

## REVIEW ARTICLE

Strategies to address health disparities in  
vulnerable populations**Kabiru Abubakar Gulma**<sup>1\*</sup>, **Salim Ilyasu**<sup>2</sup>, **Abubakar Yerima**<sup>3</sup>, and  
**Namgay Rinchen**<sup>4</sup><sup>1</sup>The Tristram Engelhardt School of Global Health and Bioethics, Euclid University, Banjul, The Gambia<sup>2</sup>Department of Pharmaceutics and Pharmaceutical Technology, Faculty of Pharmaceutical Sciences, Bayero University, Kano, Nigeria<sup>3</sup>Clinton Health Access Initiative, Abuja, FCT, Nigeria<sup>4</sup>National Medical Services, Thimphu, Bhutan**Abstract**

Health disparities, characterized by avoidable differences in health outcomes and access to healthcare services, disproportionately affect vulnerable populations, including racial and ethnic minorities, economically disadvantaged groups, and individuals in rural areas. Addressing health disparities is crucial for achieving health equity and enhancing the overall well-being of vulnerable populations. This article explores the contributing factors to health disparities, including socioeconomic, cultural, and environmental determinants, and examines the challenges faced by vulnerable populations in accessing healthcare services. It outlines strategies to address these disparities through health education, culturally competent care, policy initiatives, and community-based approaches. The review identifies socioeconomic status, education, geographic location, and race/ethnicity as significant factors contributing to health disparities. Promising interventions include improving cultural competence among healthcare providers, implementing community health worker programs, and advancing mobile health clinics. To mitigate health disparities, it is critical to address both the social determinants of health and systemic barriers that limit vulnerable populations from receiving equitable care. Effective interventions, along with policy and advocacy efforts, can significantly improve health outcomes. Ongoing research and data collection are necessary to monitor progress and ensure prioritized health equity in healthcare systems. This article is intended to inform both academic and practitioner audiences by providing theoretical insights for researchers and students, while also offering practical strategies for policymakers and health program implementers.

**Keywords:** Health disparities; Vulnerable populations; Health outcomes; Determinants of health**Academic editor:**

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**\*Corresponding author:**Kabiru Abubakar Gulma  
(gulma@euclidfaculty.net)**Citation:** Gulma, K.A., Ilyasu, S., Yerima, A. & Rinchen, N. (2025). Strategies to address health disparities in vulnerable populations. *Global Health Econ Sustain*, 3(4):40-59. <https://doi.org/10.36922/GHES025310054>**Received:** July 30, 2025**Revised:** September 18, 2025**Accepted:** September 25, 2025**Published online:** October 17, 2025**Copyright:** © 2025 Author(s). This is an Open-Access article distributed under the terms of the Creative Commons Attribution License, permitting distribution, and reproduction in any medium, provided the original work is properly cited.**Publisher's Note:** AccScience Publishing remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.**1. Introduction**

Many experts endorse a broad concept of health disparities that focuses on differences in health outcomes (Braveman, 2025; Renzi & Franci, 2023). This emphasis highlights the intersection of health risks, the various characteristics of populations experiencing illness

or health risks, and the determinants of health. Within this framework, broad categories of social determinants, such as education, occupational and environmental exposures, housing, and economic status, are prioritized (Balaj *et al.*, 2021; Vart, 2022). The key principles of this broad concept lie in its directional focus on health equity and emphasis on determinants that are socially produced and, therefore, avoidable and correctable (Renzi & Franci, 2023).

By contrast, the earliest efforts of government and academic institutions to collect data and conduct research on health disparities reflected narrower views (Chunara *et al.*, 2024). At that time, health disparities were framed mainly in terms of differences between racial or ethnic groups, implicitly positioning one group as dominant. Such framing is politically incorrect and untenable. Moreover, these early studies tended to rely solely on mortality rates or life expectancy—measures that capture only past health status with a long temporal lag. By focusing solely on medical facilities, these views of health disparities assume that medical inequities constitute the fundamental problem, thereby overlooking the broader social determinants (Njoku, 2018).

Prior reviews on health disparities have tended to emphasize single determinants, such as race, ethnicity, and income, often presenting disparities as static rather than dynamic processes influenced by intersecting social determinants (Braveman, 2025; Njoku, 2018; Renzi & Franci, 2023). While such reviews have contributed to an understanding of the issue, they frequently lack a comprehensive account of how overlapping determinants—including education, environment, housing, and systemic discrimination—interact to create persistent inequities (Chunara *et al.*, 2024; Thomas, 2014). The present review seeks to address this gap by asking three guiding questions:

- (i) What do existing studies reveal about the structural and social roots of health disparities?
- (ii) How have conceptualizations of “vulnerable populations” evolved, and with what limitations?
- (iii) What strategies have been tested to reduce disparities, and how effective are they across settings?

In preparing this review, source materials were identified through searches of peer-reviewed journals, public health databases, and key national reports on health disparities. Priority was given to studies published within the past decade, though earlier foundational works were retained when necessary for critical historical context (National Center for Health Statistics [NCHS], 2021; Office of Minority Health and Health Disparities [MHHD], 2007). This article is structured as a narrative literature review, drawing upon peer-reviewed studies, national reports, and conceptual analyses to synthesize evidence and critically

engage with the evolving debates on health disparities and vulnerable populations.

## 1.1. Definition and scope

Health disparities are defined as differences in health outcomes (e.g., burden of disease, injury, and mortality) and access to healthcare services that are not only unnecessary and avoidable but also unfair and unjust (Renzi & Franci, 2023). According to the *Healthy People 2020* program, health disparities represent “a particular type of health difference that is closely linked with social, economic, and environmental disadvantage” (NCHS, 2021). Health equity, on the other hand, refers to the absence of unfair, avoidable, or remediable differences in health among groups of people defined by social, economic, demographic, or geographic characteristics. In the United States (US), disparities in health outcomes and access to healthcare services persist across several social and demographic factors (Chen, 2025). Affected populations include racial and ethnic minorities, the economically disadvantaged, the uninsured, children, women, older adults, and those living in rural areas (Alpert, 2024; Macias-Konstantopoulos *et al.*, 2023; O’Brien *et al.*, 2020; Weeks *et al.*, 2023). Health disparities have a significant impact on vulnerable populations, who are most affected by inequities in healthcare access and provision (Rad, 2025; Thomas, 2014).

The disparities in the burden of disease and mortality have been outlined in the *Healthy People 2010* program, which defined “the seven priority areas where disparity in health outcomes was considered to be the most significant: infant mortality; cancer screening and management; cardiovascular disease; diabetes; human immunodeficiency virus (HIV) infection; immunizations; and access to health care” (Thomas and Gilbert, 2006). Regarding access to health care, the *National Healthcare Disparities Report* (MHHD, 2007) outlined differences across 40 measures, including race and ethnicity, socioeconomic status, geographic location, sex, age, disability status, and sexual orientation. The most striking conclusion about the US healthcare system was that it is unsafe, ineffective, and inefficient for vulnerable populations.

