The Role of Selection Effects in Estimated Racial Healthcare Disparities: Evidence from Travelers

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Abstract

There is a large literature estimating the effect of race on the provision of healthcare. Black patients, as well as members of other minority groups, typically receive less treatment than do their white counterparts, even after conditioning on observable characteristics such as insurance status. Many public health commentators ascribe disparities to biased providers, and the influential Institute of Medicine report, *Unequal Treatment*, includes provider prejudice among the top determinants of disparities. Economists note, however, that black individuals and white individuals receive healthcare from systematically different providers making it difficult to isolate the effect of race on the healthcare separately from other characteristics, such as location, preferences regarding providers, and patient education levels. To identify the effect of race on healthcare, we focus on individuals experiencing a heart-related emergency while traveling in Florida. We show that while there is a strong association between healthcare provision and race in the Florida data, once we condition on whether the individual is an out of state visitor to Florida, the race effect generally disappears. This suggests that observed racial healthcare disparities may not be driven by differential behavior by providers.

1. INTRODUCTION

Since the publication of the Institute of Medicine's (IOM 2003) report *Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care*, the topic of racial healthcare disparities has generated enormous interest from policymakers and health researchers alike. Given the heterogeneity in health outcomes by race, remedying healthcare disparities has the potential to improve public health substantially.

The IOM report included various provisions aimed at remedying healthcare provider biases and prejudices, including recommendations that funding for the enforcement of civil rights laws[1] be increased and that cross-cultural education be included in both medical school and continuing education curricula.[2] The IOM report recognized that disparities are likely also a function of differential access to medical care and patient preferences that may exhibit racial heterogeneity, offering recommendations relating to these causes as well.

Apportioning racial health disparities among the potential causes is both important and difficult. From a policy perspective, resources spent on addressing cultural competence in medical education will not be available to expand healthcare provision in underserved markets. If healthcare disparities are not driven by provider behavior, spending on cultural competence may be entirely wasteful with respect to eliminating healthcare disparities. Further, if this training comes at the expense of eliminating other parts of the medical school curriculum, it could worsen public health for everyone. However, because race is correlated with many characteristics of healthcare markets and patient preferences, reliably isolating the effect of race on provider behavior as distinct from selection effects arising from race-based residential patterns or patient-side preferences is not easy.

Although it is not possible to randomize race (outside of potentially problematic audit studies), following Doyle (2011), we examine what happens when an out of state traveler suffers an emergency

[1] See IOM (2003) recommendation 5-5.
[2] See IOM (2003) recommendation 6-1.

medical episode to sever the likely endogenous link between an individual's unobservable characteristics and his choice of where to seek medical care.

Using Florida hospitalization and emergency room data, we show that, on average, black patients presenting with heart conditions receive less medical care than do whites, controlling for observable characteristics, such as insurance coverage. That is, the Florida data exhibit the standard racial healthcare disparities result. However, once we condition on out of state status, these disparities effectively disappear. In addition, we find that the demographic characteristics of the local communities of black travelers are quite similar to those of black Florida residents. We focus attention on heart related emergencies and hospitalizations because of the importance of heart related medical treatments in the racial health disparities literature.

These results suggest that selection effects are important in estimating the causal effect of race on the provision of medical treatments. As with any study, there remains some concern that our identification strategy is insufficient to control for unobserved characteristics and that out of state travelers are not sufficiently representative of the black population generally, perhaps especially the low income black patients who might reasonably be seen as being most important from a public health perspective on racial health disparities. Although our identification strategy limits what we can say about the non-traveling black population, we also present some location specific traveler results that suggest our findings are not driven by tourism concentrated in relatively expensive markets.

These results contribute both methodologically and substantively to the healthcare disparities discussion. Methodologically, our research provides the strong indication that empirical researchers working on racial healthcare disparities need to re-orient themselves in the direction of better research designs focusing on plausibly exogenous variation. From a policy perspective, our results cut in favor of focusing resources on improving access to high quality medical providers as opposed to attempting to fix something that the providers themselves are doing. For example, providing financial incentives for high quality doctors to practice in lower income markets or to serve lower income patients within the market may provide a higher rate of return than spending on cultural competence training or increased funding

for the enforcement of civil rights laws against medical providers at least as far as healthcare disparities are concerned.

In section 2 below, we discuss the existing literature on the relative role of provider prejudice versus patient-side selection effects. Section 3 provides a discussion of our identification strategy and the data we use to implement it. Section 4 provides results for all inpatient and emergency room treatments received during the patients' heart-related hospital visits, and section 5 examines differential effects by tourist destination as well as other approaches meant to examine the extent to which our results are likely to be externally valid.

2. DOCTOR BIAS VERSUS PATIENT CHOICE

By the late 1990s, the issue of racial health disparities rose to prominence in the political discourse. In 1998, President Clinton asserted that nowhere are the divisions of "race and ethnicity more sharply-drawn than in the health of our people." He went on to suggest that discrimination in the delivery of healthcare services may be the primary cause of these racial disparities.[3] The Reverend Al Sharpton called racial health disparities "the new civil rights battle of the 21st Century."[4] The following year, the U.S. Commission on Civil Rights concluded in its annual report to Congress and the White House "racism continues to infect our health care system."

Congress then requested an IOM study to assess racial and ethnic healthcare disparities. In its 2003 report, the IOM panel found that "Evidence of racial and ethnic disparities in healthcare is, with few exceptions, remarkably consistent across a range of illnesses and healthcare services." The report noted that while the estimates of these disparities tend to decrease or disappear when controls for socio-economic factors are included, the "majority of studies, however, find that racial and ethnic disparities remain even after adjustment for socioeconomic differences and other healthcare access-related factors."

[3] February 21, 1998 radio address.
[4] Fessenden (1998).

