Achieving Equity in an Evolving Healthcare System: Opportunities and Challenges

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Abstract

For decades, disparities in health have been well documented in the United States and regrettably, remain prevalent despite evidence and appeals for their elimination. Compared to the majority, racial and ethnic minorities continue to have poorer health status and health outcomes for most chronic conditions including diabetes, cardiovascular disease, cancer, and end-stage renal disease.

Many factors, such as affordability, access, and diversity in the healthcare system, influence care and outcomes, creating challenges that make the task of eliminating health disparities and achieving health equity daunting and elusive. Novel strategies are needed to bring about much needed change in the complex and evolving United States health care system. Although not exhaustive, opportunities such as 1) developing standardized race measurements across health systems, 2) implementing effective interventions, 3) improving workforce diversity, 4) utilizing technological advances, and 5) adopting practices such as personalized medicine may serve as appropriate starting points for moving towards health equity.

Over the past several decades, diversity in the U.S. population has increased significantly and is expected to increase exponentially in the near future. As the population becomes more diverse, it is important to recognize the possibilities of new and emerging disparities. It is imperative that steps are taken to eliminate the current gap in care and prevent new disparities from developing. Therefore, we present challenges and offer recommendations for facilitating the process of eliminating health disparities and achieving health equity across diverse populations.

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Brief Review of Historical Perspective on Disparities

Racial and ethnic disparities in health have been noted since federal documentation of health status began.[1] Though some programs addressed minority health, mobilization and coordination of resources were not focused on the issue until the Secretary of Health and Human Services, Margaret Heckler, commissioned a comprehensive investigation in 1984. The Taskforce Report documented a "persistent and distressing disparity" across diseases and minority groups when compared to the non-minority population.[1] The Taskforce analyzed the extent of health disparities by considering excess deaths observed in the minority populations over what was expected in the non-minority population, noting differences in over 40 disease categories.[1] The Taskforce also found differences in prevalence rates of chronic and infectious diseases, hospital admissions, physician visits, limitations of activity and self-assessed health status.[1]

As a result of the Taskforce Report, the Department of Health and Human Services created the Office of Minority Health in 1987 to develop new policies and programs to eliminate disparities. Efforts focused on funding research and demonstration programs, improving race/ethnicity data collection, developing and promoting policies and practices to achieve health equity, and strengthening networks and partnerships. In 1999 Congress mandated an annual National Healthcare Disparities Report, and requested the Institute of Medicine (IOM) to assess the factors that contribute to disparities. The IOM report `Unequal Treatment: Confronting Racial and Ethnic Disparities in Health Care' found continued variation by race in prevalence and burden of a range of illnesses, as well as differences in healthcare services.[2] These differences often decreased when controlling for socioeconomic differences, but still remained.[2] In addition, the differences remained after accounting for healthcare access.[2] The report focused on the clinical encounter and found evidence of stereotyping, bias, and uncertainty that led to disparities in healthcare.[2] Most importantly, the report underscored the continued existence of disparities in the United States and noted a need to increase general and healthcare system awareness of disparities, promote the use of evidence-based guidelines to facilitate equity in care, and train a more diverse healthcare workforce.[2]

Research following the IOM report can be grouped into three phases using a widely accepted conceptual model for the health equity research agenda: detecting disparities, understanding determinants of disparities, and interventions to reduce disparities.[3] Detection of disparities is most common, including studies that track changes over time and have found that while overall quality in care has improved, disparities in quality and outcomes by income and race/ethnicity are large and persistent.[4] Understanding determinants of healthcare disparities is becoming more common in the literature, rather than simply reporting the existence of disparities; and recently the importance of social determinants as a major factor leading to disparities has been acknowledged.[5] More work is needed to improve understanding of underlying mechanisms. In addition, there is need to change

policy at different levels that will ensure reduction in disparities such as equitable provision of medical care, broader public health education efforts, and increased diversity of the medical workforce.[6]

A major policy change with possible influence on health disparities in the United States is the passage of the Affordable Care Act (ACA) of 2010.[7] A number of provisions in the Act aim to increase access to care and make health coverage more affordable.[7] In addition, provisions exist to improve data collection on race/ethnicity, disability and geographic location as well as increase diversity in the health care workforce, and expand and improve community health center facilities.[7] While these provisions exist, the extent of implementation of the health reform policies across states will determine the impact on disparities.

