Correspondence

PREVALENCE OF LATEX ALLERGY

To the Editor:

I am writing in response to Dr. Yeang's article "Prevalence of latex allergy may be vastly overestimated when determined by in vitro assays."[1] Positive predictive value (PPV) is dependent on both test specificity and the prevalence of the condition in the population. As prevalence declines, so does the PPV; therefore, the author is correct in stating that the prevalence may be overestimated when the true prevalence is low. Alternatively, imperfect sensitivity leads to underestimates of prevalence. However, this is also true when determining the prevalence by skin prick testing (SPT).

SPT is not 100% sensitive and specific. SPTs can be falsely negative or positive.[2] The Allergy Report states that some patients who have a strong history of systemic reactions may have negative skin tests for IgE to suspected allergens[3]; clinical symptoms strongly suggestive of latex allergy can often not be confirmed with SPT.[4] Up to 60% of positive SPTs to foods and up to 50% of positive SPTs to latex do not reflect symptomatic allergy.[5,6]

There is no gold standard for the diagnosis of allergy[2]; the closest thing is probably challenge testing. However, sensitivity and specificity of available diagnostic testing methods are determined by comparison to clinical history in the case of SPT or clinical history and/or SPT in the case of serologic testing. This has led to reporting of a wide variety of sensitivities and specificities of both SPT and in vitro testing.

My review of the literature on the prevalence of latex sensitization has not revealed major differences between studies using SPT or in vitro tests. A wide range of prevalence rates are reported for both methods. Rates in healthcare workers range from 2.9% to 22% when determined by SPT, and 2.9% to 12% when determined by in vitro methods. Rates in persons without occupational exposure to latex have rates ranging from 0.12% to 9% when determined by SPT, and 2% to 12% when using in vitro testing.

In conclusion, it is clear that both SPT and in vitro tests have less than perfect sensitivity and specificity. However, exclusive emphasis on specificity without regard for sensitivity adds little to further understanding of the prevalence of latex allergy.

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Response:

Dr. Page feels that I have placed undue emphasis on test specificity while neglecting test sensitivity in interpreting latex allergy prevalence estimated from in vitro assays. It is true that, just as imperfect specificity of an assay can inflate the apparent prevalence, imperfect sensitivity can also lead to a decreased estimate. However, in the low-prevalence situation that I draw attention to, the potential error in underestimation generated by imperfect sensitivity pales in comparison to the potential error in overestimation that can result from imperfect specificity. An example here will serve to illustrate the point.

To begin with, let us average up the test sensitivities and specificities claimed by manufacturers of the three Food and Drug Administration-endorsed commercial latex diagnostics to derive representative sensitivity and specificity figures. We arrive at 84% for sensitivity and 92% for specificity. Let us say that the true prevalence of latex allergy in the general population were 1 in 1,000, or 0.1% (ie, of an order reported by some research groups[1,2]). According to *Equation 1* in my paper, a hypothetical assay with 84% sensitivity and perfect specificity would give a prevalence estimate of 0.084%, which is approximately 5/6 by proportion of the true prevalence. Thus, the imperfect sensitivity alone does not place the prevalence estimate outside the ballpark. In contrast, an assay with perfect sensitivity and 92% specificity would give an estimate of 8.092%, representing a massive 80-fold inflation. The figure hardly shifts although both assay sensitivity and specificity were imperfect. Thus, an assay with 84% sensitivity and 92% specificity gives a prevalence estimate of 8.076%. It can be seen from this that the influence of imperfect sensitivity is negligible where the true prevalence is very low, and the overwhelming weight of the error comes from the overestimate that has resulted from imperfect test specificity. This example underscores how imperfect test speci-