



Focus Article

The Imperative for Racial Equality in Pain Science: A Way Forward

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Abstract: Racial equity is imperative to the future and integrity of scientific inquiry. In 2020, citizens of the United States (and globally) witnessed one of the most vile and egregious experiences of police brutality and systemic racism in recent history, the public execution of a Black American man. While some may isolate this and other similar events from influencing the scientific endeavors of pain researchers, events such as this can have a direct impact on the study, lived experience, and expression of pain in Black Americans. To truly understand the biopsychosocial effects of inequality and injustice on pain disparities, we must consider the unintended consequences that our current research approaches have in limiting the reliability and validity of scientific discovery. As we reflect on our current research practices in an effort to improve pain science, this perspective article discusses ways to initiate positive change in order to advance the science of pain in more equitable ways, not just for Black Americans, but for all individuals that identify as part of an underrepresented group.

Perspective: *Elimination of inequities in pain care and research requires the identification, naming, and mitigation of systemic discriminatory and biased practices that limit our understanding of pain disparities. Now is the time to divest from traditional research methods and invest in equitable and innovative approaches to support pain researchers in advancing the science and improving the lives of people with pain.*

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In the United States (U.S.), 2020 was an extraordinarily polarizing year characterized by the COVID-19 pandemic, social epidemics (ie, racial violence, opioid crisis), and natural disasters. The public execution of a Black

American man, George Floyd, at the hands of law enforcement, revealed anew the insidious, dehumanizing, and unacceptable impact of physical trauma, structural violence, systemic racism and social injustice, long overdue for acknowledgement and change. Many of us who conduct research on health disparities have found it increasingly difficult to reconcile this senseless act (and so many others) with the direction of our own programs of disparities and equity research. Our research, education, and clinical care aim to reduce such behavioral injustices and racist attitudes, and eradication of these damaging forces in science will require committed efforts across multiple levels. Like many others, our Pain Research and Intervention Center of Excellence (PRICE) has taken an active stance against racism and mistreatment of marginalized populations such as Black Americans. Awareness of the significant race disparities in

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health and in the delivery of healthcare, and in pain outcomes in particular, has increased significantly in recent years, and the impact of these disparities has been made glaringly obvious throughout the COVID-19 pandemic. However, less explicitly understood is that these health disparities are inevitably influenced by the same systemic and structural sources of racism that poison so many other areas of life for people of color in the U.S. As we strive to ensure that our research is equitable and just, now is the time to identify systemic issues limiting our understanding of pain disparities and to make recommendations to support pain researchers in advancing this work. This perspective article discusses ways to initiate positive change to advance the science of pain in more equitable ways.

Pervasiveness of Pain and Health Disparities

The impact of pain on people's lives is enormous economically, as well as physically and emotionally.^{21,30} Wallace and colleagues recently documented the intricate intersection of structural violence, stigma, and pain in diverse and marginalized groups with chronic pain.⁴⁹ Groups at high risk for pain and inadequate pain treatment include individuals who identify as a racial/ethnic and indigenous minority, experience low socioeconomic resources, and those of older age. Approximately 6 million Black Americans report chronic pain, but age-adjusted high-impact chronic pain and pain-related disability rates are slightly higher in this population compared to other groups labeled by race.¹⁶ Green and colleagues' seminal paper was among the first to systematically synthesize and report on the widespread disparities in pain assessment and treatment in "racial/ethnic minorities."²³ In efforts to identify sources of these disparities, more recently, an emerging movement has begun to examine the impact of social determinants of health, particularly the inequalities and negative experiences faced by Black Americans and other understudied populations.^{5,29} Indeed, major research funding entities, including the National Institutes of Health (NIH), have highlighted research on health disparities as a major emphasis (Table 1).

