Racial and Ethnic Admission Preferences at the University of Michigan Medical School

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UNTIL
OCTOBER 17, 2006

Center for Equal Opportunity

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Executive Summary

The University of Michigan Medical School (UMMS) awarded a very large degree of preference to blacks over whites and Asians with the same credentials and background for every year analyzed (1999, 2003, 2004, and 2005).

In every year:

- Black admittees had substantially lower MCAT scores and undergraduate science GPAs compared to other groups.

- The range of Hispanic admittees' MCAT scores and grades fell between those for blacks and those for Asians and whites.

- Asian admittees' MCAT scores were roughly the same as their white counterparts, but their science GPAs were slightly higher.

During the four years for which we received data, 11,647 Hispanic, Asian, and white students (or nearly 3000 students each year) who earned higher undergraduate science GPAs and scored higher on their MCATs than the median black admittee were nonetheless rejected.

Odds Ratios. Odds ratios favoring black over white candidates in admission--controlling for test scores, grades, Michigan residency, sex, and alumni connections--were very large. In 1999, the odds favoring blacks over whites with the same background and credentials was 38 to 1; they remained high (21 to 1) in 2005.

Odds favoring Hispanics over whites, all other things being equal, were large but significantly less so than the odds favoring blacks. In 1999, odds favoring Hispanic over whites were 3 to 1, increasing to more than 5 to 1 in 2005.

Odds of admission slightly favored whites over Asians with the same credentials and background for every year except 2004 (during which there was no difference).

Probabilties of Admission. Likewise, probabilities of admission favor blacks and to a lesser extent Hispanics over whites and Asians for every year. For instance, an in-state male candidate, with no parent connection to UMMS and with an MCAT score and science GPA equal to the medians for black admittees, in 1999 would have had the following probabilities of admission:

- a 72 percent chance if black;
- a 17 percent chance if Hispanic;
- a 2 percent chance if Asian; and
- a 6 percent chance if white.

Significant disparities between blacks and to a lesser extent Hispanics versus Asians and whites were found for 2003 and 2004, although the gaps were not as large as those in 1999.

In 2005, chances of admission for candidates with credentials of the average black admittee were greater for blacks than in 2004, while changing little for the other groups. The chances of admission for a male applicant from Michigan with no parent who attended UMMS and with the same test scores and science grades as the average black admittee in 2005:

- rises to 23 percent if black;
- drops to 7 percent if Hispanic; and
- drops to 1 percent if Asian or white.

The disparities are even greater as test scores and grades increase somewhat. In 2005, if a candidate had a total MCAT score of 41 and an undergraduate science GPA of 3.6, there is an even more dramatic set of outcomes – a three in four chance of admission if black, and a four in ten chance if Hispanic. If the candidate was white, the chances drop to roughly one in ten chance, and if Asian, 6 percent. A score of 43 and a science GPA of 3.8, chances rise to nine in ten if black and three in four is Hispanic, but only one in three if white and one in five if Asian.

Gaps in USMLE Step 1 scores--this is a licensing exam taken after the first two years of medical school--parallel racial/ethnic differences in entering qualifications. White and Asian median scores are substantially greater than the black scores at the 75th percentile.

Acknowledgments

On behalf of the Center for Equal Opportunity, I would like to thank the Michigan Association of Scholars and its president, Howard Schwartz, for submitting the original freedom-of-information letter along with CEO to obtain the admissions data used in this study from the University of Michigan.

I would also like to thank Linda Chavez and the staff at the Center for Equal Opportunity for giving me the chance to work on another major study of racial and ethnic preferences in university admissions. I especially would like to thank Rudy Gersten, who handled the numerous administrative aspects of obtaining the data, and Roger Clegg, who provided useful suggestions on the manuscripts.

Introduction

For many years, the question of whether or not colleges and universities should use racial preferences in admissions has been a highly controversial issue. The matter came to a head in 2003, when the U.S. Supreme Court ruled in two major cases on the legality of racial preferences in higher education admission at the University of Michigan. In the first case, *Gratz v. Bollinger*, the Court found that a point-system of preferences was unconstitutional; in the second case, *Grutter v. Bollinger*, the Court upheld a system of preferences it found to be less mechanical.

Since such preferences are not required but only allowed under current law, the question still remains: *Should* colleges and universities still use such policies? And, if they do, are they doing so within the parameters set out by the Supreme Court?

Increasing "underrepresented" minority admissions to medical schools has been a major project of the academic medical establishment for years.[1] The American Association of Medical Colleges (AAMC) and the American Medical Association (AMA) have made a concerted effort since the 1970s to increase the number of underrepresented minority doctors in America. The AAMC has collected statistics on racial and ethnic groups applying, enrolling, and completing medical school since 1960. Comparing these percentages to the percentages of groups in the general population, the medical establishment has decided that certain groups are underrepresented as compared to their percentage of the U.S. population. In keeping with this broad policy, the AAMC signed on to a friend of the court brief in *Grutter* in support of the University of Michigan Law School.

In this context, it is not surprising to find that most publicly funded medical schools have long sought to increase the enrollment of certain racial and ethnic groups. But to what extent do these schools use racial and ethnic preferences favoring one group over another--specifically, how much preference is awarded one group over another?

To answer this question, CEO embarked on a study of racial and ethnic preferences at the University of Michigan Medical School (UMMS). The medical school was not a defendant in the 2003 Supreme Court cases, so the question of what the medical school

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[1] "Underrepresented" minorities typically mean African Americans, Latinos, and Native Americans (but not Asian and Arab Americans). See Sally S. Satel, *PC, M.D.: How Political Correctness Is Corrupting Medicine* (New York: Basic Books, 2000), on the work of the AAMC and others regarding racial and ethnic preferences in medical education and beyond, as part of the general politicization of health-care groups. The general summary of the activities of these health-care groups comes from her book.

did before and what it has done after the Supreme Court decisions is especially intriguing, as both a legal and a policy matter. As noted above, the fact that an institution of higher education is allowed to use race/ethnicity as a plus factor does not mean that it is required to do so. Nor is it required--or, indeed, allowed--to use racial preferences as a factor outwhelming all other factors. Finally, the literally life-and-death stakes in admitting the most qualified individuals to public medical schools gives this matter special importance.

This study builds on previous work on racial preferences and undergraduate, medical school, and law school admissions done for the Center for Equal Opportunity.[2] As in previous CEO medical school studies, CEO obtained the data on each individual applicant's admission status, matriculation status, racial/ethnic group membership, and sex, whether the applicant was an in-state resident, whether a parent had graduated from the medical school, the applicant's MCAT scores, his/her undergraduate science grade-point average (GPA), and his/her overall college GPA. In order to include an earlier year for comparison purposes, we requested data for 1999, as well as for the most recent years available, namely 2003, 2004, and 2005. For those applicants who later matriculated at UMMS, the medical school also provided their United States Medical Licensing Examination (USMLE) scores.[3]

Omitted from the data analyses are those cases for which race or ethnicity is listed as "Other," missing, or unknown. American Indians and Native Hawaiians were also omitted because of their small numbers in this context. Also, cases with missing academic data were dropped from the statistical analyses.

Lastly, there were cases where the information could potentially lead to the identification of an individual student. The medical school itself (quite properly) exempted these data from disclosure.

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[2] See, e.g., Robert Lerner and Althea K. Nagai, "Preferences in Medical Education: Racial and Ethnic Preferences in Admission at Five Public Medical Schools," June 14, 2001.

[3] See the subsequent section of this study, "Academic Qualifications and Subsequent Performance," for a more detailed description of the USMLE.

