

Implicit Racial/Ethnic Bias Among Health Care Professionals and Its Influence on Health Care Outcomes: A Systematic Review

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Background. In the United States, people of color face disparities in access to health care, the quality of care received, and health outcomes. The attitudes and behaviors of health care providers have been identified as one of many factors that contribute to health disparities. Implicit attitudes are thoughts and feelings that often exist outside of conscious awareness, and thus are difficult to consciously acknowledge and control. These attitudes are often automatically activated and can influence human behavior without conscious volition.

Objectives. We investigated the extent to which implicit racial/ethnic bias exists among health care professionals and examined the relationships between health care professionals' implicit attitudes about racial/ethnic groups and health care outcomes.

Search Methods. To identify relevant studies, we searched 10 computerized bibliographic databases and used a reference harvesting technique.

Selection Criteria. We assessed eligibility using double independent screening based on a priori inclusion criteria. We included studies if they sampled existing health care providers or those in training to become health care providers, measured and reported results on implicit racial/ethnic bias, and were written in English.

Data Collection and Analysis. We included a total of 15 studies for review and then subjected them to double independent data extraction. Information extracted included the citation, purpose of the study, use of theory, study design, study site and location, sampling strategy, response rate, sample size and characteristics,

measurement of relevant variables, analyses performed, and results and findings. We summarized study design characteristics, and categorized and then synthesized substantive findings.

Main Results. Almost all studies used cross-sectional designs, convenience sampling, US participants, and the Implicit Association Test to assess implicit bias. Low to moderate levels of implicit racial/ethnic bias were found among health care professionals in all but 1 study. These implicit bias scores are similar to those in the general population. Levels of implicit bias against Black, Hispanic/Latino/Latina, and dark-skinned people were relatively similar across these groups. Although some associations between implicit bias and health care outcomes were nonsignificant, results also showed that implicit bias was significantly related to patient-provider interactions, treatment decisions, treatment adherence, and patient health outcomes. Implicit attitudes were more often significantly related to patient-provider interactions and health outcomes than treatment processes.

Conclusions. Most health care providers appear to have implicit bias in terms of positive attitudes toward Whites and negative attitudes toward people of color. Future studies need to employ more rigorous methods to examine the relationships between implicit bias and health care outcomes. Interventions targeting implicit attitudes among health care professionals are needed because implicit bias may contribute to health disparities for people of color. (*Am J Public Health.* 2015;105:e60–e76. doi:10.2105/AJPH.2015.302903)

PLAIN-LANGUAGE SUMMARY:

Implicit attitudes are thoughts and feelings that often exist outside of conscious awareness, and thus are difficult to consciously acknowledge and control. Negative implicit attitudes about people of color may contribute to racial/ethnic disparities in health and health care. We systematically reviewed

evidence on implicit racial/ethnic bias among health care professionals and on the relationships between health care professionals' implicit attitudes about racial/ethnic groups and health care outcomes. Fifteen relevant studies were identified through searches of bibliographic databases and reference lists of studies that met

inclusion criteria. Low to moderate levels of implicit racial/ethnic bias were found among health care professionals in all but 1 study. These implicit bias scores are similar to those in the general population. Levels of implicit bias against Black, Hispanic/Latino/Latina, and dark-skinned people were relatively similar

across these groups. Although some associations between implicit bias and health care outcomes were nonsignificant, results also showed that implicit bias was significantly related to patient-provider interactions, treatment decisions, treatment adherence, and patient health outcomes.

In the United States, people of color face disparities in access to health care, the quality of care received, and health outcomes.¹⁻³ Compared with Whites, people of color face more barriers to accessing care, which includes preventive services, acute treatment, and chronic disease management.⁴ People of color are also generally less satisfied with their interactions with health care providers. The National Healthcare Disparities Report showed that White patients received better quality of care than Black American, Hispanic, American Indian, and Asian patients.⁴ Dominant communication styles, fewer demonstrated positive emotions, infrequent requests for input about treatment decisions, and less patient-centered care seem to characterize patient-provider interactions involving people of color.⁴⁻⁶

People of color also face disparities in terms of morbidity, mortality, and health status. Black Americans, Hispanic Americans, and American Indians have higher infant mortality rates than White and Asian Americans.¹ The premature death rate from heart disease and stroke is highest among Black Americans. In addition, numerous disparities in health conditions and risk behaviors exist among people of color, including asthma, cigarette smoking, diabetes, early childbearing, HIV/AIDS, hypertension, low birth weight, obesity, periodontitis, preterm births, and tuberculosis.^{1,4} Black Americans, Hispanic Americans, and American Indians were more likely to rate their health as fair or poor, and reported more days of feeling unwell in the past month, compared with White and Asian Americans.¹ Despite all of the advancements in health care in the past century, disparities based on race and ethnicity persist in access to health care, quality of care

received, disease incidence and prevalence, life expectancy, and mortality.

HEALTH DISPARITIES AND PROVIDER ATTITUDES

Provider attitudes and behavior are a target area for researchers and practitioners attempting to understand and eradicate inequitable health care.⁷ Although overt discriminatory behavior in the United States may have declined in recent decades, covert discrimination and institutional bias are sustained by subtle, implicit attitudes that may influence provider behavior and treatment choices. As a result, patients of color may be kept waiting longer for assessment or treatment than their White counterparts, or providers may spend more time with White patients than with patients of color. In addition, providers may vary in the extent to which they collaborate with patients in systematic though nondeliberate ways, in considering treatment options based on patients' characteristics. Subtle biases may be expressed in several ways: approaching patients with a dominant and condescending tone that decreases the likelihood that patients will feel heard and valued by their providers, failing to provide interpreters when needed, doing more or less thorough diagnostic work, recommending different treatment options for patients based on assumptions about their treatment adherence capabilities, and granting special privileges, such as allowing some families to visit patients after hours while limiting visitation for other families. Variation in provider behaviors may be driven in part or in full by positive and negative attitudes that providers hold toward various racial and ethnic groups.

Negative attitudes toward certain social groups or personal

characteristics often exist at the margins of awareness and are not easily accessible to individuals. Social psychology scholars have conceptualized prejudicial attitudes or bias as implicit and explicit.⁸ Explicit attitudes are thoughts and feelings that people deliberately think about and can make conscious reports about. On the other hand, implicit attitudes often exist outside of conscious awareness, and thus are difficult to consciously acknowledge and control. These attitudes are often automatically activated and can influence human behavior without conscious volition. Racial/ethnic bias in attitudes, such as feeling that White people are nicer than Black people, whether conscious or not, can lead to prejudicial behavior, such as providers taking more time with White patients than Black patients and therefore learning more about the White patients' needs and concerns.

Within the general population, significant research exists about implicit racial/ethnic bias. For example, White Americans have tended to associate negative valence in general, and certain feelings such as fear and distrust, with Black Americans.⁹⁻¹⁵ Such group notions are automatically activated and applied most often when people are busy, distracted, tired, and under pressure.¹⁶ The cognitive effort to assess and process a person's individual characteristics appears to be greater than that required to quickly categorize a person into a particular group with particular characteristics.⁹ Such short cuts in thinking may be useful in certain situations, but when providers are seeking to establish genuine working relationships with their patients and deliver equitable health care, fast thinking or quick categorization may get in the way. For example,

during a diagnostic examination with a Black American adolescent, a provider may automatically presume that they are sexually active rather than asking open-ended questions about sexual activity and listening carefully to the responses.

