Making Healthcare Safer IV

Healthcare Worker Implicit Bias Training and Education

Rapid Review

Structured Abstract

Objectives. Evaluate the effectiveness and unintended effects of healthcare worker (HCW) implicit bias training and education interventions on patient safety, health, and healthcare outcomes.

Methods. We followed rapid review processes of the Agency for Healthcare Research and Quality Evidence-based Practice Center Program. We searched PubMed, Embase, CINAHL, PsycINFO, and the Cochrane Library from March 2013 to June 2023, in addition to a narrowly focused search for unpublished reports. We included systematic reviews, randomized controlled trials (RCTs), and observational studies with a comparison group that evaluated HCW implicit bias training and education.

Findings. Six primary studies were included (five RCTs and one pre/post study design). No included primary study evaluated HCW implicit bias training and education specifically, but each reported outcomes of interest for related, indirect interventions. One study evaluated cultural sensitivity training versus no training, two evaluated cultural competency training plus feedback versus feedback only, one evaluated communication skills training versus no training, one three-arm study evaluated education versus education plus cross-cultural communication training versus usual care, and one evaluated a communication skills training pre/post implementation. Although four of the six studies found significant improvement in select secondary HCW-related outcomes of interest after training completion, such as cultural awareness, only the pre/post study on communication skills found a significant impact on patient outcomes. Substantial heterogeneity across studies prevented any strength of evidence conclusions.

Conclusions. Only clinically heterogeneous, indirect evidence of interventions related to implicit bias training were identified for primary outcomes of interest. As no included study evaluated HCW implicit bias training and education specifically, no conclusions could be drawn regarding the impact of the intervention on patient outcomes.

PATIENT SAFETY

Contents

1. Background and Purpose

The Agency for Healthcare Research and Quality (AHRQ) Making Healthcare Safer (MHS) reports consolidate information for healthcare providers, health system administrators, researchers, and government agencies about practices that can improve patient safety across the healthcare system—from hospitals to primary care practices, long-term care facilities, and other healthcare settings. In spring 2023, AHRQ launched its fourth iteration of the MHS Report (MHS IV).

Implicit bias training as a patient safety practice (PSP) was identified as high priority for inclusion in the MHS IV reports using a modified Delphi technique by a Technical Expert Panel (TEP) that met in December 2022. The TEP included 15 experts in patient safety with representatives of governmental agencies, healthcare stakeholders, clinical specialists, experts in patient safety issues, and a patient/consumer perspective. See the Making Healthcare Safer IV Prioritization Report for additional details.[1]

In the context of this review, implicit biases are unconscious attitudes and beliefs that may influence behaviors such as nonverbal communication, healthcare worker (HCW) perceptions and clinical assessments about patients, and decisions about patient management.[2] HCWs are defined broadly as people working in facilities who provide direct care to patients including physicians, nurses, pharmacists, allied healthcare professionals, diagnostic staff, ancillary staff, contracted staff, volunteers, students, and trainees. Implicit biases operate outside of conscious awareness and are often anchored on patient characteristics such as race, ethnicity, and gender.[3] Also, socio-demographic characteristics of HCWs (e.g., gender, race, type of healthcare setting, years of experience) are correlated with level of bias.[4] These biases permeate healthcare and can influence judgment and contribute to discriminatory behavior.[5,6] More specifically, HCW implicit bias may lead to inequitable care delivery and poor patient outcomes, perpetuating well-known disparities.[4] For example, a recent systematic review revealed that many HCWs had negative bias toward non-White people, as measured by the Implicit Association Test (IAT), which negatively impacted patient-provider interactions, treatment decisions, treatment adherence, and patient health outcomes.[7] Indeed, another review found that increased provider racial and ethnic bias, as measured by the IAT, consistently correlated with poorer patient-provider interactions.[8] An additional review also showed that physicians demonstrated an implicit preference for White people, as measured by the IAT, but this bias appeared to influence clinical decision making in only two of the nine qualifying studies.[9] Racial inequities in perinatal care have garnered substantial attention and have motivated efforts to mitigate implicit bias.[10] Addressing implicit bias is a fundamental, professional responsibility of all healthcare institutions and providers.[11] HCW implicit bias training and education PSPs may aid in addressing such bias and its negative consequences.

1.1　　Overview of Implicit Bias

HCW implicit bias can impact patient safety through clinical misdiagnosis, pain mismanagement, and lead to other unfavorable patient outcomes.[12] A 2022 RAND report identified reported linkages between implicit bias and patient safety such as underreporting events and shifting blame to vulnerable populations.[13] Training programs for HCWs have arisen to combat implicit bias, with certain states passing legislation mandating implicit bias training for at least some categories of health professionals.[10] Training programs are implemented to equip HCWs with the knowledge and skills needed to prevent biases from influencing the quality of care that they provide.[14] Evidence for implicit bias training is evolving and approaches are widely heterogeneous. Implicit bias training can vary by content and learning objectives. Common objectives of training are to improve HCW awareness, recognition, and management of implicit bias through strategies such as critical reflection, perspective-taking, counter-stereotyping, and skills and knowledge-building.[15] Training can also vary by format (e.g., workshop, academic course), delivery method (e.g., in-person, web-based, in groups), frequency, or length, among other characteristics. It may focus on certain clinical areas or patient populations or take a "one-size-fits-all" approach. Further, it may be provided at any point in the HCW career, from students in degree programs, postgraduate trainees, to seasoned staff, and can be administered in clinical or nonclinical settings. To date, implicit bias training is often evaluated through pre-post surveys or standardized assessments that measure changes in HCW outcomes (e.g., attitudes and beliefs) and is rarely linked to patient health and safety. Implicit bias training that recognizes differential risks of patient safety in marginalized patient groups will be prioritized in this review.

The MHS III report noted that more can be done to explore the link between adverse safety events and provider bias and/or racism. According to the report, several studies show a link between providers' implicit bias and patient communication challenges, as well as healthcare and health outcomes.[4,7]

In the prioritization process, the Making Healthcare Safer IV TEP noted that the PSP was defined to focus on implicit bias training to recognize differential risks of patient safety events in marginalized groups, but the topic could be expanded to include the role of implicit bias in PSPs more generally. As there are several high-quality, recent systematic reviews that evaluate the impact of HCW implicit bias, this review focuses on the effect of HCW implicit bias training specifically and uses previous related systematic reviews to supplement our findings.

1.2　　Purpose of the Rapid Review

The purpose of this review is to determine the effect of HCW implicit bias training and education interventions on key patient and HCW outcomes, including health and healthcare disparities, healthcare-acquired conditions, access to healthcare, healthcare utilization, diagnostic error, mortality, quality (e.g., patient satisfaction), adverse

effects (e.g., HCW burnout and satisfaction) and unintended consequences (e.g., health and healthcare disparities in other populations) and how these interventions may be implemented.

1.3   Review Questions

1. What are the frequency and severity of harms associated with HCW implicit bias?
2. What patient safety measures or indicators have been used to examine the harm associated with HCW implicit bias?
3. What training- and education-related PSPs have been used to prevent or mitigate the harms associated with HCW implicit bias and in what settings have they been used?
4. What is the rationale for PSPs related to HCW implicit bias training and education used to prevent or mitigate the harms?
5. What are the effectiveness and unintended effects of HCW implicit bias training and education PSPs?
6. What are common barriers and facilitators to implementing HCW implicit bias training and education PSPs?
7. What resources (e.g., cost, staff, time) are required for implementation of HCW implicit bias training and education PSPs?
8. What toolkits are available to support implementation of HCW implicit bias training and education PSPs?

2. Methods

For this rapid review, strategic adjustments were made to streamline traditional systematic review processes. We followed adjustments and streamlining processes proposed by the AHRQ Evidence-based Practice Center (EPC) Program. Adjustments included being as specific as possible about the questions, limiting the number of databases searched, modifying search strategies to focus on finding the most valuable studies (i.e., being flexible on sensitivity to increase the specificity of the search), and restricting the search to studies published recently in English and performed in the United States, and having each study's eligibility assessed by a single reviewer. A randomly selected 10 percent sample of excluded citations were checked by a second reviewer. This review focused on HCW training and education PSPs to evaluate the effect on various targeted harms of implicit bias.