Current State of Disparities

Over the past twenty years, Healthy People initiatives have focused on disparities, which according to Healthy People 2020, are "*particular types of health differences that are closely linked with social, economic, and/or environmental disadvantage and adversely affect groups of people who have systematically experienced greater obstacles to health*" based on characteristics such as race and ethnicity, gender, disability, and geographical residence, among others.[8] National policies have been implemented in phases throughout the last two decades to reduce and eliminate health disparities, and more recently, attain the highest level of care among all population groups across America (i.e., health equity).[8] Despite such policies, however, specific chronic conditions remain prevalent across disadvantaged populations compared to the majority. These disease conditions, briefly discussed below, illustrate the persistent divide in care, thereby requiring an exhaustive review and comprehensive efforts to make considerable improvements in and eliminate disparate care among multiple population groups.

Diabetes

Diabetes affects 29.1 million individuals, or 9.3% of the population in the United States, and is the seventh leading cause of death.[9] It is the leading cause of non-traumatic lower-limb amputations, kidney failure, and new cases of blindness among adults.[9] Additionally, it is a major cause of heart disease and stroke, which are two-to-four times more prevalent in individuals diagnosed with diabetes.[9] Finally, average medical expenditures for individuals diagnosed with diabetes are 2.3 times higher than for those without diabetes, estimating $176 billion for direct medical costs and $69 billion in reduced productivity.[9]

The rates of diabetes vary by race/ethnicity with rates of diagnosed diabetes being higher for racial and ethnic minority groups. Compared to 7.6% of Non-Hispanic Whites (NHW), 12.8% of Hispanics, 13.2% of Non-Hispanic Blacks (NHB), and 15.9% of American Indians/Alaskan Natives (AIAN) are diagnosed with diabetes.[9] Although diabetes affects individuals in all racial and ethnic groups, minorities have a higher prevalence, risk of complications, and mortality rate compared to the majority group.[9] For example, compared to NHW adults, the risk of diagnosed diabetes is 77% higher in NHB. After being

diagnosed, NHB are four times more likely to undergo complications such as lower-limb amputations and end-stage renal disease compared to NHW.[9]

Cancer

Cancer is the second leading cause of death in the United States, accounting for nearly 600,000 deaths annually and over 1600 deaths daily.[10] Nearly 14.5 million Americans currently have a history of cancer, and another nearly 1.7 million are expected to be diagnosed in the upcoming year.[10] Cancer is most common in older people, with 78% of all cancer diagnoses occurring in people at least 55 years of age.[10] As of 2011, it is estimated that the direct medical costs (total of all health care expenditures) for cancer was $88.7 billion.[10] Fortunately, given the improvements in early detection and treatment, 5-year survival rates for all cancers improved from a low 49% between 1975–1977 to a 68% between 2004 and 2010.[10]

Cancer disparities are associated with multiple factors including race and ethnicity, socioeconomic status (SES), geography, and sex. Racial/Ethnic cancer disparities are suggested to reflect issues related to poverty, such as obstacles preventing access to health care services needed for cancer prevention, early detection, and high quality treatment.[10] For instance, NHB often undergo diagnostic evaluation less often than NHW, receive less referral for specialty care, and have less follow-up for detectable abnormalities in comparison to NHW.[11] NHB men and women are more likely to die from cancer compared to any other racial/ethnic group.[10] This trend is even observed in situations where NHB women, for example, have a better incidence of breast cancer, but unfortunately, have a higher mortality rate compared to NHW women.[10] Furthermore, people with lower SES have disproportionately higher rates of cancer incidence and mortality compared to those of higher SES, often times regardless of demographic factors such as race/ethnicity.[10] An example of this is observed in NHB and NHW men with 12 years of education where cancer mortality rates are 3-times and 4-to-5-times higher for all cancers and lung cancer, respectively, compared to men who graduated from college.[10] A notable exception to this rule is a phenomenon called the *Hispanic paradox*, where Hispanics in the United States have better health and longer life expectancies by several years compared to NHW. Finally, sex disparities continue to persist as evident in NHB men and women having higher incidence and mortality rates for certain cancers, such as colorectal cancer, compared to NHW men and women, respectively.[10]