Some White health care providers maintain problematic explicit ideas about their Black American patients, viewing them as less intelligent, less able to adhere to treatment regimens, and more likely to engage in risky health behaviors than their White counterparts.¹⁷ Hispanic/Latino/Latina patients too were viewed as unlikely to accept responsibility for their own care and more likely to be noncompliant with treatment recommendations.¹⁸ Yet, even if explicit attitudes are modified, implicit bias among providers toward people of color is likely to remain and influence care in ways that perpetuate disparity and inequity. Thus, even if explicit attitudes demonstrate a desire to provide equitable care, health care providers may unintentionally interact with patients of color less effectively than with White patients, which may contribute to health disparities.^{19,20}

PURPOSE OF THE SYSTEMATIC REVIEW

To reduce racial and ethnic disparities in health care, we must ascertain the prevalence of biased attitudes among health care providers and whether bias contributes to problems in patient-provider interactions and relationships, quality of care, continuity of care, treatment adherence, and patient health status. Although significant research has been conducted on racial/ethnic bias in the general population, relatively few studies have examined

implicit racial/ethnic bias among health care professionals, despite its potentially significant impact on service delivery and health. This is therefore an important and emerging area of research. Systematic literature reviews are particularly useful in emerging areas because they synthesize what is known about a topic area, summarize the methods used to study a particular topic, and provide directions for future research. This systematic review seeks to answer 2 research questions: (1) Is there evidence of implicit racial/ethnic bias among health care professionals toward people of color? (2) Are there relationships between implicit racial/ethnic bias among health care professionals and health care outcomes (e.g., patient-provider interactions, clinical decision-making, standards of care, treatment adherence, symptomatology, health status, and patient satisfaction with care)?

METHODS

We prepared this review using methods outlined in Cooper²¹ and Littell et al.²² and adhering to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) criteria.²³ We developed protocols for bibliographic searches, study inclusion and exclusion, and data extraction before beginning the systematic search for relevant studies. In addition, we registered this review with PROSPERO, an international database of systematic reviews on health and social well-being.

Inclusion and Exclusion Criteria

We included studies in the review if they met the following criteria: (1) collected data from participants who were health care providers or were in training to become health care providers,

(2) measured and reported results on implicit attitudes toward racial/ethnic groups, and (3) were written in English. We defined health care professionals as individuals who provided or were in training to provide preventive, curative, therapeutic, or rehabilitative health services to patients. Examples include physicians, dentists, pharmacists, physician assistants, nurses, midwives, dieticians, chiropractors, podiatrists, clinical psychologists, clinical social workers, phlebotomists, physical therapists, respiratory therapists, occupational therapists, audiologists, speech pathologists, optometrists, emergency medical technicians, and paramedics.

We excluded studies that only examined explicit bias, as well as studies that examined implicit bias that was not related to race or ethnicity. We also excluded articles or reports that were strictly theoretical or conceptual. Because of our limited proficiency in other languages, and because implicit racial/ethnic bias may be a different phenomenon in non-Western or non-English-speaking countries, we included only studies written in English. Finally, we did not use time frame restrictions because implicit bias is a relatively recent construct and we wanted to perform an exhaustive review of the literature.

Search Strategy

We consulted a behavioral and social sciences librarian to assist with identifying relevant computerized bibliographic databases in which to search. We used the following search string to search all databases for studies completed prior to June 5, 2014: (“implicit bias” OR “implicit attitude” OR “implicit prejudice” OR “conscious bias” OR “conscious attitude” OR “conscious prejudice”) AND (race OR racial OR ethnic OR ethnicity OR Hispanic

OR Black OR African OR Asian OR Latin*) AND (health OR health care OR “health care”). The term “conscious” was used because implicit bias is sometimes referred to as unconscious or nonconscious bias.

Searching multiple databases increases the likelihood of identifying all possible studies falling within the scope of the review; we therefore searched 10 databases, some of which included gray literature sources. We performed searches in the following databases via EBSCO, with terms searched within the titles, abstracts, subject headings, and keywords: Academic Search Complete, CINAHL, Health Source: Nursing/Academic, PsycInfo, and Social Work Abstracts. We searched the following databases via ProQuest with terms searched within the titles, abstracts, and subject headings: ASSIA, Dissertations & Theses Full Text, and Social Services Abstracts. In addition, we searched the Conference Proceedings Citations Index with terms searched within titles, abstracts, and keywords. Finally, we searched PubMed with terms searched within titles, abstracts, and subject headings. When available, we used the English language filter. In addition to database searches, we used a reference-harvesting technique to locate relevant studies whereby we examined the reference lists of included studies to identify studies that might have not been incorporated into computerized bibliographic databases, such as papers in press or unpublished studies.

Study Selection Methods

We created a checklist of the inclusion and exclusion criteria prior to the search and used it for eligibility assessment. We piloted the checklist using 4 articles, and then 2 members of the research team who were responsible for

screening were trained on the checklist and screening procedures. After performing the bibliographic searches, we imported 105 results into the RefWorks software program to assist with organization and duplicate removal. Following duplicate removal, 84 studies remained. Two trained members of the research team independently screened each of the 84 studies to determine eligibility. We included or excluded most studies after reading the title and abstract; however, it was also necessary to examine the full text document of some studies to determine eligibility. To examine interrater agreement, we compared the screening decisions of the 2 screeners and calculated Cohen κ with SPSS version 21 (IBM, Somers, NY), which showed excellent agreement ($\kappa = 0.82$; $P < .05$).²⁴ There were only 6 disagreements between the screeners, which the first author resolved by examining the source documents. We excluded 69 studies because they did not meet all of the inclusion criteria. Many of these studies did not address implicit bias, some did not address racial/ethnic bias, and others were nonempirical.

Data Extraction Methods

After completing the inclusion and exclusion process, we included 15 studies and then subjected them to data extraction. Figure 1 shows the process of identifying and including studies. We developed a data extraction spreadsheet to assist with identifying and collecting relevant information from the included studies. Information extracted included the citation, purpose of the study, use of theory, study design, study site and location, sampling strategy, response rate, sample size and characteristics, measurement of relevant variables, analyses performed, and results and findings. Four members of the research team

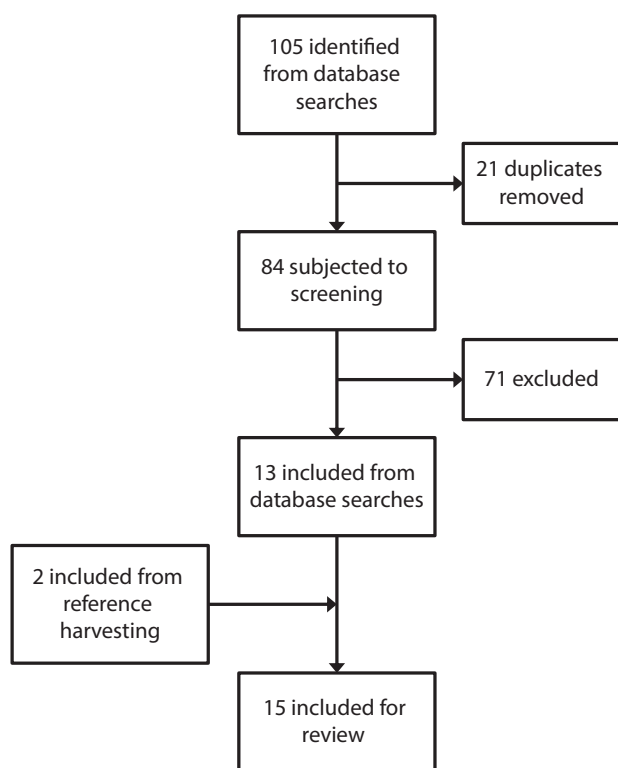


FIGURE 1—Flowchart depicting the identification, screening, and inclusion of studies of implicit racial/ethnic bias among health care professionals.

participated in the extraction process. Each study was independently extracted 2 times by 2 different researchers. Another researcher then compared the 2 extraction results for each study to examine agreement and Cohen κ statistics were calculated, which showed excellent agreement ($\kappa=0.83$; $P<.05$). There were 21 disagreements between the extractors, which 2 researchers resolved by examining the full text source document.

RESULTS

We included 15 studies in this review: 14 peer-reviewed journal articles and 1 doctoral dissertation. We present a summary of the methodological characteristics of

these studies followed by a synthesis of the substantive findings regarding the presence of implicit racial/ethnic bias among professionals and the relationships between implicit bias and health care outcomes. Table 1 shows a summary of information extracted from each study.

Study Design Characteristics

Of the 15 included studies, 13 (87%) were cross-sectional and 2 studies used cross-sectional survey data from health care providers merged with longitudinal data from patients. All of the studies sampled participants from the United States, and only 1 study included a small portion of participants from outside the United States. All of the studies used convenience sampling.

