

PERSPECTIVE



Physicians and Implicit Bias: How Doctors May Unwittingly Perpetuate Health Care Disparities

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Although the medical profession strives for equal treatment of all patients, disparities in health care are prevalent. Cultural stereotypes may not be consciously endorsed, but their mere existence influences how information about an individual is processed and leads to unintended biases in decision-making, so called "implicit bias". All of society is susceptible to these biases, including physicians. Research suggests that implicit bias may contribute to health care disparities by shaping physician behavior and producing differences in medical treatment along the lines of race, ethnicity, gender or other characteristics. We review the origins of implicit bias, cite research documenting the existence of implicit bias among physicians, and describe studies that demonstrate implicit bias in clinical decision-making. We then present the bias-reducing strategies of consciously taking patients' perspectives and intentionally focusing on individual patients' information apart from their social group. We conclude that the contribution of implicit bias to health care disparities could decrease if all physicians acknowledged their susceptibility to it, and deliberately practiced perspective-taking and individuation when providing patient care. We further conclude that increasing the number of African American/Black physicians could reduce the impact of implicit bias on health care disparities because they exhibit significantly less implicit race bias.

KEY WORDS: implicit bias; health care disparities; physicians.

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INTRODUCTION

At graduation, most newly minted physicians take the Hippocratic Oath, vowing to treat all patients as respected individuals. When they enter practice, physicians are charged to apply principles of evidence-based medicine and meet performance measures intended to produce uniformly high-

quality medical care. Despite these efforts, disparities in health care persist. The Institute of Medicine notes that these differences result from multiple factors, but "bias, stereotyping, [and] prejudice ... on the part of the health care providers" play a role.¹ The mere existence of cultural stereotypes about social groups (e.g. women, men, Blacks, Whites) can influence one's behavior toward and judgment of individuals from that stereotyped group.² As opposed to explicit prejudices (e.g., believing women are not as competent surgeons as men or that men are unemotional), implicit bias occurs without conscious awareness and is frequently at odds with one's personal beliefs.³ Because populations in the U.S. that experience the greatest health disparities also suffer from negative cultural stereotypes, implicit bias among physicians may impact clinical decision-making in ways that perpetuate health care disparities.^{4,5}

ORIGINS OF IMPLICIT BIAS

Humans base their perceptions of reality on received information and experiences reinforced until they become automatic. This ability makes human decision-making efficient and likely provided an evolutionary advantage. Stereotypes are well-learned sets of associations between some trait and a social group. A stereotype may be accurate at a group level (e.g., Wisconsinites root for the Green Bay Packers), but inaccurate at an individual level (i.e., some root for the Chicago Bears). Experiments first published by Devine demonstrated two forms of bias in a race context that result from stereotypes.² In this now classic work, Devine found that White participants explicitly endorsing prejudiced beliefs toward Blacks as well as those who holding more egalitarian beliefs were equally able to produce lists of cultural stereotypes about Blacks (e.g., rhythmic, uneducated, hostile). She also found that following exposure to stereotype-activating words, high-prejudiced and low-prejudiced participants equally interpreted ambiguous behavior of a Black character in a vignette as hostile. However, when asked to write their thoughts about Black Americans, low-prejudiced participants produced more thoughts with themes of equality,

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(e.g., “it is unfair to judge people by their color”), while high-prejudiced participants expressed more stereotype-congruent thoughts. Together, these experiments showed that common cultural experiences create awareness of stereotypes, which can be automatically activated in ways that bypass deliberate thought and influence one’s judgment in unintended and unacknowledged ways. Devine described these as automatic (implicit) and controlled (explicit) aspects of prejudice.²

Since Devine’s early work, the existence of implicit bias from the automatic activation of race, gender, ethnic, age and other stereotypes has been demonstrated to influence judgment of and behavior toward individuals from stereotyped groups. Implicit bias is also called “unconscious” or “non-conscious” bias^{6,7} and, as noted by Devine and others, often differs starkly from explicit beliefs.³ Multiple studies with randomized, controlled designs confirm that simply knowing about a stereotype distorts processing of information about individuals. Resulting outcomes include unintentionally rating identically performing Black students as less academically capable than Whites,^{8,9} and evaluating identically credentialed female applicants as less qualified than males.^{10,11}

