

The Influence of Implicit Bias on Treatment Recommendations for 4 Common Pediatric Conditions: Pain, Urinary Tract Infection, Attention Deficit Hyperactivity Disorder, and Asthma

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Management of asthma, attention deficit hyperactivity disorder (ADHD), urinary tract infection (UTI), and pain are common conditions routinely treated by pediatricians. The childhood prevalence of asthma, the most common chronic pediatric illness, is 10% ($n = 7$ million), with 8% of White children, 8% of Hispanic children, and 17% of non-Hispanic Black children currently diagnosed with asthma.¹ African American children experience the highest rates of asthma hospitalization and asthma mortality relative to other racial and ethnic groups, and this disparity is widening.² ADHD is diagnosed in 4.1% of all children, with the greatest prevalence among White children (5.1%). However, among male children, prevalence of ADHD by race is 3% for Hispanics, 4.3% for Whites, and 5.65% for African Americans.³ A meta-analysis to determine prevalence of UTI in children found that UTIs accounted for 5% to 14% of all pediatric emergency room visits annually and for 7% of infants presenting with fevers.⁴

Racial and ethnic disparities are found in asthma care, medication use for ADHD, children's timely and appropriate receipt of medication, pain management, and quality of primary care.^{2,5-8} For asthma, the rate of emergency department visits is 3 times higher for minority children than for nonminority children and use of daily anti-inflammatory medication is lower.⁹ African American and Hispanic children are more likely to have a potentially avoidable asthma hospitalization.⁹ African American and Hispanic children with asthma in the Military Health System are less likely to see a specialist than White children with asthma,⁹ even though specialist care for asthma is more likely than primary care to follow recommended guidelines.¹⁰ Minority children have lower likelihood of receiving a diagnosis of ADHD and of receiving any

Objectives. We examined the association between pediatricians' attitudes about race and treatment recommendations by patients' race.

Methods. We conducted an online survey of academic pediatricians ($n = 86$). We used 3 Implicit Association Tests to measure implicit attitudes and stereotypes about race. Dependent variables were recommendations for pain management, urinary tract infections, attention deficit hyperactivity disorder, and asthma, measured by case vignettes. We used correlational analysis to assess associations among measures and hierarchical multiple regression to measure the interactive effect of the attitude measures and patients' race on treatment recommendations.

Results. Pediatricians' implicit (unconscious) attitudes and stereotypes were associated with treatment recommendations. The association between unconscious bias and patient's race was statistically significant for prescribing a narcotic medication for pain following surgery. As pediatricians' implicit pro-White bias increased, prescribing narcotic medication decreased for African American patients but not for the White patients. Self-reported attitudes about race were associated with some treatment recommendations.

Conclusions. Pediatricians' implicit attitudes about race affect pain management. There is a need to better understand the influence of physicians' unconscious beliefs about race on pain and other areas of care. (*Am J Public Health*. 2012;102:988-995. doi:10.2105/AJPH.2011.300621)

medication for ADHD.¹¹ For the current research, we adopted the following National Institutes of Health definition of "race" (derived from a more detailed definition by the National Research Council):

a continuously evolving social construct used to categorize individuals into groups that have typically been based on the physical characteristics (e.g. skin color, hair texture or other distinctive characteristics, etc.) of an individual or their ancestors.¹²

We used the following Institute of Medicine definition of "ethnicity": "a concept referring to a shared culture and way of life."^{5(p523)}

Pain management is an area in which racial and ethnic disparities are well documented and persist.^{8,13} In a national study of hospital emergency departments that measured pain medication-prescribing patterns over a 13-year period (1993-2005), White patients were

more likely to receive an opioid analgesic than African American, Hispanic, or Asian patients.⁸

Differential treatment, which was found among adults and children for all types of pain, was greater as severity of pain increased, and the disparities did not decrease over time.⁸

Compared with research on adult pain, there is less research on racial and ethnic disparities in pain management for children, although pain is generally undertreated in children.¹⁴ One study in a pediatric hospital setting showed that Latino children received 30% less opioid analgesics than did White children for early postoperative pain.⁷