Renal Disease and Transplantation

End stage renal disease (ESRD) is the last stage of chronic kidney disease (CKD) and occurs as a result of irreversible and complete damage to the kidneys, requiring hemodialysis and transplantation. It is estimated that 26 million American adults have CKD and nearly 600,000 have ESRD, with more at increased risk for both CKD and ESRD.[12, 13] Fortunately, individuals diagnosed with CKD have access to treatment for ESRD; however, unfortunately, discernible differences in the incidence and treatment outcomes of ESRD according to race, ethnicity, and SES persist.[14]

Groups at higher risk for ESRD are those with diabetes, hypertension, and a family history of kidney disease.[12] Additionally, Individuals with lower SES have a higher incidence of CKD, increased progression to ESRD, inadequate dialysis treatment, reduced access to kidney transplantation, and ultimately, poorer health outcomes.[15] Diabetes and hypertension are conditions more prevalent in racial and ethnic minority groups and persons with lower SES. As a result, NHB have a greater risk of CKD, resulting in a rate of new ESRD cases four-to-six times higher in NHB compared to NHW.[13] Additionally, in NHB with hypertension, the rate of developing ESRD is 17-times greater.[15] Once diagnosed with CKD, NHB and Hispanics are four-times more likely to develop ESRD.[16] Paradoxically, it is worth mentioning that, although the incidence and prevalence of CKD and ESRD is higher in racial and ethnic minority groups, older adults in these groups often have a greater adjusted survival rate compared to NHW.[16] Additionally, NHB with ESRD are reported to have 13–45% lower mortality rate when receiving dialysis compared to NHW.[16]

Cardiovascular Disease and Stroke

As the leading cause of death globally, cardiovascular disease (CVD) accounts for 17.3 million deaths annually, with individuals from low- and middle-income countries most affected.[17] It is expected that the number of deaths due to CVD will exceed 23.6 million annually by the year 2030.[17]

For American adults, nearly 86 million have CVD, which includes heart disease and stroke.[17] Approximately 1.5 million heart attacks and strokes occur each year in the United States.[17] Alarmingly, CVD is highly prevalent in NHB adults with 48% of women and 46% of men having some form of the disease.[17] CVD is the leading cause of death accounting for nearly 800,000 deaths annually in the United States. Nearly half of those deaths are due to heart disease alone, which is the most common cause of death in women and kills more than 39,000 NHBs annually.[17] Additionally, NHB adults have nearly twice the risk for an initial stroke and a greater risk of death from stroke compared to NHW adults in the United States.[17] It is estimated that combined, heart disease and stroke account for more than $320.1 billion in health care expenditures and lost productivity annually.[17]

Disparities secondary to sex, race and ethnicity, and geography are related to the prevalence, morbidity, and mortality associated with CVD and its related risk factors.[17] These factors include smoking, overweight and obesity, high blood pressure, high low-density lipoprotein (LDL) cholesterol, diabetes, poor diet, physical inactivity, and excessive alcohol use.[17] Racial and ethnic minorities, such as NHB and Mexican Americans, persons with lower SES and educational attainment, and residents in the Southeastern United States tend to have a higher burden of CVD-related outcomes and its risk factors.[17] For example, a higher percentage of adult males who are American Indian or Alaska Native (26%) smoke compared to men who are NHW (22%) or NHB (21%).[17] Similarly, 46% of Hispanic males had poorly controlled cholesterol levels compared to 40% of NHW men and 37% of NHB men.[17]

Mental Health

As of 2012, approximately 43.7 million adults (18.6% of the population) aged 18 or older in the United States have been diagnosed with any mental illness (AMI).[18] Excluding developmental and substance use disorders, AMI includes mental, behavioral, or emotional disorders that have no or mild impairment compared to those that cause significantly disabling impairment such as serious mental illnesses including schizophrenia.[18] Alarmingly, 50% of all chronic mental illnesses begin by 14 years of age, while 75% begin by age 24.[18]