We searched for recent high quality systematic reviews and relied heavily on the findings of any such systematic reviews that were found. We did not perform an independent assessment of original studies cited in any such systematic review.

We answered Review Questions 1 and 2 by focusing on the harms and patient safety measures or indicators that are addressed in the studies we found for Review Question 5. For Review Question 2, we additionally focused on identifying relevant measures that are included in the Centers for Medicare & Medicaid Services (CMS) patient safety measures, AHRQ's Patient Safety Indicators, or the National Committee for Quality Assurance (NCQA) patient safety related measures.

We asked our content experts to answer Review Questions 3 and 4 by citing selected references, including PSPs used and explanations of the rationale presented in the studies we found for Review Question 5.

For Review Questions 6 and 7, we focused on the barriers, facilitators, and required resources reported in the studies we found for Review Question 5.

For Review Question 8, we identified publicly available patient safety toolkits developed by AHRQ or other organizations that could help to support implementation of the PSPs. To accomplish that task, we reviewed AHRQ's listing of patient safety related toolkits (see https://www.ahrq.gov/tools/index.html?search_api_views_fulltext=&field_toolkit_topics=14170&sort_by=title&sort_order=ASC) and we included any toolkits mentioned in the studies we found for Review Questions 5–7. We identified toolkits without assessing or endorsing them.

The protocol for this review was registered with PROSPERO (CRD42023456865).

2.1 Eligibility Criteria for Studies of Effectiveness

We searched for original studies and systematic reviews on Review Question 5 according to the inclusion and exclusion criteria presented in Table 1. There were no specific inclusion or exclusion criteria applied to other review questions other than processes for identifying information noted in the methods.

Table 1. Inclusion and exclusion criteria

Study Parameter	Inclusion Criteria	Exclusion Criteria
Population	• All patients under care of HCWs • All HCWs, including trainees and students	• Implicit bias associated with non-HCWs • Simulated or training patients only (i.e., not real-world evidence)

Intervention	• Training and education for implicit bias aimed at HCWs, for example:
	  o Implicit bias awareness, recognition, attitudes, beliefs educational content areas
	  o Debiasing or other mitigation strategies
	  o Educational didactic – synchronous or asynchronous, virtual or in-person
	  o Simulation skills training
	  o Group workshops
		• Non–educational-based interventions for implicit bias (e.g., standardized decision support tools, algorithms, guidelines, or other resources used primarily as reference)
		• Interventions addressing cognitive biases
		• Multicomponent interventions in which the isolated effect of HCW implicit bias training and education cannot be evaluated
		• Training or remediation for mitigation of explicit biases

Comparator	• No HCW implicit bias training and education • Other implicit bias training and education (i.e., other related active comparator with varying modalities, features, or administration) • Same intervention with varying HCW roles or specialties or interdisciplinary or interprofessional	• No concurrent or historical comparison group • No clear description of intervention

Study Parameter	Inclusion Criteria	Exclusion Criteria

Outcome	• Primary outcomes: patient outcomes such as
	  o Mortality
	  o Quality of life
	  o Ability, function
	  o Healthcare access (population health services, preventive health services, time to therapeutic or diagnostic)
	  o Healthcare utilization (emergency department encounters, hospitalizations, readmissions, length of hospital stay, ICU admission)
	  o Diagnostic or other medical errors
	  o Malpractice, medicolegal risk complaints
	
	• Primary outcomes: HCW outcomes, for example
	  o HCW adverse consequences: HCW wellness, satisfaction, burnout
	
	• Secondary outcomes of interest are process outcomes, intermediate outcomes, and effect on communication outcomes and effect on HCW behavior, attitudes, or beliefs such as: Secondary outcomes (included only if they are reported in studies that also report primary outcomes):
	  o Patient satisfaction
	  o Measures of HCW communication effectiveness
	  o Assessment of HCW implicit bias (i.e., awareness, attitudes, beliefs, behaviors)
	  o Implementation outcomes related to implicit bias training
	  (Review Questions 6 and 7)
	  ▪ Barriers and facilitators
	  ▪ Cost, staffing, time
		Studies without patient or HCW outcome or disparity of interest (e.g., synthetic data)

Timing	Any	None
Setting	Any real-world healthcare setting in the United States	• Outside of healthcare (e.g., human resources, financial, legal, education)
Type of studies	Systematic reviews Randomized controlled trials and observational studies with a comparison group, including pre/post studies Studies should include at least 50 HCWs	• Narrative reviews, scoping reviews, editorials, commentaries, and abstracts • Qualitative studies without quantitative data

Abbreviations: CDC = Centers for Disease Control and Prevention; HCW = healthcare workers; ICU = intensive care unit; MHS = Making Healthcare Safer

2.2 Literature Searches for Studies of Effectiveness

Our search strategy focused on biomedical databases expected to have the highest yield of relevant studies, including PubMed, Embase, CINAHL, PsycINFO, and the Cochrane Library. The main search was supplemented by a narrowly focused search for unpublished reports that are publicly available from governmental agencies or

professional societies with a strong interest in the topic, including the Association of American Medical Colleges (AAMC), Accreditation Council for Graduate Medical Education (ACGME), Centers for Disease Control and Prevention (CDC), AHRQ, the National Institutes of Health (NIH), National Quality Forum (NQF), and American Hospital Association (AHA). All searches were limited to March 31, 2013, to June 2023 , which represents the time since searches were completed by a comprehensive systematic review addressing the prevalence and impact of implicit bias among HCWs.[4] For details of the search strategy, see Appendix A.

2.3 Data Extraction (Selecting and Coding)

To efficiently identify studies that meet eligibility criteria, each citation was reviewed by a single team member. A second team member checked a 10 percent sample of excluded citations to verify that important studies were not excluded after the review of titles and abstracts. The full text of each remaining potentially eligible article was similarly reviewed by a single team member to confirm eligibility and extract data. Studies within relevant reviews were also assessed for eligibility. A second team member checked a randomly selected 10 percent sample of excluded full text citations to verify that important studies were not excluded and confirm the accuracy of extracted data. Because no studies were identified that evaluated HCW implicit bias training specifically, indirect studies of related interventions were included that may not have met all portions of the eligibility criteria (e.g., setting/country, participant number, interventions with indirect educational content).

Information was organized according to the review questions: frequency, and severity of the harms (question 1), measures of harm (question 2), characteristics of the PSP (question 3), rationale for the PSP (question 4), outcomes (question 5), implementation barriers and facilitators (question 6), resources needed for implementation (question 7), and description of toolkits (question 8).

2.4 Risk of Bias (Quality) Assessment

No original risk of bias assessment was conducted. The quality of the included primary studies was evaluated previously within the included reviews (sometimes more than once across reviews) using various tools. The results of those assessments are reported in Table 3.

2.5 Strategy for Data Synthesis

The evidence was synthesized narratively for each Review Question. No meta-analysis was conducted given the small number of included studies and diverse outcomes reported. Strength of evidence assessment was not performed based on the lack of available direct evidence and heterogeneity across included studies evaluating indirect interventions.

3. Evidence Summary

3.1   Benefits and Harms

- Six primary studies (five RCTs, one pre/post design) that evaluated indirect, but related interventions were included; only the pre/post study on communication skills training found a significant impact on patient health outcomes (decreased blood pressure or fasting blood glucose levels among patients with hypertension or diabetes, respectively, $p<0.05$).
    - Five of the six studies included primary care physicians (one of which also included nurse practitioners and physician assistants).
    - Two studies included patients with diabetes and/or hypertension, one included only patients with type 2 diabetes, one included only patients with hypertension, one included pediatric patients with persistent asthma, and one included patients receiving home and hospital care (diagnoses not reported).
    - The most frequently reported primary outcomes were changes in patient hemoglobin A1C (HbA1c) and blood pressure.
    - None of the six studies were considered low risk of bias, as determined by previous reviews.
- No included studies evaluated HCW implicit bias training and education specifically; as such, no conclusions could be drawn about the benefits and harms of this intervention.
- Facilitators to implementation of HCW implicit bias training and education cited included interventions based on theoretical frameworks for both implicit bias content and educational curricula. Barriers primarily identified resource constraints including time allotted for education, training and expertise of educational facilitators, and institutional and financial support.
- Forms of culturally focused training have been shown to improve HCW attitudes, beliefs, skills, and behaviors, but how these improvements translate to changes in disparities and patient health and safety outcomes is unclear.

