

A potential remedy would be for national and institutional databases to assign a unique number to each patient with the key held by the institutional administrator. Patient data would have to be linked to this unique number before being submitted in a deidentified manner to the national database. Alternatively, the incidence of “double counting” should be determined first with identifiable data at the institutional level, and the potential effects of such bias should be discussed in each publication that relies on large deidentified databases.

Acknowledgments

Support was provided solely from institutional and/or departmental sources.

Competing Interests

The authors declare no competing interests.

Astrid G. Stucke, M.D., Eckehard A. E. Stuth, M.D., Richard J. Berens, M.D. Children's Hospital of Wisconsin, Milwaukee, Wisconsin (A.G.S.). astucke@mcw.edu

References

1. Whitlock EL, Feiner JR, Chen LL: Perioperative mortality, 2010 to 2014: A Retrospective cohort study using the National Anesthesia Clinical Outcomes Registry. *ANESTHESIOLOGY* 2015; 123:1312–21
2. Mathis MR, Naughton NN, Shanks AM, Freundlich RE, Pannucci CJ, Chu Y, Haus J, Morris M, Khetarpal S: Patient selection for day case-eligible surgery: Identifying those at high risk for major complications. *ANESTHESIOLOGY* 2013; 119:1310–21

(Accepted for publication February 24, 2016.)

In Reply:

We thank Dr. Stucke and colleagues for bringing attention to this important issue and for providing an illuminating example from their own institution. Failure to correct for multiple procedures in the same patient may bias estimates unpredictably. Unfortunately, no single-patient identifier is available through the National Anesthesia Clinical Outcomes Registry (NACOR).

After we concluded our analysis,¹ NACOR began releasing more granular date-of-procedure information; the data set now includes year, month, and day of individual procedures. We merged procedure dates from the newer files with cases from the older file used in our manuscript. Of 944 cases reporting perioperative death, 50 cases were identified as occurring in

the same facility on the same year, month, and day in patients with identical age and sex, implying 24 unique patients with more than 1 procedure on the same date (23 patients with 2 procedures; 1 patient with 4), who ultimately died. Reassuringly, eliminating those patients' “second procedure” does not impact our findings in an informal *post hoc* sensitivity analysis we performed to answer this letter. We have not attempted to identify procedures beyond same-day cases, however, because this methodology is already quite crude.

Simple tricks like the above may be helpful in sensitivity analyses, but we emphatically agree that a unique patient number would be vastly preferable. A “hashed” identifier (anonymous, unable to be decrypted, and based on static unique patient identifiers) was proposed in detail by the Multicenter Perioperative Outcomes Group not only to identify duplicate cases, but also to link patient-level data from multiple sources.² This could include multiple institutional databases, insurance payor files, surgical databases (e.g., American College of Surgeons' National Surgical Quality Improvement Program), and national files (e.g., Social Security Death Index).

The Anesthesia Quality Institute is currently reorganizing its data collection structure and will reopen this question in the near future. Commentary on limitations stemming from the inability to identify multiple procedures in the same patient, like the letter from Dr. Stucke and his colleagues, serves to raise awareness of this important issue. We echo their call for careful consideration about the inclusion of an anonymized patient identifier, which we believe would further NACOR's mission of improving the quality of anesthesia care.

Competing Interests

The authors declare no competing interests.

Elizabeth L. Whitlock, M.D., M.Sc., John R. Feiner, M.D., Lee-lynn Chen, M.D. University of California, San Francisco, San Francisco, California (E.L.W.). elizabeth.whitlock@ucsf.edu

References

1. Whitlock EL, Feiner JR, Chen LL: Perioperative mortality, 2010 to 2014: A Retrospective cohort study using the National Anesthesia Clinical Outcomes Registry. *ANESTHESIOLOGY* 2015; 123:1312–21
2. Khetarpal S: Clinical research using an information system: The multicenter perioperative outcomes group. *Anesthesiol Clin* 2011; 29:377–88

(Accepted for publication February 24, 2016.)