

*Diversity, Equity, Inclusion, and Justice*

# Racial Bias on the Emergency Medicine Standardized Letter of Evaluation

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**ABSTRACT**

**Background** Studies on components of residency applications have shown evidence of racial bias. The Standardized Letter of Evaluation (SLOE) is an assessment measure for emergency medicine (EM) residency applications and, as more specialties opt to use SLOEs in place of narrative letters of recommendation, understanding bias on standardized assessments is essential.

**Objective** To determine whether there is a difference in rankings on the EM SLOE between underrepresented in medicine (UIM) and non-UIM applicants, White and non-White applicants, and to examine whether differences persist after controlling for other characteristics.

**Methods** The sample was drawn from medical students who applied to EM residency at the study institution in 2019. We compared rankings between UIM and non-UIM students and between students of each individual race/ethnicity and White students, after controlling for United States Medical Licensing Examination Step scores, Alpha Omega Alpha status, type of school (US MD, US DO, international medical graduate), Medical Student Performance Evaluation class percentile, affiliated program vs visiting clerkship SLOE, gender and the interaction of race/ethnicity and gender, and adjusted for students submitting multiple SLOEs, using ordinal regression.

**Results** There were 1555 applicants to the study institution in 2019; 1418 (91.2%) had a SLOE and self-identified race/ethnicity. After controlling for applicant characteristics, non-UIM students were significantly more likely to be ranked higher than UIM students on “Rank Against Peers,” (OR 1.46, 95% CI 1.03-2.07) and Grade (OR 1.46, 95% CI 1.05-2.04).

**Conclusions** Analysis of EM SLOEs submitted to our institution demonstrates racial bias on this standardized assessment tool, which persists after controlling for other performance predictors.

**Introduction**

Racial discrimination and implicit racial bias are widespread throughout medical education, resulting in disparities in assessment measures and the residency Match.<sup>1-6</sup> Studies demonstrate evidence of racial/ethnic bias in grading with an association between lower clerkship grades and non-White race/ethnicity,<sup>2</sup> and significant systematic differences exist in the language used to describe White vs Black applicants on the Medical Student Performance Evaluation (MSPE).<sup>3</sup> Further, social determinants of learning can disproportionately and negatively influence the standardized test scores of underrepresented in medicine (UIM) students.<sup>7,8</sup>

Importantly, the impact of racial/ethnic disparities in assessment have created inequities in the residency

Match. Studies have shown that a higher proportion of Black<sup>5</sup> and UIM students<sup>6</sup> are denied residency interviews compared to White or non-UIM students when using a minimum cutoff score for United States Medical Licensing Examination (USMLE) Step 1. As Step 1 transitions to pass/fail grading and more specialties develop a Standardized Letter of Evaluation (SLOE) to assess residency applicants, the effect of racial/ethnic bias on the SLOE and the potential for exacerbating racial/ethnic inequities in the Match must be considered.

In 1995, the emergency medicine (EM) SLOE was created to provide a more standardized and less biased assessment of medical students' clerkship performance.<sup>9</sup> It consists of the following (see online supplementary data for an example SLOE):

1. “Rank Against Peers”: students are ranked against all other students applying to EM residency who were assessed by the SLOE author

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*Editor's Note: The online version of this article contains an example Standardized Letter of Evaluation.*

2. Predicted placement on the institution's Match list
3. Grade on the EM rotation on which the SLOE is based
4. Qualities necessary for success in EM, ranked against peers
5. Narrative portion

The EM SLOE has become the component of an application that program directors value most when selecting students to interview and rank.<sup>10-12</sup> Other specialties (including otolaryngology, dermatology, orthopedics, and obstetrics and gynecology) have adopted a SLOE for their residency selection process, and the Coalition for Physician Accountability (COPA) recommends that all specialties cease using a narrative letter of recommendation in favor of a standardized evaluation letter.<sup>13</sup> Understanding the influence of racial/ethnic bias on the EM SLOE could have broad implications for applicants across multiple specialties.

A subgroup analysis of a recent study comparing the EM SLOE to the Standardized Video Interview found that rankings on the EM SLOE "slightly favored White applicants"<sup>14</sup>; however, no study has specifically examined racial/ethnic bias in the EM SLOE. The primary aim of this study is to determine whether there is a difference in rankings on the EM SLOE between UIM and non-UIM applicants and to examine whether differences persist after controlling for other factors in the application. The secondary aim is to determine whether there are SLOE ranking differences between non-Hispanic White and non-White applicants.

