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Healthcare Systems Level Strategies to Address Racial and Ethnic Disparities in Health and Healthcare: An Evidence Map

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Agency for Healthcare Research and Quality
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5600 Fishers Lane
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www.ahrq.gov

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Investigators:
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Preface

The Agency for Healthcare Research and Quality (AHRQ), through its Evidence-based Practice Centers (EPCs), sponsors the development of evidence reports and technology assessments to assist public- and private-sector organizations in their efforts to improve the quality of healthcare in the United States. The reports and assessments provide organizations with comprehensive, science-based information on common, costly medical conditions and new healthcare technologies and strategies. The EPCs systematically review the relevant scientific literature on topics assigned to them by AHRQ and conduct additional analyses when appropriate prior to developing their reports and assessments.

This EPC evidence report is a Technical Brief. A Technical Brief is a rapid report, typically on an emerging medical technology, strategy or intervention. It provides an overview of key issues related to the intervention—for example, current indications, relevant patient populations and subgroups of interest, outcomes measured, and contextual factors that may affect decisions regarding the intervention. Although Technical Briefs generally focus on interventions for which there are limited published data and too few completed protocol-driven studies to support definitive conclusions, the decision to request a Technical Brief is not solely based on the availability of clinical studies. The goals of the Technical Brief are to provide an early objective description of the state of the science, a potential framework for assessing the applications and implications of the intervention, a summary of ongoing research, and information on future research needs. In particular, through the Technical Brief, AHRQ hopes to gain insight on the appropriate conceptual framework and critical issues that will inform future research.

AHRQ expects that the EPC evidence reports and technology assessments will inform individual health plans, providers, and purchasers as well as the healthcare system as a whole by providing important information to help improve healthcare quality.

If you have comments on this Technical Brief, 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 epc@ahrq.hhs.gov.

Robert Otto Valdez, Ph.D., M.H.S.A.
Director
Agency for Healthcare Research and Quality

Therese Miller, M.D., M.S.
Acting Director
Center for Evidence and Practice Improvement
Agency for Healthcare Research and Quality

Craig A. Umscheid, M.D., M.S.
Director
Evidence-based Practice Center Program
Center for Evidence and Practice Improvement
Agency for Healthcare Research and Quality

Anjali Jain, M.D.
Suchitra Iyer, Ph.D.
Task Order Officers
Center for Evidence and Practice Improvement
Agency for Healthcare Research and Quality

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Healthcare Systems Level Strategies to Address Racial and Ethnic Disparities in Health and Healthcare: An Evidence Map

Structured Abstract

Background. Racial and ethnic minority groups in the United States are at disproportionate risk of experiencing worse health and healthcare outcomes. Effective strategies for healthcare systems are needed to address racial and ethnic health and healthcare disparities.

Purpose. The purpose of this Technical Brief is to provide an evidence map to inform researchers and research funding agencies on the gaps in knowledge and/or research needs for future systematic reviews, as well as to identify existing healthcare system-level interventions to be considered for implementation by healthcare system leaders and policymakers.

Methods. We searched MEDLINE, CINAHL, and Scopus through February 2023 for U.S.-based peer-reviewed published literature. Reference lists of included articles were manually screened to identify additional studies. Our gray literature search focused on pertinent organizations, foundations, and institutes. Relevant systematic reviews were hand searched. We interviewed Key Informants representing stakeholders in health care disparities. Themes identified from Key Informants were used to contextualize findings from published searches.

Findings. Our literature search resulted in 56 unique studies from 63 reports. Most of the studies used randomized controlled trial study designs and were clinic-based, enrolled a combination of race and ethnic populations (Hispanic/Latino people accounted for the highest proportion of studies with a single racial or ethnic group), examined multilevel interventions (particularly patient-plus healthcare-system-level interventions) and included system multilevel QI care process types of interventions targeted at multiple race/ethnic groups. Most system multilevel QI care process types of interventions targeted hypertension. Largely, the interventions showed signs of positive effect. However, inconsistently defined interventions led to uncertainty about their effectiveness. We also identified a lack of important outcomes, particularly, equity outcomes that specifically address health equity/disparity and cost/financial reimbursement outcomes for healthcare systems. Almost no studies examined American Indian/Alaskan Native and Asian groups. No studies reported harms or prioritized sustainability and applicability of the interventions, as well as provided any information on the potential influence of intersectional factors. End-users of study findings were not identified; and culturally adapted interventions and the role of community is still evolving. Key informants provided supplementary information on potential sustainability of interventions. Healthcare system-level interventions are still in the early phases of evolving from research to practice.

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Executive Summary

Main Points

- Hispanic/Latino people accounted for the highest proportion of studies with a single racial or ethnic group; American Indian/Alaskan Native and Asian groups were rarely studied.
- Terms used to describe interventions were inconsistently defined and appear not to have reached a point of operationalization (i.e., standardized stage involving distinct and mutually exclusive definitions).
- Largely, the interventions showed signs of positive effect; however, potential influence of intersectional factors were not addressed, and the varied and ambiguous terms used to describe intervention components, creates uncertainty about their effects.
- Multilevel interventions that included both patient-level and healthcare-system-level components were the most common interventions.
  - Amongst these complex interventions, many were system multilevel quality improvement (QI) care process interventions targeted "multiple race/ethnic groups".
  - System multilevel QI process interventions mostly targeted hypertension.
- Important outcomes were lacking, especially equity outcomes address health equity/disparity and cost/financial reimbursement outcomes for healthcare systems.
- Harms, sustainability, and applicability of the interventions were not prioritized.

Background and Purpose

Health and healthcare disparities have been documented in detail over the last three decades. A renewed call for action and accountability for reducing disparities has emerged in response to the COVID-19 pandemic, which further exposed and worsened healthcare inequities. Incidents of racially disparate police brutality and resulting racial justice protests further escalated the urgency around racial inequities and how to address them.[1] Health and healthcare disparities reflect long standing structural and systemic inequities rooted in racism and discrimination.[2-4] Addressing racial and ethnic health and healthcare disparities requires confronting the complex past and present influences of racism and discrimination in institutions, including healthcare systems. Currently, the evidence on healthcare system-level interventions is unclear, signaling a need for an overview of the body of evidence on these strategies/interventions.

We present an evidence map to inform researchers and research funding agencies on the gaps in knowledge and/or research needs for future systematic reviews, as well as to identify existing healthcare system-level interventions to be considered for implementation by healthcare system leaders and policymakers.

Methods

We employed methods consistent with those outlined in the AHRQ EPC Program Methods Guidance (https://effectivehealthcare.ahrq.gov/topics/cer-methods-guide/overview), and we describe these in the full report [include a hyperlink/URL to the full report on the AHRQ website]. Briefly, we searched MEDLINE, CINAHL, and Social Sciences Citation Index through February 2023 for U.S.-based published literature. Our gray literature search focused on

pertinent organizations, foundations, and institutes. Relevant systematic reviews were hand searched. We interviewed Key Informants representing stakeholders in healthcare disparities.

Findings

We briefly describe our findings below. Our full report contains other findings including: study design, study setting, study funding information; chronic conditions, ambiguity of intervention terms and categories; key informant supplementary information on sustainability of interventions; multidisciplinary approach, community involvement, and cultural adaptation; and important links between public health and healthcare providers.

Executive Summary Table: Summary of findings.

Categories	Findings
Number of studies	56 unique studies from 63 reports
Populations	Studies mostly enrolled a combination of race and ethnic populations (50%). Hispanic/Latino people accounted for the highest proportion of studies with a single racial or ethnic group (27%). Almost no studies enrolled American (1%) Indian/Alaskan Native and Asian groups (1%).
Types of outcomes	Outcomes identified were heterogeneous. Equity outcomes that specifically address health equity/disparity and cost/financial reimbursement outcomes for healthcare systems were particularly lacking.
Types of interventions and reported effects	Majority of the interventions showed widespread positive effects. Interventions were mostly multilevel (88%), patient- plus healthcare-system-level (59%), and system multilevel QI care process types of interventions targeted at "multiple race/ethnic groups". Most system multilevel QI care process types of interventions targeted hypertension. Information on important intersectional factors on the effects of the interventions were insufficient.
Harms, sustainability, and applicability	Not prioritized in the published literature. Key informants provided supplementary information on sustainability.

Abbreviations: QI=quality improvement

Summary and Implications

Firstly, ethnic minority groups such as Native American and Asian groups are not included in the literature, despite their unique disparities in health and healthcare. Second, most interventions were multilevel, patient- plus healthcare system-level, system multilevel QI care process types of interventions targeted at multiple race/ethnic groups. Most of the system multilevel QI process interventions targeted hypertension. Positive effects were commonly observed for included interventions; these good outcome signals are indicative of true effectiveness, and/or possible publication bias within the literature. Third, we found considerable heterogeneity in the terms used to describe the interventions. These terms seem not to have reached a standardized stage involving distinct and mutually exclusive definitions. This leads to uncertainty about the effects of the interventions.

Fourth, we found heterogeneity of outcomes; however, important cost/financial reimbursement outcomes (i.e., monetary incentives to healthcare systems or clinicians) were lacking. This may indicate outcome reporting bias. In addition, it has important implications for healthcare reimbursements for interventions that include healthcare system-level components where reimbursements are a core concern. Further, almost all the interventions lacked an explicit health equity outcome (reported changes in equity of outcomes/disparities outcome), but instead focused on improving health outcomes in the population of interest. This raises questions about

the effects of the interventions on health disparities. Lastly, studies did not address harms, and information applicability and sustainability were lacking. These represent a significant gap in the literature and have important implications for comprehensive study designs that may be applicable in real-world settings.

Next Steps

Healthcare system-level interventions are under-researched, and much work remains to further develop them. Advancing research in this area will be critical to inform future interventions and advance health equity. Areas for future research consideration include: systematic review that fully investigates health system-level interventions and captures the variously defined intervention components; studies that are inclusive of or restricted to Native American Indian/Alaska Native and Asian groups; studies that incorporates outcomes that directly measure equity/health disparity as well as cost/financial reimbursement; and studies with thoughtfully considered study designs that empirically evaluate the harms, applicability and sustainability of the healthcare system-level strategies/interventions. Our full report highlights other potential research opportunities.