Vulnerable populations refer to those who are at risk of not receiving key healthcare services due to being in marginalized or disadvantaged demographic or social groups. Barriers may include systemic discrimination, lack of awareness about available services, perceptions that services are misaligned with their needs, or structural obstacles (such as lack of transportation). The challenges facing the US healthcare system in addressing disparities in health outcomes and access for vulnerable populations are substantial and growing (MHHD, 2007). While much

of the evidence reviewed here draws from the US context, the broader social determinants of health, structural barriers, and intervention strategies discussed have global relevance. Similar inequities are observed not only in low- and middle-income countries but also within high-income settings, suggesting that the lessons highlighted in this review are transferable across diverse health systems. However, their application must be tailored to local contexts.

## 1.2. Contributing factors to health disparities

The following contributing factors to health disparities are examined in detail: Socioeconomic, cultural, and environmental factors.

Socioeconomic factors are among the most powerful predictors of health outcomes (Chunara *et al.*, 2024; Njoku, 2018; Vart, 2022). Among these, educational attainment is the single most influential determinant of health across the life course (The Lancet Public Health, 2020). Educational level shapes income potential, residential environment, access to health care, and awareness of healthy lifestyles. As a nation undergoes demographic transitions characterized by increasing diversity, lower average educational attainment, and rising poverty levels, these intersecting trends collectively contribute to poorer individual and population health outcomes.

Health and healthcare disparities exist across the US at the state and national levels. It is the responsibility of the healthcare system to identify the factors that negatively influence health in underserved communities and to raise awareness of their impact on overall health, quality of life, and life expectancy. Over the past two to three decades, the prevalence of health and health care disparities has increased, and research shows that minorities are disproportionately affected, resulting in poorer health outcomes compared to non-minority populations (Mokdad *et al.*, 2024). Specifically, research shows that minorities have poorer health outcomes due to social determinants of health (Leeshell & Douglas, 2014), including lower levels of education, socioeconomic disadvantage, inadequate housing, and exposure to environmental hazards (Chunara *et al.*, 2024; Kolossváry *et al.*, 2023; Vart, 2022; World Health Organization [WHO], 2024). Addressing these entrenched disparities requires the development and sustainability of a community-based workforce capable of meeting the increasing healthcare needs of a rapidly growing, diverse population.

A culturally competent workforce demonstrates awareness, respect, and sensitivity toward the values, beliefs, and practices of diverse groups. The need for a diverse, culturally competent healthcare workforce is

of primary importance in identifying, addressing, and eventually reducing health and healthcare disparities. There is ample evidence to support that increasing the diversity of the healthcare workforce provides significant benefits for population health, particularly among disadvantaged populations (Rod *et al.*, 2023).

## 2. Methodology

This paper adopted a narrative literature review approach, emphasizing synthesis and critical analysis rather than systematic quantification. Relevant literature was identified through searches of academic databases, including PubMed, Scopus, and Google Scholar, using combinations of terms such as “health disparities,” “vulnerable populations,” “health equity,” “social determinants of health,” and “health care access barriers.” In addition, foundational reports and guidelines from institutions, such as the “*Healthy People 2020 Final Review*” (NCHS, 2021) and the *National Healthcare Disparities Report* (MHHD, 2007), as well as WHO documents, were reviewed to capture policy-level perspectives.

Inclusion criteria focused on peer-reviewed studies that (i) examined health disparities across socioeconomic, racial/ethnic, geographic, and cultural dimensions; (ii) explicitly addressed vulnerable populations; (iii) evaluated or described interventions aimed at reducing inequities; and (iv) offered conceptual or theoretical contributions to understanding “vulnerability.”

Priority was given to articles published within the past decade to ensure the inclusion of the latest information, while seminal works were retained where they provided historical or conceptual significance. Gray literature (e.g., government reports, field reports, and policy briefs) was included selectively to highlight practical strategies with demonstrated influence on health equity programs.

The analysis followed a thematic approach, categorizing findings according to the review’s objectives: (i) Definitions and conceptualizations of health disparities, (ii) characteristics of vulnerable populations, (iii) barriers to healthcare access, and (iv) strategies and interventions. Within each category, consistencies and contradictions across studies were identified, and special attention was given to methodological rigor, scope, and limitations. This approach ensured that the synthesis remained both comprehensive and critical, striking a balance between descriptive evidence and conceptual interpretation. In addition to peer-reviewed studies, insights were also informed by the author’s professional expertise in public health and health systems research, as well as by the selective use of gray literature. This transparency acknowledges that several strategic recommendations reflect not only

published evidence but also practice-informed knowledge relevant to vulnerable populations.

### 3. Vulnerable populations

Healthcare disparities remain a prevalent public health issue worldwide and have continued to worsen despite numerous targeted interventions (Chen, 2025; Mokdad *et al.*, 2024). Vulnerable populations, particularly racial and ethnic minorities, socioeconomically disadvantaged individuals, and patients with limited health literacy, are at heightened risk of developing and experiencing health disparities (Rod *et al.*, 2023). Accordingly, the purpose of this study was to address the needs of these vulnerable populations and to develop targeted strategies to support equitable care (Johannes *et al.*, 2019).

In the context of healthcare disparities, vulnerable populations are defined as individuals at higher risk than the general population for developing disease, experiencing adverse treatment outcomes, or suffering disproportionate exposure to biological, chemical, and other hazards. Such populations often have greater healthcare needs but limited healthcare resources (Collins *et al.*, 2016; Cushing *et al.*, 2015; Johnston & Cushing, 2020). Inadequate representation in healthcare research or practice may result in treatments that are inappropriate, ineffective, or even harmful, leading to gaps in care or exclusion from essential services (Macias-Konstantopoulos *et al.*, 2023; Renzi & Franci, 2023). Examples include individuals experiencing homelessness or living below the federal poverty line (Blanch, 2023; Rolfe *et al.*, 2020; Watson *et al.*, 2016). Thus, vulnerable populations experience healthcare disparities rooted in inherent demographic and patient-level characteristics (Vergunst *et al.*, 2016).

Common vulnerable populations that experience healthcare disparities and stratified among demographic variables include racial and ethnic minorities (e.g., black, African American, and Hispanic populations), individuals of lower socioeconomic status, the uninsured, sexual and gender minorities (e.g., bisexual and transgender individuals), persons with limited health literacy or English proficiency, socioeconomically disadvantaged groups, residents of rural communities, older adults (more than 65 years), children (< 18 years), and individuals living with disabilities (Cushing *et al.*, 2015; Oberg *et al.*, 2022; Oberg & Colianni, 2016; O'Brien *et al.*, 2020; Williams *et al.*, 2021). It is worth noting that these categories often overlap, as individuals may belong to multiple at-risk groups simultaneously. Moreover, vulnerability is a dynamic concept that must be continually reevaluated in considering changing economic, social, cultural, political, environmental, and technological conditions.

#### 3.1. Definition and characteristics

Despite the conceptual ambiguities in the use of “vulnerability” in health literature, one theme appears to be consistent: The recognition of human fragility and suffering accompanied by a moral responsibility to respond (Rami *et al.*, 2023; Rod *et al.*, 2023). The combination of human suffering and susceptibility to harm raises ethical questions regarding treatment and care. Although the notion of vulnerability has been examined across various disciplines, it has acquired particular significance in health and healthcare contexts. However, defining and analyzing vulnerability is fraught with complexities (Renzi & Franci, 2023). The academic literature has no clear understanding, interpretation, or application of the concept. Attempts to describe and apply the term in research and practice are complicated by a lack of consensus regarding its meaning.