It is not uncommon for minority patients or parents to report discrimination in health care.¹⁵⁻²⁰ Parents of minority children report lower scores on interpersonal relationship with primary care providers, lower scores for provider communication, and less participatory

decision-making.² Patient perceptions and experiences of discrimination in health care can cause delay in timely treatment, an interruption in continuity of care, and mistrust and avoidance of the health care system.^{20,21} A study of physician behavior in real-world clinical interactions with adults found that, compared with White patients, physicians spend less time with African American patients, are more verbally dominant, and show a less positive affect.²²

The Institute of Medicine report *Unequal Treatment* (2003) found that “bias, stereotyping, prejudice, and clinical uncertainty on the part of healthcare providers may contribute to racial and ethnic disparities in healthcare.”⁵⁽¹²⁾ Social psychologists and the Institute of Medicine speculate that providers’ explicit and implicit attitudes and beliefs may subtly and unintentionally contribute to disparities.^{5,23,24} Explicit attitudes are ones we know we have and can report to others.²⁵ Implicit refers to attitudes that are outside of awareness, are not available to report, and are thus considered “unconscious.”²⁵ Implicit attitudes and stereotypes can exist even among individuals who endorse egalitarian beliefs.^{26–29} Explicit and implicit attitudes and stereotypes are often only weakly related.^{29–32} In the more affective dimensions of social interactions such as non-verbal behavior, implicit attitudes and stereotypes about race are more closely related to the behavior of prejudice and discrimination than is self-report.^{33,34} The existence of implicit bias in an individual does not always result in discrimination, but because implicit attitudes and beliefs are unrecognized and unintentional, these biases may subtly affect behavior.

We are extending our previous work that reported on the strength of pediatricians’ implicit and explicit attitudes and beliefs about race and their association with the difference between optimal care and “adequate” or good enough care.³⁵ In this study, we examined pediatricians’ implicit and explicit attitudes and beliefs about race and their association with each treatment recommendation for 4 conditions that are routinely seen in pediatric practice: asthma, ADHD, UTI, and pain. We expected that physicians’ self-reported attitudes and beliefs about race would be related to treatment recommendations. We hypothesized that we would find an association between strength of physicians’ implicit pro-White

attitudes and stereotypes about race and treatment recommendations by patients’ race.

METHODS

We collected data for this study in September and October 2005 using a single-session online survey of pediatricians. We recruited pediatricians from one department at a large, urban research university. We invited all faculty, residents, and fellows to participate in the study. Participants practice in primary care, ambulatory, and acute care settings. We implemented the survey on the *Project Implicit* Web servers at Harvard University.

Measures

Case vignettes. To explore the association of physicians’ attitudes and stereotypes about race with treatment options for asthma, UTI, ADHD, and pain, we designed 4 pediatric case vignettes using scenarios that this sample of pediatricians would likely encounter in their own clinical practice. Case vignettes are considered a valid method to measure quality of care.^{36,37} They have been shown to compare favorably to the research “gold standard” of using standardized patients to measure quality of care.³⁶ Patients were male in 2 of the cases (pain and ADHD) and female (UTI and asthma) in 2 cases. Each vignette had 2 versions; 1 version of each case was of an African American patient and 1 version was of a White patient. Each participant randomly received 2 vignettes in which the patient was described as African American and 2 in which the patient was described as White, but never the same vignette with both race variations.

The case vignettes were written by a senior faculty pediatrician and used in this study for the first time (Figure A, available as a supplement to the online version of this article at <http://www.ajph.org>). Each case vignette was purposefully designed to contain some degree of clinical uncertainty. Uncertainty is one factor known to contribute to bias in medical decisionmaking.^{14,38,39} The case vignettes focused on primary care referral versus specialist referral for an 8-year-old female patient with an acute asthma exacerbation following an emergency department visit and 2 prior hospitalizations, inpatient versus outpatient management of a 6-week-old female patient with a UTI, treatment of

a 9-year-old male patient diagnosed with ADHD, and pain management for a 14-year-old male patient after discharge following open reduction and internal fixation of a femur fracture. Treatment options for each case were designed to represent best practice versus “adequate” or good enough care so that subtle differences in quality could be assessed. Participants responded to each treatment option in each case using a 5-item scale:

1. “I strongly disagree. This is clearly the wrong treatment option.”
2. “I disagree. This is the wrong treatment option.”
3. “I neither agree nor disagree with this treatment option.”
4. “I agree. This is a good treatment option.”
5. “I strongly agree. This is clearly a good treatment option.”

