



Response to: neurosurgical procedures performed during residency in Europe—preliminary numbers and time trends

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Dear Editor,

It was with great interest we studied the letter composed by our colleagues Burkhardt, Oertel, and Hendrix from Homburg, in which they comment upon the first results of our recent web-based survey, supported by the EANS. Indeed, within the framework of a research project about neurosurgical training conditions in Europe [4–6], we published preliminary case numbers with the intentions “to advertise the survey and provide transparency regarding its intentions” and to “attract more potential responders to provide their numbers and hereby increase the robustness of calculations”. [3]

In their letter, the authors express doubts that the reported numbers are genuinely representative of the current training conditions in Europe. They refer to our Table 2,

where our survey had revealed an average number of 511 independent and 752 assisted surgical procedures during residency [3]. Even though their calculations are conservative—leaving out the average number of 514 supervised procedures—those numbers add up to 1263 procedures during residency, which translates into a yearly number of 210 procedures per resident. Multiplying this yearly number by 14–17 residents per hospital (last number taken from the website of the author’s institution), 2940–3570 procedures/year would be performed at the teaching institution.

We thank our colleagues for this critical and in-depth review of our data. We agree that—according to their calculations and compared with the situation found in most teaching institutions today—the number of annual

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cases appears high. At least, if one assumes that one single resident is assigned to any operative case and all of a department's residents are on clinical rotation and undergo surgical training. There are explanations for these numbers. First, a fair number of survey participants finished their training several years or even decades ago. With surgeons working 100 h-weeks and 24 h shifts every other day [1], high case numbers were not unusual. The reported numbers in our Table 2 average case numbers across all time points. Second, with government-enforced working hour restrictions and an increasing shift towards subspecialization (requiring more workforce), the number of residents per training unit has increased in the same time period [2, 7]. This naturally influences the calculations of Burkhardt, Oertel, and Hendrix that assume resident numbers equal to that in German university hospitals today. Were the same calculations conducted with a (historical) number of 5–7 residents per hospital, an annual number of 1050–1470 procedures would suddenly sound more reasonable. Because of the training issue, many neurosurgical departments today chose to employ hospitalists as residents and/or have arrangements with the neurological department to have their residents rotate into neurosurgery and hereby distribute the ward work on a sufficiently high number of physicians. Again, other resident physicians listed on the clinic websites may be on research rotations; all of these help concentrate the available case load on fewer neurosurgical trainees. Third, we disagree with our colleagues from Homburg that it is highly unusual to assign more than one resident per cranial or spinal case, unfortunately. Any double-assignment would also down-correct the calculations performed by the authors.

On the other hand, we do not want to overestimate the strength of our data, either. There are undeniable weaknesses inherent to a survey-designed study. Analyzing official data, e.g., originating from each country's board-certification authorities, might have been methodologically stronger. However, as there is a lack of standardization within Europe, such a comparison is currently impossible, albeit feasible on a national level. Furthermore, case numbers per resident vary—even across residents working in the same institution. Those privileged with high case numbers in their residency—therefore working in academic institutions nowadays—may have been more likely to notice and respond to this survey. The fact that spinal procedures were under-represented may likewise point towards a selected survey sample. Re-call bias may be a further cause of inaccuracy, which is why we motivated participants to look up their original records, whenever possible. For investing their time and doing so, we offered to list participants in the article's appendix and Medline—a strategy primarily aimed at improving data quality. Despite this, only 36% of responses were based on “actual record” data and

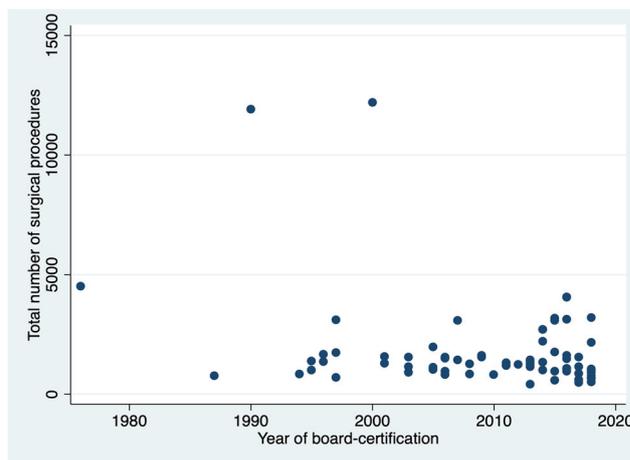


Fig. 1 Scatter plot, illustrating the reported total number of surgical procedures during residency (including those performed independently, supervised and assisted; y-axis) over time (year of board-certification; x-axis)

64% on “best estimate.” Lastly, it should be emphasized that the spread of the data was substantial and reporting mean data always risks being influenced by outliers (exemplified by Fig. 1). All these limitations were mentioned in our article, however [1]. We hope that—by attracting attention, stimulating discussion, and collecting a sufficiently large and representative sample—these potential sources of error would become less significant.

The survey remains open under <https://www.surveymonkey.com/r/RJMSLCG> and we invite further European neurosurgeons—including our board-certified colleagues from Homburg—to provide their record-based data in order to get even more robust estimates for future analyses.

Survey

The survey continues to be accessible under the following link: <https://www.surveymonkey.com/r/RJMSLCG>. We would like to invite neurosurgeons, who have finished their neurosurgical training in a European country (for the most part) to provide their surgical case numbers, using the link above. Please note that confidentiality of individual responses is provided. Responders may provide their data anonymously, but can choose to indicate their name for indexing purpose as contributor on publications that use survey data.

Compliance with ethical standards

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval For this type of study, formal consent is not required.

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