The report notes that the evidence for racial healthcare disparities is particularly convincing with respect to cardiovascular care.[5]

The IOM report increased both the political and academic attention paid to the issue of provider bias in healthcare services. Introducing the Health Care Equality and Accountability Act in 2003, Senator Tom Daschle highlighted that the bill included provisions to ensure compliance of federal agencies providing healthcare services with Title VI of the Civil Rights Act, which prohibits racial and ethnic discrimination in government agencies.[6] Invoking the IOM report is a 2005 *Health Affairs* article, Senator Ted Kennedy called for greater resources to be allocated to the HHS Office for Civil Rights in order to fight disparities (Kennedy 2003).

In addition to assessing the extant literature, the IOM report called for better data collection and analysis that could "Better understand the relative contribution of patient, provider, and institutional characteristics to healthcare disparities," as well as "Assess the relative contributions of provider biases, stereotyping, and uncertainty in producing racial and ethnic disparities in diagnosis, treatment, and outcomes of care."[7]

Early responses by health economists suggested that an important part of healthcare disparities arises from variation in quality from place to place. That is, because white patients tend to receive care in systematically different locales than do members of racial or ethnic minority groups, it is difficult to isolate the direct effect of race on the treatment provided to minority patients as distinct from local health market effects (Chandra and Skinner 2003; Baicker, Chandra, and Skinner 2005).

Barnato et al (2005) showed that disparities in treatments for Acute Myocardial Infarction (AMI) between white and black Medicare patients largely narrowed or disappeared altogether once the analysis was limited to within hospital comparisons. Based on this, the researchers suggested that much of the observed disparity in AMI treatment can be attributed to black patients receiving care in systematically

[5] IOM (2003), p. 5.
[6] Congressional Record (p. S14177) Statements on Introduced Bills and Joint Resolutions (Senate November 6, 2003).
[7] See IOM (2003) Recommendation 8-1.

worse hospitals. Work by Bach et al (2004) provides complementary insights showing that the attributes of physicians seen by black and white Medicare patients differ systematically in important ways. For example, doctors seen by black patients were significantly less likely to be board certified, and in self-reported survey responses, doctors who saw black patients were more likely to report that they had greater difficulty in referring their patients to high quality specialists, obtaining access to high quality diagnostic imagining resources, and in securing nonemergency admission to hospitals for their patients.

Recognizing the potential importance of these selection effects, He, Mellor, and Jankowitz (2013) examine the treatment of Medicare patients for AMI in Florida data, controlling for both hospital and physician fixed effects. With respect to the treatment of black patients, neither adjustment substantially reduced the estimate of racial healthcare disparities. In the three treatments they examined (cardiac catheterization, angioplasty, and coronary artery bypass grafting), the inclusion of these fixed effects still generated statistically significant negative coefficients for the effect of being a black patient, and the effect was at least 60 percent as large as that observed when fixed effects were not included. Jha et al (2007) demonstrate that the use of more general econometric models does not diminish the estimated effect of racial health disparities in AMI treatments.

Faced with the evidence that superior controls for patient selection effects do not eliminate estimated racial health disparities, many researchers returned to the possibility that provider bias is at least partly to blame for the healthcare treatment gap. In their literature review, Shavers et al (2012) find that there has been substantial interest in the role of both explicit and implicit biases on the part of providers in generating healthcare disparities, although they note there are significant shortcomings in this literature. Perhaps most important, there are relatively few studies that actually link measures of bias with treatment decisions.[8] This dearth of high quality evidence has not stopped many commentators from suggesting

[8] One exception is Sabin et al (2008) which does not find a statistically significant association between measures of bias and treatment decisions, though even this study examines hypothetical treatments rather than actual treatments.

that such biases need to be countered with education, including cultural competency training and perhaps affirmative action in medical school admissions.[9]

Chandra and Staiger (2010) take a different approach to the possibility of provider bias. They use an approach pioneered in labor economics and empirical crime research focusing on outcomes. Specifically, they posit, if physician prejudice drives observed treatment disparities, it should be the case that when minorities are indeed treated, they should experience relatively high benefits from the treatment. That is, if the latent treatment decision is affected by bias, physicians will only treat those minority patients for whom the expected benefits are systematically higher than the threshold used to decide to provide the treatment for white patients. If, instead, physicians are engaging in unbiased statistical discrimination whereby they believe unobservable characteristics related to race generate different treatment benefits, observed benefits of the treatments should be equalized across patients of different races. Finding that black patients do not experience systematically higher benefits from various heart attack treatments, Chandra and Staiger conclude that provider bias is not driving observed racial healthcare disparities.

A decade after the publication of the IOM report, while there has been substantial research on the source of racial healthcare disparities, there is little consensus on the relative contribution of the various potential causal mechanisms. Interestingly in this literature, beyond the inclusion of fixed effects models, there has been little attempt to exploit the kinds of research designs that have allowed for so much progress in other areas of empirical microeconomics and policy analysis, including applications in other areas of health research.

3. AN UNPLANNED TRIP TO THE HOSPITAL

Facing a similar identification problem in determining the value added arising from additional healthcare spending, Doyle (2011) exploits the quasi-randomization that occurs when an individual faces

[9] An additional set of papers indicates that such policies may have value even in the absence of a verified link between bias and treatment decisions because patient impressions of bias may adversely affect their willingness to seek care or to be compliant with physician recommended treatments.

a healthcare emergency while traveling. Much like the health disparities issue, selection effects make it difficult to isolate causality as a general matter. Hospitals and providers may systematically spend more money when the population they serve tends to be in worse health. In that case, cross-sectional comparisons of the correlation between treatment intensity and outcomes will be biased downwards, as the providers treat patients more intensively precisely because the average patient in the market is in worse health. By examining the effect of treatment intensity when an individual faces a medical emergency while traveling, Doyle (2011) severs the relationship between an individual's unobservable characteristics and attributes of the local healthcare market where the patient resides.

