

# Association between Anesthesia Group Size and Merit-Based Incentive Payment System Scores

To the Editor:

The Merit-Based Incentive Payment System was introduced in 2017 by the Centers for Medicare & Medicaid Services, the primary U.S. public insurer.<sup>1</sup> The Merit-Based Incentive Payment System ties payments to a score determined by four categories: cost, improvement activities, promoting interoperability, and quality.<sup>2</sup> Scores for each category are aggregated across all physicians in a group, who all then receive the same score. Understanding the association between group size and Merit-Based Incentive Payment System scores has important implications. For example, if larger groups have higher scores, this could imply that larger groups are able to deliver higher-quality care or, alternatively, that they are better able to absorb the costs of implementing Merit-Based Incentive Payment System requirements.

Using the most recent year for which Merit-Based Incentive Payment System scores are publicly available (2021; see <https://data.cms.gov/provider-data/dataset/a174-a962>) and data on physician specialty (Doctors and Clinicians File; see <https://data.cms.gov/provider-data/topics/doctors-clinicians>), we identified 1,224 anesthesia groups with Merit-Based Incentive Payment System scores, defined as sets of anesthesia professionals with the same Medicare Provider Enrollment, Chain, and Ownership System Associate Control identifier.<sup>3</sup> Using this file, we defined group size as the total number of clinicians across all specialties, hypothesizing that this number, as opposed to the number of anesthesiologists, drives resources available for Merit-Based Incentive Payment System implementation. Merit-Based Incentive Payment System scores are reported with and without a complex patient bonus; we used the former for completeness, although we also performed a sensitivity analysis with the latter.

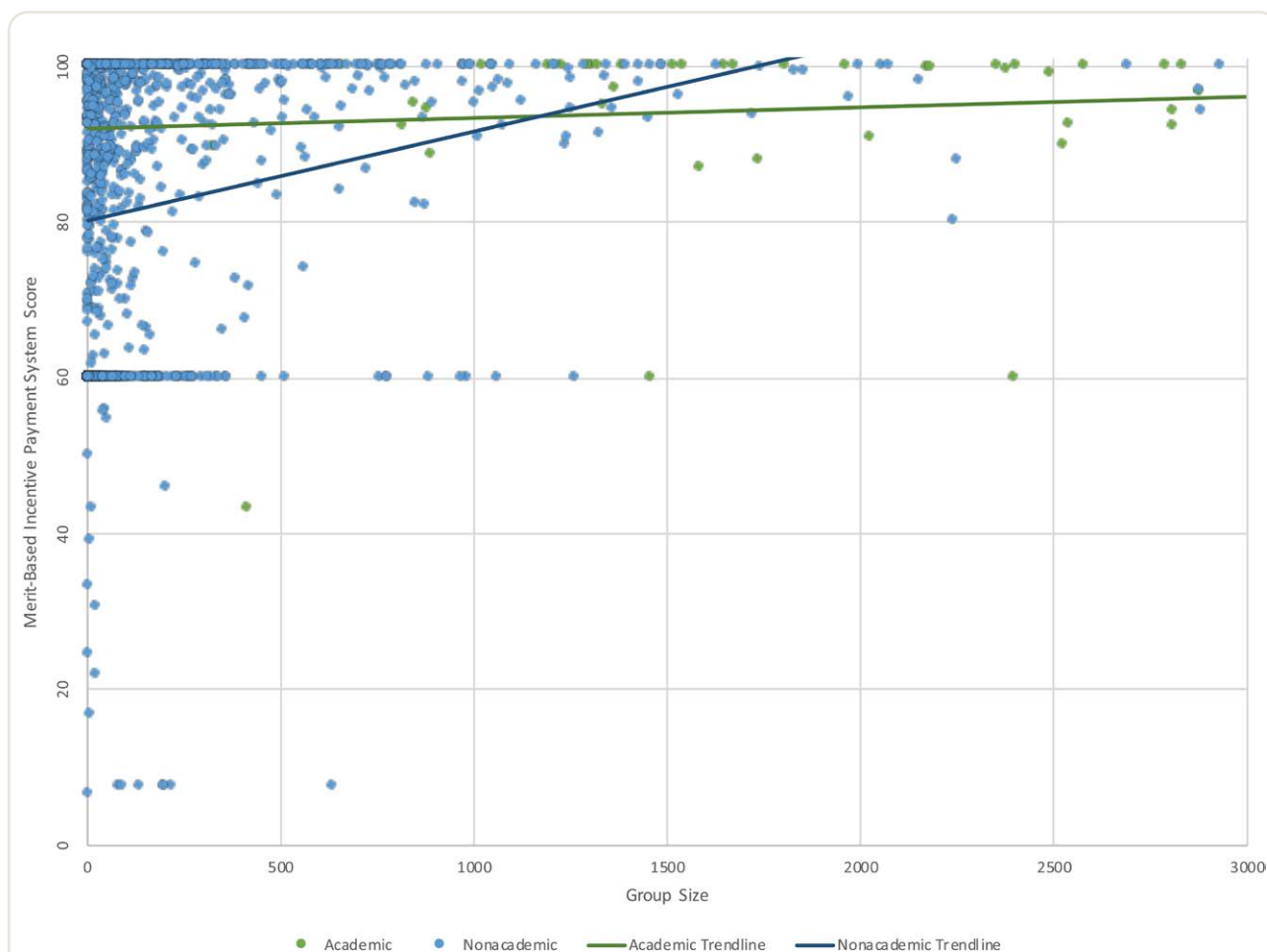
We used a linear regression to assess the statistical significance of differences in Merit-Based Incentive Payment System scores across the following predefined group size percentile ranges: less than or equal to 10th, greater than 10th to 25th, greater than 25th to 50th, greater than 50th

