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Demographics of Disciplinary Action by the Medical Board of California (2003-2013)

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Executive Summary

The Medical Board of California is tasked with protecting the health of Californians by ensuring that practicing physicians in the state are licensed and regulated. The Board is the state's primary oversight tool for the medical profession, and as a result, exercises a high amount of authority over physicians. In response to concerns regarding possible racial bias in its disciplinary process, the Medical Board requested that the California Research Bureau conduct an advanced data analysis.

This study used archival data provided by the Medical Board of complaints, investigations and discipline that occurred from July 2003 through June 2013. The Research Bureau analyzed 125,792 physician records and 32,978 complaint records to look for any evidence of disparate treatment for minority physicians in the Board's disciplinary outcomes.

Complaints may be submitted for a number of violations, including substandard care, prescribing issues, sexual misconduct, impairment, unlicensed practice, unprofessional conduct and other practice issues.

Once the Medical Board receives a complaint, it may proceed through a process of investigation and discipline, depending on the input of Medical Board Staff as well as medical and legal experts. If a complaint advances through all disciplinary steps, the final determination on discipline is made by disciplinary panels composed of members of the Board itself.

In order to evaluate the relationship between physician race and disciplinary outcomes, the Research Bureau conducted two sets of statistical tests for each step in the disciplinary process. Although limitations with the study prevent the Research Bureau from providing a definitive answer, the data does show a correlation between physician race and the pattern of complaints, investigations and discipline. After controlling for a number of other variables, Latino/a and Black physicians were both more likely to receive complaints and more likely to see those complaints escalate to investigations. Latino/a physicians were also more likely to see those investigations result in disciplinary outcomes. On the other hand, some

Figure 1: Change in Likelihood of Outcome

	Complaints	Investigations	Discipline
Race			
White	Reference Category		
Asian	▼	▼	
Latino/a†	▲	▲	▲
Black	▲	▲	
Native American			
NHPI††	▼		
Other			
2 or more Races			
No Response	▼	▼	

Arrows represent the change in likelihood for physicians of that race to have received a complaint, investigation, or discipline—compared to White physicians. Arrows pointing up indicate a higher likelihood, while arrows pointing down indicate a lower likelihood.

† Results for Latino/a physicians are subject to increased error due to higher potential non-response bias.

†† Native Hawaiian/Pacific Islander

other minority physicians—in particular Asian physicians—actually saw reduced likelihoods of receiving complaints, or of those complaints escalating to investigations. These observations remained even after controlling for age, gender, board certification, and number of hours spent on patient care.

While the overall likelihood of an investigation resulting in discipline also appears to be contingent on which executive director is currently serving, as well as which disciplinary panel is assigned, these effects are consistent across all physicians, regardless of race.

Finally, these findings should be taken with the caveat that this is an observational study, and many variables affecting the perception of physician performance (for instance, “bedside manner”) could not be taken into account. While there is evidence of disparate outcomes, there is no evidence that any actor has specifically applied racial bias to achieve these outcomes.

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Requested By

The Medical Board of California

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Physician Race and Medical Board Disciplinary Practices in CA

Background

The Medical Board of California is tasked with protecting the health of Californians by ensuring that practicing physicians in the state are licensed and regulated. The Board is the state's primary oversight tool for the medical profession, and as a result, exercises a high amount of authority over physicians.

The Black American Political Association of California and the Golden State Medical Society have raised issue with how the Medical Board disciplines physicians—i.e. they are concerned that the Medical Board disciplines minority (in particular African-American) physicians more often and more severely compared with their White colleagues. These two groups asked for the Medical Board to review its discipline data for evidence of such disparities. After an initial review by Medical Board staff that did not find evidence of any disparities, the Board requested that the California Research Bureau conduct a broader and independent analysis.

Medical Discipline in the United States

Although rare, there have been previous studies that examine the pattern of discipline made by state medical boards. Most reviews focused on aspects of professional practice (i.e. specialization, board certification and years in practice, for example) or educational background (i.e. medical school grades, or whether the school was in the United States or was international). To the extent physician characteristics have been studied, age and gender have been the most commonly covered. Race has only been looked at rarely, and has typically been treated as one characteristic of interest among many.

The earliest study the Research Bureau reviewed was a 1998 article by Morrison and Wickersham in which they used Medical Board of California data to compare disciplined physicians with a matched quasi-control group. (Morrison 1998) The study focused on what infractions were most likely to result in discipline. It primarily focused on the nature of the infraction, but it also included information about the physician in the model. However, most of the physician characteristics focused on aspects of professional practice. Other than including the gender of the physician, Morrison and Wickersham's analysis looked at type of practice, length of time in practice, whether the physician received a domestic or international education, specialization, whether the physician was board certified, and whether the physician had received an American Medical Association Physician's Recognition Award.

Morrison and Wickersham found that disciplined physicians were half as likely to be board certified, compared with the control group. At the same time, disciplined physicians were more likely to have been in practice for 20 or more years at the time of infraction, and were more likely to be anesthesiologists, compared with the control group. No other

characteristics were found to be significantly different between the two groups.

Since Morrison and Wickersham's study, a number of others have applied the same methodology to other states and/or other physician characteristics. Clay and Conatser (2003) used an identical analysis to compare disciplined physicians in Ohio with a matched quasi-control group. (Clay 2003) They found the same patterns regarding board certification, and length of practice, but failed to find a significant difference between the number of anesthesiologists in the disciplined and control groups. Kohatsu et al. (2004) used a randomly selected control, instead of a matched control, but an otherwise identical analysis. (Kohatsu 2004) They found male physicians, physicians without board certification, older physicians, and those with an international degree were more likely to be in the disciplined group than the control group. They also identified family practice, general practice, obstetrics and gynecology, and psychiatry as specializations associated with appearing in the discipline group.

Papadakis et al. (2005) used a similar matched quasi-control to look at the relationship between behavior during school and later discipline by the state's medical board. (Papadakis 2005) The authors used data from the Federation of State Medical Boards to look at graduates of three medical schools—the University of Michigan Medical School in Ann Arbor, Jefferson Medical College of Thomas Jefferson University of Philadelphia and the University of California, San Francisco School of Medicine. They identified a number of factors that increased the likelihood of later discipline: undergraduate science grade point average, Medical College Admission Test scores, United States Medical Licensing Exam scores, required repeating of a course in medical school and receiving a citation for unprofessional behavior in medical school. In addition to behavior during medical school, they also found that male physicians were more likely to be disciplined. None of the above studies included physician race or ethnicity in their analysis.

More recently, two studies have included race as an explanatory variable; however, the results were contradictory. Cardarelli, Licciardone and Ramirez (2004) used data from the Texas State Board of Medical Examiners, and included race as a physician characteristic. (R. a. Cardarelli 2004) They found that those in the disciplined group were more likely to have 20 or more years in practice, be osteopathic graduates, and—most relevant to this research—be African American, compared with the physicians in the control group. However, the subsequent study by Cardarelli and Licciardone (2006)—again using Texas State Board of Medical Examiner data—failed to find that race impacted whether a physician was disciplined. (R. a. Cardarelli 2006) Instead they found a slightly greater likelihood of being disciplined for those with a history of prior disciplinary actions, those with more years in practice, as well as anesthesiologists, psychiatrists and general practitioners.

