Favorable Trends for a Decade: Increasing Pass Rates on The American Board of Anesthesiology Examinations

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Abstract

Background: There have been some apparent increasing pass rates on the American Board of Anesthesiology Part 1 (written) and Part 2 (oral) examinations in the setting of a transition in examination format. The aim of the study is to evaluate the nature of these trends, hypothesizing that these increasing pass rate trends are significant.

Methods: In this retrospective study from 2003-2012, the first-attempt examinee pass rates on the Part 1 and Part 2 examinations were obtained from the American Board of Anesthesiology website. To evaluate the cohort of examinees, the mean United States Medical Licensing Examination scores of residents matched to anesthesia programs were also obtained. To evaluate trends over time, simple linear regression was performed with the academic year as the independent variable and examination outcome as the dependent variable, using an $\alpha = 0.05$.

Results: The median annual pass rate on the Part 1 examination was 85.5% (Interquartile range [82.75% - 87.75%]). Regression analysis showed that the slope of the least-squares regression line was greater than zero (p = 0.008). The median annual pass rate on the Part 2 examination was 81.5% (Interquartile range [77.25% - 84.75]). Regression analysis showed that the slope of the least-squares regression line was greater than zero (p < 0.001). Regression analysis also showed increasing United States Medical Licensing Examination scores for the incoming anesthesia residents (p = 0.01).

Conclusions: There have been significant increasing trends on the American Board of Anesthesiology Part 1 and Part 2 examinations over the last ten years.

Key words: Anesthesia/education, Specialty Boards

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Introduction

Board Certification through the American Board of Anesthesiology (ABA) involves the successful completion of a series of examinations. ABA candidates who will complete residency training on or after June 30, 2016 will take a staged Part 1 Examination that will consist of two separate examinations: the basic examination and the advanced examination. The basic examination focuses on the scientific basis of clinical anesthetic practice and will concentrate on content areas such as pharmacology, physiology, anatomy, and equipment. The advanced examination will primarily focus on clinical aspects of anesthetic practice and will emphasize subspecialty-based practice and advanced clinical issues in addition to its coverage of the content of the basic examination. This is followed by the applied (oral) examination.[1]

The new format addresses the need for competency-based training and promotion. This format is replacing the recent and previous format of a two-part series: The Part 1 and Part 2 examinations.[1] The Part 1 examination is a computer-based multiple choice examination.[2] The Part 2 examination consists of discussion of two clinical scenarios plus several additional topics in an oral examination format.[3] The new format is essentially splitting the Part 1 examination. The applied examination is equivalent to the Part 2 examination, with the addition of Objective Structured Clinical Examinations into its format. [1] While all examinations test the examinee knowledge in many areas of anesthesiology in its broadest sense, the decision-making and clinical judgment are evaluated further in the advanced and applied examinations.

The American Board of Anesthesiology electronically publishes first-attempt examinee pass rates on both the Part 1 and Part 2 examinations on its website through newsletters.[4] One observation is that there have been some apparent increasing pass rate trends on both the Part 1 and Part 2 examinations in recent years. While there have been some recent studies evaluating individual and programmatic variables associated with success on the American Board of Anesthesiology Part 1 and Part 2 examinations[5-7], pass rate trends have not explicitly been studied in anesthesia. Pass rate trends have been recently evaluated in surgical subspecialties, demonstrating decreasing linear trends in multiple disciplines.[8]

The aim of this study was to evaluate the nature of the trends in first-attempt examinee pass rates over time on the Part 1 and Part 2 examinations. Observationally, as examination performance appears to be improving, the hypothesis is that the pass rate trends are increasing over time in a statistically-significant fashion for both examinations.

Materials & Methods

In this retrospective cohort study from 2003-2012, the first-attempt examinee annual pass rates were obtained from the American Board of Anesthesiology annual newsletters online.[4] The newsletters were evaluated for the annual first-attempt examinee pass rates on the Part 1 and Part 2 examinations. Overlapping years were cross-checked for accuracy. To evaluate for potential changes in the examinee cohort over time, the mean United States Medical Licensing Examination (USMLE) scores were obtained for applicants of anesthesiology residency

programs that participate in the National Resident Matching Program. All available data during the study period found through the National Resident Matching Program website were used.[9] Double data entry was performed, and data sets were compared and reconciled to ensure accurate data extrapolation.