Implicit bias develops early in life from repeated reinforcement of social stereotypes. Implicit pro-White bias occurs among children as young as 3 years old throughout the world.^{12–15} In a study of children and adults, Baron et al. found that explicit beliefs about race became more egalitarian with age, but implicit race bias remained unchanged.¹⁵ Implicit and explicit beliefs about other characteristics, like age and gender, may follow similar patterns. Despite evolution of a person’s explicit beliefs, enduring implicit bias appears to have significant influence on behavioral interactions with individuals from stereotyped groups. A representative study by Dovidio et al. showed that college students’ implicit race bias had no relationship to self-reported egalitarian attitudes, yet predicted friendliness in interactions with a Black student.¹⁶

PHYSICIANS AND IMPLICIT BIAS

Physicians are not immune to implicit bias. Indeed, uncertainty and time pressure surrounding the diagnostic process may promote reliance on stereotypes for efficient decision-making.^{17–20} Physician training emphasizes group level information, like population risk factors, and may expose trainees to minorities in unfavorable circumstances of illness or addiction, reinforcing stereotypes. Finally, physicians’ vast knowledge of scientific data may create a strong belief in their personal objectivity, promoting bias in decision-making.²¹

The most commonly used measure of implicit bias is the Implicit Association Test (IAT), a computerized timed dual

categorization task that measures implicit preferences by bypassing conscious processing.²² The Black/White: Good/Bad IAT is most frequently used to assess implicit race bias. Its participants press different computer keys to sort photographs of African American and Caucasian American faces as either “Black” or “White” and then sort words like “joy, wonderful, glorious” and “agony, horrible, evil” into “Good” and “Bad” categories, respectively. Next, participants repeat the task, sequentially being asked to press one key when shown a “Black” stimulus or a “Bad” word and a different key when shown a “White” stimulus or a “Good” word, and vice versa. Participants must answer as quickly as possible, increasing reliance on automatic responses. Shorter response times for White-Good and Black-Bad associations compared with White-Bad and Black-Good reflect a pro-White implicit bias. The magnitude of the difference in milliseconds correlates with the degree of one’s implicit bias.²² In the many studies that use this version of the IAT, the vast majority of test-takers show pro-White bias.^{23–25}

The IAT has been used to measure implicit bias in physicians (Table 1). Green et al. assessed explicit and implicit race bias among internal medicine and emergency medicine residents⁷ and found significant pro-White bias despite no explicitly reported preference for Whites over Blacks. Participants also implicitly associated Blacks with uncooperativeness, particularly regarding procedures.⁷ Although Sabin et al. found less implicit race bias among pediatricians compared with other physicians, implicit (but not explicit) bias was still present, linking compliance with being White.²⁶ Sabin et al. also examined implicit race bias in physicians as a whole using data from Harvard’s *Project Implicit*© website, which allows volunteers to take various versions of the IAT online.²⁷ Overall, the 2,535 website participants who reported having an MD degree showed significant pro-White bias.²⁸ Others have confirmed that even in the absence of explicit race bias, implicit preference for Whites among physicians is common.^{29,30} The degree of implicit race bias varies by physician race and gender. In Sabin et al.’s data, the presence of pro-White bias was significant among physicians of all racial groups except African Americans, who were neutral, while women showed less implicit race bias than men.²⁸ Less—but not zero—pro-White bias has also been found among non-White vs. White resident physicians and medical students.^{7,31,32}

Race is not the only area where physicians demonstrate implicit bias. Schwartz et al. recruited physicians and researchers attending a conference on obesity. The participants completed four separate IATs associating images of obese and non-obese people with being good or bad, motivated or lazy, smart or stupid, and valuable or worthless. Regardless of their explicit beliefs,