Explicit attitudes and stereotypes. We used the following 2 “feelings” items: (1) “My feelings toward African Americans are . . .,” and (2) “My feelings toward European Americans are . . .” (Answer options ranged from 0 = cold to 10 = warm.) We asked participants to respond to 4 additional explicit questions that related in topic to the implicit measures. For these 4 questions, answers ranged from 1 to 7 (1 = African Americans are more likely; 4 = African Americans and European Americans are equally likely; 7 = European Americans are more likely). A previous report of frequency of responses to these questions showed no statistically significant difference between “warm feelings” for European Americans and African Americans.³⁵ However, 76% reported that in their own practice, African Americans were likely to be more “compliant” and 86% associated the concept of “receiving preferred medical care” with African American patients.³⁵

Implicit attitudes and stereotypes. The Implicit Association Test (IAT) is a widely used, indirect measure of implicit social cognition.⁴⁰ It is a timed cognitive test used to measure the relative strength between positive and negative associations toward one social group compared with another, such as African Americans and European Americans and “good” and “bad” (Figure B, available as a supplement to the online version of this article at <http://www.ajph.org>). Test takers are asked to sort and

group facial images of the target concept (African American faces and European American faces) and words that represent “good” or “bad.” The difference in time taken to sort and group these images with value-laden concepts reflects the ease of automatic association. There is often a difference observed between implicit attitudes about race measured by the IAT and self-reported or explicit attitudes and stereotypes about race.^{30,32,41} One study shows that in socially sensitive areas, the IAT is more predictive of the behavior of discrimination than is self-report.³⁴ We used 3 IATs to measure pediatricians’ implicit attitudes: a Race IAT to measure attitudes about race; a Race–Medical Compliance IAT to measure a stereotype of race and medical compliance; and a Race–Quality of Care IAT to measure a stereotype of race and perceptions of “preferred” (the best or ideal) care versus “adequate” (good enough) care.

All 3 IATs used computer-generated facial images (labeled “African American” and “European American”) to represent race. We used words to represent the targeted concepts of good versus bad, compliant patient versus reluctant patient, and preferred versus acceptable medical care. We designed the Race–Medical Compliance IAT³⁵ to assess an automatic association between race and medical compliance using the target categories of race and the concept of compliant patient versus reluctant patient. We designed the Race–Quality of Care IAT³⁵ to assess an automatic association between race and the concept of preferred (ideal) versus acceptable (good enough) medical care. For a detailed description, see online Figure B.

Analysis

For the IATs, we calculated an IAT D score using the standard IAT algorithm.⁴² The mean IAT D score is a continuous variable that is normally distributed. A positive IAT D score indicates some degree of implicit preference for White relative to African American. To assess effect size, we used Cohen’s d, a standardized effect size measure. Cohen’s d is interpreted as follows: d of 0.2 = small effect, d of 0.5 = medium effect, and d of 0.80 = large effect.⁴³ We analyzed the association between physicians’ explicit and implicit attitudes and stereotypes about race and each specific treatment option for all 4 case vignettes using

Pearson correlation. We repeated this analysis for physicians’ gender. We assessed the interactive effect of explicit and implicit measures and patient’s race on each treatment recommendation for each case vignettes. We created a product term for each potential interaction and used hierarchical linear regression analysis to assess whether the 2 variables together predicted treatment recommendations.

RESULTS

The overall response rate was 58% (n = 95), with 53% of the eligible sample completing all measures (n = 86). Seven of the 95 participants dropped out before completing the IATs (n = 88), and 2 more participants dropped out before completing explicit questions, which were presented last. The majority of our sample was female (65%), residents or fellows (59%), and White (82%). We compared those who responded with the complete eligible sample and found that a greater proportion of responders were female (65% vs 51%) and that the proportion of Whites was similar (82% vs 84%).³⁵ Twenty-five percent of respondents reported that, in the last 1 month, their patient population was less than 50% White, 18% reported that it was 50% to 60% White, and 57% reported that it was more than 60% White.