Eleven studies (73%) sampled participants from a single city; the cities were all large urban areas (e.g., Atlanta, GA; Baltimore, MD; and Denver, CO). Only 4 studies sampled participants from multiple locations across the United States. Among health care professional participants, the response rates ranged from 28% to 84% (mean = 57%; SD = 18.6%), and 2 studies did not report response rates. Among the 6 studies that used patient participants, 2 did not report response rates; among the studies that did report them, they ranged from 47% to 75% (mean = 66%; SD = 12.8%).

Study Samples

All 15 studies were conducted in the United States, although country in which the research was published was not an exclusion criteria. Twelve studies sampled practicing health care professionals, which included physicians, nurses, and nurse practitioners in the areas of primary care, pediatrics, internal medicine, emergency medicine, and spinal cord injury. Three studies included medical, nursing, and pharmacy students as participants. The sample sizes for health professionals varied drastically, from 14 to 2535 participants. Five studies had fewer than 50 participants, and 9 studies had between 50 and 350 professional participants. In most studies, about 75% to 80% of professionals were White, followed by small but substantial proportions of Asian professionals (10%–30%) and small proportions of Black and Hispanic/Latino/Latina professionals (0%–10%). In most studies, the proportions of males and females were about equal; however, samples tended to have more female than male participants. Six of the 12 studies that sampled practicing professionals measured their

professional experience, which showed that about half had less than 10 years of experience. National estimates of physician demographics have shown that 72% of physicians are male, 74% are White, 17% are Asian, 5% are Hispanic, 4% are Black, 29% have less than 10 years of experience, 32% have between 10 and 20 years of experience, and 39% have more than 20 years of experience.⁴⁰ However, the 15 studies in this review included physicians and other health care professionals from a variety of disciplines, which may account for the demographic differences.

Six of the 15 studies (40%) collected data from patients. Patient sample sizes ranged from 112 to 4794 (mean = 1399; SD = 1991), with 2 studies having about 3000 or more participants and 4 studies having between 100 and 300 participants. All 6 studies included Black patients, 4 included White patients, and only 2 included Hispanic/Latino/Latina patients. Most studies had larger proportions of female (about 60%–70%) than male patients. Patient samples consisted primarily of middle-age and older adults. Only 3 of the 6 studies reported information about patients' socioeconomic status, which showed that most patients' highest level of education was a high school degree and most had low to moderate incomes (i.e., <\$35 000 per year).

Measurement of Implicit Racial/Ethnic Bias

Of the 15 studies reviewed, 9 examined bias against Black people compared with White people; 3 examined bias against both Black and Hispanic/Latino/Latina people compared with White people; 1 examined bias against Hispanic/Latino/Latina compared with White people; 1 examined bias

TABLE 1—Summary of Studies Included in the Systematic Review of Implicit Racial/Ethnic Bias Among Health Care Professionals

Citation	Purpose of the Study	Study Design, Location, and Sampling Strategy	Sample Description for Health Care Professionals	Sample Description for Patients	Assessment of Implicit Bias Among Professionals	Analysis and Results on Associations Between Implicit Bias and Health Care Outcomes
Bean et al. ²⁵	To examine implicit stereotyping of Hispanic American patients among nursing and medical students	Cross-sectional study Tucson, AZ Convenience sampling	36 students (53% nursing students, 47% medical students) 81% White, 19% non-White 78% female, 22% male Response rate not reported	NA	Sequential priming examined Hispanic/Latino/Latina vs White faces associated with words related to good and bad patients. Participants were faster in recognizing noncompliance ($d = 0.68^*$), risk ($d = 1.53^*$), and general stereotype words ($d = 0.88^*$) after exposure to Hispanic/Latino/Latina faces vs White faces.	NA
Blair et al. ²⁶	To assess implicit and explicit bias against Hispanics/Latinos and Black Americans among primary care providers and community members	Cross-sectional study Denver, CO Convenience sampling	210 primary care physicians 84% White, 6% Hispanic/Latino/Latina, and 1% Black 53% female, 47% male 4% aged 18-35 y, 73% 36-55 y, 11% ≥ 56 y 47% 1-10 y of clinical experience, 30% 11-20 y of clinical experience, 21% ≥ 20 y of clinical experience Response rate = 60%	NA	Race IAT examined Black vs White faces and associated them with positive and negative words. Physicians showed moderate pro-White, anti-Black bias (Mean IAT $D = 0.27$; $SD = 0.34$). Race IAT examined Hispanic/Latino/Latina vs White faces associated with positive and negative words. Physicians showed moderate pro-White, anti-Hispanic/Latino/Latina bias (Mean IAT $D = 0.33$; $SD = 0.38$)	NA
Fitzsimmons ²⁷	To examine the extent to which implicit racial bias against students of color exists in nursing faculty teaching in baccalaureate programs in nursing	Cross-sectional study United States Convenience sampling and snowball sampling	107 nursing faculty members 92% White, 2% Black, 1% Hispanic/Latino/Latina, and 2% other 98% female, 2% male Mean years in nursing education = 14 Response rate = 30%	NA	Skin tone IAT examined associations between dark- vs light-skinned faces and positive and negative words. Nurses showed moderate bias against dark-skinned faces (mean IAT $D = 0.35$; $SD = 0.42$).	NA
Sabin et al. ²⁸	To measure implicit and explicit attitudes about race among medical doctors	Cross-sectional study United States and abroad Convenience sampling	2535 medical doctors 66% White, 11% Asian, 8% Black, and 5% Hispanic/Latino/Latina 62% male and 38% female Mean age = 37 y 79% reside in United States Response rate not reported	NA	Race IAT examined Black vs White faces associated with positive and negative words. Physicians showed moderate pro-White, anti-Black bias (Mean IAT $D = 0.39$; $SD = 0.47$).	NA

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TABLE 1—Continued

White-Means et al. ²⁹	To examine race and skin tone preferences among preprofessional health care providers	Cross-sectional study Memphis, TN Convenience sampling	333 students (57% pharmacy students, 34% medical students, and 9% nursing students) 74% White, 18% Black, 7% Asian, and 1% Hispanic/Latino/Latina Response rate = 38%	NA	Race IAT examined Black vs White faces associated with positive and negative words. 100% of Hispanics/Latinos/Latinas, 94% of Whites, 76% of Asians, and 62% of Blacks showed a preference for White over Black people. Overall, students showed moderate pro-White, anti-Black bias (Mean IAT D = 0.40; SD not reported). Skin tone IAT examined associations between dark- vs light-skinned faces and positive and negative words. 100% of Hispanics/Latinos/Latinas, 85% of Asians, 83% of Whites, 41% of Blacks, and 51% of mixed race (Black and White) were more likely to prefer light skin to dark skin. Overall, students showed a moderate bias against dark-skinned people (mean IAT D = 0.31; SD not reported).	NA
Blair et al. ³⁰	To examine if clinicians' explicit and implicit racial/ethnic bias is related to Black and Hispanic/Latino/Latina patients' perceptions of their care in established clinical relationships	Cross-sectional study Denver, CO Convenience sampling	134 primary care physicians 75% White, 25% non-White 54% female, 46% male 50% with ≥ 10 y of clinical experience Response rate = 60%	2908 patients 49% White, 30% Hispanic/Latino/Latina, 21% Black 58% female, 42% male 2% aged 18–35 y, 33% 36–55 y, 64% ≥ 56 y Education: 18% < high school diploma, 27% high school diploma or GED, 30% 1–3 y of college, 24% ≥ 4 y of college Household income: 35% < \$15 000; 19% \$16 000–\$35 000; 14%	Hierarchical linear modeling results: For Black patients: Provider's interpersonal treatment (B = -5.81*, SE = 2.52) ^a Patient-provider communication (B = -4.31c; SE = 2.47) ^a Trust in provider (B = -2.65; SE = 2.09) ^a Contextual knowledge of patient (B = -5.58*, SE = 2.73) ^a Composite score of patient-centeredness (B = -4.61*, SE = 2.25) ^a For Hispanic/Latino/Latina patients: Provider's interpersonal treatment (B = -0.58; SE = 1.71) ^a Patient-provider communication (B = -0.13; SE = 1.68) ^a Trust in provider (B = 0.85; SE = 1.42) ^a Contextual knowledge of patient (B = -0.19; SE = 1.86) ^a Composite score of patient-centeredness (B = -0.04; SE = 1.53) ^a	

