

The Upcoming Pass/Fail USMLE Step I Score Reporting: An Impact Assessment From Medical School Deans

La prochaine annonce des résultats de l'épreuve I de l'USMLE sous forme réussite/échec : évaluation de son impact par les doyens des facultés de médecins

Samuel M. Manstein, MD¹ , Elizabeth Laikhter, BA¹ ,
 Darya D. Kazei, MD², Carly D. Comer, MD¹ , Eric Shiah, BA¹ ,
 and Samuel J. Lin, MD, MBA¹

Plastic Surgery
 2023, Vol. 31(2) 169–176
 © 2021 The Author(s)
 Article reuse guidelines:
sagepub.com/journals-permissions
 DOI: 10.1177/22925503211034838
journals.sagepub.com/home/psg



Abstract

Background: The US Medical Licensing Examination (USMLE) Step I change to pass/fail has been met with mixed reviews, and the impact on medical student education and residency match is unknown. We surveyed medical school student affairs deans regarding their thoughts on the upcoming transition of Step I to pass/fail. **Methods:** A questionnaire was emailed to medical school deans. Deans were asked to rank the importance of the following after the Step I reporting change: Step 2 Clinical Knowledge (Step 2 CK), clerkship grades, letters of recommendation, personal statement, medical school reputation, class rank, Medical Student Performance Evaluation, and research. They were asked how the score change will affect curriculum, learning, diversity, and student mental health. Deans were asked to select 5 specialties they thought would be most affected. **Results:** Regarding perceived importance of residency applications following the scoring change, the most frequent number 1 choice was Step 2 CK. The majority of deans (93.5%, n = 43) felt that the change to pass/fail would benefit medical student education/learning environment; however, most (68.2%, n = 30) did not believe their school curriculum would change. Students applying to dermatology, neurosurgery, orthopedic surgery, ENT, and plastic surgery were felt to be most affected by the scoring change; 58.7% (n = 27) felt it would not adequately address future diversity. **Conclusion:** The majority of deans feel the USMLE Step I change to pass/fail would benefit medical student education. Deans feel that students applying to traditionally more competitive specialties (ie, programs with fewer overall residency positions available) will be most affected.

Résumé

Contexte : Le changement de l'épreuve I de l'USMLE pour un résultat de type réussite/échec a été accueilli par des opinions variées et son impact sur la formation des étudiants en médecine et l'adéquation des résidences est inconnu. Nous avons mené une enquête auprès des doyens des affaires étudiantes des facultés de médecine pour connaître leur opinion sur la transition prochaine de l'épreuve I à un score réussite/échec. **Méthodes :** Un questionnaire a été envoyé par courriel aux doyens des facultés de médecine. Il leur a été demandé de classer l'importance des éléments suivants après la modification de déclaration des résultats de l'Épreuve I: Épreuve 2 CK, notes d'externat, lettres de recommandation, déclaration personnelle, réputation de l'école de médecine, classement, évaluation des performances des étudiants en médecins (MSPE) et recherche. Il leur a été

¹ Division of Plastic Surgery, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston, MA, USA

² Amsterdam UMC, locatie VUmc, Amsterdam, Netherlands

Submitted April 21, 2021. Accepted June 22, 2021.

Corresponding Author:

Samuel J. Lin, 110 Francis St, Suite 5A, Boston, MA 02215, USA.
 Email: sjlin@bidmc.harvard.edu

demandé comment le changement de notation allait affecter les programmes, l'apprentissage, la diversité et la santé mentale des étudiants. Les doyens devaient sélectionner les 5 spécialités qui, à leur avis, allaient être les plus touchées. **Résultats :** Pour ce qui concerne l'importance perçue des demandes de résidence après le changement de notation, le choix numéro 1 le plus fréquent a été l'épreuve 2 CK. La majorité des doyens (93,5%, n = 43) a eu le sentiment que le changement en Réussite/Échec serait bénéfique pour la formation des étudiants en médecine et leur environnement pédagogique; toutefois, la plupart d'entre eux (68,2%, n = 30) ne croyaient pas que les programmes d'études changeraient. Les étudiants faisant des demandes en dermatologie, neurochirurgie, chirurgie orthopédique, ORL, et chirurgie plastique étaient perçus comme les plus touchés par le changement de notation. Par ailleurs 58,7% des répondants (n = 27) ont estimé que cela n'aborderait pas de manière adéquate la diversité future. **Conclusion :** La majorité des doyens a le sentiment que le passage à une notation Réussite/Échec de l'Épreuve 1 de l'USMLE serait bénéfique à la formation des étudiants en médecine. Les doyens estiment que les étudiants faisant des demandes pour des spécialités où règne traditionnellement une plus grande concurrence (c.-à-d. les programmes avec un moins grand nombre global de postes de résidents) seront les plus touchés.

