



Determining improvements in medication safety in anesthesia

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To the Editor,

Congratulations to Maximous *et al.* for conducting one of the first meta-analyses of medication safety interventions in anesthesia, concluding that multimodal approaches to safety are effective.¹ Despite including the largest studies of their kind in the world (the largest containing 74,478 patient cases), and two studies that used randomized controlled designs, Maximous *et al.* conclude that the evidence is “limited in quantity and quality of studies”. Study design is important for good quality conclusions, but the bar is often set extraordinarily high for safety interventions in healthcare compared with many other aspects of clinical practice. Furthermore, the notion of “gold standard” research in healthcare and the tools available to appraise study quality remain heavily influenced by the concept of the traditional randomized controlled trial (RCT). Nevertheless, there are significant methodological reasons why RCTs are impractical and inappropriate for safety intervention studies in complex

sociotechnical systems such as healthcare.² The weaknesses of RCTs in testing new safety interventions are reflected in the fact that they are not the preferred method of determining improved safety in many other safety critical industries, including the aviation industry, from which healthcare purports to draw lessons.³ An RCT-like lens can in fact distort our interpretation of safety studies. A case in point, Maximous *et al.* state that in one study included in their review (actually from our group), only 18% of participants were fully compliant with the principles of the safety intervention, which increased the risk of medication errors in the intervention group.⁴ The safety intervention in this study was designed to be modular, and modules could be used in isolation or in combination, without leaving patients worse off than with conventional methods alone. That we were able to detect a significant reduction in medication errors during observation in 1,075 patients with only 18% of participants using all elements of the intervention we see as a strength, not a weakness—this shows a powerful “dose effect” for the intervention in terms of decreasing medication errors, and our data also showed that using more elements led to further substantial reductions in error rates.⁴ Unlike the treatment in an RCT, safety interventions in healthcare are often iterative, and rolled out progressively to all patients. RCTs are useful tools, but there are other tools in the toolbox, and not every job needs a hammer.

The authors of the article: Can J Anesth 2021; <https://doi.org/10.1007/s12630-021-01959-7>, respectfully declined an invitation to submit a reply to the above letter.

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References

1. *Maximous R, Wong J, Chung F, Abrishami A*. Interventions to reduce medication errors in anesthesia: a systematic review. *Can J Anesth* 2021; DOI: <https://doi.org/10.1007/s12630-021-01959-7>.
2. *Webster CS*. Evidence and efficacy: time to think beyond the traditional randomised controlled trial in patient safety studies. *Br J Anaesth* 2019; 122: 723-5.
3. *Webster CS, Henderson R, Merry AF*. Sustainable quality and safety improvement in healthcare: further lessons from the aviation industry. *Br J Anaesth* 2020; 125: 425-9.
4. *Merry AF, Webster CS, Hannam J, et al*. Multimodal system designed to reduce errors in recording and administration of drugs in anaesthesia: a prospective randomised clinical evaluation. *BMJ* 2011; DOI: <https://doi.org/10.1136/bmj.d5543>

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