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TABLE 1—Continued

Blair et al. ³¹	To determine the relationship between implicit racial/ethnic bias among primary care providers and treatment processes and outcomes related to hypertension among Black and Hispanic/Latino/Latina patients compared with White patients	Cross-sectional survey of primary care providers merged with multiyear patient record data following initial visit with the provider Denver, CO Convenience sampling	138 primary care physicians 83% White, 17% non-White 54% female, 46% male 49% with ≥ 10 y of clinical experience Response rate = 52%	4794 patients 49% White, 31% Hispanic/Latino/Latina, 20% Black 58% female and 42% male Mean age = 60 y Response rate not reported	Race IAT examined Black vs White and Hispanic/Latino/Latina vs White faces associated with positive and negative words. 70% of physicians showed some level of implicit bias against Black people and Hispanics/Latinos. 51% of physicians had moderate-to-strong levels of bias against Hispanics/Latinos/Latinas. 42% of physicians had moderate-to-strong levels of bias against Black people. IAT D score not reported.	Multilevel random coefficient modeling results: For Black patients: Treatment intensification (B = 0.007; SE = 0.030) ^a Medication adherence (B = -3.8*; SE = 1.7) ^a Hypertension control (B = -1.9; SE = 2.2) ^a Time out of stage 2 hypertension (B = -1.2; SE = 1.4) ^a For Hispanic/Latino/Latina patients: Treatment intensification (B = 0.014; SE = 0.024) ^a Medication adherence (B = 1.3; SE = 1.4) ^a Hypertension control (B = 2.3; SE = 1.8) ^a Time out of stage 2 hypertension (B = -1.0; SE = 1.1) ^a
Cooper et al. ³²	To examine associations of clinician's implicit attitudes about race with visit communication and patient ratings of care	Cross-sectional study Baltimore, MD Convenience sampling	40 clinicians (90% physicians, 10% nurse practitioners) 48% White, 30% Asian, 22% Black 62% female, 38% male 38% aged 27–39 y, 35% 40–49 y, 25% 50–62 y Mean experience since residency = 13 y Response rate = 63%	269 patients 79% Black and 21% White 71% female and 29% male Mean age = 56 y 81% high school graduates 59% annual income > \$35 000 Response rate = 67%	Race IAT examined Black vs White faces associated with positive and negative words. Physicians showed slightly moderate pro-White, anti-Black bias (Mean IAT D = 0.26; SD = 0.49). Medical Compliance IAT examined Black vs White faces associated with compliant and reluctant patients. Physicians showed moderate association of White race with compliance (Mean IAT D = -0.29; SD = 0.41).	Linear and logistic regression with generalized estimating equations results: For White patients: Clinician verbal dominance (B = 11.0*) ^a Visit length (B = 8.0) ^a Clinician speech speed (B = 0.25) ^a Patient centeredness (B = -0.05) ^a Clinician positive affect (B = -0.01) ^a Patient positive affect (B = 0.01) ^a Clinician asked for patient input (OR = 16.6*; 95% CI = 7.3, 33.5) ^a Clinician respected patient (OR = 26.5*; 95% CI = 18.7, 36.0) ^a Clinician liked patient (OR = 8.0*; 95% CI = 3.0, 19.5) ^a Patient liked clinician (OR = 31.4; 95% CI = 20.8, 44.5) ^a Patient trust in clinician (OR = 76.9; 95% CI = 68.9, 83.4) ^a Patient confidence in clinician (OR = 79.0; 95% CI = 70.7, 85.4) ^a Patient would recommend clinician (OR = 29.1; 95% CI = 19.4, 41.2) ^a Clinician verbal dominance (B = -25.0*) ^b Visit length (B = -21.0*) ^b Clinician speech speed (B = 3.9*) ^b Patient centeredness (B = 0.15*) ^b Clinician positive affect (B = 0.12*) ^b Patient positive affect (B = 0.11†) ^b Clinician asked for patient input (OR = 19.4*; 95% CI = 6.8, 44.1) ^b

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TABLE 1—Continued

Clinician respected patient (OR = 21.6; 95% CI = 8.3, 45.5) ^b	
Clinician liked patient (OR = 6.6; 95% CI = 1.8, 21.4) ^b	
Patient liked clinician (OR = 31.6; 95% CI = 22.5, 42.5) ^b	
Patient trust in clinician (OR = 73.9; 95% CI = 64.2, 81.7) ^b	
Patient confidence in clinician (OR = 74.9; 95% CI = 66.0, 82.0) ^b	
Patient would recommend clinician (OR = 23.7*; 95% CI = 15.5, 34.5) ^b	
For Black patients:	
Clinician verbal dominance (B = 9.0) ^a	
Visit length (B = 7.0) ^a	
Clinician speech speed (B = -0.76) ^a	
Patient centeredness (B = -0.10) ^a	
Clinician positive affect (B = -0.10) ^a	
Patient positive affect (B = -0.10*) ^a	
Clinician asked for patient input (OR = 28.3; 95% CI = 22.3, 35.1) ^a	
Clinician respected patient (OR = 34.9*; 95% CI = 27.2, 43.5) ^a	
Clinician liked patient (OR = 23.8; 95% CI = 17.9, 31.0) ^a	
Patient liked clinician (OR = 32.7*; 95% CI = 26.2, 39.9) ^a	
Patient trust in clinician (OR = 67.6; 95% CI = 60.6, 73.8) ^a	
Patient confidence in clinician (OR = 71.4*; 95% CI = 64.1, 77.7) ^a	
Patient would recommend clinician (OR = 34.4*; 95% CI = 27.1, 42.5) ^a	
Clinician verbal dominance (B = 10.0) ^b	
Visit length (B = 20.0*) ^b	
Clinician speech speed (B = -1.75*) ^b	
Patient centeredness (B = -0.93) ^{†b}	
Clinician positive affect (B = -0.06) ^b	
Patient positive affect (B = -0.04) ^b	
Clinician asked for patient input (OR = 23.0*; 95% CI = 16.8, 30.7) ^b	
Clinician respected patient (OR = 37.0; 95% CI = 28.7, 46.2) ^b	
Clinician liked patient (OR = 23.2; 95% CI = 16.7, 31.3) ^b	
Patient liked clinician (OR = 38.4; 95% CI = 31.7, 45.5) ^b	
Patient trust in clinician (OR = 64.0*; 95% CI = 6.5, 70.9) ^b	
Patient confidence in clinician (OR = 71.2 [†] ; 95% CI = 63.8, 77.7) ^b	
Patient would recommend clinician (OR = 36.3; 95% CI = 29.4, 43.8) ^b	