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Introduction

Background

Health disparities have reached crisis proportions among racial and ethnic groups across the United States.[1] Defined as preventable differences in disease burden, injury, violence, or opportunities to achieve optimal health among socially disadvantaged populations, health and health care disparities have been documented over the last three decades. For example, mortality rates for colorectal cancer are highest among Black people (19/100,000) and next highest among American Indian or Alaskan Natives (16/100,000) compared with rates of 13.8/100,000 for non-Hispanic whites.[2] A renewed call for action and accountability for reducing disparities has emerged in response to the COVID-19 pandemic, which further exposed and worsened healthcare inequities. In addition, incidents of racially disparate police brutality and resulting racial justice protests further escalated the urgency around racial inequities.[3]

Health and healthcare disparities reflect long standing structural and systemic inequities rooted in racism and discrimination.[3-5] Racism and discrimination harms health and negatively affects healthcare by creating unequal access to resources and power such as housing, education, and employment, known as social determinants of health (SDoH).[6,7] Racism and discrimination can also be individually mediated through stress, leading to the activation of the stress-response cycle and physiologic wear and tear that is associated with chronic diseases.[8-11]

Addressing racial and ethnic health and healthcare disparities requires confronting the complex past and present influences of institutions, including healthcare systems, as well as social, political, economic, and environmental institutions. Our conceptual framework (Figure 1) draws on the National Institute on Minority Health and Health Disparities Research Framework[12] and the work of Purnell and colleagues,[13] which consider the multilevel factors that influence disparities in health and healthcare. The focus on healthcare system change aligns with the call for focusing on structural and systemic causes of health inequities.[3,5,14] The past few years have brought a significant shift towards a "structural competency" perspective rather than a cultural competency approach, indicating that many health and healthcare outcomes previously attributed to aspects of culture may represent the downstream consequences of structural implications such as zoning laws, food systems, and more specifically access to healthcare systems.[15]

Figure 1. Understanding the drivers and interventions to reduce health and healthcare disparities

Racism and Discrimination

Economic Stability	Neighborhood and Physical	Healthcare System	Education	Food security and access	Community, Safety and Social Context

Organizational/institutional level

Clinician level

Patient level

Single level Interventions
Multi-level interventions

Chronic Conditions Outcomes
- Clinical/Health outcomes
- Process of care
- Patient experience of care
- Equity of service
- Care utilization
- Cost/financial reimbursement

The Department of Health and Human Services (HHS)'s Healthy People 2000 established national objectives for improving health and well-being. Since then, efforts to eliminate disparities have increased.[16] The President's Office recently signed an executive order on *Advancing Racial Equity and Support for Underserved Communities Through the Federal Government*, followed by the release of actionable recommendations in the Health Equity Task Force report.[17,18]

However, despite major efforts in research, practice, and policy, racial and ethnic disparities in health and healthcare have not only persisted but escalated. Healthcare system interventions, as shown in Figure 1, offer one avenue by which to address racial and ethnic health and healthcare disparities. Our conceptual framework suggests that these interventions may occur at single or multiple levels of the healthcare system. Additionally, health disparities disproportionately affect individuals and groups that self-identify as having more than one marginalized identity (such as gender, LGBTQIA+ status, disability status, geographic location [rural vs. urban]) alongside race/ethnicity.[19] Intersectionality offers a valuable framework for examining how these social factors interact to reflect the influence of social position and access to resources (e.g., racism) and experience (e.g., discrimination) on people and their health.[20] Since intersectional factors play a role in health disparities, more clarity on how these factors overlap with race and ethnicity may improve the distinct effects of healthcare system-level interventions.[19]

Purpose and Scope

Evidence on healthcare system-level interventions is unclear, signaling a need for an overview of the body of evidence. Our report supplements an Agency for Healthcare Research and Quality (AHRQ) 2012 report, that examined the effectiveness of quality improvement (QI) interventions in reducing disparities in health and healthcare on a limited set of clinical conditions.[21] We expand the scope of the evidence base review by including an unrestricted set of chronic conditions and strategies/interventions targeted more broadly at the healthcare system. This technical brief was designed to present an evidence map on healthcare system-level interventions to address racial/ethnic disparities in health and healthcare, to inform researchers and funding agencies on the gaps in knowledge and/or future research needs including future

systematic reviews, and to identify existing interventions potentially ready for implementation by healthcare system leaders and policy makers.

Guiding Questions

The questions below were developed in collaboration with AHRQ and guided our work on mapping the available evidence on healthcare system level interventions to reduce racial/ethnic disparities in health and healthcare.

What is the current evidence for healthcare system-level strategies (including components of multifaceted strategies) designed to reduce racial and ethnic disparities and improve health outcomes?

a. What interventions have been studied?
b. What racial and ethnic populations have been studied?
c. What are the characteristics of the healthcare systems involved in studies of interventions to reduce disparities (e.g., size, location, private/public, etc.)?
d. What common (multiple and single) chronic conditions have been studied?
e. What primary outcomes have been studied?
f. What are the reported effects (that is a summary of the direction of effects) of the strategies used in studies of interventions to reduce disparities?
g. What are the reported unintended consequences, harms, or adverse events of the strategies used in studies of interventions to reduce disparities?
h. Within race/ethnic groups, what other intersectional influences (e.g., income, sexual orientation, geographic location, language, gender) have been targeted in studies of interventions to reduce disparities?
i. What study designs have been used?
j. What information is available on the applicability and sustainability of interventions?
k. What gaps exist in the current research?

Methods

To address the Guiding Questions listed above, we created an evidence map of primary studies (from the peer-reviewed published literature) focused on healthcare system level strategies/interventions to reduce racial and ethnic disparities in health and healthcare. Where applicable, we supplemented information from the published literature with information from the gray literature and Key Informants interviews.

Evidence maps are an approach to systematically identify and report the range of research activity in broad topic areas.[22] Evidence maps describe the quantity, design, and characteristics of research in broad topic areas.[23] As such, evidence maps are best used to inform research priority setting, and help to define the focus of evidence synthesis such as systematic reviews when there is an abundance and a diversity of research .[22] Despite these conventions, no widely accepted standards yet exist for evidence mapping; instead, products and methods vary based on project goals.[24]

Published Literature

Search Strategies

We conducted a comprehensive literature search from January 2017 through February 2023, searching MEDLINE (Ovid), CINAHL (EBSCOHost) and Scopus (Elsevier B.V.). We also scanned the references cited by included studies. Relevant systematic reviews were hand searched. The search was limited to publications from 2017 to the present due to resource constraints and given that recent initiatives of the National Academy of Medicine have called for innovations in health disparities interventions including multisectoral partnerships to address social determinants of health.[25] (For further details on the search methods, see the review protocol [https://effectivehealthcare.ahrq.gov/products/healthcare-system-level-strategies/protocol] and Appendix A.

Study Selection

We developed criteria for study inclusion and exclusion based on the Guiding Questions and we adapted the standard PICOTS framework (Population, Intervention, Comparators, Outcomes, Timing, and Setting) to outline our eligibility criteria. Studies needed to either focus on specific racial/ethnic minority groups, or, if they enrolled multiple racial/ethnic groups, then racial/ethnic minority groups needed to constitute the majority of the study population. We included only U.S.-based studies with randomized controlled trial study design, non-randomized study designs (non-randomized controlled trials, cohort studies with comparator arms, pre-post, and quality improvement or single-arm studies of implemented strategies with outcomes captured before and after implementation), and mixed-method study designs. In addition, we included studies where the reported strategies/interventions were clearly targeted at the healthcare system-level (e.g., structure of the organization) as well as studies where patient- and/or clinician-level strategies/interventions were incorporated with healthcare system-level interventions. We excluded studies where the strategies/interventions were aimed exclusively at the patient-level and/or clinician-level. Further, we included studies where the aims were relevant to racial/ethnic health disparities, and settings where clinical care was provided, or showed strong linkages to health care systems that provided such care. We excluded studies of medical interventions with

exploratory racial sub-group analyses. We detail our inclusion and exclusion criteria in Appendix B. A list of studies excluded at full text review is provided in Appendix C.

We screened the literature using PICO Portal software at title/abstract and full text.[26] We used PICO Portal's machine learning algorithm to prioritize the literature most likely to be included. Two independent reviewers screened for possible inclusion at title/abstract as well as full text. We resolved conflicts through discussion and consensus with a third reviewer. Content expert team members provided advice where design features were unusual or ambiguous. To ensure that included studies would be reproducible, we confirmed that exclusion reasons were clearly captured. Our review team met at least weekly to discuss questions arising from screening to ensure consistency in interpreting eligibility criteria.

Data Extraction and Data Management

To answer the Guiding Questions, we extracted data from eligible studies into an Excel Spreadsheet for the data extraction table. And as mentioned, review team members met at least weekly to discuss questions arising from data extraction and to ensure consistency in abstraction.

Data Presentation

We used information reported in the included studies to group interventions, outcomes, and reported effect, and we list and define the groups we used in the Findings section of this brief. To develop categories for intervention types, we reviewed the author's descriptions of the interventions, and finalized the categories through discussion and consensus with Content expert team members. We repeated these steps to also develop and categorize outcomes and effect categories.

When reporting study characteristics, we used wherever possible the exact terms used by study authors. When the studies used uncommon terms to name interventions, we grouped them into relatively similar categories based on the way studies described the interventions.

We used bar charts, pie graphs, heat maps, and bubble plots to summarize information relevant to the Guiding Questions. The graphics summarize characteristics of our evidence dataset. Bubble plots provide the ability to display three-dimensional study characteristics data.[27] Evidence tables of data from all included studies are presented in Appendix D.

Gray Literature

We performed supplemental gray literature searches to locate relevant articles that may have been poorly or inaccurately indexed or unindexed. We browsed the first 200 results from Google and Google Scholar for each search string using a combination of terms and word variations. We also browsed relevant organizations to help contextualize our search results. These organization websites included the National Academies of Medicine Culture of Health Program, the Johns Hopkins Center for Health Equity, the American Hospital Association HEAL Health Equity Action Library, the Robert Wood Johnson Foundation Culture of Health Partnerships, the Patient Centered Outcomes Research Institute Portfolio, and the Dissemination & Implementation Models In Health. We provide additional details in Appendix A, including a table of all websites that we browsed.

Discussions with Key Informants

We identified Key Informants representing a broad range of perspectives on healthcare system-level strategies/interventions to reduce racial and ethnic disparities and improve health and healthcare outcomes. We identified potential Key Informants from frequently listed and cited authors of relevant peer-reviewed literature, internet searches for people with relevant viewpoints, AHRQ Learning Health System partnerships and stakeholder lists, and nominations by review team members. We included patient advocates/representatives, advocacy organizations, clinicians, provider organizations, and researchers. When we could not identify a specific individual to represent a specific organization, we invited the organization to nominate an individual.

We conducted semi-structured interviews (60 – 90 minutes) via conference calls in September and October 2022. Key Informant interviews helped us to: identify important strategies/interventions to include in the evidence map; classify types of strategies/interventions; identify potential promising interventions; and inform our navigational strategy for the gray literature and peer-reviewed literature sources.

Prior to the discussions, the Key Informants received invitation letters with a brief description of the project, information on their expected role, appropriate disclosure forms for conflict of interest, and discussion questions. Appendix A provides example interview questions. We tailored questions to the unique expertise and perspectives of our Key Informants. We assigned Key Informants to conference calls based on two affiliation groupings: 1) patient advocates/representatives, and 2) advocacy organizations, clinicians, provider organizations, and researchers. We did this to maximize the synergy of group discussions and minimize unhelpful conflict. We recorded all calls and circulated call summaries (including themes from individual calls and the overall Key Informant discussions) to participants for content confirmation. In addition, we incorporated the themes from the Key Informant interviews as supporting information in the discussion section (Summary and Implications of Findings and Next Steps) in this brief.