3.2   Future Research Needs

- High quality trials that evaluate the longitudinal impact of theory-based HCW implicit bias training and education on patient health and safety outcomes.
- Research to help determine optimal education frameworks and training, reproducible strategies, and the effective cadence and frequency of such training.
- Toolkits for implementation with demonstrated effectiveness for HCW implicit bias training and related quality measure development to improve patient safety.

4. Evidence Base

4.1 Number of Studies

Our searches retrieved 1,217 unique titles and abstracts from which we screened 261 full text articles for eligibility (Figure 1). No studies were identified that evaluated implicit bias training and education specifically; however, seven reviews and one primary study were identified that evaluated indirect but related interventions. After assessing the included studies within those seven reviews for eligibility, only five primary studies were relevant to this review, resulting in six included primary studies total. A list of excluded studies can be found in Appendix B. Almost all studies that were excluded at full-text screening lacked relevant outcomes.

Figure 1. Results of search and screening
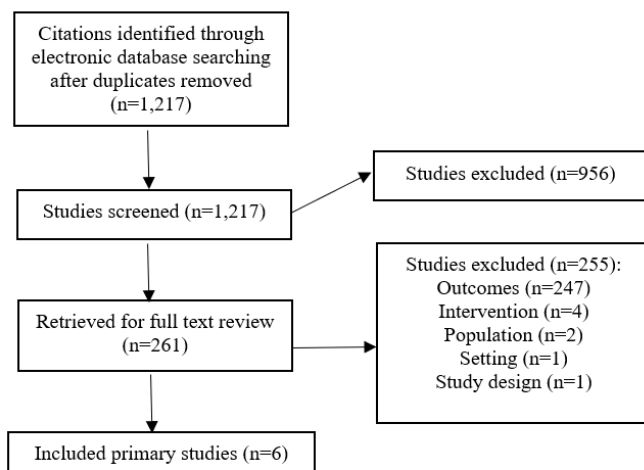
4.2 Findings for Review Questions

4.2.1 Question 1: What Are the Frequency and Severity of Harms Associated With HCW Implicit Bias?

HCW implicit bias can lead to inequitable care delivery, including clinical misdiagnosis and pain mismanagement, and lead to other unfavorable patient outcomes, perpetuating well-known disparities.[4,12] A recent systematic review on implicit bias in HCWs reported that 35 of the 42 included studies found evidence of implicit bias in HCWs and every study that investigated correlations found a significant positive relationship between level of implicit bias and lower quality of

care.[4] Indeed, another recent review revealed that many HCWs had negative bias toward non-White people, as measured by the Implicit Association Test (IAT), which negatively impacted patient-provider interactions, treatment decisions, treatment adherence, and patient health outcomes.[7] Similarly, another review found that increased provider racial and ethnic bias, as measured by the IAT, consistently correlated with poorer patient-provider interactions.[8] An additional review also showed that physicians demonstrated an implicit preference for White people, as measured by the IAT, but this bias appeared to influence clinical decision-making in only two of the nine qualifying studies.[9]

4.2.2   Question 2: What Patient Safety Measures or Indicators Have Been Used To Examine the Harm Associated With HCW Implicit Bias?

There are currently no existing CMS, AHRQ, NCQA patient safety measures or indicators examining the harm associated with HCW implicit bias.[16-18] However, the CMS Innovation Center 2022 Strategic Plan calls for advancing health equity with plans to tackle implicit bias, specifically relating to algorithmic bias. As part of this effort, CMS has moved to modify known biased algorithms to determine beneficiary eligibility including estimated glomerular filtration rate (eGFR), comprehensive joint replacement model, and the Million Hearts® Model.[19] While these efforts do not directly address HCW implicit bias or related training, they encourage clinicians to adopt more equitable algorithms used in their health system. Similarly, select NCWA measures aim to standardize care and track utilization for vulnerable populations, including patients with alcohol and other drug abuse or dependence and individuals with mental health conditions.[17] Such standardization of care through more equitable algorithms and measured focused on marginalized patient populations may indirectly effect HCW implicit bias.

4.2.3   Question 3: What Training- and Education-Related PSPs Have Been Used To Prevent or Mitigate the Harms Associated With HCW Implicit Bias and in What Settings Have They Been Used?

Our search did not find any studies specifically addressing HCW implicit bias training and education effects on patient health and safety outcomes. One review article has explored educational strategies in health professions trainees to mitigate the effects of implicit bias, the majority of which focus on medical students.[20] The focus of this review was on the role of educational interventions to reduce to influence of implicit bias on clinicians' decision making. Only eight studies were identified in this review article, most of which did not use an underlying conceptual framework. Racial implicit bias was the most common, followed by general implicit bias and weight-based implicit bias. A variety of educational approaches

were used, many of which included only a single synchronous session or flipped classroom approach, and few used real-world environments that would be applicable to practicing healthcare workers. A wide variety of educational techniques were employed with the most common being group discussion, readings, critical reflection, and use of the IAT. Assessment strategies were varied and not applicable to practicing healthcare workers. Notably, for future research related to bias and equity initiatives it is important that conceptual frameworks be included in study development and publication to improve the quality of scholarship in this realm.

Another systematic review similarly found a lack of studies in practicing healthcare workers, with the few existing studies failing to adequately describe educational approaches or outcomes relevant to clinical care or patient safety.[21] Studies have shown participant reflection and changes in self-awareness of implicit bias. In health professions education, the IAT has been used as a tool to raise awareness of existing implicit bias and to assess efficacy of educational interventions.[6]

Notably, in 2018, Sukhera et al.[22] proposed a six-point framework for integrating implicit bias training into health professions education. This framework includes the following considerations: "creating a safe and nonthreatening learning context, increasing knowledge about the science of implicit bias, emphasizing how implicit bias influences behaviors and patient outcomes, increasing self-awareness of existing implicit biases, improving conscious efforts to overcome implicit bias, and enhancing awareness of how implicit bias influences others." This framework may help institutions or health systems that wish to incorporate more implicit bias training into their curricula or faculty development approaches.

A narrative review underscores prior evidence findings that contemporary approaches to teaching cultural competence and minority health are generally insufficient to reduce implicit bias among HCWs.[23] A study found that implicit prejudice and stereotyping is present when students begin training in healthcare, and that the level of implicit bias remains constant or increases as students matriculate through their training.[24] Another study found significant increases in medical students' disparate behaviors toward Black standardized patients between their first and second years of medical school.[25] Similar results stemmed from the analysis of data from The Cognitive Habits and Growth Evaluation Study (CHANGES) project.[26] The CHANGES project was a 4-year longitudinal study that tracked implicit and explicit bias among 3959 students across 49 medical schools in the United States. Analyzing CHANGES data, Phelan and colleagues[26] found that whereas implicit bias toward obese patients remained constant, explicit bias increased during the 4 years of medical school. Also using the CHANGES dataset, van Ryn and colleagues[27] identified several informal factors that predicted increases in implicit bias during medical school, such as hearing negative comments from supervising medical attendings about Non-Hispanic Black/African American (AA) patients or having minimal interactions with Black/AA medical students or

attending physicians. The van Ryn paper[27] reported that several formal trainings, such as courses, workshops, and seminars on cultural competence, minority health, and racial healthcare disparities, resulted in small but significant associations with reductions in implicit bias during medical school; however, these effects were eliminated after controlling for other formal training exposures and baseline implicit bias tests. Of the formal curricula variables, having taken an IAT as part of medical school training and self-efficacy regarding care for African American patients persisted in their statistically significant association with reductions in implicit bias. This evidence on both formal interventions as well as the role of hidden curriculum and exposure to diversity in educational settings is useful to guide training efforts to help mitigate bias in clinical settings.

4.2.4 Question 4: What Is the Rationale for PSPs Related to HCW Implicit Bias Training and Education Used To Prevent or Mitigate the Harms?