Table 1. Research Relevant to Implicit Bias and Clinical Decision-Making

	Lead Author, Year	Type of Bias Measured	Stereotyped Group	Results
Studies showing implicit bias in physicians via the Implicit Association Test (IAT)	Schwartz, 2003	Explicit and implicit	Obese individuals	Implicit negative obese bias present and did not correlate with explicit obese bias.
	Sabin, 2008	Explicit and implicit	Black individuals	Despite a lack of explicit race bias, pro-White implicit bias present, but did not correlate with responses to vignette.
	Sabin, 2009	Implicit	Black individuals	Significant pro-White bias present, regardless of race, but Black physicians had a less than non-Black physicians, and female physicians had less than male physicians.
	White-Means, 2009	Explicit and Implicit	Black individuals	Medical students had significant pro-White implicit bias, throughout training. Black and biracial students tended to have less than White, Hispanic and Asian students.
Studies linking IAT-measured bias with clinical decision-making or patient perceptions	Cooper, 2012	Implicit	Black individuals	Implicit pro-White bias and an association of Whites with compliance found. Increased provider implicit bias associated with physician verbal dominance and less positive perceptions of interactions by Black patients.
	Green, 2007	Explicit and implicit	Black individuals	No explicit race bias but significant pro-White implicit bias found. More pro-White bias associated with lower referral rates of Black vignette patient for thrombolysis. Participants aware of study intent more likely to treat patients similarly, regardless of their implicit race bias.
	Penner, 2010	Explicit and implicit	Black individuals	Physicians with low explicit but high implicit race bias were rated more poorly by Black patients and had lower rates of patient satisfaction than those with low explicit and implicit bias. Physicians with both high explicit and high implicit biases were not rated as poorly as those with low explicit and high implicit biases.
	Sabin, 2012	Explicit and implicit	Black individuals	Pro-White bias present; participants implicitly associated Black patients with non-adherence despite absent explicit biases. Implicit pro-White bias associated with providing opioids less for Black children with postoperative pain.
Vignette studies suggesting the presence of implicit bias	Borkhoff, 2008	None	Women	Despite being otherwise identical, male patients referred for TKA significantly more often than females, even when adjusting for covariates.
	Chapman, 2001	None	Women	Physicians are more likely to diagnose male patients with COPD when provided with history and examination alone. Providing PFTs consistent with COPD mitigated this difference.
	Madan, 2001 and 2006	None	Elderly individuals	Breast conservation therapy recommended significantly more frequently for younger vignette patients, even after adjusting for covariates.
	Reuben, 1995	Explicit	Elderly individuals	Varying degrees of explicit bias about elderly patients present. Elderly patients were treated significantly less aggressively than young patients
	Uncapher, 2000	None	Elderly individuals	Depression and suicidality recognized in both elderly and younger patients; treatment offered to elderly less and providers less optimistic regarding treatment benefit.
Real clinical scenarios where bias is suggested	Drwekci, 2011	None	Black individuals	Nurses asked to take the patient's perspective offered equal pain treatment, regardless of patient race, whereas those not asked to do so recommended more pain medication for White patients.
	Todd, 1993	None	Hispanic individuals	Hispanic patients significantly more likely not to receive analgesia in the ER compared to non-Hispanic patients, even when adjusting for confounders
	Todd, 1994	None	Hispanic individuals	Hispanic patients and non-Hispanic patients did not differ significantly in pain ratings, and there was no difference in physician-patient disparity in pain ratings for Hispanic patients vs. non-Hispanic patients
	Todd, 2000	None	Black individuals	Patients had similar pain ratings regardless of race, yet Black patients were significantly less likely to receive pain medication, even after adjusting for covariates

COPD chronic obstructive pulmonary disease; IAT implicit association test; PFT pulmonary function test; TKA total knee arthroplasty

participants implicitly associated obese people with negative cultural stereotypes.³³ Studies examining clinical

decision-making suggest that implicit bias in other areas, including gender and age, may also be present.³⁴⁻³⁹

THE EFFECTS OF IMPLICIT BIAS ON MEDICAL DECISION-MAKING

Demonstrating that physicians have measurable implicit bias does not prove that this bias affects patient–doctor interactions or alters the treatment patients receive. However, research supports a relationship between patient care and physician bias in ways that could perpetuate health care disparities.⁴ In a qualitative study of patient–doctor communication, Cooper et al. found that physicians' implicit pro-White bias on the IAT correlated with Black patients' perceptions of poorer communication and lower quality care.³⁰ Penner et al. found that Black patients were less satisfied with physicians who had low explicit but high implicit race bias, rating them as less warm, friendly, and team-oriented compared to physicians with equal degrees of implicit and explicit bias.³² The small number of family medicine residents in this study showed less implicit bias than physicians in other studies, possibly because most of them were born outside the U.S. and were caring only for non-White patients. Dovidio et al. also found that the perception of an interaction between White physicians and Black patients was affected by a physician's implicit race bias, even in the absence of explicit biases.¹⁶ Such negative perceptions could alter their behavior in ways that reduce adherence, return for follow-up, or trust and thus contribute to disparities in care.