AMI diagnoses are prevalent with 2.6% of American adults living with bipolar disorder, 6.9% living with major depression—the leading cause of disability worldwide, and 18.1% living with an anxiety disorder.[18] In the United States, approximately 13.6 million adults live with a serious mental illness, 1.1% of which (or 2.4 million) having schizophrenia.[18] SMI independently accounts for $193.2 billion in lost wages annually.[18]

Mental health disorders have major consequences and a profound impact in America as reported by the National Alliance on Mental Illness. Approximately 8.4 million adults are dually diagnosed with a mental health and an addiction disorder.[18] Approximately 26% of homeless adults residing in temporary housing such as shelters have an SMI.[18] Approximately 24% of prisoners have some history of a mental health disorder.[18] Of the 40,000 Americans who commit suicide each year, 90% have an underlying mental illness.[18,19]

According to the American Psychological Association, mental and behavioral health is often not sufficiently addressed in racial and ethnic minority groups, especially since these populations are over-represented in and most at risk for mental health disorders.[20] Nearly 60% of adults diagnosed with an AMI did not receive treatment or mental health services during the previous year.[21] Minorities including NHB, Hispanics, and Asian Americans used mental health services less compared to NHW (at rates half that of NHW for NHB and Hispanics, and 33% of that for Asian Americans).[18] Furthermore, racial and ethnic minorities are often undiagnosed, underdiagnosed, or misdiagnosed due to cultural, linguistic, or historical reasons.[20] Despite this knowledge, the mental health system has not been able to meet the demands of diverse needs of these individuals, resulting in inadequate and often times, inappropriate care.

Challenges

Affordability and Universal Access to Care

Despite efforts to reduce disparities in the United States, consistent evidence shows that gaps continue to exist. The existence of disparities in certain types of care, while not in others suggests that cost of care is a factor.[2] In addition, financial barriers have been shown to influence health outcomes, and socioeconomic disparities often underlie or partially explain racial disparities.[5, 22] Both materialistic and psychosocial pathways have been suggested as mechanisms for explaining how socioeconomic disparities influence morbidity/mortality,[22] suggesting addressing affordability of care may have health benefits beyond simply access to care.

Affordability of care includes consideration of out-of-pocket expenses, insurance deductibles, and indirect costs such as time off work and transportation. Health insurance status is an important factor to consider, but does not alleviate financial pressures experienced by some populations, and does not fully explain disparities in access to care.[23, 24] One challenge is understanding the differential influence of cost of care and lack of health insurance on access to care. The relative importance of insurance coverage, income and community medical care resources differs by ethnicity, with lack of health insurance being a significant access barrier for Hispanics, but less so for African Americans.[23] Less frequently studied factors, such as care-seeking behavior, trust, patient-provider communication, and discrimination are equally important as insurance for African Americans, and should be considered in addition to affordability of care when developing interventions to improve access.[23]

A closely related but separate challenge is universal access/universal health insurance. This has received significant focus both in the United States and across the world, being the focus of the Affordable Care Act of 2010 and a recent UN General Assembly resolution for high-level political commitment.[7, 25] Often it is implied that health equity is a natural result of universal access, however, examples from implementation across the globe show the extent to which equity is achieved depends on how universal access/health insurance policies are defined, designed, implemented and sequenced.[25] A significant socioeconomic status disparity continues to exist in the United Kingdom (UK), though the relative health status of individuals along the gradient are higher for those in the UK compared to US counterparts on the socioeconomic distribution.[26] In Brazil, gradual expansion through a narrow set of health services has actually shown increased health inequities.[25, 27] And, while the socioeconomic disparity in life expectancy decreased in Taiwan after introduction of a national health insurance system, the magnitude was small compared to the size of remaining gaps.[28] In the United States, individual states will play a role in implementation of the ACA, [7] so the possibility for regional differences or state level disparities may increase as a result.

