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Predicting Multidrug-Resistant Gram-Negative Bacterial Colonization and Associated Infection on Hospital Admission: Methodological Issues

To the Editor—We read with great interest the article titled "Predicting Multidrug-Resistant Gram-Negative Bacterial Colonization and Associated Infection on Hospital Admission" by Tseng et al[1] published in a recent issue of this journal. We would like to congratulate the authors on their valuable work; however, we think some methodological and statistical issues should be considered to avoid misinterpretation.

As shown in the Table 3 of the article, when a predictor meets a univariate criterion of $P < .01$, the predictor is further considered for multivariable analysis. Here, we are concerned that the authors considered a very conservative P value for univariate screening of candidate predictors. They argued that when a conservative P value (eg, $<.01$ or $<.05$) is selected in univariate analysis, only the predictors with relatively large

effect will be included in the multivariable analysis. In such a situation, the estimated regression coefficients of selected predictors can have bias away from the null,[2,3] which is known as testimation bias.

Considering a liberal P value (eg, $<.10$ or $<.20$) in univariable analysis can effectively compensate for testimation bias.[2] In other words, we can be sure that predictors with relatively large effect (eg, $P < .01$) and predictors with relatively small effect (eg, $.10 < P < .20$) can be tested in multivariable analysis after univariate screening with, for example, $P < .20$. In the study,[1] although long-term hemodialysis appear to be an uninteresting predictor for risk of multidrug-resistant gram-negative bacteria (MDR-GNB) colonization in univariable analysis, it may have a significant effect but only in the presence of other predictors.

We acknowledge that the study provides very interesting results, but the estimated associations for predictors of MDR-GNB colonization may be different from those reported in the study due to testimation bias.

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