Findings

This section addresses the findings of our evidence map from the published literature based on our Guiding Questions. Where relevant, we incorporated findings from the gray literature and Key Informant interviews as discussed in the Methods section of this brief.

Results of Published Literature Searches

Figure 2 presents the literature flow of the search results. Database searches of published literature resulted in 8,180 potentially relevant articles. We identified five additional articles of potential relevance through citation searching. After dual review of abstracts and titles, 471 articles and gray literature reports were selected for full-text dual review; of these, 63 articles[28-90] (reporting on 56 unique studies) met inclusion criteria, and were included in the evidence map. Appendix C provides a list of the articles excluded at full-text screen, sorted by reason for exclusion.

Figure 2. Literature flow PRISMA diagram: search results to included studies
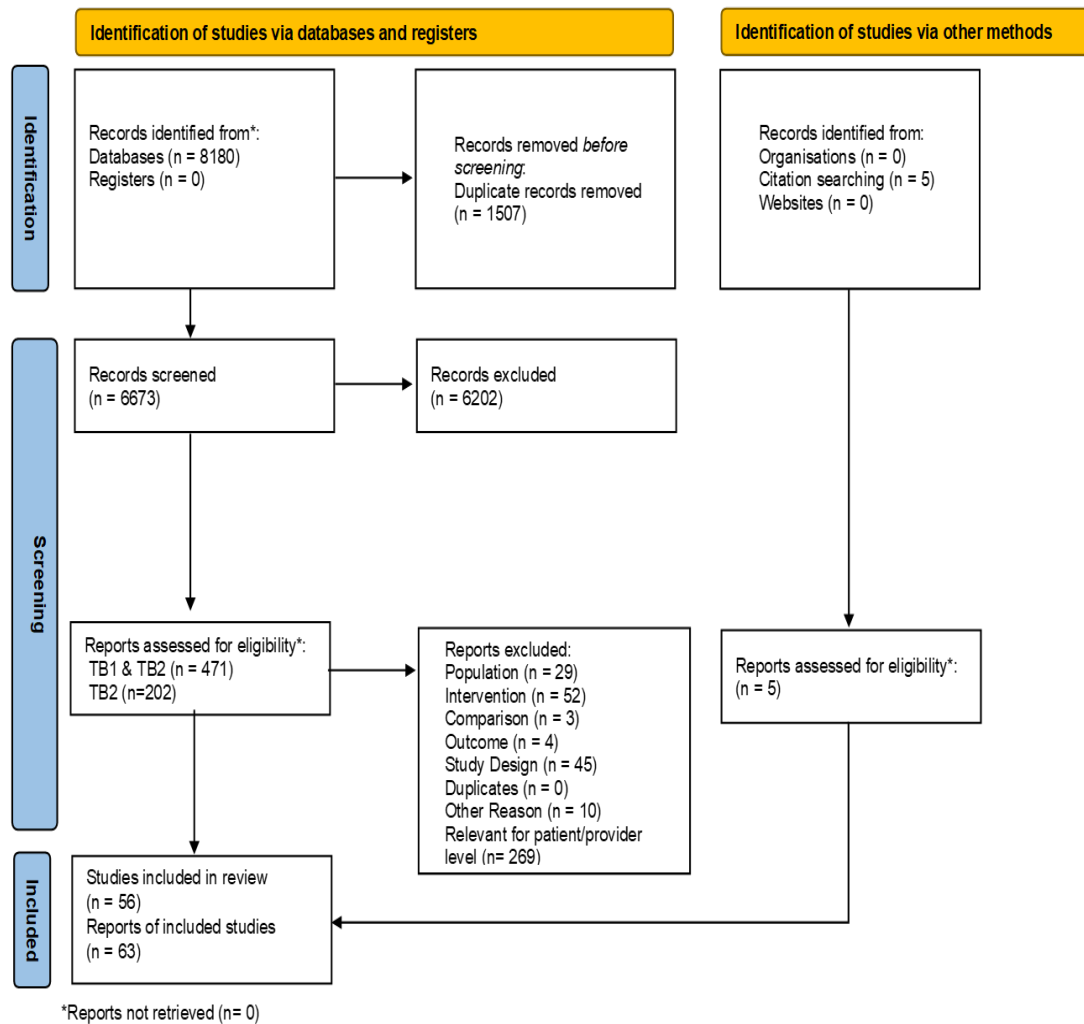
From: Page MJ, McKenzie JE, Bossuyt PM, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi: 10.1136/bmj.n71. For more information, visit: http://www.prisma-statement.org/

Descriptive Evidence Map

Below, we summarize descriptive characteristics of the eligible studies (n=56). Appendix D provides a table with detailed information for each included study. We grouped these summarized descriptive results by study design, setting, population (race/ethnic group), targeted chronic conditions, interventions, and outcomes.

Study Design

A notably large number (30%) of included studies used a randomized controlled study design. The next most common were labeled by the authors as quality improvement (QI) studies and observational cohort studies with comparator arms, each making up 16 percent and 20 percent of the total study designs, respectively. The remaining study design types included pre-post, mixed-methods, non-randomized controlled trials, or implementation science studies to improve understanding of how to implement interventions.

Study Setting

The studies were mostly carried out in clinic-based settings, followed by Federal Qualified Health Centers (FQHCs), then hospital and community-based settings (Figure 3). FQHCs receive federal funding to provide comprehensive health services to underserved populations, thus often may conceptually overlap with clinics, but may also provide hospital or specialty care. The remaining settings included public health systems and nonprofit settings. Community-based settings were used for strategies that reach out to the patient communities, such as interventions based out of churches, local libraries, or community centers. State or large city governments may provide preventive or other health services through public health systems. Only three studies focused on a rural setting.[40,50,72]

Within these settings, interventions to address disparities were delivered by a wide array of personnel. Clinicians, including physicians, nurses, pharmacists, and other allied health professionals, were the most common (Figure 3). Several studies used researchers and implied the job duties would transfer to administrative staff. Patient navigators and community health workers are generally chosen for their ability to represent and reach patient populations, although patient navigators for more severe disease conditions may be trained healthcare staff embedded in the health system. A few studies bypassed personnel by using technology-based interventions such as laboratory health information exchange (LHIE) intervention[39] and electronic centrally routed screening exam information.[28] A few studies used mobile health, or m-Health, such as text messaging, wireless data transmission, and smartphone apps to send health-related information or to direct care.[31,51,61,79]

Studies rarely reported information on the size of the healthcare system where the study took place.

Figure 3. Number of studies by type of study setting by delivery personnel

Study Setting	Intervention Delivery Personnel						
	Multiple	Provider/ Clinician	Community health worker	Researcher/ Admin	Patient Navigator (employee)	Other	NR
Clinic	9	7	4	1	2	5	1
FQHC	6	2				2	
Hospital	4			1	1		
Community-based	3		1	1			1
Public health system	1	1				1	
Nonprofit system		1					
Other	1						

Count of Studies

1   9
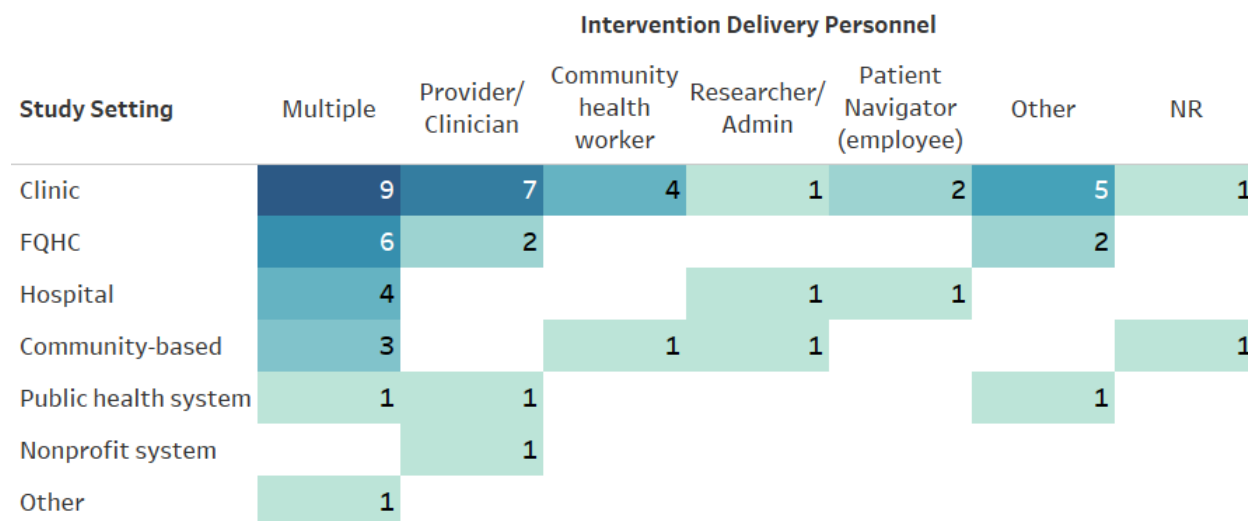
Abbreviation: CHW=community health worker; FQHC=Federal Qualified Health Center; NR=not reported

*Note: The categories for study setting were the exact information reported by the study authors. The definition of these categories may overlap between studies.

Populations

Half of the included studies enrolled participants from more than one racial/ethnic group (Figure 4). Where studies included a single racial and ethnic group, Hispanic people accounted for the highest proportion, followed by African Americans/Blacks (Figure 4). Only one study included exclusively American Indian/Alaskan Native[48] or Asians,[63] respectively.