To provide greater coherence, this review conceptualizes “vulnerable populations” as groups whose health outcomes are shaped simultaneously by individual-level susceptibilities (such as age, disability, and chronic illness), environmental exposures (including housing, pollution, and unsafe labor conditions), and systemic inequities (such as institutional discrimination, economic deprivation, and political marginalization). This integrated framework highlights that vulnerability is not an intrinsic trait but rather the result of intersecting risk domains that limit individuals’ and communities’ capacity to achieve equitable health outcomes (Clark & Preto, 2018; Evans *et al.*, 2016; Rami *et al.*, 2023). By situating vulnerability within overlapping personal, environmental, and structural contexts, the review advances a multi-dimensional understanding that connects the lived experiences of disadvantaged groups to broader systems of social and political power.

The concept of vulnerability remains central to contemporary debates on health inequalities and interventions. In the context of global disparities in social advantages, health status, and healthcare accessibility, clarifying the definition of vulnerability is imperative for both ethical and practical reasons (Rami *et al.*, 2023). A review of the literature revealed that the term appears frequently in everyday discourse, phrased as “the vulnerable,” “vulnerable communities,” “vulnerable groups,” “vulnerable populations,” “vulnerable words,” “vulnerable technologies,” or “vulnerable issues” (Patrick *et al.*, 2018; Rod *et al.*, 2023; Vergunst *et al.*, 2016), yet continues to lack conceptual precision. As a result, its use often relies on subjective interpretation—a vague notion at best—making its implementation in practice difficult.

In health literature, “vulnerability” often assumes specific meanings. The two major classes of such

meanings involve: (i) Vulnerability to illness itself, and (ii) Vulnerability to inadequate or inaccessible health care (Clark & Preto, 2018; Patrick *et al.*, 2018). Although these categories may appear as a simple typology, they are deeply intertwined and should not be conflated. Vulnerability is seen as a multi-dimensional concept. Evans *et al.* (2016) argued that vulnerability and persistent health disadvantages arise from the interplay of multiple factors, including socioeconomic, geographic, developmental, political, and ideological factors, as well as entrenched patterns of social stratification that disempower specific groups. Consequently, more pronounced health disadvantages are more likely to be observed in groups that are socially disadvantaged and, hence, politically marginalized, economically deprived, or otherwise socially disempowered. Kotoh and Van der Geest (2016) further emphasized that health vulnerabilities manifest through exposure to risk factors, contextual circumstances that heighten susceptibility to disease, limited access to health care, and inequities in the quality of treatment received. Meanwhile, vulnerable groups were also defined as “social groups who experience limited resources and consequent high relative risk for morbidity and premature mortality” (Flaskerud & Winslow, 1998). These groups, including women, children, older adults, ethnic minorities, displaced people, and individuals with disabilities, experience marginalization and disadvantage (Johannes *et al.*, 2019; Patrick *et al.*, 2018; Rami *et al.*, 2023).

### 3.2. Common vulnerable groups

Vulnerable populations often endure disparities in their healthcare experiences due to common barriers that limit healthcare access or impact the quality of care (Johannes *et al.*, 2019). A clearer understanding of these shared experiences can be achieved by identifying the groups most commonly affected. The underlying vulnerability of these groups is influenced by various social determinants of health, which shape the healthcare environments (Chunara *et al.*, 2024; Rahemi *et al.*, 2024; Vart, 2022; Vergunst, 2016). Given these considerations, the following groups were proposed as common vulnerable populations: Low-income communities, racial and ethnic minorities, English learners, older adults, and individuals with disabilities (Bulatao *et al.*, 2004; Cushing *et al.*, 2015; O'Brien *et al.*, 2020; Rami *et al.*, 2023). This outlines a framework for evaluating other populations that may require intervention programs. In general, vulnerable populations are characterized by conditions such as low socioeconomic or education levels, speaking English as a second language, or having physical or mental health disabilities, all of which contribute to greater obstacles in accessing specialized medical care (Irimia *et al.*, 2024;

Pandey *et al.*, 2021). Understanding their unique health needs and care experiences is essential for designing programs to address their circumstances.

A comprehensive understanding of vulnerability also requires acknowledging how health risks accumulate and are transmitted across the life course and generations. The concept of “weathering” illustrates how prolonged exposure to social, economic, and environmental stressors leads to premature aging and increased susceptibility to chronic disease among marginalized groups (Do *et al.*, 2019; Leeshell & Douglas, 2014). Similarly, the intergenerational transmission of risk—such as the persistence of poor health outcomes among children of socioeconomically disadvantaged parents—reflects how structural disadvantage reproduces inequities over time (Grey *et al.*, 2021). Adult health problems rooted in childhood trauma, neglect, or discrimination further demonstrate that vulnerability is not only immediate but embedded within lived histories of exclusion (Thomas, 2014). These processes are inseparable from disparities in political and economic power, exposing marginalized communities to hazardous environments, unemployment, and sub-standard care (Blanch, 2023; Rolfe *et al.*, 2020).

### 4. Health disparities among vulnerable populations

The unequal distribution of health outcomes within demographic groups is referred to as health disparities. Health disparity is the term used to describe the health inequalities between vulnerable and non-vulnerable populations. Numerous racial and ethnic disparities have been documented, including those among American Indian and Alaska Native adults, Hispanic adults, and black adults in the US (Bulatao *et al.*, 2004). For example, the Hispanic adult population suffers from disproportionately high rates of chronic diseases—including asthma, heart disease, diabetes, and HIV—due to healthcare and social disparities, including low educational level, limited English proficiency, lack of medical insurance, and living close to hazardous waste sites (Collins *et al.*, 2016; Cushing *et al.*, 2015; Pandey *et al.*, 2021; The Lancet Public Health, 2020). Rural black and Hispanic adults are particularly at risk for racial and ethnic healthcare disparities due to socioeconomic distress—including higher poverty rates, limited educational attainment, and reduced access to private insurance—compared with their metropolitan counterparts (Alpert, 2024; Bulatao *et al.*, 2004; Manuck, 2017; McConnell, 2013; NCHS, 2021).

Uninsured adults remain more vulnerable than their insured counterparts, even after adjusting for age, personal characteristics, and socioeconomic indicators (Babu *et al.*,

2025; Lee *et al.*, 2021; Wehby & Lyu, 2018). Frequent medical care use—including visits to specialists and the emergency department—indicates that patients have difficulty accessing health care and are disproportionately affected by a vulnerable healthcare status. Despite the implementation of the Affordable Care Act in the US, low-income adults continue to experience disparities in insurance coverage and healthcare access, with racial and ethnic discrimination further exacerbating these inequities, even after adjusting for age, employment, and health status (Gaffney & McCormick, 2017). Their health needs and disparities in care quality are further compounded by the absence of a regular source of care, contributing to unmet healthcare needs and unaddressed referrals or treatment recommendations (Thomas, 2014). Compared with non-vulnerable populations, hospitalized individuals in vulnerable groups are less likely to receive recommended care and are more likely to experience discrimination when seeking care (Hudelson *et al.*, 2009; Rivenbark & Ichou, 2020).