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Applicants, Admittees, and Enrollees: 1999, 2003, 2004, and 2005

Racial/Ethnic Composition of the Pool

Table 1 below displays the racial composition of the medical school's pool of applicants, admittees, and enrollees in 1999, 2003, 2004, and 2005.

Table 1. Racial Composition of Applicants, Admittees, and Enrollees[4]

		Applicants	*Admittees*	*Enrollees*
1999	Black	5%	14%	11%
	Hispanic	5%	5%	–
	Asian	31%	19%	10%
	White	58%	62%	79%
2003	Black	7%	10%	8%
	Hispanic	5%	4%	–
	Asian	30%	25%	27%
	White	58%	61%	64%
2004	Black	7%	8%	14%
	Hispanic	5%	4%	–
	Asian	32%	30%	20%
	White	56%	57%	66%
2005	Black	6%	9%	10%
	Hispanic	5%	4%	–
	Asian	32%	24%	14%
	White	57%	63%	76%

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[4] "No Response," "American Indian," "Native Hawaiian," "Alaskan Native," and "Other" were dropped from the analysis. In cases where the information could potentially lead to the identification of an individual student, UMMS excluded the data from disclosure. The total numbers are below.

Year	Applicants	Admittees	Enrollees
1999	3948	267	131
2003	4236	367	143
2004	4475	379	129
2005	4469	337	136

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Applicants

The racial/ethnic composition of the applicant pool remains fairly constant throughout. White applicants make up between 55 and 60 percent of the total; Asians make up slightly more than 3 in 10, and Hispanics make up 5 percent; the percentage of black applicants rose slightly, from 5 percent of the total in 1999 to 7 percent in 2003 and 2004, and was 6 percent in 2005.

Admittees

Changes occur in the pool of admittees from 1999 to 2005. In 1999, blacks were 14 percent of those admitted to UMMS, dropping to 10 percent in 2003, and even lower in the two subsequent years. The Hispanic percentage changes little, from 5 percent in 1999, to 4 percent in the years that follow. The percentage of white admittees hovers just above 60 percent during these years, except for 2004 (57 percent).

The largest change is in the percentage of Asians admitted. In 1999, Asians made up 19 percent of those admitted, jumping to 30 percent by 2004. In 2005, the Asian percentage dropped back to 24 percent.

Enrollees

No Hispanics were among the enrollees in the database at UMMS in these years.[5]

The racial/ethnic composition of the matriculating class (enrollees) changed over these years, with the largest change coming from the proportion of Asians in the class. In 1999, 11 percent of enrollees were black, 10 percent were Asian, and 79 percent were white. In 2003, the percentage of Asians jumped to 27 percent. In contrast, the percentage of blacks dropped to 8 percent and the percentage of whites declined to 64 percent. In 2004, the class was 14 percent black, 20 percent Asian, and 66 percent white.
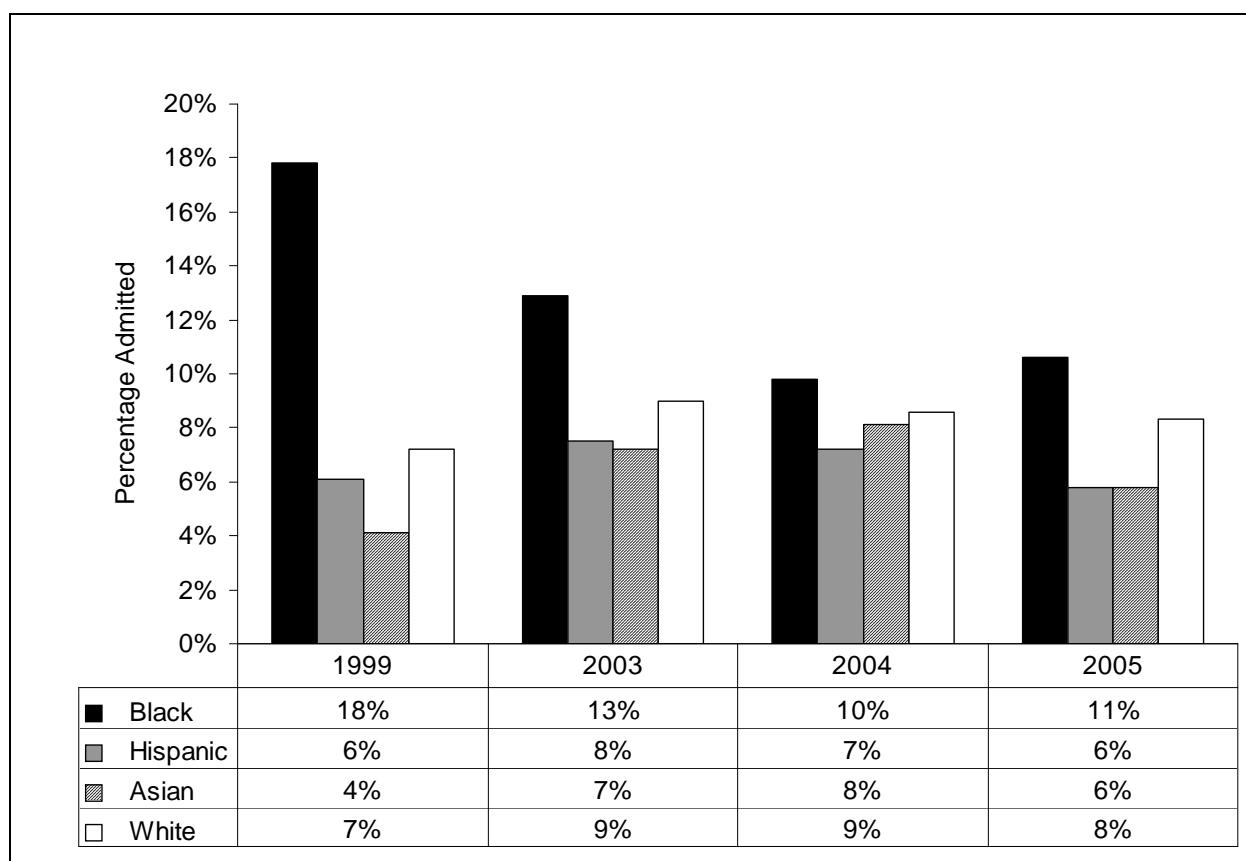
In 2005, the proportion of enrollees who were black declined to 10 percent and the percentage of enrollees who were Asian declined to 14 percent. The percentage of whites rose to 76 percent (10 points from the previous year).

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[5] See also previous footnote regarding excluded data.

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Admission Rates

Figure 1. University of Michigan Medical School Admission Rates

	1999	2003	2004	2005
■ Black	18%	13%	10%	11%
▨ Hispanic	6%	8%	7%	6%
▨ Asian	4%	7%	8%	6%
☐ White	7%	9%	9%	8%

Changes in admission rates over the years have varied from group to group (see Figure 1). The largest change for Hispanics occurred from 2004 to 2005.

For black applicants, admission rates dropped by 5 percentage points from 1999 to 2003, and by an additional 3 points from 2003 to 2004. The admission rate rose by a point for 2005.

Admission rates changed slightly for Hispanic applicants during the same period. In 1999, UMMS admitted 6 percent of Hispanics, rising to 8 percent in 2003, but then dropping to 7 percent in 2004, and 6 percent in 2005.

Admission rates for Asians and whites rose from 1999 to 2003 (by 3 percentage points for Asians and 2 percentage points for whites). In 2004, the admission rates for Asians and whites were 8 and 9 percent, respectively. For Asians in 2005, the admission rate dropped to 6 percent, while the admission rate for whites dropped to 8 percent.