Keywords

education, residency, USMLE, surgical education

Introduction

The impact of the US Medical Licensing Examination (USMLE) Step 1 on medical student education and resident selection has been at the forefront of discussion among students, residents, educators, and program directors for many years. USMLE Step 1 is a single day, 8-hour multiple choice examination that tests medical students on basic science material covered during their preclinical years.¹ Implemented in 1992, it is the first of 3 medical board licensing examinations in the United States. Over the years, the USMLE Step 1 has become a tool by which residency programs screen their applicant pool, and it is now the most common factor programs will use when considering an applicant for interview.² For specialties considered as highly competitive, a significantly higher score has been traditionally expected in order to match into a program.³ This in turn has caused medical students to spend a significant amount of time and resources during their preclinical years preparing for this examination and for medical schools to provide students with extended study periods. Reports have revealed medical students spend approximately 10.6 hours a day, for an average of 33.5 days following their last day of preclinical courses, preparing for Step 1.⁴

There has been much debate in the medical community about the impact Step 1 has on student education, as well as its effect on opportunities for residency positions. Some physicians believe that the USMLE should be used as a tool to assess the "minimum level of knowledge" necessary to continue training,⁵ and others believe that using the 3 digit score to screen applicants leads to under-representation of minorities in competitive specialties.⁶ However, many have cited the USMLE Step 1 as one of the few objective measures by which to rank residents,⁷ and multiple articles have demonstrated a correlation with USMLE scores and In-Training Examination (ITE) scores.⁸⁻¹⁰

Although there are compelling arguments from both sides, The Federation of State Medical Boards and the National Board of Medical Examiners (NBME) announced on February 12, 2020, that USMLE Step 1 would transition from 3 digit

score reporting to pass/fail reporting no earlier than January 1, 2022.^{11,12} Proponents of this change believe it will allow for a more holistic approach to resident selection,¹³ while others argue that no alternative objective metrics have been suggested to compare applicants.¹⁴ As the USMLE Step 1 plays a substantial role in the matching of medical students to specialties,² a change or new set of criteria will likely be needed. There is speculation in the academic community that Step 2 Clinical Knowledge (Step 2 CK) will replace Step 1 with regard to the context surrounding their use in resident selection, or that medical school reputation will play a larger role in residency match selection. As it remains uncertain how the Step 1 score reporting change will affect the landscape of medical education, resident selection, and student well-being, this study aims to better understand the impact of this transition from the perspective of medical school student affairs deans, who are the primary letter writers for graduating medical students.

Methods

The study was reviewed and approved by our Institutional Review Board, protocol 2020P000303. A survey questionnaire was emailed to all US allopathic medical school deans. Survey items were developed by collating concerns among program directors in our department as well as views expressed by educators and faculty prior to and after the scoring change decision.^{5, 7, 14-16} The survey was pretested among the staff in our research group to ensure clear and concise questions that captured the concerns expressed in the literature.

The questionnaire included basic demographic information (regional, class size, residency applications per specialty/per year), and deans were asked to rank the level of importance of the following, after institution of the Step 1 score reporting change: Step 2 CK, clerkship grades, letters of recommendation (LOR), personal statement, reputation of medical school, class ranking, Medical School Performance Evaluation, and research. The deans were also asked how the score change will affect students' learning environment, curriculum, mental health, out of classroom experiences, and diversity through

Table 1. Demographics of Deans by Age, Sex, Region of Medical School, and Class Size of Their Medical School.

	n	% Respondents
Age		
35-44	8	17.4
45-54	16	34.8
55-64	12	26.1
65-74	7	15.2
Prefer not to answer	3	6.5
Sex		
Female	24	53.33
Male	20	44.44
Prefer not to answer	1	2.22
Region		
Northeast (NJ, NY, PA, RI, CT, MA, VT, NH, ME)	11	24.4
South (MD, DE, WV, VA, DC, KY, TN, NC, SC, GA, AL, MS, FL, AR, LA, OK, TX)	14	31.1
Midwest (OH, MI, IN, WI, IL, MN, IA, MO, ND, SD, NE, KS)	16	35.6
West (MT, WY, CO, NM, ID, UT, AZ, WA, OR, CA, NV)	4	8.9
Pacific (AK, HI)	0	0%
Class size		
<100	10	22.7
100-200	29	65.9
200-300	3	6.8
>300	2	4.6

yes-or-no and open-text responses. Lastly, they were asked to select 5 specialties that they believe will be most affected by the scoring change. A complete copy of the survey is presented in Online Appendix A.

Survey responses were anonymous and confidential. The emails of medical school deans were obtained through an online search. Using REDCap secure database, the respondents were emailed a prospective agreement and a link to the REDCap survey. The respondents were given 3 weeks to complete the survey with 2 additional reminder emails sent during that time. There was no incentive offered for completing the survey. Statistical analysis was performed using STATA software package.