#### **4.1. Racial and ethnic disparities**

Racial and ethnic disparities in healthcare access, treatment recommendations, and receipt of procedures contribute to a disproportionate burden of disease incidence, prevalence, morbidity, mortality, and survival rates across specific health conditions (Cushing *et al.*, 2015; Lee *et al.*, 2021). Notable examples include higher breast cancer incidence rates among white women but greater breast cancer mortality among black women (Yedjou *et al.*, 2019); a higher frequency of late-stage cervical cancer diagnoses and precursor lesions among Hispanic women compared with white women (Amboree *et al.*, 2023); and higher rates of preterm birth, low birth weight, and infant mortality among black women compared with white and Hispanic women (Manuck, 2017). Such disparities exist across a broad range of diseases and population subgroups, including, but not limited to, racial and ethnic minorities (Leeshell & Douglas, 2014).

Aside from the burden of disease, healthcare disparities are also intertwined with the social determinants of health—the economic and social conditions that shape individual differences in health status. For example, black individuals are more likely to live in a neighborhood characterized by concentrated poverty, inadequate housing, limited employment opportunities, and segregated settings (Do *et al.*, 2019; Rolfe *et al.*, 2020). Compared with white populations, black and Latino individuals are more likely to rely on welfare assistance and receive housing subsidies, while less likely to own homes (McConnell, 2013). They also have lower access to recreational places and healthy food outlets, resulting in higher exposure to

environmental hazards, chronic stress, unhealthy dietary choices, and comorbidities of mental illness and substance abuse problems (Blanch, 2023; Do *et al.*, 2019; McConnell, 2013; Rolfe *et al.*, 2020).

It is important to distinguish racial and ethnic health inequities from those associated with gender, age, disability status, or sexual orientation. Racial and ethnic inequities are historically rooted in legacies of slavery, segregation, colonization, and systemic racism that continue to structure unequal access to housing, education, employment, and health care (Do *et al.*, 2019; Macias-Konstantopoulos *et al.*, 2023; O'Brien *et al.*, 2020). By contrast, inequities related to gender, disability, or sexual orientation often emerge from other forms of social stratification, stigma, or exclusion, all of which may interact with, but are not reducible to, racial and ethnic histories (Patrick *et al.*, 2018; Rami *et al.*, 2023). Recognizing these distinct trajectories is essential, as strategies to reduce health disparities must address not only common determinants such as poverty and geography but also the unique historical and structural forces that sustain racial and ethnic inequities.

#### **4.2. Socioeconomic disparities**

The growing understanding of health extends beyond the mere absence of disease to encompass the overall physical, mental, and social well-being, reflecting a continuum that ranges from malnutrition and injury to vitality and longevity (Grey *et al.*, 2021). However, the ability to live a healthy life protected by adequate medical care is unequal across socioeconomic groups and racial lines, both within and between nations. Social disadvantage is a lack of access to socially acceptable levels of income, wealth, education, occupational attainment, social status, and political and financial power (Vart, 2022; Williams *et al.*, 2021). Groups or individuals experiencing these limitations are considered socially disadvantaged (Leeshell & Douglas, 2014). This comprehensive term encompasses economically underprivileged groups, such as minority ethnicities, female-headed households, large families, homeless individuals, persons with chronic illness or disability, immigrants, older adults, and the unemployed (Martínez-Martínez & Rodríguez-Brito, 2020; Rami *et al.*, 2023).

Research unveils geographic and community-level discrepancies across the US, where individuals in lower socioeconomic strata encounter poorer health outcomes across nearly all indicators. Greater attention should be directed toward understanding how socioeconomic status shapes health outcomes, as evidence shows that individuals living at or below poverty standards have higher rates of disease and premature mortality than those above it (Holmes, 2019). The absence of high-quality data

on socioeconomic differences could lead to unfounded presumptions about the relative influence of socioeconomic and racial factors on health disparities.

### 4.3. Geographic disparities

Geographic disparities arise when individuals in certain regions experience elevated risks of poor health. In the US, such disparities are well-documented across healthcare access and outcomes, with a focus on their impact among vulnerable populations (Ye & Kim, 2014). Attention to geographic disparities is essential, given the diversity of health risk factors and health events across areas, states, and nations. The geographic focus is also underscored by the Institute of Medicine reports, drawing attention to specific subsets of population configuration as vulnerable: minorities, older adults, people experiencing poverty, immigrants, and individuals with severe mental health issues (Bauer *et al.*, 2014). Furthermore, Burgard and Lin (2013) shocks contribute to marked variations in health outcomes across states, neighborhoods, and communities. Similarly, Thomas's (2014) research highlighted two facets of geographic disparities: Limited access to rural healthcare services and the influence of neighborhood effects on mental health.

To this end, rural healthcare disparities, particularly in mental health care, among vulnerable populations, particularly the rural poor, were emphasized. Thus, there is a need for research to provide a more nuanced understanding of how geographic context shapes health experiences. The rural context was critically explored and reframed as a geographic space (an area with characteristics that differentiate it from others) and social construction (ensuring rurality is socially constructed). This dual nature of rurality is important for framing, interpreting, and responding to geographic health disparities.

## 5. Barriers to healthcare access

Multiple barriers impede access to healthcare services among vulnerable populations. Healthcare access barriers can be defined as obstacles that delay, limit, or prevent individuals from accessing necessary healthcare services. These barriers can be classified into three categories: enabling barriers, predisposing barriers, and need barriers (Aragie *et al.*, 2025). Enabling barriers refer to obstacles in social networks that limit access to healthcare services, such as inadequate community resources and limited family support. Predisposing barriers encompass factors, such as educational level, race, and occupation, that affect an individual's vulnerability to health problems. Need barriers relate to factors involving actual health needs essential to performing healthcare services, including health status and disability (Johannes *et al.*, 2019).

In practice, vulnerable populations face a range of obstacles, such as limited access to health information, a lack of healthcare providers, transportation difficulties, financial constraints, a complex healthcare system, cultural differences, stigmatizing attitudes, and poor health status. Minorities, immigrants, low-income individuals, and victims of violence and trafficking are particularly affected, often encountering multiple layers of disadvantage in both preventive and treatment settings. Understanding these barriers is essential for both providers and patients, as it clarifies the reasons for not utilizing healthcare services.

While the scope of health disparities is necessarily broad, this review emphasizes the importance of analytical depth. A recurring theme across studies is the inconsistency in how disparities are measured—some focus narrowly on healthcare access, while others examine broader social determinants such as education, housing, and systemic discrimination (Chunara *et al.*, 2024; Njoku, 2018). For example, disparities in cardiovascular outcomes are often attributed to both behavioral risk factors and structural barriers, such as food deserts or inadequate insurance coverage, yet studies diverge on assessing which determinants carry the most significant weight (Alpert, 2024; Mokdad *et al.*, 2024). Highlighting these consistencies and inconsistencies enables a more critical interpretation of the findings and helps avoid overgeneralization.

### 5.1. Financial barriers

Cost-related barriers include the lack of insurance and the inability to see a healthcare provider due to financial constraints. Individuals without insurance are more likely to forgo medical care because of cost and are less likely to have visited a healthcare provider within the past year. In contrast, individuals with a regular healthcare provider are less likely to experience barriers related to affordability. Among African American individuals, financial barriers are further shaped by socioeconomic disadvantage—particularly through the inverse relationship between household income and healthcare access, even after controlling for other socioeconomic characteristics (Pratte, 2016).