Multiple factors contribute to racial and ethnic disparities in pain, many of which represent more proximal manifestations of the overarching influence of structural racism (see Table 2 for definitions of key terms). The prevailing tendency to focus on attenuated individual and interpersonal factors, such as implicit bias, "perceived" injustice, and sociodemographic characteristics (eg, food/nutrition access, substandard housing, lower quality education, and economic deprivation),¹³ runs the risk of diminishing the societal structures that are the root cause (ie, systemic racism) of health disparities. Even worse, some such efforts may inadvertently assign blame to Black Americans for the adverse social conditions and health inequities that often plague their lives and experiences.^{1,11,42} While focusing on individual processes may inform patient-

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Table 1. NIH Initiatives Supporting Health Disparities Research and Workforce Diversity

Establishment of the National Institute on Minority Health & Health Disparities (NIMHD) Established in 2010, NIMHD's mission is to lead scientific research to improve minority health and reduce health disparities.
Most NIH Institutes have specific programs or offices devoted to health disparities research and devote significant proportions of their budgets to health disparities research.
NIH frequently issues specific funding announcements soliciting health disparities research grant applications. For example, see the recent announcement: Understanding and Addressing the Impact of Structural Racism and Discrimination on Minority Health and Health Disparities (RFA MD-21-004)
NIH recently released a funding announcement designed to "transform culture at NIH-funded extramural institutions by building a self-reinforcing community of scientists committed to diversity and inclusive excellence." NIH Faculty Institutional Recruitment for Sustainable Transformation (FIRST) Program: FIRST Cohort (RFA-RM-022)
NIH established the UNITE initiative to "address structural racism and promote racial equity and inclusion at NIH and within the larger biomedical research enterprise." They recently requested input from stakeholders that can inform development and implementation of this initiative (NOT-OD-21-066).

level interventions that could benefit individuals in pain, this approach fails to highlight the need for broader systemic reforms that could address disparities on a more global scale. Researchers investigating these patient-level factors should place them in systemic context, such as clearly linking them to adverse societal forces including structural racism. Relatedly, the impact of structural racism is evident in the multiple health system and provider-level factors that contribute to disparities in pain.⁶ Indeed, studies show that providers' (implicit or explicit) biases and misconceptions of individuals' pain experiences can promote discrimination and disrupt shared decision-making,^{3,17,27} thereby undermining patients' expectations for beneficence and nonmaleficence in both clinical care and scientific research. Providers' (implicit) biases are often a symptom or manifestation of a long history of overt or structural racism,^{25,36} which demands direct measurement of the actual concept/experience of racism. Thus, we must begin to critically examine our research practices to instill public confidence in the results, but more importantly to ensure that our interpretation and presentation of the data is 'just'.

Recommendations and Potential Key Implementation Strategies

Researchers investigating pain in underrepresented groups face a variety of needs and challenges to address diversity issues and improve inclusivity in pain research. It is widely known that strategies to intentionally diversify research teams and the scientific workforce, including a commitment to trainees of color, in addition to workforce training and education to build cultural

Table 2. Key Terms in Health Disparities Research

Health Disparities	A particular type of health difference that is closely linked with social, economic, and/or environmental disadvantage. Health disparities adversely affect groups of people who have systematically experienced greater obstacles to health based on their racial or ethnic group; religion; socioeconomic status; gender; age; mental health; cognitive, sensory, or physical disability; sexual orientation or gender identity; geographic location; or other characteristics historically linked to discrimination or exclusion. ⁴⁸
Implicit Bias	Attitudes or stereotypes that affect our understanding, actions, and decisions in an unconscious way, making them difficult to control. ⁴⁰
Discrimination	The unfair or prejudicial treatment of people and groups based on characteristics such as race, gender, age or sexual orientation. ²
Racism	Any action, belief, or attitude, whether conscious or unconscious, that reproduces a racial hierarchy that subordinates an individual or group based on skin color or race. It can be enacted individually, institutionally, ideological, or representational. ¹²
Institutional Racism	Racially adverse “discriminatory policies and practices carried out [within and between individual] state or non-state institutions” on the basis of racialized group membership. ⁵
Structural Racism	The totality of ways in which societies foster [racial] discrimination, via mutually reinforcing [inequitable] systems. . . (eg, 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. ⁶

humility across the lifespan, are critical steps toward engendering cultural sensitivity among pain researchers. Informed by research and our experiences, the following research practice recommendations set forth a way forward to help address challenges in combatting pain disparities through research, understand their causes, and set priorities for action that can be utilized in research environments at any stage of engagement. These recommendations speak to the ways in which researchers 1) promote pain disparities publicly, 2) design studies and enroll participants, and 3) analyze and report findings.

