanolin, an emollient derived from sheep's wool, than adults. A retrospective study showed that children with AD were more likely to be sensitized to lanolin than children without AD.⁴ All children who were sensitized to lanolin in our cohort had a history of AD (Table 1) possibly because of frequent exposures to lanolin-containing products in AD children and the increased absorption of products in atopic skin.⁴ Children were less likely to be sensitized to fragrances. Previous studies have demonstrated that fragrance allergy increases with age because of cumulative exposures.⁵ Limitations include the retrospective nature of our study and smaller pediatric cohort compared with adults, leading to unequal variances. Our findings

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