Ongoing evaluation and tracking is needed to ensure disparities are addressed, and care must be given to consider specific factors rather than general provisions. The factors contributing to disparities often differ by disease or type of care, and design of effective interventions needs to take potential determinants into account.[3, 24] For instance, while inclusion of ESRD in Medicare coverage addressed payment for dialysis and kidney transplantation, it did not address other barriers resulting in sustained disparities in care for patients with kidney disease.[29] A similar result can occur with implementation of the Affordable Care Act if modifiable factors are not considered and success is not based on the ability to provide high-quality care regardless of complexity of needs.[29] Similarly reproductive health care disparities show wide geographical variation, suggesting state-level factors and social determinants of health such as racism, acculturation, maternal occupation, and residential segregation, must be considered rather than simply relying on provisions in the Affordable Care Act to increase access to preventative services or insurance coverage.[30] It will remain important to both understand and address multilevel factors leading to health disparities, including influences at the patient, provider, and system level.[3]

In addition, lack of information and misinformation regarding health reform is a specific challenge when addressing concerns regarding affordable care and universal access.[31] An analysis of awareness of health disparities in 2010 showed there was only a modest increase of awareness from a similar survey completed in 1999 (55% to 59% of respondents), and that African Americans were more aware disparities existed than whites (89% of African Americans vs. 55% of whites).[31] Awareness of health disparities is often a first step in moving towards change, indicating dissemination of information is still needed.[31] Misinformation is also a concern, especially when dealing with complex information, such as provisions of the Affordable Care Act.[32] The influence of misleading or incomplete reports on the status of health reform, intent of provisions, and impact of regulation changes are important to take into account and should be monitored.[32] It will be important to continue providing information on how the act functions, which provisions are expected to influence disparities, and how specific provisions may impact different diseases or sectors of the healthcare system.[32]

Genomic Markers and Personalized Medicine

Personalized medicine, also known as individualized medicine, is a rapidly, emerging field in which medical treatments are tailored to an individual's genomic characteristics in order to provide more targeted interventions for patient care.[33] Its concept is unique in that it utilizes the molecular and genetic profiles of individual patients to diagnose and treat medical diseases. It is suggested that personalized medicine is an extension of traditional medicine and allows for an overall patient assessment including individual susceptibility to diseases, responses to different medications, and even the likelihood a selected treatment for an individual is successful.[33, 34] Additionally, use of genetic information promises to inform clinical decision making; however, it still remains unclear whether utilizing such information will prove beneficial overall or actually unconsciously perpetuate the healthcare divide.[34, 35]

As with any new development, potential challenges may arise if the use of genomic markers and personalized medicine is adopted into clinical care. First, evidence suggests that, historically, the collection and use of genetic information was based primarily on individuals of European ancestry.[34] For personalized medicine to achieve what it has been theorized to do, medical guidelines and policies will have to ensure the inclusion of all racial and ethnic groups from diverse communities; otherwise, gaps in care between different groups may be exacerbated. Second, a lack of evidence in the form of clinical trials minimizes the credibility of personalized medicine. Additional research is needed to identify genomic markers specific to particular diseases, as well as the design of appropriate interventions that target those markers. Feero et al suggests that genome-wide association studies have identified new genetic markers related to common chronic diseases such as diabetes, heart disease, Crohn's disease, and certain cancers, but other markers have yet to be discovered.[36] By identifying additional genomic markers, new developments in testing, drug development, and intervention design are possible.[36] This could prove extremely valuable, particularly in chronic disease conditions highly prevalent in racial and ethnic minorities. Third, because of the personal and sensitive nature of the type of information being collected, privacy and confidentiality problems may arise as an unintended consequence. The potential for

discrimination based on genetic information could arise, again widening the gap in care between those who have and those who do not. Fourth, uncertainty about the costs of research and medical care could present challenging, especially so in those of lower SES. It is estimated that genomic sequencing can range from $1,000 to $100,000,000 depending on the desired information.[37] Having other responsibilities and competing interests, combined with financial obligations and lower annual household incomes, many individuals are unlikely to have the necessary resources available to afford this type of specialty care. As a result, SES disparities could increase. Finally, it will be important to understand the ethical, legal, and regulatory issues associated with translating genomic information into clinical practice. It is imperative that both the patient and provider understand and comprehend issues such as human rights, harm and benefit, transparency, and informed consent.[38] Differences across racial/ethnic groups in understanding the risks and benefits of genomic medicine could result in disparities of care related to use, rather than access, to genomic medicine and personalized care.