Recommendation 1: *Recognize chronic pain as a national health disparity issue (ie, public health priority).*

Key Implementation Strategies: The broad-based recognition of chronic pain as a critical public health issue has emerged only recently, fueled in large part by its linkage with the opioid epidemic and the need to increase access to and affordability of nonpharmacological treatment options. However, the unequal burden of pain across population groups remains underappreciated. Hence, we should continue to build and disseminate the evidence base to inform the public and key stakeholders that pain is not only a global public health issue but also a high priority health disparity issue that when mitigated may decrease healthcare costs per capita. As individuals and organizations stand with “Black Lives Matter,” we should leverage this opportunity to demonstrate *why* Black lives matter and highlight that pain is among the serious health issues that disproportionately impact this group. A recent study concluded that non-White racial/ethnic groups, including Black Americans, have a higher likelihood of high-impact chronic pain that is associated with greater healthcare use.³⁷ As pain scientists, it is pivotal to collaborate with economists and other social scientists to analyze the socioeconomic impact of chronic pain on the U.S. economy and global health ranking, and this work must inevitably address disparities in pain across population

groups. Moreover, pain disparities researchers must work to de-stigmatize chronic pain and redirect research efforts away from approaches that disproportionately places accountability on Black Americans for their pain and suffering.^{1,5} For example, inaccurate beliefs regarding biological and lifestyle (eg, presumed criminality) characteristics assigned to Black individuals can adversely affect their pain treatment.^{5,8,27,33} Disparities researchers can take the lead in challenging these inaccurate beliefs and redirecting research to incorporate structural and systemic factors that exert the greatest impact on the health of Black Americans.

Lastly, it may be necessary to frame addressing the chronic pain crisis in the U.S. as a “public health priority,” rather than a “racial disparity” or “moral imperative” (since appealing to the morality of others has generationally failed Black Americans). In order to effectively reduce the impact of pain in the overall population, public health interventions will need to recognize and address the root causes of racial and ethnic disparities in pain, and identify thoughtful treatment approaches that will not result in unintended consequences (eg, opioid misuse). This means understanding the lived experiences of Black individuals with chronic pain, their responses to disparities, and desired solutions to healthcare injustices.⁸

Recommendation 2: *Use research methodologies that reduce perpetuation of bias.*

Key Implementation Strategies: As a field, we have been successful at employing various methodologies to consistently report that Black Americans are disproportionately affected by the burden of pain,³¹ yet we are far from eliminating pain disparities if we fail to move beyond our current race-informed data analyses. Often, our models and methodologies for studying pain reflect underlying assumptions that may contribute to injustice. Here are a few example assumptions:

- 1. Race is a biological factor that drives differences in perception and transmission of pain:** This gives rise

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to the fallacy that the Black “body” is inherently biologically (and psychologically) different than the White body.²⁷ Therefore, analyses tend to observe for the effect of race rather than the pathological effect of racism in influencing biological variations. Instead, researchers must consider race as a signal that warrants further acknowledgement and investigation on how different levels of influence contribute to the relationships being studied.

2. **There is no parity in pain outcomes:** Similarities across groups are often considered uninteresting, hence, we often begin our “analytic search” by exploring and expecting disparities or differences, thereby minimizing equality of outcomes. For example, in an analysis conducted by our lab, we examined racial differences in movement-evoked pain and perceived stress. Our investigation sought to identify and find differences, but to our surprise, average perceived stress scores were comparable (nearly equal) between non-Hispanic Blacks and non-Hispanic Whites. Despite this parity in scores, stress was more strongly associated with movement-evoked pain in Black than in White individuals.¹⁰
3. **Black adults report more negative outcomes:** For example, research publications often report that Black adults are high in “catastrophizing”³² rather than Black Americans are *resilient* given the daily struggle of living with more severe pain and disability combined with facing structural racism and its attendant social stressors. Indeed, members of our own group have fallen prey to this tendency,^{14,24} though our more recent work has attempted to better contextualize these findings.^{7,34,46} Instead of labeling select catastrophizing behaviors as a negative or maladaptive coping mechanism, it is important to understand the context of such coping strategies among Black individuals experiencing pain, and to more comprehensively explore the multiple factors that may drive their pain outcomes.²⁰ The importance of refraining from assigning a negative characteristic and trait to an already marginalized population cannot be overstated. Notably, it would be helpful to employ psychometric studies to ensure that the validity of the constructs holds within the population of interest and then to explore which constructs independently predict the outcome of interest.⁹

