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Medical Student Perspectives Following the Change to a Pass/Fail USMLE Step 1 Exam

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Abstract: *The transition of the United States Medical License Exam Step 1 examination to pass/fail was implemented in January 2022 with the intent to reduce medical student stress levels while ensuring that students maintained a sufficient degree of medical knowledge in order to continue in their educational journey. While this is an admirable goal, uncertainty remains regarding the efficacy of this decision and the ramifications this will have on residency applications. The purpose of this study was to understand how the change of Step 1 to pass/fail has impacted student wellness and student perceptions of residency application factors.*

Keywords: medical education, USMLE step 1 pass/fail, medical board exams, student perspectives, student wellness

INTRODUCTION

Traditionally, the medical school curriculum is divided into two pre-clinical and two clinical years(AAMC Students and Residents, n.d.). The first two years are spent primarily in the classroom learning the basic sciences relevant to medicine whereas the final two years are spent in hospital and clinic settings learning to care for patients. While individual medical schools have authority in the way they structure their curriculum, all medical students are required to take three standardized national examinations throughout their training two of which are taken in medical school and the last of which is taken in the year following graduation. During medical school, students typically take their United States Medical Licensing Examination (USMLE) Step 1 board exam following the completion of the pre-clinical years and USMLE Step 2 following the first clinical year(AAMC Students and Residents, n.d.). These two exams are important metrics on the student's application to residency submitted at the beginning of the fourth year and are often used as a screening tool to narrow the list for holistic review.

In addition to USMLE Step Exam scores, several other factors are included in a medical student's application to residency (Goshtasbi et al., 2021). These factors include participation in research projects including publications, individual performance during clinical and preclinical years, a narrative evaluation of the student's performance throughout medical school, faculty letters of recommendation, membership in honors societies, volunteer and leadership positions, and a personal statement. Given the transition of Step 1 to pass/fail, with the exception of Step 2,

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most of these factors are either not comparable between schools or difficult to quantify posing major challenges in the review of residency applications.

As described by Salari and Deng (2020), the purpose of USMLE Step 1 "was never to place medical students on a spectrum of perceived preparedness or to predict the quality of their future patient care" (p. 1312). However, this was the role it took on over time. The reliance on a single board examination score as a predictor of candidate proficiency reasonably led to the significant prevalence of high stress levels and poor mental health for medical students (Prober et al., 2016; Tackett et al., 2022; Yodh et al., 2023). The prevalence of stress in medical school is widely acknowledged and while Step 1 can only account for a portion of this efforts to decrease overall stress have been recognized as more important over the last two decades as a result of studies indicating higher rates of depression, burnout, suicidal ideation, and overall mental illness(Dyrbye et al., 2008, 2010; Roberts, 2010; Schwenk et al., 2010; Thun-Hohenstein et al., 2021). In early 2020, the National Board of Medical Examiners (NBME) decided to transition the scoring system of the Step 1 from scored to a Pass/Fail (P/F)(Salari & Deng, 2020). There have been minimal studies on the efficacy of this change in lowering student stress levels, however our review of literature did reveal one relevant study (Baniadam et al., 2023). In this study, Baniadam et al. (2023) compared stress levels before and during the dedicated study period for one cohort that took the exam pass/fail and one that took it scored. While the results revealed a decrease in the stress of the pass/fail cohort leading up to the dedicated period, this decrease was not sustained during the study period. Also, there was no data regarding the affect the pass/fail change would have on other aspects of student life and training. As such, additional research is required to better understand the effect of standardized testing on medical student well-being and the overall impact the scoring change for USMLE Step 1 will have on students. The purpose of this study was to assess the impact of this change on student wellness, study habits, time/financial contributions and perceptions of the impact this will have on residency applications.

PURPOSE/OBJECTIVES

The purpose of this study was to:

- investigate how the decision to report the USMLE Step 1 score as pass/fail impacts student use of study resources, habits, and well-being.
- investigate how the decision to report the USMLE Step 1 score as pass/fail impacts student perception of the importance of various application components.
- Investigate the overall time and financial expense required for USMLE Step 1 preparation.