Our search did not find any studies specifically addressing HCW implicit bias training and education with an eye toward patient safety outcomes. However, multiple strategies have been considered to reduce HCW implicit bias, including increasing awareness of implicit biases and attempts to encourage behavior change.[28]

Most educational interventions designed to reduce implicit bias use a two-step approach that includes (1) making students aware of their implicit biases or self-reflection activities, and (2) providing instruction on strategies they can use to either reduce the activation of implicit associations or control how those associations influence judgment and behavior.[23,27,29-32] Most training workshops with HCWs begin with self-reflection activities as a common educational tool for helping HCWs become aware of bias.[32] However, evidence suggests that awareness, by itself, is insufficient to change HCW perceptions, attitudes, or behaviors toward stigmatized patient groups.[24]

Control strategies focus on instructing HCWs in managing their automatic responses to stigmatized patients, such as affirming egalitarian goals, seeking common-group identities, perspective-taking, and individuation via counter-stereotyping.[29-31] One study by Lai and colleagues[33] compares these strategies and suggests that seeking counter-stereotypic and common-identity information (e.g., shifting group affiliations or boundaries) may be especially effective for reducing implicit bias among a non-healthcare worker sample. Instruction in perspective-taking strategies shows positive effects on implicit bias among HCWs.[34] Blatt et al.[35] demonstrated that a perspective-taking intervention with medical students improved African American/Non-Hispanic Black patient satisfaction relative to the control training.

Several studies have shown the benefit of combining the strategies above in a singular training or educational activity.[36] Two-step training programs that raise

awareness and thereafter provide control strategies have demonstrated changes in HCW biases.[37]

It remains unclear which strategies, either in isolation or combination, work best for reducing implicit bias in patient care. The strategies above are assessed as educational interventions without addressing the patient-facing outcomes of HCW implicit bias. Nevertheless, integrating implicit bias education into existing healthcare training appears necessary to address the role that HCW bias may play in creating disparities in patient outcomes.

4.2.5   Question 5: What Are the Effectiveness and Unintended Effects of HCW Implicit Bias Training and Education PSPs?

No studies were identified that evaluated implicit bias training and education specifically. Seven reviews[38-44] and one primary study[45] were identified that evaluated indirect but related interventions. After assessing the included studies within those seven reviews for eligibility, only five primary studies were relevant to this review, resulting in six included primary studies total (Table 2).[45-50] Other primary studies from the identified reviews were excluded primarily based on outcomes.

Five of the six studies were RCTs and one was mixed methods pre/post study.[50] One study evaluated cultural sensitivity training versus no training,[46] two studies evaluated cultural competency training plus feedback versus feedback only,[47,48] one study evaluated communication skills training versus no training,[49] one three-arm study evaluated education versus education plus cross-cultural communication training versus usual care,[45] and one studied evaluated a communication skills training pre/post implementation.[50] The evidence from these studies is indirectly applicable to implicit bias training. Five of the studies focused on training for primary care physicians (one of which also included nurse practitioners and physician assistants),[48] while one study focused on training for nurses and homecare workers.[46] Two studies included patients with diabetes and/or hypertension,[47,50] one included only patients with type 2 diabetes,[48] one included only patients with hypertension,[49] one included pediatric patients with persistent asthma, and one included patients receiving home and hospital care (diagnoses not reported).[46] Although there was some similarity across studies for patient outcomes reported (e.g., HbA1c, blood pressure), the training focus and content provided in each study varied widely. The substantial heterogeneity across studies prevented any strength of evidence conclusions. Notably, only three of the six studies[45,49,50] were conducted in the last 10 years.

Table 2. Primary study characteristics

Author, Year Country	Study Design	HCW Characteristics	Patient Characteristics	Intervention(s) and Comparator(s)	Timing	Patient Outcome Measures
Majumdar, 2004[46] Canada	RCT	Nurses and homecare workers from two agencies and one hospital (n=114)	Patients receiving home and hospital care (n=133); diagnoses NR	Cultural sensitivity training versus no training (content NR)	36 hours of training over 3 months Assessment at baseline, 3, 6, 9, and 12 months	Satisfaction, use of resources, access to services, mental and physical health, activities of daily living
Thom, 2006[47] USA	Cluster RCT	Primary care physicians (n=53) from four practice sites in single health system	Patients with diabetes and/or hypertension (n=429)	Cultural competency curriculum with feedback (n=23) or feedback only (n=30) Three interactive and experiential modules on cultural knowledge, cross-cultural communication, use of interpreters and cultural brokering; used LEARN model	Half day (4.5 hours) or three sessions of 1-1.5 hours each Assessment at baseline and 6 months	Trust, satisfaction, weight, systolic blood pressure, HbA1c

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Author, Year Country	Study Design	HCW Characteristics	Patient Characteristics	Intervention(s) and Comparator(s)	Timing	Patient Outcome Measures
Sequist, 2010[48] USA	Cluster RCT	Primary care physicians, NPs, PAs (n=124) from eight ambulatory centers in single health system	Patients with type 2 diabetes (n=2,699)	Primary care teams received cultural competency training plus performance reports (n=15) or reports only (n=16) Training was an offsite program addressing trust/bias, disparities, skills to improve cross-cultural care; mix of didactic lectures, group discussions, and engagement activities	Half-day workshop, half-day community engagement Assessment at baseline and 12 months	HbA1c, LDL cholesterol, weight, blood pressure control

Author, Year Country	Study Design	HCW Characteristics	Patient Characteristics	Intervention(s) and Comparator(s)	Timing	Patient Outcome Measures
Manze, 2015[49] USA	RCT	Primary care doctors (n=58)	Patients with hypertension (n=379; n=203 final sample with results)	Communication skills training (n=119) versus no training (n=84) Communication skills training focused on patient-centered counseling and cultural competency. Training used role play and the "5 A's": ask about management, assess medication adherence, advice on pharmacologic treatment, assist with barriers, and arrange follow-up; also included understanding the patient, risks for nonadherence, fears, concerns	2 workshops for 1 hour Followup time variable by outcome	Blood pressure (systolic, diastolic), medication adherence

Author, Year Country	Study Design	HCW Characteristics	Patient Characteristics	Intervention(s) and Comparator(s)	Timing	Patient Outcome Measures
Claramita, 2020[50] Indonesia	Pre/post	Two groups of 15 primary care doctors	Patients with diabetes (n=51) or hypertension (n=45)	Culturally sensitive communication training with "Greet-Invite-Discuss" guideline, a guideline that accommodates the need for culturally sensitive partnership communication (tailored to the Southeast Asian context) Training plus an education session After training, doctors were assigned to have consultations with patients with feedback sessions	4-hour guideline training with a 2-hour followup education on hypertension or diabetes Consultation and feedback sessions conducted over 4 days Assessment at baseline and 6 weeks Focus groups were also conducted	Patient and doctor assessment of doctor communication skills, blood pressure, glucose levels

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Author, Year Country	Study Design	HCW Characteristics	Patient Characteristics	Intervention(s) and Comparator(s)	Timing	Patient Outcome Measures
Patel, 2019[45] USA	RCT	Primary care physicians (n=112)	Pediatric patients with persistent asthma (n=867)	Physician Asthma Care Education (PACE; n=282) versus PACE with cross-cultural communication training (PACE Plus; n=413) versus usual care (n=172) PACE is based on the Model for Managing Chronic Disease (MMCD), which focuses on self-regulated learning and social cognitive theory PACE Plus content focused on cross-cultural communication and working with a translator	Two lectures lasting 2 hours delivered 2 weeks apart Assessment at baseline, 9 months, and 21 months	Changes in ED visits, hospitalization, asthma symptom experience, and patient-provider communication

Abbreviations: ED = emergency department; HCW = healthcare worker; LEARN = listen, engage, acknowledge, respect, negotiate; NP = nurse practitioners; NR = not reported; PA = physician assistant; PACE = physician asthma care education; RCT = randomized controlled trial; QoL = quality of life

Although four of the six studies reported significant improvement in select HCW-related outcomes of interest after training completion,[45,46,48,50] (e.g., understanding, awareness, confidence, and communication ability), only one study reported a significant impact of training on patient health outcomes[50] (Table 3). Specifically, a culturally sensitive communication training that used a guideline (tailored to the Southeast Asian context) plus feedback for primary care doctors was found to significantly decrease blood pressure or fasting blood glucose levels six weeks post implementation ($p<0.05$) among patients with hypertension or diabetes in Indonesia.[50] The quality of this pre/post study was assessed in one of the included reviews[41] using the ROBINS-I tool and was considered to have "Some Concerns." The authors observed potential confounding of post-intervention blood glucose outcomes (e.g., meals were not standardized prior to data collection) and

some risk of social desirability bias related to measures of patient perceptions of doctors' communication attitudes. The other five studies evaluating cultural sensitivity, cultural competency, or cross-cultural communication training showed no impact on patient health outcomes of interest. Each of those five RCTs were also appraised in at least one of the included reviews. None were considered low risk of bias. As no study evaluated HCW implicit bias training and education specifically, no conclusions could be drawn about the impact of this intervention on patient outcomes.