Measurement of Race

To support regular reporting and in an effort to address racial/ethnic disparities in health care, federal agencies recommend, and in some cases, require collection of racial/ethnic background information.[39] Measurement of race has been instrumental in addressing the first phase of disparities research – to detect differences in disease risk and outcomes.[3, 40] It is also important in understanding barriers and facilitators to addressing disparities by understanding differences in race/ethnicity, and allowing analysis of patient, provider and system level factors.[3] One challenge is complete and reliable information. Data collection at the national, state, and community level often has missing information, small samples sizes for sub-population analysis, or measurement errors to take into account.[39, 40] Samples sizes limit analyses to broad racial/ethnic groups, and restrict analysis of within-group variation, which is specifically important when elucidating reasons for disparities and developing interventions.[39–41] Missing data on race/ethnicity or income restricts the ability to identify disparities or track changes over time.[40] The amount of missing data varies both by dataset and by population investigated, for instance a study of missing race/ethnicity data in Veterans found missing data ranged from 0% to 48%.[42] Though methodologies exist, including imputation, data linkage, and the use of proxy variables, each has limitations and increases the difficulty of interpretation.[40]

Inconsistency in definition of terms is also a concern.[39–41] Standardization of race/ethnicity categories is one important step, and has been addressed in more detail through provisions of the Affordable Care Act. However, discordant conceptualizations of race/ethnicity between those creating questions and those answering may limit the usefulness of standardization.[40, 41] There is a growing interest in more granular data, which can be rolled up to standard categories if needed.[40] Analysis of trends over time, and use of data from systems not using the same categories, however, continues to create challenges that must be addressed.[39] Categories such as "other" create additional challenges, both from an analysis and interpretation standpoint.[41] Even changing definitions of health equity and health disparities influences how data is analyzed, as seen by shifting measurement approaches at

the World Health Organization.[43] Therefore, consistent and clear measurement is an important challenge when considering the future of disparities research.[43]

One specific area to consider is the collection of race/ethnicity data for Hispanics/Latinos. Identification with a racial/ethnic group is influenced by a number of factors, and should be considered when collecting and analyzing data.[41] While race/ethnicity in the United States is generally dichotomized between non-Hispanic white and black, understanding of race among Hispanics/Latinos includes considerations such as birthplace, culture, and social class, rather than physical appearance or ancestry.[41] Conceptualization of ethnicity is also influenced by time spent in the United States and experience with discrimination, with distinct differences existing between the classification system and racial identification.[41] For instance 75% of respondents who identified as Hispanic/Latino classified their race as other, citing cultural reasons for not identifying as a specific race.[41] Studies have shown that reclassification of "some other race" to either white or black changes interpretation of data related to disparities in health outcomes and infant mortality, suggesting racial group identification is not a simple categorization.[41]

Workforce Diversity

A final effort in addressing the diverse healthcare needs of the United States is developing diversity in the workforce.[44, 45] Consistent reports show the healthcare workforce is not keeping pace with changing demographics and diversity of the US population,[45] particularly when having a diverse physician workforce is critical to maximizing care for diverse patient populations.

The Association of American Medical Colleges defines the underrepresented in medicine (URM) as racial and ethnic populations underrepresented in the medical profession relative to their numbers in the general population.[46] Historically, the referenced racial and ethnic populations included Blacks or African Americans (i.e., NHB), Hispanics, American Indians/Alaska Natives (i.e., AIAN), and Asian Americans; however, the definition continues to evolve to be more inclusive of the changing societal demographic and workforce.[46] Currently, approximately 8.9% of the physician workforce identify as NHB, AIAN, and Hispanic.[46]

Challenges regarding implementation of workforce diversity efforts, however, are abundant and evidence showing the impact or success of these efforts is lacking.[47–49] For example, despite comprising 13% of the nation's population, NHB account for only 4% of the physician workforce.[46] Additionally, there is a gender gap in the workforce for members of minority racial and ethnic groups such that 52% of younger physicians (29 years of age) are women compared to men.[46] Finally, URM faculty represent only 4% of the faculty members in medical schools in the United States, and the majority of URM medical school graduates matriculate through five schools: Howard University and Meharry Medical College, as well as the University of Puerto Rico, Universidad Central del Caribe, and Ponce, for NHB and Hispanics, respectively.[46]