DESIGN AND METHODOLOGY

The survey was originally created as a collaboration between the University of Nebraska Medical Center (UNMC) College of Medicine and (blinded for review). Several faculty members at UNMC including the associate dean of medical education and senior faculty with extensive survey writing experience as well as a number of senior medical students who had already taken Step I were consulted on survey design and provided feedback on survey questions. In addition to faculty and student input, several previous survey-based studies regarding the effect of Step 1 on students were considered during the process of survey item writing(Cortes-Penfield et al., n.d.; Green et al., 2009; Kumar et al., 2015). Lastly, The National Resident Matching Program Director

Survey, which is a biennial survey of residency program directors regarding how applicants are selected for interviews and ultimately ranked by program directors in the residency match, was also utilized to guide survey item creation(National Resident Matching Program, 2021). The questions were designed with the goal of providing additional details to medical school administration and students on the overall effects of the transition of Step I to pass/fail. Questions included inquiry into past student performance on standardized exam, medical specialty of interest, general demographical data, impact on stress, participation in wellness activities, time spent studying and resources used, and perceived impact on residency applications. Survey items were written primarily as multiple choice for ease of analysis with a few questions requiring participants to rank a number of options from most to least important in order to acquire detailed information regarding student perspectives on importance of various components of the application. The study was approved by the Institutional Review Board at UNMC.

An anonymized and voluntary 36-question electronic survey was administered through Microsoft Forms and sent to 228 medical students within the (blinded for review) in May and June of 2023. Specific questions can be found in Table 1. The invitation to participate was sent to students twice over the course of two months. The first invitation was sent shortly after the school-specified deadline for completion of Step 1. Information about demographics, impressions on the new Step 1 score format, anticipated changes in applicant selection, methods and duration of studying, impact on mental health, and importance of various other factors in selecting applicants were queried. Descriptive statistics were used to analyze survey results.

The educational importance of our study is multi-tiered. We assessed whether student stress levels were worsened or alleviated by the scoring change for Step 1 as previously there was a notable degree of anxiety regarding the significance of the 3-digit numerical score on a student's future career. Additionally, as there are multiple aspects of a medical student's application to residency, we sought to answer whether students believed other, previously minor, aspects of their application would carry more significance in addition to their Step 2 score. Currently, there is limited data from the perspectives of current medical students regarding the transition to a P/F Step 1 and the implications this has on their medical education. Herein, we assess student perceptions on this change regarding wellness, degree of competitiveness for residency applications, and an analysis of what resources students felt were most important in their adequate preparation for Step 1.

RESULTS

Of the 228 second year medical students who received the survey, 39.5% completed it. Nearly half were male (48.9%), 28.9% were non-white, and 28.9% indicated that they were interested in competitive specialties (e.g., plastic surgery, dermatology, orthopedic surgery, otolaryngology, and neurological surgery).

Our analysis regarding the perception of the change to a P/F Step 1 revealed that 48.5% of students felt the scoring change did not improve or worsened their stress level regarding the exam. Nearly a third (30%) of students rated their overall well-being as poor or worse during their USME Step 1 dedicated period and 51.4% stated that they spent less time partaking in activities related to their wellness in comparison to during their didactic blocks. Nonetheless, the majority of students agreed that they preferred the transition (65.7%).

When asked what students believed to be the most important application factors for residency programs to consider when determining to offer candidates an interview moving

forward, 72.9% of students felt that Step 2 would be the most important variable and 92.9% of students felt it would be one of the top three variables. Similarly, most students ranked clinical evaluations (65.7%) and letters of recommendation (58.6%) as two of the three most important factors in being selected for residency interviews. The factors that the majority of students (54.0%) felt were least important included induction into the Alpha Omega Alpha or Gold Humanism Honor Societies as well as class ranking.