Table 3. Primary study results and quality

Author, Year	Results	Quality Appraisal(s)
Majumdar, 2004[46]	No impact of provider cultural sensitivity training on patient-reported satisfaction, activities of daily living, or resource utilization; modest improvement in patient use of social resources and self-reported functional capacity ("total OARS," no value reported); improvements in provider multicultural understanding, cultural awareness, and ability to communicate with minorities	Moderate, as determined by the review authors (Lie 2011[44]) using tertiles of scores for the STROBE and MERSQI
Thom, 2006[47]	No impact of physician cultural competency training plus feedback on disease-specific or patient-specific outcomes or patient-reported physician cultural competence	Moderate, as determined by the review authors (Lie 2011[44]) using tertiles of scores for the STROBE and MERSQI
Sequist, 2010[48]	The combination of cultural competency training and race-stratified performance reports increased clinician awareness of racial disparities in diabetes care, but did not improve clinical outcomes among Black patients	Moderate, as determined by the review authors (Lie 2011[44]) using tertiles of scores for the STROBE and MERSQI High risk of bias (driven by multiple "unclear" scores), as determined by the review authors (Yao 2021[40]) using the Cochrane risk of bias tool for RCTs Some concerns, as determined by the review authors (Vella 2022[41]) using the RoB2-CRT for RCTs JBI Critical Appraisal Checklist for RCTs used in Wilson 2022[42]) review but overall quality NR
Manze, 2015[49]	No impact of communication skills training on provider counseling, medication adherence, or blood pressure	High risk of bias, as determined by the review authors (Yao 2021[40]) using the Cochrane risk of bias tool for RCTs
Patel, 2019[45]	Over the long-term, PACE Plus physicians reported significant improvements in confidence and use of patient-centered communication and counseling techniques compared with PACE physicians (p<0.01); however, no other significant benefit in primary and secondary outcomes was observed	Some concerns, as determined by the review authors (Vella 2022[41]) using the RoB2-CRT for RCTs

Author, Year	Results	Quality Appraisal(s)
Claramita, 2020[50]	Doctors' self-assessments and patients' perceptions of doctors' communication skills increased significantly (p<0.05). Mean blood pressure of patients with hypertension decreased from 158.3/90.5 mmHg to 137.3/85.7 mmHg (normal Systole/Diastole: <130/90) and mean arterial pressure level decreased from 110.2 to 104.42 (normal: 70–110) (p<0.05). The fasting capillary blood glucose levels of patients with diabetes decreased significantly from 221.15 mg/dl to 185.38 mg/dl (p<0.05), although it did not reach the normal value of <126 mg/dl. The two-hour post-prandial blood glucose levels of patients decreased, but statistically insignificant, lowering from 306.17 mg/dl to 261.11 mg/dl (normal is <140mg/dl). Assessments taken at baseline and 6 weeks	Some concerns, as determined by the review authors (Vella 2022[41]) using the ROBINS-I (and MMAT-2018)

Abbreviations: CRT = cluster randomized trials; JBI = Johanna Briggs Institute; MERSQI = Medical Education Research Study Quality Instrument; MMAT = Mixed Methods Appraisal Tool; OAR = Off-Axis-Ratio; PACE = physician asthma care education; RCT = randomized controlled trial; RoB = risk of bias; ROBINS-I = Risk of Bias in Non-Randomized Studies - of Interventions; STROBE = Strengthening the Reporting of Observational Studies in Epidemiology

4.2.6 Question 6: What Are Common Barriers and Facilitators to Implementing HCW Implicit Bias Training and Education PSPs?

As no eligible studies specific to implicit bias training effects on eligible outcomes were identified, there was no information on barriers and facilitators to effective implementation. However, several studies excluded for eligibility in Review Question 5 were identified during citation screening that described effective strategies for to implementation of implicit bias training PSPs for HCWs and may provide useful context as potential facilitators and barriers.

Education focusing on implicit bias recognition and management skills development was proposed to be conceptually more effective than de-biasing and awareness education in a 2023 scoping review of implicit bias curricular interventions.[51] Specifically, use of transformative learning theory has been postulated to be an effective educational theory framework for delivering implicit bias training.[6,51] While no eligible studies were identified that used skills-based practice and development interventions in clinical settings, multiple aspects of curricula were identified that can be used for the basis of more advanced curriculum implementation to assess theoretic frameworks for educationally sensitive patient outcomes. Use of objective assessment and construct validity of assessment tool was seen in nine (out of 51) studies, several measured assessment 16 weeks or greater post-intervention (n=5/51 studies) compared with immediately after the education, five studies implemented seven or more training sessions in series for learners to achieve greater sustainability, and seven studies described implicit bias training programs that targeted more than one target group of bias (e.g., race, ethnicity, gender, religion). In another scoping review, group

discussion format was most frequently cited (26%, n=9/35 studies) as a facilitator and an aspect of strength for educational formats.[52] A 2022 review examining the effect of educational interventions for both explicit and implicit bias similarly found that the majority of interventions (68%, n=17/25 studies) were able to use interactive formats including classroom and web-based sessions.[6]

Resource availability is frequently cited as a common barrier to implementation of implicit bias training for HCW. A 2022 scoping review characterizing the educational curricula used in implicit bias training interventions of post-graduate physicians found that most studies (53%, n=19/36) cited resource limitations, including time and scheduling, training, financial and institutional support as the most common barriers to implementation of implicit bias training.[52] Over half of the described interventions included only one education session due to scheduling and time constraints of the learners. The 2023 scoping review similarly noted that most studies described implicit bias training programs that were single-session only, used self-assessment rather than objective, validated assessment post-training, measured effects of training to the immediate post-intervention period and instead of longitudinally, and focused on a single area of bias rather than training for multiple biases or implicit bias in general.[51] These limitations reflect commonly cited barriers to implementation of implicit bias training programs. No implicit or explicit bias training interventions included clinical settings in the Vela 2022 review, pointing to the pragmatic challenges of such study designs in the previous literature.[6] A third identified scoping review described implicit bias educational interventions specific to health professional trainees or students with notable findings of heterogeneous and limited interventions.[53] They noted most identified studies lacked an implicit bias content framework (39%, n=11/28 studies), lacked an educational curricular framework (36%, n=10/28 studies), lacked implicit bias learning objectives (43%, n=12/28 studies), and were delivered to a single discipline (78%, n=22/28 studies). Also, only a handful of studies were described for nursing (7%, n=2/28 studies), pharmacy (4%, n=1/28 studies), or allied health sciences fields (4%, n=1/28 studies).

4.2.7 Question 7: What Resources (e.g., Cost, Staff, Time) Are Required for Implementation HCW Implicit Bias Training and Education PSPs?

No information was identified to quantify costs, personnel, time, or related resources required to implement HCW implicit bias training. As these may be highly contextual and heterogeneous depending on setting, learner, and infrastructure, information is provided in this section on criteria or other recommendations for necessary components to implicit bias training for HCWs.

