



Published in final edited form as:

Ann Surg. 2023 August 01; 278(2): 184–192. doi:10.1097/SLA.0000000000005858.

Surgical Care for Racial and Ethnic Minorities and Interventions to Address Inequities: A Narrative Review

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Abstract

Objective: Racial and ethnic inequities in surgical care in the United States are well documented. Less is understood about evidence-based interventions that improve surgical care and reduce or eliminate inequities. In this review, we discuss effective interventions at the patient, provider, system, and policy levels to reduce inequities and identifying gaps in intervention-based research.

Summary Background Data: Evidenced-based interventions to reduce racial and ethnic inequities in surgical care are key to achieving surgical equity. Surgeons, surgical trainees, researchers, and policy makers should be aware of the evidence-based interventions known to reduce racial and ethnic disparities in surgical care for prioritization of resource allocation and implementation. Future research is needed to assess interventions effectiveness in reduction in potential disparities in both long term and patient reported measures.

Methods: We searched PubMed database for English-language studies published from January 2012 through April 2022 to assess interventions to reduce or eliminate racial and ethnic disparities in surgical care. A narrative review of existing literature was performed identifying interventions at the patient, surgeon, healthcare system, community and policy level interventions have been associated with reduction in racial and ethnic disparities in surgical care.

Results and Conclusion: Achieving surgical equity will require implementing evidenced-based interventions to improve access, quality, and outcomes. Moving beyond description towards elimination of racial and ethnic inequities in surgical care will require prioritizing funding of intervention-based research, utilization of implementation science and community based-participatory research methodology, and principles of learning health systems.

Mini-Abstract:

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Disclosures:

Sidra Bonner receives personal fees from the JAMA network for design and editing as a Visual Abstract Editor.

Racial and ethnic inequities in surgical care in the United States are well documented, yet there remains less understanding of effective interventions at the patient, provider, healthcare system, community and policy levels to reduce inequities. Moving beyond description towards elimination of racial and ethnic inequities in surgical care will require prioritizing funding of intervention-based research, utilization of implementation science and community based-participatory research methodology, and principles of learning health systems.

Introduction:

Racial and ethnic inequities in access, delivery, quality, and outcomes in surgical care are well documented across surgical specialties [1–13]. These inequities have significant implications for the wellbeing and health of patients, their families, and communities in addition to being associated with higher costs to healthcare systems and lost productivity within society [14]. The underlying mechanisms contributing to persistent disparities have been described at the patient, provider, community, healthcare system and societal levels. For instance, prior research has identified higher levels of individual and community socioeconomic disadvantage, provider bias, differential access to surgeon specialties, hospital and healthcare system segregation, and historic federal and state policies as contributing mechanisms to persistent racial and ethnic inequities in surgical care in the United States [7–13].

Recent calls from policy makers, payers, public health entities and professional societies have prioritized the implementation of evidence-based interventions to achieve equity as a core component of surgical quality in the United States [15–18]. Despite decades of research documenting racial and ethnic disparities, there remains limited understanding and cohesive frameworks of interventions that improve surgical care for racial and ethnic minorities. In this narrative review, we review the evidence regarding interventions to mitigate disparities and improve surgical access, quality, and outcomes among racial and ethnic minorities, and identify gaps in current research and opportunities for future work.

Definitions and Mechanisms of Racial and Ethnic Inequities in Surgical Care in the United States

Defining Structural Racism

The well described racial and ethnic inequities in surgical access, quality, and outcomes in the United States among minoritized groups must be considered as a byproduct of structural racism. Structural racism for the purpose of this review is defined as “the totality of ways in which societies foster [racial] discrimination, via mutually reinforcing [inequitable] systems (e.g., in housing, education, employment, earnings, benefits, credit, media, health care, criminal justice, etc.) that in turn reinforce discriminatory beliefs, values, and distribution of resources”, reflected in history, culture, and interconnected institutions [19]” (Table 1). The presence of structural racism in the United States as a result of governmental and institutional laws and policies that create significant inequities across economic status, employment, education, neighborhood quality, health, and social policy

as well as stereotypes and cultural beliefs pertaining to distinct racial and ethnic groups [20–22].