Although education is not a direct financial barrier, it is associated with other access-related challenges. Individuals without a college degree are significantly more likely to lack insurance, have no regular healthcare provider, or forgo routine check-ups within the past 2 years, compared to college graduates. Those without a high school diploma face a greater disadvantage, being more likely to experience all four barriers (Johannes *et al.*, 2019; Vart, 2022; Williams *et al.*, 2021). Across all income levels, individuals in lower-income categories are more likely to be uninsured and unable to visit a provider due to cost, compared with those

in the highest income category. Financial instability often compels individuals to prioritize necessities such as food and housing over health care (Johannes *et al.*, 2019). In addition, there are significant affordability disparities, such that younger adults, women, and those with lower-income levels are more likely to report cost-related barriers.

### **5.2. Cultural and linguistic barriers**

Cultural and linguistic barriers that prevent or limit equitable access to adequate healthcare services perpetuate health disparities among vulnerable populations across the US. Although cultural competence efforts across healthcare systems have tried to address these disparities, their success has been mixed. Many approaches have proven either too vague to be effective or insufficiently responsive to the specific social and structural barriers affecting the most vulnerable populations (Wynia & Matiassek, 2006).

To create meaningful change in communities of color, cultural competence initiatives must address systemic inequities in healthcare access and quality. Moreover, cultural competence has also been characterized as a process rather than a fixed outcome—one shaped by multiple factors operating across individuals and institutions—making it a more nebulous concept to pursue than a target to strive for. Nevertheless, there is broad agreement on basic practices essential for culturally competent care. These include understanding cultural beliefs and their influences on patient interactions, developing knowledge of specific patient groups and their healthcare practices, ensuring the availability of language assistance services, and recruiting and training staff in cultural sensitivity and awareness (Zambrana *et al.*, 2004).

### **5.3. Health literacy barriers**

Health literacy influences access to healthcare and determines health outcomes among at-risk populations. Higher levels of education, income, and insurance coverage are positively linked to health literacy (Coughlin *et al.*, 2020). Individuals with limited health literacy often face significant challenges in navigating the healthcare system, understanding health information, making informed decisions about their health, and keeping pace with the increasing complexity of modern health care, all of which impact their health outcomes. Similarly, individuals in vulnerable populations often experience low health literacy precisely because of the structural and environmental disadvantages in which they live, perpetuating a cycle of poor health. Therefore, social determinants of health and health literacy must be considered together to achieve equitable health outcomes.

Limited health literacy is often seen as an individual shortcoming. However, healthcare organizations and

providers also share responsibility for ensuring that health information is understandable and that treatments, services, and applications are usable (Fitzpatrick, 2023). The Institute of Medicine Committee on Health Literacy has called for the continuous redesign and testing of health information to meet the needs of individuals with limited literacy skills (Hasannejadasl *et al.*, 2022). Emerging evidence highlights practical strategies for communicating health information in ways that enhance understanding among those with limited health literacy and improve usability for the general population.

## **6. Strategies for addressing health disparities**

In selecting exemplars of policy and system-level interventions, this review prioritized initiatives that (i) have been evaluated in peer-reviewed literature or national reports, (ii) demonstrate measurable outcomes in reducing disparities, and (iii) reflect a diversity of approaches across education, community engagement, and healthcare delivery. For example, community health worker (CHW) programs were included because they combine cultural competence with demonstrated improvements in healthcare access and chronic disease outcomes (Joanna, 2010; Malik, 2018). Mobile health clinics (MHCs) were highlighted for their capacity to overcome geographic and financial barriers while providing preventive and primary care (Singh *et al.*, 2022; Yu *et al.*, 2017). Policy initiatives such as the Culturally and Linguistically Appropriate Services (CLAS) standards and local health equity legislation were reviewed as structural efforts to institutionalize equity across systems (MHHD, 2007). These exemplars were chosen not to be exhaustive but to illustrate the range of tested strategies that can inform broader systemic reforms.

### **6.1. Health education and promotion programs**

Health education and promotion programs tailored to the unique needs of vulnerable populations can help bridge gaps in access to care, particularly for those affected by latent health conditions, chronic illnesses, or limited awareness of preventative care options (Grazón-Orjuela *et al.*, 2020). Such initiatives should address disparities in the context of controlled street environments, access to care, social connectedness, and overall neighborhood environment (Guidry *et al.*, 2005, n.d.). Raising awareness of these healthcare disparities may enhance understanding of how individuals within similar socioeconomic contexts face barriers to obtaining care, preventive measures, or prescription remedies, potentially motivating collective action to seek or advocate for improved healthcare access (Leeshell & Douglas, 2014).

Incorporating an understanding of a population's context is essential for promoting awareness and empowerment. Effective implementation of health education initiatives requires culturally sensitive strategies that leverage existing community structures and resources. These may include exploring neighborhood environments to assess engagement factors; organizing collaborative, community-based study groups to document and present findings; and hosting local gatherings or street-based forums to foster dialog around health disparities and available resources. Such participatory methods not only help identify unaddressed needs but also empower residents to co-develop and sustain intentions. Ultimately, these community-driven approaches can raise awareness of healthcare inequities and stimulate broader efforts to promote health equity within vulnerable populations (Leeshell & Douglas, 2014).

## 6.2. Culturally competent care

Vulnerable populations exhibit diverse healthcare needs, preferences, and practices, which are intertwined with factors such as culture, language, education, race/ethnicity, geography, health status, and disability (Zambrana *et al.*, 2004). Recognizing that diverse groups do not uniformly experience health outcomes and access to health care, researchers emphasize the importance of culturally competent health care as a fundamental pathway to achieving health equity (Blonigen-Heinen & Basol, 2015).

Enhancing cultural competence among healthcare providers is critical to improving the quality of care for vulnerable populations. Effective strategies include fostering inclusive environments, offering bilingual services, training staff in cultural sensitivity, and conducting awareness campaigns that highlight diverse cultural backgrounds and health needs. Improving patient-provider communication is equally vital; for example, providing Medicaid beneficiaries with informational pamphlets and using visual aids and illustrations to explain treatment can facilitate understanding.

## 6.3. Policy and advocacy initiatives

Various policy and advocacy initiatives have emerged to address healthcare disparities through community revitalization and systemic reform. In Washington, DC, several programs aim to expand economic opportunities for residents of the city's most underserved neighborhoods. Many people in these neighborhoods live in public housing or are rent-burdened in the private market. Deteriorating neighborhood conditions—such as broken streetlights, vacant lots, and boarded-up buildings—reflect broader systemic neglect, including limited access to education and healthcare services (Baquet *et al.*, 2004). Consequently,

children born into these neighborhoods often face the same intergenerational cycle of poverty as families did decades ago.

A concerted effort of philanthropic foundations has launched a coordinated effort to reverse these trends by fostering job creation, building workforce skills, and investing in community amenities such as schools and healthcare facilities. These efforts are modeled on the successful neighborhood redevelopment projects in Baltimore, Maryland; Atlanta, Georgia; and Chicago, Illinois (Williams & Cooper, 2019). However, evidence regarding their long-term impact remains mixed. A recent study from the University of Pennsylvania determined that, despite billions of dollars of investment, “the vast majority of neighborhoods that were ‘invested’ in over 20 years continued on a downward spiral” (Steif, 2014).

