Converting USMLE Step 1 to Pass or Fail: A Retrospective Cross-Sectional Study on The Potential Impact to Surgical Residency Diversity

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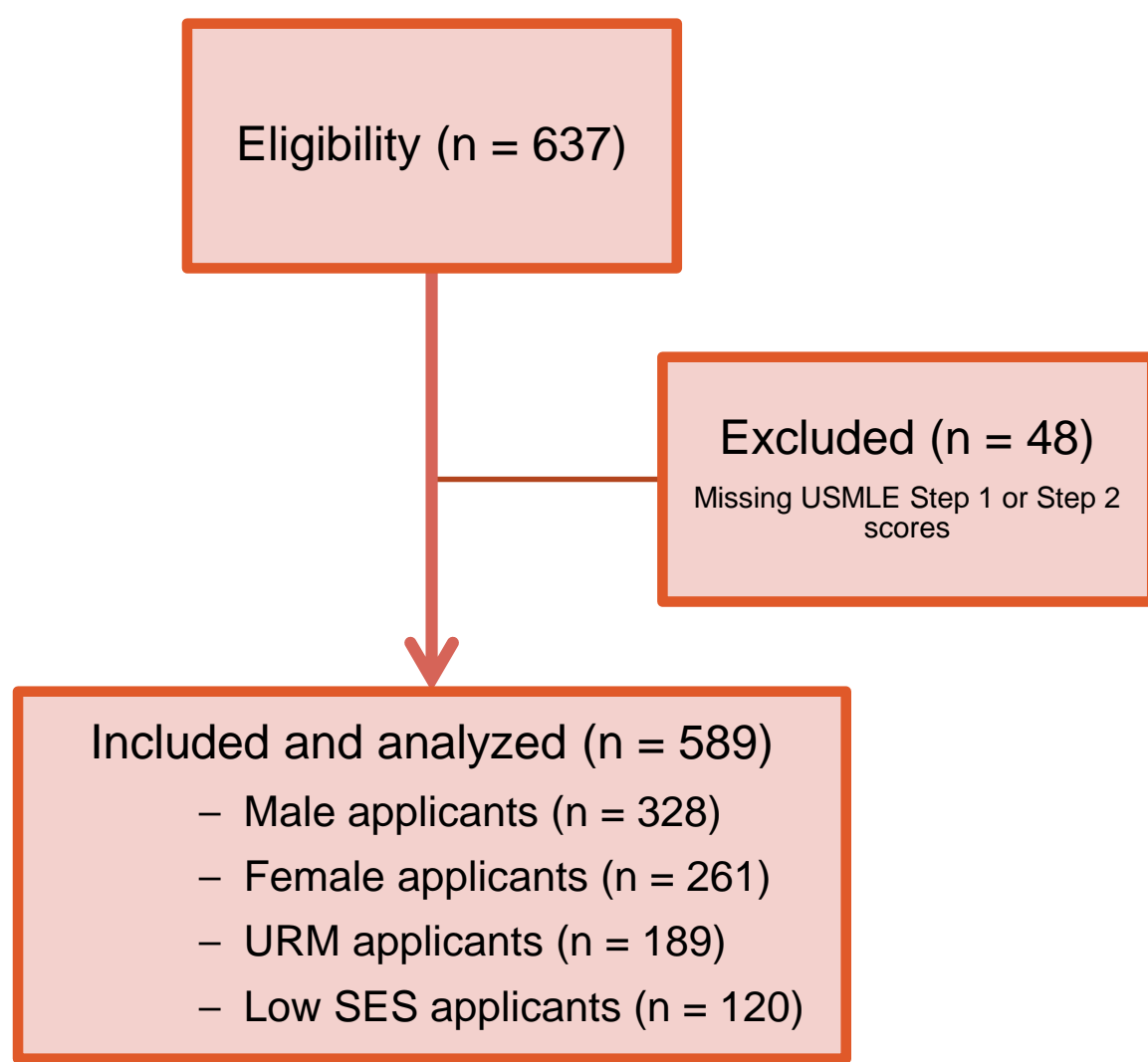
Background

- United States Medical Licensing Exam (USMLE) Step 1 and Step 2 are often used as numerical measures for programs to screen applicants in the residency match process.

- As of January 2022, USMLE Step 1 transitioned from a three-digit numeric score to reporting only pass/fail.

   o The goal of this change was to promote holistic applicant review by program directors and to foster a less stressful learning environment for medical students.[1]

- Past studies have shown that women, under-represented minorities (URM) as well as individuals of low socioeconomic status (SES) score significantly lower than their non-URM, male, and high SES colleagues on the USMLE Step 1 exam.[2,3]

- Since the transition, Step 2 scores became a popular screening tool for residency applicants[4] and the impact on groups historically marginalized, and thus the diversity of surgical training programs by standardized testing is unknown.

- We hypothesize the transition will be beneficial to women, URM, and low socioeconomic status applicants.

Objective

This study investigated the relationships between three surgery applicant groups (sex, underrepresented minority status, socioeconomic status) and USMLE Step 2 examination scores for potential effects on the surgery residency interview process due to a transition to pass/fail reporting for the USMLE Step 1 exam.