## Methods

### Setting and Participants

This is a retrospective quantitative document review study. The sample was drawn from the students who applied to the study institution's EM residency program (a Midwest, urban, university-based, 3-year program with 18 residents per class) in 2019, including all US MD, US DO, and international medical graduate (IMG) applicants. This represents 39% of the total EM applicant pool<sup>15</sup> and 55% of the US MD EM applicant pool in 2019.<sup>15</sup>

### Interventions

We obtained data from the Electronic Residency Application Service (ERAS) file of each student. SLOE rankings, student race/ethnicity, type of school (US MD/US DO/IMG), gender, USMLE Step 1 score,

#### Objectives

To determine whether there are difference in rankings on the emergency medicine Standardized Letter of Evaluation (SLOE) by race.

#### Findings

After controlling for applicant characteristics, the emergency medicine SLOE demonstrates significant differences in rankings by race.

#### Limitations

This was a convenience sample of standardized letters submitted to one residency during one application season.

#### Bottom Line

Standardized letters demonstrate similar racial bias to other assessment methods and residency program directors need to be aware of these limitations when assessing residency applicants.

affiliated program vs visiting clerkship SLOE, Alpha Omega Alpha (AOA) status, and MSPE class percentile were paired and de-identified. Students self-identify their race/ethnicity on ERAS, with the following options: "American Indian or Alaska Native," "Asian," "Black or African American" (Black), "Hispanic, Latino, or of Spanish Origin" (Hispanic), "Native Hawaiian or Other Pacific Islander," "White," "Other," or "Unknown." Students may select as many as needed, or leave it blank.

### Outcomes Measured

The 3 main variables on the SLOE are:

1. Rank Against Peers (RAP), ranging from top 10%, top 1/3, middle 1/3, lower 1/3
2. Rank List Prediction (RLP), ranging from top 10%, top 1/3, middle 1/3, lower 1/3, unlikely to rank
3. Grade, which generally ranges from Honors, High Pass, Pass, Fail

The RAP and Grade are 4-point ordinal scales; the RLP is a 5-point ordinal scale. A ranking of one correlates with top 10% on RAP and RLP, and Honors on Grade.

### Analysis of Outcomes

The primary outcome is a comparison of the RAP, RLP, and Grade between UIM (defined as students who identified as Black, Hispanic, American Indian/Alaska Native, and/or Native Hawaiian/Pacific Islander on their application)<sup>8</sup> and non-UIM students, using the Wilcoxon rank sum test. Using ordinal regression, we controlled for USMLE Step scores, AOA status, type of school (US MD, US DO, IMG), MSPE class percentile, affiliated program vs visiting clerkship SLOE, gender and the interaction of race/

**TABLE 1**  
Applicant Demographics

Demographic	No. of Applicants in Sample <sup>a</sup>	% of Applicants in Sample	% of Applicants in National Applicant Pool <sup>b</sup>
Gender			
Male	822	58.0	66.0
Female	595	42.0	34.0
UIM status			
Non-UIM	1117	78.8	84.7
UIM	301	21.2	19.0
Race/ethnicity			
Non-Hispanic White	775	54.7	62.2
Asian	282	19.9	18.2
Black or African American	154	10.9	7.5
Hispanic, Latino, or of Spanish Origin	137	9.7	10.1
American Indian or Alaska Native	12	0.8	0.9
Native Hawaiian or Other Pacific Islander	9	0.6	0.4
Other	60	4.2	4.0
Type of school			
US MD	1134	80.0	55.1
US DO	187	13.2	26.5
IMG	97	6.8	18.9
AOA status			
AOA	132	9.3	5.7
Not AOA	1286	90.7	94.3

Abbreviations: UIM, underrepresented in medicine; IMG, international medical graduate; AOA, Alpha Omega Alpha.

<sup>a</sup> Applicants were categorized as White if they selected White and no other race/ethnicity (ie, there were 43 students who selected both White and Hispanic, they were studied as Hispanic). They were categorized as Asian if they selected Asian or Asian and White, but not if they also selected another race/ethnicity. They were categorized as Black, Hispanic, American Indian/Alaska Native, or Native Hawaiian/Pacific Islander if they selected that category, including if they also selected any other race/ethnic category (ie, there were 6 students who selected Black and Hispanic, they were studied as Black when comparing Black students to White students and studied as Hispanic when comparing Hispanic to White students).