Methodology

At the request of the Medical Board, the Research Bureau met with representatives of the Medical Board of California, the Black American Political Association of California and the Golden State Medical Society in order to understand the specific nature of the questions and concerns about potential disparities in how the Medical Board disciplines physicians. From

those meetings, the Research Bureau identified a set of research questions for analysis. The questions were evaluated on the basis of their centrality to the core question of disparate treatment, the availability of data for analysis, and their feasibility of answering within a reasonable time frame. The questions selected for this analysis are:

1. How is the likelihood of a physician having a complaint made against them correlated with the race or ethnicity of the physician?
2. How is the likelihood of the Medical Board dismissing vs. escalating a complaint to a disciplinary hearing correlated with the race or ethnicity of the physician?
3. How is the severity of the Medical Board's disciplinary action against a physician correlated with the race or ethnicity of the physician?
4. Does the correlation between disciplinary outcomes and the race or ethnicity of physicians vary across the different tenures of Medical Board executive directors?
5. Does the correlation between disciplinary outcomes and the race or ethnicity of physicians vary whether the Medical Board's Panel A or B reviews the complaint?

To answer these questions, the analyses are broken out into three distinct phases. The first looks specifically at which physicians receive complaints, the second looks at which complaints escalate to the level of investigation and the third looks at which investigations result in discipline for the physician. For each phase, the analyses are further split between two statistical tests. The first, a Chi-Square test of independence, analyzes the overall pattern of outcomes (i.e. complaint filed or not, investigation conducted or not, and discipline received or not) by the physician's race, comparing it to the expected pattern if race was unrelated to the outcome. This provides an answer to the general question of whether a physician's race is predictive of the outcome, but doesn't provide a way to differentiate the effect for White physicians versus those of a different race.

Second, in order to identify the effect for each race individually, the Research Bureau also conducted a series of multivariate logistic regressions over each outcome, including detailed control variables for race, other demographics, and the characteristics of the physician's professional practice. This second set of tests provides information for each racial category separately as well as controlling for other variables that might be more directly causal while still correlated with race. For example, the Research Bureau included control for the physician's age and the amount of time spent in patient care rather than teaching, research or other duties.

Data Sources

For this study the California Research Bureau used data supplied by the Medical Board of California. Data on complaints, investigations and discipline were drawn from an archival dataset created by the Medical Board during its transition to the Department of Consumer Affair's BreEZe record system in 2013. The archived data cover July 2003 through June 2013. Physician-level data are drawn from a similarly archived dataset created of all active physicians as of June 2013. Physician demographics are drawn from physician responses to a voluntary survey that the

Table 1: Physicians, Complaints, Investigations and Discipline by Physician's Self-Reported Race

	Physicians		Complaints		Investigations		Discipline	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*
White	60613	48.2%	16949	51.4%	4051	52.4%	633	51.8%
Asian	26669	21.2%	6591	20.0%	1413	18.3%	201	16.4%
Latino/a	3421	2.7%	1248	3.8%	333	4.3%	65	5.3%
Black	3345	2.7%	1438	4.4%	391	5.1%	51	4.2%
Native American	150	0.1%	77	0.2%	20	0.3%	4	0.3%
NHPI†	98	0.1%	21	0.1%	6	0.1%	1	0.0%
Other	4577	3.6%	1422	4.3%	321	4.2%	47	3.8%
2 or More Races	1742	1.4%	499	1.5%	137	1.8%	20	1.6%
No Response	25177	20.0%	4733	14.4%	1059	13.7%	201	16.4%
Total	125792		32978		7731		1223	

† Native Hawaiian/Pacific Islander

Medical Board sends to physicians when they renew their license. These sources were used to create a physician-level and a complaints-level dataset.

As part of the survey that the Medical Board includes with each physician's license renewal, physicians are asked to provide their ethnic background across 25 potential categories, and are able to select more than one. They also have an option to decline to state. These survey responses were used to identify the race for all responding physicians.

Table 1 provides a summary of the study population, with the count of physicians, complaints, investigations and discipline each broken out by the physician's race.

The percentages are calculated according to the percent each race makes up within each column. For example, Whites represent 48.2 percent of physicians in the study population, but 51.4 percent of complaints. For both White and Black physicians, they appear to be overrepresented among Complaints and Investigations, but drop closer to expected numbers among Discipline cases. Asian physicians are underrepresented for all three categories, while Latino/a physicians are overrepresented across all three.

Non-Response Bias

Physicians are required to submit their renewal forms every two years; however, the ethnic background section is voluntary. In fact, of the 125,792 active physicians included in the study population, 25,177 did not provide data on ethnicity. In some cases, the question was left blank; in other cases the respondent checked the box marked "Decline to State." This represents a response rate of 79.98 percent of all physicians in the study. The Office of Management and Budget recommends testing for non-response bias when response falls below 80 percent.[1] The Research Bureau

[1] Office of Management and Budget. (2006) Statistical Policy Directive No. 2: Standards and Guidelines for Statistical Surveys. Source: https://www.whitehouse.gov/sites/default/files/omb/inforeg/statpolicy/standards_stat_surveys.pdf.

benchmarked the race/ethnic breakdown of survey respondents against data from the U.S. Census' American Community Survey[2] as a proxy for the actual distribution. Because the Census does not include non-respondents, the Research Bureau excluded those who responded "Decline to State" and those who did not respond at all. As a result, the percentages reported in Table 2 will differ from those included in Table 1.

Some shortcomings exist in this comparison. The Medical Board data and the Census data cover slightly different time periods, and represent slightly different populations of respondents.[3] Despite these differences, the distributions are generally in relatively close alignment.

Black, Native American, Native Hawaiian/Pacific Islander and Multiple fall within the Census' margin of error. White and Asian fall just beyond the margin of error. Latino/a and Other are significantly different, however. The difference between the Medical Board data and the Census for Latino/a and Other are similar, but in opposite directions. This raises the possibility that some physicians are responding Other to the Medical Board survey, but as Latino/a to the Census Bureau. One explanation for this could be differences in question wording. For example, the Census asks two separate questions, one about Hispanic, Latino or Spanish origin, and a second about the respondent's race. The Medical Board survey asks a single question about ethnic background, and combines Hispanic, Latino or Spanish origin with both race and other national origins. Such differences could result in the same person responding differently to the two surveys. However, we cannot be sure of the actual cause of the discrepancy; as a result we do recommend caution in interpreting the results regarding Latino/a physicians.