Figure 4. Percentage of studies by race/ethnicity
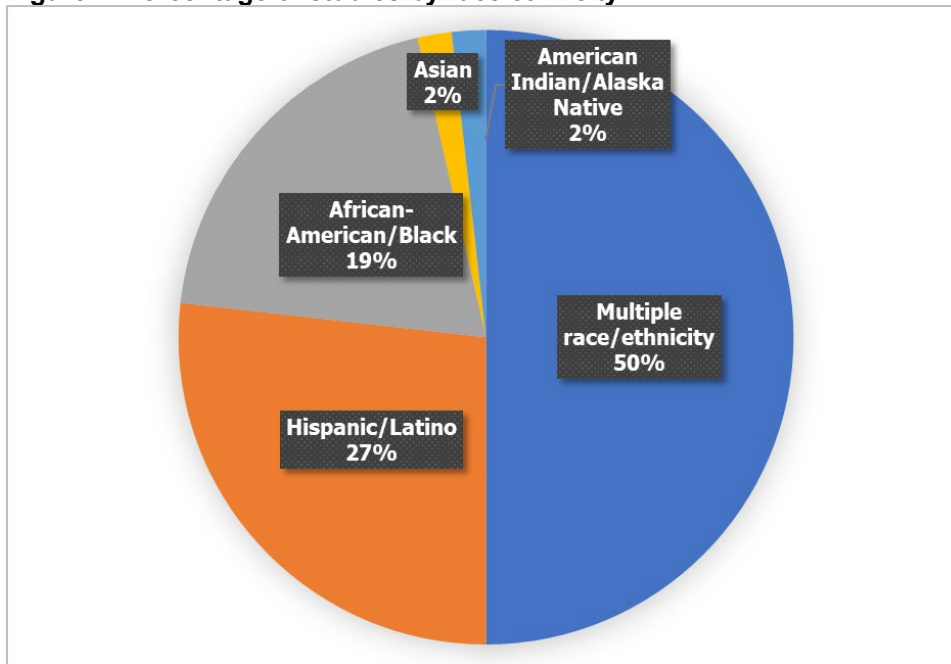
Note: The race/ethnicity groups represent studies that comprise a single racial group, and the multiple race/ethnicity group represents studies that comprise more than one racial or ethnic group

Interventions

Intervention Target Level

Interventions can be implemented in many levels of a complex system. Patient-level interventions refer to those targeted at patients, such as patient education. Clinician-level interventions refer to those targeted at clinicians, such as clinician reminders for medication adherence. Healthcare system-level interventions refer to healthcare system interventions that are targeted at the institutional level of the healthcare system, such as a patient navigation program spanning the medical, financial, and psychosocial aspects of care. Single-level interventions are those that target only one level of the healthcare system, such as the institutional level. Only 14 percent of studies examined single-level interventions (Figure 5). Multilevel interventions are those with components that overlap more than one level of the healthcare system, which in this case it includes interventions that target the institutional level of the healthcare system and clinician and/or patient-level interventions. One example of a multilevel intervention targeted at healthcare system and patient levels would be a multilevel technology-based intervention for a bi-directional exchange of patient laboratory information (between ordering clinicians and laboratory staff) through an existing EHR system.

The majority (59%) of multilevel interventions encompassed both healthcare system and patient-level components. Other multilevel interventions had a combination of healthcare system, clinician, plus patient-level interventions (20% of included studies), and healthcare system plus clinician-level interventions (7% of included studies).

Figure 5. Percentage of studies by intervention level
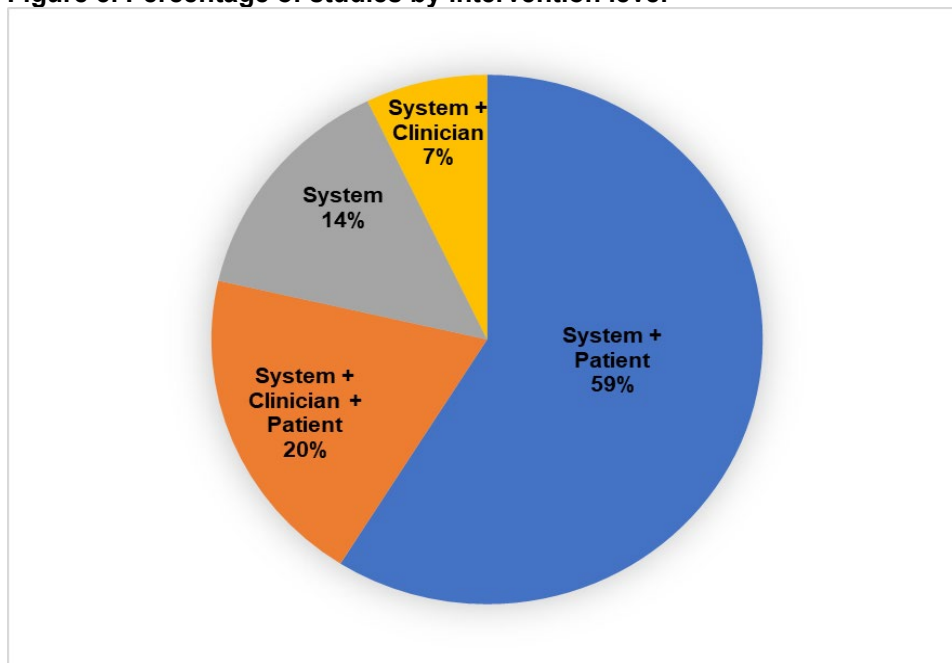
Note: Patient-level interventions refer to interventions that are targeted at the patients only. Clinician-level interventions refer to interventions that are targeted at clinicians only. Healthcare system-level interventions refer to healthcare system interventions that are targeted at the institutional level of the healthcare system. Healthcare system+patient level interventions refer to interventions targeted at both the institutional level of the healthcare system and patients. Healthcare system+clinician level interventions refer to interventions targeted at both the institutional level of the healthcare system and clinicians. Healthcare system+clinician+patient level interventions refer to interventions targeted at the institutional level of the healthcare system, clinicians and patients.

Types/Categories of Interventions

Interventions examined in the included studies did not easily fall into clean categories. We used study author intervention labels where provided, but often had to use study intervention descriptions to categorize the interventions. Through this process, we grouped the interventions into ten categories that we treated as mutually exclusive, regardless of the potential overlap between categories.

The largest category, **System Multilevel QI Care Process,** included interventions often involve re-engineered care processes, including patient registries derived from electronic health records (EHRs), feedback to clinical teams, or clinician dashboards.[33,36,37,41,42,47,48,50,53,59,63,64,73,74,77,80,82-84,88] These interventions varied widely and may have incorporated one of the components listed below. One example of these interventions is a QI project to improve equitable access to cervical cancer screening and management.[59] Following a preparatory stage that included a systematic review of cervical cancer screening, the project included 1) team engagement (team meetings); 2) patient engagement via a tool on cervical cancer screening that was provided in both English and Spanish (an adaptation of the Ottawa Personal Decision Guide); 3) a Well Woman HealthCheck Program WWHP eligibility screening and enrollment tool for registration staff that included updated registration guidelines and a WWHP registration log in which to record all women enrolled in the program; 4) and the implementation of a case log for case management.

Collaborative Care Models offer integrated care across multiple disciplines.[44-46,54,66,67,71,72,78,81] Studies were often self-identified as collaborative care models by the study

authors, but this resulted in extending the use of the term from the original purpose of integrating medical and behavior health to also including collaborative agreements for shared practices between physicians and pharmacists. From the patient side of receiving care provided in a collaborative manner, this distinction may be unimportant. One study that illustrates this approach used a Pharmacist-physician collaborative care model and reduce the time to goal blood pressure in an uninsured population of which 80 percent were Black adults.[44]

Care coordination interventions focus on systematic organization of care activities and assuring shared information between all clinicians or other allied health involved with a patient's care.[43,55,56,58,69,76,90] They may include clinicians or other allied health staff to support medication management. One example of a care coordination study used a primary care medical home model with high levels of care coordination in a network of federally qualified health centers across Florida for a population with multiple race/ethnicities.[58]

Self-management Support interventions with the purpose of helping patients take responsibility for managing their health conditions.[29,31,51,61,79] The interventions may incorporate patient education, appointment reminders, adherence to medication and care plans, behavioral skills training, and group-based counseling, including peer-led support. Self-management support interventions at the system level may take more systemic approaches with multiple staff involved. As an example, one study used clinical staff, using risk model to rank estimates of health benefits from improved adherence to preventive care goals, to engage a predominately Hispanic population with multiple health conditions in shared decision making, and health coaches to enhance patient self-monitoring towards those health.[29]

Technology based single component are interventions that focused on technology-based interventions.[28,32,39] One example is a study that examined 1) implementing an electronic (paperless) workflow, and 2) decreasing wait time for prior comparisons, to decrease screening mammography turnaround time for exams performed by mobile mammography van and urban community health center serving many racial/ethnic groups.[28]

Transition of Care interventions involved intensive care coordination, discharge planning, and possibly home-based care for specific care transitions.[30,49] One illustrative study examined hospital based real-time screening, patient engagement, enrollment, enhanced discharge care coordination, and intensive home visits and telephone follow-up for at least 45 days for high-need, high-cost patients who were predominately non-Hispanic Black.[30]

Other individual intervention categories included a **Patient Education** interventions focused on computer-tailored patient education improved colorectal cancer screening among low-income African Americans.[70] A **Patient Navigation** intervention study used a quality improvement approach to expand a care coordinator's role to include specific patient navigation tasks to improve first appointment completion rates for a multiracial, although majority Black, population with diabetes.[89] A **Prevention/Lifestyle Intervention** compared a system-based colorectal cancer screening outreach intervention consisting of (1) mailed one page English and Spanish invitation, (2) an at-home FIT kit, (3) FIT completion instructions in English and Spanish, and (4) a self-addressed return envelope, with patient navigation for Hispanic patients.[35]

The **Other single component** category captured interventions examining a single component but not otherwise easily grouped. These interventions examined shared medical appointments,[68] group education for community-to-clinic settings,[65] attending one population health program per year, stress management training tools,[62] a hub for patient referral to self-management programs, and a centralized community-clinic linkage hub to connect patients to community resources for participating clinics.[38]

We provide the number of studies in each category in Figure 6.

Figure 6. Number of studies by intervention type by intervention target level

	Intervention Target			
Intervention Categories	Patient + System	System	Clinician + System	Patient + Clinician +System
System multilevel QI care process	12	1	2	5
Collaborative care model	5	4		1
Care coordination	4	2		1
Self-management support	5			
Technology-based single component	1		2	
Transition of care	1	1		
Patient education	1			
Patient navigation	1			
Prevention/Lifestyle support				1
Other single component	3			3

Count of Studies

1   12

Abbreviations: QI=quality improvement

Most of the single-level interventions at the healthcare system level focused on collaborative care models, while multilevel strategies focused on system multilevel QI care processes (Figure 6). Thirty-four percent of included studies reported some form of cultural adaptation of the interventions (e.g., availability of an interpreter, information offered in several languages, and use of culturally aware peers to deliver the interventions). Community partnership/collaboration was reported in 34 percent of included studies.

Chronic Conditions

Figure 7 depicts the distribution of targeted chronic conditions for the included studies. The most common chronic conditions studied were cancer[28,34,35,41,43,45,50,59,65,70,88] and diabetes[46,51,58,61,67-69,76,78,84,89] (11 studies each). The next most common report was multiple chronic conditions[29,30,38,56,57,60,62,71,72,79] (10 studies), followed by hypertension[32,44,47,53,63,64,73,74,77] (9 studies).