Societal Inequities in Resource Allocation Contribute to Inequities in Surgical Care

The conceptual model for structural racism as the fundamental driver for inequities in surgical care is outlined in Figure 1. The result of societal-level inequities in the distribution of resources contribute to patient, provider and healthcare system factors leading to worse surgical care for racial and ethnic minorities. For instance, higher rates of individual and community level poverty as well as the physiologic impact of racism and discrimination on racial and ethnic minorities are associated with worse overall health status and access to healthcare as well as higher social needs and financial barriers affecting the ability to access health care [21,23–25]. This in turn contributes to more comorbidities and decreased functional status at the time of surgical diagnosis, delayed presentations and lower access to preventative, surveillance, or follow-up services for surgical diagnoses [26–29].

At the provider level, inequities in education and economic mobility among racial and ethnic groups create barriers (i.e., financial costs of applying and attending medical school, concentration in low performing middle and high schools, and lack of mentorship in higher education, etc.) to entry into the healthcare workforce as surgeons or healthcare systems leaders [30–31]. The stagnation of workforce diversity is detrimental to efforts to improve the effectiveness of teams, patient-provider communication, and access to surgical services in vulnerable communities. Furthermore, the needs of diverse patient populations may be invisible within organizational and research priorities of surgical departments and healthcare institutions due to a lack of diversity within surgical and healthcare system leadership [32–33]. Increasing diversity among the physician workforce improves healthcare access, outcomes, and patient satisfaction among racial and ethnic minority communities [34–35]. However, racial, and ethnic diversity remains low among the surgery workforce [35–36].

At the system level, racial residential and hospital level segregation in conjunction with modern healthcare system financing such as insurance price discrimination has contributed to the concentration of racial and ethnic minority groups at lower volume and lower quality hospitals for their surgical care [8,13, 38–42]]. For instance, the significantly higher payment in services from private health insurers compared to Medicare and Medicaid, creates incentives for hospitals to provide care to populations that are with larger shares of privately insured patients[43]. This has implications for racial and ethnic inequities in care given that non-Hispanic Black and Hispanic patient populations are disproportionately enrolled in Medicaid, whose access to surgical services, particularly surgical subspecialty care, may be limited given lower reimbursement [42]. Furthermore, recent analysis has demonstrated that less than 25% of hospitals in the United States perform 90% of surgeries for American Indian/Native Americans, Asian and Pacific Islander, Hispanic, and non-Hispanic Black patients with those hospitals having worse outcomes [13].

Discriminatory Beliefs, Negative Stereotypes and Surgical Inequities

Finally, the prevalence of discriminatory beliefs and negative social stereotypes regarding specific racial and ethnic minority groups contributes to healthcare inequities [43,44].

Prior work has raised concerns that health care provider communication is perceived as less patient-centered and trustworthy from racial and ethnic minorities [45]. A prior assessment of trauma surgeons demonstrated that most surgeons, specifically White, Asian, and Hispanic surgeons, had unconscious preference toward White compared to Black people on the Implicit Association Test [46]. The biases may contribute to differences in treatment plans, style of communication and/or decision making ultimately impacting the quality of care received by racial and ethnic minorities.

The collective impact of these mechanisms contributes to worse surgical outcomes, including higher mortality rates, postoperative complications, and readmissions among racial and ethnic minority groups. These worse outcomes lead patients to have worse quality of life, higher financial toxicity, and increased familial and community burden. Furthermore, these disparities contribute to lost economic productivity and higher healthcare spending. Therefore, interventions to improve the surgical care of racial and ethnic minorities is in the best interest of patients, communities and the healthcare system [47].

Search Methods:

This narrative review was conducted according to the principles of the PRISMA guidelines [48]. The PubMed database was searched from January 1, 2012 through June 22, 2022 for English-language studies in the United States to assess interventions aimed at reducing or eliminating racial and ethnic disparities in surgical care. The final search terms included healthcare disparities OR disparities OR disparity OR inequity OR inequities AND (1) surgery OR specialties or surgical or surgical procedures, operative AND (2) race OR ethnic OR ethnicity OR racial groups AND interventions OR implement OR implementation OR program OR education. Including pediatric and adult surgical patients within the following specialties were included: General Surgery, Colorectal Surgery, Trauma Surgery, Breast Surgery, Thoracic Surgery, Benign Gynecologic Surgery, Gynecologic Oncology, Neurological Surgery, Ophthalmic Surgery, Oral and Maxillofacial Surgery, Orthopedic Surgery, Otolaryngology, Pediatric Surgery, Vascular Surgery, Urology, Transplant Surgery, Endocrine Surgery. Our data review demonstrated 996 findings in PubMed. Additional studies not captured through the original search known to be focused on interventions to reduce inequities in surgical care were also added, specifically only those involving surgeon level interventions given the literature base focus on improving workforce diversity. Evidence Based Intervention: defined as a rigorously studied targeted operation at patient, provider, community, healthcare system or service line or policy level to reduce racial and ethnic disparities in surgical care with measurable results that positively improved care for racial and ethnic minority groups. A final total of 48 studies met these criteria. The search and sift process is presented in the PRISMA diagram in Figure 2. Review of these manuscripts were performed and subsequently categorized the following intervention levels: Patient-, Surgeon- Community-, Policy- and Multi- Level with examples from each category selected for each category to outline key principles (Table 2). These levels of intervention were determined based on traditional levels used for quality improvement in healthcare and the known association between an individual's community and surgical outcomes [47,49]. The level of intervention for the reviewed studies was determined by the recipient of the

