We thank Dr. Stern (1) for his interest in our work (2). We agree that risk distribution curves are a valuable addition in the assessment of risk prediction models, particularly in the interpretation of reclassification measures. Two identical risk distribution curves that differ in location reflect models with different calibration, and 2 risk distribution curves that differ in dispersion reflect differences in discrimination.

Reclassification may be observed when the risk distributions of 2 nested risk models do or do not overlap. When 2 curves completely overlap (Figure 1A), they have the same area under the receiver operating characteristic curve (AUC). The observation of reclassification means that the updated model makes different errors from those of the initial model (2, 3). The net reclassification improvement of nested models with overlapping risk distribution curves therefore is always zero (2, 3). When 2 curves do not overlap (Figure 1B), the updated model has a higher AUC than the initial model. In this case, the net reclassification improvement will be higher than zero for most risk thresholds, indicating improvement.

Note that both the risk distribution curves of the total population and the plot of separate risk distributions in individuals with and without the disease of interest provide additional information. In fact, the latter plot is the most relevant. When the risk distributions in people with and without disease are superimposable, the AUC of the risk distribution curve of the total population will be zero. A net improvement in the AUC indicates that the updated model makes less error than the initial model.
model is 0.50. When the 2 curves are dispersed, individuals with the disease have higher risks than those without the disease. This degree of dispersion is reflected in higher values of the AUC (Figure 1, C and D). This graphical presentation of risk distributions clearly shows that it is easier to distinguish between individuals with and without the disease of interest when the AUC is higher.

In conclusion, risk distributions, in both the total population and separately in individuals with and without the disease of interest, facilitate interpreting the clinical relevance of discrimination and reclassification measures.

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Raluca Mihaescu and A. Cecile J. W. Janssens (e-mail: a.janssens@erasmusmc.nl)
Department of Epidemiology, Erasmus University Medical Center, 3000 CA Rotterdam, the Netherlands

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