Table 1

Survey Questions on Step 1 Preparation, Wellness, and Perceived Effect on Residency Applications

Q1	Did you complete Step 1?
Q2	I generally score in the ____ percentile on standardized tests (e.g. ACT, MCAT).
Q3	In general, during the didactive blocks I've completed this far, I've been in the ___ percentile.
Q4	Compared to your undergraduate education, how difficult do you feel medical school has been?
Q5	How did the change of the Step 1 exam to pass/fail impact your stress level?
Q6	Would you prefer that Step 1 was scored?
Q7	Are you interested in any of the following: Plastic Surgery, Dermatology, Orthopedic Surgery Otolaryngology, Neurological Surgery?
Q8	Which specialties are you interested in? (Plastic Surgery, Dermatology, Orthopedic Surgery Otolaryngology, Neurological Surgery?)
Q9	In your opinion, which of the following will be most important when residency programs screen your application for interview consideration? (volunteer experience, research experience, scholarly activity, Alpha Omega Alpha or Gold Humanism Honors Society Membership, Clerkship Evaluations, Step 2 score, Letters of Recommendation, Class Ranking/Quartile, audition elective, awards and honors)
Q10	How many weeks did you spend preparing for the Step 1 exam after the Multisystem disease block ended?
Q11	What do you feel is the ideal amount of dedicated time to prepare for Step 1?
Q12	In general, how many days per week during your dedicated time did you study for the Step 1 exam?
Q13	How many hours per day did you study for the Step 1 exam during your dedicated time?
Q14	Did you study in groups for the Step 1 exam?
Q15	How many hours per day did you spend studying in groups?
Q16	Where did you do the majority of your studying for the Step 1 exam?
Q17	Did you study for Step 1 prior to dedicated?
Q18	How many months before your dedicated time did you start studying specifically for the Step 1 exam?
Q19	Prior to the beginning of dedicated, how many hours per week did you study?
Q20	Did you study over the summer between your M1 and M2 years?
Q21	Overall, how many hours per week did you study over the summer?
Q22	What Step 1 practice tests did you use? (NBME Comprehensive Basix Science Self-Assessment, USMLE UWorld Self-Assessment, NBME Free 120 Question Assessment, Amboss Self-Assessment)

Q23	Would you recommend the Step 1 practice tests you used?
Q24	How many Step 1 practice tests did you take?
Q25	What's the highest estimated likelihood of passing you've received on a Step 1 practice exam?
Q26	What resources did you use to prepare for the Step 1 exam and how much did you use them?
Q27	After your experience, would you recommend the resources that you used to prepare for the Step 1 exam?
Q28	Approximately how much money did you spend out of pocket on resources for Step 1?
Q29	How many UWorld questions did you complete while studying for the Step 1 exam?
Q30	Overall, how would you rate your wellness during your dedicated Step 1 study time?
Q31	Did you spend the same amount of time partaking in activities for your wellness during your dedicated Step 1 block as you did during the didactic blocks?
Q32	What is your age?
Q33	What is your gender?
Q34	What is your race/ethnicity?
Q35	What is your current relationship status?
Q36	Do you have any words of advice that can be passed on to future M2s or medical school advisors regarding USMLE Step 1?

Although 80.0% of students spent greater than four weeks of dedicated study time preparing for the Step 1 examination, over three-quarters (82%) of students felt that a study period of five weeks or more was necessary in feeling adequately prepared. All except for 8.6% of this cohort studied at least 6 days a week during their dedicated period and the majority studied no less than six hours a day (94.2%). Some students (15.7%) studied in groups, but for on average less than an hour each day and 32.9% of students elected to study outside of their residence. Only 10.0% of students waited to study for Step 1 until their dedicated period, while 42 of their peers (60.0%) began studying at least three months before the start of their dedicated time. Prior to the start of dedicated studying, the majority of students studied less than five hours a week, only 17.1% began studying the summer before the start of their M2 year, and only 2.9% studied over 30 hours a week over their summer.

During the dedicated study period for Step 1, students use a variety of different resources in order to solidify important material. The most common types of study resources are practice questions in the form of question banks or formal practice tests. However, flashcard applications, high-yield review books, and several other resources in the form of videos or podcasts are also used. In our cohort, the most commonly utilized study resources included the UWorld question bank, Anki flashcards, and the First Aid Step 1 book. In contrast, the Kaplan Step 1 question bank and medical podcasts were the least used. Following the exam, after UWorld, Pathoma (78.6%) and Sketchy Micro (64.3%) were most recommended by students for future test takers. Almost 80% of students (78.6%) completed at least 59% of the UWorld question bank (n= >2,000 questions). Lastly, 40% of students spent more than $300 on preparation resources not including the cost of UWorld or the Step 1 examination itself which cost upwards of $450 and $650 respectively.