Implicit Measures

We previously reported implicit bias scores for this sample, using mean IAT D scores and Cohen’s d to measure effect sizes.³⁵ This sample of pediatricians, overall, showed weak pro-White implicit bias on the Race IAT (mean IAT D score = 0.18, SD = 0.44, P = .01, Cohen’s d = 0.40), a moderate implicit pro-White race and medical compliance stereotype (mean IAT D score = 0.25, SD = 0.42, P = .001, Cohen’s d = 0.60), and a moderate implicit association of African Americans rather than White Americans with the concept of “preferred” medical care (mean IAT D score = -0.21, SD = 0.33, P = .001, Cohen’s d = -0.64).³⁵

Treatment Recommendations for Case Vignettes

A detailed previous report of responses to differences by patient race between optimal care and adequate care for the case vignettes showed no statistically significant difference,

except for UTI, in which case the White patient was more likely to remain hospitalized.³⁵ We conducted further analyses of physicians’ attitudes and stereotypes and physicians’ response to each individual treatment recommendation on all 4 case vignettes (Table 1). We found that for pain management and treatment of UTI, physicians most often chose the optimal treatment recommendation. For ADHD, most physicians favored 2 of the options: (1) an individual education program and long-acting Ritalin (75% agreed with this option), which is the optimal recommendation, and (2) an individual education program and behavioral intervention (85% agreed), which is not the best option. For asthma, the majority of physicians did not agree with a referral to the pulmonary clinic (44% agreed), although this was indicated. The majority chose to refer the patient back to primary care (77% agreed).

We expected that self-reported attitudes and stereotypes about race would be associated with treatment recommendations for each case. However, we found no significant relationship between any self-reported measures and

TABLE 1—Physicians’ Agreement With Treatment Recommendations for 4 Common Pediatric Conditions: University of Washington Physician Survey 2005, United States, September–October 2005

Treatment	No. (%)
Pain control	
Oxycodone for 5 more d ^a	47 (50)
Ibuprofen	11 (12)
Management of UTI	
Home ^a	60 (65)
Inpatient	31 (33)
ADHD	
IEP + long-acting Ritalin ^a	70 (75)
IEP + behavioral intervention	79 (85)
IEP + short-acting Ritalin	23 (25)
Asthma control	
Refer to pulmonary clinic ^a	41 (44)
Refer back to primary care physician	72 (77)

Note. ADHD = attention deficit hyperactivity disorder; IEP = individual education program; UTI = urinary tract infection. Physicians (n = 95) gave a response to each option.

^aThe recommended ideal treatment.

treatment of pain and UTI for African American patients (results not shown). Pediatricians who reported that White patients rather than African American patients were generally more medically compliant were more likely to agree with prescribing a narcotic medication for pain for the White patient but not the African American patient. For the White patient, the measure of “warm feelings” for European Americans was significantly positively related to the nonpharmacologic treatment of ADHD and for referring the asthma patient back to the

primary care physician rather than to the pulmonary clinic. Neither option is optimal care. “Warm feelings” for African American patients were not associated with treatment recommendations.

We hypothesized that implicit attitudes and stereotypes about race would be associated with treatment recommendations. There were no significant associations between implicit attitudes and stereotypes about race and any of the treatment recommendation options for UTI, ADHD, and asthma (Table 2). For pain,

participants with greater implicit pro-White bias were more likely to agree with prescribing a narcotic medication for postsurgical pain for the White patient but more likely to disagree with prescribing it for the African American patient. Physicians who demonstrated stronger pro-White bias on the Race IAT were more likely to agree with prescribing ibuprofen for the White patient (not the best option), but no significant association was found for the African American patient. For pain management, we found a significant correlation between

TABLE 2—Intercorrelations of Measures of Physicians' Implicit Racial Bias and Treatment Recommendations, by Patient's Race: University of Washington Physician Survey 2005, September-October 2005.