Continued

TABLE 1—Continued

Green et al. ³³	To test the presence of implicit race bias among physicians and assess its prediction of thrombolysis recommendations for Black and White patients with acute coronary syndromes	Cross-sectional study Boston, MA, and Atlanta, GA Convenience sample	220 resident physicians (83% internal medicine residents, 17% emergency medicine residents) 63% White, 24% Asian/Pacific Islander, 6% Other, 5% Black, 2% Hispanic/Latino/Latina 60% male, 40% female Response rate = 28%	NA	Race Preference IAT examined Black vs White faces associated with positive and negative words. Residents showed moderate pro-White, anti-Black bias (Mean IAT D = 0.36; SD = 0.40). Race Cooperative IAT examined Black vs White faces associated with general cooperativeness. Residents showed moderate association of White race with cooperativeness (mean IAT D = 0.30; SD = 0.39). Race Medical Cooperative/Compliance examined Black vs White faces associated with medical cooperativeness. Residents showed moderate association of White race with cooperativeness (mean IAT D = 0.22; SD = 0.40).	Multiple linear regression results: For White patients: Recommend thrombolysis for treatment of coronary artery disease (B = 0.17*) ^b Recommend thrombolysis for treatment of coronary artery disease (B = 0.08) ^b Recommend thrombolysis for treatment of coronary artery disease (B = 0.10) ^c Recommend thrombolysis for treatment of coronary artery disease (B = 0.16*) ^d For Black patients: Recommend thrombolysis for treatment of coronary artery disease (B = -0.19*) ^a Recommend thrombolysis for treatment of coronary artery disease (B = -0.09) ^b Recommend thrombolysis for treatment of coronary artery disease (B = 0.02) ^c Recommend thrombolysis for treatment of coronary artery disease (B = -0.11*) ^d
Hagiwara et al. ³⁴	To examine how non-Black primary care physician's explicit and implicit racial bias and Black patients' perceived past discrimination affected physician-patient talk time ratio during medical interactions and the relationship between this ratio and patients' subsequent adherence	Cross-sectional survey of physicians and longitudinal data collection with patients Detroit, MI Convenience sampling	14 primary care physicians 86% Asian, 14% White 50% female, 50% male Mean age = 30 y Response rate = 83%	112 patients 100% Black 77% female, 23% male Mean age = 43 y 100% low income Response rate = 75%	Race IAT examined Black vs White faces associated with positive and negative words. Physicians showed a very slight pro-Black, anti-White (Mean IAT D = -0.10; SD = 0.36). Mean age = 43 y 100% low income Response rate = 75%	Correlation and OLS regression results: For Black patients: Physician verbal dominance during patient encounter ($r = 0.32^*$) ^a Patient treatment adherence at baseline ($r = 0.03^*$) ^a Patient treatment adherence at 4-wk follow-up ($r = 0.11^*$) ^a Patient treatment adherence at 16-wk follow-up ($r = 0.12^*$) ^a Patient trust in physician ($r = 0.03^*$) ^a Physician verbal dominance during patient encounter ($b = 0.33^*$; SE = 0.19) ^a
Haider et al. ³⁵	To estimate unconscious race and social class bias among 1st-year medical students and examine the association of these biases with clinical assessments	Cross-sectional study Baltimore, MD Convenience sampling	202 medical students 54% White, 31% Asian, 6% Black, 6% Hispanic/Latino/Latina, 3% other 52% female, 48% male 16% aged ≤ 21 y, 76% 22-25 y, 8% ≥ 26 y Response rate = 84%	NA	Race IAT examined Black vs White faces associated with positive and negative words. No implicit bias among 17% of medical students. 69% of students demonstrated preference for White over Black. 14% of students demonstrated preference for Black over White. Students showed moderate pro-White, anti-Black bias (Mean IAT D = 0.32; SD = 0.33).	OLS regression and logistic regression results: For Black patient vignettes: Assessment of pain level ($b = -0.35^*$) ^a Appropriate informed consent (OR = 0.60; 95% CI = 0.22, 6.2) ^a Reliability of patient (OR = 2.45; 95% CI = 0.82, 5.36) ^a Trust in patient (OR = 1.22; 95% CI = 0.35, 4.30) ^a For White patient vignettes: Assessment of pain level ($b = -0.69^*$) ^a Appropriate informed consent (OR = 1.50; 95% CI = 0.20, 4.20) ^a Reliability of patient (OR = 1.50; 95% CI = 0.38, 5.80) ^a Trust in patient (OR = 1.34; 95% CI = 0.43, 4.21) ^a

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TABLE 1—Continued

<p>Hausmann et al.³⁶ To examine implicit racial bias of SCI physicians and its association with functioning and well-being for individuals with SCI</p>	<p>Cross-sectional study United States Convenience sampling</p>	<p>14 SCI physicians 57% White, 29% Asian, 7% Black, 7% Pacific Islander 93% male, 7% female Mean age = 48 y 57% had at least 15 y experience in SCI medicine Response rate = 49%</p>	<p>162 patients with neurologic impairments from SCI 60% White, 40% Black 77% male, 33% female Mean age = 40 y Response rate not reported</p>	<p>Race IAT examined Black vs White faces associated with positive and negative words. 100% of SCI physicians show some level of implicit bias toward Black people. Physicians showed strong pro-White, anti-Black bias (Mean IAT D = 0.62; SD = 0.35).</p>	<p>Multilevel logistic and linear regression results for White and Black patients: Patients' social integration (OR = 4.80*; 95% CI = 1.44, 16.04)^a Depression (B = 3.24*)^a Satisfaction with life (B = -4.54*)^a Patient mobility (OR = 0.38; 95% CI = 0.11, 1.35)^a Occupational engagement (OR = 0.61; 95% CI = 0.20, 1.89)^a Physical independence (OR = 2.91; 95% CI = 0.57, 14.80)^a General health status (OR = 1.40; 95% CI = 0.38, 5.16)^a</p>
<p>Penner et al.³⁷ To examine the relationship of non-Black physicians' implicit and explicit racial bias to their perceived behavior and their perceptions of their interactions with Black patients</p>	<p>Cross-sectional study Detroit, MI Convenience sampling</p>	<p>15 primary care physicians 80% Asian, 20% White 53% male, 47% female Mean age = 31 y Response rate = 83%</p>	<p>150 patients 100% Black 75% female and 25% male Mean age = 44 y Response rate = 73%</p>	<p>Race IAT examined Black vs White faces associated with positive and negative words. Physicians showed slight pro-White, anti-Black bias (Mean IAT D = 0.10; SD not reported).</p>	<p>Multilevel modeling with general estimating equation results: Among physicians: Feeling on the same team (b = -0.28†)^a Consultation with patient on treatment decisions (β = 0.22)^a Among Black patients: Physician warmth and friendliness (b = -0.29*)^a Feeling on the same team (b = -0.18)^a Consultation with patient on treatment decisions (b = -0.08)^a Satisfaction with interaction (b = -0.31)^a Composite score of patients' team feelings, physician warmth and friendliness, and satisfaction with interaction (b = -0.26†)^a Correlation results regarding racial differences in ideal treatment recommendations for pain control, UTI management, ADHD, and asthma control: (r = 0.00, r = -0.04)^a (r = 0.16, r = -0.05)^b (r = -0.27, r = 0.09)^c</p>
<p>Sabin et al.³⁸ To assess implicit racial bias among pediatricians</p>	<p>Cross-sectional study Seattle, WA Convenience sample</p>	<p>95 pediatricians (59% resident physicians, 41% attending physicians) 82% White, 18% non-White 65% female, 35% male 42% aged 20–30 y, 33% 31–40 y, 25% > 40 y Response rate = 58%</p>	<p>NA</p>	<p>Race Attitude IAT examined Black vs White faces associated with positive and negative words. Physicians showed slight pro-White, anti-Black bias (Mean IAT D = 0.18; SD = 0.44). Race and Compliant Patient IAT examined Black vs White faces associated with compliant and reluctant patients. Physicians showed a moderate implicit association between complacency and White faces (Mean IAT D = 0.25; SD = 0.42). Race and Quality of Medicine IAT examined Black vs White faces associated with preferred and acceptable medical care. Physicians showed a moderate association between preferred care and Black faces (Mean IAT D = -0.21; SD = 0.33).</p>	<p>Composite score of patients' team feelings, physician warmth and friendliness, and satisfaction with interaction (b = -0.26†)^a Correlation results regarding racial differences in ideal treatment recommendations for pain control, UTI management, ADHD, and asthma control: (r = 0.00, r = -0.04)^a (r = 0.16, r = -0.05)^b (r = -0.27, r = 0.09)^c</p>