intervention. The full list of articles by level of intervention with key findings are included in the supplemental table 1..

Interventions that Reduce Racial and Ethnic Inequities in Surgical Care

Patient Level

Patient level interventions include improving health literacy and education, culturally tailored communication, utilization of care navigator to improve decision making and access to care. Numerous studies within the field of transplantation have highlighted the benefits of patient level interventions for reduction in inequities in care [56–60]. For instance, a multifaceted intervention termed the Living Organ Video Educated Donors program (LOVED) included enrolling African- American patients in an 8-week program that included educational videos, group chat sessions and an African American navigator who previously received a living donor kidney transplant. This intervention was associated with African Americans patients having significantly increased willingness to seek out potential donors and self-advocate for living donation [56]. However, these outcomes represent a proximal outcome demonstrating the need to assess longer term outcomes such as actual receipt a living donor kidney. Furthermore, the Explore Transplant education program including videos, printed materials and transplant educator discussions was found to be associated with Black patients more likely to initiate or restart transplant evaluation [59]. In addition, comprehensive education sessions including classes led by social workers, transplant center and financial coordinators was associated with higher completion of kidney transplant evaluation among African American patients [60]. Furthermore, patient navigation programs involving multi-disciplinary teams for patients have been found to be associated with reduced time to treatment, including surgery, and treatment completion for breast cancer and cleft-palate [61–62]. Lastly, the use of decision aids have also been identified to help to reduce disparities in receipt of surgery. For example, the use of a video-based decision aid describing treatment options, surgical procedures, risks, benefits, and efficacy of total knee replacement was associated with improved receipt of total knee replacement among Black patients with osteoarthritis meeting clinical indications [63].

While patient level interventions have centered on improving patient education, there remains a need for ongoing research particularly focused on interventions addressing social and financial needs of patients in the pre-, peri-, and post-operative settings and the association with access, quality, and outcomes among racial and ethnic minorities. Furthermore, it is notable that the field of transplantation, which is heavily regulated by government agencies for issues of equity, represents the specialty with a majority of studies highlighting the need for additional surgical specialties to evaluate patient-level interventions.

Surgical Level

A majority of surgeon level interventions aimed to improve care for racial and ethnic minorities have centered on improving work-force diversity. Prior research has demonstrated that racial concordance between patients and physicians is associated with improved healthcare experience and higher perceived quality of communication among racial and

ethnic minorities [34–35,64]. Additional studies have demonstrated racial concordance was associated with improved patient outcomes and quality of care for African American patients in primary care and intensive care unit settings [65,66]. In addition to these findings within healthcare, multiple studies across sectors have demonstrated that diverse teams outperform homogenous teams [66]. Given this evidence for increasing racial and ethnic diversity of the healthcare workforce, surgical programs have engaged in various initiatives focused on pipeline programs, recruitment practices, and targeted mentorship [67–69]. For example, Nth Dimensions is a not-for-profit organization founded by board certified surgeons seeking to increase the number of women and underrepresented minorities in procedural based specialties [70]. The program targets medical students and consists of early exposure to procedural specialties, clinical and research experiences, and mentorship and professional development. Nth Dimension has a reported match rate of 72%, demonstrating strategic pipeline programs can be successful in increasing the number of underrepresented minorities that apply and matriculate to procedure-based residency programs. Similarly, the University of Pennsylvania plastic and reconstructive surgery residency program implemented a multifaceted recruitment strategy, which included a visiting clerkship program targeting underrepresented in medicine (URiM) 4th year medical students, holistic review of residency applications, and outreach for URiM candidates by URiM healthcare providers within the University of Pennsylvania Health System [71]. Through these measures, the number of URiM residents increased over a 5-year time period.