Perceptions of poorer care or communication alone may not directly alter the quality of treatment provided, but research also supports a link between disparate treatment decisions and implicit provider bias. This research exists in two forms: studies comparing treatment recommendations for patients who are identical except for social category information, and studies directly measuring implicit bias and then determining the correlation between measured bias and physicians' decisions. The former studies assume providers are not intentionally acting with any explicit bias, while the latter group quantifies explicit and implicit bias.

Two studies found that Black patients seen in emergency departments receive less analgesia than White patients.^{40,41} Hispanic patients in one study were seven times less likely to receive opioids in the emergency room than non-Hispanic patients with similar injuries, even when adjusting for confounders.⁴² These findings were duplicated in Black patients.⁴³ In a follow-up study, researchers assessed physicians' ability to quantifying pain in Hispanic patients compared to non-Hispanic patients. They found that physicians could accurately judge patients' pain severity regardless of ethnicity yet still provided less analgesia to Hispanic patients with severe injuries.⁴⁴ Even in the absence of direct measurement of implicit bias, these compelling data suggest that physicians make treatment decisions that divide patients with similar clinical presentations along lines of race or ethnicity.

Sabin et al. measured implicit race bias in pediatricians who were then provided with identical vignettes randomly identifying a patient as either Black or White. Providers

who had a high degree of implicit pro-White bias were significantly more likely to disagree with the standard of care—providing opioid analgesics to the patient—than those with a low degree of bias, while explicit race attitudes had no bearing on treatment.²⁹ Green et al. demonstrated that providers' implicit attitudes about race may contribute to the disparity in care of patients with acute coronary syndrome,⁷ where Black patients are less likely than Whites to receive appropriate therapies.^{45–49} Internal medicine and emergency medicine residents took the Black/White:Good/Bad IAT and also answered questions about a vignette of a patient with chest pain randomly designated as Black or White. Residents with greater implicit bias were significantly less likely to recommend thrombolysis for Black patients than those with less bias. Again, implicit bias measured in this study was associated with different treatment of theoretical patients that corresponds with a real-life health care disparity.

Implicit gender bias among physicians may also unknowingly sway treatment decisions. Women are three times less likely than men to receive knee arthroplasty when clinically appropriate. Although physicians denied that patient gender influenced decisions to refer patients for the procedure,^{50–52} a study by Borkhoff et al. challenged this. In the study, orthopedic surgeons and family practitioners received vignettes featuring a patient with moderate unilateral knee pain and a radiograph revealing osteoarthritis. Identical vignettes were randomly ascribed to a female or male patient. The statistically significant odds ratio for referring the male vs. female patient for arthroplasty was 22.1 for orthopedic surgeons and 2.21 for family practitioners.³⁸ Implicit assumptions based on stereotypes that men are more stoic than women or more likely to engage in rigorous activities that would benefit from joint replacement may contribute to the disparity and adversely influence the care of individual female patients.^{38,51,52}

Implicit stereotype-based bias may also contribute to gender differences in the diagnosis of chronic obstructive pulmonary disease (COPD), even in the face of near comparable smoking rates between men and women and women's increased susceptibility to the disease. Chapman et al.³⁹ created a clinical vignette of a middle-aged patient presenting with a chronic cough and a smoking history. All vignettes were identical except for the randomly assigned patient gender. Female patients were more likely to receive a diagnosis of asthma or a non-respiratory problem, while identical male patients were more likely to be diagnosed with COPD.³⁹ Implicit bias was not measured, but assumptions that women are less likely to smoke and more apt to manifest anxiety as respiratory complaints may have played a role in this diagnostic disparity.