Methods

Eligibility (n = 637)

Excluded (n = 48)
Missing USMLE Step 1 or Step 2 scores

Included and analyzed (n = 589)
– Male applicants (n = 328)
– Female applicants (n = 261)
– URM applicants (n = 189)
– Low SES applicants (n = 120)

- Retrospective cross-sectional analysis of Electronic Residency Application Service (ERAS) for single general surgery residency program during the 2021-2022 application cycle

- Study population represents 24.5% of the 2021 application pool

- For applicant SES, median household income data was obtained from self-reported permanent zip codes, the U.S Census Bureau: 2021 American Community Survey 1-Year Estimates and Internal Revenue Service for the 2021 Tax Filing Year.[5,6]

- Low SES were categorized as falling into the 10% and 12% tax brackets

Results

Figure 1: *Applicant Self-Reported Data and USMLE Step Scores*

	Overall N=589	Female N=261	Male N=328	P-value	URM N=189	Non-URM N=400	P-value
USMLE Step 1:							
Overall	226.3 ± 12.0						
Male	228.4 ± 15.5	-	228.4 ± 15.5		-	-	
Female	223.6 ± 14.3	223.6 ± 14.3	-		-	-	
White	226.6 ± 14.7	-	-	0.0001	-	226.6 ± 14.7	0.0005
Asian	228.1 ± 15.3	-	-		-	228.1 ± 15.3	
Hispanic	223.4 ± 14.2	-	-		223.4 ± 14.2	-	
Black	223.1 ± 14.9	-	-		223.1 ± 14.9	-	
American Indian	214.0 ± 16.0	-	-		214.0 ± 16.0	-	
Others	228.6 ± 18.0	-	-		228.6 ± 18.0	-	
USMLE Step 2:							
Overall	237.9 ± 12.1						
Male	237.6 ± 13.0	-	237.6 ± 13.0		-	-	
Female	238.0 ± 13.2	238.0 ± 13.2	-	0.712	-	-	
White	239.5 ± 12.6	-	-		-	239.5 ± 12.6	0.0012
Asian	237.4 ± 13.1	-	-		-	237.4 ± 13.1	
Hispanic	235.5 ± 13.0	-	-		235.5 ± 13.0	-	
Black	231.0 ± 12.5	-	-		231.0 ± 12.5	-	
American Indian	227.7 ± 12.2	-	-		227.7 ± 12.2	-	
Others	239.1 ± 13.8	-	-		239.1 ± 13.8	-	

Abbreviations: URM, underrepresented minority.

Figure 2: *Linear Regression of Applicant USMLE Step Scores*

Variables	Coefficient	95% Confidence Interval	P-Value
Sex			
Male	Ref		
Female	0.84	-1.34 to 3.02	0.449
Race			
Black	Ref		
White	10.41	5.59 to 15.22	**0.001**
Asians	6.53	1.51 to 11.56	**0.011**
Hispanic	5.72	0.54 to 10.89	**0.030**
American Indian	-2.07	-13.30 to 9.15	0.717
Others	12.07	4.32 to 19.82	**0.002**
Medical School			
International MG	Ref		
US MD Public	1.26	-1.36 to 3.90	0.344
US MD Private	0.94	-2.80 to 4.69	0.621
US DO Graduate	-1.48	-4.56 to 1.59	0.344
US Tax Bracket			
10%	Ref		
12%	3.39	-9.40 to 16.18	0.603
22%	0.70	-12.10 to 13.51	0.914
24%	2.71	-10.02 to 15.44	0.676
32%	- 0.72	-14.35 to 12.91	0.918
35%	5.03	-8.85 to 18.92	0.477

Abbreviations: Ref, reference value. MG, medical graduate.

Discussion

- No significant difference was noted between male and female applicant scores on USMLE Step 2.

- The move to pass/fail scoring for Step 1 by the NBME could represent a promising step towards a future in which female surgical applicants face less barriers and biases when applying to a historically male-dominated field.

- No significant differences in the Step 2 scores across the federally defined tax brackets.

- Significant variations in USMLE Step 2 scores between URM applicants and non-URM applicants.

- These findings align with previous research highlighting the existence of racial and ethnic disparities in standardized testing.[2,7]

- Changing USMLE Step 1 to pass/fail may not improve the competitiveness of URM and may in fact exacerbate inequity.

Conclusion

The transition to reporting USMLE Step 1 as pass/fail may benefit female applicants while adversely impacting underrepresented minority applicants. Low SES applicants also may benefit from the change, however, the true impact may be foregone given that few students from the lowest income tax bracket even make it to the residency application. As the holistic review process evolves, the impacts on historically underrepresented individuals need to be carefully evaluated to achieve equitable representation in surgical residency programs.

References

1. How the switch to pass-fail scoring for USMLE Step 1 is going. American Medical Association. Published April 5, 2023. Accessed September 26, 2023. https://www.ama-assn.org/medical-students/usmle-step-1-2/how-switch-pass-fail-scoring-usmle-step-1-going
2. Gauer JL, Jackson JB. Relationships of demographic variables to USMLE physician licensing exam scores: a statistical analysis on five years of medical student data. Adv Med Educ Pract. 2018;9:39-44. doi:10.2147/AMEP.S152684
3. Cuddy MM, Swanson DB, Clauser BE. A multilevel analysis of examinee gender and USMLE step 1 performance. Acad Med. 2008;83(10 Suppl):S58-62. doi:10.1097/ACM.0b013e318183cd65
4. National Resident Matching Program, Data Release and Research Committee: Results of the 2021 NRMP Program Director Survey. National Resident Matching Program, Washington, DC. 2021.
5. U.S. Census Bureau QuickFacts: United States. Accessed August 21, 2023. https://www.census.gov/quickfacts/fact/table/US/PST045222
6. SOI Tax Stats - Individual Statistical Tables by Filing Status | Internal Revenue Service. Accessed August 21, 2023. https://www.irs.gov/statistics/soi-tax-stats-individual-statistical-tables-by-filing-status
7. Jones AC, Nichols AC, McNicholas CM, Stanford FC. Admissions Is Not Enough: The Racial Achievement Gap in Medical Education. Acad Med. 2021;96(2):176-181. doi:10.1097/ACM.0000000000003837