Additional workforce measures have focused on URiM surgical resident retention, as well as recruitment and advancement of URiM faculty. The Diverse Surgeons Initiative (DSI), a program created to provide URiM surgical residents with clinical knowledge and surgical skills to excel in surgical residency. Of those that participated in DSI, nearly all completed general surgery residency, the majority completed fellowship, and 40% obtained faculty positions [72]. The Johns Hopkins Department of Otolaryngology-Head and Neck Surgery developed a comprehensive diversity and inclusive initiative that centered a climate of diversity, aggressive recruitment, and mentorship. Through their approach, they saw an increase in URiM faculty within their department [73]. Similarly, the University of Michigan Department of Surgery implemented a multi-faceted faculty recruitment strategy including mandatory training, a standing recruitment with diverse membership, broad promotion of open positions, a modified “Rooney Rule”, panel interviews with standard scoring and evaluation tools. The implementation of this strategy was associated with increased diversity of recruited and hired faculty [74].

While workforce diversity pipeline programs have been the main surgeon level intervention implemented, there remains a gap in current research on effective interventions centered on variation in surgeon decision making, physician communication and implicit bias that have direct effects on patient care for racial and ethnic minorities. For instance, a recent study of Medicare beneficiaries demonstrated that Black patients had lower odds of receiving surgical consultation after being admitted from the emergency department with an emergency general surgery condition compared to white patients [75]. These findings highlight the need for structural interventions within healthcare systems and hospitals to combat the role of physician level implicit bias on surgical care and outcomes for racial and ethnic minorities. Given mixed evidence regarding the effectiveness of anti-bias

and anti-prejudice training on an individual's behavior, it is imperative to consider how systematic interventions such as standardized admission protocols and service clinical guidelines and race-specific data feedback to providers and teams may mitigate the effects of surgeon or physician level bias [76,77]. Furthermore, while the examined studies document interventions associated with increased racial and ethnic diversity of the workforce, there is an ongoing need to demonstrate that these efforts improve surgical care for patients, who are racial and ethnic minorities. Similar to research performed among medical and pediatric patients, there is a need to assess the association of racial concordance and the diversity of surgical teams with surgical care and outcomes, including patient-reported measures.

Healthcare System Level

Interventions to eliminate inequities in surgical care at the healthcare system level have primarily focused on leveraging enhanced recovery after surgery (ERAS) protocols, implementing electronic medical record alerts, and clinical feedback mechanisms [78–83]. The implementation of ERAS programs has been associated with reduction in racial and ethnic disparities in postoperative length of stay after colorectal surgery and cardiac surgery and perioperative and postoperative pain management for multiple operations, and intensive care readmission following cardiac surgery [79,81–82,84–85]. These standardized treatment pathways reduce variability in clinical decisions and may mitigate the impact of provider bias. Beyond ERAS programs, healthcare systems have demonstrated that care coordination, navigators and feedback systems may reduce racial and ethnic disparities in fragmented care. Additionally, a tracking and feedback registry of breast cancer patients requiring adjuvant chemotherapy following surgery was found to reduce racial and ethnic inequities in adjuvant therapy with increased therapy rates among non-Hispanic Black, Hispanic and Asian women [74].

To date, there are scarce studies evaluating how surgical departments, hospitals or healthcare can operationalize health equity into existing structures. The Institute of Medicine has determined that equity is a domain of quality and therefore there is a need for integration of health equity into existing surgical quality improvement structures within hospitals and healthcare systems [87].

Community Level

Multiple studies to date have demonstrated the association between an individual patient's neighborhood and surrounding community and surgical care. For instance, studies have demonstrated that racial and ethnic minorities residing in economically deprived neighborhoods and/or segregated neighborhoods receive worse surgical care and have inferior outcomes [88,89]. Given this association, implementation of interventions targeting these communities may translate to meaningful reductions in racial inequities in surgical care. Through community engagement, community members become empowered to participate in health initiatives. These members in turn are key in fostering connectedness and trust, which may be lacking due to historical and contemporary acts of medical misconduct and discrimination [90–94]. Community outreach involves information sharing, which is a two-way process, examples of which have been reported across a variety of specialties [92–96]. The University of Cincinnati Cochlear Implant Program surveyed

African Americans with cochlear implants to identify socioeconomic and cultural barriers to seeking assistance for their hearing loss, specifically cochlear implant surgery. The program then developed partnerships with community organizations to increase provider and patient awareness about cochlear implants [92]. In a study to increase awareness of breast cancer care and breast reconstruction in underserved populations, physician-led annual educational symposiums were held in the community. The symposium consisted of short lectures, cancer screening, patient testimonials, question and answer panels, and an exhibitor fair. Participant knowledge based on survey scores were significantly improved after the symposium [88].

