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In Reply To: “Validating an HIV Risk Score” (AJEM9872)

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HIV; emergency department; clinical decision instrument

We appreciate the correspondence and interest in our study. However, in spite of the concerns raised, we believe our data and findings as reported demonstrate the potential value of an empirically-developed clinical prediction instrument (in this case, an abbreviated version of the Denver HIV Risk Score) for identifying patients at increased risk for undiagnosed HIV infection in an urban emergency department (ED).¹ The Denver HIV Risk Score was not developed as an instrument to precisely quantify a patient's HIV risk, but rather to categorize patients into differing risk strata in order to help clinicians identify patients who should or should not be offered HIV testing. A goal in developing this clinical prediction instrument, therefore, was to assess how well it performed across different populations and settings, including in two EDs in Baltimore, Maryland. In these instances, and including the work reported in our article in this Journal, the Denver HIV Risk Score has performed very well.¹⁻³ The next logical steps include assessing the effectiveness of targeted HIV screening using the Score as an instrument to identify patients at increased risk. We do not believe the slight differences in how the Score performs, as defined by how its calibration or discrimination is reported, will significantly influence how it works in actual clinical practice.⁴

We do, however, appreciate the comments related to how we report the Score's calibration and discrimination. Although the authors comment on several modifications to how they believe the figures should have been presented, we recognize that there are several ways to

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characterize such results.⁵ We do not believe our results are misleading, and certainly did not intend to mislead. As described, calibration plots simply graph observed versus predicted outcomes. When the observed outcome is continuous, the values on a calibration plot will appear as a scatterplot. However, when the observed outcome is binary as with HIV infection, one axis of the plot will only contain 0 and 1 values. As such, observed probabilities between 0 and 1 do not exist; instead, it is common and reasonable to plot results for subjects grouped by similar predicted probabilities as we did originally and as we do in an updated figure (**Figure 1**).² In the new figure we categorized patients into 30 groups (instead of 10) by predicted probabilities to maximize the granularity of our data presentation, recognizing that we cannot plot individual-level values along the diagonal. For the benefit of the authors and future readers, we included a smoothed loess curve, a linear regression line, and an ideal 45 degree line (referred to as the “unity line”). We believe the loess curve and linear regression line are sufficiently similar and reasonably close to the unity line, thus demonstrating good calibration. In addition, we appreciate the comment regarding specific thresholds plotted on the receiver operating characteristics curve and have provided that updated figure as well (**Figure 2**). We hope the updated figures improve readers’ understanding of the performance of the Denver HIV Risk Score when applied to an urban ED patient population with a relatively high prevalence of HIV infection.

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Figure 1. Expected (predicted) versus observed prevalence (%) of newly-diagnosed HIV infection using an abbreviated version of Denver HIV Risk Score.

Figure 2.

Discrimination of an abbreviated version of the Denver HIV Risk Score (DHRS) to identify patients with newly-diagnosed HIV infection. Points on the curve represent specific DHRS values, as labeled. The area under the curve was 0.75 (95% confidence interval: 0.71 – 0.79).