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How to use Peanut IgE Levels to Predict Challenge Outcomes in the Pediatric Population

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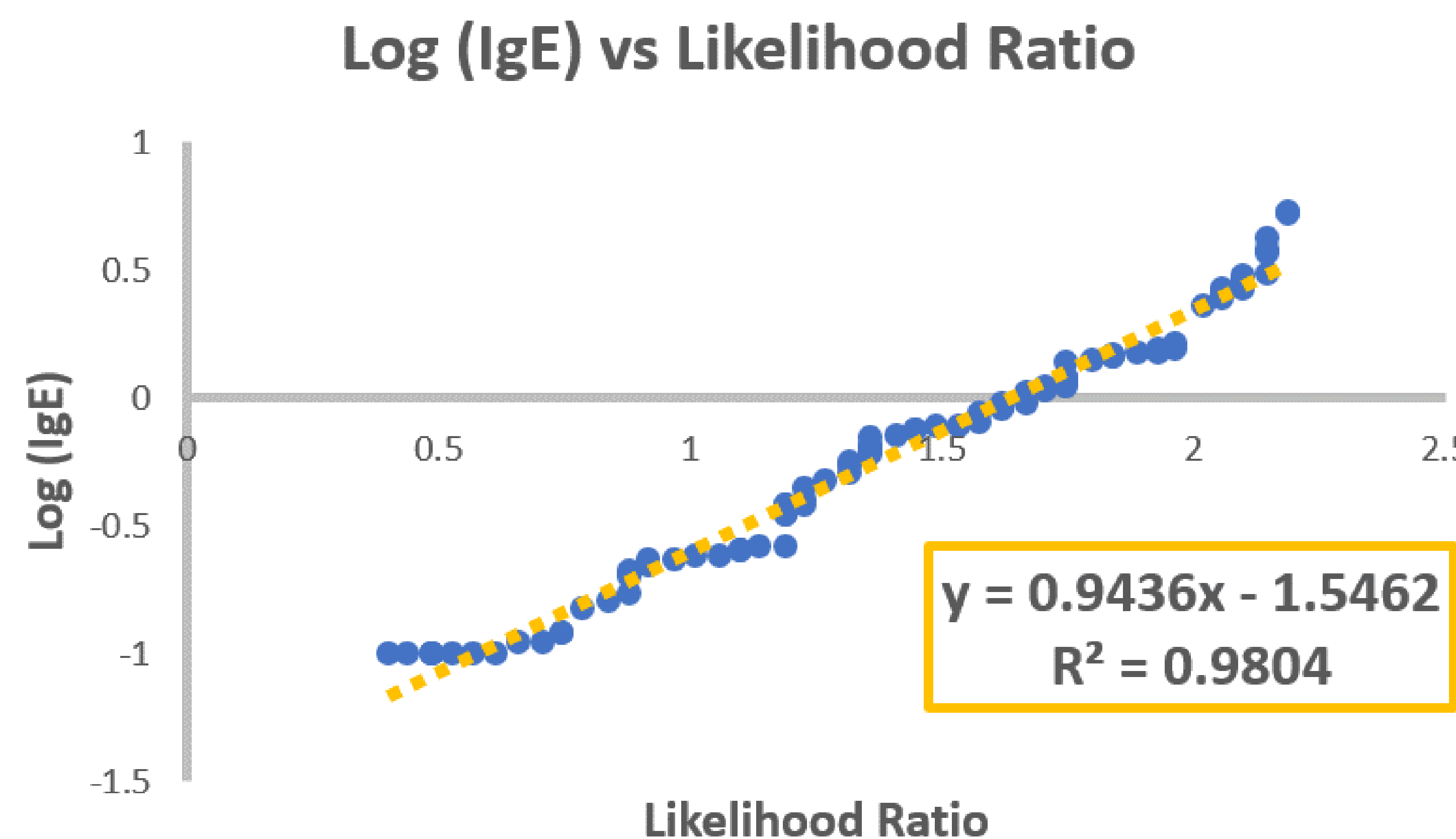
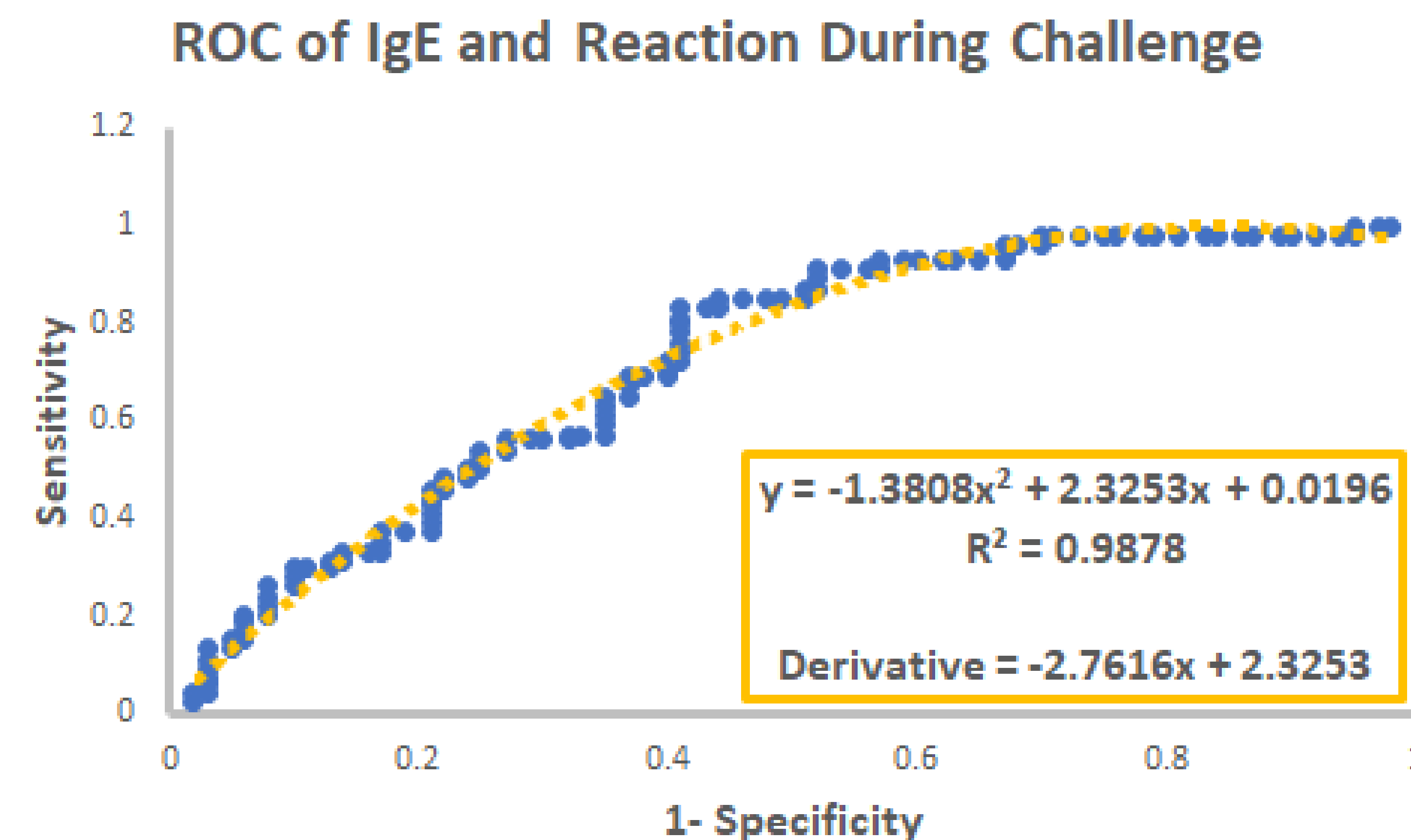
Introduction

