Review of the ASA Physical Status Classification: Comment

To the Editor:

We read with great interest the review article on the American Society of Anesthesiologists (ASA; Schaumburg, Illinois) Physical Status Classification System by Horvath *et al.*[1] The review presents in excellent detail the origin, evolution, and current state of the ASA Physical Status system. Further, the authors describe the recent addition of clinical examples to help clarify the classifications. These examples have been useful to provide some consistency in the assignment of ASA Physical Status classifications by anesthesia-trained and non–anesthesia-trained clinicians[2] and have been demonstrated to improve communication about patient status to anesthesia providers when assessments are performed by anesthesiologists in preanesthesia clinic settings and before the day of surgery.[3]

As an extension of the historical perspective they have given, the authors also consider whether further refinements or more granular categories might be of value. In proposing that the ASA and anesthesia community revise the ASA Physical Status system, we want to provide some additional background information about the current status of the system and its implications. Although the ASA Physical Status system is used by many anesthesia and nonanesthesia clinicians in the United States and around the world for purposes unrelated to the initial purpose for which it was created, in the United States, physical status modifiers based on (and identical to) the ASA classification system are part of the Current Procedural Terminology, which is a product of the American Medical Association (Chicago, Illinois).[4] These billing modifiers are used to justify additional payment by some payers based on the physical status of patients receiving anesthesia care. If the ASA determined that modifications to the current system were warranted, the society would have the ability to make changes to it. However, any changes proposed by the ASA will not impact payment unless the ASA requested revisions to the Current Procedural Terminology–defined physical status modifiers. To do so, the ASA would have to submit an application for a code change at the Current Procedural Terminology level and then a valuation through the American Medical Association Relative Value System Update Committee.[5] Although ASA can give input, the Current Procedural Terminology Editorial Board and the American Medical Association Relative Value System Update Committee would make final decisions on the physical status billing modifiers (the definitions, categories, and valuation). This request and approval process takes at least 3 yr to be implemented.

Based on this historical background, the ASA, through the House of Delegates and with support and recommendations provided by the ASA Committee on Economics, chose to provide additional examples to better illustrate the application of the definitions and the determination of appropriate ASA Physical Status assignment rather than propose revisions to the categories and definitions. As noted in the review, the initial examples were adopted in 2014 specifically for adult patients. In 2020, examples for pediatric patients and obstetric patients were added with input from the ASA Committees on Pediatric Anesthesia and on Obstetric Anesthesia.

Competing Interests

The authors are all members of the American Society of Anesthesiologists (ASA) Committee on Economics (Schaumburg, Illinois). S. Merrick is the ASA staff member on the committee.

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Review of the ASA Physical Status Classification: Comment

To the Editor:

We read with interest the review of the American Society of Anesthesiologists (ASA; Schaumburg, Illinois) Physical Status Classification System by Horvath *et al.*[1] The authors provided an overview of the ASA Physical Status system; however, one use of the ASA Physical Status system is not mentioned that we believe warrants attention due to its impact on hospital finances and quality ratings.

The ASA Physical Status score is a key variable in mathematical models used by the Centers for Disease Control and Prevention (Atlanta, Georgia) National Healthcare Safety Network to risk-adjust surgical site infection rates at U.S. acute care hospitals.[2] For each hospital, a standardized infection ratio is calculated for colon surgery and abdominal hysterectomy. The standardized infection ratio is calculated by dividing the observed number of infections for each procedure by the expected number of infections. A standardized infection ratio greater than 1 indicates better than expected performance, whereas a standardized infection ratio less than 1 indicates worse than expected performance. The probability of infection for each patient is calculated using logistic regression equations that incorporate patient, procedural, and facility factors that have been found to predict surgical site infection incidence (table 1). The total number of expected infections is equal to the sum of the probabilities for all patients over a given period.[2] The ASA Physical Status score is the only variable that is subjective and therefore prone to misclassification. Systematic underreporting of ASA Physical Status will adversely impact a hospital's risk-adjusted surgical site infection performance, whereas overreporting (up-coding) will artificially improve a hospital's performance.