to 75th, greater than 75th to 90th, and greater than 90th. We performed a subgroup analysis on academic anesthesia groups, defined as groups receiving National Institutes of Health (Bethesda, Maryland) funding (Blue Ridge Institute for Medical Research [Horse Shoe, North Carolina]; see <https://brimr.org/brimr-rankings-of-nih-funding-in-2021/>) and groups affiliated with Harvard Medical School (Boston, Massachusetts), which are not reported by Blue Ridge. To connect Blue Ridge institution names to Medicare Provider Enrollment, Chain, and Ownership System Associate Control identifiers, we searched institutional websites to identify clinicians in each Blue Ridge institution and then identified their reported Medicare Provider Enrollment, Chain, and Ownership System Associate Control identifier in the dataset. A full list of Blue Ridge names and associated Medicare Provider Enrollment, Chain, and Ownership System Associate Control identifiers is included in the Supplemental Digital Content (table S1, <https://links.lww.com/ALN/D420>). We performed several sensitivity analyses. First, we performed a sensitivity analysis in which group size was defined by the number of anesthesiologists; because many groups are composed of one anesthesiologist; for this analysis, we *ex post* combined the less than or equal to 10th percentile and 10th to 25th percentile groups. Second, because many nonacademic groups are small, we performed a sensitivity analysis comparing academic with nonacademic groups that was restricted to groups of at least 100 members. Third, we also performed a sensitivity analysis where group size was treated as a continuous variable. Finally, we performed a sensitivity analysis that used Merit-Based Incentive Payment System scores without the complex patient bonus. An analysis plan was written and recorded in the investigators' files before analyses were performed.

The average group size was 256 (median, 56; interquartile range, 13 to 234) and the average Merit-Based Incentive Payment System score was 83.0 (median, 91.4; interquartile range, 60.0 to 100.0). For academic groups, the average group size was 1,560 (median, 1,486; interquartile range, 862 to 2,388) and the average Merit-Based Incentive Payment System score was 94.2 (median, 100.0; interquartile range, 92.4 to 100.0). Group size was associated with increasing Merit-Based Incentive Payment System scores (fig. 1). For example, the average Merit-Based Incentive Payment System score was 74.3 (95% CI, 71.3 to 77.4) for the smallest 10% of groups, compared to 94.2 (95% CI, 91.9 to 96.5;  $P < 0.001$  for the difference) for the largest 10% of groups (table 1). A test of interactions found no significant difference in the association between group size and Merit-Based Incentive Payment

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**Fig. 1.** Merit Based Incentive Payment System scores and group size. Merit-Based Incentive Payment System scores for clinician groups containing anesthesiologists, plotted on the number of clinicians in the group as of 2021, reported by the Doctors and Clinicians file. Groups are identified as academic or nonacademic by the Blue Ridge Institute (Horse Shoe, North Carolina). For expository purposes, this plot excludes three outlier groups with more than 3,000 clinicians, although they are included when calculating trendlines. Trendlines were calculated with univariate regressions of Merit-Based Incentive Payment System score on group size for each subgroup. For academic groups, the intercept is 92.0 and the slope ( $\beta$ ) is 0.001 (95% CI,  $-0.002$  to  $0.005$ ;  $P = 0.465$ ). For nonacademic groups, the intercept is 80.2 and the slope is 0.01 (95% CI,  $0.008$  to  $0.014$ ;  $P < 0.001$ ). The difference between the estimated slope of the trendlines for academic and nonacademic groups is statistically significant ( $P < 0.001$  in a test of interactions). Regression diagnostic tests revealed no observations with outside influence or leverage.

System scores for academic and nonacademic groups ( $P = 0.11$ ). In general, sensitivity analyses did not qualitatively change our findings (Supplemental Digital Content table S2, <https://links.lww.com/ALN/D420>), although the association between group size and Merit-Based Incentive Payment System score was more pronounced for nonacademic groups when group size was treated as a continuous variable (fig. 1).