Table 2: Comparison of Physician's Self-Reported Race According to the Medical Board of California and U.S. Census American Community Survey†

	MBC	Census	
	%	%	+/-
White	60.20%	58.30%	1.10%
Asian	26.50%	28.70%	1.00%
Latino/a	4.10%	7.10%	0.80%
Black	3.30%	3.70%	0.50%
Native American	0.10%	0.10%	0.10%
NHPI	0.10%	0.10%	0.10%
Other	4.50%	1.00%	0.20%
2 or More Races	1.10%	1.00%	0.50%

† Data from non-respondents excluded from table.

To further assess bias, the Research Bureau also evaluated whether there were differences between survey respondents and non-respondents regarding their likelihood of receiving a complaint. To do this, we adopted a

[2] Census (2006-2010) American Community Survey, Detailed Census Occupation by Sex and Race/Ethnicity for Worksite Geography–Universe: Civilians employed at work 16 years and over.

[3] The Census data are from 2006-2010, while the survey responses represent only each physician's most recent survey. As the study period continued into 2013, the majority of survey responses were returned in 2012 or 2013. The pool of individuals covered may also be modestly different. The Census includes individuals who consider their occupation to be a physician or surgeon, while the survey respondents are licensed physicians and surgeons. The former may include individuals who consider themselves physicians or surgeons but are not currently licensed, perhaps because they are retired or have transitioned to a related business. The latter may include individuals who are licensed but consider their occupation to be something other than a physician/surgeon, such as a hospital administrator, or are not currently working. In addition, each phrases their questions differently. The Census separates race and ethnicity, asking about race and Hispanic origin separately, while the Medical Board combines them.

methodology commonly used in survey research. (TRC 2009) This methodology calculates the difference in rates of complaints between responding physicians and non-responding physicians, and then weights that difference by the size of the non-responding group. A 95 percent confidence interval was also estimated. The study data reveal a bias coefficient of 0.0120, with a confidence interval of 0.0124 to 0.0143. It appears that non-response bias is present in the data and that there are differences in the likelihood of complaints for responding versus non-responding physicians; however, the effect is quite small and does not appear to be highly correlated with race/ethnicity.

Other Limitations

In addition to the non-response issue, it is important to recognize that the ability to draw distinct conclusions from this report is limited in several additional ways.

Although the study started with a sizeable sample, few physicians receive a complaint in any given year and most complaints and investigations are closed after initial review. As a result, out of 125,792 physicians, only 1,223 could be identified as having been disciplined a total 1,267 times during the study period.

Additionally, as an observational study, the best this review can show is statistical association not cause and effect. Furthermore, a number of important variables could not be included, including physician quality as well as patient characteristics. This further limits the Research Bureau's ability to draw robust conclusions, as there are other reasonable explanations for the patterns observed.

While these are the largest issues, a full discussion of methodological considerations is in Appendix A.

Results

In order to evaluate the relationship between physician race and disciplinary outcomes, the Research Bureau conducted two sets of statistical tests for each step in the disciplinary process. In the end, physician race does appear to be related to the pattern of complaints, investigations and discipline. After controlling for a number of other variables, Latino/a and Black physicians were more likely to receive complaints, to see those complaints escalate to investigations and Latino/a physicians were more likely to see those investigations result in disciplinary outcomes. On the other hand, some other minority physicians—in particular Asian physicians—actually saw reduced likelihoods of receiving complaints, or of those complaints escalating to investigations. These observations were robust even after controlling for age, gender, board certification, and number of hours spent on patient care.

While the overall likelihood of an investigation resulting in discipline appears to be contingent to some extent on the executive director's tenure as well as which disciplinary panel is assigned, two factors that stakeholders expressed particular concern about, these effects are consistent across all physicians, regardless of race.

Physicians to Complaints

The Medical Board reviews complaints for a number of physician violations, including substandard care, prescribing issues, sexual misconduct, impairment, unlicensed practice, unprofessional conduct and other practice

Table 3: Physicians by Race and Complaint Status

	Physicians Received Complaint?					
	Yes		No		Total	
	N	%	N	%	N	%
White	10943	18.1%	49670	81.9%	60613	100.0%
Asian	4410	16.5%	22259	83.5%	26669	100.0%
Latino/a†	742	21.7%	2679	78.3%	3421	100.0%
Black	786	23.5%	2559	76.5%	3345	100.0%
Native American	32	21.3%	118	78.7%	150	100.0%
NHPI	14	14.3%	84	85.7%	98	100.0%
Other	865	18.9%	3712	81.1%	4577	100.0%
2 or More Races	295	16.9%	1447	83.1%	1742	100.0%
No Response	3014	12.0%	22163	88.0%	25177	100.0%
Total	21101	16.8%	104691	83.2%	125792	100.0%
Chi-Square	673.22					
Degrees of Freedom	8					
Significance	<0.001					

† Results for Latino/a physicians are subject to increased error due to higher potential non-response bias.

issues. More than four-fifths of physicians did not receive a complaint during the studied period. An examination of the complaints data using a Chi- Square test of independence showed that the relationship between a physician's race and the rate of receiving a complaint were correlated, and the correlation was unlikely to be due to random chance (χ^2=673.223, df=8, p<.001). Table 3 provides a summary of receipt of a complaint, broken out by the race of the physician.

Black, Latino/a and Native American physicians were much more likely to receive a complaint than average. White physicians and physicians listing Other were also slightly more likely to receive a complaint. Native Hawaiian/Pacific Islander physicians and physicians with no response were less likely to receive a complaint. Asian physicians, and those responding with 2 or more races received complaints at approximately the same rate as physicians as a whole. If complaints for just the five overrepresented groups had been made at the overall rate, then approximately 1,273 fewer physicians would have received a complaint between 2003 and 2013, a change of slightly more than 1 percent.

To provide further detail, the Research Bureau conducted a multivariate logistic regression and calculated odds ratios for key variables of interest. In addition to race indicators, the regression controls for physician age; sex; board certification; training status; hours reported spent on patient care, research, teaching, administration and other; and demographic characteristics of the county of practice. Table 4 provides the adjusted odds ratios for variables of interest and key controls.

Table 4: Adjusted Odds Ratio for Physician Receiving Complaint

	Adjusted Odds Ratio	95% Confidence Interval			
Race					
White		Reference Category			
Asian	0.90	0.86	-	0.94	***
Latino/a†	1.13	1.04	-	1.24	***
Black	1.40	1.27	-	1.53	***
Native American	1.13	0.86	-	1.48	
NHPI	0.60	0.36	-	0.95	**
Other	1.07	0.98	-	1.16	
2 or more Races	0.88	0.74	-	1.04	
No Response	0.95	0.90	-	1.00	*
Age	1.02	1.02	-	1.02	***
Sex					
Male		Reference Category			
Female	0.65	0.63	-	0.68	***
Board Certified	0.83	0.80	-	0.86	***
Additional Controls					
County Demographics					
Training Status					
Activities in Medicine					

*, **, *** indicates significance at the 90%, 95% and 99% level, respectively.

Additional controls were included in regression analysis, but not reported for the sake of brevity. Full tables are in Appendix B.

