

Changing Trends in the U.S. Anesthesiology Workforce, with a Focus on Geographic Regions and Gender

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IN the current issue of *ANESTHESIOLOGY*, Baird *et al.*¹ report on survey research that evaluated 2013 workforce trends among U.S. anesthesiologists actively engaged in clinical practice. The research was commissioned by the American Society of Anesthesiologists (ASA) and conducted by the RAND Corporation, a United States–based nonprofit global policy think tank (Santa Monica, California, and elsewhere). To test a multiplicity of hypotheses, the study compared four geographic regions—the Northeast, Midwest, South, and West—and male *versus* female workers. The 2013 survey instrument was related to, and allowed direct comparison with, an earlier 2007 RAND survey of the anesthesiology workforce.² Small differences between the two surveys—that is, “questions that were added, removed, or slightly changed”—were “made according to feedback from (a six-member) advisory group” provided by the ASA.¹ Of note, more than 80% of practicing U.S. anesthesiologists are members of the ASA. The 2013 survey of all ASA members had a 25.6% response rate, and data from 6,783 physicians were included in the final analysis.¹ The research provided a wealth of information that is of value not only to the specialty of anesthesiology but also to practitioners in other medical specialties, educators and healthcare planners, and the general public.

In the analysis relating geography to practice patterns, Baird *et al.* discovered that the four geographic regions varied according to employment arrangements, engagement in team care anesthesia practices, types of cases performed by anesthesiologists, and financial compensation. For example, Baird *et al.* reported that the majority of anesthesiologists in the West spent 10% or less of their time supervising nurse anesthetists and other providers. In contrast, in locations



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other than the West, at least one third of anesthesiologists spent the majority of their time (and > 70% of cases) supervising other providers. In a separate *post hoc* analysis that was in part independent of the four geographic regions construct, Baird *et al.* evaluated data from the 20 states that had *opted out* of requiring nonphysician anesthesia providers to be supervised by a physician (*i.e.*, state actions consequential to altered Medicare billing rules). The 2013 survey determined that *opting out* was more common in the West and Midwest states. In the three states—that is, California, Colorado, and Kentucky—that had adopted *opt-out* practices between the 2007 and 2013 surveys, the change of status resulted in “no significant changes in the percent of time spent supervising among anesthesiologists in these three states relative to other states,” and *opt-out* status change “in the short term...did not seem to be associated with substantial shifts in the use of team care with anesthesiologists in the state.”¹ Because the 2013 survey provides baseline data, it will be interesting to determine (*via* future surveys) whether these relationships between anesthesiologists and nonsupervised nonanesthesiologist providers persist in *opt-out* states.

Equally remarkable is that the 2013 survey—similar to the 2007 survey—identified statistically significant geographic differences in the fraction of time anesthesiologists contributed to monitored anesthesia care. In the more recent survey, Northeastern anesthesiologists spent 22% of their time allocated to monitored anesthesia care, in contrast to 13% for Western anesthesiologists. Some of the greatest regional variations in monitored anesthesia care delivered by *any anesthesia provider* occurred with colonoscopies (55%

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coverage in the Northeast *vs.* 25% in the West) and echocardiography (38% coverage in the Northeast *vs.* 16% in the West). It is difficult to envision that these considerable geographical differences in practice fractions were solely the result of the types of patients treated and their medical needs. Further study of this issue in 2013 would have arguably allowed valuable insights into the origins and appropriateness of one practice extreme *versus* the other. Unfortunately, data collection on monitored anesthesia care in the 2013 RAND survey was less granular than in the 2007 survey, and an opportunity was lost to determine the specific role of anesthesiologists *versus* other anesthesia providers in delivering that care. Clearly further research is needed in these areas to evaluate the relationship of these issues to practice safety, practice outcomes, and compensation. Such research holds the promise of facilitating data-informed practice guidelines on the optimal role of anesthesiologists in delivering monitored anesthesia care.