Figure 7. Number of studies by target chronic condition
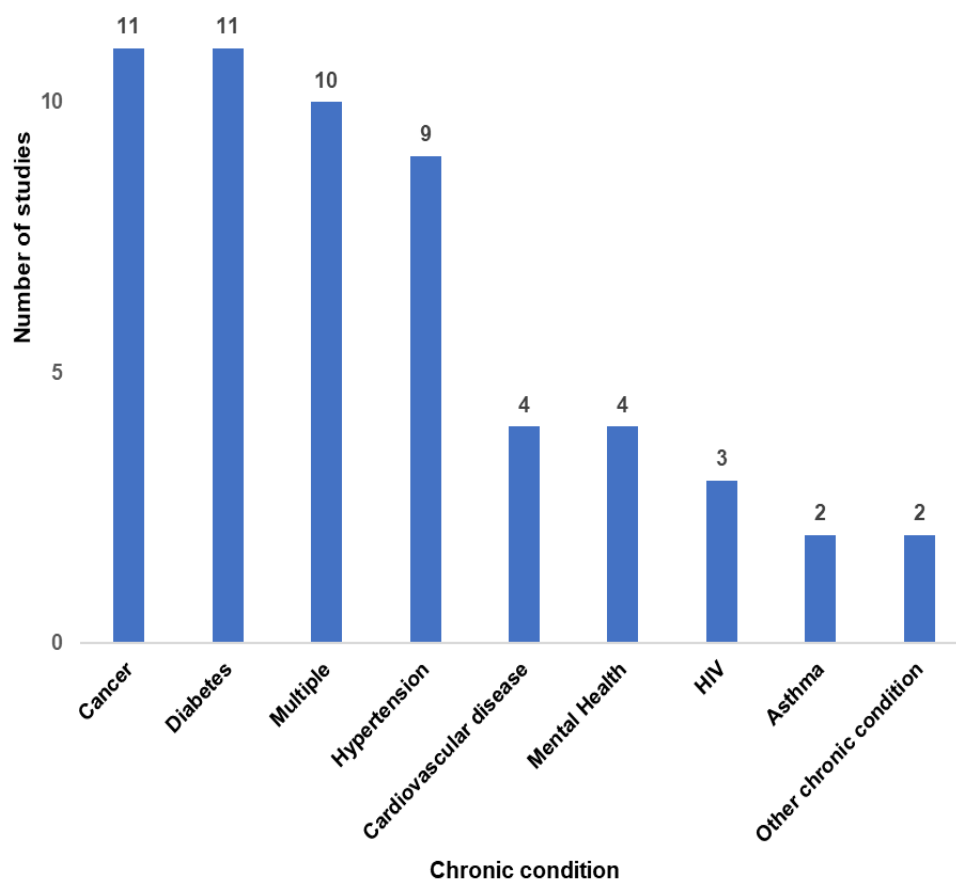
*Note: The categories for target chronic condition were the exact information reported by the study authors.

Intersectional Factors

We identified the intersectional factors addressed within studies by documenting when studies reported distinct effects of patient- and clinician-level interventions on study populations characterized by marginalized social factors (such as gender, LGBTQIA+ status, disability status, geographic location [rural vs. urban]) in addition to race and ethnicity.[19] Studies did not reported on intersectional factors.

Outcomes

We also classified the included studies according to reported outcomes. In creating the outcome categories, we considered the practicality of these categories for use by researchers, research funding agencies, health professionals, managers, and policymakers. Table 1 provides information on the outcome categories used.

Table 1. Outcome categories

Outcome category	Definition and Example outcomes
Clinical outcomes	Change in symptoms, overall health, ability to function, quality of life and survival outcomes that result from giving care to patients. Example: Disease specific morbidity and mortality, blood pressure control, Hba1c levels

Process of care	Execution and compliance with recommended best patient care practice. Example: Turnaround time, physician implementation of specific recommendation
Care utilization	How much healthcare persons use, the type of healthcare and the timing of that care Use of a healthcare service. Example: Uptake of services, completing screening, primary care clinic visits, inpatient hospitalizations, emergency department visits
Equity of service	Promotion of health for all Individuals by adapting services to eliminate disparities in the delivery of services. Example: Treatment completion assessed between a minority racial group (such as African American/Black people) and non-minority racial group (such as White people).
Patient experience of care	Individual patient experience of how healthcare intervention works for them. Example: Patient satisfaction, patient-reported measures of health care access and quality, acceptability (such as confidence in using information given in an intervention)
Multiple outcomes	No one primary outcome was identified, or specifically stated that more than one outcome was a primary outcome. Example: Clinical outcome (such as blood pressure control) and care utilization outcomes (such as primary care clinic visits) reported together in a study with no specifically stated primary outcome.

Studies commonly reported clinical outcomes and process outcomes. Thirty-eight percent (21/56) reported clinical outcomes and 30 percent (17/56) reported process of care outcomes. Studies reported limited information on care utilization,[32,64] patient experience of care,[69] and equity of service[41] (Figure 8). Other important outcomes such as cost/financial reimbursement outcomes (i.e., monetary incentives to healthcare systems or clinicians) were lacking. Reimbursement outcomes were reported alongside other types of outcomes in three of our included studies and categorized as "multiple outcome".

Figure 8. Number of studies by outcome type
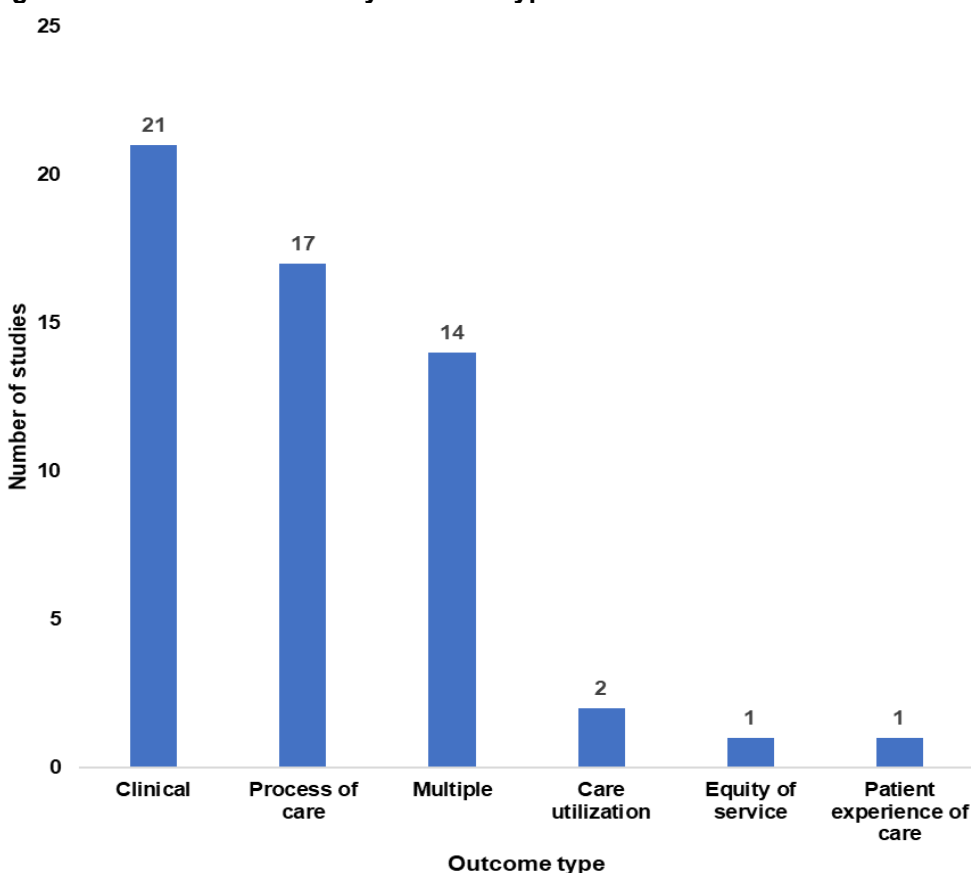
Links Between Public Health and Healthcare Organizations

Most of the studies were unclear about whether the interventions had connections to or partnerships with healthcare providers in which they were studied, or if they had connections with the public health system at the time of the research.

Harms or Adverse Events

We identified no studies that reported harms or adverse events (such as unintended negative consequences, including misallocation of effort, decreased patient satisfaction, stigma etc.) of healthcare system level interventions to address racial disparities in health and healthcare. Similarly, we found no additional information on harms or adverse events of healthcare system level interventions in the gray literature or in discussions with Key Informants.

Applicability and Sustainability of Interventions

In this brief, applicability has been defined as the extent to which the intervention could be implemented in a setting outside of where it has been researched.[91] Almost no studies reported pragmatic information on the applicability of healthcare system interventions. Overall, studies provided little information with which other healthcare organizations might evaluate the intervention's fit to their own local conditions. Two studies highlighted that their interventions were potentially applicable/generalizable to general clinic settings because they tested the intervention under real-world conditions following previous success in a randomized controlled

trial.[61,90] One study focused on a Mobile Insulin Titration Intervention (MITI) program, a multilevel, patient- plus healthcare system-level intervention that helps patients with type 2 diabetes find their correct basal insulin dose without in-person care.[61] The other study examined a Prevention of Cardiovascular Outcomes in African Americans with Diabetes (CHANGE) intervention, a multilevel, patient- plus healthcare system-level intervention aimed to improve adherence to medication for cardiovascular disease.[90]

Sustainability was defined in this brief as the continued use of program components and activities for the ongoing achievement of desirable program and population outcomes.[92] Included studies did not address sustainability of healthcare-system-level interventions. Nor did we locate information on applicability and sustainability of healthcare-system-level interventions in the gray literature.

Information From Key Informant Discussion

Several Key Informants emphasized certain intervention qualities necessary for sustainable impact on health and healthcare disparities. The qualities they emphasized were cultural consideration, engagement of patients and communities, and a holistic approach to addressing patients' medical and social needs. In addition, Key Informants noted significant barriers to sustainability, including lack of financial support, lack of intrinsic motivation, and poor understanding of the time span needed to bring about an impact of the interventions.

Study Funding Information

The biggest funder of the included studies was the government (46%, 26/56), followed by multiple funding sources (9%), academic (5.3%), foundations (5.3%), and other non-profit funding (3.6%). Twenty-seven percent of studies did not report funding source.

Evidence Map – Bubble plots

After examining the descriptive characteristics of the studies, as reported above, we constructed the bubble plots in the sections below to display three-dimensional study characteristics data (i.e., relationship between three variables).[27] We offer these bubble plots to provide richer information for researchers, research funding agencies, health professionals, managers, and policymakers. We grouped bubbled plot results by intervention type and intervention target level in relation to race/ethnic group, chronic conditions and reported effect.

Figure 9 shows the bubble plot by intervention type across targeted chronic conditions. In this plot, each bubble represents one study, and the size of the bubble represents the study sample size for the targeted chronic condition and the intervention type. The color of the bubble represents the reported effect of the intervention as presented in the literature. We did not perform further statistical analysis on the effectiveness information presented by the studies. The most common type of intervention targeted at nearly all chronic conditions was system multilevel QI process intervention. Overall, studies reported positive effects of interventions on the targeted chronic conditions, particularly with the system multilevel QI process interventions. Few studies reported no effect. System multilevel QI process intervention targeted at hypertension, and care coordination intervention targeted at multiple chronic conditions had the most noticeable no effect. Interventions had mixed findings, except patient education, patient navigation, and prevention/lifestyle support.