The accepted clinical practice is to consider oral challenge when peanut IgE levels are 2.0 or less in patients with a history of a major reaction or less than 5.0 in patients with only sensitization. Certain patients are predisposed to having increased IgE levels, and these patients are often not offered challenges due to their elevated numbers.

Methods

Unidentified patient information through REDCap was reviewed on peanut IgE levels and oral challenge outcomes. 117 peanut challenges were reviewed from patients less than 18 years old. 53 patients had a reaction. We performed a ROC using SPSS from IBM and the points from the ROC curve were used for an exponential regression. Since the likelihood ratio is the derivative of the ROC, the derivative of the graph was obtained. Then the Log (IgE) was plotted vs likelihood ratio so an IgE level can be obtained from a given likelihood ratio based off the ROC.

Results



The results from the points on the ROC created an exponential regression of $-1.3808x^2 + 2.3253x + 0.0196$ with an r value of 0.9878. The area under the curve was 0.716 (CI 0.623-0.809). The derivative was then $-2.7616x + 2.3253$, which would represent the likelihood ratio. Then the Log (IgE) was plotted with the likelihood ratio which gave a linear regression of $0.9436x - 1.5462$ with a r value of 0.9804. An example would be given a likelihood ratio of 1 the IgE would be 0.25

Conclusions

It is important to remember that every patient is different, and the risk associated with oral challenge varies based on the clinical history. Shouldn't the cut-off of peanut IgE be dynamic? Using the likelihood ratio as opposed to a set threshold IgE level enables us to better predict the possibility of a reaction. By using the patient-specific likelihood ratio, we were able to find an equation to allow us to calculate a more meaningful IgE cutoff for each patient.

References

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