Results

Two hundred and seventy-five deans were contacted, and 46 submitted responses (16.7%). General demographics of age, sex, region, and class size are demonstrated in Table 1. When asked to rank the perceived importance of a student’s residency application following the Step 1 change to pass/fail, the most frequently first-ranked choice was Step 2 CK and the most frequent number 2 and number 3 choices were clerkship grades and LOR, respectively. Research was most frequently selected as least important. Utilizing a weighted scoring system, the order of perceived importance from most important to least

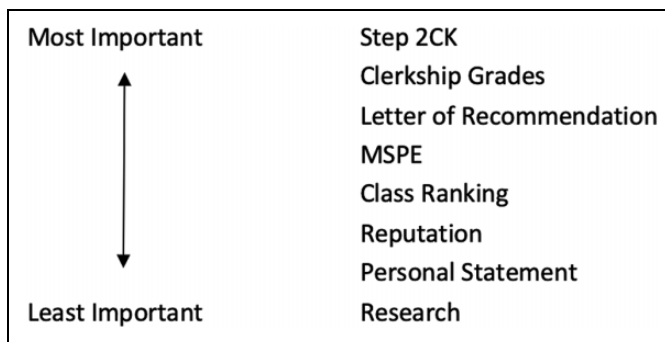


Figure 1. Perceived importance of a student’s residency application following scoring change by medical school deans. Most important (top) to least important (bottom).

important following the change to pass/fail is demonstrated in Figure 1.

Overall, the majority of deans (93.5%, n = 43) felt that the change to pass/fail would benefit medical student education/learning environment; however, most (68.2%, n = 30) did not believe their school curriculum would change (Figure 2). When asked if the change to pass/fail would adequately address mental health concerns among medical students, 58.7% (n = 27) answered “no” (Figure 2). The 3 most common specialties applied to at the institutions in our study were internal medicine, pediatrics, and emergency medicine. Students applying to dermatology, neurosurgery, orthopedic surgery, ENT, and plastic surgery were felt to be most affected by the change in score reporting. The majority (95.7%, n = 44) felt the scoring change would encourage opportunities for students outside of the classroom (ie, research, leadership, or contribution to the community); however, 58.7% (n = 27) felt it will not adequately address future diversity in the workforce (Figure 2).

Discussion

The USMLE Step 1 scoring change to pass/fail will likely alter the current medical education learning environment. According to 93.5% of the deans participating in this study, this change will benefit medical school education. The most common theme among dean responses to why it would benefit students was reduced stress and anxiety during the preclinical years. Many deans feel that the scoring change will allow students to focus on obtaining a deeper understanding of knowledge pertinent to being a good clinician, rather than memorizing facts for the test. One respondent stated, “[there will be] less focus on a number, and more focus on learning what is needed to be a physician.” Another respondent stated, “students are less engaged in their learning on how to be an excellent physician to focus on how to achieve ‘>240’ on the Step 1 exam and this creates a lot of stress and anxiety for the students.” Only 3 respondents felt that the scoring change would detract from the medical student education/learning environment. Two of the respondents felt that the scoring change will transition the anxiety and attention over to Step 2 CK during the third year. Of note, one of those respondents felt that the “students