† Results for Latino/a physicians are subject to increased error due to higher potential non-response bias.

After controlling for those intervening factors, physicians identifying as Black or Latino/a show an increased likelihood of receiving a complaint.

On average, holding other controls constant, the odds of a complaint being made against a Latino/a physician were 1.13 times more likely than for White physicians. Likewise, a Black physician was 1.4 times more likely to receive a complaint. Asian, Native Hawaiian/Pacific Islander and non-responding physicians were all less likely to receive a complaint. Native American, Other, and physicians identifying with 2 or more Races did not show a significant relationship with the receipt of a complaint.

Complaints to Investigations

Once a complaint has been made to the Medical Board, its Central Complaint Unit evaluates the details of the complaint and determines whether an investigation is required. Out of 32,978 complaints, 7,731 (23.4 percent) resulted in an investigation. The majority were dismissed, referred for

Table 5: Complaints by Race and Outcome

	Complaint Leads to Investigation?					
	Yes		No		Total	
	N	%	N	%	N	%
White	4051	23.9%	12898	76.1%	16949	100.0%
Asian	1413	21.4%	5178	78.6%	6591	100.0%
Latino/a†	333	26.7%	915	73.3%	1248	100.0%
Black	391	27.2%	1047	72.8%	1438	100.0%
Native American	20	26.0%	57	74.0%	77	100.0%
NHPI	6	28.6%	15	71.4%	21	100.0%
Other	321	22.6%	1101	77.4%	1422	100.0%
2 or More Races	137	27.5%	362	72.5%	499	100.0%
No Response	1059	22.4%	3674	77.6%	4733	100.0%
Total	7731	23.4%	25247	76.6%	32978	100.0%
Chi-Square	43.96					
Degrees of Freedom	8					
Significance	<0.001					

† Results for Latino/a physicians are subject to increased error due to higher potential non-response bias.

mediation, or were minor violations that resulted in a fine. An examination of the complaints data using a Chi-Square test of independence showed that the relationship between a physician's race and the rate of complaint dismissal were correlated, and the correlation was unlikely to be due to random chance (χ^2=43.96, df=8, p<.001). Table 5 provides a summary of how many complaints led to an investigation, broken out by the race of the physician.

Black, Latino/a, Native American and Native Hawaiian/Pacific Islander physicians were slightly more likely to have a complaint escalate to an investigation than average, as were physicians reporting more than one race. White and Asian physicians were less likely, as were those listing Other and non-respondents. If complaints for the five overrepresented groups had escalated to investigation at the overall rate, then approximately 112 fewer physicians would have been investigated between 2003 and 2013, a change of 1.4 percent.

As with the analysis of Physicians to Complaints, the Research Bureau conducted a multivariate logistic regression and calculated odds ratios for key variables of interest. Table 6 provides the adjusted odds ratios for the variables of interest and key controls. The full regression table, including all controls is published in Appendix B.

After controlling for intervening factors, physicians identifying as Latino/a or Black continued to show an increased likelihood of a complaint escalating to an investigation. On average, holding other controls constant, a complaint made against a Latino/a physician was 1.25 times more likely to escalate to an

Table 6: Adjusted Odds Ratios for Complaint Escalating to Investigation

	Adjusted Odds Ratio	2.5		97.5	
Race					
White	Reference Category				
Asian	0.89	0.82	-	0.96	***
Latino/a†	1.25	1.09	-	1.43	***
Black	1.20	1.05	-	1.36	***
Native American	0.79	0.52	-	1.17	
NHPI	0.86	0.32	-	2.00	
Other	0.96	0.84	-	1.11	
2 or more Races	1.15	0.89	-	1.47	
No Response	0.92	0.84	-	1.01	*
Age	1.01	1.00	-	1.01	***
Sex					
Male	Reference Category				
Female	0.79	0.73	-	0.85	***
Board Certified	0.74	0.69	-	0.78	***
Additional Controls					
County Demographics					
Training Status					
Activities in Medicine					

*, **, *** indicates significance at the 90%, 95% and 99% level, respectively.

Additional controls were included in regression analysis, but not reported for sake of brevity. Full tables are in Appendix B.

† Results for Latino/a physicians are subject to increased error due to higher potential non-response bias.

investigation than ones against White physicians, who made up the reference category. Likewise, a complaint made against a Black physician was 1.2 times more likely to escalate to investigation. Asian physicians and Decline to State were the only groups showing a clear reduced likelihood of a complaint escalating to an investigation. Native American, Native Hawaiian/Pacific Islander, Other and 2 or More Races did not show a statistically significant relationship with the likelihood of a complaint escalating to investigation.

Investigations to Discipline

Once a complaint has been referred for investigation, the complaint is assigned to an investigator within one of the Medical Board's district offices (or a medical expert, in the case of a quality of care complaint), as well as a Deputy Attorney General. Investigation may be closed without charges if the violation cannot be confirmed, or if there is insufficient evidence to take disciplinary action. The decision about whether to draft formal charges is held by the Deputy Attorney General. If the Office of the

Table 7: Investigations by Race and Outcome

	Investigation Leads to Discipline?					
	Yes		No		Total	
	N	%	N	%	N	%
White	633	15.6%	3418	84.4%	4051	100.0%
Asian	201	14.2%	1212	85.8%	1413	100.0%
Latino/a†	65	19.5%	268	80.5%	333	100.0%
Black	51	13.0%	340	87.0%	391	100.0%
Native American	4	20.0%	16	80.0%	20	100.0%
NHPI	1	16.7%	5	83.3%	6	100.0%
Other	47	14.6%	274	85.4%	321	100.0%
2 or More Races	20	14.6%	117	85.4%	137	100.0%
No Response	201	19.0%	858	81.0%	1059	100.0%
Total	1223	15.8%	6508	84.2%	7731	100.0%

Chi-Square	17.20
Degrees of Freedom	8
Significance	0.028

† Results for Latino/a physicians are subject to increased error due to higher potential non-response bias.

Attorney General files charges, physicians typically either agree to a stipulated settlement (i.e. a plea bargain) or contest the charges. In these cases, an Administrative Law Judge drafts a recommended decision, which is then reviewed by a Medical Board disciplinary panel. Each case is assigned to one of two panels—either Panel A or Panel B—based on the first initial of the physician's last name.

The likelihood of the Medical Board disciplining a physician is generally low. Out of the 7,731 investigations included in this study, only 1223 (15.8 percent) resulted in discipline. When the Research Bureau examined disciplinary outcomes using a Chi-Square test of independence, the relationship between a physician's race and disciplinary outcome were found to be correlated, and the correlation was unlikely to be due to random chance ($\chi 2=17.20$, df=8, p=.028). Table 7 above provides a summary of how many investigations led to discipline, broken out by the race of the physician.

Latino/a, Native American, Native Hawaiian/Pacific Islander and non-respondents were more likely to have an investigation result in discipline than average. All other groups were less likely. If the four overrepresented groups had been disciplined at the same rate as physicians overall, approximately 47 fewer physicians would have received discipline, a reduction of 3.8 percent.