Statistics:

Nonparametric descriptive statistics were used, as the distributions of data were not normal distributions. To evaluate pass rate trends over time, simple linear regression was performed using the academic year as the independent variable and the first-attempt pass rate as the dependent variable. Regression was also performed over time with regard to USMLE scores over time. Trends were considered statistically significant if the slope of the least-squares regression line was greater than zero, using an $\alpha = 0.05$. Pearson and Spearman's rank correlation coefficients were determined between year and annual pass rate. All statistics were performed with Stata 13 statistical software (StataCorp, College Station, TX).

Results

There were data available for 10 (100%) years of the study period. The median annual pass rate on the Part 1 examination was 85.5% (Interquartile range [82.75% - 87.75%]). The relationship between annual first-attempt examinee pass rate on the Part 1 examination and academic year is shown in Figure 1A. Regression analysis showed that the slope of the least-squares regression line was greater than zero ($p = 0.008$). The Pearson correlation was 0.78. The Spearman's ρ was 0.73 ($p = 0.02$).

The median annual pass rate on the Part 2 examination was 81.5% (Interquartile range [77.25% - 84.75%]). The relationship between annual first-attempt examinee pass rate on the Part 2 examination and academic year is shown in Figure 1B. Regression analysis showed that the slope of the least-squares regression line was greater than zero ($p < 0.001$). The Pearson correlation was 0.88. The Spearman's ρ was 0.86 ($p = 0.001$).

The mean USMLE score for residents matched into anesthesia residency programs over time are shown in Figure 2. Regression analysis showed that the slope of the least-squares regression line was greater than zero ($p = 0.01$). The Pearson correlation was 0.99. The Spearman's ρ was > 0.99 ($p < 0.001$).

Discussion

This was a retrospective study of the pass rate trends on the ABA Part 1 (written) and Part 2 (oral) examinations based on recent observations. The statistical analyses showed that the pass rates are increasing over time for both examinations. There are also moderate-to-high levels of linear correlation over time. The statistical results are consistent with the study hypothesis. These findings directly contrast the recent decreasing trends that have been seen in surgical specialties in written examination formats in the American Board of Ophthalmology and the American Board of Thoracic Surgery, as well as oral examination formats in the American Board of Surgery and the American Board of Thoracic Surgery. No recent increasing linear

trends were seen in surgical specialties in either the written or the oral examination formats.[8] The range in pass rates in other procedural specialties are similar to the range in pass rates seen in anesthesia.[8]

The etiology of these favorable trends is unknown. Broadly speaking, trends may be due to the nature of the examination or the nature of the examinees. The examination difficulty is unlikely to be changing, given the rigor in which the examination items are evaluated. It will be very interesting to see if these examination trends continue in the setting of a split Part 1 examination and new elements to the Part 2 examination. Regarding the examinees, this study showed that there is evidence of a changing nature of the ABA examinee cohort in that there are upward linear USMLE examination trends in the recent years. It should be noted that only four years of matching applicant USMLE data were available during the overall study period. Although a limitation of this analysis, the increasing linear trend for the limited data set was statistically significant. This effect would not be immediate, but frame-shifted by the length of residency training. The nature of the examinees in residency can also be affected by programmatic improvements in educational curricula and clinical experience. The examinee environment has been evolving in the recent past due to duty hour standards and the more common presence of Certified Registered Nurse Anesthetists, especially in the milieu of academic training programs.[10] Evaluating such educational demographics would make for interesting future study.

Now, there are numerous limitations to this research. One major limitation of this study is that pass rates only were evaluated. The nature of individual examinees, with exception of baseline USMLE scores, and programmatic variables mentioned above were not evaluated, and are major limitations. This is also a retrospective research study, making it difficult to draw conclusions about the data and results. Only associations of pass rates over time can be made. Importantly, the change in the examination format that is in process, makes this study impossible to repeat in the future. However, this study does demonstrate clear linear trends, and shows that there are changes in the cohort of examinees taking the ABA examinations. Knowing these recent past trends can be useful for the ABA as the examination format completes its transition within the next few years.