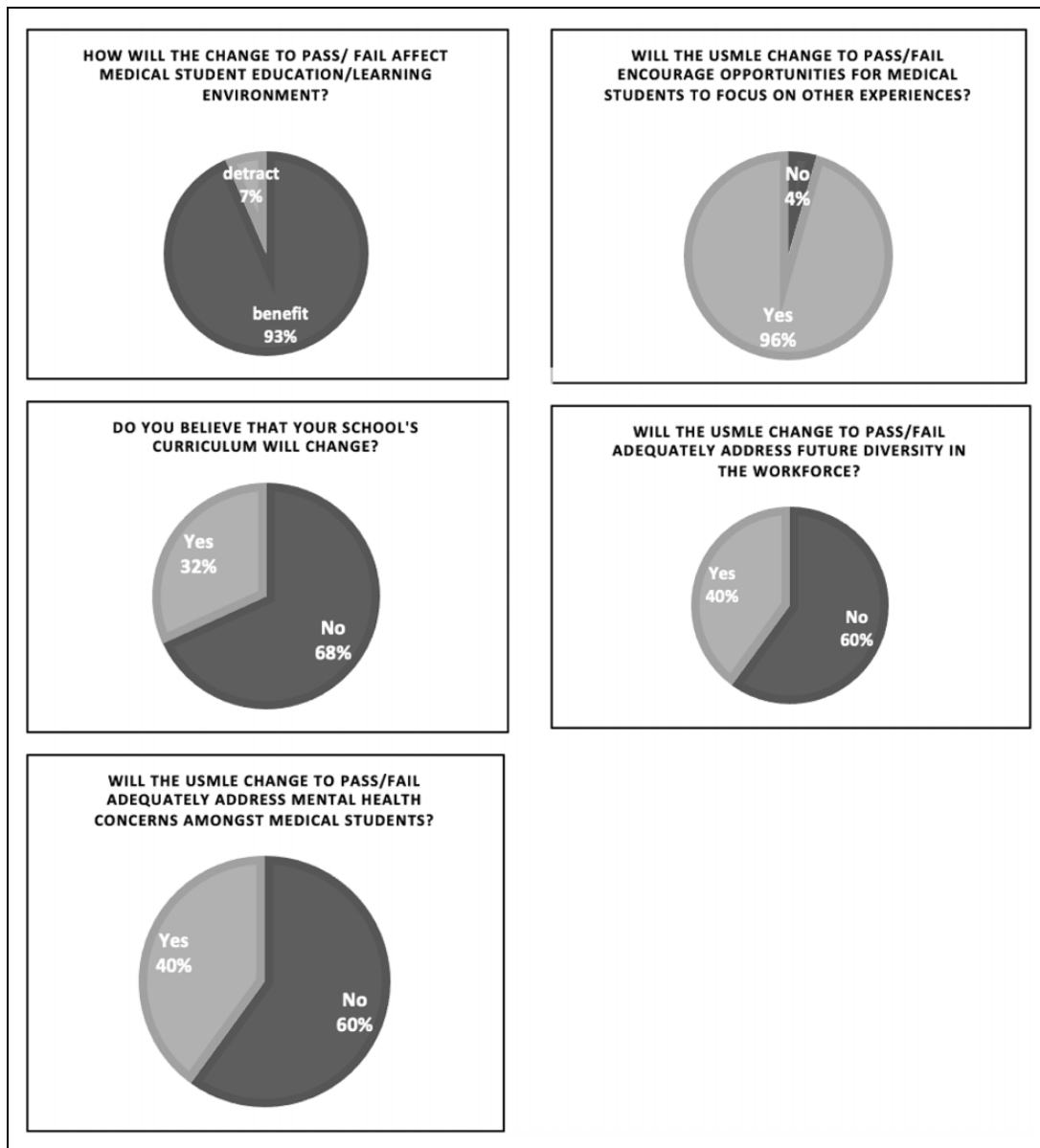


Figure 2. Breakdown of Dean's responses to yes-no questions in survey.

will worry and focus on other areas taking away from learning basic information.” Two respondents felt that change will both benefit and detract; it will allow more time for learning and other scholarly activities in a less stressful environment, but shift the stress and distractions to their clerkship years.

Notably, the overall sentiment of the medical school deans surveyed in our study markedly differs from those of residency program directors. A prior survey of residency program directors demonstrated that 60.8% disagreed with the scoring change, 23.9% were neutral, and 15.3% agreed with it.¹⁷ The vast majority of program directors felt the scoring change will make it more difficult to compare applicants.¹⁷ Most programs will now also require Step 2 CK scores and place a larger emphasis on it when selecting candidates.¹⁷ Compared to our survey in which 93.5% of deans felt the change will benefit

students, only 25% of program directors think student well-being would improve.¹⁷ This impression is echoed in other surveys of program directors. A survey of general surgery program directors found that the vast majority did not agree with the scoring change.¹⁸ They believe screening and ranking will become more difficult and therefore will increase the weight of Step 2 CK when selecting applicants.¹⁸ This emphasis on Step 2 CK may, as the deans in our study have stated, severely distract students during their clerkships. Neurosurgical program directors also disagree with the scoring change and believe students from prestigious medical schools will benefit greatly compared to other students.⁷

Plastic surgery program directors have similar opinions to program directors in other specialties regarding the scoring change. The majority of plastic surgery program directors do

not agree with the scoring change and believe it will lead to a greater emphasis on Step 2 CK.^{19, 20} However, similar to the dean's responses, the majority of plastic surgery program directors do not think the change will have a positive effect on socioeconomic disparities nor have an effect on student well-being. Furthermore, the majority believe this change will lead to a greater emphasis on an applicant's medical school,¹⁹ which will conflict with the NBME's desire to improve diversity among medical specialties.

The differences in opinion between student affairs deans and program directors may be due to the difference in the nature of their role in education. Although the 2 positions have many overlapping roles, deans may primarily focus on fostering a well-rounded, undergraduate medical learning environment and developing holistic physicians, whereas program directors may prioritize the development of clinically competent physicians in their specialty. As residency programs must prepare their residents for passing the boards, clinical competence is highly emphasized. Multiple studies have demonstrated an association with Step 1 and ITE scores,⁸⁻¹⁰ which may offer an explanation to program director's sentiments to the scoring change. Another reason for the difference in opinions could be because program directors use Step 1 as a metric to select residency applicants, whereas the numerical score is not utilized by deans in any significant evaluation.