More direct efforts in DC have focused on addressing immediate healthcare needs. The most critical elements of these efforts are the development of a community health center at the site of the former United Medical Center in Southeast Washington, DC, along with plans to strengthen the city's emergency medical services system. The health center is designed to provide various services, including multilingual staff, transportation assistance, and extended operating hours to improve accessibility. However, implementation delays have limited its capacity, leaving many residents without consistent access to care. A plan before the DC Council seeks to revitalize emergency medical services—currently strained by limited funding and political support—by adopting cost-effective strategies used in other urban areas, including partnerships with private ambulance providers.

## 7. Community-based approaches

This section builds on, rather than revisits, the vast literature on engaging communities in health improvement. Several emerging projects are highlighted to illustrate a shift toward more embedded and holistic models of local engagement, demonstrating the potential of community-driven approaches to strengthen public health initiatives (Robinson, 2005). The broad dissemination of these approaches through academic forums, public health networks, and organizational meetings, seminars, and symposia can enhance their visibility and coherence (Epps *et al.*, 2021).

### 7.1. Community health workers

Community health worker and other lay health worker programs have emerged as culturally appropriate and community-based resources to address healthcare disparities. As unique members of the communities they

serve, CHW programs have increased access to vulnerable populations while delivering culturally competent and diverse care (Malik, 2018). They provide disease-specific health education and create an environment of trust among community members, making them approachable to underserved populations. Furthermore, CHW programs are often more effective at engaging consumers by fostering their social and familial connections with community members. By bridging the gap between vulnerable communities and healthcare providers, CHW programs contribute to sustainability, quality assurance, cultural competency, workforce training, healthcare performance, and health outcomes (Joanna, 2010).

For populations at the “downstream end”—those experiencing barriers to health care such as lack of access and underutilization of available resources—programs aiming to overcome these barriers, in some cases using lay health workers as sources of culturally appropriate care, have been established nationwide. The Community Health Representative Program, for example, builds upon the traditional role of trusted community members and lay health workers, providing an effective funding model, sustainability, and program design for future community-based models of care geared toward sub-Saharan African refugee communities. The native American practice of “circular care” provides unique insight into building community relationships, addressing gaps in utilizing available care, and honoring cultural contexts in health service delivery.

## 7.2. MHCs

MHCs—specially customized and medically equipped vehicles, often retrofitted buses, trucks, and vans—are used by public and private non-profits, health departments, hospitals, or community health center organizations (Singh *et al.*, 2022). These vehicles are typically staffed with healthcare professionals, such as nurse practitioners, registered nurses, physician assistants, social workers, and outreach workers, who provide a range of services, from preventative health screenings (e.g., colorectal cancer, hypertension, diabetes, cervical cancer, mammography, cholesterol screening, and HIV screening) to primary and ongoing care (e.g., immunizations, check-ups, chronic diseases management, and medications). These services reduce barriers related to time, cost, and accessibility (Kirk *et al.*, 2013), meeting the healthcare needs of uninsured and vulnerable populations who face logistical or financial challenges in accessing traditional care facilities.

In Georgia, one project demonstrated how the utilization of MHC improved healthcare access through community surveys that reflected diverse racial, gender,

age, educational, and employment demographics (Egwu, 2019). Access to health care was identified as the most significant challenge affecting the community, citing difficulties with transportation, scheduling, and financial constraints. Rural residents experienced higher morbidity and mortality rates than urban residents. A literature review on the health status and barriers to healthcare access in underserved populations complemented these findings (Faridi *et al.*, 2025).

There are approximately 2000 MHCs in the US, with one registered MHC in Georgia (Yu *et al.*, 2017). Most MHCs (67%) are publicly funded, with the federal government as the most common funding source (38%), followed by private non-profit grants (28%), other sources (15%), the funds contributed by the healthcare institution providing the service (13%), and state/town/federal grants (6%) (Hill *et al.*, 2014). Many MHCs operate on a budget of less than a million, covering operational and maintenance costs. According to a Caucasian teenage female respondent, her family previously commuted an hour by bus for routine check-ups; rerouting the MHC to nearby community buildings significantly reduced travel time. With approximately 10 staff members and volunteers, the overall turnover rate was at 50% (Yu *et al.*, 2017). Due to the diversity of staff backgrounds, aligning cultural understanding with the populations served and resolving conflicts were noted as challenges. In past years, approximately 23 patients per year used MHC services, and among surveyed clinics, 12 offered medical assistance to non-clientele patients whereas 11 restricted services to sponsoring patients (Yu *et al.*, 2017).

## 8. Technology and innovation in health care

One prospective source of better access and more equitable healthcare delivery is leveraging technology and innovation. Digital public health and digital health solutions can bridge gaps in healthcare access, preventive care, efficient and high-quality care delivery, and self-management of health conditions (Azzopardi-Muscat & Sørensen, 2019). However, the digitalization of health may also alleviate inequities or create new ones. Key questions include:

- (i) What role will technology and innovation play in achieving a healthier, more equitable population?
- (ii) What will be the unintended consequences of new technology?
- (iii) How can health systems and communities use technology effectively now and in the future?
- (iv) What is needed to achieve these aspirations?

Addressing these questions highlights the broader implications of technology for health systems design,

engagement models, equitable access, and resilience planning.

Recent scholarship emphasizes that digital innovations are not simply supportive tools but also transformative drivers of equity when implemented with sensitivity to local contexts. Emerging region-specific applications, such as telemedicine in rural indigenous communities and mobile health apps targeting African immigrant populations, illustrate how innovation can directly address structural inequities (Olowoyo *et al.*, 2024; Walter *et al.*, 2024; Xu *et al.*, 2022). Positioning such interventions within the equity discourse ensures that technology is viewed not only as a technical solution but also as part of broader public health systems reform.

Digital public health encompasses innovation and technology, comprehensive solutions, and systems that support citizens in achieving good health (Qoseem *et al.*, 2024; Zhen *et al.*, 2024). It represents a radical transformation and paradigm shift for the public health workforce, requiring the upscaling of current capacity-building exercises to strengthen data literacy and the recruitment of professionals with citizen-focused and technological competencies. New legislation that supports healthy information systems at the global and national levels is needed to ensure that the health ecosystem is accessible, equitable, and citizen-driven. Public health will hold the chief stewardship role on health matters as the meta-coordinator of rapidly evolving technology, citizen empowerment, and public-private partnerships (WHO, n.d.-a). Ultimately, digital public health will facilitate a shift from currently available information to a culture of calm awareness, responsibility, precaution, and preparedness in dynamic global situations.

Innovations in telehealth are increasingly discussed in the scholarly literature as central to resilience in health systems, particularly in low- and middle-income countries where infrastructural constraints amplify disparities (Phan *et al.*, 2022; Touger & Wood, 2019). Integrating telemedicine within health equity frameworks allows health systems to transition from ad hoc digital adoption to sustainable models of care that are responsive to vulnerable populations.

## 8.1. Telemedicine and telehealth

Telemedicine is the exchange of medical information through electronic communications. It is an inclusive concept encompassing traditional telemedicine, telehealth, and e-health services. While traditional telemedicine focused on technical constraints and teleconsultation, telehealth refers to the health services and activities delivered via telecommunication technologies, excluding

interactive communications. Virtual care, in contrast, is conducted in near real-time through audio and video communications. Collectively, these approaches hold promise for improving the quality, affordability, and accessibility of healthcare services, particularly among underserved communities (Hiratsuka *et al.*, 2013).