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Overall Group Comparisons of Admittees' Test Scores and Grades

Methodology

Just as high school seniors seeking college admission take the SAT or the ACT, prospective medical school students must take the Medical College Admission Test (MCAT). The MCAT is a standardized test made up of three multiple-choice subtests and, since 1993, a writing section. The three subsections are the verbal reasoning section, the physical sciences section, and the biological sciences section.[6] MCAT science subtests are achievement tests, not aptitude tests. They measure knowledge, not intelligence.

The physical sciences, biological sciences, and verbal reasoning subtests are given subscores, each ranging from a low of 1 to a high of 15. In addition, the writing sample is given a letter grade, ranging from J to T.[7]

CEO obtained the data on individual applicants' admission status (accept or reject), matriculation status (enroll or not), racial or ethnic group membership, sex, state of residency, whether a parent had graduated from the medical school, individual MCAT subscores, a mean MCAT score, undergraduate science grade-point averages (GPAs), and overall undergraduate GPAs.

We report scores for those admitted to the medical school, at the 25th, 50th, and 75th percentiles. While the 50th percentile (i.e., the median) represents the middle of the distribution, the 25th and 75th percentile scores taken together represent the actual spread of scores. For example, a 3.25 GPA at the 25th percentile means that 25 percent of GPAs were below 3.25, while 75 percent were above it. A GPA of 3.90 at the 75th percentile means that 75 percent of scores were below 3.90, while 25 percent were above it.

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[6] Association of American Medical Colleges, 1998, *MCAT Interpretive Manual (*Washington, D.C.: Association of American Medical Colleges): 1-5.

[7] The letter grade for writing was converted to a numerical score, where "J" equals "1," "K" equals "2," and so forth.

Results

MCAT Scores[8]

Figure 2. Total MCAT Scores for Admittees

	75th ●	50th ■	25th ▲

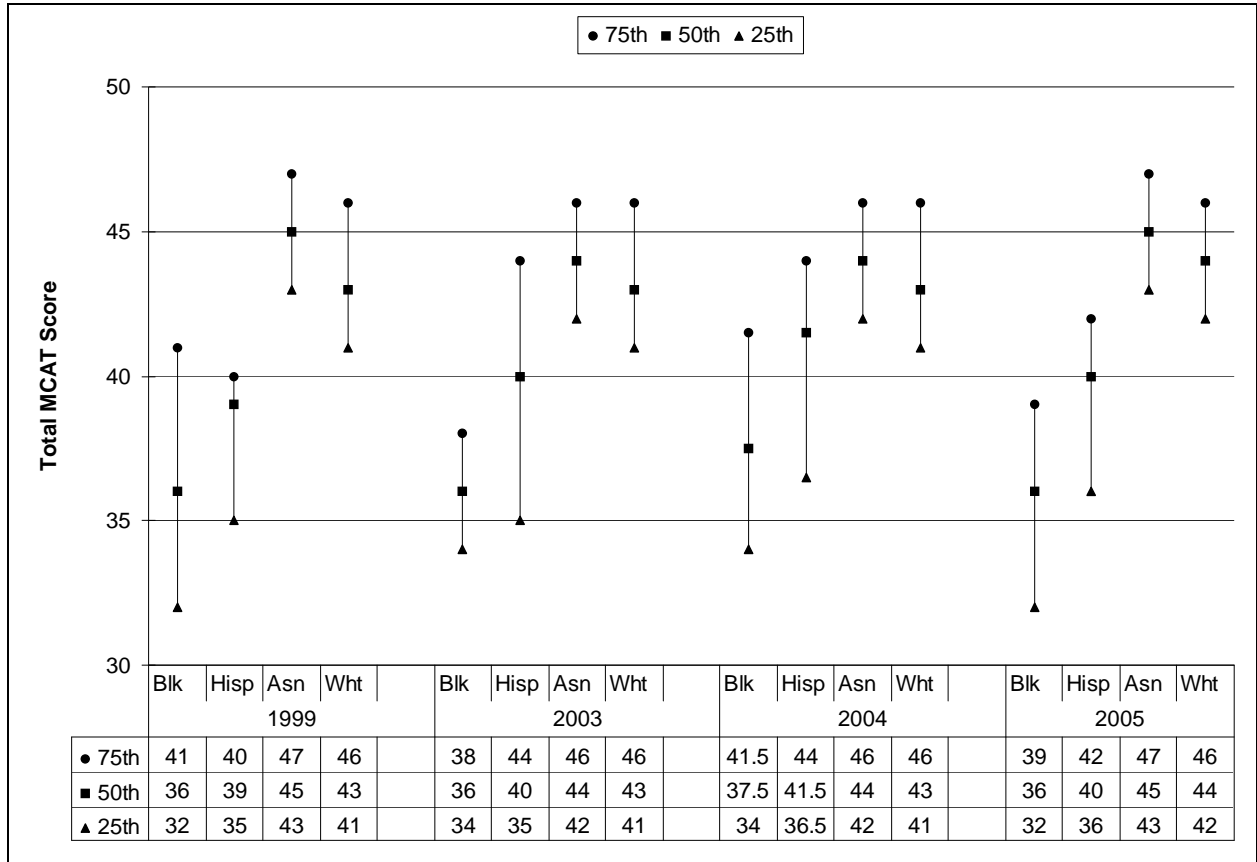|	Blk	Hisp	Asn	Wht		Blk	Hisp	Asn	Wht		Blk	Hisp	Asn	Wht		Blk	Hisp	Asn	Wht
			1999					2003					2004					2005	
● 75th	41	40	47	46		38	44	46	46		41.5	44	46	46		39	42	47	46
■ 50th	36	39	45	43		36	40	44	43		37.5	41.5	44	43		36	40	45	44
▲ 25th	32	35	43	41		34	35	42	41		34	36.5	42	41		32	36	43	42

Figure 2 displays the spread of admittees' scores for the MCAT. In every year, black admittees had substantially lower test scores than the other three groups.

The median MCAT score for black admittees is lower than the Hispanic median in every year. In 2003, 2004, and 2005, scores at the 75th percentile for black admittees were equal to or lower than the Hispanic median.

Scores at the 75th percentile for black admittees were roughly equal to or lower than those for Asians and whites at the 25th percentile for every year. This means that, in every year,

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[8] MCAT subscores including the writing subscore provided by UMMS were combined to create a total MCAT score for each applicant. The number of admittees with test scores and grades by race/ethnicity are as follows.

	1999	2003	2004	2005
Blacks	38	37	32	30
Asians	50	92	115	82
Hispanics	13	15	16	13
Whites	165	222	216	211

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75 percent of blacks were admitted with lower test scores than approximately 75 percent of Asian and white admittees.

Scores for Hispanic admittees were generally lower than those for Asian and white admittees. In 1999, Hispanic scores at the 75th percentile were lower than scores at the 25th percentile for Asians and whites. In 2003 and 2004, scores for Hispanic admittees at the 75th percentile were the same as the Asian median and were only a point higher than median scores for white admittees. In 2005, Hispanic scores at the 75th percentile were equal to or lower than those for Asians and whites at the 25th percentile.

Lastly, the test scores of Asian admittees were generally higher than those of white admittees. The median test score for Asians was higher than that for whites in every year.