In our study, deans were asked to select which specialties would be most affected by the scoring change. The 5 most commonly selected were dermatology, neurosurgery, orthopedic surgery, ENT, and plastic surgery. This selection is likely due to the importance these specialties place on Step 1 in the residency match, as they have the highest average Step 1 scores in the 2020 match.³ A survey of medical students and residents at University of California, Los Angeles found the majority (60%) were in favor of numerical scoring.¹⁵ Those who are in more selective specialties (dermatology, general surgery, ophthalmology, orthopedics, ENT, plastic surgery, radiation oncology, and radiology) and those who scored >240 preferred numerical scoring.¹⁵ Other reasons that program directors face surround clinical and academic performance in the long term. With both a written and oral examination for many specialties, it may be seen that a medical student who has a low board score in a group of students with high board scores may have a challenge passing written boards, for instance, given a normative testing curve. Nonetheless, perhaps there are those individuals who believe that no testing should be performed for board certification.

Interestingly, the majority of students and residents felt that knowledge of Step 1 material would decrease with a transition to pass/fail.¹⁵ This contrasts with deans' responses in our study that pass/fail would allow students more time to gain a deeper understanding of the material. As a result, this study has highlighted the inconsistent and varying viewpoints among medical school deans, residency program directors, medical students, and between specialties on the perceived impact of Step 1 score change on medical students.

As Step 1 scores are frequently used as an objective ranking metric, it is likely that Step 2 CK will replace the role of Step 1 after the scoring change. Medical school deans appear to agree with this prediction, as in our study, they ranked Step 2 CK as the most important factor in a student's application after the scoring change. Similar to Step 1, Step 2 CK scores have been positively associated with board pass rates. However, there are conflicting data on whether Step 1 or Step 2 is a better predictor.^{10, 21-23} Interestingly, "research" was ranked by the deans as the least important factor following the change. However, research appears to play an important role in certain specialties, as matched-residents had on average 19.0, 23.4, and 19.1 abstracts, presentations, and publications in dermatology, neurosurgery, and plastic surgery, respectively.³ We can compare this to those of unmatched applicants in these specialties who had on average 10.8, 11.8, and 11.6 publications, respectively.³ More popular specialties had significantly fewer publications overall and had very little disparity in publication volume between matched and unmatched applicants.³ Although the deans in our study predict research to be the least important aspect following the scoring change, it will likely remain an influential factor in the applications for historically competitive specialties.

An important rationale for the scoring change is to improve diversity in medical specialties. Studies have demonstrated that underrepresented minorities, on average, have lower scores on the USMLE Step 1 examination compared to non-underrepresented minorities.^{16,24} As Step 1 scores are frequently used as a screening tool, a disproportionate number of underrepresented minorities may not meet these thresholds for granting interviews.^{2,25} This amplifies the disparity in medical care, as nearly 40% of the US population is composed of racial and ethnic minorities, yet less than 11% of physicians in the US identify as black or Hispanic.^{16,26} Therefore, the members of the medical community argue that removing the numerical Step 1 score will help facilitate diversity in the medical profession, especially in historically competitive specialties.⁶ In our survey, 58.7% (n = 27) answered "no" when asked if the scoring change will adequately address future diversity in the workplace, likely due to the prediction that Step 2 CK will be used instead of Step 1 for interview thresholds in the future. As mentioned previously, many surgical program directors will begin to require Step 2 CK scores, which does little to address the issue of diversity in medical specialties.²⁷ A potential solution to improving diversity may require alternative interview methods or screening tools. Surgical programs have utilized "situation judgement tests" in conjunction with lowering their Step 1 cutoff, which yielded a statistically significant increase in interview invitations to under-represented minorities.²⁸ Alterations to interview invitation practices in conjunction with changes to the USMLE scoring system may yield improvements in physician diversity. However, it will likely take years of data to determine whether the scoring change has a profound impact on medical provider diversity for our increasingly diverse patient population.

The impact of the USMLE Step 1 change on student mental health is an important consideration, especially given that up to 50% of medical students report experiencing burnout or depression.²⁹⁻³¹ There is evidence that the rates of depression and anxiety are higher during final examinations and high-stakes examinations,³² and several cite these statistics in support of the change of USMLE Step 1 to pass/fail.^{33,34} Although a majority of deans (54%, $n = 25$) cited decreased anxiety/stress or improved mental health as reasons the scoring change will benefit students, when asked whether the change will adequately address student mental health concerns, only 39.1% of medical school deans reported “yes.” One dean suggested that the impact on student mental health and wellness is more nuanced: “of course, it won’t ‘adequately’ address those things [. . .] It will likely partially address” [student mental health]. On the other hand, other deans were worried this change would increase stress levels for Step 2 CK, with one dean stating, “the students’ focus on Step 2 CK will end up having 10x the stress of Step 1.” Another dean stated, “students will worry and focus on other areas,” echoing the sentiment that changing USMLE Step 1 to pass/fail may ameliorate some but not all medical student mental health concerns, and that there may always be the potential for unintended consequences.