Community based interventions extending beyond physician-led outreach to include community-member facilitated education have also been studied. Community based participatory research (CBPR) represents the most involvement by community members where they are involved in all aspects of the research process and viewed as equal partners among key stakeholders. An example of CBPR is highlighted by the Reducing Disparities in Access to kidney Transplantation (RaDIANT) Community Study, which was a randomized controlled trial that sought to improve facility level referral for kidney transplantation in Georgia [94]. To develop their multicomponent intervention consisting of transplant education and engagement activities, they capitalized on the expertise of community and academic partners including patients with end stage renal disease, dialysis facilities, transplant centers, social workers, healthcare providers and researchers.

State and Federal Policy Level

State and federal policy impacts the degree to which marginalized communities are able to overcome systemic barriers in access to quality surgical care. To date, several studies have focused on the effects of the Affordable Care Act, particularly Medicaid expansion, on improvements in surgical care, yet the evidence is mixed for racial and ethnic disparities in surgery [95–99]. For instance, on the one hand Medicaid expansion is associated with reduced disparity in in-hospital mortality and post-discharge rehabilitation for patients following admission for trauma between Black and White patients [100,101]. On the other hand, Medicaid expansion has not reduced racial and ethnic disparities in access to bariatric surgery, receipt of specific cardiac operations including implantation of left ventricular devices for heart failure, or surgical cancer care [102–106]. While the evidence for Medicaid expansion as a tool to reduce racial and ethnic disparities in surgical care is not currently clear, it is important to note that racial and ethnic minorities represent a disproportionate number of patients living currently in non-Medicaid expansion states [107]. Therefore, the current evidence regarding the effect of Medicaid expansion may be incomplete given certain states have yet to expand Medicaid coverage. Furthermore, this evidence highlights that health insurance policy alone will not address the complex societal inequities and social determinants of health that affect racial and ethnic minorities.

Addressing patient's social determinants of health is key to improving outcomes in underserved communities [108]. A unique way to approach this is through community benefit spending, which is a requirement for nonprofit hospitals to retain tax-exempt status. This requirement requires hospitals to assess and address a community's social needs and their impact on healthcare outcomes [109–110]. While studies on the effects of community

benefit spending are limited, prior work has demonstrated that nonprofit hospitals with higher community benefit spending have lower readmission rates [111]. Future research is needed to assess how state and federal level community health needs assessments and community benefit spending may be associated with variation in surgical outcomes between racial and ethnic minorities given its potential as a policy lever to prioritize equity across healthcare systems.

Multi-Level

Multi-level interventions, reflecting those that affect at least two levels of influence, have recently been identified as a key strategy to reducing racial and ethnic disparities in population health [112]. The use of multi-level interventions has been used in multiple surgical specialties to improve surgical care for racial and ethnic minorities. For instance, the Northwestern Medicine Hispanic Kidney Transplant Program (NM HKTP), which uses 16 different components including culturally targeted education to patients and their families and bilingual outreach at dialysis centers is targeted at the patient and community level. This program has been associated with increased living donor kidney transplant rates at transplant centers implementing the program with high fidelity [112–113].

Within the field of trauma surgery, hospital-based violence intervention programs targeting patients and communities leveraging hospital-community partnerships have been demonstrated the effectiveness for violence prevention and trauma recidivism among racial and ethnic minorities. For instance, the Wraparound Project at the San Francisco General Hospital provides intensive case management centered on connecting patients at high risk for re-injury with community-based resources ranging from housing to vocational training. This program has been associated sustained recidivism and addressing complex social needs among Black and Hispanic patients with violent injury [115–119].

Lastly, a multi-level intervention targeting patients and multi-disciplinary providers involved in the treatment of cancer patients, including surgeons, has demonstrated significant reduction in racial disparities for patients with lung and breast cancer [117–119]. This intervention combines several system interventions including a real time registry derived from electronic records to signal missed appointments or unmet care milestones, a nurse navigator and race-specific feedback to clinical teams on treatment completion rates has been found to have significant impact on lung and breast cancer disparities [117–119]. This systems-based intervention has eliminated disparities between Black and White patients in receipt of curative treatment, including surgical resection, for early-stage lung cancer and improved the care for White patients as well. Further assessment of this intervention has demonstrated a reduction in the racial and ethnic inequities in time surgery for lung cancer and complete oncologic treatment (i.e., surgery, radiation, and chemotherapy) for early-stage breast and lung cancer [117–119].