Undergraduate Science GPAs

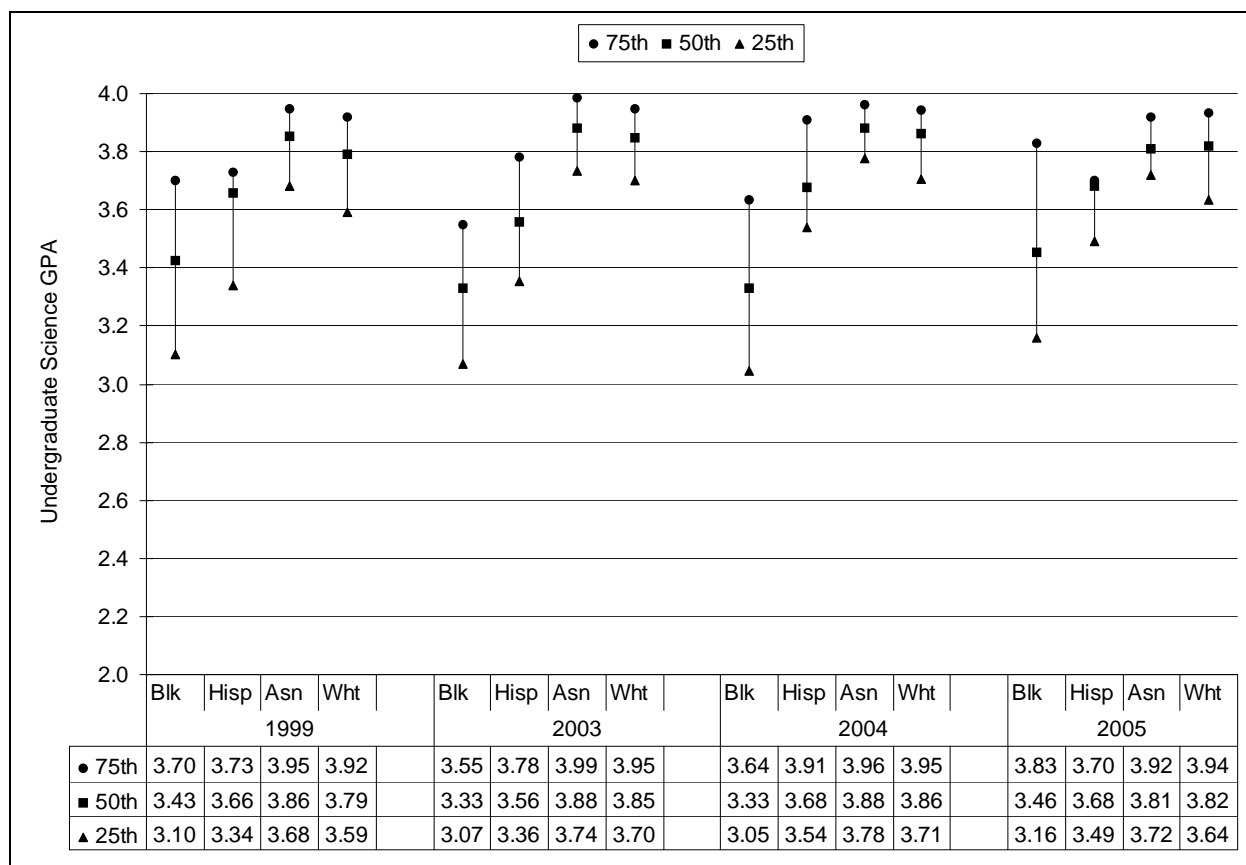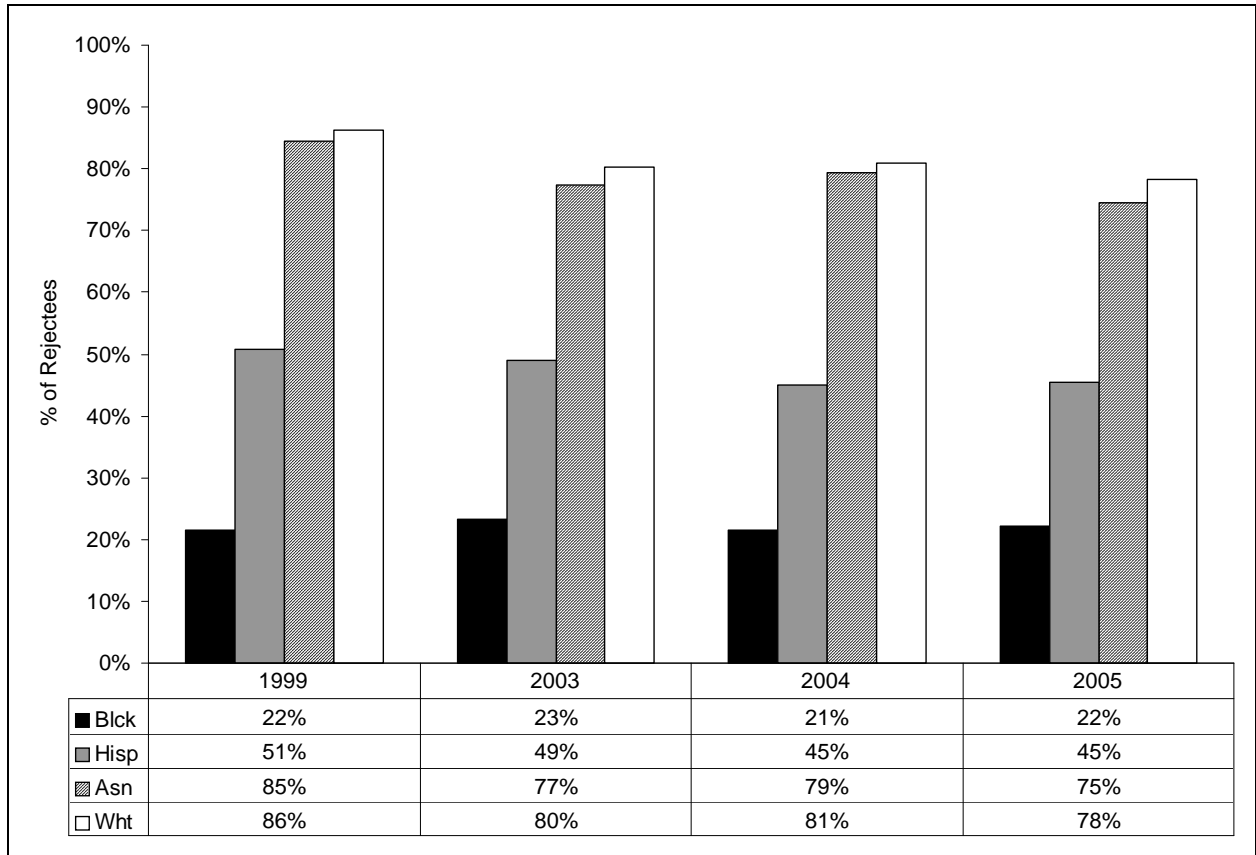**Figure 3. Undergraduate Science GPAs for Admittees**

	Blk	Hisp	Asn	Wht		Blk	Hisp	Asn	Wht		Blk	Hisp	Asn	Wht		Blk	Hisp	Asn	Wht
			1999					2003					2004					2005	
● 75th	3.70	3.73	3.95	3.92		3.55	3.78	3.99	3.95		3.64	3.91	3.96	3.95		3.83	3.70	3.92	3.94
■ 50th	3.43	3.66	3.86	3.79		3.33	3.56	3.88	3.85		3.33	3.68	3.88	3.86		3.46	3.68	3.81	3.82
▲ 25th	3.10	3.34	3.68	3.59		3.07	3.36	3.74	3.70		3.05	3.54	3.78	3.71		3.16	3.49	3.72	3.64

Figure 3 displays the undergraduate science grade-point averages (GPAs) for each racial/ethnic group at the 25th, 50th, and 75th percentiles. Whites and Asians had comparable GPAs for all four years, although Asians' were slightly higher except in 2005.