Like Doyle (2011), we use data provided by the Florida Agency for Healthcare Administration (AHCA) covering in-patient admissions and emergency room treatments for individuals in Florida covering the period 2001-2010 for the inpatient data and 2006-2010 for the emergency room data. The choice of Florida is driven by the fact that the state attracts a large number of tourists to many different destinations. We restrict attention to individuals experiencing one of the following heart related problems: 1) Acute myocardial infarction (ICD-9 Diagnosis Code 410); 2) cardiac dysrhythmias (ICD-9 Diagnosis Code 427); or 3) heart failure (ICD-9 Diagnosis Code 428).

The choice to focus on heart issues is driven by two important issues: 1) as discussed above, the original IOM report suggested that the IOM panel found the evidence for healthcare disparities related to treatments for heart conditions to be particularly strong; this has led to many researchers focusing on heart related treatments; and 2) since our identification strategy hinges on travelers needing to seek treatment suddenly without much input regarding where that treatment will be sought, heart emergencies are particularly useful. Specifically, virtually all of these heart episodes will lead to a visit to the hospital, and emergency response personnel are trained to react quickly to signs of these heart problems, minimizing patient input to any decision about how to respond to heart symptoms (Chandra and Staiger 2010).

We focus our analyses on treatment provided to white and black males.[10] For our purposes, the choice to focus on males is driven by the fact that female heart problems manifest significantly later in life, perhaps causing problems for our research design since travel declines as individuals age. Our restriction to white and black patients only is for simplicity and to follow most of the literature in this area. That said, the IOM report suggested that more research is needed regarding health disparities with respect to other racial and ethnic groups.

4. DISPARITIES IN EXPENDITURES

We first examine spending as our metric of treatment intensity. The spending data in the AHCA data is not the actual amount paid for services provided. Instead, it represents the chargemaster total for all services rendered. By focusing on this amount, we do not need to worry about differential charges by insurance type or differences that arise because some patients or their insurers are more adept at bargaining with the hospital. Also, since the chargemaster amounts are not individualized, we do not need to worry about the possibility that a hospital engages in price discrimination with respect to certain groups of patients. Especially when we include hospital fixed effects, the chargemaster total is a useful proxy for the number of procedures and tests performed on a patient.

We examine the natural log of average expenditures per day for a given patient, controlling for whether the patient is black. In some specifications, we include hospital fixed effects to account for differential quality or treatment levels across hospitals, and we also include patient specific characteristic controls in some specifications. This set of patient specific controls includes the patient's age (controlled for through a set of categorical dummy variables), as well as separate indicators for whether the patient is covered under Medicare, Medicare Managed Care, Medicaid, Medicaid Managed Care, Workers Compensation, VA, Other Federal Funding Source, Other State Funding Source, and separate controls for which heart condition the patient is suffering from, namely acute myocardial infarction, cardiac dysrhythmia, and/or heart failure. We also control for patient income using the average income level

[10] We have also estimated results using all white and black patients; the results are qualitatively similar.

found within the patient's residential zip code. Descriptive statistics for the AHCA inpatient sample data are provided in Table 1A and the descriptive statistics for the ER sample are presented in Table 1B.

4.1 Comparison of Travelers and Locals

One concern is that travelers and locals, of either race, may be systematically different in unobserved ways. The typical "test" for such concerns is to examine demographic data under the assumptions that large differences in the treated and untreated populations (in our case travelers and locals) correspond to similar differences in unobserved characteristics. Unfortunately we have very little demographic data in the AHCA data. However, the data do, in addition to information on patient race, contain information on patient age and insurance status. We present this information in Table 2A. The mean and standard deviation by race and travel status are included in column2-5. In column 6 and 7 we show the differences between instate and out of state blacks whites. The key takeaway from Table 2A is that the differences between black travelers and locals are small (half a year in age) while the differences between black and white travelers are much larger suggesting that black travelerss look much more like the local black population relative to white out of staters. A similar story could be told of black travelers relative to local whites. There are a few notable exceptions. Florida residents (either black or white) are more likely to be in Medicare or Medicaid managed care reflecting the earlier introduction of managed care in Florida relative to other states.

In Table 2B we examine the demographic characteristics of locals and travelers' home zip code provided by the AHCA data. We match this to data from the American Community Survey (ACS), a nationally representative, cross-sectional survey of approximately 3 million households annually, administered by the U.S. Census Bureau. The ACS contains information on age, race and household location in so-called PUMAs (Public Use Microdata Areas). We construct a synthetic panel by age, race and PUMA and match this to each zip code in the AHCA.[11]

[11] The ACA is available at the zipcode level but cannot be matched as tightly to age as our synthetic panel. Specifically we divide the sample into three age groups: over 64, 21-64 and under 21. The results are identical if we use finer gradations of age but the number of matched individuals in the AHCA data decreases as all age-race-

The results of our matching of community demographics to the AHCA sample are shown in Table 2B with the mean and standard deviation shown in columns 2-5 and the differences between instate and of state blacks in column 6. Column 7 contains the differences for travelers of both races. The story is similar to Table 2A. The demographics of the communities that black visitors to Florida are drawn from look much closer to those of local blacks that either local whites or white travelers. Most telling, household income in our matched sample of black locals and black travelers differ by $24.70, while out of state blacks earn $17,278 less than white travelers. Other demographic characteristics are similar.

Both the matched sample from the ACA and the limited demographic data in the AHCA data suggest that travelers are similar in terms of the underlying demographics to local communities of the same race. This further suggests that rather than a non-random sample of the population, those who experience a health event while traveling are fairly reprehensive of the demographics of their respective racial groups.

4.2 Treatment of Heart Disease

A second concern with our identification strategy is that the intensity of treatment for patients with heart problems will vary depending on whether the person is traveling or not. Note that in principle the difference in difference nature of our estimation should take care of this difference since we are primarily concerned with whether the differences we observe in the treatment intensity of black and white locals is replicated in travelers under the assumption that travelers are dislocated from their community hospital.