Recommendation 3: *As scientists, apply critical thinking and reflexivity to understand ourselves and improve our research.*

Key Implementation Strategies: To advance equitable research, we must ask ourselves deep questions: What privilege do researchers bring to the interpretation of findings? What theoretical and conceptual models inform our research? What factors should we measure? What interventions would be most helpful for various groups of people? These are all questions that researchers should consider when designing equitable research studies. Further, during times of social instability and major events, we need to measure factors that are likely

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to differentially impact the experience and management of pain in disparate groups of research participants.

1. How Do Structural Inequities Get Under the Skin?

While historical concepts of inherent biological differences between race groups have been widely debunked, it is critical to better understand the biological consequences of the pervasive disadvantages levied by racism. To put it plainly, given well-documented interactions between biology and environment, a disregard for the social experience of research participants risks invalidating our research and promulgates the belief that structural racism does not shape the experience of pain. Multiple biological pathways are influenced by environmental exposures – inflammation, epigenetics, telomere length, allostatic load, and brain structure/function/biochemistry – and the continuous onslaught of adverse social conditions can become biologically embedded and even passed to future generations via the epigenome.^{4,45} A key distinction to note is that although race is considered a social construct originally defined by skin color and the physical attributes of a person,¹⁸ it is the sum of life experiences associated with being socialized into a particular race group that becomes embedded and modifies biological functions (eg, chronic stress, perceived stress), and not race itself. The utility of using race as a biological mechanism in models of pain has been debated.¹⁸

2. Understanding vs. Controlling for the Influence of Exposures:

Given the often-dramatic differences in environmental exposures, researchers must consider how certain exposures may truly be incomparable across race groups or difficult to interpret, leading to false dichotomies of disparities and misunderstanding of race/ethnic differences. To account for such “differences,” researchers attempt to control for potential “confounders” as statistical covariates, but *is this analytic approach valid? Ethical? Biased? Limiting our understanding and implications?* This approach seems logically flawed, as it makes an implicit assumption that there must be a true influence of race on the outcome, independent of the historical, social and environmental factors for which race is a proxy. Indeed, one researcher’s confounder is another’s mechanism. For example, socioeconomic status (SES) is a common confounder that investigators control for when exploring race/ethnic group differences^{10,15,39}; however, we recently found that SES was more strongly associated with pain and function among non-Hispanic White compared to non-Hispanic Black adults with chronic knee pain.⁴⁷ These findings illustrate how the common statistical practice of using SES as a covariate may wash out contextual nuances and intersectional dynamics that may hold the key to understanding pain within groups. Thus, authors should more explicitly describe their conceptual and statistical models, clearly indicating the factors being considered as confounders vs. mediators vs. outcomes.

3. Escaping the Tyranny of Between Group Comparisons: Another practice that perpetuates racial dominance and white supremacy is the designation of “White” race as the reference group in comparison studies without a scientific justification. In addition, these between-group comparisons fail to fully interrogate the sources of pain heterogeneity within groups. Other areas to consider include the titles given to publications, which should be clear, but also refrain from the appearance of bias or the potential to be misinterpreted. Even for this article, we struggled to identify the most sensitive and accurate terminology to use when referring to Black Americans—African Americans; Blacks (Note: this term is discouraged without an accompanying noun, such as Black adults or Black participants); African Descendants of Slaves (ADOS); Black, Indigenous, and People of Color (BIPOC); Afro-Caribbean; ethnic/racial minorities; etc. We selected Black Americans because the systemic issues described herein are often shared across the Black “race” and individuals of darker melanin. These identities are not always interchangeable and deciding on the appropriate terminology will depend on a number of complex contextual factors and situational nuances including but not limited to:

- Characteristics of the population within the geographic region in which the research is conducted. For example, participants from a diverse city may be first-generation immigrant Black Africans, ADOS and/or African Americans, and individuals of mixed race (eg, Black and White). In this case, a researcher may choose a more general racial category of Black Americans.
- How participants self-identify. It is important that we give participants the opportunity to self-identify their racial identity and then use the term preferred by the larger group. For example, during a research study conducted by the first author [SQB], most participants identified as African American, while a few identified as Black because their most recent family generations were not “African or from Africa” (even if they are descendants of African slaves).
- Age or Generation of the research participants. Individuals in different generations (Baby Boomers, Gen X, Millennials, Gen Z, etc.) may also vary in how they identify as a result of experiences and unique cultural values and lineage.
- Requirements of the journal and/or grant funding agencies. Some journals may require that terminology align with the U.S. Census categories, and grants submitted to acquire funding are generally designed and carried out according to the funding agency guidelines.
- Social trends and embracing intersectionality and history of the African diaspora. Over time, racial terms have evolved, particularly for Black Americans, based on changing societal beliefs and upward socioeconomic mobility.

Optimizing pain-related outcomes for individuals of underrepresented groups demands increased efforts to consider the sociocultural, economic, and political contexts that influence pain.³³ To improve understanding of mechanisms driving pain disparities among people of color, researchers are encouraged to consider the multiple interacting processes operating at the biological, psychological, and social levels.³⁸ Because pain is a culturally-bound experience, researchers should include study instruments with established psychometric properties in the targeted population(s) to facilitate interpretation and comparison of study findings when possible. If needed, development of new instruments or the use of existing instruments should consider their psychometric properties in all subgroups to be studied, including internal consistency, test-retest reliability, as well as face and criterion/construct validity within the target population and setting.^{28,44} Further, we should incorporate validated instruments to measure and describe social determinants of health (eg, [NIH PhenX Toolkit](#)) in research when possible. In addition, mixed methods research strengthens and provides insight into culturally relevant constructs that may not be adequately captured solely via quantitative methods.²⁶ We also encourage researchers to use more equitable and bias-free language that is free from prejudicial and marginalizing connotations (eg, “minority” may be associated with notions of human and social inferiority), including the critical evaluation of language to create inclusivity and respect for identity.

Recommendation 4: *Intentionally include and authentically engage people of color, particularly Black Americans, in pain intervention trials.*

Key Implementation Strategies: Researchers should promote interdisciplinary collaborations to improve understanding of pain employing various methodological approaches across the translational continuum as well as across educational training models (ie, biomedical, nursing, psychology, physical therapy) to understand the complex mechanisms that inform treatment targets. It is imperative that research participation be expanded through efforts that ensure accessibility for populations that have been historically underrepresented, not for the purpose of securing a sample size but to produce “just” findings that will support the reduction of pain through more precise assessment and treatment. Under-enrollment in clinical research is a particular challenge among many racially/ethnically-diverse communities, due in part to financial and transportation constraints, medical mistrust, fear of exploitation, and lack of familiarity with and awareness of research, all of which are well-founded concerns that each investigator should address.^{19,22}

Additionally, stringent inclusion criteria may also exclude Black Americans from research trials, especially trials involving drugs or devices. Addressing these barriers may require the provision of financial and transportation incentives for participation, as well as the integration of culturally informed recruitment and retention strategies to engage underrepresented racial/ethnic populations in research. Such efforts include