The science GPAs for black admittees were lower than those for whites and Asians for all four years. In 1999, the median science GPA for black admittees was roughly one-half point lower that that for Asian and white admittees. For all four years, the science GPAs for black admittees at the 75th percentile were lower than the median science GPAs for whites and Asians. That is, 75 percent of blacks admitted to the medical school had lower science GPAs than at least half the Asian and white admittees. In 2003 and 2004, they were lower than the science GPAs of 75 percent of white and Asian admittees.

The gaps are similar when comparing Hispanic versus white and Asian admittees. In 2003 and 2004, the median science GPA of Hispanic admittees was lower than the science GPAs of Asian and white admittees at the 25th percentile. This means that half the Hispanics admitted had science GPAs lower than at least 75 percent of Asian and white admittees. In 1999 and 2005, the median science GPA of Hispanic admittees was lower than the Asian science GPA at the 25th percentile, but fell between the 25th and 50th percentiles for white admittees.

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Rejectees versus Admittees

Figure 4. Percentage of Rejectees with MCAT Scores and Science GPAs Higher than Black Admittee Medians

	1999	2003	2004	2005
■ Blck	22%	23%	21%	22%
▨ Hisp	51%	49%	45%	45%
▨ Asn	85%	77%	79%	75%
☐ Wht	86%	80%	81%	78%

Next we compare the test scores and undergraduate science GPAs of applicants rejected by the medical school with the median test scores and science GPAs of black admittees. [9] That is, we are looking at applicants who were rejected despite having higher MCAT scores and science GPAs than the average black admittee.

Between twenty and thirty percent of black rejectees in any given year had better test scores and science GPAs compared to the average black admittee. The percentages for other racial/ethnic groups are significantly higher. Between forty and fifty percent of

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[9] The number of rejectees with higher than the black admittee median is as follows.

	1999	2003	2004	2005
Blacks	38	58	63	56
Hispanics	101	90	93	96
Asians	990	915	1040	993
Whites	1842	1808	1852	1827

Hispanic rejectees in any given year had higher test scores and grades. For Asians, 85 percent of rejectees had better test scores and grades than the average black admittee in 1999, remaining at more than three out of four for subsequent years. For whites, more than eight in ten rejectees in 1999, 2003, and 2004 had higher test scores and grades compared to the average black admittee, as did nearly eight in ten in 2005.

This means that there were almost 3000 Hispanic, Asian, and white rejectees with higher test scores and grades than black median admittees in every year.[10] Taking all four years together, there were 11,647 Hispanic, Asian, and white applicants rejected by UMMS despite having higher test scores and grades compared to the average black admittee.

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[10] There were 2,933 in 1999; 2,813 in 2003; 2,985 in 2004; and 2,916 in 2005.

Logistic Regression Analysis and Odds Ratios

Methodology

Admitting students based on racial and ethnic preferences results in schools accepting preferred minorities with lower test scores and grades as compared to nonpreferred minorities and white students at the same school. Admission officers essentially reach down into the applicant pool and pull up certain students, a practice that necessarily results in at least some whites with better credentials than preferred minority admittees being rejected from the same schools, despite their superior qualifications.

Although the data presented thus far provide substantial evidence of racial and ethnic preferences at the University of Michigan Medical School, it is possible to make the case even stronger and considerably more precise. The most powerful means of assessing the degree of racial and ethnic preference in admissions is to develop statistical models that predict the probability of admission at a school for members of the different ethnic and racial groups, holding constant their qualifications. This is done by computing a multiple logistic regression equation that predicts admission decisions by race and ethnicity and that includes MCAT scores and science grades, among other things, as statistical control variables.

Multiple logistic regression analysis was used as the preferred statistical technique because of the nature of the data provided. One way of conventionally expressing a relationship between the independent and dependent variable is by using correlation coefficients. A negative correlation coefficient of -1.0 signifies a perfect negative relationship between the independent (predictor) variable and the dependent (or outcome) variable, whereby an increase in the value of the independent variable yields a decrease in the value of the dependent variable. A positive correlation coefficient of 1.0 signifies a perfect positive relationship between the two variables; as the independent variable increases, so does the dependent variable. Strictly speaking, however, one cannot use correlations to analyze admissions data because correlations and standard multiple regression analysis require a dependent variable that is non-binary in form. In the case of an applicant's admission status, the dependent variable (individual admission status) is a binary dependent variable—reject versus admit. To get around this binary-variable problem, we rely on multiple logistic regression equations and their corresponding odds ratios.

The odds ratio is somewhat like a correlation coefficient, except instead of varying from 1.0 to –1.0, it varies between zero and infinity. An odds ratio of 1.0 to 1 means that the odds of admissions for the two groups are equal. It is equivalent to a correlation of zero. An odds ratio greater than 1.0 to 1 means that the odds of members of Group A being admitted are greater than those for members of Group B, in precisely the amount calculated. An odds ratio of less than 1.0 to 1 means the members of Group A are less likely to be admitted than those in Group B. The former is similar to a positive correlation, the latter similar to a negative correlation.

The statistical technique of multiple logistic regression allows us to present admissions data in terms of the relative odds of those in Group A being admitted compared to Group B while simultaneously controlling for a host of other possibly confounding variables. The value of the odds ratio is that it provides a relatively direct summary measure of the degree of racial or ethnic preference given in the admissions process for a particular school.

Logistic regression equations predicting the likelihood of admissions were computed for the 1999, 2003, 2004, and 2005 applicant pools, controlling for MCAT scores, science grade-point averages, alumni connections, sex, and in-state residency. We were able to derive the odds of admission from these equations for each minority group relative to that of whites, while simultaneously controlling for the effects of these other variables.[11]

Logistic regression analysis also allows us to test for statistical significance. Statistical calculations always include what is called a *p*-value. When results are deemed to be statistically significant, this means that the calculated *p*-value is less than some pre-determined cutoff level of significance. The level of significance conventionally is reported in the form of "$p \leq .05$." This value means that, with these data, there is a probability equal to or less than 5 percent that the difference found between one group and another (e.g., blacks versus whites, Hispanics versus whites, or Asians versus whites, since minority groups are being compared to whites) is due to chance. It is a convention in statistical studies to use the 0.05 value. In more stringent analyses, 0.01 (one in 100) or occasionally 0.001 (one in 1,000) can be used as the cutoff. Any *p* value greater than 0.05 (or the more stringent 0.01) is rejected, and the results are said to be nonsignificant. A difference that is statistically significant has very little chance of being the result of chance—that is, a statistical fluke.

In the next section, we discuss odds ratios derived from comparing blacks to whites, Hispanics to whites, and Asians to whites in the University of Michigan Medical School's admission process. Statistical significance is also noted. The size of the odds ratio reflects the strength of the association between race or ethnicity and admission status. An odds ratio equal to or greater than 3.0 to 1 is commonly thought to reflect a strong relationship; an odds ratio of less than 3.0 to 1 to about 2.0 to 1 reflects a moderate association, while a relative odds ratio of 1.5 or less to 1 indicates a weak relationship. Of

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[11] For a discussion of logistic regression and a more complete discussion of odds ratios, see Alan Agresti, *Introduction to Categorical Data Analysis* (New York: John Wiley and Sons, 1996).