The three types of heart related ICD-9 Diagnosis codes included in our sample are designed to capture ischemic heart disease (IHD) in the form of both blockages of blood vessels that supply the heart and heart attacks.[12] The most severe is acute myocardial infarction (AMI) or heart failure, which is

PUMAs cells are then not represented in the synthetic panel forcing us to drop individual in the AHCA sample in empty race-age-PUMAs cells.

[12] We also include cardiac dysrhythmias which is not always associated with IHD, since differentiating these conditions may not occur until after some testing or hospitalization.

broadly defined as damage to the heart muscle due to insufficient blood flow. IHD symptoms include chest pain and shortness of breath. The symptoms are typically noticed by the patient and are fairly well known so that when the symptoms present themselves, even while traveling, they are likely to result in a trip to the hospital.

The typical treatment of IHD is hospitalization until the patient is stable. Once the patient is stable, he may be transferred, something far more likely for travelers, so we confine our analysis to a patient's treatment until his first discharge from the hospital. Because mild and severe IHD is hard to differentiate, there is also a great deal of variation in treatment intensity across hospitals during our sample periods (see Cutler et al. 2000).

The typical diagnostic tool for IHD is cardiac catheterization. Catheterization is an intensive diagnostic procedure that involves inserting a catheter into the blood vessels supplying the heart and injecting a dye to determine the severity of the blockage. Chandra and Steiger (2008) argue that catheterization is a marker for surgically intensive management of patients since the other two treatments commonly identified as intensive treatments would generally be preceded by a catheterization.

The two primary treatment options are bypass surgery, which is an open heart procedure to restore blood flow to the heart by grafting around the blockage, and angioplasty, which is an alternative procedure that inflates a balloon to restore blood flow. There are numerous less intensive treatments, such as anti-clotting drugs (thrombolytics) and monitoring that are used either in conjunction with more intensive procedures such as bypass or angioplasty or, in the case of more minor IHD, non-invasive procedures may be used. The choice of treatment involves several clinical factors such as age, severity of the heart condition, and comorbidities. The intensive treatments vary significantly in terms of cost with bypass surgery being one of the most profitable and costly procedures (Dranove et al. 2013).

4.3 Results

Our empirical model examines the log of average daily expenditures (or total expenditures for the visit in the case of the ER since all ER visits in our sample are essentially less than one day) for patient visit i in year t for hospital k

$$\ln(E_i) = \beta_1 black_i + \beta_2 out_i + \beta_3 black_i * out_i + \beta_4 X_i + \alpha_t + \delta_k + \epsilon_{ikt}$$

where $black_i$ is and indicator variable equal to one for black patients, out_i is an indicator equal to one for out of state patients, X_i are the individual characteristics discussed above, α_t are year fixed effects, δ_k are hospital fixed effects and ϵ_{ikt} is the robust standard error clustered at the hospital level.

Table 3 below shows the effect of being black on inpatient expenditures. Regardless of whether we control for hospital fixed effects and/or patient characteristics, we find that being black is associated with a reduction in the amount spent of between 10 percent and 14 percent. That is, we find the standard result that relative to white patients, black heart patients receive significantly less care. To put this in context, the daily spending rate on black male heart patients in our sample is at least $1,100 lower per day using our lowest estimate of the disparity.

In Table 4 below, we implement our identification strategy. In addition to the regression controls described above, we include a control for whether an individual is from a different state, and we estimate the interaction between being black and being a resident of another state. In all cases, black travelers receive higher treatment intensity.

While we continue to find that being black, at baseline, is associated with less spending of a similar magnitude as shown above, the black * out of state interaction implies greater spending. Once the black and black * out of state interaction are combined, the effect is not statistically different from zero and the sign of the total effect is, in fact, positive in the regressions including hospital fixed effects. To the extent that black men living outside of Florida admitted to a Florida hospital are effectively randomly assigned to a hospital, our results suggest that they receive more intensive care than local black men admitted to their local hospital. The result is robust to the inclusion of individual characteristics, such as insurance status, age, income, and hospital fixed effects. To clarify the meaning of the final column we find that once we "randomly assign" black heart patients to a hospital (via the quasi-shock generated through travel) we can explain all of the racial disparity even within the same hospital. Put differently, the average conditional difference in spending between a black traveler and a white individual is zero.

4.4 ER Sample

Although most serious heart conditions will lead to a hospital admission in fairly short order, there is the concern that in some cases, there will be a non-random component of where an individual, even a tourist, is eventually admitted. To mitigate this concern, Table 5 provides results from our analysis for the emergency room sample. Here too, while we find that being black is associated with significantly less spending, the black * out of state interaction reverses this effect. Specifically we find that local black heart patients receive about 4-7 percent lower expenditures per ER visit while out of state black heart patients receive about 12 percent higher ER expenditures. The total effect for black out of state visitors is statistically indistinguishable from zero although the point estimate is actually positive.

One concern that arises from our focus on average daily inpatient spending involves the possibility that black out of state patients are more quickly transferred than their white counterparts. If spending is generally front-loaded for a hospital visit, such heterogeneity in transfer experience could mask lower spending for black out of state patients post transfer. In Table 6, we examine this transfer heterogeneity, finding that black out of state patients are significantly more likely to be transferred out of their Florida hospital, controlling for all of the same covariates used above, raising some concerns about the interpretation of our primary results. Though we cannot examine the post-transfer spending, in the next column of Table 6, we restrict our attention to patients who are not transferred out of their initial hospital (i.e., they are either released or they die). Focusing on this subset of patients, we find that while black patients experience 14 percent lower spending on average, black out of state patients experience 15 percent higher spending, leading to a net spending disparity that is not distinguishable from zero. This suggests that any selection effects arising from differential transfer are not driving our main result.