DISCUSSION

Although a medical education is very rewarding for students learning to take care of patients, it is also a highly stressful process. There are years of work that go into cultivating a competitive residency application and understanding how to efficiently prepare for Step 1 as well as how to allocate a student's time while in medical school. The transition of USMLE Step 1 to pass/fail scoring represents a tremendous change in medical education and residency applicant selection. While this change was implemented in an attempt to decrease medical student stress, opinions on the efficacy and ramifications of this decision remain mixed (Rajesh et al., 2021; Salari & Deng, 2020).

Prior to the change of Step 1 to pass/fail, minimal research was performed regarding student well-being during the dedicated study period leading up to the licensing exam. In one study, a multi-institutional survey of students following USMLE Step 1 revealed this dedicated study period to be a time of social deprivation and increased financial stress (Tackett et al., 2022). Due to a lack of control data, it is unclear whether the change to binary scoring of the USMLE Step 1 exam has resulted in a significant change in medical student stress and wellbeing. The purpose of this study was to assess the impact of this change on student wellness, study habits, time/financial contributions, and perceptions of the impact this will have on residency applications.

Our study demonstrates that despite the change to a binary scoring system students continue to report poor overall well-being during the preparation period leading up to Step 1. Nearly half of all surveyed students reported similar levels of anxiety or increased concern regarding their performance and the implication on their careers as compared to the first two years of medical school. Traditionally, the USMLE Step 1 examination served as an opportunity for students to stand out amongst their peers, especially in competitive specialties including plastic surgery, dermatology, orthopedic surgery, otolaryngology, and neurological surgery. Scheduled at the end of the second year of medical school, the numerically scored Step 1 exam provided students with clear, early insight into the caliber of their application. Although only a single exam, Step 1 previously served as a loose measure of a medical student's proficiency in the foundational medical sciences as well as marked their level of preparedness prior to the start of clinical rotations. Reported as a three-digit score and the corresponding percentile, a scored Step 1 exam helped students distinguish where they stood in comparison to other medical students that had previously applied and been successful matching into their specialty of choice. It provided students with 12 to 15 months advance notice of what additional academic, service, leadership, or research experiences they needed to partake in to develop a cohesive application. Yet, with the recent shift in paradigm, the uncertainty around a medical student's education and career path seems to have grown exponentially.

Although intended to remove the emphasis on Step 1 as the main criteria for interview invitation, the shift to a P/F scoring system, does not remove the burden of exam performance and the vast extent of medical knowledge needed to be a competitive applicant (Rajesh et al., 2021). Rather, this may simply delay pressure for a competitive score from the Step 1 to Step 2 exam. Due to the timing of the second exam, students have less time to select a residency training path and are often distressed when they realize they will not be a competitive applicant in their desired specialty based on screening guidelines. Alternatively, students with a high score on Step 2 may become overwhelmed due to an increased number of available options and less time to enhance other aspects of their application. Program directors of highly specialized programs anticipate a shift in the metrics for candidate selection towards a greater emphasis on the Step 2 score and scholarly activities (Girard et al., 2023; Goshtasbi et al., 2021).

Interestingly, though stress levels were reported to remain stagnant or possibly worsened during the period of dedicated studying for Step 1, an almost two-thirds majority agreed that this shift to a Pass/Fail system was a step in the right direction. This may be attributed to feelings of reduced student readiness secondary to pass/fail pre-clerkship curriculums or relaxed study behaviors early in medical school due to knowledge of a pass/fail scoring system for Step 1. As the gross number of medical school programs have adopted a pass/fail pre-clerkship curriculum, it is likely that students experience difficulty quantifying the strength of their understanding of medical anatomy, pathophysiology, and pharmacology. Additionally, students, faculty, and academic advisors alike may have also shifted their focus and emphasis away from Step 1 with the knowledge that a binary scoring system likely requires less vigorous preparation from medical students than before.