Continued

TABLE 1—Continued

Sabin and Greenwald ³⁹	To examine the association between attitudes and beliefs about race among pediatricians and treatment recommendations for asthma, ADHD, UTI, and pain	Cross-sectional study Seattle, WA Convenience sampling	86 pediatricians (59% resident physicians, 41% attending physicians) 82% White, 18% non-White 35% male, 65% female Response rate = 53%	NA	Race IAT examined Black vs White faces associated with positive and negative words. Physicians showed slight pro-White, anti-Black bias (Mean IAT D = 0.18; SD = 0.44). Medical Compliance IAT examined Black vs White faces associated with compliant and reluctant patients. Physicians showed a moderate pro-White implicit race and compliance bias (mean IAT D = 0.25; SD = 0.42). Race-Quality of Care IAT examined Black vs White faces associated with preferred and acceptable medical care. Physicians showed a moderate implicit association of Black patients with preferred medical care (Mean IAT D = -0.21; SD = 0.33).	Correlation results: For White patient vignettes: Recommended ideal treatment of pain ($r = 0.47$) ^a Recommended ideal treatment of UTI ($r = -0.12$) ^a Recommended ideal treatment of ADHD ($r = -0.38$) ^a Recommended ideal treatment of asthma ($r = -0.04$) ^a Recommended ideal treatment of pain ($r = 0.37$) ^b Recommended ideal treatment of UTI ($r = -0.14$) ^b Recommended ideal treatment of ADHD ($r = 0.11$) ^b Recommended ideal treatment of asthma ($r = -0.09$) ^b Recommended ideal treatment of pain ($r = 0.67$) ^c Recommended ideal treatment of UTI ($r = -0.06$) ^c Recommended ideal treatment of ADHD ($r = -0.14$) ^c Recommended ideal treatment of asthma ($r = -0.09$) ^c For Black patient vignettes: Recommended ideal treatment of pain ($r = -0.38$) ^a Recommended ideal treatment of UTI ($r = -0.15$) ^a Recommended ideal treatment of ADHD ($r = 0.49$) ^a Recommended ideal treatment of asthma ($r = -0.10$) ^a Recommended ideal treatment of pain ($r = -0.11$) ^b Recommended ideal treatment of UTI ($r = 0.04$) ^b Recommended ideal treatment of ADHD ($r = 0.04$) ^b Recommended ideal treatment of asthma ($r = 0.16$) ^b Recommended ideal treatment of pain ($r = 0.04$) ^c Recommended ideal treatment of UTI ($r = -0.07$) ^c Recommended ideal treatment of ADHD ($r = -0.21$) ^c Recommended ideal treatment of asthma ($r = 0.43$) ^c

Note. ADHD = attention deficit hyperactivity disorder; CI = confidence interval; IAT = implicit Association Test; NA = not applicable; OLS = ordinary least squares; OR = odds ratio; SCI = spinal cord injury; UTI = urinary tract infection. IAT D score is an effect size: 0 indicates no bias, positive scores indicate preference for White people over people of color, and negative scores indicate preference for people of color over White people.

^a $P < .1$; ^b $P < .05$.

^aAssociation between outcome variable and implicit bias assessed in terms of good vs bad.

^bAssociation between outcome variable and implicit bias assessed in terms of compliant vs noncompliant.

^cAssociation between outcome variable and implicit bias assessed in terms of cooperative vs uncooperative.

^dAssociation between outcome variable and implicit bias composite score.

^eAssociation between outcome variable and implicit bias assessed in terms of high quality of care vs low quality of care.

against individuals with darker versus lighter skin tones; and 1 examined bias against Black, Hispanic, and dark-skinned individuals versus White or light-skinned individuals. Fourteen of the 15 studies used the Implicit Association Test (IAT)⁴¹ to measure implicit bias. The IAT is a computerized categorization task in which participants sort stimuli (e.g., pictures, names, and words) into opposing categories as quickly and as accurately as possible. For example, a participant might demonstrate faster reaction times between negative words (e.g., nasty) and pictures of Black faces than White faces, which would reflect an association between negativity and Black Americans. To score responses on the IAT, a D score is calculated, which is an effect size.⁴² When interpreting IAT D scores, 0 indicates no bias, positive scores indicate preference for White people over people of color, and negative scores indicate preference for people of color over White people. All 14 studies examined associations along the dimension of positive versus negative using words such as wonderful and peace versus words like horrible and evil. Of these studies, 4 also examined associations related to the medical context, such as patient compliance and cooperativeness. Only 1 study²⁵ did not use the IAT, but instead used sequential priming. In this method, faces were presented very briefly, at a subliminal level, followed by positive and negative words to be evaluated. Meta-analytic data suggest that sequential priming measures show evidence of validity similar to that of the IAT.⁴³

Implicit Racial/Ethnic Bias Among Professionals

Of the 15 reviewed studies, 14 found evidence of low to moderate levels of implicit bias against people of color among health care

professionals. Only 1 study reported no evidence of implicit bias against people of color.³⁴ Thirteen studies reported that health care professionals were more likely to associate Black Americans with negative words compared with White Americans. The D scores reported in these studies ranged from -0.10 to 0.62 (mean = 0.28 ; SD = 0.18). Two studies did not provide D scores, but found evidence of low to moderate bias against Black Americans in 42% and 43% of their samples of professionals. Four studies reported prevalence rates of anti-Black bias in their overall sample, which ranged from 42% to 100% (mean = 63.5 ; SD = 23.7). In sum, 13 of 14 studies examining implicit anti-Black bias found that health care professionals tended to possess low to moderate levels of negative associations with Black Americans.

Further, 4 studies found evidence of moderate anti-Black bias in health care professionals' evaluations of Black Americans as patients, with D scores ranging from 0.22 to 0.30 (mean = 0.26 ; SD = 0.03). However, 2 studies also reported that their samples of professionals associated high-quality medical care, as opposed to low-quality care, more with Black Americans than with White Americans.^{38,39} Thus, these 4 studies revealed that, overall, health care professionals associated Black Americans with being less cooperative, less compliant, and less responsible in a medical context.

Four studies reported evidence of moderate levels of implicit bias against Hispanic/Latino/Latina individuals compared with White individuals. Two studies did not report their D scores, but reported that about half of their participants demonstrated moderate to strong implicit bias against

Hispanic/Latino/Latina individuals.^{30,31} One study reported an overall moderate bias against Hispanic/Latino/Latina individuals relative to Whites on the IAT (D = 0.33).²⁶ Further, Bean et al.²⁵ reported that professionals tended to associate Hispanic/Latino/Latina people with noncompliance and risky behavior, and had general stereotypes of them (e.g., that they were unimaginative). These studies suggested that health care professionals possess implicit bias against Hispanic/Latino/Latina individuals at a level comparable to levels of implicit bias against Black Americans.

Finally, 2 studies reported moderate amounts of implicit bias among health care professionals against darker-skinned individuals compared with lighter-skinned individuals.^{29,32} IAT D scores in these studies were 0.33 and 0.31 , which are comparable to the D scores reported in other studies of implicit biases against Black Americans and Hispanic/Latino/Latina individuals.

To characterize the effect size in these studies, we performed a meta-analysis on the 13 studies that reported an effect size or sufficient information to compute one. The weighted mean effect size was $d = 0.34$, which is significantly different from zero ($z = 7.17$; $P < .001$). Tests for heterogeneity of effects were not significant ($Q[12] = 3.94$; $P = .98$) indicating a lack of heterogeneity across samples. Implicit bias scores were robust and showed little variability across studies, suggesting that this moderate effect size may provide a good estimate of the effect in the population of health care professionals.

Implicit Racial/Ethnic Bias and Health Care Outcomes

Ten of the 15 studies examined the relationships between implicit

racial/ethnic bias scores and particular types of health care outcomes. We chose to divide these outcomes into 4 general categories to succinctly summarize the literature: patient-provider interactions, treatment decisions, patient treatment adherence, and patient health outcomes. Within these categories the outcome data source (e.g., patient self-report, provider self-report, and medical records) varied. Five studies focused on patient-provider interactions. Four studies considered treatment decision-making and recommendations. Two examined treatment adherence, and 2 looked at health or mental health outcomes. Among the 80 associations between implicit bias and variables related to patient-provider interactions, 33 were significant or marginally significant. Among the 40 associations between implicit bias and variables related to treatment decisions, 7 were significant or marginally significant. Among the 5 associations between implicit bias and variables related to treatment adherence, 1 was significant. Finally, among the 11 associations between implicit bias and patient health outcomes, 3 were significant. We did not perform a meta-analysis on these associations because the 136 reported associations came from only 10 samples, which poses problems for the assumption that observed effects reflect independent estimates.