Figure 9. Type of intervention by chronic condition by direction of effect
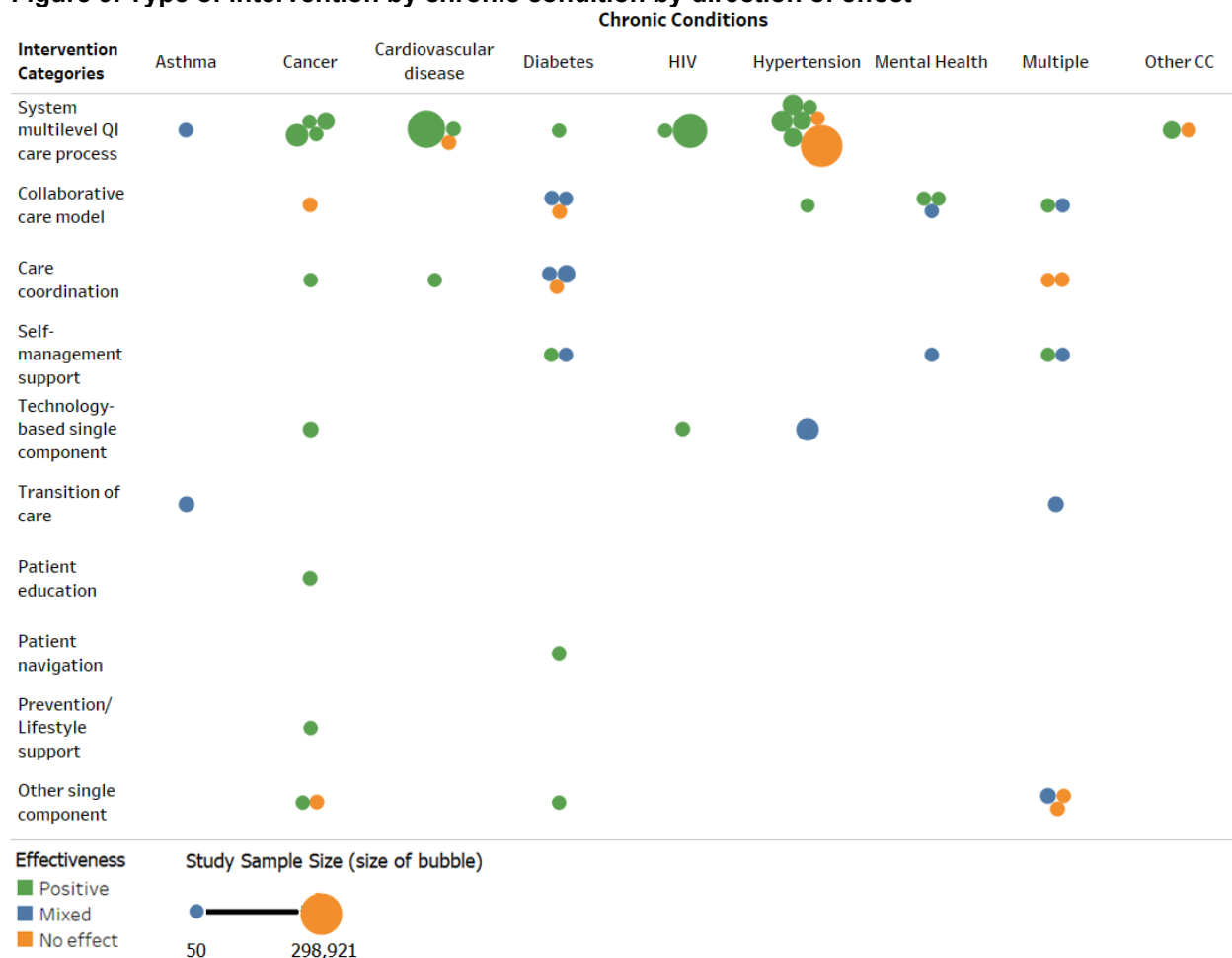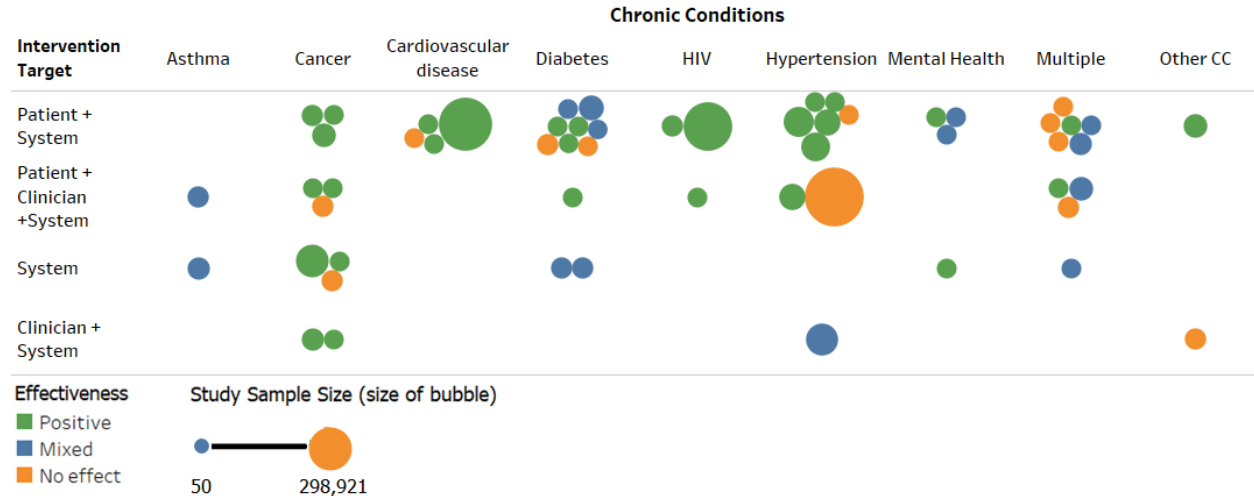

Abbreviations: CC=chronic condition; HIV=infection with human immunodeficiency virus; QI=quality improvement

*Note: Each bubble represents one study. Bubble size reflects the participant sample size included in the interventions. Smaller bubbles indicate smaller participant sample sizes and larger bubbles indicate larger participant sample sizes. The color of the bubble represents the effect of the interventions. For direction of effect, we classified studies as positive where all reported findings aligned in the positive direction of effect; no effect where negligible effect was reported; and mixed where reported findings were not all aligned in the same direction of effect. None of the studies had negative effect (i.e., where reported findings were all aligned in the negative direction of effect), therefore we do not provide that category in this brief.

Figure 10 is the bubble plot by intervention target level across targeted chronic conditions. In this plot, each bubble represents one study, and the size of the bubble represents the study sample size for the targeted chronic condition and the intervention type. The color of the bubble represents the reported effect of the intervention as presented in the literature. We did not perform further statistical analysis on the effectiveness information presented by the studies. Overall, studies reported positive effects of the levels of interventions on the targeted chronic conditions, particularly with the patient- plus healthcare system-level interventions that targeted hypertension. Few studies reported no effect. Patient plus healthcare system-level interventions that targeted hypertension had the most noticeable lack of effect. The largest participant sample with no effect was in patient- plus clinician- plus healthcare system-level interventions targeted at hypertension. All levels of interventions reported mixed findings, most notably for healthcare

system-level interventions. The largest participant sample with mixed findings was in clinician-plus healthcare system-level interventions for hypertension.

Figure 10. Intervention target level by chronic condition by direction of effect
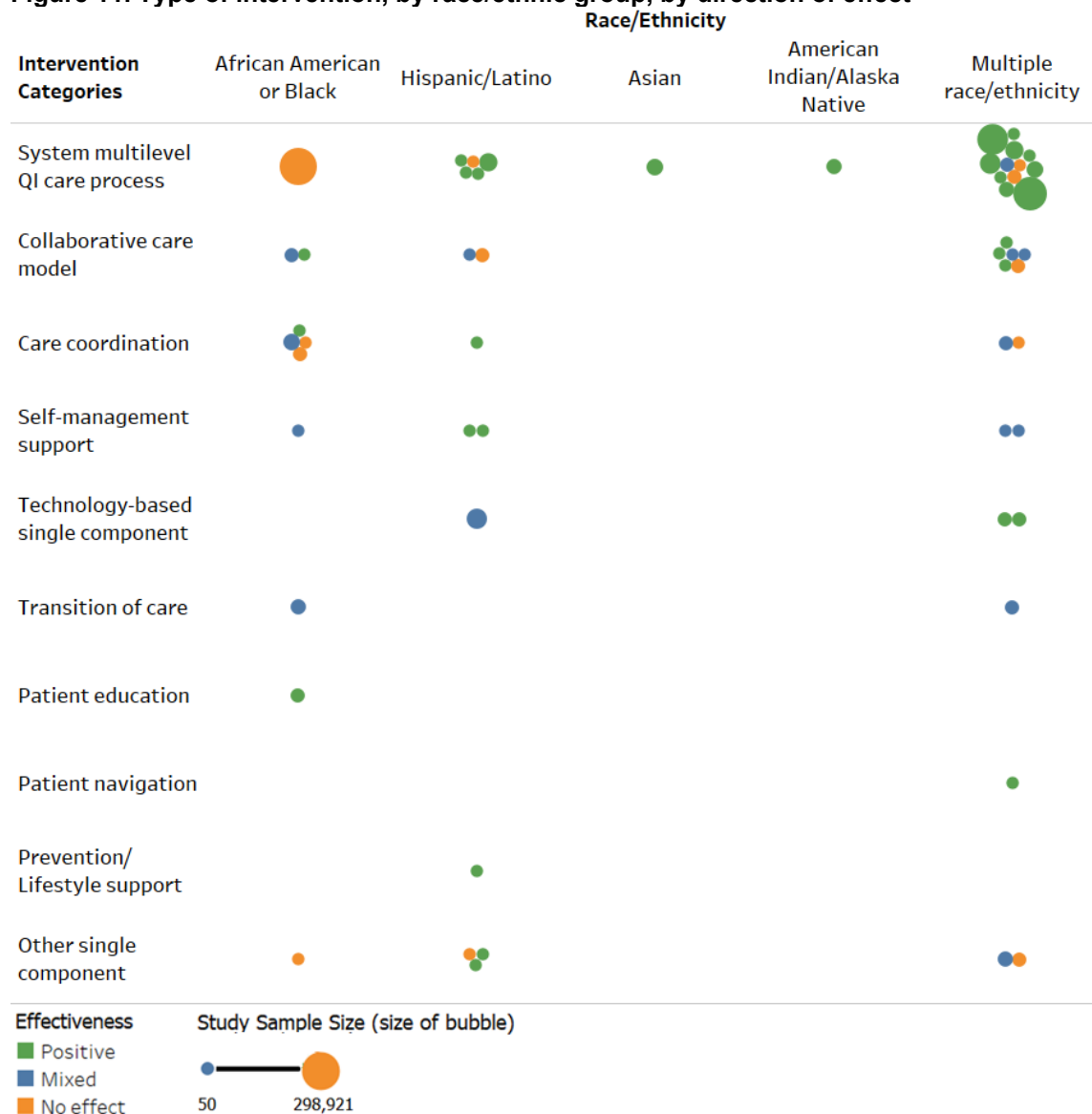

Abbreviations: CC=chronic condition; HIV=infection with human immunodeficiency virus

*Note: Each bubble represents one study. Bubble size reflects the participant sample size included in the interventions. Smaller bubbles indicate smaller participant sample sizes and larger bubbles indicate larger participant sample sizes. The color of the bubble represents the effect of the interventions. For direction of effect, we classified studies as positive where all reported findings aligned in the positive direction of effect; no effect where negligible effect was reported; and mixed where reported findings were not all aligned in the same direction of effect. None of the studies had negative effect (i.e., where reported findings were all aligned in the negative direction of effect), therefore we do not provide that category in this brief.