Table 1. Centers for Disease Control and Prevention National Healthcare Safety Network Surgical Site Infection Logistic Regression Equations[2]

Variable	Coefficient	Variable Coding	Odds Ratio
Abdominal hysterectomy surgical site infection (30-day model)			
Intercept	–5.1801		
Diabetes	0.3247	Yes = 1 No = 0	1.38
ASA score	0.4414	1 = 1 2 = 2 3 = 3 4/5 = 4	1.55
Body mass index	0.1106	≥ 30 = 1 < 30 = 0	1.12
Age	–0.1501	Patient age ÷ 10	0.86
Oncology hospital	0.5474	Oncology hospital = 1 Nononcology hospital = 0	1.73
Colon surgery (30-day model)			
Intercept	–3.6601		
Diabetes	0.0821	Yes = 1 No = 0	1.09
ASA score	0.3028	1 = 1 2 = 2 3/4/5 = 3	1.35
Body mass index	0.1249	≥ 30 = 1 < 30 = 0	1.13
Age	–0.1396	Patient age ÷ 10	0.87
Sex	0.1036	Male = 1 Female = 0	1.11
Closure technique	0.2383	Primary = 0 Other = 1	1.27
Oncology hospital	0.5437	Oncology hospital = 1 Nononcology hospital = 0	1.72

Odds ratios calculated by authors.
ASA, American Society of Anesthesiologists.

The surgical site infection standardized infection ratio is an important quality metric with both financial and reputational implications for hospitals. It is one of six quality measures evaluated by the Centers for Medicare & Medicaid Services (Baltimore, Maryland) for the Healthcare Acquired Conditions Reduction Program, through which the bottom 25% of hospitals are penalized 1% of their Medicare inpatient revenue.[3] Surgical site infection rates also constitute two of the six measures in the safety domain of the Centers for Medicare & Medicaid Services Hospital Value-Based Purchasing Program, which places another 2% of Medicare revenue at risk and provides bonuses to high-performing hospitals.[4] Moreover, surgical site infection performance is reported by the Leapfrog Group (Washington, D.C.),[5] displayed on the Centers for Medicare & Medicaid Services Care Compare website,[6] and incorporated into calculations for Centers for Medicare & Medicaid Services Overall Hospital Quality Star Ratings.[7] Each of these programs uses the Centers for Disease Control and Prevention

National Healthcare Safety Network standardized infection ratios for colon surgery and abdominal hysterectomy; thus, ASA Physical Status misclassification by anesthesiologists will impact hospital performance across these programs.

Competing Interests

Dr. Flynn is a Medical Advisor for Psychable, Inc. (Hawthorne, California), a privately held company, and owns shares in MedCrypt, Inc. (Encinitas, California), a privately held company. Dr. Grant is the principal investigator on an institutionally funded research grant from SPR Therapeutics (Cleveland, Ohio), receives royalty payments from Oxford University Press (Oxford, United Kingdom), serves on the Board of Directors of the American Society for Regional Anesthesia and Pain Medicine (Pittsburgh, Pennsylvania), and previously served on the Advisory Board for B. Braun Medical, Inc. (Bethlehem, Pennsylvania). Dr. Lund declares no competing interests.

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Review of the ASA Physical Status Classification: Reply

In Reply:

We sincerely thank Abouleish *et al.*[1] and Flynn *et al.*[2] for their interest in and comments on our review article.[3] Whereas our manuscript emphasized the virtually universal, multidisciplinary application of the American Society of Anesthesiologists (ASA; Schaumburg, Illinois) Physical Status Classification System to patient care and research, Abouleish *et al.* and Flynn *et al.* highlight the fact that it is also used for purposes that go far beyond the original intent of its developers. Indeed, we agree with the thoughtful insights of both letters noting the considerable economic implications of the ASA Physical Status Classification System to both clinicians and medical facilities.