As in the prior sections, the Research Bureau conducted a multivariate logistic regression and calculated odds ratios for key variables of interest. The first part of this analysis closely mirrors that used for Physicians to Complaints

Table 8: Adjusted Odds Ratios for Investigation Escalating to Discipline

	Model 1				Model 2			
	Adjusted Odds Ratio	**2.5**	**97.5**		**Adjusted Odds Ratio**	**2.5**	**97.5**	
Race								
White	Reference Category				Reference Category			
Asian & NHPI	1.02	0.84	1.24		1.02	0.83	1.25	
Latino/a†	1.64	1.20	2.22	**	1.64	1.18	2.24	***
Black	0.86	0.60	1.21		0.71	0.38	1.23	
Native American	0.70	0.16	2.13		0.83	0.19	2.60	
NHPI	-	-	-		-	-	-	
Other	1.00	0.68	1.43		0.98	0.66	1.42	
2 or more Races	0.74	0.38	1.35		0.79	0.40	1.47	
No Response	1.06	0.84	1.34		1.08	0.85	1.37	
Age	1.00	0.99	1.01		0.99	0.99	1.00	
Sex								
Male	Reference Category				Reference Category			
Female	1.01	0.82	1.23		0.94	0.76	1.16	
Board Certified	0.87	0.75	1.02		0.9	0.73	1.11	
Directors								
Ron Joseph					4.33	3.20	5.84	***
Dave Thornton					6.20	5.01	7.70	***
Barb Johnston					5.01	4.06	6.21	***
Linda Whitney					Reference Category			
Panel A					0.86	0.73	1.01	*
Interactions								
Thornton x Black					1.11	0.54	2.27	
Panel A x Black					1.53	0.75	3.11	
Additional Controls								
County Demographics								
Training Status								
Activities in Medicine								

*, **, *** indicates significance at the 90%, 95% and 99% level, respectively.

Additional controls were included in regression analysis, but not reported for sake of brevity. Full tables are in Appendix B.

† Results for Latino/a physicians are subject to increased error due to higher potential non-response bias.

and Complaints to Investigation. One exception is that the small number of investigations of complaints made against Native Hawaiian/Pacific Islander physicians

necessitated merging those physicians with Asian physicians into a combined racial category. Beyond that, a second model specification is included that also looks for differences between the tenures of the five executive directors that served between July 2003 and June 2013 as well as differences between the two panels that review disciplinary recommendations. Table 8 provides the adjusted odds ratios for the variables of interest and key controls.

Latino/a physicians show an increased likelihood of an investigation resulting in discipline. On average, holding other controls constant, investigations made into complaints against Latino/a physicians were 1.64 times as likely to result in discipline as ones against White physicians, who are used as the reference category. No other groups were significantly more or less likely to have investigations result in discipline.

The second model adds controls for both which executive director was appointed at the time of initial complaint as well as which disciplinary panel was assigned. The tenures of both Ron Joseph and Kimberly Kirchmeyer only partially overlap with the study period. Only 554 complaints in the study came during Joseph's tenure, and only two of those resulted in discipline. Likewise, only 20 complaints in the study came during Kirchmeyer's tenure, and none of those resulted in discipline. Complaints made during Kirchmeyer's tenure were included in the analysis; however the estimated odds ratio is unlikely to be accurate, and is not reported in the table above. The full table is published in Appendix B.

Linda Whitney's tenure covered the largest number of complaints in the study, and is used as the reference category. Investigations during the tenure of the other three executive directors were all more likely to result in discipline than under Whitney. The disciplinary panel assigned was correlated with the likelihood of discipline; however the results were not significant at the 95 percent level. Additionally, Panel A—which both the Black American Political Association of California and the Golden State Medical Society identified as being the more severe of the two panels—was actually correlated with reduced odds of receiving discipline.

The Research Bureau also looked at whether the likelihood of discipline was related to both the executive director's tenure and the race/ethnicity of the physician at the same time. Likewise, the Bureau evaluated the likelihood of discipline given both the disciplinary panel and the race/ethnicity of the physician. These are referred to as "interaction effects." Controlling for other characteristics, the analysis was unable to identify an effect of either directorship or panel selection, for Black physicians.

Discussion

The impetus for this research is a concern from stakeholders that minority physicians, and especially Black physicians, are disciplined more often than their White colleagues. The analysis focuses on evidence of disparate outcomes for minority physicians at the level of complaints made, investigations conducted and disciplinary decisions.

Figure 1 shows the general patterns found in the data: a higher likelihood of adverse outcomes for Latino/a and Black physicians, with better than average outcomes for Asian and Native Hawaiian/Pacific Islander physicians

Figure 1: Change in Likelihood of Outcome

	Complaints	Investigations	Discipline
Race			
White	Reference Category		
Asian	▼	▼	
Latino/a†	▲	▲	▲
Black	▲	▲	
Native American			
NHPI[1]	▼		
Other			
2 or more Races			
No Response	▼	▼	

Arrows represent the change in likelihood for physicians of that race to have received a complaint, investigation, or discipline—compared to White physicians. Arrows pointing up indicate a higher likelihood, while arrows pointing down indicate a lower likelihood.

† Results for Latino/a physicians are subject to increased error due to higher potential non-response bias.

as well as physicians who did not report their race.

Focusing on the groups with adverse outcomes, Latino/a physicians[4] had higher rates of complaints received, higher rates of complaints escalating to an investigation, and higher rates of investigations resulting in discipline. Black physicians had higher rates of complaints, and higher rates of complaints escalating to an investigation.

However, this is an observational study, with all the associated difficulties in drawing concrete conclusions from the results. The quality of the findings is contingent on whether the analysis captured all relevant factors that could contribute to a physician's involvement in the disciplinary process. Complaints are not random. Potentially important characteristics, such as the physician's "bedside manner," level of medical expertise and types of insurance accepted, are not part of the survey data available for this study. In addition, complaints require someone to formally contact the Medical Board to report a problem. Certain physicians may be more likely to receive a complaint simply because their patients and/or colleagues are more likely to complain. While the data shows evidence of disparate impacts for Latino/a and Black physicians, the Research Bureau could only control for many—but not all—relevant factors. Accordingly, considering the limitations of the study, the Research Bureau cannot draw conclusions about the cause of the disparities.

[4] As previously stated, results for Latino/a physicians are subject to increased error due to higher potential non-response bias.

Appendix A: Quantitative Analysis—Data and Methods

To assess the impact of a physician's race on the pattern of medical complaints and professional discipline, the Research Bureau conducted a series of inferential tests using Medical Board of California disciplinary data from June 2003 through June 2013. The analyses were broken out into three stages, representing key points in the complaint/disciplinary process. The first set of analyses looks at the pattern of physician complaints, the second set looks at how the pattern of complaints escalate to investigations, while the third looks at how investigations escalate to disciplinary outcomes.

