Evaluating Predictability

To the Editor:

I found the data from Canto et al.’s article, “Comparison of IOL Power Calculation Methods and Intraoperative Wavefront Aberrometer in Eyes After Refractive Surgery”1 in the July issue meaningful and thank them for sharing it with the Journal. As we strive for improved predictability in our intraocular lens (IOL) calculations, particularly in the more difficult to predict eyes after keratorefractive surgery, analyzing the data from newer devices and a selection of IOL calculation formulas can potentially change the way we take care of our patients.

One of the more notable findings in Canto et al.’s study was that the standard deviation, the best statistical descriptor of the “spread of the data” used (aka, “predictability”), was lowest for the “ASCRS estimation,” followed by the “IOLMaster keratometry,” estimation, “ORange,” and average keratometry estimation” when looking at the “Absolute Mean Prediction Error” data. This occurred despite the authors not using historical, pre-refractive surgery, data. As the authors mention, historical data would be expected to improve further the predictability of the ASCRS estimation. Perhaps many of the Journal’s readers do use historical data, when available, to help with these calculations.

The authors describe the lower “Mean Prediction Error” with ORange and conclude that it was the most “accurate” method. Although the “Mean Prediction Error” was lowest for ORange in the data presented, it is important to remember that it is a low standard deviation that ultimately describes predictability and defines a “tight” data set. If the prediction error is off target, simple nomogram adjustments will be expected to improve the prediction errors (accuracy) of subsequent treatments. I am not sure whether the lower standard deviation in the ASCRS estimation was statistically significant (I would expect that it is, given the magnitude of the difference and the number of eyes studied), but it is an important finding in the authors’ study that was not discussed.

REFERENCE


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Reply

We thank Dr. Davidorf for his careful reading of our article and we appreciate his constructive comments. He is right to point out that there are two different facets that can be examined in the analysis, namely (1) the accuracy and (2) the precision of each method. In our analysis, we chose to focus on accuracy (ie, answering the question of how successfully each method predicted emmetropia). Alternatively, one could look at the precision of each method and calculate a nomogram in which to correct for any deviation from the target. Given the relatively low number of eyes in this analysis, we do not believe we have the appropriate data to construct such a nomogram but agree that this would be an excellent focus of a future study.

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