Recommended criteria to develop effective implicit bias training interventions for HCWs have been described, including resources required. These

include formal curriculum development training of educational leads, mandate inclusion in required aspects of training curricula, knowledge, and assessment of evidence-based curriculum design by educators, utilizing patient simulation to practice skills-based development, and objective assessment of skills using validated tools. Resistance to education and assessment was experienced in significant minority of participants exposed to implicit bias education, leading authors to recommend use of trained facilitators, instruction on the assessment tool itself, debriefing strategies, and dedicated instruction on management strategies.[6] A qualitative study of medical students' views on challenges and opportunities in racial and ethnic implicit bias instruction revealed common themes including questioning the presence of bias within themselves, utility of the IAT, and the influence of implicit bias on clinical outcomes.[54] Resistance to implicit bias education from this study also noted that bias is immutable and learned at an early age and that education in implicit bias is common sense, intuitive, and unnecessary.

The 2022 systematic review by Vela et al. examining explicit and implicit bias noted that effects on sustained patient health outcomes were lacking across all health disciplines and all levels of training.[6] Authors of this review suggested that implicit bias training alone is likely insufficient to improve outcomes, but would need to be paired with efforts to eliminate barriers such as structural inequities and need for increased diversity of HCWs.[6]

In the previously described 2023 scoping review, financial support for implicit bias curricula were secured through various mechanisms and agencies for 18 of 51 described studies, including five which received institutional funding.[51] Level of funding or other financial parameters were not reported.

4.2.8 Question 8: What Toolkits Are Available To Support Implementation of HCW Implicit Bias Training and Education PSPs?

No toolkits for implicit bias training for HCWs were identified on the AHRQ Tools site. We identified several articles that offered various forms of tools, tips, and recommendations for implementation of implicit bias training for HCWs. However, none of these tools incorporate guidance for measurement and reporting of patient safety or quality of care. The tools are mostly limited to implementation of educational curricula. The tools are the following:

- A Framework for Integrating Implicit Bias Recognition Into Health Professions Education[22]
- Implicit Bias in Health Professions: From Recognition to Transformation[55]
- Addressing Biases in Patient Care with The 5Rs of Cultural Humility, a Clinician Coaching Tool[56]
- Twelve tips for teaching implicit bias recognition and management[15]

- I'm Biased and So Are You. What Should Organizations Do? A Review of Organizational Implicit-Bias Training Programs[57]
- Recommendations and Guidelines for the Use of Simulation to Address Structural Racism and Implicit Bias[58]
- Confidence, Connection & Collaboration: Creating a Scalable Bias Reduction Improvement Coaching Train-the-Trainer Program to Mitigate Implicit Bias across a Medical Center[59]
- Patient perspectives on racial and ethnic implicit bias in clinical encounters: Implications for curriculum development[60]
- Implicit Bias in Health Professions: From Recognition to Transformation[55]

5. Discussion

5.1 Summary and Interpretation of Findings

This review sought to understand what we know about the impact of implicit bias training and education on key patient and provider outcomes and the feasibility and issues around implementation of such trainings. There is currently no published research on the effectiveness of implicit bias training and education specifically, but six primary studies (five RCTs and one pre/post study) that evaluated related, indirect interventions were identified and included. One study evaluated cultural sensitivity training versus no training, two evaluated cultural competency training plus feedback versus feedback only, one evaluated communication skills training versus no training, one three-arm study evaluated education versus education plus cross-cultural communication training versus usual care, and one evaluated a communication skills training pre/post implementation.

Although four of the six studies found significant improvement in select secondary HCW-related outcomes of interest after training completion, such as cultural awareness, only the pre/post study on communication skills found a significant impact on patient health outcomes. Specifically, a culturally sensitive communication training that used a guideline plus feedback for primary care doctors was found to significantly reduce blood pressure or fasting blood glucose levels 6 weeks post implementation among patients with diabetes or hypertension, respectively, in Indonesia.[50] Substantial heterogeneity across studies prevented any strength of evidence conclusions. None of the six studies were considered low risk of bias.

With only one of six studies reporting any significant effect on patient health outcomes, and previous work suggesting flaws in current educational strategies for HCWs,[20,51,52] more rigorous approaches may be needed. Generally, forms of culturally focused training have been shown to improve HCW attitudes, awareness, skills, and behaviors,[38,39,41] but how these improvements translate to changes in disparities and patient health and safety outcomes needs further investigation.

5.2 Limitations

All searches were limited to 2013 to present which restricts the amount of evidence included, but the cut-off was thoughtfully chosen, as it represents the time since searches were completed by a comprehensive systematic review addressing the prevalence and impact of implicit bias among HCWs.[4] Further, no included study evaluated implicit bias training and education specifically; therefore, only indirect evidence that may not have met all inclusion criteria was discussed. Although related to implicit bias, cultural competency (and other communication skills) are separate constructs. None of the included primary studies were considered low risk of bias, as determined by the review authors. Also, as this was a rapid review, screening and extraction was conducted by a single reviewer. However, a second team member

checked a 10 percent sample of excluded citations at both the title/abstract and full-text stage to verify that important studies were not excluded and confirm accuracy of the data.

5.3 Implications for Clinical Practice and Future Research

As no included study evaluated HCW implicit bias training and education specifically, no conclusions could be drawn on the effectiveness of the intervention on patient outcomes. High quality, pragmatic randomized or other controlled comparative effectiveness trials conducted in real-world clinical settings are needed to evaluate the longitudinal impact of theory-based HCW implicit bias training and education on patient health and safety outcomes. As previously noted in the 2022 RAND report on the linkage between patient safety and implicit bias, evidence on causality is available but limited and frequently reported in editorial and commentary forms and further empirical evidence is needed related to implicit bias, HCW training, and patient safety. Further, research should aim to determine optimal education frameworks and training, reproducible strategies, and the effective cadence and frequency of such training. Finally, there is a need for toolkits for implementation with demonstrated effectiveness for HCW implicit bias training and related quality measure development to improve patient safety.

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Disclaimers

The information in this report is intended to help healthcare decision makers—patients and clinicians, health system leaders, and policymakers, among others—make well-informed decisions and thereby improve the quality of healthcare services. This report is not intended to be a substitute for the application of clinical judgment. Anyone who makes decisions concerning the provision of clinical care should consider this report in the same way as any medical reference and in conjunction with all other pertinent information, i.e., in the context of available resources and circumstances presented by individual patients.

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Afterword

Recognized for excellence in conducting comprehensive systematic reviews, the Agency for Healthcare Research and Quality (AHRQ) Evidence-based Practice Center (EPC) Program is developing a range of rapid evidence products to assist end-users in making specific decisions in a limited timeframe. AHRQ recognizes that people are struggling with urgent questions on how to make healthcare safer. AHRQ is using this rapid format for the fourth edition of its Making Healthcare Safer series of reports, produced by the EPC Program and the General Patient Safety Program. To shorten timelines, reviewers make strategic choices about which processes to abridge. However, the adaptations made for expediency may limit the certainty and generalizability of the findings from the review, particularly in areas with a large literature base. Transparent reporting of the methods used and the resulting limitations of the evidence synthesis are extremely important.

AHRQ expects that these rapid evidence products will be helpful to health plans, providers, purchasers, government programs, and the healthcare system as a whole. Transparency and stakeholder input are essential to AHRQ. If you have comments related to this report, they may be sent by mail to the Task Order Officer named below at: Agency for Healthcare Research and Quality, 5600 Fishers Lane, Rockville, MD 20857, or by email to MHS@ahrq.hhs.gov.

