

As an alternative to restricting our analysis to specific procedures or illness profiles, we used RUB scores to account for comorbid illnesses in all children in the Raine cohort. The Johns Hopkins Adjusted Clinical Groups Case-Mix System was used to generate the RUB scores. The Adjusted Clinical Groups system is a widely accepted method for measuring health resource utilization and was used in this study after a comprehensive search to find the most appropriate comorbidity adjustment method available for children and adults. The reason that the RUB comorbidity correction had varying effects on the different outcomes is that different cognitive deficits may impact health services resource utilization differently. However, as emphasized in our Discussion, unmeasured and often unknown differences in exposed and unexposed children may still represent a source of residual confounding. Even the most rigorous adjustment technique in an observational study cannot match the ability of randomization to account for both known and unknown confounders between the two groups.

Regarding the adjustment for sex, all medical and demographic covariates were included as categorical variables in our modified multivariable Poisson regression model, which is a standard method in regression modeling. Per Dr. Drummond's request, we have evaluated the association between anesthetic exposure and cognitive deficit in boys in the restricted and full cohorts and found that the point estimates of the risk ratios were consistent with those reported in our article. Owing to decreased sample size in this subset analysis, however, some of the models did not converge and those that did provided wider CIs for the outcome variables. We also tested for possible interaction by sex, and found that there was no significant interaction with sex in any of the associations between exposure to anesthesia and cognitive outcomes.

We agree with Dr. Drummond that the question of whether exposure to anesthetics in early childhood has any significant long-term adverse effect on neurodevelopment in children is of clinical and public health importance yet extremely difficult to tackle. We are determined to continue our efforts to help answer this important question through rigorously designed and carefully performed studies.

### Competing Interests

The authors declare no competing interests.

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## Old Guidelines or Methods Cannot Insure Quality or Progress

*To the Editor:*

The recent article and editorial regarding the use of a proprietary Decision Support Tool extolled the need to quit memorizing data, favoring medical interactive applications in applying medical knowledge.<sup>1,2</sup> The Decision Support Tool was designed to increase adherence to an outdated yet still “current” 2007 American College of Cardiology/American Heart Association perioperative evaluation consensus guideline (PECG). It is clear that perioperative  $\beta$  blockade (PBB) and cost containment played a very large role in the underlying assumptions of that guideline. It is also clear that in 2008, the POISE study (PeriOperative ISchemic Evaluation trial [ClinicalTrials.gov Identifier: NCT00182039]) completely transformed the premise of PBB, finding PBB stroke morbidity outweighed any cardiac morbidity prevention. PBB guideline revisions followed rapidly in 2009, without corresponding PECG changes. Furthermore, the reporting of Dr. Poldermans ethical violations, as a world proponent of PBB, further publically raised significant questions undermining the 2007 PECG validity. Cardiac guidelines experience particularly rapid turnover for multiple reasons.\* Medical reversal is a rapidly emerging reality, indicating guidelines have limits to application, as well as potentially short shelf-lives, as PBB clearly demonstrated.<sup>3</sup> This may directly compromise the usage of any Decision Support Tool, especially if failing to update rapidly while physician's life-long learning does facilitate updates.

Assuming the PECG is “correct” in 2014, is a fundamental problem. Similarly, testing “correct answers” based

\* Boyles S: Cardiac Practice Guidelines Have High Turnover, May 27, 2014. Available at: <http://www.medpagetoday.com/Cardiology/CHF/46004>. Accessed June 13, 2014.

on a Decision Support Tool adhering to the 2007 PCCG, presents simply a false premise for contemporary knowledge. The guideline should also fit the patient and not vice versa. I would ask the researchers to publish their “defined as correct” answers to the already published questions, to facilitate assessment whether these answers are deemed correct by modern readers! Knowledgeable physicians may justifiably reject the guideline and the proposed “Correct” answers in modern practice, especially when tailored to the variable contemporary reality at hand (*i.e.*, University *vs.* rural hospital). External realities further impose, where patients produce satisfaction scores and see themselves deserving EVERY consideration, test and therapy, regardless of cost, when rare complications produce 100% morbidity and mortality to them personally as “rare events.” The editorial goes even further, promoting the unproven utility of recertification. Similarly, transferring simulation and objective structured clinical examination applications for medical student/resident educations onto Recertification testing of practicing and competent physicians is yet another unproven leap of faith. Board certification, and especially recertification, have never been proven or demonstrated to clearly improve quality in care in outcome-based studies.

The real problem emphasized by both study and editorial, is that while both *support the use of internet-based data acquisition* in daily medical practice, certification, and recertification tests forbid it completely. Similar to old guidelines, simply believing that “certification or recertification matters,” may also be a mere historical relic, proprietary advertisement and/or simple false legacy assumption, having emerged before modern licensure and extensive regulation of residency training programs.<sup>4</sup> These and other concerns have led to the significant opposition to maintenance of certification among physicians at large. It is time for an open discussion of *the risks and benefits* of the cost and unproven assumptions of recertification and maintenance of certification, as a Quality = Value/cost indicator. Blind, computerized, adherence to aging guidelines, however, requires short-term revalidation of underlying programs to insure patient safety.

### Competing Interests

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### In Reply:

Dr. Kempen’s Letter to the Editor provides his perspective on the study by Hand *et al.*<sup>1</sup> and our accompanying Editorial<sup>2</sup> recently published in *ANESTHESIOLOGY*. Kempen asserts that medical knowledge changes rapidly and as such, “This may directly compromise the utility of any DST [Decision Support Tool], especially if failing to update rapidly-while physician’s lifelong learning does facilitate updates.”

*Were it so easy and simple!* How wonderful it would be if physicians were able to conduct their own lifelong learning in a dedicated, systematic, rigorous, and comprehensive fashion. We all wish we could faithfully read all of the pertinent journals in a most timely manner; ideally, we would also perform critical appraisals of each manuscript and incorporate only the appropriate results into our daily medical practice. Of course, this theoretical physician would also attend to patient care’s long hours while balancing all of life’s outside demands. Professional and personal life just do not allow for this ideal vision of lifelong learning.

Lifelong learning is essential for effective and efficient patient care. Teunissen and Dorman<sup>3</sup> remind us that medical schools do not adequately prepare new practitioners to assume the responsibilities of patient care and simultaneously be the best lifelong learners. Panda and Desbiens<sup>4</sup> present a strong case for incorporating lifelong learning concepts into undergraduate and graduate medical education. Becker *et al.*<sup>5</sup> studied stress and burnout among physicians and attribute difficulty in staying current with new knowledge as one contributor to the problem. Perhaps most importantly, Burden *et al.*<sup>6</sup> have studied the use of cognitive aids during simulated anesthetic emergencies (and specifically a designated “Reader” to assist the “Leader” during these events). They found that whereas none of the subjects performed all of the critical actions in the control group, introduction of a “Reader” with a cognitive aid resulted in execution of all described critical actions.

As aptly pointed out by Li *et al.*<sup>7</sup> in their analysis of and suggestions for lifelong learning strategies, multiple barriers stand in the way of physicians attempting to reach their self-directed learning goals. “Five themes emerged that characterized barriers to achieving learning goals: difficulty with personal reflection, environmental strain, competing demands, difficulty with goal generation, and problems with plan development and implementation.”<sup>7</sup>