To examine the robustness of our results further, we analyze a number of other restricted samples. In Table 7, we look at results where we exclude all Medicaid patients; we also examine only those individuals with private insurance. To motivate the exclusion of Medicaid patients, we note that Medicaid coverage differs substantially from state to state. Thus, although we have a Medicaid control in all of our regressions, it is not clear that Medicaid patients from different states are actually comparable.

However, we find that excluding Medicaid patients from the sample does not affect our results. We continue to find that any baseline decrease in spending on black patients is undone for out of state black patients.

Regarding the restriction of attention to the privately insured, we note recent findings by Spencer, Gaskin, and Roberts (2013) that suggest patients with private insurance receive substantially better care on average. When this restriction is made, we find that while black patients receive 12-14 percent less spending at baseline, black travelers receive 9 percent more spending, leaving a net disparity that is not statistically significant.

In Table 8, we examine a few other sample restrictions that relate to concerns regarding whether we are actually picking up travelers through our focus on patients with non-Florida zip codes. First, we exclude observations coming from Florida's panhandle. Given the proximity of this region of Florida to areas in, for example, southern Georgia that are not densely populated, it may be the case that some out of state individuals use panhandle hospitals as their local hospital. When this subsample is omitted, we continue to find no net disparity in hospital spending for black travelers. To mitigate concerns arising from "snowbirds" whose addresses indicate an out of state residence when, in fact, Florida is their residence for a significant portion of the year, we also re-run our analysis omitting anyone over the age of 65. In this analysis, we find that while black patients receive 13 percent less spending, black travelers receive 9 percent more spending, leading to a net disparity that is not distinguishable from zero. Despite the lack of statistical significance with respect to this last comparison, the point estimate of the difference of 4 percent could be substantively important evidence of a causal disparity, but even in this case, it is one third as large as the estimate that does not account for selection effects.

4.5 Impact of Race on the Choice of Procedure

In this section we examine the specific intensive procedure performed on the patient. The three intensive procedures are catheterization, angioplasty and bypass surgery. In Table 9A we provide the breakdown of intensive procedure rates by race. In each case the treatment intensity for travelers is higher, consistent with our earlier findings and lower for locals with local blacks having the least

intensive treatments. Also consistent with our earlier results we find that black and white travelers have very similar rates of intensive treatments. In Table 9B we confirm this difference in means findings from the upper panel using a linear probability model including our control variables discussed above. We again find that local blacks receive less intensive treatments while out of state patients receive more intensive treatments but that there little difference between out of state blacks and whites. The exception appears to be bypass surgery where out of state places are slightly more likely (.08%) to receive bypass surgery than out of state whites.

5. DO THE RESULTS APPLY GENERALLY?

While we believe our design and results demonstrate the importance of controlling for unobservable characteristics when estimating racial health disparities, the value of the results substantively may be limited. That is, the lack of racial health disparities among black patients may be limited to the subset of individuals who travel. This subset may be selecting for individuals who are themselves different in important ways, namely they may be higher income or they may have other attributes that counter whatever it is that generates health disparities for the average black patient. At a minimum, this suggests that effect heterogeneity would be important in examining racial healthcare disparities.

To assess whether our treatment effect is driven by some unobservables leading to a selection effect in traveler status, we examine location specific treatment effects in Table 10. We take the top 10 tourist destinations and examine all hospitals within five miles of the particular tourist location or, absent any hospitals in close proximity, we use all hospitals in the zip code of the attraction.

Presumably, if unobservables such as wealth or education are driving our results, we should see important differences based on location. For example, travel to Key West and the Florida Keys is very expensive, while Amelia Island is easily reached by car from poor communities in southern Georgia. If something like wealth differentials is driving our results, we might expect to see that disparities disappear in the Keys but endure in Amelia Island. We see no clear pattern of this. While we do see a large reversal of the baseline black effect in expensive places such as Key West (and the Keys more generally),

we see even larger reversals in Amelia Island. Along related lines, we see no reversal near the Kennedy Space Center which might be thought to attract travelers with higher education levels than some of the other destinations. While the Table 10 results do not (and could not) ensure that our causal estimates are typical of travelers and non-travelers alike, they also do not suggest any obvious concern that we are estimating a rich traveler effect.

Following a similar intuition, we also divide the hospitals in our sample based upon the income level of the zip code in which they are situated. We then re-run our analysis separately by income quartile in Table 11. In all income quartiles, we continue to find that black patients receive less spending at baseline. For the first and fourth quartiles, the black out of state effect reverses the deficit completely, leaving net racial healthcare disparities that are indistinguishable from zero. In the second and third quartiles, the gap is not closed to the same degree. In the second quartile hospitals, the net disparity is 3.5 percent, and it is 6.9 percent in the third quartile hospitals. Although these disparities are not statistically significant, the effects are large enough to be potentially important. Even in these quartiles, however, we can see that a failure to account for selection effects substantially overstates causal race healthcare disparities.

The fact that we see no disparity in the first and fourth quartiles leads us to believe that unmeasured socio-economic differences are not driving our results in general. This combined with the tourist destination specific results provides some confidence that our results are not limited to a small subset of the black patient distribution.

6. CONCLUSION

Racial healthcare disparities are a significant concern in public health. If the disparities are driven by selection effects due to institutional and social inequities, the right policy response is very different than if they are driven by provider bias. Disentangling these different potential sources of disparities is both important and difficult. Research designs in this literature have not focused on plausibly exogenous variation to identify the effects of race on healthcare treatments. By exploiting the quasi-randomization afforded by medical emergencies while traveling, we show that standard estimates of

racial health disparities may suffer from significant selection bias. If our results are generally applicable, this suggests that resources should be focused on improving access to better quality providers for black patients, as opposed to spending resources on combatting provider bias. More important, our research suggests that the cross sectional comparisons relied upon in the healthcare disparities literature are misleading.