<sup>b</sup> Electronic Residency Application Service (ERAS) statistics<sup>15</sup> include in each category all applicants who selected that category, therefore, the category for White and Asian will be higher than by our study method.

ethnicity and gender, and adjusted for students submitting multiple SLOEs (students generally obtain at least 2 SLOEs, one from their affiliated program clerkship and one after a visiting clerkship, with some students completing multiple visiting clerkships). Because MSPE class percentiles are variable between schools (quartile, tertile, etc), percentiles were converted to an ordinal ranking with one being the top ranking.

The secondary outcome is a comparison of the RAP, RLP, and Grade between non-Hispanic White (White) students and Black, Asian, and Hispanic students, using the Wilcoxon rank sum test. Ordinal regression was used to control for the above performance variables. Statistics were performed using R Studio (RStudio, Boston, MA).

This study received Institutional Review Board exemption from the University of Chicago and the University of Illinois at Chicago.

## Results

In 2019, 1555 students applied to the study institution's EM residency program. Of these, 1493 applicants submitted at least one SLOE and, of those, 1418 students self-identified their race/ethnicity. In all, 3515 SLOEs were available for analysis from applicants who self-identified their race/ethnicity.

For each outcome variable, we assessed only the SLOEs in which that variable was assigned. There were 3507 SLOEs assigning a RAP, 3389 assigning an RLP, and 3041 that assigned a Grade and were not graded as pass/fail (SLOEs graded as pass/fail were not included in the grade analysis, as only 13% of SLOEs were graded pass/fail and, of those, 100% of students received a pass).

TABLE 1 represents the demographics of the applicants in our sample who had at least one SLOE and self-identified their race/ethnicity and the demographics of the national EM applicant population for 2019.

**TABLE 2**  
Rank Against Peers—Distribution of Rankings by Race/Ethnicity

Race/Ethnicity	N	Top 10%	Top 1/3, %	Middle 1/3, %	Lower 1/3, %
Overall	3507	16.9	39.2	35.6	8.3
Non-UIM	2778	18.0	40.4	34.5	7.1
UIM <sup>a</sup>	729	12.3	35.0	39.9	12.8
White	1917	19.4	41.8	32.4	6.5
Asian <sup>b</sup>	716	15.1	37.6	38.5	8.8
Black <sup>b</sup>	377	10.3	31.0	43.0	15.6
Hispanic <sup>b</sup>	327	14.1	39.4	36.1	10.4

Abbreviation: UIM, underrepresented in medicine.

<sup>a</sup> Denotes significantly lower distribution of ranks compared to non-UIM, Wilcoxon rank sum test  $P < .05$ .

<sup>b</sup> Denotes significantly lower distribution of ranks compared to White, Wilcoxon rank sum test  $P < .05$ .

### Rank Against Peers

The median rank for RAP for the cohort was 2 (interquartile range [IQR] 2-3). TABLE 2 represents the percent of SLOEs with each rank by UIM status and race/ethnicity.

SLOEs from UIM students had significantly lower rankings on the RAP section of the SLOE compared with SLOEs from non-UIM students ( $P < .05$ ). After controlling for gender, the interaction of race/ethnicity and gender, MSPE class percentile, AOA status, type of school, affiliated program vs visiting clerkship SLOE, and Step 1 score, non-UIM students were significantly more likely to be ranked higher than UIM students (OR 1.46, 95% CI 1.03-2.07).

SLOEs from Asian, Black, and Hispanic students had significantly lower rankings on the RAP section compared with SLOEs from White students ( $P < .05$ ). After controlling for the predictors above, White students were significantly more likely to be ranked higher than Asian students (OR 1.46, 95% CI 1.00-2.13) and Black students (OR 1.81, 95% CI 1.15-2.83), respectively. There was no difference between White and Hispanic student rankings after controlling for the predictors.