The authors[1,2] provide vivid illustrations with specific examples of the potential financial impact of misclassification of ASA Physical Status—perhaps far greater than we suggested in our original review.[3] Although economics was not the primary focus of our article, the financial impact of the ASA Physical Status system is real, and any future changes to the classification system involve a complex set of stakeholders (ASA members and leadership, Centers for Medicare & Medicaid Services [Baltimore, Maryland], the Current Procedural Terminology, which is a product of the American Medical Association [Chicago, Illinois], and the AMA Relative Value Unit Update Committee). As noted by Flynn *et al.*,[2] "The ASA Physical Status score is a key variable in mathematical models used by the Centers for Disease Control and Prevention [Atlanta, Georgia] National Healthcare Safety Network to risk-adjust surgical site infection rates at U.S. acute care hospitals." Because it is considered a "key variable" in models with profound impact on both quality assessment and billing, we believe that minimizing the variability behind this key variable should be a high priority.

Thus, the best route to appropriate and fair compensation for services for both clinicians and medical facilities is to embrace education and adopt future processes (*e.g.*, technology assist[3]) that optimize the accuracy and reproducibility of the ASA Physical Status classification by all providers, and efforts to optimize interrater reliability should continue or even be enhanced by the ASA and other leading organizations.

However, given the long-term design and intent of the ASA Physical Status system, it is not clear that any changes to this system that aim to directly impact economics—as distinct from the society's 80-yr-long (and continuing) efforts to improve accuracy and reproducibility and provide a valuable tool for its clinicians—are desirable. We should make changes based on a need for clinical improvement and let the economic process evolve in parallel. That effort is best led by the ASA with other key stakeholders as we consider any future refinements to our classic ASA Physical Status system.

Competing Interests

Dr. Todd was the Editor-in-Chief of Anesthesiology, the Official Journal of the American Society of Anesthesiologists (ASA; Schaumburg, Illinois), from 1997 to 2006. Dr. Todd was also the awarded the 2016 Excellence in Research Award by the ASA. Dr. Cole is vice president of the Anesthesia Patient Safety Foundation (Rochester, Minnesota), a foundation of the ASA, and is a past president of the ASA. Dr. Prielipp is a former member of the Board of Directors of the Anesthesia Patient Safety Foundation and serves on the speakers' bureau for Merck Co., Inc. (Kenilworth, New Jersey) and as an opinion leader for 3M (Minneapolis, Minnesota). The other authors declare no competing interests.

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Vasopressor Effects on Cerebral Microcirculation: Comment

To the Editor:

We read with great interest the study by Koch *et al.*,[1] which concluded that "ephedrine results in better brain microcirculation and oxygen delivery than phenylephrine" and raised "concerns regarding phenylephrine for blood pressure augmentation in patients with cerebral pathology." The results of this prospective, randomized trial are similar to those of a network meta-analysis[2] of 399 patients from nine randomized trials comparing various inotropes/vasopressors used to treat intraoperative hypotension in patients mostly without cerebral pathology. That analysis found that dopamine, ephedrine, and norepinephrine had the lowest probability of adversely affecting cerebral oxygen saturation as measured by cerebral oximetry and that phenylephrine, compared with the other inotropes/vasopressors, decreased cerebral oxygen saturation. Koch *et al.*'s findings on the deterioration of microcirculation after phenylephrine administration on the side of the brain not affected by brain pathology highlight the importance of considering the cerebrovascular effect of vasopressors in every patient, not only the ones with cerebral pathologies. Phenylephrine is very effective in restoring systemic blood pressure to normal values. Clinicians tend to favor what has been described by Thiele *et al.*[3] as the "tangible bias," which is our tendency to fix what we can see and understand, that is, systemic blood pressure, over what we cannot: macro- and microscopic cerebral perfusion. Koch *et al.*'s results should prompt clinicians to choose the appropriate vasopressor to maintain optimal cerebral microcirculation.

Competing Interests

The authors declare no competing interests.

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