Predicting PA Program Matriculation Among Diverse Applicants

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Health Disparities Harm Patients

Disparities in quality of care

➢ Across disease areas, minorities less likely than Whites to receive needed services\(^1\)
➢ Physicians 2x more likely to underestimate Black patients’ pain\(^2\)
➢ Clinicians’ racial biases \(\rightarrow\) poorer quality of care, especially among Black patients\(^3\)

Disparities in health outcomes\(^4,5\)

<table>
<thead>
<tr>
<th>Deaths per 100K live births</th>
<th>White</th>
<th>Other races</th>
<th>Black</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>12.7</td>
<td>14.4</td>
<td>43.5</td>
</tr>
</tbody>
</table>
One Solution: Diverse Health Care Workforce

- Minority clinicians more likely to:
  - Practice in underserved areas
  - Serve patient populations with a higher percentage of minorities
  - Serve lower income patient populations
  - Practice in primary care
Patients want and benefit from a diverse health care workforce:

- Black and Hispanic patients preferentially seek same-race physicians\(^1\)
- Black and Hispanic patients report higher satisfaction with same-race physicians\(^2\)
- Black patients with same-race physicians more likely to report receiving preventive care during previous year\(^2\)
Other Aspects of Diversity

- Patients have **gender preferences** for their health care providers:
  - Gender preferences are stronger for those treating intimate/psychosocial health problems\(^1\)
  - Differential symptom reporting by clinician sex\(^2\)

- **And age preferences:**
  - 24% of patients treated in an Emergency Department reported a provider age preference\(^3\)
PA Workforce

PA-Cs per 100K population (2016)

- 115K+ certified PAs
- 28% work in primary care, with many working in underserved areas
- Majority non-Hispanic White, trending younger, trending female

Map showing distribution of PA-Cs per 100K population across the United States.
Role of PA Programs

➢ Help foster a diverse medical workforce by ensuring equal access to education for students from diverse backgrounds
Current Study

➢ Do odds of matriculation into PA school differ by student demographics?
   ➢ Underrepresented minority (URM) status
   ➢ Age
   ➢ Gender
2015 – 2016 CASPA

22,432 applicants

7,162 (31.9%) matriculants
CASPA Application

Demographics
- Race & ethnicity → URM
- Age
- Gender

Academic achievement
- Undergraduate GPA
- GRE percentiles

Other covariates
- Number of designations
- Patient care hours
URM Status

**Non-URMs**
- Non-Hispanic White
- Asian (alone or in combination with White)

**URMs**
- Hispanic (regardless of race)
- Non-White
- Non-Asian

<table>
<thead>
<tr>
<th>Category</th>
<th>Percentage</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-URMs</td>
<td>83%</td>
<td>18,719</td>
</tr>
<tr>
<td>URMs</td>
<td>17%</td>
<td>3,713</td>
</tr>
</tbody>
</table>
Age

Min = 18
Max = 65
$M = 25.9$
$SD = 5.8$

Percentiles

<table>
<thead>
<tr>
<th>25th</th>
<th>50th</th>
<th>75th</th>
</tr>
</thead>
<tbody>
<tr>
<td>22</td>
<td>24</td>
<td>27</td>
</tr>
</tbody>
</table>
Gender

- Female: 72% (16,068)
- Male: 28% (6,364)
Academic Achievement

GRE
- 71% of 15,897 students took the GRE.
- 29% of 6,535 students did not take the GRE.

Avg. percentiles
- Verbal Reasoning: 53.3
- Quantitative Reasoning: 44.9
- Analytic Writing: 53.2

GPA
- Min = 1.39
- Max = 4.00
- M = 3.36
- SD = 0.35

Percentiles

<table>
<thead>
<tr>
<th>Percentile</th>
<th>25th</th>
<th>50th</th>
<th>75th</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>3.14</td>
<td>3.39</td>
<td>3.62</td>
</tr>
</tbody>
</table>
### Designations

Min = 1  
Max = 77  
\( M = 6.7 \)  
\( SD = 6.0 \)

### Percentiles

<table>
<thead>
<tr>
<th>25\text{th}</th>
<th>50\text{th}</th>
<th>75\text{th}</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>5</td>
<td>9</td>
</tr>
</tbody>
</table>

### Hours

<table>
<thead>
<tr>
<th>Hours</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>27.2%</td>
</tr>
<tr>
<td>1 - 500</td>
<td>15.4%</td>
</tr>
<tr>
<td>501 - 1,000</td>
<td>10.7%</td>
</tr>
<tr>
<td>1,001 - 1,500</td>
<td>9.7%</td>
</tr>
<tr>
<td>1,501 - 2,000</td>
<td>6.3%</td>
</tr>
<tr>
<td>2,001 - 2,500</td>
<td>6.2%</td>
</tr>
<tr>
<td>2,501 - 3,000</td>
<td>3.8%</td>
</tr>
<tr>
<td>3,001 - 3,500</td>
<td>3.0%</td>
</tr>
<tr>
<td>More than 3,500</td>
<td>17.6%</td>
</tr>
</tbody>
</table>
Analytic Plan

1. Univariate diversity variable
2. Covariates
3. Other demographics
4. Academic achievement
5. GRE01
6. GRE01 \times \text{diversity variable}

Odds of matriculation
Odds of matriculation were 45% lower for URMs vs. non-URMs
Difference in odds of matriculation becomes non-significant after controlling for academic achievement.
URM Status

Odds of a URM without GREs matriculating were 27% lower than those of non-URMs
URM Status

URMs without GREs had lower predicted probabilities of matriculation
Lower odds of matriculation for older applicants, decreasing 5% for each year over average age
Age

Odds of matriculation for older applicants increase after adding covariates but remain significantly lower.
Significantly lower odds of matriculation only among older applicants without GREs
Older applicants had lower predicted probabilities of matriculation. Effect especially pronounced for students without GRE scores.
Gender

Odds of matriculation were 14% lower for male vs. female applicants.

Odds ratios

<table>
<thead>
<tr>
<th>1</th>
<th>Male</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>+ Designations, patient care</td>
</tr>
<tr>
<td>3</td>
<td>+ URM status, Age</td>
</tr>
<tr>
<td>4</td>
<td>+ GRE percentiles, GPA</td>
</tr>
<tr>
<td>5</td>
<td>+ GRE</td>
</tr>
<tr>
<td>6</td>
<td>+ GRE x male</td>
</tr>
</tbody>
</table>

0.86 [0.81, 0.91]
As covariates are added, pattern of results switch. Odds of matriculation become **13% higher** among males.
Gender differences in odds of matriculation not contingent on having GREs
Summary

➢ On average, URMs, older applicants, males less likely to matriculate

➢ After controlling for key confounders, some patterns change:
  ➢ URMs no less likely to matriculate
  ➢ Older applicants remain less likely to matriculate
  ➢ Males more likely to matriculate
Differences in odds of matriculation among URMs and by age driven by GRE status

URMs and older applicants without GRE scores were less likely to matriculate into a PA program than those with GRE scores.
Are GRE Requirements Hindering Diversity?

- Lack of current GREs limits possible pool of programs to apply to
- GREs increase application costs
- Students with many years of professional work may experience a GRE requirement as a hindrance
- Systematic race, sex, SES biases in GRE scores
Limitations

➢ Single wave of applications
➢ Not all programs use CASPA
➢ Missing demographic data
➢ Predicting matriculation, not acceptance
Future Directions

➢ Program attributes
  ➢ Geography (population, urbanicity)
  ➢ Type of program (public, private, academic health center)
  ➢ Institutional ranking
Questions?