Figure 11 is the bubble plot by intervention type across race/ethnic groups. In this plot, each bubble represents one study, and the size of the bubble represents the study sample size for the targeted chronic condition and the intervention type. The color of the bubble represents the reported effect of the intervention as presented in the literature. We did not perform further statistical analysis on the effectiveness information presented by the studies. The most common type of intervention targeted at nearly all race/ethnic groups was system multi-level QI process intervention. Overall, studies reported widespread positive effects of the intervention type on the targeted race/ethnic groups, particularly with the system multi-level QI process interventions targeted at "multiple race/ethnic groups". Few studies reported no effect. The largest participant sample with no effect was in system multilevel QI process interventions targeted at African American/Blacks. Mixed findings were observed for some interventions including care coordination, collaborative care model, self-management support, "other single component", technology-based single component, and transition care.

Figure 11. Type of intervention, by race/ethnic group, by direction of effect

Intervention Categories	African American or Black	Hispanic/Latino	Asian	American Indian/Alaska Native	Multiple race/ethnicity
System multilevel QI care process					
Collaborative care model					
Care coordination					
Self-management support					
Technology-based single component					
Transition of care					
Patient education					
Patient navigation					
Prevention/ Lifestyle support					
Other single component					

Effectiveness
■ Positive
■ Mixed
■ No effect

Study Sample Size (size of bubble)
50 — 298,921

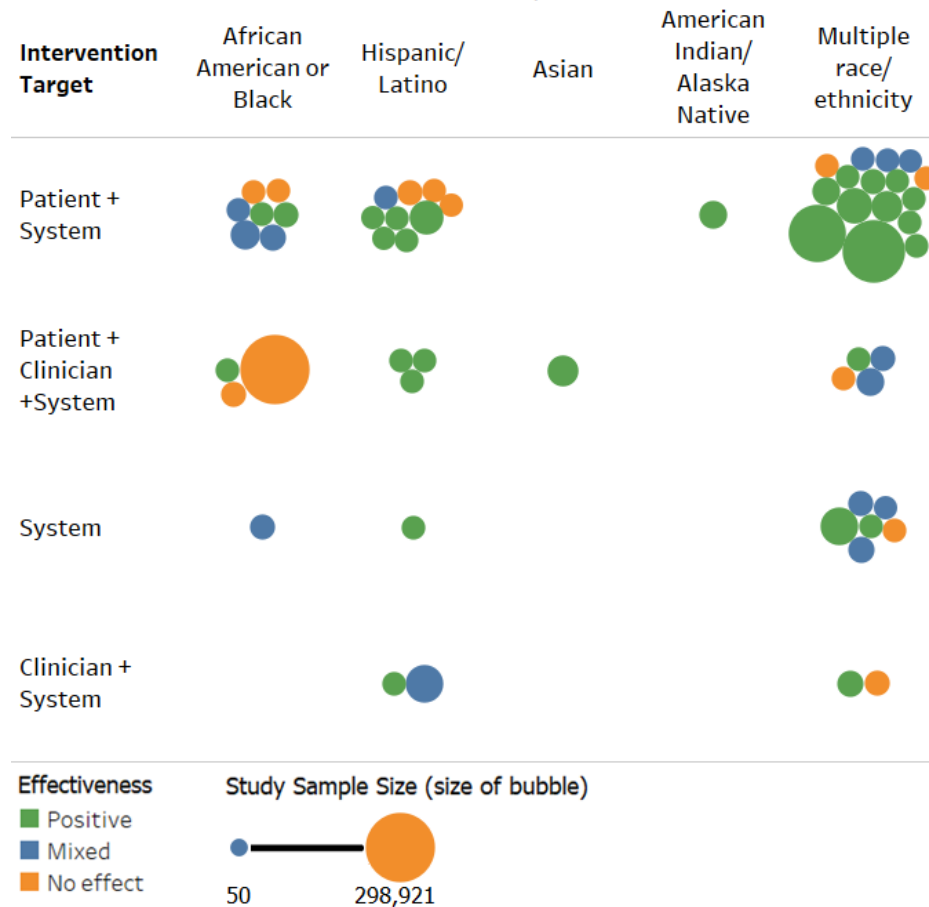Abbreviations: QI=quality improvement

*Note: Each bubble represents one study. Bubble size reflects the participant sample size included in the interventions. Smaller bubbles indicate smaller participant sample sizes, larger bubbles indicate larger participant sample sizes. The color of the bubble represents the effect of the interventions. For direction of effect, we classified studies as positive where all reported findings aligned in the positive direction of effect; no effect where negligible effect was reported; and mixed where reported findings were not all aligned in the same direction of effect. None of the studies had negative effect (i.e., where reported findings were all aligned in the negative direction of effect), therefore we do not provide that category in this brief.

The race/ethnicity groups represent studies that comprise a single racial or ethnic group, and the multiple race/ethnicity group represents studies that comprise more than one racial or ethnic group.

Figure 12 is the bubble plot by intervention target level across race/ethnic groups. In this plot, each bubble represents one study, and the size of the bubble represents the study sample size for the targeted chronic condition and the intervention type. The color of the bubble represents the reported effect of the intervention as presented in the literature. We did not

perform further statistical analysis on the effectiveness information presented by the studies. Overall, studies reported widespread positive effects of the levels of interventions on the targeted race/ethnic groups, particularly with the patient-level plus healthcare system-level interventions that were targeted at "multiple race/ethnic groups". Few studies reported no effect. The largest participant sample with no effect was in patient- plus clinician- plus healthcare system-level interventions targeted at African American/Blacks. Mixed findings were reported for all levels of interventions, most notably for healthcare system-level interventions. The largest participant sample with reported mixed findings was in clinician- plus healthcare system-level interventions targeted at Hispanic/Latino people.

Figure 12. Intervention target level, by race/ethnic group, by direction of effect

*Note: Each bubble represents one study. Bubble size reflects the participant sample size included in the interventions. Smaller bubbles indicate smaller participant sample sizes, larger bubbles indicate larger participant sample sizes. The color of the bubble represents the effect of the interventions. For direction of effect, we classified studies as positive where all reported findings aligned in the positive direction of effect; no effect where negligible effect was reported; and mixed where reported findings were not all aligned in the same direction of effect. None of the studies had negative effect (i.e., where reported findings were all aligned in the negative direction of effect), therefore we do not provide that category in this brief.

The race/ethnicity groups represent studies that comprise a single racial or ethnic group, and the multiple race/ethnicity group represents studies that comprise more than 1 racial or ethnic group.

# Additional Information on Selected Interventions

The majority of included studies examined system multi-level QI process interventions. Below, we present a focused bubble plot for studies of this intervention in relation to race/ethnic group, specific clinical condition, and reported effects. We also present narrative summaries of selected interventions within the bubble plot, based on the highest number of studies in relation to a targeted chronic condition and across all race/ethnic groups. Our goal was to show how diverse and multifaceted the interventions were, and to capture the considerable variety of terms used in the literature to describe them.

Figure 13 shows system multi-level QI process intervention bubble plot by race/ethnic group, targeted chronic conditions, and reported effects. In this plot, each bubble represents one study, and the size of the bubble represents the study sample size for the targeted chronic condition and the intervention type. The color of the bubble represents the reported effect of the intervention as presented in the literature. We did not perform further statistical analysis on the effectiveness information presented by the studies.

The highest number of system multi-level QI process intervention studies (7 studies) targeted hypertension across all race/ethnic groups, except for American Indian/Alaska Native people.[47,53,63,64,73,74,77] Five out of these studies reported positive effects,[47,53,63,73,77] while others reported no effects.[64,74]

The interventions were distinct and highly varied. One study reported the adaptation and implementation of Kaiser Permanente's Hypertension management program targeted to multiple race/ethnicities, although a predominantly Hispanic population, in 12 urban safety net clinics and delivered by nurses, pharmacists and clinicians.[47] The intervention consisted of four key elements consisting of 1) development of internal hypertension patient registry, 2) evidence-based treatment intensification protocol, 3) standardized blood pressure measurement protocol, and 4) blood pressure check visits. Another study intervention targeted a population health management program delivered by population health coordinators and clinicians to Hispanic and non-Hispanic Black populations across 18 practices using an information technology system to identify patients not meeting LDL cholesterol and blood pressure goals.[53] One study examined an electronic health record (EHR-based) intervention delivered by clinicians that included launching hypertension patient registries targeted to South Asian immigrants and implementing culturally tailored alerts and order sets across 14 practices.[63] One study examined a decision support tool delivered by clinical care teams that was designed to help them identify at-risk patients, and facilitate clinically appropriate changes in treatment targeted to Black patients.[64] One study examined the implementation of key components of hypertension guidelines delivered by clinicians, including 1) accurate blood pressure measurement, 2) effective treatment, and 3) timely follow-up across high-volume Medicaid practices targeted to multiple race/ethnicities but predominantly served Black population.[73] One study examined a culturally adapted intervention that included an office system component built into the EHR to help identify at-risk patients and a provider support component consisting of nine coaching sessions delivered by medical assistants intended to improve medication adherence among Hispanic patients.[74] Finally, a pharmacist-led and clinician-delivered hypertension management program was examined that used a data analytic tool to identify and engage patients with uncontrolled hypertension, targeted to multiple race/ethnicities but predominantly serving Black patients.[77]