The timing of Step 2 CK could potentially contribute to medical student stress as well as outcomes. This examination is often taken during clerkship rotations when medical students have less control over their schedule than their preclerkship time, and the amount of free time a student has can be highly dependent on the rotation. Students will likely have to plan their clerkship schedule around their Step 2 CK date in order to optimize the amount of time available for preparation. With most students taking Step 2 CK toward the end of their core rotations, this may create tension among medical students whom are all trying to get outpatient rotations or vacation blocks toward the end of their core-clerkship years to maximize studying opportunities.

With rapid advances to medicine and health care, medical school curricula are continuously evolving.^{35,36} However, when asked whether they anticipate their medical school’s curriculum will change in response to the USMLE step 1 score reporting change, most medical school deans (68.18%) answered that it will not. Given that most deans anticipate that Step 2 CK will become the most important factor in residency selection, medical educators may focus on preparing students for step 2 CK, placing greater emphasis on clinical education. Many schools have already transitioned to shorter preclinical curricula in order to focus more on clinical training,³⁶ which may be a reason that a majority of deans do not think their curriculum will change even further in response to Step 1 scoring change. Recent literature suggests that current medical school curricular changes focus on teaching students beyond board examination material, with focus on areas such as active learning, medical technology, physician competencies, poverty, climate change, and community outreach.^{35,37,38} On the other hand, 31.8% of deans think their curriculum will change.

Although the most innovative curricular changes focus on integrating medicine with technology and society, the NBME and USMLE continue to be benchmarks that are used when developing curricula for new medical schools and to gauge the effectiveness of changes to established medical school curricula.^{36,39} Additionally, it is important to consider that student affairs deans may not necessarily be the ones directly in charge of the curriculum. Regardless of the magnitude of the curricular change, this is important information for medical educators and clinicians to consider when teaching the future generation of physicians.

An important limitation to note to our study is the sample size, with 16.7% of student affairs deans responding. Some of the low response rate may be secondary to the timing of when the survey was distributed as automatic responses from dean’s emails stated they were working remotely during the coronavirus disease 2019 pandemic. Nonetheless, scheduled reminders were sent to the deans over 3 weeks in an attempt to address the response rate. Despite our response rate, our respondents were a diverse representation of medical school deans in the United States. The respondent ages followed a normal distribution curve and slightly more than half of respondents identified as female. Although we received responses from each geographic region, we received slightly fewer responses from the west region than expected. Fifteen percent of all allopathic medical schools are located in the west region ($n = 24$), however, only 8.9% ($n = 4$) of respondents comprised this region. Four responses from the west region equate to a 70% confidence level with a 28% margin of error that our sample size accurately captured the population of interest. As cultural differences based on US geographic location have been demonstrated,⁴⁰ there is a possibility our study did not fully represent the diversity of opinions across the United States. This survey was created in a manner to minimize confusion and encourage participation; therefore, many yes/no type answers were created. Although this simplifies the surveying process, it does not allow deans to clarify their answer choices, which may not be as explicit as “yes or no.”

Conclusion

Much is still unknown about how the Step 1 scoring change will affect medical education as well as resident selection. From the medical school student affairs dean perspective, overall, students will benefit from this transition as they will have less stress during their preclinical years. Those applying to historically competitive specialties will likely be most affected, as these specialties place high importance on high Step 1 scores. As the scoring change will take effect in the coming year, we will likely see a transition in resident selection criteria with an emphasis on Step 2 CK, potentially replacing the “screening role” of Step 1. Future studies after the implementation of the Step 1 scoring change to pass/fail will be pertinent in determining the true effects of the scoring change on resident selection criteria, medical student mental health, and resident diversity.

Authors' Note

All procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the Helsinki Declaration of 1975, as revised in 2008. Informed consent was obtained from all patients for being included in the study. Informed consent was obtained from all individual participants included in the study. We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome. No funding was received for this work.



Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iDs

Samuel M. Manstein, MD  <https://orcid.org/0000-0003-3686-847X>
 Elizabeth Laikhter, BA  <https://orcid.org/0000-0002-0072-0011>
 Carly D. Comer, MD  <https://orcid.org/0000-0002-7016-0048>
 Eric Shiah, BA  <https://orcid.org/0000-0001-5742-7011>

Supplemental Material

Supplemental material for this article is available online.