Data

Additionally, a number of complaints included in the data had no associated physician license at all. Sometimes this is because complaints are made to the Medical Board for non-physician medical professionals that are not part of the Medical Board's oversight (i.e. nurses, chiropractors, etc.). In these cases, the complaint is forwarded to the appropriate oversight body; however a record of the complaint is maintained in the Medical Board's records. Most missing license numbers are likely due to complaints against non-physicians (i.e. nurses, etc); however, some records with missing license numbers may represent complaints against physicians that belong in the study population but are missing identifiers in the provided data.

The Medical Board of California provided the Research Bureau with an archive containing information on complaints, investigation and disciplinary events covered by the study period. The study group comprised physicians identified as having active licenses when the archive was first created in October 2013. Physicians who were active during the early part of the 2003-2013 period, but no longer had active licenses by 2013 were not in the data and have been left out of the study. Complaints, Investigations and Disciplinary cases that did not have an associated physician could not be included in the analysis.

Similarly, if a complaint was made prior to June 2003, but the investigation continued into the study period, then the records for that event are partially missing and were removed from the analysis. Likewise, if an investigation occurred prior the start of the study period, but the disciplinary process was not closed until after, those disciplinary events were removed as well.

For complaints to investigations, 119 investigations (1 percent) could not be matched with a corresponding complaint. Likewise, 422 disciplinary decisions (13 percent) could not be matched with an original investigation.

Investigations will occasionally need to be re-opened because a physician has petitioned for a change to their disciplinary sentence, or because one has violated the terms of probation. There were 22 disciplinary events that were duplicates of earlier discipline decisions. These duplicates do not represent new instances of investigations escalating to discipline, and so were removed.

Physicians Records Excluded from Study Population

	Physicians	Complaints	Investigations	Discipline
Starting Count	129,395	41,492	11,331	3,318
Unmatched (Totaled from Below)	-	8,468	3,585	2,047
No License	-	2,404	720	2
No Matching Physician	-	6,064	2,746	1,601
No Matching Complaint	-	-	119	-
No Matching Investigation	-	-	-	422
Duplicates	-	-	-	22
Special License Types	3,603	46	15	4
Final Count	125,792	32,978	7,731	1,267

Finally, as the study focus is on practicing physicians, the study population was limited to physicians with an A, C or G license type. For example, physicians with teaching licenses, and those with fee-exempt license types were removed. This resulted in the removal of 3,603 physicians, 46 complaints, 15 investigations, and 4 disciplinary cases from the study.

The physician survey included an "Other" category. This can be problematic for statistical purposes as each person's definition of what constitutes a distinct racial category can be unique and subjective. For the purposes of the study, the only physicians coded in this category were those who marked themselves as "Other." Likewise, the only physicians coded in the multiple races category were those who responded with two or more identified races, the multiple race category doesn't include physicians who responded with one identified race and "Other."

There is a discrepancy in the coding of Pilipino physicians. The U.S. Census counts Pilipinos with Asians, whereas California counts them with Native Hawaiian/Pacific Islander. Unfortunately, the American Community Survey does not provide occupational breakouts beyond top-level race categories, making it impossible to recode the Census data to match California standards. In order to use the Census data for non-response bias estimation and correction, Pilipino physicians were regrouped with Asian physicians for the purpose of this study.

Limitations of the Study

Disparity and Direct vs Indirect Discrimination

Generally, discrimination refers to differentiating between individuals on the basis of their membership—or perceived membership—in a certain group or category rather than on the unique characteristics of each individual. In common practice discrimination refers specifically to the disparate treatment of individuals on the basis of their race, gender, sexual orientation or other characteristic.

An important characteristic of this definition of discrimination is that it rests on the *intent* of the disparate treatment. This makes objectively proving discrimination difficult without direct evidence about the reasons for the disparate treatment. One approach to this problem is to apply a threshold test, comparing the probability of seeing the level of disparate treatment observed in the data purely due to random chance. If the pattern is suitably unlikely, then discrimination is considered to have occurred. For example, the Castaneda rule (from *Castaneda vs Partida*, a 1977 court case involving jury selection) uses a threshold of three standard deviations from the expected value under random chance. (Sugrue 1983)

One result of defining discrimination based on intent is that it excludes disparate treatment arising from seemingly neutral practices. There is also an important distinction between direct and indirect discrimination. Indirect discrimination, even on the basis of a protected class, can be legal if it is "objectively justified by a legitimate aim and the means of achieving that aim are appropriate and necessary." (Ellis 2005) This has been established in the United States both through court precedent (*Griggs vs Duke Power Co.*, a 1971 court case involving employment discrimination) and in subsequent legislation.

In this context, the purpose of this study is not to recognize the presence of discrimination, rather the goal is to evaluate whether or not disparate impact can be identified, regardless of whether the cause of the disparate treatment was due to discrimination.

Data and Measurement Limitations

The study population is drawn from the administrative records of the Medical Board of California. However, the Medical Board follows differing document retention policies for survey responses and disciplinary process records. For example, a physician's survey responses were overwritten in Medical Board records whenever a new survey was received. If a physician answered the full survey, then switched to "Decline to State" or ceased answering the voluntary sections of the survey, the relevant responses were lost. Complaints, Investigations and Discipline records each have their own policies, varying from disposal after one year for complaints found to be without merit, to indefinite retention for certain disciplinary outcomes.[5] Fortunately, document disposal is not automatic, and it appears that the Medical Board was able to reconstruct a substantial portion of its full records for the study period. However, to the extent they were not able to retrieve all cases, then the data are incomplete and uncertainty is added to any results.

[5] All Medical Board of California document retention schedules are available from the CA Secretary of State's Athena search tool: http://www.sos.ca.gov/archives/programs/state-records-appraisal/athena/.

Design Limitations

Observational Approach

The ability of observational studies to identify causal patterns is contingent on including all relevant factors and testing all alternative explanations. With an issue as complex as the sources of medical error and physician malpractice, this is incredibly difficult. The Research Bureau was unable to include adequate controls for a number of plausible intervening factors, including the ability and expertise of each physician, as well as key characteristics of their patient base. Although board certification and county-level demographics were included as controls, these provide very poor proxies of physician quality or patient pool.

Severity

One of the key complaints made by the Black American Political Association of California and the Golden State Medical Society was about severity of discipline, not simply presence or absence of discipline. Unfortunately, the overall number of discipline cases was too small to effectively estimate the impact of race on discipline severity. If White physicians are just as likely to be sentenced for discipline, but are less likely to be severely disciplined, the data available does not allow the Research Bureau to identify it.

Executive Directorship

The ability of the Medical Board to review complaints is contingent on its available resources. This raises the question of whether the coefficients for each director's tenure are capturing the effects of specific policies, or are merely capturing varying levels of funding for the Board.