**TABLE 3**  
Rank List Prediction—Distribution of Rankings by Race/Ethnicity

Race/Ethnicity	N	Top 10%	Top 1/3, %	Middle 1/3, %	Lower 1/3, %	Unlikely to Match, %
Overall	3389	17.1	39.2	33.6	9.7	0.5
Non-UIM	2684	18.3	39.6	33.0	8.8	0.4
UIM <sup>a</sup>	705	12.5	37.6	35.9	13.2	0.9
White	1860	20.4	40.0	31.8	7.5	0.3
Asian <sup>b</sup>	686	13.6	39.7	34.4	12.0	0.4
Black <sup>b</sup>	361	11.1	34.6	38.8	14.7	0.8
Hispanic <sup>b</sup>	320	13.1	41.2	32.2	12.5	0.9

Abbreviation: UIM, underrepresented in medicine.

<sup>a</sup> Denotes significantly lower distribution of ranks compared to non-UIM, Wilcoxon rank sum test  $P < .05$ .

<sup>b</sup> Denotes significantly lower distribution of ranks compared to White, Wilcoxon rank sum test  $P < .05$ .

### Rank List Prediction

The median rank for RLP for the cohort was 2 (IQR 2-3). TABLE 3 represents the percentage of SLOEs with each rank by UIM status and race/ethnicity.

SLOEs from UIM students had significantly lower rankings on the Predicted Match section of the SLOE compared with SLOEs from non-UIM students ( $P < .05$ ). After controlling for gender, MSPE class percentile, AOA status, type of school, and affiliated program vs visiting clerkship SLOE, non-UIM students were significantly more likely to be ranked higher than UIM students (OR 1.30, 95% CI 1.04-1.62). After controlling for Step 1 score and the interaction of race/ethnicity and gender, there was no difference between non-UIM and UIM rankings.

SLOEs from Asian, Black, and Hispanic students had significantly lower rankings on the Predicted Match section compared with SLOEs from White students ( $P < .05$ ). After controlling for the above predictors, White students were significantly more likely to be ranked higher than Asian students (OR 1.49, 95% CI 1.04-2.15). After controlling for gender, MSPE class percentile, AOA status, type of school, affiliated program vs visiting clerkship SLOE, and Step 1 score, White students were significantly more likely to be ranked higher than Black students

**TABLE 4**  
Grade—Distribution of Rankings by Race/Ethnicity

Race/Ethnicity	N	Honors, %	High Pass, %	Pass, %	Low Pass or Fail, %
Overall	3041	49.7	38.2	11.8	0.3
Non-UIM	2427	51.6	36.5	11.7	0.2
UIM <sup>a</sup>	614	42.0	45.0	12.4	0.7
White	1669	53.1	36.1	10.6	0.2
Asian <sup>b</sup>	626	49.2	36.1	14.5	0.2
Black <sup>b</sup>	333	38.7	44.7	15.3	1.2
Hispanic <sup>b</sup>	262	44.7	46.2	8.8	0.4

Abbreviation: UIM, underrepresented in medicine.

<sup>a</sup> Denotes significantly lower distribution of scores compared to non-UIM, Wilcoxon rank sum test  $P < .05$ .

<sup>b</sup> Denotes significantly lower distribution of scores compared to White, Wilcoxon rank sum test  $P < .05$ .

(OR 1.41, 95% CI 1.12-1.78). After controlling for the interaction of race/ethnicity and gender, there was no difference between White and Black student rankings. There was no difference in rankings between Hispanic and White students after controlling for predictors.

### Grade

The median ranking for Grade for the cohort was 2 (IQR 1-2). TABLE 4 represents the percentage of SLOEs with each Grade by UIM status and race/ethnicity.

SLOEs from UIM students had significantly lower rankings on the Grade section of the SLOE compared with SLOEs from non-UIM students ( $P < .05$ ). After controlling for gender, the interaction of race/ethnicity and gender, MSPE class percentile, AOA status, type of school, affiliated program vs visiting clerkship SLOE, and Step 1 score, non-UIM students were significantly more likely to rank higher than UIM students (OR 1.46, 95% CI 1.05-2.04).

SLOEs from Asian, Black, and Hispanic students had significantly lower rankings on the Grade section compared with SLOEs from White students ( $P < .05$ ). After controlling for the above predictors, White students were significantly more likely to rank higher than Black students (OR 1.65, 95% CI 1.08-2.52). There is no difference in grades between Asian or Hispanic students and White students after controlling for these predictors.