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partnering with members of the targeted community (ie, community-based participatory research [CBPR]; community advisory boards; citizen scientists) including local organizations, religious groups, and key stakeholders as a means of fostering a mutual rapport and trust among staff and study participants, as well as addressing fears and concerns regarding research participation. This partnership includes all phases of research from project conceptualization and informed consent to implementation²² (see examples and resources for CBPR in pain research, Black Americans, and aging populations^{35,41,43}). Likewise, the identification of factors that enhance research participation is critical as this could facilitate the adoption and adaptation of strategies that are culturally sensitive and optimize inclusivity (eg, use of linguistically and visually appropriate research materials, having research staff representative of the research participants' racial/ethnic group). There is a need to promote/encourage training in cultural humility which consists of promoting self-awareness and insight of one's own cultural identity, increasing understanding on the unique values and beliefs that shape an individual, and recognizing the intersectionality of cultural identities.⁵⁰

Exemplar

We describe the approach we have taken at the [University of Florida \(UF\) Pain Research & Intervention Center of Excellence](#) (PRICE) as an attempt to implement some of the strategies described above, yet we acknowledge our shortcomings and failures. We are very much a work in progress with a goal of ensuring that our scientific approach bends ever more towards justice. The mission of the PRICE, through excellence in pain research, treatment, and education, is to reduce pain-related suffering and improve quality of life for those from underserved and vulnerable communities throughout Florida and the nation by conducting research that aspires to eradicate racial, ethnic, and gender disparities in pain. One persistent strength that has fueled PRICE's success has been the diversity of our faculty, staff, and trainees. This diversity both results from and advances our efforts to create a culture in which all individuals feel valued and supported, and we embrace the diversity of thought, perspective, and experience that emerges when people from different backgrounds coalesce. Creating a diverse and inclusive culture also extends to engaging the community as partners by working with a diverse citizen scientists board who provide support for study development and implementation and working with a local community-based outreach program (HealthStreet) dedicated to navigating under-represented individuals toward participation in research studies. In addition, we collaborate closely with the College of Journalism and Communications to ensure that our health communications (educational materials, recruitment flyers, and advertisements) are culturally-sensitive and appropriate for various research populations. Our NIH-funded postdoctoral training program (National

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Institute on Aging [NIA]-T32AG049673) has attracted outstanding candidates from highly diverse backgrounds (eg, race, age, educational background, nationality, gender, socioeconomic history), many of whom we have successfully retained as UF faculty. In addition, we have frequently leveraged Research Supplements to Promote Diversity in Health-Related Research (PA-21-071) to obtain support for trainees, faculty and staff from underrepresented backgrounds, further enhancing the diversity of our team. PRICE strives to serve as a vehicle to embrace, embody, and enact the above-mentioned recommendations in the research conducted by our faculty and trainees.

More recently, we established the Center for Advancing Minority Pain and Aging Science (CAMPAS; NIA-P30AG059297), which supports the research and career development of early stage investigators from underrepresented backgrounds. Through CAMPAS, we have further expanded our commitment and capacity to support a diverse group of scientists and to provide training and support related to research addressing racial and ethnic disparities in pain and its treatment. Through their diverse perspectives and experiences, our early career investigators have engaged in reverse mentoring to help educate PRICE's more senior leadership, which has greatly enhanced the breadth and depth of our disparities research program. We believe this model of embracing and valuing diversity, promoting inclusion, providing research infrastructure and investing in high quality mentoring can and should be replicated across the country, thereby producing tremendous dividends toward a diverse pain research workforce that will more creatively and effectively address the major challenges faced by the field.

Concluding Remarks

We face a colossal, deep-rooted challenge amidst a year where our nation has experienced a deluge of unfortunate events. Science must move towards integrating responsible conduct of research, which must include just and equitable conduct of research for all. Similar to our understanding of pain as a unique lived experience, each of us has the power to impact change, by listening and learning from one another, and respecting individuality. We need to cultivate a model in pain research where individual differences are recognized, appreciated, and valued by fostering understanding, collaboration, and professionalism through open communication and positive interactions. These issues, in particular anti-racism, have become a central topic in shifting the consciousness of scientific discourse, public debates, and civil rights demonstrations, which attempt to deepen a sustained national commitment to social justice and to eradicate the unjust foundation on which the U.S. has been built. Like many around the country, we feel demoralized and infuriated at the continued expression and tragic consequences of structural racism and discrimination. Yet, we are encouraged at the national and global response demanding change, and we remain hopeful that we as a society can and will do better.

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