There were also differences in the ways implicit bias was measured and the presence of significant associations with health care outcomes. General good versus bad bias was the most common method used to assess bias; however, some studies attempted to tap more nuanced forms of bias in terms of compliant versus non-compliant, cooperative versus

uncooperative, and high versus low quality of care. Among the 84 associations between general bias and health care outcomes, 26 were significant or marginally significant. Among the 102 associations between more nuanced forms of bias and outcomes, 18 were significant or marginally significant. Thus, the more general and perhaps visceral comparison, good versus bad, seemed more often to have an impact on health care outcomes.

Patient–provider interactions. Black patients perceived poorer treatment in domains such as patient centeredness, contextual knowledge of the patient, and patient–provider communication from providers who demonstrated implicit bias against Blacks on the IAT; Latino patients in the same study did not perceive poorer treatment in these domains, although higher percentages of physicians showed bias against them than against Black patients.³⁰ In another study, White and Black patients found physicians with anti-Black bias to be more dominant in their communication styles. Pro-White, anti-Black physician bias was associated with White patients feeling more respected by the physician. However, among Black patients, provider bias was associated with less respect from providers, lower levels of liking the providers, and less willingness to recommend their provider to someone else. They also reported longer visits and experienced their visits with the provider as being less collaborative.³² Another study also found an association between implicit racial bias and verbal dominance by physicians during encounters with Black patients.³⁴ Pro-White attitudes among primary care physicians were associated with lower scores by Black

patients on physician warmth and friendliness, as well as lower scores by physicians regarding their feelings of “being on the same team” with their Black patients.³⁷ Conversely, no significant associations were noted when vignettes were used to assess the impact of bias on medical student responses in terms of assessment of pain delivery or proper informed consent.³⁵

Treatment decisions. When treatment recommendation was used as an outcome, Green et al.³³ found that physicians demonstrating pro-White bias were less likely to recommend thrombolysis to Black patients and more likely to recommend this treatment of White patients. Among pediatricians, Sabin et al.³⁸ found no significant associations between implicit bias and treatment recommendations for pain control, urinary tract infection, attention deficit hyperactivity disorder, and asthma control. Yet in a similar study, Sabin and Greenwald³⁹ found pediatricians recommending the ideal management of pain at lower rates when responding to vignettes of Black patients as opposed to White patients.

Patient treatment adherence. Pro-White bias was associated with Black patients being less likely to fill prescriptions; however, this relationship was not found for Hispanic/Latino/Latina patients.³¹ Another study did not find significant relationships between implicit bias assessed at baseline and Black patient treatment adherence at 4 and 16 weeks follow-up.³⁴

Patient health outcomes. Two studies examined health and mental health outcomes: one with spinal cord injury patients and another with hypertensive patients. The study of physicians specializing in spinal cord injury found significant relations

between implicit bias scores and patient health outcomes.³⁶ Psychosocial health outcomes (i.e., social integration, depression, and life satisfaction) for Black and White patients appeared to be negatively affected by the presence of physician bias in this sample. However, physical health outcomes (i.e., mobility, physical independence, and general health status) appeared uninfluenced by the presence of bias. Another study found no significant associations between implicit bias and hypertension outcomes among Black and Hispanic/Latino/Latina patients.³¹

DISCUSSION

Results of this review suggest that implicit bias against Black, Hispanic/Latino/Latina, and dark-skinned individuals is present among many health care providers of different specialties, levels of training, and levels of experience. Mean IAT scores and prevalence rates of implicit racial/ethnic bias among the reviewed studies are similar to those documented using the general population.⁴⁴ In addition, the levels of implicit bias among health care professionals against Black, Hispanic/Latino/Latina, and dark-skinned people appear to be relatively similar across these groups. Virtually absent in the literature, however, is evidence-based information on how to reduce an individual health care provider’s bias.

The extant literature is also unclear on how implicit bias affects health care outcomes both through direct and indirect pathways. Results were mixed, as some studies reported significant relationships between implicit racial/ethnic bias scores and health care outcomes and other studies found no significant relations.

Nonetheless, implicit bias appears to be more frequently associated with patient–provider interactions and relationships than other outcomes. These findings may imply a pathway by which patient–provider interactions mediate the relationship between provider implicit bias and patient outcomes in terms of treatment adherence and health status. Other factors not considered in this review, such as health care system characteristics, provider background characteristics, and patients with multiple minority identities, may mediate or moderate the ways in which provider attitudes influence patient–provider relationships and health outcomes.

This review also raises questions of how biases may interact in terms of intersecting identities. The patient and professional samples used were predominantly female. Because women in the general population have been shown to have lower levels of implicit racial/ethnic bias,⁴⁵ it is possible that the estimates of bias, both in attitudes and in outcomes, in the samples represented in this review are lower than if the samples of both patient and providers were more gender balanced. Likewise, women, regardless of ethnicity, are more likely than men to experience biased interactions and treatment in care.^{46,47}

Implicit bias toward people of color may indeed interact with other characteristics such as gender, age, sexual orientation, national origin, and disability status to produce differential treatment outcomes. There is evidence of implicit bias based on gender, age, sexual orientation, ethnicity, religion, and disability in the general population.⁴⁴ However, research on implicit bias in health care has tended to focus on race, and few studies have

investigated bias related to other identity characteristics.

Findings from this review suggest that implicit bias may be activated under stressful working conditions. Health profession students demonstrated levels of implicit racial/ethnic bias similar to those of practicing providers; however, students' bias may have been less likely to affect decision-making and outcomes than practitioners' bias. Only 1 study examined the relationship between implicit bias among students and health care outcomes, but it found no significant relationships.³⁵ However, 8 of the 9 studies of practicing providers found significant relationships between implicit bias scores and health care outcomes. Perhaps the impact of bias becomes more pronounced as professionals progress through their health care training and career. Repeated instances of certain patient situations may become engrained as "truths" about an entire population group. For example, Hispanic/Latino/Latina patients often coming to appointments late may lead to a provider's belief that this group does not take responsibility for their health care, and consequently the provider is generally less respectful and pleasant with future Hispanic/Latino/Latina patients. In addition, exposure to bias among providers' peers may reinforce their bias, making them more likely to make treatment decisions that are based on racial/ethnic stereotypes rather than an individual patient's medical status. There is evidence of cultural and institutional bias in health care settings.⁴⁸⁻⁵⁰ Researchers seeking to develop and test interventions to decrease bias should consider multiple targets, including primary prevention for health profession students, interventions for practitioners actively

working with patients, and systemic interventions that neutralize biases that have been institutionalized in health care settings.

Finally, the reviewed studies focused on relatively few health care specialties, making comparisons of implicit bias between areas of health care difficult. Nonetheless, 2 studies^{38,39} of pediatricians in this review found that they had lower levels of implicit bias than other types of health care providers. Certain health care disciplines may be more prone to implicit bias. It is possible that certain types of training address problematic attitudes throughout the education period so that practicing professionals demonstrate lower levels of bias. Within medicine, examinations of the curriculum and comparisons by specialty may prove useful. Interventions for bias may look different according to the needs and realities of particular specialties. For instance, because of time pressure, critical care professionals may need more systemic interventions, whereas specialties such as internal medicine, pediatrics, or family medicine may benefit from a combination of both individual and systemic intervention strategies.

In sum, the current literature suggests that implicit racial/ethnic bias is present in health care and bias can affect health care outcomes. However, the current literature is not strong enough to make definitive statements about the impact of implicit bias because of the methodological limitations of studies in the literature.

Methodological Limitations of Studies

We identified 5 prominent limitations among the studies reviewed. First, all but 2 of the studies used cross-sectional designs. Although cross-sectional

designs are useful in determining the prevalence of a condition within a given population, they have limited ability to determine predictive relationships between variables. Because cross-sectional studies are conducted at 1 point in time, it is difficult to infer causality between a risk factor (e.g., exposure to a biased health care provider) and an outcome (e.g., a patient's psychological distress).

A second limitation was the use of convenience sampling. Although convenience sampling may be highly feasible and efficient, it can lead to the underrepresentation or overrepresentation of particular groups within a sample. It is therefore unlikely that a convenience sample is representative of the population of interest, which raises questions about the generalizations that can be made from the findings.