### Discussion

Rankings on the EM SLOE were lower for UIM students compared to non-UIM students, Black students compared to White students, Asian students compared to White students, and Hispanic students compared to White students across all studied measures on the SLOE. Lower rankings for UIM students compared to non-UIM students on RAP and Grade persisted even after controlling for other

factors, including the MSPE class percentile and Step 1 score. Further, when controlling for other factors, Asian and Black students were ranked lower than White students on RAP, Asian students were ranked lower than White students on RLP, and Black students received lower grades than White students. These results demonstrate racial/ethnic bias on the EM SLOE, for both UIM students compared to non-UIM students, and Asian, Black, and Hispanic students compared to White students.

Our results are consistent with the racial/ethnic bias found in other forms of medical student assessment and add to the literature in 2 ways. First, we found that disparities in rankings by race/ethnicity persist on the EM SLOE after controlling for multiple measures of competency, suggesting that these disparities cannot be attributed to differences in clinical performance. Second, previous studies demonstrating racial/ethnic bias examined assessments in which there is a wide variability between schools.<sup>2,4</sup> Our study shows that similar racial/ethnic bias is present on clinical assessments that are standardized throughout the country. The recent statement from COPA lists “the presence of individual and systemic bias” as one reason for all specialties to adopt a SLOE.<sup>13</sup> This study demonstrates that simply making an assessment standardized does not eliminate racial/ethnic bias and further action via a systemic, anti-racist strategy is necessary.

One way to approach this problem is through a recently published framework to address systemic change through an anti-racist lens: See, Name, Understand, Act.<sup>16</sup> The results from our study allow us to “See” the problem. Program and clerkship directors, in all specialties using a SLOE, need to acknowledge the limitations of a SLOE in assessing students of different racial/ethnic backgrounds and the potential to exacerbate racial/ethnic inequity in the Match by placing too much emphasis on a specific metric rather than conducting holistic review.<sup>17,18</sup>



There are several limitations to this study. First, this study was conducted by convenience sample, not randomization, therefore there may be selection bias. The SLOEs studied were submitted to a single institution, therefore results may not be generalizable to the entire applicant pool. Specifically, our sample weighs heavily toward US MD applicants and underrepresents US DO and IMG applicants. Second, we only analyzed SLOEs that were submitted in applications, thus SLOEs that students purposely did not submit, due to perceived bias or other reasons, were not included. Third, due to the low number of students identifying as American Indian/Alaska Native or Native Hawaiian/Pacific Islander, we did not have the power to include them in the White vs non-White analysis. They were, however, included within the UIM group for the UIM vs non-UIM group analysis. Finally, the race/ethnicity of the SLOE author may also contribute to the presence or absence of bias. Although 68% of the US EM workforce identifies as White,<sup>19</sup> to our knowledge no data exist describing the race/ethnicity of SLOE authors, and authors do not self-identify their race/ethnicity when creating a SLOE.

Future work can be directed by the rest of the anti-racist framework—“Name,” “Understand,” and “Act.” Leaders in education need to “Name” the problem. The consistency of findings across many different assessment measures in medical education demonstrate that the identified racial/ethnic disparities are not isolated to specific situations, institutions, or assessment tools. Education leaders must be willing to name the more insidious factors leading to assessment disparities by race/ethnicity across the spectrum of assessment, including systemic racial/ethnic inequalities and social determinants of education.<sup>7,20</sup> Next, we need to further “Understand” the problem to propose effective solutions. The structure of the SLOE may contribute to racial bias and represents an opportunity to further understand how changes to an assessment tool can affect equity. The current norm-referenced “Rank Against Peers” likely introduces bias into the assessment that could be mitigated by changing to a criterion-based assessment. Recent work suggests that using a “deficit-based” approach to assessment (such as putting students into a lower third ranking) compared to utilizing a competency-based approach to assessment may “disproportionately disadvantage UIM learners.”<sup>21</sup> Additionally, literature suggests that any assessment utilizing a comparison to peers is inherently inequitable.<sup>22</sup> Changing to a criterion-based system would require writers to anchor their assessments of students to specific competency descriptors and reduce subjectivity. Finally, these findings should

be a call for further immediate “Action,” including using group SLOEs with diverse faculty representation<sup>21</sup> and committing to exploring solutions to the pervasive racial bias present in medical student assessment uncovered by us and others.<sup>1-8</sup> As multiple specialties currently use and more continue to adopt the SLOE, this will not be a problem limited to EM.

## Conclusions

Rankings on EM SLOEs submitted to the study institution demonstrate disparities by race/ethnicity after controlling for other measures of competency and achievement.

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