REDUCING THE IMPACT OF IMPLICIT BIAS

With growing evidence that implicit bias in physician decision-making makes a significant contribution to perpet-

uating health care disparities, it is critical to find ways to reduce its impact. Conceptualizing implicit bias as a “habit of mind” provides a useful framework for developing interventions.^{53–55} This approach allows mobilization of a large body of work on facilitating intentional behavioral change.⁵³ As with any behavioral change, individuals need to become aware of their habitual engagement in an undesirable behavior and be provided with strategies to increase self-efficacy to engage in a new desirable behavior.⁵⁶ The study by Green et al. provides an example of how simply increasing physicians’ awareness of their susceptibility to implicit bias changes behavior.⁷ A subset of participants who were aware that bias was a focus of the investigation were significantly more likely to recommend thrombolysis for Black patients, even if they had a high degree of implicit pro-White bias.⁷

Although awareness is important, as with clinical efforts to change patients’ undesirable health behaviors,⁵⁷ it is not sufficient to reduce the automatic, habitual activation of stereotypes and the subsequent impact of implicit bias in medical decision-making. One strategy that appears effective in reducing implicit bias is individuating. Individuating involves conscious effort to focus on specific information about an individual, making it more salient in decision-making than that person’s social category information (e.g. race or gender). Lebrecht et al. tasked White participants to indicate whether they had previously seen a Black face presented to them. Those trained to differentiate Black faces were more accurate than untrained participants, and their accuracy correlated with reduced implicit race bias.⁵⁸ Chapman et al.’s study of gender disparities in COPD diagnoses supports the benefit of individuation in reducing the influence of implicit bias in medical practice. In the study, the initial gender differences in diagnosis were eliminated when physicians were provided with spirometry data consistent with COPD.³⁹ Specific, individuated patient information prevents physicians from filling in partial information with stereotype-based assumptions. Unfortunately, medicine is often practiced under time-pressured circumstances with incomplete information.

Another strategy to mitigate the impact of implicit bias is perspective-taking. Originally described by Galinsky et al.,⁵⁹ this is a conscious attempt to envision another person’s viewpoint and can reduce implicit bias in social interactions.^{59,60} Drwecki et al. applied perspective-taking to a clinical setting. In this study, nurses were shown pictures of either White or Black patients with genuine expressions of pain and asked how much pain medication they recommended. Nurses told to use their best judgment recommended significantly more pain medication for White than Black patients, whereas nurses instructed to imagine how the patient felt recommended equal analgesic treatment regardless of race.⁶¹ It may thus be possible to reduce disparities in pain treatment if providers actively attempt to

take patients’ perspectives. In addition to behavioral strategies aimed at individual physicians, the contribution of implicit race bias to health care disparities could be reduced on a population level by increasing the number of African American/Black physicians because they consistently demonstrate less race bias.^{7,28,31} Certainly society is not divided along lines of race, gender, age or weight alone, and the impact of implicit social bias is likely far more complex than available data can capture. Nonetheless, individuating and perspective-taking are bias-mitigating strategies that should be effective regardless of a patient’s social group.

CONCLUSION

Despite the best intentions of physicians to provide equal treatment to all, disparities linger and may lead to unacceptable increases in morbidity and mortality for some. Many factors have helped create these disparities, including implicit bias, an unintentional, unacknowledged preference for one group over another. Implicit bias is present in physicians and correlates with unequal treatment of patients. We suggest the contribution of implicit bias to health care disparities could be reduced if all physicians acknowledged their susceptibility to such bias and deliberately practiced perspective-taking and individuation. Additionally, increasing the number of African American/Black physicians could reduce the impact of implicit bias on some health care disparities because they exhibit significantly less implicit race bias. Although challenging, these strategies may help create a practice of medicine that embodies the ideals and guiding principles that attract physicians to the field.

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REFERENCES

1. **Nelson A.** Unequal treatment: confronting racial and ethnic disparities in health care. *J Natl Med Assoc.* 2002;94(8):666–8.
2. **Devine PG.** Stereotypes and prejudice: their automatic and controlled components. *J Personal Soc Psychol.* 1989;56(1):5–18.
3. **Devine PG, Plant EA.** *Advances in Experimental Social Psychology.* San Diego: Academic; 2012.