Conversely, there are some strengths of this study. First, the study design is intuitive, and straightforward. The use of published data means that it could easily be repeated by others. Moreover, the outcome variables involved a more pure cohort of first-attempt examinees that reflected the population as opposed to a locoregional sample of examinees. And, although this study is brief, there are important findings and implications of these findings. Any statistical trends are important to the ABA, as they are the regulatory body and in charge of the psychometrics of the examination. These upward trends cannot continue indefinitely because of a ceiling effect. These results are also important for leadership in residency programs, as institutional performance can and should be measured against these national trends for potential institutional educational needs-assessment purposes. Finally, these results are important to examinees and future applicants, as certification is a career milestone for physicians.

Overall, there have been favorable pass rate trends in both the established written and oral examinations offered by the ABA over the last ten years. The reasons behind these

favorable trends are likely multifactorial, and are in the setting of a stronger examinee cohort. The study of individual and programmatic variables would be interesting future endeavors with regard to ABA examination performance, especially in the setting of recent examination format changes.

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Legend for Illustrations:

Figure 1: Simple linear regression of pass rate trends from 2003 - 2012 on the American Board of Anesthesiology Part 1 examination (A) and Part 2 examination (B)
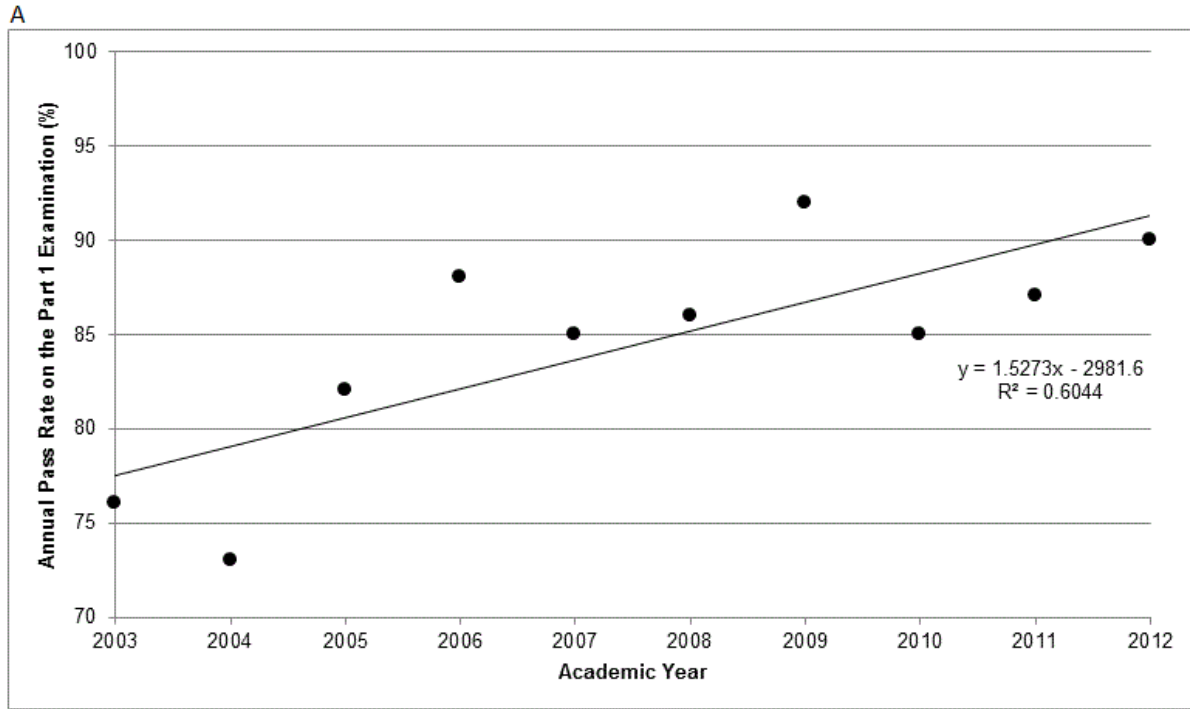
A

Figure 2: Simple linear regression of mean United States Medical Licensing Examination scores for examinees matched into anesthesia residency programs over time

B