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Table 1A:
Descriptive Statistics Inpatient Sample

	Mean	St. Dev.
Inpatient Expenditures	11,095	14,231
Black	0.12	0.33
Out of State	0.05	0.21
Age	70	14
Medicare	0.59	0.49
Medicare Managed Care	0.13	0.34
Medicaid	0.03	0.17
Medicaid Managed Care	0.01	0.10
Workers Compensation	0.002	0.044
VA	0.01	0.09
Other Federal Funding Source	0.01	0.08
Other State Funding Source	0.01	0.09
Heart410	0.19	0.39
Heart427	0.57	0.49
Heart428	0.44	0.50
Observations	1,610,303	

Table 1B:
Descriptive Statistics Emergency Room Sample

	Mean	St. Dev.
Inpatient Expenditures	3,457	3,678
Black	0.14	0.35
Out of State	0.06	0.24
Age	65	18
Medicare	0.52	0.50
Medicare Managed Care	0.09	0.29
Medicaid	0.03	0.18
Medicaid Managed Care	0.02	0.13
Workers Compensation	0.004	0.065
VA	0.01	0.09
Other Federal Funding Source	0.01	0.09
Other State Funding Source	0.01	0.09
Heart410	0.04	0.19
Heart427	0.73	0.44
Heart428	0.31	0.46
Observations	344,402	

Table 2A: Summary Statistics for AHCA Data

	White/Out State	White/In State	Black/Out State	Black/In State	Difference between In & Out State Blacks	Difference between Out State Whites & Out State Blacks
Age	72.44	73.46	62.15	62.64	0.49	10.29
	(12.77)	(13.61)	(15.72)	(16.31)		
Medicare	0.673	0.642	0.518	0.433	-0.085	0.155
	(0.469)	(0.479)	(0.500)	(0.496)		
Medicare Managed Care	0.0921	0.139	0.0759	0.162	0.0861	0.0162
	(0.289)	(0.346)	(0.265)	(0.368)		
Medicaid	0.00862	0.0215	0.0609	0.0966	0.0357	-0.05228
	(0.0924)	(0.145)	(0.239)	(0.295)		
Medicaid Managed Care	0.00148	0.00762	0.00876	0.0482	0.03944	-0.00728
	(0.0384)	(0.0870)	(0.0932)	(0.214)		
Workers' Compensation	0.000836	0.00133	0.00175	0.00106	-0.00069	-0.000914
	(0.0289)	(0.0365)	(0.0418)	(0.0325)		
Other Federal Program	0.00536	0.00578	0.00934	0.00423	-0.00511	-0.00398
	(0.0730)	(0.0758)	(0.0962)	(0.0649)		
Veterans Administration	0.00421	0.00501	0.00861	0.00504	-0.00357	-0.0044
	(0.0648)	(0.0706)	(0.0924)	(0.0708)		
Other State Program	0.00189	0.00614	0.00613	0.0149	0.00877	-0.00424
	(0.0434)	(0.0781)	(0.0781)	(0.121)		
Observations	119647	2584773	6851	410714	417565	

Note: The sample consists of white and African American men. The table shows the mean and standard deviation of age and insurance status of locals and visitors in the AHCA. The difference in the out of state and in state mean by for blacks and by out of state status by race.

Table 2B: Summary Statistics for ACS Residents by ZIP Code

	White/Out State	White/In State	Black/Out State	Black/In State	Difference between In & Out State Blacks	Difference between Out State Whites & Out State Blacks
Average Household Income	64835.9	63478.2	47557.6	47582.3	24.7	-17278.3
	(26163.1)	(17785.3)	(19846.6)	(12803.2)		
Average Home Value	263176.9	258463.5	171331.3	191647.5	20316.2	-91845.6
	(180563.1)	(100308.8)	(139997.7)	(66025.3)		
Average Number of Children	0.248	0.207	0.541	0.563	0.022	0.293
	(0.187)	(0.174)	(0.313)	(0.318)		
Average Number of Children under 5	0.0257	0.0218	0.0689	0.0720	0.0031	0.0432
	(0.0495)	(0.0424)	(0.0758)	(0.0792)		
Average Proportion Married	0.554	0.585	0.407	0.439	0.032	-0.147
	(0.151)	(0.150)	(0.157)	(0.162)		
Average Proportion without a High School Diploma	0.219	0.176	0.307	0.296	-0.011	0.088
	(0.0976)	(0.0936)	(0.203)	(0.167)		
Average Proportion with Only High School Diploma	0.417	0.414	0.391	0.393	0.002	-0.026
	(0.120)	(0.103)	(0.118)	(0.0947)		
Average Proportion with Some College	0.150	0.182	0.174	0.174	0	0.024
	(0.0389)	(0.0279)	(0.0963)	(0.0813)		
Average Proportion College Graduates	0.120	0.135	0.0754	0.0818	0.0064	-0.0446
	(0.0638)	(0.0504)	(0.0626)	(0.0496)		
Average Proportion with Graduate Degree	0.0939	0.0935	0.0520	0.0554	0.0034	-0.0419
	(0.0724)	(0.0540)	(0.0558)	(0.0411)		
Average Proportion Unemployed	0.0134	0.0170	0.0454	0.0528	0.0074	0.032
	(0.0132)	(0.0148)	(0.0407)	(0.0428)		

Average Proportion in Labor Force	0.706	0.722	0.570	0.540	-0.03	-0.136
	(0.265)	(0.265)	(0.286)	(0.295)		
Average Total Income	31666.1	33185.5	22287.1	22190.7	-96.4	-9379
	(16434.5)	(14575.4)	(9929.2)	(7738.1)		
Average Proportion without Insurance	0.0172	0.0249	0.0725	0.0916	0.0191	0.0553
	(0.0327)	(0.0427)	(0.0805)	(0.0915)		
Average Proportion with Private Insurance	0.380	0.348	0.277	0.255	-0.022	-0.103
	(0.0490)	(0.0546)	(0.0904)	(0.0749)		
Average Proportion on Medicaid	0.0682	0.0582	0.129	0.110	-0.019	0.0608
	(0.0286)	(0.0289)	(0.0761)	(0.0592)		
Average Proportion on Medicare	0.404	0.400	0.259	0.268	0.009	-0.145
	(0.204)	(0.200)	(0.242)	(0.247)		
Observations	170991	3852648	9303	578432	587735	587735

Note: The sample consists of the mean demographic data for the ZIP code of locals and visitors in the hospital data matched to the American Community Survey. The table presents the means and standard deviations in parentheses and the difference in the out of state and in state mean by for blacks and by out of state status by race.

