THE AMERICAN JOURNAL of MEDICINE®

The Reply

We appreciate the comments of Wickliffe et al[1] on our article published recently in ***The American Journal of Medicine***.[2] We strongly disagree with both their opinion and conclusions. We followed very well-established standard study designs for clinical research and the outcomes (clinical biomarkers). The results were subsequently interpreted and discussed appropriately with existing literature. With regard to their criticisms, we have serious concerns about their analysis of the data presented in our published article. More specifically, there are inconstencies in the data presented in Table 1 by Wickliffe et al. For instance, their data do not reflect the actual data of Table 2 in our article published in ***The American Journal of Medicine***.[2] It appears that these authors derived the low and high values by subtracting or adding the standard deviations from or to the mean values of Table 2, producing completely erroneous values from the actual data that we used in our analysis. In addition, more errors were made in calculating values for some variables that they presented in Table 1. Moreover, there are no data that correspond to males or females in Table 2 of our article. Assuming that the source of data for male and female (hemoglobin, hematocrit, and creatinine levels) was from Table 4 of our published article, we noticed inconsistencies in calculating low and high values. Further, the reference links provided by Wickliffe et al in support of their data presented in Table 1 could not be accessed. Thus, we believe that these authors based their criticism on their flawed data used in Table 1 and are not valid to derive any accurate conclusions about our published work.

It should be noted that our study is not based on epidemiological analysis, as Wickliffe et al have attempted to argue, to deal with convenience sampling and case-control matching. It is a retrospective clinical study that has been carried out using a well-accepted clinical research study design. The selection of subjects both unexposed and exposed to the oil spill was described clearly in the study. In ideal situations, the best control for our study would have been the same subjects whose health analysis was made before and after the oil spill exposure so that the evaluation of their clinical biomarkers could provide a better understanding of the effect of the oil spill exposure on their health. Unfortunately, we lacked the data before their exposure to the oil spill and therefore, an unbiased control group of subjects was included in the study.

As noted by Wickliffe et al, the clinical biomarker values do fall within a range of normalized values, however, several biomarker values differ significantly between the oil-exposed and -unexposed (control) groups, indicating potential health risks in subjects exposed to the oil spill. Our study was the first of its kind to analyze the hematological and hepatic effects in the oil spill-exposed subjects. There exist a number of other studies that have evaluated hematological and other functions in subjects exposed to benzene in relation to control or unexposed subjects.[3-6] Significant differences were seen in various clinical biomarkers despite values of these markers falling under the range of normalized values. We believe that the study is hypothesis driven with clear objectives, and the conclusions drawn were valid. These findings can serve as a basis for future prospective studies that can explore the health effects of the oil spill exposure. Thus, the findings of our study provide valuable information on the health consequences among subjects exposed to the oil spill.

In order to further clarify issues raised by Wickliffe et al, we performed additional analysis of the clinical data of the oil spill-exposed subjects. In this second analysis, we assessed the blood profiles and liver function data of the subjects who participated in the Gulf oil spill clean-up operations and compared them with the standard normalized range values. In brief, the results of this analysis indicate that a considerable number of exposed subjects exhibited altered biomarkers above the upper limits of the normal range. Thus, these results support our earlier study findings published in the *Journal*.[7] The details of the outcomes can be found in the accompanying article.

It should be noted that unlike Wickliffe et al, who disclosed direct or indirect sponsored grants from several agencies including British Petroleum, our study was not supported by any outside funding agencies. It was a self-supported and self-motivated study with no bias, and based on the actual data gathered from medical records. The strengths and weaknesses of the study were discussed in detail and the conclusions drawn from the study are valid.

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http://dx.doi.org/10.1016/j.amjmed.2014.04.036

Funding: None.
Conflicts of Interest: None.
Authorship: Both authors listed in the manuscript had access to the data and a role in preparing the manuscript.

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