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course, an odds ratio of 1.0 to 1 indicates no relationship.[12] Note that a *very* strong relationship might be taken to be the rough equivalent of the relative odds of smokers versus nonsmokers dying from lung cancer, which in one well-known study is calculated as 14 to 1.[13]

Results: Relative Odds of Admission, Controlling for Other Factors[14]

Table 2. Relative Odds of Various Groups Being Admitted over White Applicants, Controlling for Other Factors

	Black to White	Hispanic to White	Asian to White	Inverted, White to Asian[15]
1999	37.670 to 1****	2.982 to 1*	0.310 to 1****	3.225 to 1****
2003	36.7114 to 1****	4.9759 to 1****	0.4282 to 1****	2.336 to 1****
2004	9.567 to 1****	4.689 to 1****	0.899 to 1^{ns}	1.112 to 1^{ns}
2005	21.385 to 1****	5.491 to 1****	0.476 to 1****	2.101 to 1****

*p<0.05, **p<0.01, ***p<0.001, ****p<0.0001, ^{ns}Not statistically significant.

In every year of our analysis, the largest odds ratios are those of blacks to whites. They were largest in 1999 and 2003 (roughly 38 and 37 to 1, respectively), dipped to about 10 to 1 in 2004, and then more than doubled to over 21 to 1 in 2005. All black-white odds ratios are statistically significant.

Odds ratios for Hispanics over whites in 1999 were roughly 3 to 1, and rose in 2003 to roughly 5 to 1. They have remained at that level for subsequent years.

Except for 2004, when the Asian-white odds ratio was roughly 1 to 1, the medical school has given preferences to whites over Asians. The odds ratio favoring whites to Asians was roughly 3 to 1 in 1999, and 2 to 1 in 2003 and 2005.

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[12] Adapted from David E. Lilienfeld and Paul D. Stolley, *Foundations of Epidemiology*, 3rd edition (New York: Oxford University Press, 1994): 200-202.

[13] Taken from a 20-year longitudinal study of British male physicians by R. Doll and R. Peto, as quoted in Agresti, *Introduction to Categorical Data Analysis*, p. 47.

[14] 1999 is the only year where alumni connection was used as a variable in the regression analysis. Collinearity between "Hispanic" and "alumni status" required dropping "alumni status" from the regression for 2003. There were no applicants with complete data and alumni connections for 2004 and 2005, so the latter variable was also dropped for those years.

[15] The white-to-Asian odds ratio is calculated by taking the reciprocal of the Asian-to-white odds ratio.

Probabilities of Admission

The meaning of logistic regression equations and their associated odds ratios may be difficult to grasp because the equations are complex and hard to explain without resorting to mathematical formulations. A more intuitive way to grasp the underlying dynamic of preferential admissions is to convert these logistic regression equations into estimates of the probabilities of admission for individuals with different racial/ethnic group membership, given the same MCAT scores and grades. In this section, we compare the probabilities of admission for individuals belonging to these different groups, using the logistic regression equation specific to each year. The probability calculations provide an estimate of the admission chances for members of each group, all with the same test scores and grades, alumni and residency status, and sex.

We chose to examine the probabilities for an in-state male applicant, with no alumni connections to UMMS, and a total MCAT score and an undergraduate science GPA equal to the median MCAT score and science GPA of black admittees for each year.[16] The same set of test scores and science GPAs was entered for blacks, whites, Hispanics, and Asians. Then we calculated the chances of admission for a black applicant, a white applicant, a Hispanic applicant, and an Asian applicant with those academic qualifications. These calculations do not change the statistical results reported in the earlier section on odds ratios. They simply provide an easier-to-understand interpretation of their meaning.

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[16] One can compare probabilities of admission for any combination of alumni status, residency status, and sex. Equations for calculating probabilities for each year and each racial/ethnic group are provided in the appendices.

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Figure 5. Probability of Admission

	1999	2003	2004	2005
■ Blck	72%	35%	16%	23%
▨ Hisp	17%	7%	9%	7%
▨ Asn	2%	1%	2%	1%
□ Wht	6%	1%	2%	1%
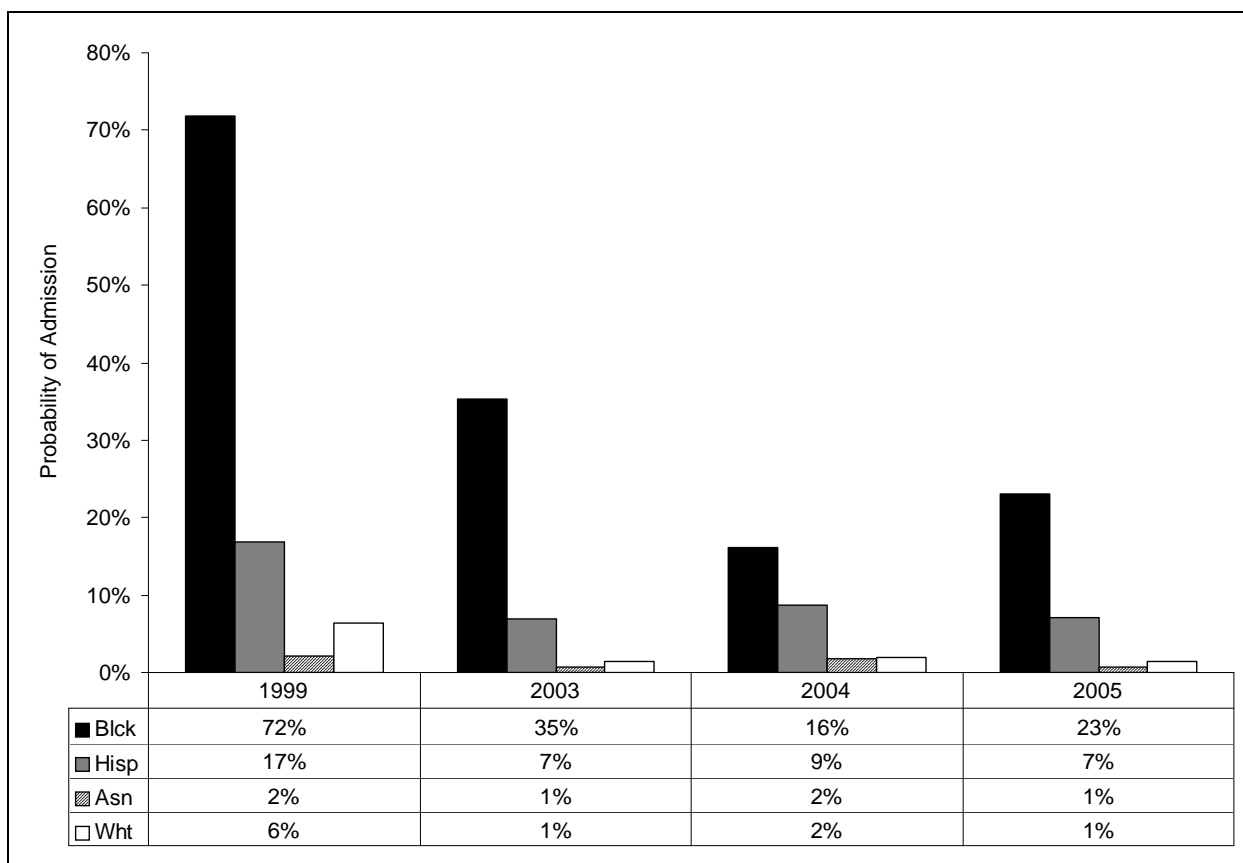
Controlling for test scores, grades, sex, residency, and alumni connection of applicant. Assumes applicant is male, a Michigan resident, with no parent who attended the institution, and has the same total MCAT score and undergraduate science GPA as the median for black admittees for that particular year.