In addition, removal of this score has created particular concern for international and osteopathic students who have traditionally matched into competitive specialties at lower rates (Craig et al., 2021; Salari & Deng, 2020). Concerns surrounding possible discrimination against international medical graduates, students at lower "ranked" medical schools, or those from lower socioeconomic backgrounds were key challenges identified. The potential emphasis on scholarly activities may also provide an unfair advantage to students who attend large research institutions where opportunities for research are more readily available compared to smaller schools. Thus our study along with findings reported by Tackett et al. (2022) illustrate that a pass/fail scoring scheme has contributed to continued stress, decreased overall wellbeing, less participation in wellness activities, and continued financial burden. While certain resources are often included in the cost of tuition, others are paid for out of pocket. Not including the cost of the question bank or the test itself, 40% of students survey paid greater than $300 in additional test preparation resources. Supporting previous research regarding the financial burden of the exam and demonstrating continuing costly nature of preparation despite binary score reporting.

Just as the financial burden of Step 1 has continued to impact students the large time commitment required for adequate exam preparation also remains. While it is difficult to understand how these changes in scoring have impacted the exact amount of time spent studying, our studying clearly indicates that the time required is extensive. In our study, 80% of students spent at least four weeks of dedicated time studying for the exam. During this time over 91% of participants studied for at least six days each week and 94.2% of students spent six hours or more each study day. Notably, relatively few students elected to spend any time studying in groups during this time (15.7%) and the majority of these students did so for less than one hour per day. Also of note, nearly 67% of students spent most of their time studying at home. This large quantity of time spent studying independently and for many students at home, may contribute to feelings of isolation, stress, and poor overall well-being reported by students within the dedicated study period in this study which is consistent with previous work by Tackett et al. (2022). This is quite distinct from the proceeding preclinical years which require large amounts of time working directly with instructors and peers.

While some stakeholders emphasize the importance of more holistic review of residency applications, others point to the need for comparable metrics that standardized testing affords (Berk et al., 2022). While the use of USMLE Step 1 scores to rank applicants has certainly resulted in significant stress for medical students and is an imperfect measure of future performance, there are several considerations regarding the benefits of a scored USMLE Step 1 exam.

The primary goal for residency programs during applicant selection is to determine which candidates have a high probability of success. Although USMLE Step 1 scores were previously

used by the vast majority of program directors as a primary method for screening applicants for residency interviews, research remains inconclusive regarding the correlation between USMLE Step 1 score and residency performance (Borowitz et al., 2000; Makhoul et al., 2020; Raman et al., 2016). Several studies support the use of other factors in residency selection due to increased correlation with residency and post-residency performance (Dirschl et al., 2002; Raman et al., 2016). These factors include membership to the national medical honor society Alpha Omega Alpha (AOA), Step 2 score, and honors in clinical rotations. Our study revealed students agreed that Step 2 and performance on clinical rotations were likely to become two of the most important factors. However, students also cited letters of recommendation as likely to be important and membership to honors societies such as AOA as unlikely to be particularly important in applicant review. This may be related to the way AOA selection and honors are determined. Each school can determine the specific criteria for AOA selection and achieving honors in a rotation which makes these application components difficult to compare. Additionally, some schools do not even offer an opportunity for students to honor or do not have an AOA chapter. This marks another barrier in assessing student competitiveness.

One study suggested that information submitted during application to residency simply is not predictive of clinical performance (Borowitz et al., 2000). It is somewhat unsurprising that current methods of ranking applicants which frequently rely largely on knowledge based standardized exams and other quantifiable factors have been unsuccessful in predicting resident success. This is likely in part due to the variety of difficult to quantify characteristics including professional and interpersonal skills that are crucial in the practice of clinical medicine. However, this leaves many questions regarding how program directors can better select applicants. In this study, students were asked which parts of the residency application they believe will be weighed most heavily in consideration for interview selection. The majority of students surveyed stated they believed that Step 2, clinical evaluations, and letters of recommendation will be among the top 3 factors considered. As more students are accepted into residency who have taken Step 1 and received a binary score, more data will be available regarding the most important characteristics in an application. However, this data suggests that standardized board exams will remain a very important part of student applications while other more subjective characteristics will play a larger role in selection for interviews.

