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Reply to Nielsen, Dominic; Visram, Anil, regarding their comment 'Comment on Tait AR, Bickham R, O'Brien LM, Quinlan M, Voepel-Lewis T. The STBUR questionnaire for identifying children at risk for sleep-disordered breathing and postoperative opioid-related adverse events - potential confounders

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Sir - We thank Drs. Nielsen and Visram for their interest in our paper regarding the use of the STBUR tool to identify children at risk for sleep-disordered breathing and postoperative opioid-related adverse events.[1] Given that postoperative opioid-related adverse events were our primary outcome measure, we recruited children undergoing procedures requiring postoperative opioids. To this end, the majority of children in the study were those who had undergone adenotonsillectomy (T & A) and by association, many who also had sleep-disordered breathing. We agree with the authors that many children undergoing T & A surgery are at increased risk for perioperative respiratory adverse events but our point here was to determine if the STBUR tool could identify those children (undergoing both airway and non-airway procedures) who might be at greater risk because of their sleep-disordered breathing symptoms. In this study we showed that for all procedures children who presented with ≥ 3 STBUR symptoms had a two-fold increase in the risk of perioperative respiratory adverse events compared with children with < 3 symptoms. We also noted at the time that the incidence of perioperative respiratory adverse events among children with sleep-disordered breathing was lower than in our initial evaluation of the STBUR[2] tool and speculated that this may have been due to an increased awareness of sleep-disordered breathing as a risk factor in our institution and implementation of risk mitigation strategies. Drs. Nielsen and Visram correctly point out however, that there was no statistical difference in perioperative respiratory adverse events between children with and without sleep-disordered breathing who underwent T & A surgery in the current study. In response to this comment, we re-examined the data from our previous study[2] (of which 85% were non- T & A surgeries) and found that children with sleep-disordered breathing (per STBUR) undergoing T & A procedures had a greater than two-fold increase in the risk of perioperative respiratory adverse events (OR, 95% CI = 2.56, 0.74 - 9.06). Although this was also not statistically significant, we believe that the increase in risk is clinically important. For children undergoing non-T & A surgery with sleep-disordered breathing there was a greater than four-fold increased risk of perioperative respiratory adverse events (OR, 95% CI = 4.43, 1.08 – 21.0). Again, we can only speculate on the reasons for the non-statistical differences in the T & A group but suggest that in both studies we

were likely under-powered to detect a difference. In the present study for example, the sample size was based on the ability to detect differences in postoperative oxygen desaturation of <90%.

With respect to the authors' comment regarding age as a potential confounder, we completely agree that younger children are typically at increased risk for perioperative respiratory adverse events and this indeed was confirmed in our study. For example, although we did not present the data in the paper, younger children (2-7 yrs.) who underwent both T & A and non-T & A surgery had significantly greater risk of perioperative respiratory adverse events compared with children 8-17 years. Furthermore, the risk among younger children undergoing T & A was, as expected, greater than similarly aged children who underwent non-T & A surgery (OR, 95% CI = 3.73, 2.29 – 6.08). In the paper, we showed that the ability of the STBUR to identify children at increased risk for perioperative respiratory adverse events was consistent for both young and older children. However, if, as the authors suggest, we stratify these age data by type of surgery, we find that although there was a trend towards a greater incidence of perioperative respiratory adverse events in the sleep-disordered breathing group compared with the no-sleep-disordered breathing group, the differences were not significant, again, likely due to sample size and/or as speculated above, perhaps as a result of optimized management strategies (i.e., young children undergoing non-T & A: OR, 95% CI = 6.50, 0.441 – 187.7) and young children undergoing T & A: OR, 95% CI = 1.41, 0.81 – 2.44). When analyzing the same data for older children, there were also no statistical differences between children with and without SDB.

The goals of this study were to confirm our previous data regarding the ability of the STBUR to identify children at risk for perioperative respiratory adverse events for a variety of surgical procedures but more specifically to examine if STBUR could be used to identify children at risk for postoperative opioid-related adverse events. While Drs. Nielsen and Visram raise some valid questions regarding the potential confounding effects of age and T & A, the observation that the STBUR is able to identify "at risk" children in the absence of these confounders suggests its utility as a simple and practical preoperative risk assessment tool.

Conflicts of interests: No conflicts of interest declared
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References

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