Limitations

Given the breadth of the topic discussed, it is likely that there are additional papers and studies that were not found by our search terms alone. However, we provide illustrative

examples at various levels to highlight common interventions used to mitigate racial and ethnic inequities in surgical care.

Future Directions to address racial and ethnic inequities in surgery

As efforts to recognize surgical equity as an integral part of quality in surgical care increase, surgeons will need to be knowledgeable of interventions to reduce racial and ethnic disparities (Table 3). This transformation will require multiple concurrent efforts to move beyond mere description of racial and ethnic inequities to testing and implementing interventions. To move towards more robust intervention-based research, we recommend increased utilization of research methodologies less frequently used in surgical health services research such as implementation science and community-based participatory research [120–124]. These research methodologies are particularly suited for promotion of surgical equity given they involve engagement of stakeholders ranging from surgeons to community members with the goal of improvement in evidence-based practices and key outcomes determined by the affected community [107,111]. Community Based Participatory research (CBPR), which involves a collaborative partnership involving a researcher and community members within all phases of research, may also address the upstream social determinants of health known to contribute to worse surgical outcomes among racial and ethnic minorities. In addition, because CBPR is rooted within the communities of patients, the findings and implications have direct impact on the community involved and may also serve to improve trust with medical institutions and relationships with surrounding communities of racial and ethnic minorities [120]. Implementation science is the “study of methods to promote the adoption and integration of evidence-based practices, interventions, and policies into routine health care and public health settings to improve the impact on population health” [122]. Implementation science encompasses a wide range of methodologies, ranging from qualitative analysis to quasi-experiments, then can be leveraged to effect practice change and address racial and ethnic disparities by ensuring evidence-based care is received by all patients [121]. Second, learning healthcare systems defined as healthcare systems integrating internal data and experience with external evidence may allow for real-time identification and assessment of healthcare system inequities that can be targeted by system leaders [123]. The use of health-equity dashboards, electronic health record-based registries and integration of external data, such as census tract level measures of poverty, all represent possibilities of leveraging data routinely collected by healthcare systems to address inequities in surgical care. Third, research is needed to understand how leveraging technological advancements such as artificial intelligence and machine learning can minimize bias in clinical decision making and reduce systemic variation in surgical care through the use of clinical decision aids and clinical informatics[124]. Fourth, additional research is needed to evaluate how interventions affect both inequities in long-term and patient-centered outcomes beyond traditional surgical quality metrics. Finally, there is a robust literature of interventions to mitigate or eliminate racial and ethnic disparities among patients with medical conditions. Therefore, the field of surgery should move towards evaluating these known multi-level interventions to assess their utility in surgical cohorts and service lines [125,126].

Conclusions:

The elimination of racial and ethnic disparities in surgical care is central to the way modern surgical care delivery is discussed, researched, and provided. As surgeons, we must be aware of current evidence-based strategies and gaps in knowledge regarding innovative interventions to move towards delivering equitable care.

Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

Funding Sources:

Dr. Sidra N Bonner receives funding from the NIH T32 Multidisciplinary Program in Lung Disease at the University of Michigan NHLBI (T32HL007749). Dr. Chloé A Powell, MD is supported by training grant AG062043 from the National Institute on Aging. Dr. Lesly A Dossett has a K08 award from NIH-AHRQ (1K08HS026030-01A1).

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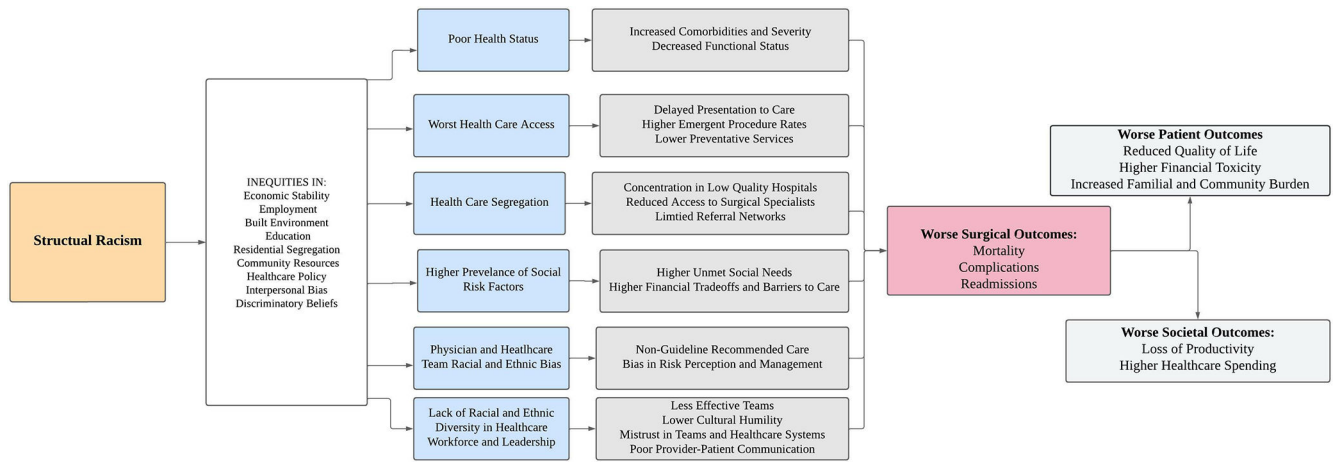