Treatment Recommendations	Race IAT (n = 43)	Race-Medical Compliance IAT (n = 88)	Race-Quality of Care IAT (n = 45)
African American Patients			
Pain			
Give oxycodone ^a	-0.38*	-0.11	0.04
Give ibuprofen	0.22	0.23	-0.30
Urinary tract infection			
Treat as outpatient ^a	-0.15	0.04	-0.07
Treat as inpatient	0.27	0.20	-0.24
Attention deficit hyperactivity disorder			
IEP + long-acting Ritalin ^a	0.49	0.04	-0.21
Behavioral intervention + short-acting Ritalin	0.27	-0.18	0.03
Behavioral intervention + IEP	0.14	0.06	0.32
Asthma			
Refer to pulmonary clinic ^a	-0.10	0.16	0.43
Refer back to primary care physician	0.43	0.01	-0.17
White Patients			
Pain			
Give oxycodone ^a	0.47	0.37*	0.67**
Give ibuprofen	0.61*	0.08	-0.31
Urinary tract infection			
Treat as outpatient ^a	-0.12	-0.14	-0.06
Treat as inpatient	-0.12	0.07	0.49
Attention deficit hyperactivity disorder			
IEP + long-acting Ritalin ^a	-0.38	0.11	-0.14
Behavioral intervention + short-acting Ritalin	0.27	0.08	0.11
Behavioral intervention + IEP	0.01	-0.01	0.03
Asthma			
Refer to pulmonary clinic ^a	-0.04	-0.09	-0.09
Refer back to primary care physician	0.31	-0.11	0.19

Note. IAT = Implicit Association Test; IEP = individual education program. Intercorrelations are Pearson correlation coefficients. The numbers of patients by race and treatment recommendation are as follows. For African American patients, treatment for pain and urinary tract infection, n = 27 for Race IAT, n = 57 for Race-Medical Compliance IAT, n = 30 for Race-Quality of Care IAT; treatment for attention deficit hyperactivity disorder and asthma, n = 15 for Race IAT, n = 30 for Race-Medical Compliance IAT, n = 15 for Race-Quality of Care IAT. For White patients, treatment for pain and urinary tract infection, n = 15 for Race IAT, n = 30 for Race-Medical Compliance IAT, n = 15 for Race-Quality of Care IAT; treatment for attention deficit hyperactivity disorder and asthma, n = 27 for Race IAT, n = 56 for Race-Medical Compliance IAT, n = 29 for Race-Quality of Care IAT.

^aThe recommended ideal treatment.

*P = .05; **P = .01.

physician female gender and the willingness to prescribe a narcotic pain medication for the White patient, but not for the African American patient (results not shown).

We examined the interactive effect or joint association of implicit attitudes about race, implicit stereotypes about race-medical compliance, implicit beliefs about “preferred care,” and patient’s race on treatment recommendations. There were no significant joint associations between patient’s race and implicit measures on treatment for UTI and asthma. We found a statistically significant association between patient’s race and implicit race bias on treatment of ADHD. Stronger implicit pro-White bias was associated with recommending an individual education program and long-acting Ritalin (the best option) for both the White patient and the African American patient (not shown). We found a statistically significant joint association of pediatricians’ implicit biases and patient race on pain management (Figure 1). For management of pain, physicians with low pro-White implicit race bias agreed with the recommendation of 5 more days of oxycodone for the African American patient (the best option), and physicians with high implicit race bias did not agree.

DISCUSSION

We expected that physicians’ self-reported positive attitudes and beliefs about race would be associated with recommending the best treatment option for the African American patient and the White patient. Most pediatricians reported “warm feelings” for both White Americans and African Americans. We found that physicians’ self-reported attitudes about race (warm feelings and medical compliance) were associated with agreeing with recommendations for the White patient that are not the recommended guidelines for treatment.^{10,44} This is an area that warrants further exploration.

On the basis of previous research, we expected that physicians’ implicit pro-White biases might be related to poorer quality of care for an African American patient than for a White patient.⁴⁵ With the exception of pain management, we found no significant correlation between implicit measures and treatment recommendations. Implicit attitudes and

stereotypes may not influence care for many chronic and acute pediatric conditions. More research is needed that uses representative samples of physicians who serve diverse patient populations to determine the influence of providers’ implicit attitudes and stereotypes in a variety of areas of care in which disparities are known to exist. Physicians’ gender was associated with prescribing narcotic pain medication for the White patient but not the African American patient. Future research is needed to determine whether and how provider characteristics such as gender and race interact with implicit attitudes and beliefs about race and patient race to influence medical care across a spectrum of chronic and acute conditions.