The focus on telemedicine has been mainly limited to Asian regions. Acquired immunodeficiency syndrome (AIDS) and tuberculosis (TB) are two major co-epidemics in China and Asia (Phan *et al.*, 2022; Touger & Wood, 2019). Since 2005, there has been an increasing interest in telemedicine in AIDS care in China and the Asian region. At an international conference, researchers and physicians discussed the potential and challenges of implementing telemedicine in developing countries, focusing on interactive teleconsultation for AIDS and TB, barriers to adoption in China, and regional partnerships with seven hospitals in the Western Pacific Region via training on HIV/TB co-infection clinical management (Zhen *et al.*, 2024).

Teleconsultation services are targeted at rural hospitals lacking the essential physicians and facilities to treat complex AIDS and TB cases. A core site was established in Beijing and linked with two telemedicine training sites in Hanoi, Vietnam, and Bangkok, Thailand. Supporting services, such as web-based management systems, streaming hardware and software, logistics services, funding, and training programs, were developed. Early program evaluation among high-risk populations, such as prison-governed HIV clients and hospitals across the Western Pacific Region, revealed a 74% response rate, with 1–48 consultations/h and 2–68 consultations/month, predominantly related to AIDS.

Despite the promising potential of telemedicine, successful Asia Pacific telemedicine services for AIDS care remain limited. Persistent barriers include the dual burden of AIDS/TB co-epidemics, resistance from local health departments, the lack of regulations and standards, and systemic distrust in purchased services. To facilitate dissemination and sustainability, appropriate funding for pilot programs, greater international support for local health departments, the establishment of regional frameworks and regulatory standards, and the rigorous evaluation of cost-effectiveness are needed.

## 8.2. Health apps and wearable devices

Technological innovations, such as health apps and wearable devices, have the potential to promote health equity. These innovations can empower individuals to manage their health, access resources, and engage productively with the healthcare ecosystem (Olowoyo *et al.*, 2024; Phan *et al.*, 2022; Xu *et al.*, 2022). They can

deliver vital services directly to those who would benefit most. With the evolution of the body-connected health app ecosystem, innovation has opportunities to improve clinical outcomes and promote health equity. The COVID-19 pandemic has heightened interest and investment in all forms of digital health to address health disparities. However, more focuses are needed on wearables within the biomedical engineering community.

Wearables, as non-invasive medical devices, measure, store, and interpret clinically significant physiological biomarkers. While individual apps may provide elegant solutions to specific problems, the broader ecosystem often requires more efficiency, organization, and cohesion. Moreover, for vulnerable populations with limited access to traditional health care, this fragmented landscape can exacerbate health disparities (Walter *et al.*, 2024). Efforts to democratize healthcare access continue across the US, such as expanding CHWs, deploying MHCs, and enhancing telehealth outreach strategies (Xu *et al.*, 2022; Yu *et al.*, 2017). Ideally, medical wearables should function in both clinical and non-clinical environments, interfacing with the healthcare delivery ecosystem. Unlike earlier models of health education or access interventions, wearables and apps offer continuous, real-time monitoring that reduces the lag between a health need and its service provision. When deployed with equity goals, these innovations represent a paradigm shift in public health, aligning with calls for proactive, personalized, and community-embedded care (Walter *et al.*, 2024; Xu *et al.*, 2022).

## 9. Case studies and best practices

Examining successful programs and practices designed to address healthcare disparities provides promising models for replication and highlights the needs, challenges, and opportunities for further development. These programs target underserved individuals and communities, addressing their unique cultural and linguistic challenges. Some are designed as systems-level approaches aimed at improving care delivery for all individuals in a geographic area.

The reviewed case studies span multiple sectors and demonstrate various strategies for reducing health inequities across racial and ethnic minority populations. Each program provides valuable insights, showcasing innovative approaches and highlighting lessons learned from the experiences of others (Baquet *et al.*, 2004).

Despite these advances, many issues remain unaddressed, emphasizing the need for further innovation and continued support. Future efforts should prioritize expanding outreach and services for individuals with limited English proficiency, enhancing and developing

cultural competence training among healthcare providers, and strengthening partnerships with community-based groups. In addition, the emergence of new state-level initiatives, additional resources, and advances in health information technology present opportunities to reinforce and expand investment in this area (MHHD, 2007).

### 9.1. Successful interventions and programs

Nineteen studies with a multi-variate range of focus and methodology met the inclusion criteria. They were compiled into eight themes: Models for change, outreach and access, cultural competency, community collaboration, provider education, mental health services, chronic care, and special populations (Baquet *et al.*, 2004). Models for change offer blueprints for future intervention design, such as the Minnesota (MIN) transportation study, MIN policy model, Washington Healthy Communities project, and Work and Gain Employment Bangladesh Rural Advancement Committee program. Outreach and access initiatives include programs such as emotional health screenings for African American and Hispanic children, the Michigan “7” project, and efforts to enhance culturally appropriate healthcare services in Spanish-speaking environments; other publications have described programs promoting breastfeeding among low-income minorities. Cultural competency initiatives highlight tools such as the “ethnic(s) mnemonic” clinical tool for ethnogeriatric education.

Community collaboration studies detailed ways to build and sustain networks of community organizations focused on disparities in asthma, low birth weight, and lead exposure. A key example was the Bronx interfaith congregation’s medical clinic. The case study of Partnerships for Asthma Community-based Translational Studies further illustrated the importance of collaboration, where community collaboration among faith-based organizations, schools, hospitals, and housing organizations played key roles in coordinating care across 13 community organizations, including a National Institute of Health trial on asthma among inner-city children. Similarly, the Bronfman Center for Youth Services demonstrated the value of multi-sector collaboration through its multi-faceted approach to youth development.

Provider education initiatives include a study assessing the impact of media campaigns designed to raise awareness about factors contributing to health disparities among minorities. Cultural competency interventions include initiatives targeting healthcare provision for Hispanic elders to improve culturally appropriate patient assessments. An increasing body of literature has focused on improving mental health services and outcomes among minorities, primarily targeting Latino and African

American communities. Chronic care programs address the needs of African American, native American, Latino, and homeless persons (Garzón-Orjuela *et al.*, 2020).

## 10. Ethical considerations in addressing health disparities

Significant health disparities exist between healthy young adults and vulnerable, at-risk populations during the COVID-19 pandemic (Häfliger *et al.*, 2023; Mheidly *et al.*, 2022; Nana-Sinkam *et al.*, 2021; Tan *et al.*, 2023; Vanden Bossche *et al.*, 2023). These disparities arise from the complex interaction between social determinants of health (factors rooted in social and economic conditions) and health-system factors (e.g., barriers related to insurance coverage, accessibility, and system trust). Together, these determinants perpetuate inequities in vaccination access and uptake, critically affecting vulnerable populations (Dagovetz *et al.*, 2025; Santangelo *et al.*, 2024; Williams *et al.*, 2021). As vaccination becomes the primary means to end the pandemic, understanding and addressing the unreasonable disparities that hinder equitable access is necessary.