Despite arguments against binary Step 1 score reporting, program directors and applicants alike will have to adapt to this new era of resident selection. Many individuals have discussed the importance of replacing the Step 1 exam with other objective measures such as USMLE Step 2, however some have advocated for change to allow for more holistic review of applicants (Berk et al., 2022; Dumas et al., 2019; Pontell et al., 2021; Salari & Deng, 2020). Those who advocate for the use of Step 2 as a replacement for Step 1 quote the scarcity of objective measures that have made comparing applicants more challenging. Advocates of this resident selection method also quote data that shows correlation between strong Step 2 scores and strong resident performance (Dirschl et al., 2002; Pontell et al., 2021; Raman et al., 2016). Arguments against the use of Step 2 as a primary method of evaluating resident applicants include the potential to negate any decrease in stress levels or even the increase in stress levels of applicants due to the delayed timeline (Pontell et al., 2021; West et al., 2020). Although substituting Step 1 with Step 2 as a tool for the selection of medical students for residency interviews may be an easy option for program directors, some individuals have suggested larger changes that may allow for better applicant selection and the opportunity for true holistic review (Berk et al., 2022; Pontell et al., 2021; Salari & Deng, 2020).

Although holistic review has become a major buzzword in higher education admissions, the reality may still be far from the goal. Challenges to holistic review include difficulties comparing applicants, a rapidly increasing number of applications, and a lack of clarity regarding which aspects of an application are most predictive of future success (Salari & Deng, 2020). With less quantifiable characteristics available as test scores and school grades alike are converted to pass/fail, comparing applicants has become more difficult. On top of that, applicants feel pressured to apply to more and more programs each year given the competitive nature of the residency selection process, which makes full review of each candidate's application improbable. Lastly, uncertainty remains regarding which factors of an application are truly predictive of success in a future physician. A few solutions to these problems have been proposed. One solution involves the standardization of recommendation letters and the Medical Student Performance Evaluation which summarizes a student's performance throughout medical school so that these elements are more easily compared between applicants. Another solution involves further utilization of the current signaling system that some programs use which allows applicants to indicate interest in a few programs to help optimize interview allotment with the goal of decreasing total applications per applicant. Others have advocated for simply capping the total amount of programs an applicant can apply to in a given year. Any of these solutions have the potential to decrease the total number of applicants at a given program making holistic review more feasible and negating the need for cutoff scores that have been used in past years due to the volume of applicants per institution.

Our study is limited by the surveying of opinions and impressions of medical students at a single institution. This may contribute to notable differences in student perception and ranking of residency application components due to variances in each medical school's core values. Additional input from medical students of osteopathic and international medical institutions may be required for a more comprehensive assessment of medical student perspectives in the transition to a P/F Step 1 examination. Another possible limitation involves the risk for sample bias. While the response rate was relatively high at almost 40%, it is possible that differences exist between responders and nonresponders that have effected the study results. Lastly, this study does not include data from before the scoring transition which makes interpretation of the results challenging. As such, survey results demonstrate the large time and financial commitment Step 1 requires but this cannot be directly compared to previous test-takers experiences. Nonetheless, as the 2024 Residency Match will be the first cohort of medical students to have applied with a P/F Step 1 exam, it will provide preliminary information and clarity regarding which factors residency Program Directors will rely upon for medical resident selection.

CONCLUSIONS

The recent transition of Step 1 from scored to P/F has affected students in many ways over the last two years. Our preliminary data suggests that practice exams and the UWorld question bank are two of the most utilized and suggested resources for exam preparation. Although the switch to pass/fail was reportedly decided on with the goal of reducing student stress, the majority of our cohort report spending less time partaking in wellness related activities than in the first two years of medical school and nearly one third of students reported worse or poor overall wellbeing during the dedicated study period. Additionally, almost half of students felt the scoring change did not improve or worsened their stress level. Despite these results, the majority of students preferred the pass/fail system. Overall, the dedicated study period leading up to Step 1 is a time-consuming and stressful time for many medical students and with the switch to pass/fail these factors remain

true for most students. However, with one less numerical metric most students believe that other factors such as Step 2, clinical evaluations, and letters of recommendation will become the most important factors considered in determining which students receive interview invitations. Nonetheless, many questions still remain, and this study represents preliminary insight into the perceived implications of this USMLE Step 1 scoring change. An annual analysis of residency program admissions will be necessary to truly understand the ramifications of this change in medical training.

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