We chose pain management for 1 case vignette because this is an area with reported disparities, a high level of clinical subjectivity, and reports of clinicians’ associations of African Americans with perceptions of opioid misuse. In a study of patients’ opioid misuse, providers were more likely to assess African American patients, younger patients, and patients with a history of illicit drug use as likely to have misused prescribed opioids.⁴⁶ However, this perception was not correct; only the patients who had a history of illicit drug use reported opioid misuse.⁴⁶ Pain inherently introduces clinical uncertainty into the clinical interaction because it is based on individual subjective report. Clinical uncertainty, a high workload, physician fatigue, and other circumstances that produce cognitive stress lead to bias and error in medical decision-making.^{14,38,39,47} These are conditions that physicians routinely encounter in everyday practice. Clinicians are more likely to apply social stereotypes to pain management decisions when the circumstances are complex and when they believe this information is clinically relevant.⁴⁸ Our research is the first to show that physicians with more pro-White implicit bias were more ready to prescribe pain medication to White patients than to African American patients. In addition, our study is the first to show a negative joint effect of implicit race biases and patient’s race on treatment of pain.

Our study found a surprising positive interaction effect between patient’s race and physician’s implicit race bias on the guideline recommended treatment of ADHD, but not for the other options of ADHD treatment

presented. As physicians’ implicit pro-White bias increased, the likelihood of recommending the optimal treatment recommendation (an individual education program and long-acting Ritalin) for the African American patient and the White patient increased. We speculate that there is an unknown variable to account for this finding. The influence of providers’ implicit attitudes about race on treatment of ADHD is an area in need of further study.

Implicit attitudes are related to affective dimensions of behavior such as nonverbal friendliness.³³ Development and evaluation of educational programs that target improvements in the more affective dimensions of communication and clinical behavior may contribute to reducing disparities in care. Many African American patients perceive discrimination in health care, and those who perceive it prefer a physician of their own race/ethnicity.⁴⁹ However, African Americans and other minorities continue to be underrepresented in the physician workforce.⁴⁹ One study found that African American physicians show no implicit racial bias for either Whites or African Americans.²⁹ Increasing diversity in the physician workforce may help decrease the effects of implicit bias in health care through increasing the opportunity for patient–provider concordance and increasing the likelihood that all patients interact with unbiased providers.

Limitations

There are several limitations of this study. First, as previously reported, the response rate for completing all measures in our survey was 53%. We do not know whether the response rate had an effect on our results. In addition, female physicians were overrepresented relative to the eligible sample.³⁵ Research shows that female physicians hold less implicit race bias than male physicians,²⁹ and because most of our respondents were female, our results may be an underestimation of the influence of implicit bias on treatment. Second, an important limitation of our study is that we were unable to explore the interaction of physician’s gender, race, and implicit attitudes and stereotypes and of patient’s race on treatment because of the small sample size. Third, our findings are not generalizable because of the small, nonrepresentative sample of pediatricians who participated in the study. Finally, rather than assessing real-world quality