Figure 1. Conceptual Model for Structural Racism as the Driver for Racial and Ethnic Inequities in Surgical Care

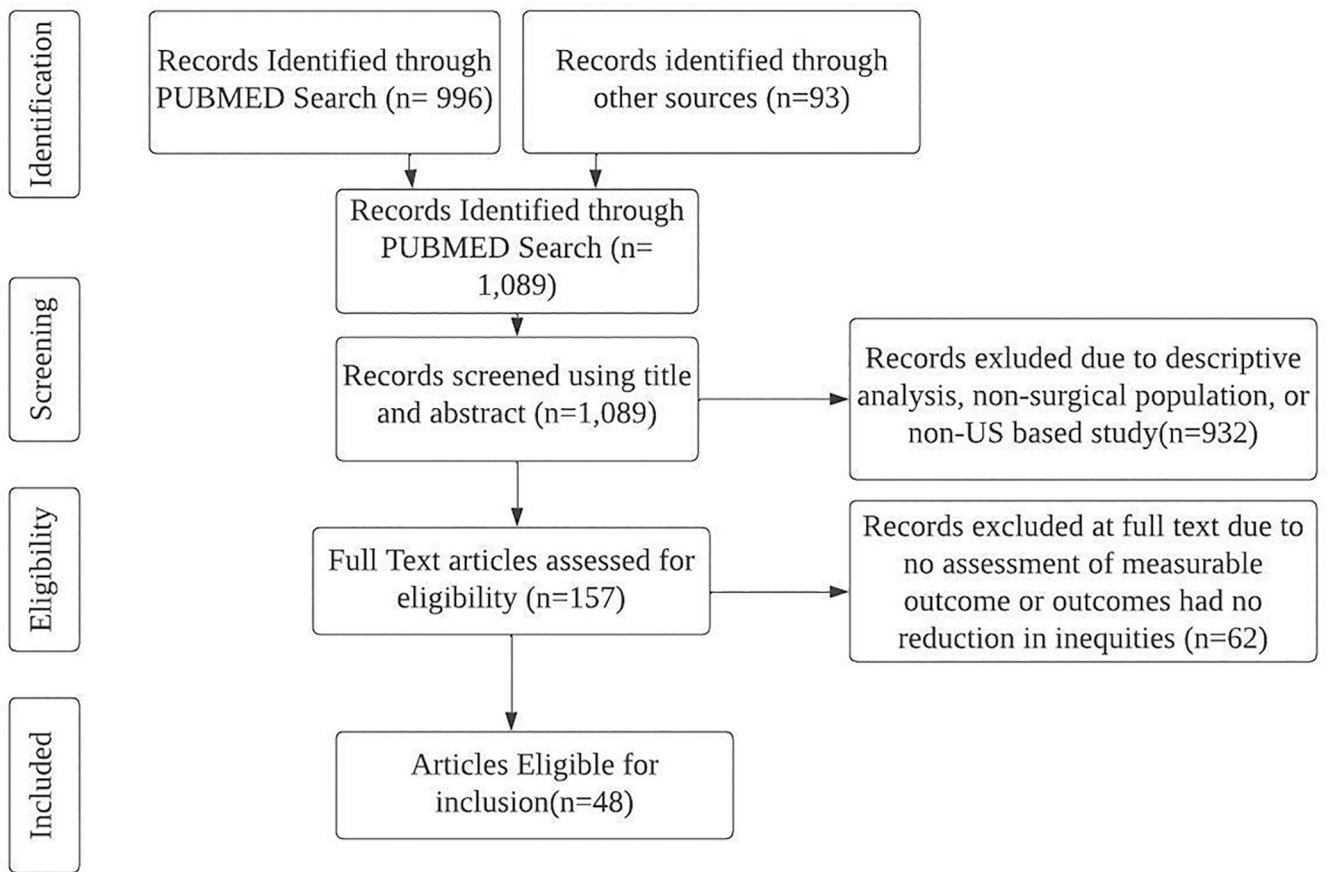


Figure 2.
PRISMA Diagram

Table 1.