References

1. United States Medical Licensing Examination. Step 1. Publication year 2020. Updated October 2020. Accessed September 2, 2020. <https://www.usmle.org/step-1/#content-description>
2. National Resident Matching Program. Results of the 2018 NRMP program director survey. 2018, June;
3. National Resident Matching Program. Charting outcomes in the match: Senior students of U.S. MD medical schools. Publication year 2020. Updated July 2020. Accessed July 14, 2020. https://mk0nrmp3oyqui6wqfm.kinstacdn.com/wp-content/uploads/2020/07/Charting-Outcomes-in-the-Match-2020_MD-Senior_final.pdf
4. Kumar AD, Shah MK, Maley JH, Evron J, Gyftopoulos A, Miller C. Preparing to take the USMLE Step 1: a survey on medical students' self-reported study habits. *Postgrad Med J*. 2015; 91(1075):257-261. doi:10.1136/postgradmedj-2014-133081
5. Carroll RG. In the valley of the blind, the USMLE is king. *Adv Physiol Educ*. 2017;41(2):246-247. doi:10.1152/advan.00021.2017
6. Isaq NA, Bowers S, Chen ST. Taking a "step" toward diversity in dermatology: De-emphasizing USMLE Step 1 scores in residency applications. *Int J Womens Dermatol*. 2020;6(3):209-210. doi:10.1016/j.ijwd.2020.02.008
7. Huq S, Khalafallah AM, Botros D, et al. Perceived impact of USMLE Step 1 pass/fail scoring change on neurosurgery: program director survey. *J Neurosurg*. 2020;1-8. doi:10.3171/2020.4.Jns20748
8. Fening K, Vander Horst A, Zirwas M. Correlation of USMLE Step 1 scores with performance on dermatology in-training examinations. *J Am Acad Dermatol*. 2011;64(1):102-106. doi:10.1016/j.jaad.2009.12.051
9. Thundiyl JG, Modica RF, Silvestri S, Papa L. Do United States Medical Licensing Examination (USMLE) scores predict in-training test performance for emergency medicine residents? *J Emerg Med*. 2010;38(1):65-69. doi:10.1016/j.jemermed.2008.04.010
10. Rayamajhi S, Dhakal P, Wang L, Rai MP, Shrotriya S. Do USMLE steps, and ITE score predict the American Board of Internal Medicine Certifying Exam results? *BMC Med Educ*. 2020;20(1):79. doi:10.1186/s12909-020-1974-3
11. Federation of State Medical Boards. USMLE program announces upcoming policy changes. Published year 2020. Updated February 12, 2020. Accessed September 20, 2020. <https://www.fsmb.org/advocacy/news-releases/usmle-program-announces-upcoming-policy-changes/>
12. United States Medical Licensing Examination. Change to pass/fail score reporting for Step 1. Published year 2020. Updated February 12, 2020. Accessed July 14, 2020. <https://www.usmle.org/incus/>
13. Pershing S, Co JPT, Katznelson L. The new USMLE Step 1 paradigm: an opportunity to cultivate diversity of excellence. *Acad Med*. 2020;95(9):1325-1328. doi:10.1097/acm.0000000000003512
14. Rozenshtein A, Mullins ME, Marx MV. The USMLE Step 1 pass/fail reporting proposal: the APDR position. *Acad Radiol*. 2019; 26(10):1400-1402. doi:10.1016/j.acra.2019.06.004
15. Lewis CE, Hiatt JR, Wilkerson L, Tillou A, Parker NH, Hines OJ. Numerical versus pass/fail scoring on the USMLE: what do medical students and residents want and why? *J Grad Med Educ*. 2011;3(1):59-66. doi:10.4300/jgme-d-10-00121.1
16. Williams M, Kim EJ, Pappas K, et al. The impact of United States Medical Licensing Exam (USMLE) Step 1 cutoff scores on recruitment of underrepresented minorities in medicine: a retrospective cross-sectional study. *Health Sci Rep*. 2020;3(2):e2161. doi:10.1002/hsr2.161
17. Makhoul AT, Pontell ME, Ganesh Kumar N, Drolet BC. Objective Measures Needed - Program Directors' Perspectives on a Pass/Fail USMLE Step 1. *N Engl J Med*. Jun 18 2020;382(25):2389-2392. doi:10.1056/NEJMp2006148
18. Pontell ME, Makhoul AT, Ganesh Kumar N, Drolet BC. The change of USMLE Step 1 to pass/fail: perspectives of the surgery program director. *J Surg Educ*. 2020;doi:10.1016/j.jsurg.2020.06.034
19. Lin LO, Makhoul AT, Hackenberger PN, et al. Implications of pass/fail step 1 scoring: plastic surgery program director and applicant perspective. *Plast Reconstr Surg Glob Open*. 2020; 8(12):e3266. doi:10.1097/gox.0000000000003266
20. Pontell ME, Makhoul AT, Ganesh Kumar N, Drolet BC. The change of USMLE Step 1 to pass/fail: perspectives of the surgery program director. *J Surg Educ*. 2021;78(1):91-98. doi:10.1016/j.jsurg.2020.06.034
21. Ost SR, Wells D, Goedecke PJ, Tolley EA, Kleinman M, Thompson NS. Relationship between standardized test scores and board certification exams in a combined internal medicine/pediatrics