The differences in odds ratios illuminate the large differences in the probability of admission based on an applicant's race. The probability of admission is presented in Figure 5 for every racial/ethnic group, for each year, using the median test score and science GPA for black admittees.[17]

Comparing probabilities of admission show that, in every year, applicants from other racial/ethnic groups with the same qualifications as meidan black admittees had little to no chance of admission. An in-state male candidate, with no parent connection to UMMS and with an MCAT score and science GPA equal to the medians for black admittees, in 1999 would have had a 72 percent admissions chance if black, a 17 percent chance if Hispanic, a 2 percent chance if Asian, and a 6 percent chance if white.

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[17] The black median MCAT score and science GPA in 1999 was 36 and 3.43, respectively; for 2003, it was 36 and 3.33; for 2004, 37.5 and 3.33; and for 2005, 36 and 3.46.

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In subsequent years, the probability of admission for black applicants with the test scores and grades of the average black admittee drops, but it is still much larger than the probabilities of admission for the other three groups.

In 2003, candidates' chances of admission with the same background as in 1999 but test scores and science GPAs equal to the black admittee median of 2003 would be as follows: a 35 percent chance if black; a 7 percent chance if Hispanic; and a 1 percent chance if Asian or white. Thus, the chances of admission if black were 35 times greater that of an Asian or white candidate.

In 2004, the chances of admission all decline, but the chances for black candidates with the background and credentials described earlier were 8 times greater than the chances facing an Asian or white candidate with the same characteristics. For that year, a black male in-state applicant with test scores and grades equal to the average black admittee would have had a 16 percent chance of admission. Hispanic applicants with the same background and credentials had a 9 percent chance, while Asians and whites would have had a 2 percent chance of admission.

Finally, the probability of admission if black is greater in 2005 than that in 2004, while for the other groups it remains roughly the same. The chances if black are more than 20 times greater than if Asian or white. In 2005, a black male in-state applicant with qualifications equal to the average black admittee had a 23 percent of admission, while the probability for Hispanic applicants with the same background and qualifications was 7 percent, and the probability if Asian or white was only 1 percent.

Disparities in admission show up however when one looks at somewhat higher test scores and grades. In 2005, for instance, an applicant with an MCAT total of 41 and an undergraduate science GPA of 3.6 would have a 74 percent chance of admission if black and a 43 percent chance if Hispanic. The likelihood of admission drops to only 12 percent if white and 6 percent if Asian with these same credentials and background. For those with a test score of 42 and 3.7 GPA, probabilities rise to 85 percent if black and 59 percent if Hispanic, but only to 21 percent if white and 11 percent if Asian. Finally, for those with a total score of 43 and a GPA of 3.8, a black applicant would have a 91 percent chance of admission, and a Hispanic, 73 percent chance. If white, the applicant would have only a 33 percent chance of admission, while if Asian, only a 19 percent chance.

Academic Qualifications and Subsequent Performance

What are the consequences of these policies? Do minorities entering medical school with weaker academic credentials perform worse than students with stronger credentials? There are many statistical studies that look at this question. One of the major findings of this research is that science grades and, above all, MCAT scores are statistically significant predictors of subsequent performance in medical school (MCAT scores are the single best predictor of subsequent performance). Other variables, such as the more subjective ones (e.g., communication skills, volunteer activities, and prior medical background), have not been found to correlate significantly with medical school and licensing exam performance, all other things being equal.

MCAT scores and undergraduate grades also have been found to be the best predictors of passing the required physician's licensing exam, the United States Medical Licensing Examination (USMLE).

The USMLE is the licensing exam of the National Board of Medical Examiners (NBME). It is generally required of every medical school student seeking to practice medicine in the United States. The USMLE consists of three separate examinations (Steps 1, 2, and 3). Step 1 is taken after the first two years of medical school, and a passing score is often required for a student to continue in medical school. Step 2 is taken after the second two years. Step 3 is taken after graduation from medical school. The NBME establishes the minimum scores required to pass each part of the licensing exam. According to the NBME, most scores fall between 160 and 240. The passing score for the USMLE Step 1 is 179, and the overall pass rate is typically 90 percent.[18]

The American Association of Medical Colleges (AAMC) reports in its *Interpretive Manual* the results of its ongoing study, which finds the MCATs more valid than other factors in predicting subsequent performance in medical school.[19] The AAMC reports that an individual's MCAT scores have a 0.67 correlation with first-year medical school grades, a 0.64 correlation with first- and second-year medical school grades, and a 0.72 correlation with scores on the USMLE Step 1 exam. In contrast, an individual's college GPA has a 0.54 correlation with first-year medical school grades, a 0.58 correlation with first- and second-year grades, and a 0.48 correlation with scores on the USMLE Step 1.

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[18] From the USMLE website.

[19] AAMC *Interpretive Manual*, pp. 15-16.

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Other research has also found MCAT scores, more than undergraduate GPAs and any nonacademic factors, to be the best predictor of medical school grades, subsequent test scores on the medical licensing exams, and eventual completion of the medical school program**.**[20]

Moreover, there is no cultural bias associated with the MCATs in predicting subsequent performance. Researchers have found that MCAT scores predicted medical school performance among members of all racial and ethnic groups.[21] Others found that controlling for MCAT scores and college grades dramatically reduced the differences between racial and ethnic groups in passing the USMLE Step 1. With the same MCAT scores and college grades, Hispanic and black men performed about as well as white men on the Step 1. The same was the case for black women and white women with the same academic credentials, while Hispanic women performed only slightly worse.[22]

The medical establishment claims, nonetheless, that racial and ethnic preferences are needed to increase the number of black, Hispanic, and Native American doctors, which in turn is supposed to improve medical care for patients of the same race. But research in this area is meager, and a review of the literature of minority health care and physicians' race/ethnicity yields contradictory findings. Moreover, there is little research relating the performance of underrepresented minorities in medical school, their performance on licensing exams, and their subsequent performance as physicians.[23]