Table 3:
Baseline Racial Healthcare Disparities
(Standard Errors Clustered by Hospital in Parentheses)

	ln(Inpatient Expenditures)			
Black	-0.13***	-0.11***	-0.15***	-0.13***
	(0.02)	(0.02)	(0.02)	(0.01)
Hospital Fixed Effects	No	No	Yes	Yes
Patient Characteristic Controls	No	Yes	No	Yes

Note: Sample includes white and black male patients only. Regressions with patient characteristic controls include indicators for Age, Medicare, Medicare Managed Care, Medicaid, Medicaid Managed Care, Workers Compensation, VA, Other Federal Funding Source, Other State Funding Source, Heart410, Heart427, and Heart428 as well as a control for income in the individual's zip code of residence. Observations = 1,584,850 in regressions without patient characteristics controls and 1,552,653 in those specifications with those controls.

***p < 0.01

**p < 0.05

*p < 0.10

Table 4
Racial Healthcare Disparities For Out of State Travelers
(Standard Errors Clustered by Hospital in Parentheses)

	ln(Inpatient Expenditures)			
Black	-0.12***	-0.11***	-0.16***	-0.13***
	(0.02)	(0.02)	(0.02)	(0.01)
Out of State	0.09***	0.01	0.10***	0.03
	(0.03)	(0.02)	(0.03)	(0.02)
Black * Out of State	0.12***	0.09***	0.16***	0.13***
	(0.03)	(0.03)	(0.03)	(0.02)
Test of linear combination:	-0.004	-0.015	0.003	0.001
Black + (Black * Out of State)	(0.030)	(0.027)	(0.026)	(0.020)
Hospital Fixed Effects	No	No	Yes	Yes
Patient Characteristic Controls	No	Yes	No	Yes

Note: Sample includes white and black male patients only. Regressions with patient characteristic controls include indicators for Age, Medicare, Medicare Managed Care, Medicaid, Medicaid Managed Care, Workers Compensation, VA, Other Federal Funding Source, Other State Funding Source, Heart410, Heart427, and Heart428 as well as a control for income in the individual's zip code of residence. Observations = 1,579,856 in regressions without patient characteristics controls and 1,552,653 in those specifications with those controls.

***p < 0.01

**p < 0.05

*p < 0.10

Table 5:
Racial Healthcare Disparities For Out of State Travelers – Emergency Room
(Standard Errors Clustered by Hospital in Parentheses)

	ln(Total ER Expenditures)	
Black	-0.07***	-0.04***
	(0.01)	(0.01)
Out of State	-0.12***	-0.07***
	(0.02)	(0.02)
Black * Out of State	0.13***	0.08***
	(0.05)	(0.09)
Test of linear combination:	0.062	0.041
Black + (Black * Out of State)	(0.044)	(0.087)
Hospital Fixed Effects	Yes	Yes
Patient Characteristic Controls	No	Yes

Note: Sample includes white and black male patients only. Regressions with patient characteristic controls include indicators for Age, Medicare, Medicare Managed Care, Medicaid, Medicaid Managed Care, Workers Compensation, VA, Other Federal Funding Source, Other State Funding Source, Heart410, Heart427, and Heart428 as well as a control for income in the individual's zip code of residence. Observations = 344,188 in regressions without patient characteristics controls and 319,857 in those specifications with those controls.

***p < 0.01

**p < 0.05

*p < 0.10

Table 6
Patient Transfers
(Standard Errors Clustered by Hospital in Parentheses)

	Likelihood of Transfer	ln(Total Inpatient Expenditures) non-transfers only
Black	0.002	-0.14***
	(0.003)	(0.01)
Out of State	-0.080***	0.02
	(0.004)	(0.03)
Black * Out of State	0.054***	0.15***
	(0.009)	(0.03)
Test of linear combination:	0.057***	0.009
Black + (Black * Out of State)	(0.009)	(0.025)
Hospital Fixed Effects	Yes	Yes
Patient Characteristic Controls	Yes	Yes

Note: Sample includes white and black male patients only. Regressions include indicators for Age, Medicare, Medicare Managed Care, Medicaid, Medicaid Managed Care, Workers Compensation, VA, Other Federal Funding Source, Other State Funding Source, Heart410, Heart427, and Heart428 as well as a control for income in the individual's zip code of residence. Observations = 1,582,594 in the likelihood of transfer regression and 942,404 in the non-transfers only sample.
***p < 0.01
**p < 0.05
*p < 0.10

Table 7:
Non-Medicaid and Privately Insured Patients
(Standard Errors Clustered by Hospital in Parentheses)

	ln(Total Inpatient Expenditures)	
	Medicaid Excluded	Privately Insured Only
Black	-0.14***	-0.12***
	(0.01)	(0.01)
Out of State	0.03	0.03
	(0.02)	(0.02)
Black * Out of State	0.13	0.09**
	(0.02)	(0.04)
Test of linear combination:	-0.006	-0.033
Black + (Black * Out of State)	(0.020)	(0.033)
Hospital Fixed Effects	Yes	Yes
Patient Characteristic Controls	Yes	Yes

Note: Sample includes white and black male patients only. Regressions include indicators for Age, Medicare, Medicare Managed Care, Medicaid, Medicaid Managed Care, Workers Compensation, VA, Other Federal Funding Source, Other State Funding Source, Heart410, Heart427, and Heart428 as well as a control for income in the individual's zip code of residence. Observations = 1,518,445 in the sample that excludes Medicaid patients and 254,612 in the privately insured only sample.