Figure 13. System multilevel QI process intervention by race/ethnicity group by chronic condition by direction of effects
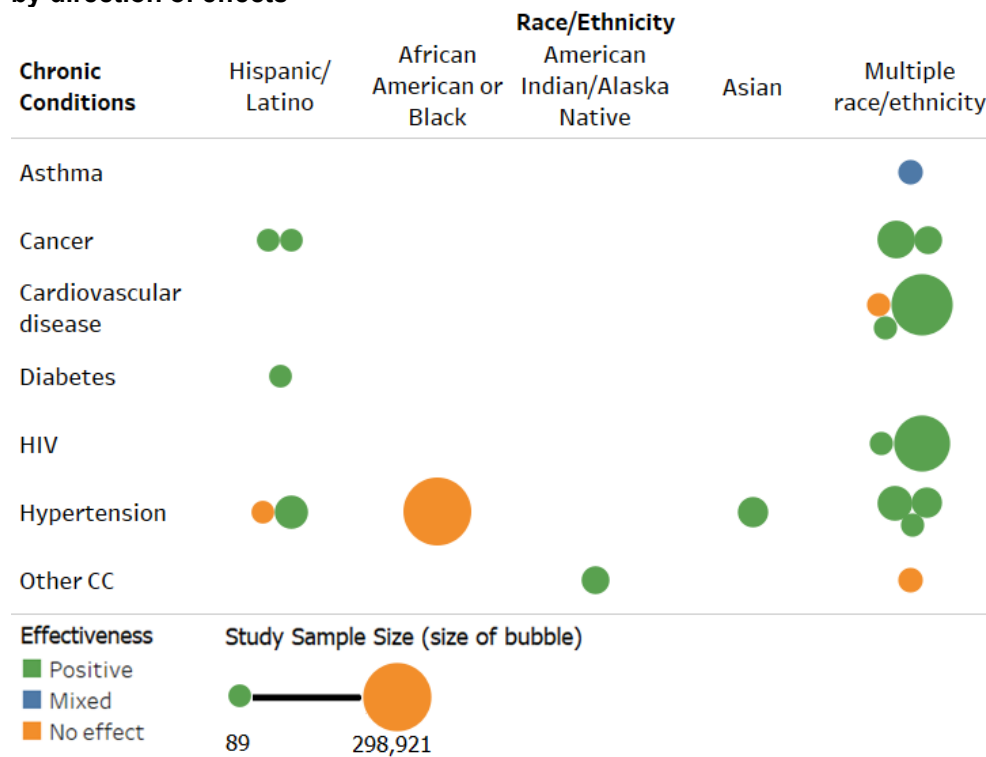
*Note: Each bubble represents one study. Bubble size reflects the participant sample size. Smaller bubbles indicate smaller sample sizes and larger bubbles indicate larger sample sizes. The color of the bubble represents the effect of the interventions. For direction of effect, we classified studies as positive where all reported findings aligned in the positive direction of effect; no effect where studies reported negligible effect; and mixed where reported findings were not all aligned in the same direction of effect. None of the studies had negative effect (i.e., where reported findings were all aligned in the negative direction of effect); therefore, we do not provide that category in this brief.

The race/ethnicity groups represent studies that comprise a single racial or ethnic group, and the multiple race/ethnicity group represents studies that comprise more than one racial or ethnic group.

Summary and Implications

This technical brief was designed to provide—using an evidence map approach— an overview of the body of evidence available on healthcare system-level strategies/interventions aimed at addressing racial and ethnic disparities in health and healthcare. This evidence map is a preliminary step in a multi-step process. The end goal of that process is to identify relevant evidence on existing healthcare system level strategies/interventions, and to initiate the process of developing a research agenda to address evidence gaps and inform practice, policy, and research decisions. This evidence map focuses on 56 studies published since 2017. Studies in our evidence map were based in several states, reflecting widespread national importance of this topic.

To make this summary and implications section as useful as possible, we present our observations under subheadings related to various characteristics of this literature set.

Study Funding

Unsurprisingly, many of the studies in our evidence map were researcher (academic funded) or grant-driven research (government funded). Without grant funding, these interventions are very challenging to fund because the services they encompass (system multilevel QI care process, patient navigation, care coordination, etc.) present difficulties for reimbursement. However, some studies were funded by other entities (such as foundations and other non-profits), which indicates a broad interest in this work.

Links Between Public Health and Healthcare Organizations

Most studies in our evidence map seemed not to consider the potential end user of the interventions (such as health professionals, managers, and policymakers). We could not determine whether some strategies/interventions had connections to or partnered with the healthcare system, or if they had connections with public health systems at the time of the research. Study settings also showed an overlap between the healthcare system and the public health system requiring us to rely on the study authors' descriptions of study settings. Federally qualified health centers are a good example of a setting that straddles the line in that they are a government-supported approach to providing health care to underserved populations. Yet, as crucibles of care that demand making the most out of the least resources, these health centers may offer ideas for healthcare organizations acting as Accountable Care Organizations who seek to improve health at the community level.

Ambiguity of Intervention Terms and Categories

As noted in the Methods section, the volume and heterogeneity of the evidence required us to create groupings for several of our included study characteristics, including intervention types, outcomes, and reported effects. When the studies used interventions difficult to label, we grouped them subjectively into relatively similar categories. For categories of study designs and study settings, we used the exact information reported by the study authors; however, potential overlaps exist among the categories. For example, a pre-post study could be a quality improvement study, and a federally qualified health center could be grouped as a community-based and/or public health hospital. We acknowledge that our categorization scheme represents broad definitions, that our assignments may be imprecise, and that other researchers may arrive

at different categorizations based on their chosen theoretical or conceptual frameworks. A more in-depth approach to categorization would have been out of scope for an evidence map.

Our evidence map reveals ambiguity of intervention terms, such as care coordination or self-management support. These terms seem not to have reached a stage of operationalization involving distinct and mutually exclusive definitions. Instead, they are under-specified in this literature set, and sometimes used interchangeably. However, studies used the terms in ways that suggested they held specific meaning. Ultimately, if health systems work locally to address the people likely to experience health disparities—especially when working with community-based partners—then interventions should be expected to vary widely in composition and process even if the same intervention term is used as a label.

Intended Populations

Our evidence map indicates that, with regard to studies of a single race/ethnic group, the literature on healthcare system strategies/interventions to address disparities focused mostly on Hispanic/Latino people. Only one study enrolled solely Native Americans or Asians, respectively.[48,63]

Interventions Characteristics and Reported Effect

Most interventions in our evidence map were multilevel, patient- plus healthcare system-level, system multilevel QI care process types of interventions targeted at "multiple race/ethnic groups". Most of the system multilevel QI process interventions targeted hypertension. Most interventions in our included studies showed signs of positive effect. This might indicate that the interventions are truly effective. But it could also be a signal of publication bias within the literature.

Overall, the interventions directly focused on the environment in which health and healthcare disparities occur in healthcare settings and paid little attention to the social determinants of health shown in our conceptual framework.

Community Involvement and Cultural Adaptation

A few of these interventions reported some form of community involvement (either partnership or collaboration) or cultural adaptation. This may reflect lack of understanding within the healthcare system with regard to participants' important cultural characteristics. It may also reflect mistrust of the healthcare system within the communities, resulting from experiences of racism and discrimination.

Outcomes Characteristics

We found heterogeneity of outcomes across our included studies; however, important information cost/financial reimbursement outcomes (i.e., monetary incentives to healthcare systems or clinicians) were lacking. Example: reimbursement schemes were limited in our evidence map and were reported alongside other types of outcomes in three of our included studies. This may indicate outcome reporting bias. It has important implications for healthcare reimbursements for interventions that include healthcare system-level components where reimbursements are a core concern. Almost all the interventions in our included studies lacked an explicit health equity outcome (reported changes in equity of outcomes/disparities outcome), but instead focused on improving health outcomes in the population of interest. This raises questions

about the effects of the interventions on health disparities. Only one of our included studies reported changes in equity of outcomes.[41]

Intersectional Factors

Included studies did not appear to consider intersectional factors. This made it difficult to identify distinct effects of healthcare system-level interventions on populations based on their identified intersectional factor.

Applicability and Sustainability

This literature showed a general lack of consideration for sustainability and a dearth of information on applicability. This calls for more rigorous and comprehensive study designs. For example, this field needs studies that translate randomized controlled trials of interventions into pragmatic trials in real-world settings. Implementation science techniques and reporting will be vital.

Harms or Adverse Events

Studies did not address harms or adverse events. This represents a significant gap in the literature and has important implications for the identifying interventions that may be applicable in real-world settings. Unintended consequences from changes to complex systems are common as people adapt to new ways of doing things, including unanticipated workarounds as they try to avoid what they see as a difficulty or problem. As attention and resources shift, unintended consequences may even arise for patients who were not involved in the intervention. Capturing these forms of harms may require casting wider nets than traditional research would use.

Evidence Reviews on Healthcare System-Level Interventions

Our scope did not include an analysis of existing evidence reviews. However, in Appendix E we provide summary information on current published evidence reviews on healthcare system-level strategies/interventions. We offer this information to help further establish the scale of the literature, present the topics/scope of the existing reviews, and avoid unnecessary duplication for future reviews. Most of the literature on healthcare system-targeted strategies concentrated on digital health technologies (e.g., telemedicine, telehealth, m-Health), provider pay for performance, and local community coalitions to improve health and healthcare outcomes in the treatment/prevention of chronic conditions (such as diabetes, cancer, and cardiovascular conditions) in African American/Black, Hispanic, and Asian racial groups.

Overall, most healthcare system-level strategies are multilevel interventions, with loosely defined components and, therefore, uncertain effects. Too little attention has been paid to other important outcomes (e.g., equity outcomes that specifically address health equity/disparity, and cost/financial reimbursement outcomes for healthcare systems). Further, indigenous and Asian groups are nearly absent; harms and adverse events as well as sustainability and applicability of the interventions have not been prioritized; intervention end-users are not clearly identified; information on potential influence of intersectional factors is lacking; and culturally adapted interventions and the role of community is still developing. Nonetheless, the scale of the literature on interventions on healthcare systems interventions is encouraging. The breadth of this literature set may suggest a willingness to continue expanding the field and, ultimately,

implement innovative interventions to address racial and ethnic disparities in health and healthcare. The next section highlights possible areas for future research.

Next Steps

Our evidence map highlighted several areas for future research consideration and below we describe these research opportunities (in no particular order):

- Future systematic reviews are needed to more fully investigate what is known about health system-level interventions. This investigation will need to expend resources considering how to capture the varied intervention components and groupings.
- Focused research is needed on healthcare system-level strategies/interventions where the researchers consider the end users and specify the connections or partnership with the healthcare system.
- Focused research is needed on Native American Indian/Alaska Native and Asian groups, given the fact that no information was captured for these group in our evidence map.
- Focused research is needed on the impact of intersectional factors on the effect of interventions to address racial and ethnic disparities in health and healthcare.
- Studies should empirically evaluate the applicability and sustainability of the healthcare system-level strategies/interventions. Transparency of reporting, clear links to companion articles that assess intervention implementation is required. Numerous reporting guidelines for complex interventions and implementation research are available to support such efforts.
- More research is needed that incorporates outcomes that directly measure equity/health disparity as well as cost/financial reimbursement.
- More studies are needed that assess the impact of community involvement and cultural adaptation on healthcare system-level interventions.
- Key Informants highlighted the need to recruit and retain a racially and ethnically diverse healthcare workforce. This strategy was not captured in our evidence map. Research is needed to bridge this gap in knowledge.

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