Addressing healthcare disparities experienced by vulnerable populations is an ethical imperative. Three fundamental ethical principles—equity, justice, and human rights—guide these efforts. In health care, equity means that all individuals are given fair opportunities to achieve their optimal level of health. Justice suggests that a fair distribution of social resources should be sought, so that those who are sick, disadvantaged, or with more significant social vulnerabilities should receive preferential treatment. Human rights assert that all individuals should be treated equally to access needed health services, regardless of their status (e.g., social, structural, and political).

In the pursuit of health equity, justice is a key ethical principle (Smith *et al.*, 2023). Broadly, justice concerns the fair and equitable treatment of individuals. Although there are competing conceptions of justice, most moral philosophers agree on two fundamental principles: (i) All individuals should be treated with equal consideration and respect, and (ii) no person should gain an unfair advantage in the distribution of benefits and burdens (i.e., individuals should not be privileged based on arbitrary characteristics such as race, gender, and social position) (Burton *et al.*, 2023; WHO, n.d.-b). In addition to these broad ethical principles, justice also entails a specific obligation toward vulnerable populations—those who have been historically and systematically disadvantaged, marginalized, excluded, or disempowered (Rod *et al.*, 2023). Pursuing health equity thus involves addressing these inequities that are unfair, avoidable, and systemic in nature.

Strengthening the link between justice initiatives and the concept of vulnerability requires recognizing that inequitable health outcomes are not only medical issues but are deeply rooted in discrimination and structural inequality. Vulnerable populations are disproportionately exposed to systemic barriers—such as housing segregation, employment discrimination, and exclusion from political participation—that shape both access to care and long-term health trajectories (Do *et al.*, 2019; Rolfe *et al.*, 2020). Justice initiatives that focus solely on the redistribution of resources without addressing these structural injustices risk perpetuating the inequities they aim to reduce. Therefore, equity and justice frameworks must explicitly integrate the multi-dimensional concept of vulnerability, acknowledging how overlapping forms of disadvantage (e.g., race, gender, disability, and socioeconomic status) compound exposure to harmful environments and limited opportunities. Linking justice to vulnerability in this way ensures that health equity strategies remain grounded in addressing the root causes of disparities rather than only their symptoms (Burton *et al.*, 2023; Macias-Konstantopoulos *et al.*, 2023).

## 11. Conclusion

While immense challenges remain in achieving health equity, great efforts are underway, and the current moment presents a tremendous opportunity to make meaningful progress. This conclusion is grounded in a transparent narrative review methodology that synthesized evidence from peer-reviewed studies, national reports, and practice-based insights. The integration of multiple evidence streams strengthens both the academic rigor and practical applicability of the findings, ensuring that the recommendations are firmly tied to the literature while also reflecting field-level realities.

Today, approximately 67 million people in the US live in a primary care health professional shortage area (HPSA), a figure that has remained relatively unchanged since 2000. Around 24 million live in a dental HPSA, doubling since 2000. Insurance barriers remain highly prevalent, especially for low-income adults, with a quarter lacking coverage at any given time. Estimates showed that, between 2019 and 2020, racial/ethnic minority subgroups experienced 4 times more unattended healthcare needs than White Americans. Addressing these issues requires effort, coordination, resources, and a significant amount of time. Applying a fresh equity focus to these efforts will present challenges: fostering awareness, consensus, and depoliticized dialog around equity will take time. Meanwhile, millions, even hundreds of millions, of persons continue to suffer or die prematurely despite growing investments in healthcare infrastructure (Health Resources and Services Administration, n.d.). A more critical

engagement with existing literature highlights not only the persistence of disparities but also the methodological limitations of prior reviews. By clarifying the scope, review type, and sources used, this paper addressed these limitations and provided a more reliable foundation for advancing equity-focused interventions.

Taken together, the evidence presented in this review demonstrates that vulnerable populations cannot be understood as a fixed or homogeneous category, but rather as groups whose risks and outcomes are shaped by intersecting structural, social, and biological determinants. The concept, therefore, requires continuous reassessment in light of changing demographic, political, and environmental contexts (Rami *et al.*, 2023; Renzi & Franci, 2023). A key conclusion is that strategies to address disparities must begin by clarifying the dimensions of vulnerability—individual, environmental, and systemic—and linking these to targeted interventions. Building upon this conceptual foundation, the review recommends (i) embedding equity assessments across all levels of health policy design, (ii) investing in community-driven interventions such as CHW programs and MHCs, (iii) strengthening methodological rigor and transparency in disparity research, and (iv) ensuring that race- and ethnicity-based inequities are addressed alongside, but not conflating them with, other axes of disadvantage (Macias-Konstantopoulos *et al.*, 2023; Do *et al.*, 2019).

Through this exploration of healthcare disparities and strategies for addressing them among vulnerable populations, key insights and lessons learned have emerged. The following are some of the most salient points for reflection and action in promoting health equity.

The first insight is the importance of understanding the context of underserved groups when addressing health disparities. For example, it is necessary to recognize housing, educational, occupational, and social disparities faced by the US–Mexico border population or the incarcerated individuals. It is crucial to avoid overgeneralization and faulty assumptions about vulnerable populations based on limited or non-representative data, as this risks perpetuating misunderstanding and ineffective intervention. Similarly, engagement strategies that overlook sensitive topics, such as stigmatization and anxieties related to disclosure, may further alienate those most in need. Moreover, recognizing the diversity within vulnerable populations underscores the necessary intersectionality of outreach strategies (Leeshell & Douglas, 2014).

The second insight emphasizes the need to rethink outreach efforts. Outreach proponents must broaden the scope by including community-based initiatives that actively acknowledge the cultural and social contexts

of vulnerable communities. For example, as part of recruitment strategies, focus group studies can explore the rapid dissemination of information relevant to recruitment (e.g., employment opportunities and mental care) through word-of-mouth communication within border communities or among incarcerated populations. Demonstrating respect for the concerns of marginalized communities and developing rapport is vital. Concerns of vulnerable communities, such as the fears and anxieties related to disclosure of sensitive information that can lead to stigmatization, should be actively acknowledged and addressed.

Despite increased attention to health disparities, multiple barriers hinder access for vulnerable populations. Further initiatives should be inspired to support policy development and community engagement. Specific local, regional, and national measures are proposed to help improve access to healthcare services and reduce disparities for vulnerable, high-risk populations.

At the local level, decision-makers and healthcare providers should collaborate with community-based organizations and academic partners to identify populations that are most at risk. Detailed red flags should be established to identify populations in need according to the type of healthcare services (US National Committee on Vital and Health Statistics & National Center for Health Statistics, 2005).

Regional or state-level action can focus on the passed legislation requiring culturally and linguistically appropriate care, including healthcare system assessment, collection, and the use of healthcare data stratified by race, ethnicity, language, and other factors. Health systems should be encouraged to provide a culturally and linguistically appropriate healthcare environment. In addition, strengthening partnerships and alliances with producer learning collaboratives can raise awareness of the benefits of culturally competent services while providing support and incentives for changing such services.

At the national level, health policy-related organizations should work with community-based organizations and other organizations representing vulnerable populations to advocate for the importance of equity and eliminate access barriers. A national health equity and access agenda should be established to consolidate current and past initiatives and maintain policy focus on improving population health outcomes through equitable access to quality health care. More consistent efforts are needed to proactively engage community stakeholders in the policy development process. Furthermore, health systems should increase incentives, such as grants, and offer enhanced reimbursement rates for CLAS.

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