4. Institute of Medicine. Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care. **Smedley BD, Stith AY, Nelson AR, eds.** Washington, D.C. : The National Academies Press 2001
5. **Dovidio JF, Penner LA, Albrecht TL, Norton WE, Gaertner SL, Shelton JN.** Disparities and distrust: the implications of psychological processes for understanding racial disparities in health and health care. *Soc Sci Med.* 2008;67(3):478–86.
6. Association of American Medical Colleges. What You Don't Know: The Science of Unconscious Bias and What to Do About It in the Search and Recruitment Process. Available at: https://www.aamc.org/initiatives/leadership/recruitment/178420/unconscious_bias.html. Accessed February 14, 2013.
7. **Green AR, Carney DR, Pallin DJ, Ngo LH, Raymond KL, Iezzoni LI, et al.** Implicit bias among physicians and its prediction of thrombolysis decisions for black and white patients. *J Gen Intern Med.* 2007;22(9):1231–8.
8. **Biernat M, Manis M.** Shifts in standards and stereotype-based judgments. *J Personal Soc Psychol.* 1994;60:485–99.
9. **Hodson G, Dovidio JF, Gaertner SL.** Processes in racial discrimination: differential weighting of conflicting information. *Pers Soc Psychol Bull.* 2002;28(4):460–71.
10. **Isaac C, Lee B, Carnes M.** Interventions that affect gender bias in hiring: a systematic review. *Acad Med.* 2009;84(10):1440–6.
11. **Moss-Racusin CA, Dovidio JF, Brescoll VL, Graham MJ, Handelsman J.** Science faculty's subtle gender biases favor male students. *Proc Natl Acad Sci U S A.* 2012;109(41):16474–9.
12. **Bigler RS, Liben LS.** A developmental intergroup theory of social stereotypes and prejudice. *Adv Child Dev Behav.* 2006;34:39–89.
13. **Newheiser AK, Olson KR.** White and Black American Children's Implicit Intergroup Bias. *J Exp Soc Psychol.* 2012;48(1):264–70.
14. **Dunham Y, Baron AS, Banaji MR.** From American city to Japanese village: a cross-cultural investigation of implicit race attitudes. *Child Dev.* 2006;77(5):1268–81.
15. **Baron AS, Banaji MR.** The development of implicit attitudes. Evidence of race evaluations from ages 6 and 10 and adulthood. *Psychol Sci.* 2006;17(1):53–8.
16. **Dovidio JF, Kawakami K, Gaertner SL.** Implicit and explicit prejudice and interracial interaction. *J Pers Soc Psychol.* 2002;82(1):62–8.
17. **Tversky A, Kahneman D.** Judgment under Uncertainty: Heuristics and Biases. *Science.* 1974;185(4157):1124–31.
18. **Tait RC, Chibnall JT, Kalauokalani D.** Provider judgments of patients in pain: seeking symptom certainty. *Pain Med.* 2009;10(1):11–34.
19. **Croskerry P.** Achieving quality in clinical decision making: cognitive strategies and detection of bias. *Acad Emerg Med.* 2002;9(11):1184–204.
20. **Martell RF.** Sex bias at work: the effects of attentional and memory demands on performance ratings of men and women. *J Appl Soc Psychol.* 1991;21(23):1939–60.
21. **Uhlmann EL, Cohen GL.** I think it, therefore it's true': Effects of self-perceived objectivity on hiring discrimination. *Organ Behav Hum Decis Process.* 2007;104(2):207–23.
22. **Greenwald AG, McGhee DE, Schwartz JL.** Measuring individual differences in implicit cognition: the implicit association test. *J Pers Soc Psychol.* 1998;74(6):1464–80.
23. **Nosek BA, Banaji M, Greenwald AG.** Harvesting implicit group attitudes and beliefs from a demonstration web site. *Group Dyn: Theory Res Pract.* 2002;6(1):101–15.
24. **Greenwald AG, Poehlman TA, Uhlmann EL, Banaji MR.** Understanding and using the Implicit Association Test: III. Meta-analysis of predictive validity. *J Personal Soc Psychol.* 2009;97(1):17–41.
25. **Eisenberg T, Johnson SL.** Implicit racial attitudes of death penalty lawyers. Cornell Law Faculty Publications, Paper 353. 2004. Available at: <http://scholarship.law.cornell.edu/facpub/353>. Accessed on February 14, 2013.
26. **Sabin JA, Rivara FP, Greenwald AG.** Physician implicit attitudes and stereotypes about race and quality of medical care. *Med Care.* 2008;46(7):678–85.
27. Corporation I. Project Implicit.
28. **Sabin J, Nosek BA, Greenwald A, Rivara FP.** Physicians' implicit and explicit attitudes about race by MD race, ethnicity, and gender. *J Health Care Poor Underserved.* 2009;20(3):896–913.
29. **Sabin JA, Greenwald AG.** The influence of implicit bias on treatment recommendations for 4 common pediatric conditions: pain, urinary tract infection, attention deficit hyperactivity disorder, and asthma. *Am J Public Health.* 2012;102(5):988–95.