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Appendixes

Appendix A. Methods

Search Strategies for Published Literature

Table A-1. PubMed search strategy (includes Cochrane Database of Systematic Reviews)

Set	Description	Search Terms
1	Implicit Bias/Bias	implicit bias[mh] OR implicit bias*[ti] OR interpersonal bias*[ti] OR subconscious bias*[ti] OR unconscious bias*[ti]
2	Related Vocabulary	social discrimination[mh] OR bias*[ti] OR discriminat*[ti] OR microaggress*[ti] OR prejudic*[ti] OR stigma[ti] OR stereotype*[ti]
3	Forms of Discrimination and Bias	ableism[ti] OR ableist[ti] OR addict*[ti] OR addiction[ti] OR age[ti] OR ageist[ti] OR ageism[ti] OR cultur*[ti] OR disabilit*[ti] OR disabled[ti] OR disadvantaged[ti] OR disparit*[ti] OR ethnic*[ti] OR felon*[ti] or homeless*[ti] OR gay[ti] OR gender[ti] OR homophobi*[ti] OR homosexual*[ti] OR immigrant*[ti] OR impoverish*[ti] OR incarcerat*[ti] OR inequit*[ti] OR institutionalised[ti] OR institutionalized[ti] OR lgbtq*[ti] OR "low income"[ti] OR marginalised[ti] OR marginalized[ti] OR mental health[ti] OR mental illness[ti] OR mentally ill[ti] OR multicultural*[ti] OR migrant*[ti] OR minorit*[ti] OR obese[ti] OR obesity[ti] OR offender*[ti] OR oppress*[ti] OR overweight[ti] OR prison*[ti] OR poverty[ti] OR race[ti] OR racial[ti] OR racism[ti] OR racist[ti] OR refugee[ti] OR sexism[ti] OR sexist[ti] OR sexual*[ti] OR socioeconomic*[ti] OR transgender[ti] OR undocumented[ti] OR unhoused[ti] OR vulnerab*[ti]
4	Related Vocabulary	cultural competency[majr] OR cultural diversity[mh] OR diversity, equity, inclusion[mh] OR advoca*[ti] OR "anti-opp*"[ti] OR antiopp*[ti] OR "anti-rac*"[ti] OR antirac*[ti] OR critical consciousness[ti] OR "cultural competenc*"[ti] OR culturally competent[ti] OR cultural effectiveness[ti] OR culturally effective[ti] OR culturally humble[ti] OR cultural humility[ti] OR "cultural responsiv*"[ti] OR culturally responsive[ti] OR cultural safety[ti] OR culturally safe[ti] OR cultural sensitivity[ti] OR culturally sensitive[ti] OR divers*[ti] OR equity[ti] OR equality[ti] OR inclusion[ti] OR inclusiv*[ti] OR perspective-taking[ti] OR social justice[ti] OR "structural competenc*"[ti] OR structurally competent[ti]

Set	Description	Search Terms
5	Training and Educational Interventions	education[majr:noexp] OR education department, hospital[majr] OR education, medical[majr] OR education, medical, continuing[majr] OR education, medical undergraduate[majr] OR education, nursing[majr] OR education, pharmacy[mh] OR education, professional[majr:noexp] OR inservice training[majr] OR patient simulation[mh] OR preceptorship[mh] OR problem based learning[mh] OR role playing[mh] OR self-directed learning as topic[mh] OR sensitivity training groups[mh] OR address*[ti] OR checklist*[ti] OR class*[ti] OR coach*[ti] OR community[ti] OR course*[ti] OR reflection[ti] OR curriculum*[ti] OR discuss*[ti] OR educat*[ti] OR framework[ti] OR guid*[ti] OR "in-service"[ti] OR inservice[ti] OR instruct*[ti] OR inter-professional[ti] OR interprofessional[ti] OR intervention*[ti] OR learn*[ti] OR lectur*[ti] OR manag*[ti] OR mentor*[ti] OR mitigat*[ti] OR module*[ti] OR multi-professional[ti] OR multiprofessional[ti] OR online[ti] OR professional development[ti] OR program*[ti] OR recogni*[ti] OR reduc*[ti] OR seminar*[ti] OR skill*[ti] OR strateg*[ti] OR student*[ti] OR syllabus[ti] OR teach*[ti] OR technique*[ti] OR train*[ti] OR webinar*[ti] OR workshop*[ti]
6	Combine Concepts	(#1 OR (#2 AND (#3 OR #4))) AND #5
7	Apply Date and Language Limits	#6 AND (2013:2023[pdat] AND english[la])
8	Remove Unwanted Study Designs	#7 NOT (booksdocs[Filter] OR "case reports"[pt] OR comment[pt] OR congress[pt] OR editorial[pt] OR letter[pt] OR "case report"[ti] OR comment[ti] OR commented[ti] OR commenting[ti] OR comments[ti] OR editorial[ti] OR letter[ti] OR news[ti] OR ((protocol[ti] AND (study[ti] OR trial[ti])) NOT ("therapy protocol"[ti] OR "therapy protocols"[ti] OR "treatment protocol"[ti] OR "treatment protocols"[ti])))

Table A-2. Embase.com search strategy

Set	Description	Search Terms
1	Implicit Bias/Bias	'implicit bias'/exp OR ('interpersonal bias*' OR 'subconscious bias*' OR 'unconscious bias*'):ti
2	Related Vocabulary	prejudice/exp OR 'social discrimination'/exp OR (bias* OR discriminat* OR microaggress* OR prejudic* OR stigma OR stereotype*):ti
3	Forms of Discrimination and Bias	(ableism OR ableist OR addict* OR addiction OR age OR ageist OR ageism OR 'critical consciousness' OR cultur* OR disabilit* OR disabled OR disadvantaged OR disparit* OR divers* OR equity OR equality OR ethnic* OR homeless* OR felon* OR gay OR gender OR homophobi* OR homosexual* OR immigrant* OR impoverish* OR incarcerat* OR inequit* OR inclusivity OR institutionalised OR institutionalized OR lgbtq* OR "low income" OR marginalised OR marginalized OR 'mental health' OR 'mental illness' OR 'mentally ill' OR migrant* OR multicultural OR minorit* OR obese OR obesity OR offender* OR oppress* OR overweight OR prison* OR poverty OR race OR racial OR racism OR racist OR refugee* OR sexism OR sexist OR sexual* OR socioeconomic* OR transgender OR unhoused OR undocumented OR vulnerab*):ti

Set	Description	Search Terms
4	Related Vocabulary	'cultural competence'/de OR 'cultural diversity'/de OR 'diversity, equity and inclusion'/de OR ((cultural* OR multicultural) NEXT/2 (aware* OR competen* OR divers* OR effectiv* OR humble OR humility OR responsiv* OR safe* OR sensitiv*)):ti OR (advocat* OR 'anti-opp*' OR antiopp* OR 'anti-rac*' OR antirac OR divers* OR equity OR equality OR inclusion OR inclusiv* OR 'perspective taking' OR 'social justice' OR 'structural* competen*'):ti
5	Training and Educational Interventions	'continuing education'/mj OR 'delivery of healthcare'/mj OR 'education'/mj OR 'in service training'/mj OR 'medical education'/mj OR 'nursing education'/mj OR 'patient simulation'/mj OR 'professional development'/mj OR 'role playing'/mj OR 'self-directed learning'/mj OR 'sensitivity training'/de OR (address* OR checklist* OR class OR classes OR coach* OR community OR course OR reflection OR curriculum OR discuss* OR educat* OR framework OR guid* OR 'in-service' OR inservice OR instruct* OR 'inter-professional' OR interprofessional OR intervention* OR learn* OR lectur* OR manag* OR mentor* OR mitigat* OR module* OR 'multi-professional' OR multiprofessional OR online OR preceptor* OR 'professional development' OR program* OR recogni* OR reduc* OR seminar* OR skill* OR strateg* OR student* OR syllabus OR teach* OR technique* OR train* OR webinar* OR workshop*):ti
6	Combine Concepts	(#1 OR (#2 AND (#3 OR #4))) AND #5
7	Apply Date and Language Limits	#6 AND [2013-2023]/py AND [english]/lim
8	Remove Unwanted Study Designs	#7 NOT ('book'/de OR 'case report'/de OR 'conference paper'/exp OR 'editorial'/de OR 'letter'/de OR (book OR chapter OR conference OR editorial OR letter):it OR [conference abstract]/lim OR [conference paper]/lim OR [conference review]/lim OR [editorial]/lim OR [letter]/lim OR (abstract OR annual OR conference OR congress OR meeting OR proceedings OR sessions OR symposium):nc OR ((book NOT series) OR 'conference proceeding'):pt OR ('case report' OR comment* OR editorial OR letter OR news):ti OR ((protocol AND (study OR trial)) NOT ('therapy protocol*' OR 'treatment protocol*')):ti)