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[20] See J.A. Koenig and A. Wiley, "The Validity of the Medical College Admission Test for Predicting Performance in the First Two Years of Medical School," *Academic Medicine*, 71:S83-S85, 1996. See also S.M. Case, D.B. Swanson, D.R. Ripkey, L.T. Bowles, and D.E. Melnick, "Performance of the Class of 1994 in the New Era of USMLE," *Academic Medicine*, 71, #10 (Oct. 1996 Supplement):S91-S93; J.A. Koenig, W. Li, and R. Haynes, "Estimation of the Validity of the 1991 MCAT for Predicting Medical School Grades, NBME Performance, and Academic Difficulty" (paper prepared for the MCAT Evaluation Panel Meeting, Dec. 1987), available at http: //www.aamc.org/stuapps/admiss/mcat/koeni001.htm.
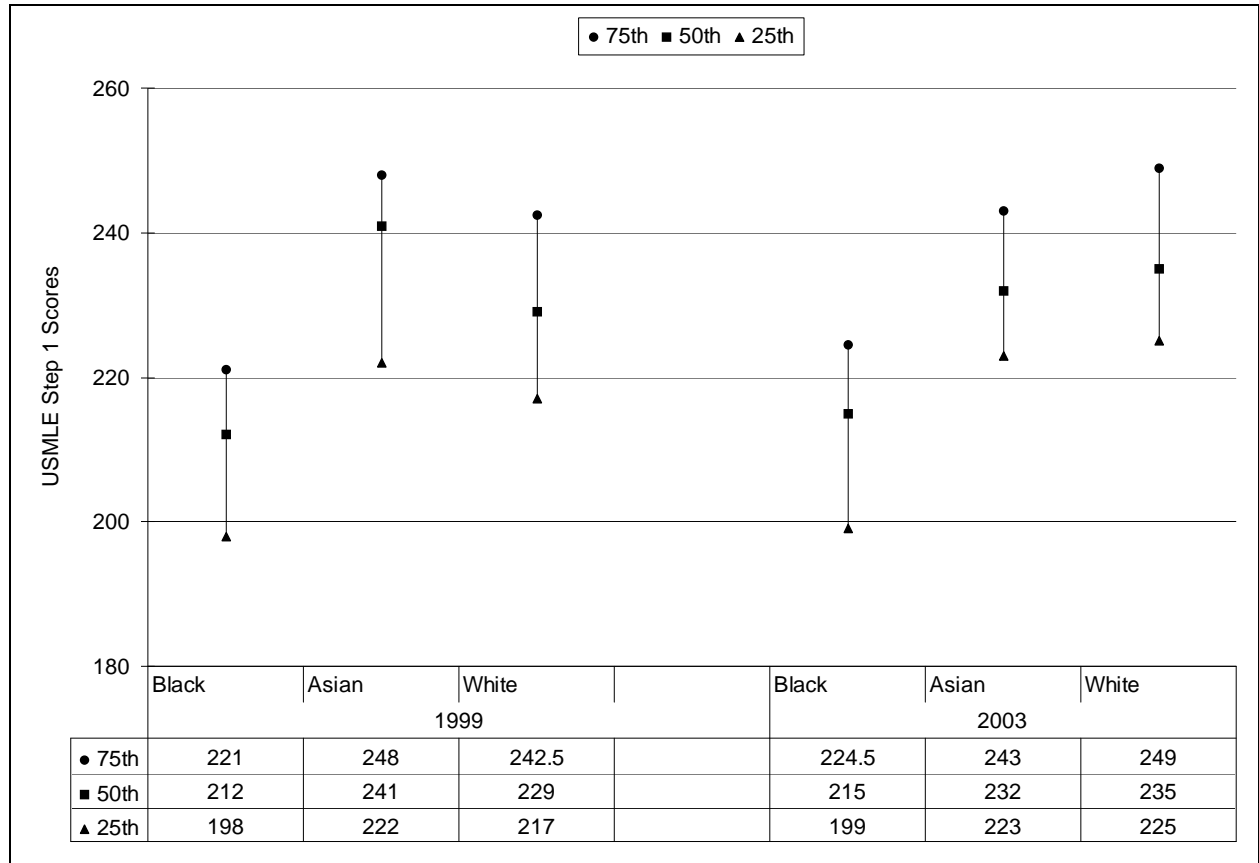
[21] J.A. Koenig, S.G. Sireci, and A. Wiley, "Evaluating the Predictive Validity of MCAT Scores across Diverse Applicant Groups," *Academic Medicine,* 73, #10 (1998): 1095-1106.

[22] B. Dawson, C.K. Iwamoto, L.P. Ross, R.J. Nungester, D.B. Swanson, and R.L. Volte, "Performance on the National Board of Medical Examiners Part I Examination by Men and Women of Different Race and Ethnicity," *Journal of the American Medical Association*, 272, #9 (1994): 674-79.

[23] See Satel, *PC M.D.*, pp. 183-86, for a review of the research. Satel notes that time spent between physician and patient is probably the most important factor in the doctor-patient relationship, not the race of the physician. More recently, a study found being a minority to be a risk factor in predicting who would be a problem resident; here, too, insufficient medical knowledge, poor clinical judgment, and insufficient use of time were the most frequently reported difficulties. (Medical knowledge and clinical judgment are most closely related to test scores, as previously discussed.) See D.C. Yao and S.M. Wright, "National Survey of Internal Medicine Residency Programs Directors Regarding Problem Residents," *Journal of the American Medical Association*, Sept. 6, 2000, www.jama-ama.assn.org.

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Since the USMLEs are taken after the first two years of medical school, Step 1 scores were available for 1999 and 2003. The figure below shows the Step 1 scores at the 25th, 50th, and 75th percentiles for these two classes.[24]

Figure 6. UMMS USMLE Step 1 Scores

	Black	Asian	White		Black	Asian	White
		1999				2003	
● 75th	221	248	242.5		224.5	243	249
■ 50th	212	241	229		215	232	235
▲ 25th	198	222	217		199	223	225

There were no Hispanics in the dataset. Of the black students taking the USMLE Step 1s in 1999, the median score was a 212, which was almost 30 points lower than the median score for Asians and 17 points lower than the median score for whites. Step 1 scores for black students at the 75th percentile were lower than Asian scores at the 25th percentile and only four points higher than white scores at the 25th percentile. This means that 75 percent of black students taking the USMLE Step 1 test in 1999 scored lower than roughly 75 percent of the Asian and white students taking the test in 1999.

In 2003, the median score for black students was 17 points lower than the median for Asians and 20 points lower than the white median. Scores for black students at the 75th

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[24] The number of students in each racial/ethnic group taking the USMLE Step 1s is as follows.

	1999	2003
Black	14	12
Asian	13	39
White	103	85

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percentile were roughly the same as the scores for Asian and white students at the 25th percentile. In other words, 75 percent of black students taking the test in 2003 scored lower than 75 percent of Asian and white students taking the test that year.

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Appendices

Appendix 1. Logistic Regression Equations

Variable	Unstandardized Regression Coefficient	Odds Ratios	Unstandardized Regression Coefficient	Odds Ratios
	1999		2003	
Total MCAT	0.367059	1.4435****	0.3619	1.4361****
SciGPA	1.352213	3.8660***	2.7947	16.3581****
Black	3.628871	37.6703****	3.6031	36.7114****
Asian	-1.170810	0.3101****	-0.8482	0.4282****
Hispanic	1.092736	2.9824*	1.6046	4.9759****
Sex	0.583207	1.7918**	0.7598	2.1378****
Residency	1.879969	6.5533****	1.0977	2.9973****
Alum	1.608379	4.9947^{ns}		
Constant	-22.424400	0.0000****	-27.6397	0.0000****
	2004		2005	
Total MCAT	0.382202	1.4655****	0.383606	1.4676****
SciGPA	3.690016	40.0455****	2.588075	13.3041****
Black	2.258365	9.5674****	3.062672	21.3846****
Asian	-0.10643	0.8990^{ns}	-0.742270	0.4760****
Hispanic	1.545173	4.6888****	1.703081	5.4908****
Sex	1.060944	2.8891****	0.830557	2.2946****
Residency	1.584484	4.8768****	1.064289	2.8988****
Constant	-32.106700	0.0000****	-28.101000	0.0000****

*$p<0.05$, **$p<0.01$, ***$p<0.001$, ****$p<0.0001$, ^{ns}Not statistically significant.*

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Appendix 2. Calculating the Probability of Admission

Probability of Admission = A/(1+A)

1999

A = EXP((0.367059*TotMCAT) +(1.352213*SciGPA) +(3.628871*Black) +
(-1.17081*Asian) +(1.092736*Hispanic) +(0.583207*Sex) +(1.879969*Residency)
+(1.608379*Alum) +(-22.4244))

2003

A = EXP((0.3619TotMCAT) +(2.7947*SciGPA) +(3.6031*Black) +(-0.8482*Asian)
+(1.6046*Hispanic) +(0.7598*Sex) +(1.0977*Residency) +(-27.6397))

2004

A = EXP((0.382202*TotMCAT) +(3.690016*SciGPA) +(2.258365*Black) +
(-0.10643*Asian) +(1.545173*Hispanic) +(1.060944*Sex) +(1.584484*Residency) +(-32.1067))

2005

A= EXP((0.383606*TotMCAT) +(2.588075*SciGPA) +(3.062672*Black) +
(-0.74227*Asian) +(1.703081*Hispanic) +(0.830557*Sex) +(1.064289*Residency) +(-28.101))

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Linda Chavez, Chairman