30. **Cooper LA, Roter DL, Carson KA, Beach MC, Sabin JA, Greenwald AG, et al.** The associations of clinicians' implicit attitudes about race with medical visit communication and patient ratings of interpersonal care. *Am J Public Health.* 2012;102(5):979–87.
31. **White-Means S, Zhiyong D, Hufstader M, Brown LT.** Cultural competency, race, and skin tone bias among pharmacy, nursing, and medical students: implications for addressing health disparities. *Med Care Res Rev.* 2009;66(4):436–55.
32. **Penner LA, Dovidio JF, West TV, Gaertner SL, Albrecht TL, Dailey RK, et al.** Aversive racism and medical interactions with Black patients: a field study. *J Exp Soc Psychol.* 2010;46(2):436–40.
33. **Schwartz MB, Chambliss HO, Brownell KD, Blair SN, Billington C.** Weight bias among health professionals specializing in obesity. *Obes Res.* 2003;11(9):1033–9.
34. **Uncapher H, Arean PA.** Physicians are less willing to treat suicidal ideation in older patients. *J Am Geriatr Soc.* 2000;48(2):188–92.
35. **Reuben DB, Fullerton JT, Tschann JM, Croughan-Minihane M.** Attitudes of beginning medical students toward older persons: a five-campus study. The University of California Academic Geriatric Resource Program Student Survey Research Group. *J Am Geriatr Soc.* 1995;43(12):1430–6.
36. **Madan AK, Aliabadi-Wahle S, Beech DJ.** Age bias: a cause of underutilization of breast conservation treatment. *J Cancer Educ.* 2001;16(1):29–32.
37. **Madan AK, Cooper L, Gratzner A, Beech DJ.** Ageism in breast cancer surgical options by medical students. *Tenn Med.* 2006;99(5):37–8. 41.
38. **Borkhoff CM, Hawker GA, Kreder HJ, Glazier RH, Mahomed NN, Wright JG.** The effect of patients' sex on physicians' recommendations for total knee arthroplasty. *CMAJ.* 2008;178(6):681–7.
39. **Chapman KR, Tashkin DP, Pye DJ.** Gender bias in the diagnosis of COPD. *Chest.* 2001;119(6):1691–5.
40. **Heins JK, Heins A, Grammas M, Costello M, Huang K, Mishra S.** Disparities in analgesia and opioid prescribing practices for patients with musculoskeletal pain in the emergency department. *J Emerg Nurs.* 2006;32(3):219–24.
41. **Miner J, Biros MH, Trainor A, Hubbard D, Beltram M.** Patient and physician perceptions as risk factors for oligoanalgesia: a prospective observational study of the relief of pain in the emergency department. *Acad Emerg Med.* 2006;13(2):140–6.
42. **Todd KH, Samaroo N, Hoffman JR.** Ethnicity as a risk factor for inadequate emergency department analgesia. *JAMA.* 1993;269(12):1537–9.
43. **Todd KH, Deaton C, D'Adamo AP, Goe L.** Ethnicity and analgesic practice. *Ann Emerg Med.* 2000;35(1):11–6.
44. **Todd KH, Lee T, Hoffman JR.** The effect of ethnicity on physician estimates of pain severity in patients with isolated extremity trauma. *JAMA.* 1994;271(12):925–8.
45. **Petersen LA, Wright SM, Peterson ED, Daley J.** Impact of race on cardiac care and outcomes in veterans with acute myocardial infarction. *Med Care.* 2002;40(1 Suppl):186–96.
46. **Allison JJ, Kiefe CI, Centor RM, Box JB, Farmer RM.** Racial differences in the medical treatment of elderly Medicare patients with acute myocardial infarction. *J Gen Intern Med.* 1996;11(12):736–43.
47. **Canto JG, Allison JJ, Kiefe CI, Fincher C, Farmer R, Sekar P, et al.** Relation of race and sex to the use of reperfusion therapy in Medicare beneficiaries with acute myocardial infarction. *N Engl J Med.* 2000;342(15):1094–100.
48. **Weitzman S, Cooper L, Chambless L, Rosamond W, Clegg L, Marcucci G, et al.** Gender, racial, and geographic differences in the performance of cardiac diagnostic and therapeutic procedures for hospitalized acute myocardial infarction in four states. *Am J Cardiol.* 1997;79(6):722–6.
49. **Taylor HA Jr, Canto JG, Sanderson B, Rogers WJ, Hilbe J.** Management and outcomes for black patients with acute myocardial infarction in the reperfusion era. National Registry of Myocardial Infarction 2 Investigators. *Am J Cardiol.* 1998;82(9):1019–23.
50. **Hawker GA, Wright JG, Coyte PC, Williams JI, Harvey B, Glazier R, et al.** Differences between men and women in the rate of use of hip and knee arthroplasty. *N Engl J Med.* 2000;342(14):1016–22.
51. **Coyte PC, Hawker G, Croxford R, Attard C, Wright JG.** Variation in rheumatologists' and family physicians' perceptions of the indications for and outcomes of knee replacement surgery. *J Rheumatol.* 1996;23(4):730–8.
52. **Wright JG, Coyte P, Hawker G, Bombardier C, Cooke D, Heck D, et al.** Variation in orthopedic surgeons' perceptions of the indications for and outcomes of knee replacement. *CMAJ.* 1995;152(5):687–97.