Specialization

Prior studies identified certain medical specializations as having a higher likelihood of discipline. For example, Morrison and Wickersham (1998) identified anesthesiologists as more likely to receive discipline. Based on these prior studies, the Research Bureau initially included specialty in its analysis. However, for reported analysis, they were removed. The majority of specializations were not significantly correlated with the dependent variable. Additionally, the coefficient estimates for specializations were not robust against changes to model specification, increasing the likelihood that these estimates were due to random chance. Finally, including specializations doubled the number of control variables in the model, for very little increased model fit, and a comparison of the Akaike information criterion[6] for the different model specifications indicated that their inclusion was not necessary.

Panel Assignment

Cases are assigned to a panel only after the investigation is completed, and after the physician has had a chance to agree to a stipulated agreement or an administrative law judge has issued a proposed decision. The panel is then responsible for approving or denying the proposed discipline. This means the panel members are adopting or denying a decision suggested by other parties in the process. This complicates the ability of the study to isolate the specific effect a given panel has on the likelihood of discipline.

[6] The Akaike information criterion is a model-selection technique. It compares the information that is lost when adopting one model specification over another.

In addition, panels are assigned based on the first initial of the physician's last name. Although unlikely, if this initial is correlated with race or ethnicity, then the correlation between race and panel assignment would make the estimates of those coefficients erratic, with the potential for large changes in the estimate from small changes in the underlying data.

Appendix B: Quantitative Analysis—Complete Regression Tables

Adjusted Odds Ratio for Physician Receiving Complaint—Full Table

	Adjusted Odds Ratio	2.5		97.5	
Race					
White	Reference Category				
Asian	0.90	0.86	-	0.94	***
Latino/a[†]	1.13	1.04	-	1.24	***
Black	1.40	1.27	-	1.53	***
Native American	1.13	0.86	-	1.48	
NHPI	0.60	0.36	-	0.95	**
Other	1.07	0.98	-	1.16	
2 or more Races	0.88	0.74	-	1.04	
No Response	0.95	0.90	-	1.00	*
Age	1.02	1.02	-	1.02	***
Sex					
Male	Reference Category				
Female	0.65	0.63	-	0.68	***
Board Certified	0.83	0.80	-	0.86	***
County Demographics					
% Medicare	1.05	1.02	-	1.07	***
% Medicaid	1.00	0.98	-	1.01	
% VA	0.88	0.83	-	0.94	***
% Uninsured	1.03	1.01	-	1.05	***
% Black	1.01	1	-	1.02	*
% Native American	0.97	0.92	-	1.01	
% Asian	1.01	1	-	1.02	
% NHPI	1.09	1.01	-	1.17	**
% Latino/a	1.01	1	-	1.01	
% Other	1.55	1.02	-	2.33	**
% 2 or more Races	0.99	0.93	-	1.05	
% Foreign-Born	0.98	0.96	-	0.99	***
Poverty Rate	1.00	0.98	-	1.02	
Training Status					
Currently Resident	0.23	0.19	-	0.27	***

Currently Fellow	0.42	0.36	-	0.49	***
Years Post Graduate Training	1.05	1.04	-	1.06	***
Activities in Medicine (Reference Category is "None")					
Patient Care					
1 to 9 Hours	1.06	0.84	-	1.34	
10 to 19 Hours	1.55	1.24	-	1.96	***
20 to 29 Hours	2.11	1.69	-	2.66	***
30 to 39 Hours	2.77	2.23	-	3.49	***
40+ Hours	3.46	2.78	-	4.34	***
Research					
1 to 9 Hours	1.02	0.97	-	1.07	
10 to 19 Hours	0.84	0.76	-	0.93	***
20 to 29 Hours	0.89	0.76	-	1.04	
30 to 39 Hours	0.63	0.48	-	0.81	***
40+ Hours	0.69	0.53	-	0.90	***
Teaching					
1 to 9 Hours	0.90	0.86	-	0.94	***
10 to 19 Hours	0.72	0.66	-	0.77	***
20 to 29 Hours	0.79	0.70	-	0.90	***
30 to 39 Hours	0.64	0.49	-	0.83	***
40+ Hours	0.60	0.46	-	0.77	***
Administration					
1 to 9 Hours	1.15	1.10	-	1.20	***
10 to 19 Hours	1.37	1.29	-	1.45	***
20 to 29 Hours	1.43	1.30	-	1.57	***
30 to 39 Hours	1.62	1.36	-	1.92	***
40+ Hours	1.44	1.19	-	1.73	***
Other					
1 to 9 Hours	1.09	1.03	-	1.16	***
10 to 19 Hours	1.19	1.04	-	1.36	**
20 to 29 Hours	1.35	1.05	-	1.70	**
30 to 39 Hours	1.97	1.36	-	2.79	***
40+ Hours	1.78	1.29	-	2.42	***

*, **, *** indicates significance at the 90%, 95% and 99% level, respectively.

† Results for Latino/a physicians are subject to increased error due to higher potential non-response bias.

Adjusted Odds Ratios for Complaint Escalating to Investigation—Full Table

	Adjusted Odds Ratio	2.5		97.5	
Race					
White	Reference Category				
Asian	0.89	0.82	-	0.96	***
Latino/a[†]	1.25	1.09	-	1.43	***
Black	1.20	1.05	-	1.36	***
Native American	0.79	0.52	-	1.17	
NHPI	0.86	0.32	-	2.00	
Other	0.96	0.84	-	1.11	
2 or more Races	1.15	0.89	-	1.47	
No Response	0.92	0.84	-	1.01	*
Age	1.01	1.00	-	1.01	***
Sex					
Male	Reference Category				
Female	0.79	0.73	-	0.85	***
Board Certified	0.74	0.69	-	0.78	***
County Demographics					
% Medicare	0.99	0.95	-	1.02	
% Medicaid	1.01	0.99	-	1.03	
% VA	0.97	0.88	-	1.07	
% Uninsured	1.03	1.01	-	1.06	**
% Black	0.98	0.97	-	1.00	*
% Native American	0.99	0.91	-	1.07	
% Asian	1.01	0.99	-	1.03	
% NHPI	0.87	0.77	-	0.99	*
% Latino/a	1.00	0.98	-	1.01	
% Other	0.72	0.37	-	1.33	
% 2 or more Races	1.02	0.93	-	1.13	
% Foreign-Born	0.99	0.98	-	1.01	
Poverty Rate	0.98	0.96	-	1.01	
Training Status					
Currently Resident	1.37	0.97	-	1.89	.
Currently Fellow	1.25	0.94	-	1.65	
Years Post Graduate Training	0.98	0.97	-	1.00	*
Activities in Medicine (Reference Category is "None")					

