

## There Is No Place Clean: The Clinical Utility of a Postdischarge Nausea and Vomiting Score

To the Editor:

Apfel *et al.*<sup>1</sup> have devised a simple scoring system to quantify the risk of a patient having postdischarge nausea and vomiting (PDNV). I would like to commend the authors for being able to distill and present the multiple factors contributing to postoperative nausea and vomiting (PONV) and PDNV.

However, I have a few issues to raise. First, while the authors' analysis described five seemingly independent parameters, there may still be residual confounding to be addressed. Given the emetogenic side effects of opioids, opioids given in the postanesthesia care unit and nausea in the postanesthesia care unit are not independent factors. Similarly for female gender and history of PONV, it is plausible that a difference in reporting a past history of PONV exists between the different genders. The authors' analysis does not clearly resolve these cause-and-effect relationships, and leaves the possibility for residual bias. If the factors were positively correlated to each other, rather than to an independent outcome of PDNV, it would still fit a linear regression model.

Also, certain factors that were significant for PONV in the postanesthesia care unit were not statistically significant for PDNV; however, vomiting in the postanesthesia care unit which incorporates these factors is still statistically significant. Would the authors then consider these factors to be clinically, even if not statistically, significant?

Second, I would like to discuss the clinical relevance of the score. Unlike a similar article published by Apfel *et al.*,<sup>2</sup> in this case the authors do not suggest a cutoff where postdischarge antiemetic therapy should be prescribed. I would like to prompt the authors to provide a recommendation on this and demonstrate the clinical impact even with a hypothetical number needed to treat analysis.

In his previous article, Apfel *et al.*<sup>2</sup> has indicated that he would consider a cutoff of 39% risk of PONV to treat (where two risk factors are present). Assuming a similar case where two risk factors are present in the current study for PDNV (30% risk), why not simply treat all laparoscopic patients when there is a 38% incidence of PDNV, whether or not any risk factors are identified? This strategy is unable to be tested, because in some instances the patient characteristics differ quite significantly from their development and validation groups, such as for laparoscopic approach (development 14.8%, validation 1.2%), and several other nonstatistically significant factors which differ by a factor of 3–10.

In light of the number needed to treat figures described by Gupta *et al.*,<sup>3</sup> where the number needed to treat of prophylactic combination therapy for PDNV is about 5, would

there be any significant benefit with a risk stratification strategy in the overall number needed to treat?

The fundamental issue is that PONV and PDNV are issues with a high incidence rate, and we should work on strategies to mitigate this problem. Apfel *et al.* have taken a significant step toward addressing this problem in a scientific manner. But would any risk score be able to significantly affect clinical practice?

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## References

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## In Reply:

We are pleased that our new score to predict a patient's risk of postdischarge nausea and vomiting (PDNV score) that helps clinicians to decide on an antiemetic regimen has been positively received.<sup>1</sup>

Generally, the advantage of performing a multiple logistic regression analysis is to determine the effect of one variable while all other variables are held constant, hence inherently eliminating any source of confounding. This works fairly well unless there is a very high correlation among two variables, which was not the case in our dataset, *i.e.*, the use of opioids and the development of nausea in the postanesthesia care unit (PACU) for the prediction of PDNV did not correlate strongly enough to affect prediction. In other words, the coefficients for opioids and nausea in the PACU would remain very similar even if one of these parameters were taken out of the equation. Of note, in some datasets, gender and history of postoperative nausea and vomiting do not only correlate, but also interact in the way they affect outcome. However, we have previously established that considering such an interaction does little to improve the predictive accuracy as measured by the area under the receiver operating characteristic curve.<sup>2</sup> These previous results corroborate the notion to use a simplified model.

That said, nausea and vomiting in the PACU were highly correlated as shown in our Venn diagram (fig. 1).<sup>1</sup> Furthermore, in simple bivariate analyses, both nausea and