The 2007 and 2013 RAND surveys also contained intriguing information on the relationship among practicing anesthesiologists' social/family arrangements, gender, work hours, and compensation. All of these lead to new insights into the discussion of *gender equality* in compensation—*a.k.a.*, “equal work for equal pay.” The 2013 RAND survey determined that, whether an anesthesiologist was male or female, the presence of children in the household had no effect on work hours. However, married female anesthesiologists (irrespective of children) worked fewer hours than their male counterparts. The relationship between gender compensation independent of marriage status and children was far more complex. In the unadjusted analysis, female anesthesiologists were compensated 29% less *per annum* than male anesthesiologists. But the 2013 RAND survey also determined that, because female anesthesiologists overall worked fewer hours per week (*e.g.*, females worked 45 clinical hours and 51 total hours per week; males worked 49 and 57 h, respectively), their *per-hour* compensation was now reduced to 15% less than that of males. These figures—the 29% less compensation *per annum* and the 15% less compensation *per hour* for female anesthesiologists—should approximate the upper limit of any possible salary discrimination within the workplace, depending on whether the possibility of work-access discrimination is factored into the calculus. The survey also determined that the fraction of female anesthesiologists in the workforce had increased from 22% in 2007 to 25% in 2013,¹ a directional change that is true for medicine in general (as reviewed by Baird *et al.*). Although the fraction of female anesthesiologists had increased across the entire age range between the two RAND surveys, the largest increase occurred in younger females (*i.e.*, approximately 40% of anesthesiologists under the age of 36 yr were female). As such, practicing female anesthesiologists tended to be younger and had fewer years' work experience after completing their training. They also varied from males in the types of patients they treated (*e.g.*,

more time spent on pediatric and obstetric/gynecological patients; less time spent on generalist and cardiac/vascular patients) and the type of practice models that employed them. When these confounding factors were entered into the data analysis, gender disparities in *per-hour* compensation declined from 15% less in females to 7% less. These data beg the question of whether the remaining 7% compensation differential (1) represents gender discrimination (either in opportunities available or compensation for work performed), (2) results from employment styles and choices by female and male anesthesiologists not identified by the RAND surveys, (3) reflects a compensation response to fewer hours worked per female anesthesiologists in the face of fixed benefit and administrative costs per physician employed, or (4) is due to other factors. Unfortunately, the existing data do not allow the readers to make a meaningful conclusion; however, they do identify a path for future research with implications not just for anesthesiologists but also for the U.S. workforce in general.

There are many admirable aspects of the research and resulting report by Baird *et al.* Perhaps most satisfying is that, by comparing 2013 data to 2007 data and discussing their relationship to data from other workforces, readers can have added confidence in the validity and utility of information within the RAND reports. However, this confidence is tempered somewhat by the fact that only one in four ASA members responded to the 2013 RAND survey. Low response rates among physicians is a longstanding, growing, and difficult-to-remediate problem in survey research, and this problem also occurs with other healthcare providers.^{3,4} For example, Cho *et al.*,⁴ in a meta-analysis of 154 subgroups of studies published between 1958 and 2012, determined that the overall survey response rate among healthcare professionals was 53%, with a linear decline from approximately 80% to approximately 40% over the 54-yr interval. Low response rates, in turn, introduce the potential for selection bias regarding who does and does not introduce data into the database on which statistical analyses will subsequently be performed, and this can harm the generalizability and applicability of the findings.^{3,4} Baird *et al.* used accepted tests, *post hoc*, in an attempt to identify evidence of selection bias and correct for sampling variability. Unfortunately, identification of sampling bias is highly problematic in that the basis of any bias may not be discernable from the evidence at hand. As such, we must be cognizant of the survey's strengths and weakness as we attempt to understand and (perhaps) act on the findings.

Should we desire action based on the research by Baird *et al.*, we must consider both the positive and negative consequences of those actions. Many anesthesiologists still remember the results of yet another ASA-sponsored manpower study—that is, the Abt Associates, Inc. (Bethesda, Maryland), report of 1994⁵—whose downstream interpretation and use proved immensely harmful to the field of anesthesiology.⁶ We are all warned that data from a large survey of anesthesiology

manpower cannot be used in isolation, and we must use common sense when interpreting and applying them.

Despite these issues, the research by Baird *et al.* represents an impressive effort to better understand the U.S. anesthesiology workforce and drivers that affect it. Their report also gives us hints that similar survey methodologies can be used to address other pressing contemporary issues among anesthesiologists: for example, (1) satisfaction in the workplace, (2) risk factors for professional burnout, (3) private practice employers' expectations for the skills and knowledge that new anesthesiologists must have mastered upon completing residency training and before entering the workforce, (4) expectations for the qualities and direction of thematic anesthesiology research, and (5) the origins of anesthesiologists' shortcomings when competing for extramural research funding. Indeed, the possibilities are limited only by our imaginations.

Research such as that of Baird *et al.* in the current issue of *ANESTHESIOLOGY* helps prove that anesthesiologists have much to teach others when it comes to exploring contemporary challenges in optimizing the healthcare workforce and the choices, satisfaction, and aspirations of its practitioners. Because of anesthesiology's diversity of physician practitioners; established interactions between physician and nonphysician healthcare providers; focus on quality improvement, patient safety, and cost reduction; models for practice organization and reimbursement; and relative fluidity of movement of our physicians from one practice model and setting to another, we U.S. anesthesiologists

can perhaps serve as a model to others of not only the cutting edge medical practices but also offer commentary on the motivations and practices of the global U.S. workforce.

Competing Interests

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