Patient Care					
1 to 9 Hours	1.22	0.83	-	1.82	
10 to 19 Hours	1.17	0.80	-	1.73	
20 to 29 Hours	1.07	0.74	-	1.57	
30 to 39 Hours	0.92	0.64	-	1.35	
40+ Hours	0.87	0.61	-	1.28	
Research					
1 to 9 Hours	1.04	0.96	-	1.13	
10 to 19 Hours	1.06	0.89	-	1.27	
20 to 29 Hours	0.87	0.64	-	1.17	
30 to 39 Hours	0.59	0.31	-	1.04	.
40+ Hours	1.42	0.88	-	2.23	
Teaching					
1 to 9 Hours	0.90	0.84	-	0.96	**
10 to 19 Hours	0.90	0.79	-	1.04	
20 to 29 Hours	0.91	0.72	-	1.13	
30 to 39 Hours	0.87	0.51	-	1.41	
40+ Hours	0.70	0.42	-	1.10	
Administration					
1 to 9 Hours	0.98	0.92	-	1.05	
10 to 19 Hours	0.86	0.78	-	0.95	**
20 to 29 Hours	0.97	0.84	-	1.13	
30 to 39 Hours	0.57	0.41	-	0.77	***
40+ Hours	0.59	0.42	-	0.82	**
Other					
1 to 9 Hours	1.12	1.02	-	1.23	*
10 to 19 Hours	0.87	0.69	-	1.08	
20 to 29 Hours	1.40	1.00	-	1.95	*
30 to 39 Hours	0.47	0.21	-	0.91	*
40+ Hours	0.93	0.56	-	1.47	

*, **, *** indicates significance at the 90%, 95% and 99% level, respectively.

† Results for Latino/a physicians are subject to increased error due to higher potential non-response bias.

Adjusted Odds Ratios for Investigation Escalating to Discipline—Full Table

	Model 1				Model 2			
	Adjusted Odds Ratio	**2.5**	**97.5**		**Adjusted Odds Ratio**	**2.5**	**97.5**	
Race								
White	Reference Category				Reference Category			
Asian	1.02	0.84	1.24		1.02	0.83	1.25	
Latino/a[†]	1.64	1.20	2.22	**	1.64	1.18	2.24	***
Black	0.86	0.60	1.21		0.71	0.38	1.23	
Native American	0.70	0.16	2.13		0.83	0.19	2.60	
NHPI	-	-	-		-	-	-	
Other	1.00	0.68	1.43		0.98	0.66	1.42	
2 or more Races	0.74	0.38	1.35		0.79	0.40	1.47	
No Response	1.06	0.84	1.34		1.08	0.85	1.37	
Age	1.00	0.99	1.01		0.99	0.99	1.00	
Sex								
Male	Reference Category				Reference Category			
Female	1.01	0.82	1.23		0.94	0.76	1.16	
Board Certified	0.87	0.75	1.02		0.9	0.73	1.11	
Directors								
Ron Joseph					4.33	3.20	5.84	***
Dave Thornton					6.20	5.01	7.70	***
Barb Johnston					5.01	4.06	6.21	***
Linda Whitney					Reference Category			
Panel A					0.86	0.73	1.01	*
Interactions								
Thornton x Black					1.11	0.54	2.27	
Panel A x Black					1.53	0.75	3.11	
County Demographics								
% Medicare	0.96	0.87	1.06		0.99	0.89	1.09	
% Medicaid	0.97	0.91	1.03		0.99	0.93	1.05	
% VA	1.07	0.83	1.37		1.02	0.79	1.32	
% Uninsured	1.01	0.95	1.08		1.01	0.94	1.08	
% Black	1.01	0.97	1.05		1.01	0.97	1.05	

% Native American	1.08	0.88	-	1.29		1.03	0.84 - 1.25	
% Asian	1.01	0.96	-	1.07		1.01	0.96 - 1.07	
% NHPI	0.95	0.68	-	1.32		0.87	0.62 - 1.22	
% Latino/a	0.99	0.96	-	1.03		1.00	0.96 - 1.04	
% Other	0.46	0.02	-	2.85		0.41	0.02 - 2.68	
% 2 or more Races	0.90	0.70	-	1.17		0.98	0.75 - 1.29	
% Foreign-Born	0.99	0.94	-	1.03		0.99	0.94 - 1.04	
Poverty Rate	1.03	0.95	-	1.11		1.01	0.93 - 1.09	
Training Status								
Currently Resident	3.74	1.96	-	6.94	***	8.54	4.31 - 16.53	***
Currently Fellow	2.00	1.04	-	3.61	*	2.51	1.26 - 4.72	***
Years Post Graduate Training	0.94	0.90	-	0.97	**	0.92	0.88 - 0.96	***
Activities in Medicine (Reference Category is "None")								
Patient Care								
1 to 9 Hours	0.91	0.39	-	2.41		0.90	0.36 - 2.49	
10 to 19 Hours	0.84	0.36	-	2.20		0.90	0.37 - 2.46	
20 to 29 Hours	0.68	0.30	-	1.77		0.71	0.30 - 1.92	
30 to 39 Hours	0.79	0.35	-	2.02		0.85	0.36 - 2.26	
40+ Hours	0.75	0.34	-	1.89		0.82	0.35 - 2.17	
Research								
1 to 9 Hours	0.78	0.62	-	0.97	*	0.83	0.66 - 1.04	
10 to 19 Hours	0.64	0.35	-	1.08		0.72	0.40 - 1.24	
20 to 29 Hours	0.98	0.41	-	2.07		0.94	0.39 - 2.02	
30 to 39 Hours	0.46	0.02	-	2.55		0.53	0.03 - 3.04	
40+ Hours	1.47	0.46	-	3.92		1.83	0.55 - 5.18	
Teaching								
1 to 9 Hours	0.82	0.69	-	0.99	*	0.81	0.67 - 0.97	**
10 to 19 Hours	0.46	0.28	-	0.72	**	0.46	0.28 - 0.72	***
20 to 29 Hours	0.95	0.49	-	1.72		0.87	0.44 - 1.60	
30 to 39 Hours	1.14	0.26	-	3.50		1.14	0.25 - 3.72	
40+ Hours	0.78	0.17	-	2.56		0.83	0.18 - 2.87	
Administration								
1 to 9 Hours	1.10	0.93	-	1.31		1.07	0.90 - 1.28	
10 to 19 Hours	0.99	0.76	-	1.28		0.99	0.75 - 1.29	
20 to 29 Hours	0.85	0.55	-	1.28		0.84	0.53 - 1.28	
30 to 39 Hours	1.15	0.46	-	2.46		1.20	0.47 - 2.70	
40+ Hours	0.97	0.36	-	2.21		1.36	0.48 - 3.28	
Other								
1 to 9 Hours	0.85	0.65	-	1.09		0.91	0.69 - 1.18	

10 to 19 Hours	0.65	0.31 - 1.22	0.71	0.33 - 1.35
20 to 29 Hours	1.25	0.56 - 2.51	1.18	0.51 - 2.49
30 to 39 Hours	3.40	0.69 - 13.62	3.04	0.57 - 13.68
40+ Hours	0.80	0.18 - 2.49	0.91	0.19 - 3.19

*, **, *** indicates significance at the 90%, 95% and 99% level, respectively.

† Results for Latino/a physicians are subject to increased error due to higher potential non-response bias.