- residency program. *Cureus*. 2021;13(2): e13567. doi:10.7759/cureus.13567
22. McDonald FS, Jurich D, Duhigg LM, et al. Correlations between the USMLE step examinations, American College of physicians in-training examination, and ABIM internal medicine certification examination. *Acad Med*. 2020;95(9):1388-1395. doi:10.1097/acm.0000000000003382
 23. Maker VK, Zahedi MM, Villines D, Maker AV. Can we predict which residents are going to pass/fail the oral boards? *J Surg Educ*. 2012;69(6):705-713. doi:10.1016/j.jsurg.2012.08.009
 24. Campbell KM, Brownstein NC, Livingston H, Rodríguez JE. Improving underrepresented minority in medicine representation in medical school. *South Med J*. 2018;111(4):203-208. doi:10.14423/smj.0000000000000792
 25. Edmond MB, Deschenes JL, Eckler M, Wenzel RP. Racial bias in using USMLE Step 1 scores to grant internal medicine residency interviews. *Acad Med*. 2001;76(12):1253-1256. doi:10.1097/00001888-200112000-00021
 26. AAMC. Diversity in medicine: facts and figures 2019. Updated July 2019. Published 2019. Accessed July 14, 2020. <https://www.aamc.org/data-reports/workforce/interactive-data/figure-18-percentage-all-active-physicians-race/ethnicity-2018>
 27. Poon S, Nellans K, Rothman A, et al. Underrepresented minority applicants are competitive for orthopaedic surgery residency programs, but enter residency at lower rates. *J Am Acad Orthop Surg*. 2019;27(21): e957-e968. doi:10.5435/jaaos-d-17-00811
 28. Gardner AK, Cavanaugh KJ, Willis RE, Dunkin BJ. Can better selection tools help us achieve our diversity goals in postgraduate medical education? Comparing use of USMLE Step 1 scores and situational judgment tests at 7 surgical residencies. *Acad Med*. 2020;95(5):751-757. doi:10.1097/acm.0000000000003092
 29. Schwenk TL, Davis L, Wimsatt LA. Depression, stigma, and suicidal ideation in medical students. *JAMA*. 2010;304(11): 1181-1190. doi:10.1001/jama.2010.1300
 30. Ludwig AB, Burton W, Weingarten J, Milan F, Myers DC, Kligler B. Depression and stress amongst undergraduate medical students. *BMC Med Educ*. 2015;15:141. doi:10.1186/s12909-015-0425-z
 31. Dyrbye LN, Thomas MR, Massie FS, et al. Burnout and suicidal ideation among U.S. medical students. *Ann Intern Med*. 2008; 149(5):334-341. doi:10.7326/0003-4819-149-5-200809020-00008
 32. Dyrbye LN, Thomas MR, Shanafelt TD. Systematic review of depression, anxiety, and other indicators of psychological distress among U.S. and Canadian medical students. *Acad Med*. 2006; 81(4):354-373. doi:10.1097/00001888-200604000-00009
 33. Prober CG, Kolars JC, First LR, Melnick DE. A Plea to reassess the role of United States medical licensing examination Step 1 scores in residency selection. *Acad Med*. 2016;91(1):12-15. doi:10.1097/acm.0000000000000855
 34. Carmody JB, Sarkany D, Heitkamp DE. The USMLE Step 1 pass/fail reporting proposal: another view. *Acad Radiol*. 2019;26(10): 1403-1406. doi:10.1016/j.acra.2019.06.002
 35. Fischel JE, Olivet DM, Iuli RJ, Lu WH, Chandran L. Curriculum reform and evolution: innovative content and processes at one US medical school. *Med Teach*. 2019;41(1):99-106. doi:10.1080/0142159x.2018.1444268
 36. Torre DM, Dong T, Schreiber-Gregory D, et al. Exploring the predictors of post-clerkship USMLE Step 1 scores. *Teach Learn Med*. 2020;32(3):330-336. doi:10.1080/10401334.2020.1721293
 37. Wellbery C, Sheffield P, Timmireddy K, Sarfaty M, Teherani A, Fallar R. It's time for medical schools to introduce climate change into their curricula. *Acad Med*. 2018;93(12):1774-1777. doi:10.1097/acm.0000000000002368
 38. Doran KM, Kirley K, Barnosky AR, Williams JC, Cheng JE. Developing a novel poverty in healthcare curriculum for medical students at the University of Michigan medical school. *Acad Med*. Jan 2008;83(1):5-13. doi:10.1097/ACM.0b013e31815c6791
 39. Johnson TR, Khalil MK, Pepler RD, Davey DD, Kibble JD. Use of the NBME comprehensive basic science examination as a progress test in the preclerkship curriculum of a new medical school. *Adv Physiol Educ*. Dec 2014;38(4):315-320. doi:10.1152/advan.00047.2014
 40. Plaut VC, Markus HR, Treadway JR, Fu AS. The cultural construction of self and well-being: a tale of two cities. *Pers Soc Psychol Bull*. Dec 2012;38(12):1644-1658. doi:10.1177/0146167212458125