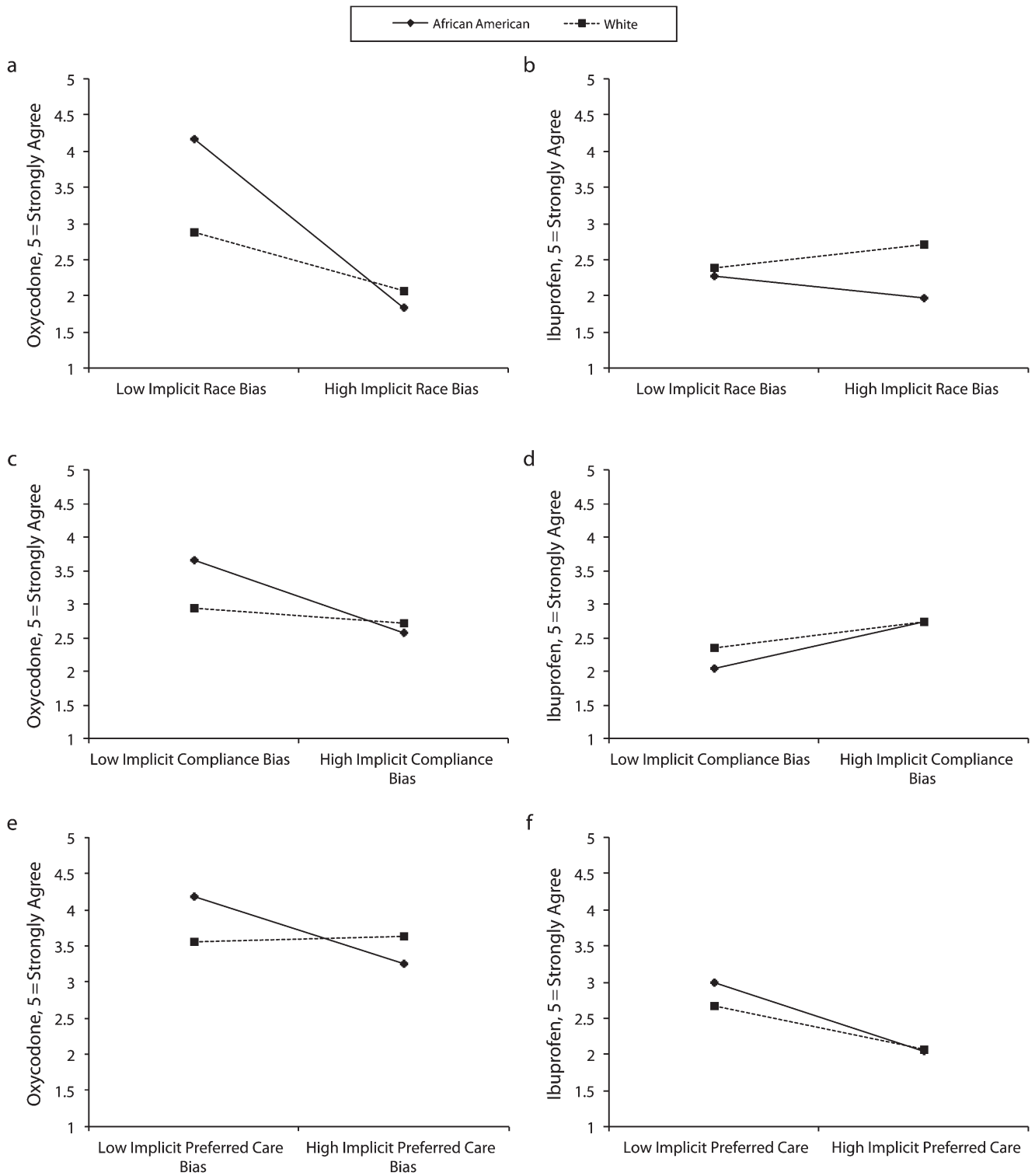


FIGURE 1—Relationship between physicians' implicit bias and decisions regarding pain treatment with (a, c, e) oxycodone or (b, d, f) ibuprofen, by race of the patient: University of Washington Physician Survey 2005, September-October 2005.

of care, our study presented treatment recommendations using case vignettes, which may not represent how this sample of pediatricians would actually deliver care. Despite these limitations, our study provides the first evidence in support of the hypothesis that provider's implicit attitudes about race may have a negative influence in some areas of pediatric care.

Conclusions

Implicit bias is a common social phenomenon,^{27,35} but its influence on clinical practice can be managed. Acknowledging one's own biases and stereotypes about race may help to manage the influence of implicit biases on clinical practice. When clinicians become aware of areas in which they hold implicit bias and situations in which biases are likely to be activated, they can be more purposeful in decision-making. Methods to manage the effects of implicit bias on medical care include placing greater emphasis on adhering to clinical guidelines, using objective decision tools, instituting team-based care in which decision-making is shared, and improving clinicians' patient- and family-centered communication skills. Organizational auditing of disparities in care can identify areas in which implicit bias may be affecting clinical care.

Incorporating the evidence of the science of unconscious bias, self-assessment, and communication skills enhancement into medical education, continuing medical education, education for nurses, public health practitioners, and other health care providers and evaluating the impact of this education on clinical care is one approach to reducing health disparities. ■

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Contributors

J. A. Sabin led the writing of the article. Both authors contributed to the conceptualization of the research, analysis of the data, interpretation of the results, and

writing of the article, and approved the final version of the article.

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Human Participation Protection

All aspects of the research were reviewed and approved by the University of Washington human subjects institutional review board.

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