Definitions of Terms to Describe Surgical Care received by Racial and Ethnic Minorities

Race	A social interpretation of physical appearance in a given time and place[49].
Ethnicity	A two-dimensional, context-specific, social construct with an attributional dimension that describes group characteristics (e.g., culture, nativity) and a relational dimension that indexes a group's location within a social hierarchy (e.g., minority vs. majority status [50].
Health Inequality	Preventable differences in the burden of disease, injury, violence, or in opportunities to achieve optimal health experienced by socially disadvantaged racial, ethnic, and other population groups, and communities[52].
Health Disparity	Differences in the health of individuals or groups[51].
Health Inequity	A specific type of health inequality that denotes an unjust difference in health and are systematic differences in health that could be avoided by reasonable means [52].
Healthcare Disparity	Differences in the quality of health care that are not due to access-related factors or clinical needs, preferences, and appropriateness of intervention [53].
Health Equity	The principle underlying a commitment to reduce—and, ultimately, eliminate—disparities in health and in its determinants, including social determinants [54].
Racism	A system of structuring opportunity and assigning value based on the social interpretation of how one looks that unfairly disadvantages some individuals and communities, unfairly advantages other individuals and communities, and saps the strength of the whole society through the waste of human resources [49].
Structural Racism	The totality of ways in which the totality of ways in which societies foster [racial] discrimination, via mutually reinforcing [inequitable] systems...(e.g., in housing, education, employment, earnings, benefits, credit, media, health care, criminal justice, etc.) that in turn reinforce discriminatory beliefs, values, and distribution of resources", reflected in history, culture, and interconnected institutions[19].
Bias	The negative evaluation of one group and its members relative to another attributable to both implicit stereotypes and prejudices[43].

Table 2.

Interventions to improve surgical care for racial and ethnic minorities and reduce inequities by level.

Level of Intervention	Interventions
Patient Level	Culturally Tailored Education [55, 56] Racially and/or Ethnically Concordant Care Navigators or Educators [55, 56] Clinical Decision Aids [57] Intensive Care Management with Care Coordination linked to Community Organizations and Resources [58,59]
Provider Level	Workforce Diversity Pipeline Programs [60,61,62] Holistic and Standardized Faculty Recruitment Practices [63,64]
System Level	Electronic Record Based Registry with Race and Ethnicity Specific feedback mechanisms to Care Teams [65,66,68,73,78] Nurse or Coordination Care Navigators [66,73,78] Enhanced Recovery After Surgery Programs [67, 70, 71, 74] Electronic Health Record Alerts and Dashboards with Race and Ethnicity Specific Data[66, 73, 78]
Community Level	Research Partnerships with Community Organizations [84] Education Symposiums at Community and Cultural Centers [82, 83] Community Needs Assessments to identify socio-economic needs of patients requiring Surgical Care[82]
Policy Level	Affordable Care Act, specifically Medicaid Expansion [90,91] State and Federal Policy requiring Healthcare System Community Benefit Spending for Tax Exemption Status[101]

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Table 3.

Future Directions of Research and Healthcare System Implementation of interventions to Address Racial and Ethnic Disparities in Surgical Care

<p>Use of Alternative Research Methodology[102, 103] Implementation and De-implementation Science Community Based Participatory Research Machine Learning and Artificial Intelligence</p>
<p>Identify New Research Priorities [104, 105] Screening for Social Risk Factors Within System Treatment and Outcome Disparities Clinical Decision Support Systems to Standardize Recommendations, Treatment and Mitigate bias</p>
<p>Transform to Learning Healthcare Systems [104, 105] Combine Data on Patient Demographics with Local External Data source to Estimate Social risk of Patients Leverage Internal Data to create Equity Dashboards for Surgeons, Divisions, and Departments</p>
<p>Study and Implement Established Interventions in Medical Cohorts [106, 107] Clinical Reorganization and Multidisciplinary Teams to address Chronic Surgical Needs Community Health Worker Interventions Post-Discharge for At-risk Patients for Readmission Standardized Surgeon and System Feedback on Patient Outcomes Stratified by Race and Ethnicity Pay for Performance Equity-Based Initiatives</p>

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