In this national study of 1,224 anesthesia groups, we found that higher Merit-Based Incentive Payment System scores are associated with larger group size, although this association may be attenuated among academic groups. Our findings suggest that larger groups may have higher Merit-Based Incentive Payment System scores because they have more resources dedicated to performance measurement than smaller groups. A limitation of this

study was that we did not account for the insurance case mix that could impact a group's incentive to participate in Merit-Based Incentive Payment System. Future research is necessary to better understand the relative contribution of clinical performance *versus* reporting resources on Merit-Based Incentive Payment System scores.

### Research Support

Support was provided solely from institutional or departmental funds.

### Competing Interests

Dr. Sun receives funding from the National Institute on Drug Abuse (Bethesda, Maryland) and the Agency

**Table 1.** Association between Group Size and Merit-Based Incentive Payment System Scores

Group Size	Full Sample (n 1,224 Average (99% CI, P Value)	Academic Groups (n = 52 Average (99% CI, P Value)	Nonacademic Groups (n = 1,172) Average (99% CI, P Value)
Group size defined by total clinicians in the group			
≤ 10th percentile (ref.)	74.3 (70.3–78.4)	93.2 (75.9–110.5)	73.5 (69.4–77.5)
> 10th and ≤25th	75.5 (71.9–79.1, <i>P</i> = 0.57)	88.6 (68.2–109.1, <i>P</i> = 0.65)	75.0 (71.4–78.6, <i>P</i> = 0.47)
> 25th and ≤50th	80.0 (77.3–82.7, <i>P</i> = 0.002)	95.1 (86.7–103.5, <i>P</i> = 0.80)	79.3 (76.6–82.0, <i>P</i> = 0.002)
> 50th and ≤75th	85.4 (82.8–88.0, <i>P</i> < 0.001)	97.3 (93.5–101.2, <i>P</i> = 0.53)	84.9 (82.2–87.5, <i>P</i> < 0.001)
> 75th and ≤90th	90.0 (86.6–92.4, <i>P</i> < 0.001)	92.0 (79.2–104.8, <i>P</i> = 0.88)	89.9 (86.4–93.4, <i>P</i> < 0.001)
> 90th	94.2 (91.2–97.2, <i>P</i> < 0.001)	96.0 (91.5–100.5, <i>P</i> = 0.68)	94.1 (91.0–97.2, <i>P</i> < 0.001)
Group size defined by total anesthesiologists in the group			
≤ 25th percentile (ref.)	80.2 (77.6–82.8)	89.9 (77.4–102.3)	79.8 (77.2–82.5)
> 25th and ≤ 50th	82.3 (79.6–84.9, <i>P</i> = 0.16)	97.8 (94.5–101.1, <i>P</i> = 0.10)	81.7 (79.0–84.4, <i>P</i> = 0.19)
> 50th and ≤ 75th	84.7 (81.7–87.7, <i>P</i> = 0.004)	93.6 (84.8–102.4, <i>P</i> = 0.51)	84.2 (81.1–87.3, <i>P</i> = 0.005)
> 75th and ≤ 90th	86.5 (83.2–89.8, <i>P</i> < 0.001)	97.6 (94.3–101.0, <i>P</i> = 0.11)	86.0 (82.5–89.4, <i>P</i> < 0.001)
> 90th	85.4 (81.3–89.5, <i>P</i> = 0.006)	95.7 (88.8–102.6, <i>P</i> = 0.28)	84.9 (80.7–89.2, <i>P</i> = 0.008)

Report of results from the main specification and the two subgroup analyses. For each regression, groups of the tenth percentile of size and below were excluded. Percentile bounds were recalculated for each subgroup. Regressions were specified with robust standard errors. The predicted means for each percentile bound were calculated, and the 99% CI is reported. The *P* values for *F*-tests of the difference between each percentile bound and the lowest percentile bound are also reported. In the specifications where group size is defined by the number of anesthesiologists rather than the number of clinicians, all groups below the 25th percentile had the same number of anesthesiologists, so the 25th percentile and below is used as the reference group in those specifications.

for Healthcare Research and Quality (Rockville, Maryland), serves on the advisory board of Lucid Lane LLC (Los Altos, California), and is a consultant for Analysis Group Inc. (Boston, Massachusetts), all of which are unrelated to this study. Dr. Glance receives funding from the National Institute on Aging (Bethesda, Maryland) and the National Institute of Nursing Research (Bethesda, Maryland), both of which are unrelated to this study. The other authors declare no competing interests.

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DOI: 10.1097/ALN.0000000000004887

## Supplemental Digital Content

Supplemental Tables, <https://links.lww.com/ALN/D420>

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(Accepted for publication December 18, 2023.)