***p < 0.01

**p < 0.05

*p < 0.10

Table 8:
Other Sample Restrictions
(Standard Errors Clustered by Hospital in Parentheses)

	ln(Total Inpatient Expenditures)	
	Panhandle Excluded	65+ Excluded
Black	-0.13***	-0.13***
	(0.01)	(0.01)
Out of State	0.04	0.03
	(0.03)	(0.02)
Black * Out of State	0.13***	0.09**
	(0.02)	(0.04)
Test of linear combination:	-0.006	-0.043
Black + (Black * Out of State)	(0.018)	(0.035)
Hospital Fixed Effects	Yes	Yes
Patient Characteristic Controls	Yes	Yes

Note: Sample includes white and black male patients only. Regressions include indicators for Age, Medicare, Medicare Managed Care, Medicaid, Medicaid Managed Care, Workers Compensation, VA, Other Federal Funding Source, Other State Funding Source, Heart410, Heart427, and Heart428 as well as a control for income in the individual's zip code of residence. Observations = 1,446,653 in the sample that excludes Panhandle patients and 198,700 in the sample that excludes those 65 and older.
***p < 0.01
**p < 0.05
*p < 0.10

Table 9A: Summary Statistics for Procedures in the AHCA

	White /Out State	White /In State	Difference (t-statistics)	Black /Out State	Black /In State	Difference (t-statistics)
Catheterization	0.204	0.149	-0.0552***	0.212	0.119	-0.0926***
	(0.403)	(0.356)	(-52.19)	(0.409)	(0.324)	(-23.56)
Bypass Surgery	0.0365	0.0235	-0.0129***	0.0358	0.0108	-0.0250***
	(0.187)	(0.152)	(-28.56)	(0.186)	(0.103)	(-19.65)
Angioplasty	0.101	0.0627	-0.0385***	0.0991	0.0377	-0.0614***
	(0.302)	(0.242)	(-53.10)	(0.299)	(0.190)	(-26.40)
Observations	119804	2584773	2704577	6982	410714	417696

Note: The sample consists of white and African American men. The table shows the mean and standard deviation of procedures in the AHCA. The difference in the out of state and in state mean by race. *** indicate significance at the 5% level.

Table 9B: Probability of Procedure

	Catheterization	Angioplasty	Bypass Surgery
Black	-0.0402***	-0.0291***	-0.0158***
	(0.00382)	(0.00174)	(0.00141)
Black Out of State	0.0149	0.0103	0.00808*
	(0.0104)	(0.00574)	(0.00350)
Out of State	0.0171***	0.0125**	0.0108***
	(0.00477)	(0.00392)	(0.00282)
Mean Procedure Rate	0.148	0.0614	0.0225

Note: Sample includes white and black male patients only. Regressions with patient characteristic controls include indicators for Age, Medicare, Medicare Managed Care, Medicaid, Medicaid Managed Care, Workers Compensation, VA, Other Federal Funding Source, Other State Funding Source, Heart410, Heart427, and Heart428 as well as hospital fixed effects. Observations = 1,582,594

***p < 0.01
**p < 0.05
*p < 0.10

Table 10:
Racial Health Expenditures By Location
(Standard Errors Clustered by Hospital in Parentheses)

	ln(Total Inpatient Expenditures)
Black	-0.13***
	(0.01)
Effects for Black * Out of State Indicator Interacted with Location Indicator	
Amelia Island	0.22***
	(0.03)
Castillo	0.03
	(0.09)
Everglades	0.03
	(0.02)
Florida Keys	0.21**
	(0.08)
Fort Lauderdale	0.00
	(0.04)
Kennedy Space Center	0.00
	(0.11)
Key West	0.16*
	(0.08)
South Beach	-0.06
	(0.08)
Universal Studios	0.10
	(0.14)
Disney World	-0.00
	(0.13)

Note: Sample includes white and black male patients only. Regressions include indicators for each of the locations, Out of State, Age, Medicare, Medicare Managed Care, Medicaid, Medicaid Managed Care, Workers Compensation, VA, Other Federal Funding Source, Other State Funding Source, Heart410, Heart427, and Heart428 as well as a control for income in the individual's zip code of residence as well as hospital fixed effects. Observations = 1,552,653.
***p < 0.01
**p < 0.05
*p < 0.10

Table 11:
Effect by Hospital Income Quartile
(Standard Errors Clustered by Hospital in Parentheses)

	ln(Total Inpatient Expenditures)			
	First Quartile	Second Quartile	Third Quartile	Fourth Quartile
Black	-0.15***	-0.09***	-0.15***	-0.12***
	(0.01)	(0.02)	(0.02)	(0.01)
Out of State	0.01	-0.00	-0.01	0.06
	(0.02)	(0.01)	(0.02)	(0.05)
Black * Out of State	0.14***	0.05	0.07	0.15***
	(0.03)	(0.04)	(0.05)	(0.03)
Test of linear combination: Black + (Black * Out of State)	-0.012	-0.04	-0.071	0.022
	(0.030)	(0.03)	(0.045)	(0.025)
Hospital Fixed Effects	Yes	Yes	Yes	Yes
Patient Characteristic Controls	Yes	Yes	Yes	Yes

Note: Sample includes white and black male patients only. Regressions include indicators for Age, Medicare, Medicare Managed Care, Medicaid, Medicaid Managed Care, Workers Compensation, VA, Other Federal Funding Source, Other State Funding Source, Heart410, Heart427, and Heart428 as well as a control for income in the individual's zip code of residence as well as hospital fixed effects.
***p < 0.01
**p < 0.05
*p < 0.10