Making Healthcare Safer IV – Implicit Bias Training and Education

Table A-3. CINAHL search strategy

Set	Description	Search Terms
1	Implicit Bias/Bias	MH (implicit bias) OR TI (implicit bias* OR interpersonal bias* OR subconscious bias* OR unconscious bias*)
2	Related Vocabulary	MH (social discrimination) OR TI (bias* OR discriminat* OR microaggress* OR prejudic* OR stigma OR stereotype*)
3	Forms of Discrimination and Bias	TI (ableism OR ableist OR addict* OR addiction OR age OR ageist OR ageism OR cultur* OR disabilit* OR disabled OR disadvantaged OR disparit* OR ethnic* OR felon* or homeless* OR gay OR gender OR homophobi* OR homosexual* OR immigrant* OR impoverish* OR incarcerat* OR inequit* OR institutionalised OR institutionalized OR lgbtq* OR "low income" OR marginalised OR marginalized OR mental health OR mental illness OR mentally ill OR multicultural* OR migrant* OR minorit* OR obese OR obesity OR offender* OR oppress* OR overweight OR prison* OR poverty OR race OR racial OR racism OR racist OR refugee OR sexism OR sexist OR sexual* OR socioeconomic* OR transgender OR undocumented OR unhoused OR vulnerab*)
4	Related Vocabulary	MH (cultural competency OR cultural diversity OR diversity, equity, inclusion) OR TI (advoca* OR "anti-opp*" OR antiopp* OR "anti-rac*" OR antirac* OR critical consciousness OR "cultural competenc*" OR culturally competent OR cultural effectiveness OR culturally effective OR culturally humble OR cultural humility OR "cultural responsiv*" OR culturally responsive OR cultural safety OR culturally safe OR cultural sensitivity OR culturally sensitive OR divers* OR equity OR equality OR inclusion OR inclusiv* OR perspective taking OR social justice OR "structural competenc*" OR structurally competent)
5	Training and Educational Interventions	MH (education OR education department, hospital OR education, medical OR education, medical, continuing OR education, medical undergraduate OR education, nursing OR education, pharmacy OR education, professional OR inservice training OR patient simulation OR preceptorship OR problem based learning OR role playing OR self-directed learning as topic OR sensitivity training groups) OR TI (address* OR checklist* OR class* OR coach* OR community OR course* OR reflection OR curriculum* OR discuss* OR educat* OR framework OR guid* OR "in-service" OR inservice OR instruct* OR inter-professional OR interprofessional OR intervention* OR learn* OR lectur* OR manag* OR mentor* OR mitigat* OR module* OR multi-professional OR multiprofessional OR online OR professional development OR program* OR recogni* OR reduc* OR seminar* OR skill* OR strateg* OR student* OR syllabus OR teach* OR technique* OR train* OR webinar* OR workshop*)
6	Combine Concepts	(S1 OR (S2 AND (S3 OR S4))) AND S5
7	Apply Date and Language Limits, Remove Medline Records	S6 AND Published Date: 20130101-20231231; English Language; Exclude MEDLINE records

Set	Description	Search Terms
8	Remove Unwanted Study Designs	S7 NOT (PT (book OR book chapter OR book review OR commentary OR conference paper OR conference proceeding OR doctoral dissertation OR editorial OR letter OR masters thesis OR proceedings) OR TI ("case report" OR comment* OR editorial OR letter OR news) OR (TI (protocol AND (study OR trial)) NOT TI ("therapy protocol*" OR "treatment protocol*")))

Table A-4. PsycINFO Search Strategy

Set	Description	Search Terms
1	Implicit Bias/Bias	implicit bias/ OR (implicit bias* OR interpersonal bias* OR subconscious bias* OR unconscious bias*).ti.
2	Related Vocabulary	social discrimination/ OR (bias* OR discriminat* OR microaggress* OR prejudic* OR stigma OR stereotype*).ti.
3	Forms of Discrimination and Bias	(ableism OR ableist OR addict* OR addiction OR age OR ageist OR ageism OR cultur* OR disabilit* OR disabled OR disadvantaged OR disparit* OR ethnic* OR felon* OR homeless* OR gay OR gender OR homophobi* OR homosexual* OR immigrant* OR impoverish* OR incarcerat* OR inequit* OR institutionalised OR institutionalized OR lgbtq* OR "low income" OR marginalised OR marginalized OR mental health OR mental illness OR mentally ill OR multicultural* OR migrant* OR minorit* OR obese OR obesity OR offender* OR oppress* OR overweight OR prison* OR poverty OR race OR racial OR racism OR racist OR refugee OR sexism OR sexist OR sexual* OR socioeconomic* OR transgender OR undocumented OR unhoused OR vulnerab*).ti.
4	Related Vocabulary	cultural competence/ OR cultural diversity/ OR cultural sensitivity/ OR cross cultural differences/ OR cross cultural treatment/ OR ethnic diversity/ OR (cultural* ADJ1 (competen* OR divers* OR effective* OR humble OR humility OR responsiv* OR safe* OR sensitiv*)).ti. OR (advoca* OR "anti-opp*" OR antiopp* OR "anti-rac*" OR antirac* OR critical consciousness OR divers* OR equity OR equality OR inclusion OR inclusiv* OR perspective-taking OR social justice OR "structural* competen*").ti.

Making Healthcare Safer IV – Implicit Bias Training and Education

Set	Description	Search Terms
5	Training and Educational Interventions	continuing education/ OR diversity training/ OR education/ OR educational programs/ OR graduate education/ OR higher education/ OR individualized instruction/ OR inservice teacher education/ OR medical education/ OR multicultural education/ OR nursing education/OR problem based learning/ OR role playing/ OR sensitivity training/ OR teacher education/ OR (address* OR checklist* OR class* OR coach* OR course* OR community OR critical reflection OR curriculum* OR discuss* OR educat* OR framework OR guid* OR "in-service" OR inservice OR instruct* OR "inter-professional" OR interprofessional OR intervention* OR learn* OR lectur* OR manag* OR mentor* OR mitigat* OR module* OR "multi-professional" OR multiprofessional OR online OR professional development OR program* OR recogni* OR reduc* OR skill* OR strateg* OR student* OR syllabus OR seminar* OR teach* OR technique* OR train* OR webinar* OR workshop*).ti.
6	Combine Concepts	(1 OR (2 AND (3 OR 4))) AND 5
7	Apply Date and Language Limits	limit 6 to (english language and yr="2013 -Current")
8	Remove Medline Records	7 NOT (1* OR 2* OR 3* OR 4* OR 5* OR 6* OR 7* OR 8* OR 9*).pm.
9	Remove Unwanted Study Designs	8 NOT ((chapter OR "column/opinion" OR "comment/reply" OR dissertation OR editorial OR letter OR review-book).dt. OR (book OR encyclopedia OR "dissertation abstract").pt. OR ("case report" OR comment* OR editorial OR letter OR news).ti. OR ((protocol AND (study OR trial)) NOT ("therapy protocol*" OR "treatment protocol*")).ti.)

Appendix B. List of Excluded Studies Upon Full-Text Review

1. Aggarwal AK, Thompson M, Falik R, et al. Mental illness among us: A new curriculum to reduce mental illness stigma among medical students. Acad Psychiatry. 2013 Nov;37(6):385-91. doi: 10.1007/BF03340074. PMID: 24185285

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3. Alraqiq HM, Sahota SK, Franks CL. Cultural awareness training for dental students. J Dent Educ. 2021 Oct;85(10):1646-54. doi: 10.1002/jdd.12696. PMID: 34091910

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13. Bahrieni F, Azodi P, Hajivandi A, et al. The effect of education in nurse's moral sensitivity. J Pharma Sci Res. 2017 Oct 1;9(10):1817-21.

14. Bamgbade BA, Barner JC, Ford KH. Evaluating the impact of an anti-stigma intervention on pharmacy students' willingness to counsel people living with mental illness. Community Ment Health J. 2017 Jul;53(5):525-33. doi: 10.1007/s10597-016-0075-6. PMID: 27981413

15. Bamgbade BA, Ford KH, Barner JC. Impact of a mental illness stigma awareness intervention on pharmacy student attitudes and knowledge. Am J Pharm Educ. 2016 Jun 25;80(5):80. doi: 10.5688/ajpe80580. PMID: 27402983

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