Small sample size was a third limitation because the studies were estimating the prevalence of implicit bias and quantitatively examining the strength and direction of relationships between bias and health care outcomes. Eight studies had sample sizes of approximately 100 professional participants or less, and 3 of these studies had 15 participants or less. These small sample sizes raise the concern of whether these studies possessed enough statistical power to detect the prevalence of implicit bias in their sample and the effect of implicit bias on health care outcomes. In addition, certain statistical analyses in some studies relied on much smaller samples than the initially reported total sample size (e.g., Sabin and Greenwald³⁹), which reduces the chance of detecting a true effect.

A fourth limitation related to the measurement of implicit bias. Fourteen studies used the IAT to measure implicit bias. Although

the IAT has demonstrated good internal consistency, with Cronbach alphas ranging from 0.70 to 0.90,⁵¹ the instruments' test-retest reliability has been criticized.⁵² The relatively low test-retest reliability of the IAT, ranging from 0.25 to 0.60,⁵³ raises concerns about whether the IAT measures stable implicit attitudes or if other, nonattitudinal factors influence performance on the IAT. For example, contextual information such as whether a Black individual is presented in a positive or negative context influences the degree to which participants make negative associations with Black individuals.⁵⁴ Some researchers have also argued that performance on the IAT might be influenced by individuals' knowledge or awareness about group stereotypes in a society rather than their personal attitudes.⁵⁵⁻⁵⁸ Other researchers have argued that some effects of the IAT may be influenced by whether paired categories are similar in salience.^{59,60} For example, images of people of color may be more salient to the average White participant because of unfamiliarity, whereas negative words may be more salient in general because of their affective nature. Thus, when 2 highly salient categories are paired (e.g., people of color and negative words), participants are quicker to respond than if categories different in salience are paired (e.g., White individuals and negative words). The IAT is the most widely known implicit measure but also the most controversial.^{52,61}

A final limitation was the narrowness in measurement of implicit bias. Most studies focused on bias against Black Americans. Few studies examined implicit bias against Hispanic/Latino/Latina Americans, and no studies

examined bias toward other racial/ethnic minority groups, such as American Indians, Asian Americans, and Arab Americans. These groups also face health disparities,^{1,4} and there is evidence of stereotypical and negative implicit attitudes toward these groups among the general population in the United States.⁴⁴ In addition, no study investigated implicit bias toward immigrants. Many people of color are also immigrants and may face a unique form of prejudice related to their race/ethnicity as well as their immigrant status. Finally, although Black versus White inequalities have tended to dominate the focus of race relations in the United States, Asian, Hispanic/Latino/Latina, and multiracial Americans are the fastest-growing racial/ethnic groups,⁶² and examining bias toward these groups should not be neglected.

Recommendations for Future Research

Implicit attitudes appear to be an important target for further research in health care; however, methodological limitations need to be addressed in future studies to more fully and accurately understand how implicit bias affects care and health. In addition, researchers will need to ask more nuanced questions and use more rigorous designs and analytic methods to fully understand the role, impact, and appropriate intervention strategies for implicit bias within health care.

In the future, cross-sectional studies should primarily be used to ascertain national estimates of implicit bias among health care providers, to examine correlational research questions, or to test exploratory hypotheses. Longitudinal studies are needed to examine causal relations between implicit bias and health care

outcomes. Longitudinal studies could also provide information on changes in implicit bias over time throughout providers' careers and could help identify appropriate intervention points and factors that affect the acquisition of implicit bias. Interventions to address implicit bias are emerging; to date, they are not well tested, although some intervention studies are in process.^{63–65} To evaluate the efficacy and effectiveness of such interventions, researchers should use pretest–posttest cohort designs, well-matched intervention–comparison group pretest–posttest designs, and randomized control trials, which are the gold standard design for measuring intervention impact. Finally, multi-level study designs may be needed to address clustering concerns, such as providers being nested within medical specialties and care delivery sites. Likewise, if the unit of analysis is patients and their experience, patients can be nested within families, providers, and health care settings. Not accounting for clustering during analyses can lead to biased estimated standard errors and spurious results.⁶⁶ Multilevel studies also allow researchers to examine the influence of both provider and institutional bias on health care outcomes.

In terms of sampling, future studies should strive for samples that are more representative. Research on implicit bias would be strengthened by more geographically representative samples of providers and patients. At this point, we know little about whether providers in particular regions are more likely to be influenced by implicit bias than those in other geographic regions. Sampling of providers could be stratified by geographic location or specialty. Although this review focused on bias among various health care

professionals from different specialties and levels of training and experience, future researchers may want to focus on specific groups of providers, such as those from a particular discipline, to investigate training and professional socialization related to implicit bias. In terms of sampling patients, researchers may stratify on the basis of geographic location or patient type. The influence of implicit bias may differ between patients experiencing only acute health problems and those struggling with chronic diseases, or between pediatric and adult patients. When patients are sampled, every effort must be made to extend beyond convenience sampling. Sampling practices should attempt to include all patients, not just those who are easy to reach or those who are nonintermittent patients—patients may stop or avoid care because of discriminatory experiences. In addition, although costly and perhaps difficult to obtain, large national samples would allow for more accurate prevalence estimates of implicit bias among US providers. Large sample sizes also provide more statistical power, which is needed for multilevel modeling, multivariate analyses, and the detection of small or moderate effects in terms of associations between variables and group differences.

A comprehensive understanding of the role of implicit bias in health care will require converging evidence using a wider variety of well-validated implicit measures. Although the research reviewed here relied almost exclusively on the IAT to assess implicit bias, this test is only one of several well-studied implicit assessments. Sequential priming tasks are another well-validated class of implicit measures, and meta-analytic comparisons show that the average association

between priming tasks and behavior ($r=0.28$)⁴³ is similar to the meta-analytic association between the IAT and behavior ($r=0.27$).⁶⁷ Sequential priming tasks include evaluative priming,¹² lexical decision tasks, and the Affect Misattribution Procedure.⁶⁸ Of these, the Affect Misattribution Procedure displays the highest reliability (meta-analytic average Cronbach $\alpha=0.81$)⁶⁹ and associations with behavior (meta-analytic $r=0.35$).⁴³ Because each type of measure has unique strengths and weaknesses, future research should employ a broader array of measures to avoid systematic biases in results.

Future studies should also expand the assessment of implicit bias. Although health disparities are particularly prominent among Black Americans, inequities also exist for other people of color, including American Indians, Asian Americans, and Hispanic/Latino/Latina Americans. Thus, future studies should examine levels of implicit bias among providers regarding these groups and whether bias contributes to health disparities. Researchers should also measure bias based on social identity characteristics in addition to race/ethnicity, such as age, gender, socioeconomic status, national origin, sexual orientation, gender identity, religious orientation, and disability status. Bias can exist on multiple social dimensions, and patients with multiple minority identities may be particularly affected. In addition, measuring various demographic characteristics among patients and providers would allow more advanced hypothesis testing. For example, a patient's gender may moderate the relationship between a provider's implicit racial/ethnic bias and quality of care, and providers in some specialties may

have significantly higher levels of implicit bias than those in other areas (e.g., emergency medicine physicians vs pediatricians).

Finally, findings from this review indicate that we are at the fetal stage of understanding what represents the construct of implicit racial/ethnic bias, how it functions in health care, and what it influences. Theory can be useful as we move forward in this area. However, of the 15 studies reviewed, only 3 were informed explicitly by theory (e.g., aversive racism theory).^{27,31,37} The predictive utility of a theory depends on whether it can be applied to distinguish underlying processes and their respective effects on outcomes. Although implicit attitudes may influence a range of outcomes in health care, very few studies examined the relationship between implicit bias and the end result of care—patient health. Our findings suggest that greater conceptual clarity is needed for interpreting existing differential effects of implicit bias on behavior and patient health outcomes, developing new theories, and designing future studies. New intervention research questions for future studies to consider are on the malleability of implicit bias and the mechanisms for regulating the effects on behavior that contribute to racial/ethnic inequities in health. ■

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