53. **Carnes M, Devine PG, Isaac C, Baier Manwell L, Ford CE, Byars-Winston A, Fine E, Sheridan J.** Promoting institutional change through bias literacy. *J Divers High Educ.* 2012;5(2):63–77.
54. **Devine PG, Plant EA, Buswell BN, Oskamp S.** Breaking the prejudice habit: Progress and obstacles. *Reducing Prejudice and Discrimination.* Mahwah, NJ, US: Lawrence Erlbaum Associates Publishers; 2000:185–208.
55. **Devine PG, Forscher PS, Austin AJ, Cox WTL.** Long-term reduction in implicit race prejudice: a prejudice habit-breaking intervention. *J Exp Soc Psychol.* 2012;48:1267–78.
56. **Bandura A, Kazdin, A.E.** Social-cognitive theory. *Encyclopedia of psychology*, Vol. 7. Washington, DC, New York, NY, USUS: American Psychological Association, Oxford University Press; 2000:329–32.
57. **Prochaska JO, DiClemente CC.** Stages of change in the modification of problem behaviors. *Prog Behav Modif.* 1992;28:183–218.
58. **Lebrecht S, Pierce LJ, Tarr MJ, Tanaka JW.** Perceptual other-race training reduces implicit racial bias. *PLoS One.* 2009;4(1):e4215.
59. **Galinsky AD, Moskowitz GB.** Perspective-taking: decreasing stereotype expression, stereotype accessibility, and in-group favoritism. *J Pers Soc Psychol.* 2000;78(4):708–24.
60. **Todd AR, Bodenhausen GV, Richeson JA, Galinsky AD.** Perspective taking combats automatic expressions of racial bias. *J Pers Soc Psychol.* 2011;100(6):1027–42.
61. **Drwecki BB, Moore CF, Ward SE, Prkachin KM.** Reducing racial disparities in pain treatment: the role of empathy and perspective-taking. *Pain.* 2011;152(5):1001–6.