Addressing barriers throughout the course of an individual's education is a challenge that calls upon sectors outside the healthcare field to assist.[45] Addressing unsupportive

institutional cultures, providing more options for funding, and increasing leadership with a demonstrated commitment to diversity, are areas where the healthcare field can make progress.[45] One challenge is the focus on the number of individuals entering and leaving the "pipeline", rather than on the approaches needed to develop talent throughout the educational continuum.[49] For example, among NHB, only one-third of medical student applicants are male, which diminishes diversity in the number of available graduates and future physicians represented by this group.[46] Additionally, while focus has been on diversity in the physician workforce, an additional challenge is developing diversity across the healthcare system, including nurses, allied health professionals, researchers, and healthcare leadership.[44] Increasing the pool of leaders and mentors is a vital factor, and can only be addressed as diversity is increased across the healthcare field.[45, 49] Attention to the skills and talents needed, rather than focus on steps and stages, is necessary to continue progress made in removing overreliance on standardized tests.[49] Finally, institutions need to show accountability and commitment to communities, and improve efforts to recruit and retain underrepresented populations.[45]

Opportunities

Comprehensive Data Collection

Provisions in the Affordable Care Act set the stage for improved federal collection of information on race and ethnicity in all national population health surveys, in addition to the option for the Department of Health and Human Services to collect additional demographic data in an effort to understand health disparities.[7] Improvement in the collection of valid and reliable data on factors including race/ethnicity, gender, and socioeconomic status can assist in documenting, tracking, and understanding disparities in healthcare.[3] It is important to consider that race/ethnicity is part of a larger historical, geographic, and political context.[5] As such collecting comprehensive data based on conceptual models of the pathways through which race, ethnicity, and socioeconomic status influence health will provide opportunities to develop targeted interventions that address disparities at local, regional, and national levels.[3, 22, 24]

More complete and reliable information in itself is important, but the process of implementing new collection techniques can also be used as an opportunity to better understand conceptualizations of race and additional social determinants of health.[41] This information will help health systems better understand the communities they serve, and develop interventions and outreach efforts to improve access to care.[41] Targeted efforts in under-resourced or low-income communities can help ensure disparities are not increased.[27] However, this cannot be accomplished without a better understanding of the community and factors that influence their ability and proclivity to access care.[41, 50]

Finally, comprehensive collection of data can create opportunities to better coordinate between national programs, private health insurance systems, and local or regional hospitals and medical groups.[39] Current lack of standardization and recommendations at the national level to improve collection can create an environment to begin discussions about how best to coordinate beyond only data collection. Linking data between groups can expand our understanding of disparities, and facilitate new analytical methods to better investigate

strategies.[39] Use of novel techniques, such as geospatial analysis, will also allow investigation into topics shown to be important but difficult to explore such as residential segregation, neighborhood socioecnoomic status, access to healthy foods, and other regionally important factors.[40]

Implementing Effective Interventions

It is reasonable to expect that universally applied and targeted interventions may not eradicate health disparities; however, certain interventions have been shown to be effective or at least, have shown improvements in addressing and reducing health disparities in vulnerable populations.[51] According to the Centers for Disease Control (CDC), these types of interventions have six key components: 1) **innovation**, 2) **technical package** (with synergistic, evidence-based interventions targeting specific, high-priority goals), 3) **performance management** (i.e., meticulous real-time monitoring, evaluation, and feedback), 4) **partnerships** with public and private organizations, 5) effective **communication**, and 6) **political commitment** for resources and support.[51]

An example of a public health program utilizing several of the aforementioned components was an intervention designed to reduce disparities in motor vehicle injuries and deaths among AIAN.[52] Prior evidence had shown motor-vehicle death rates to be four-to-six times higher in AIAN compared to other racial/ethnic groups.[52] Four AIAN tribal communities were targeted for implementation of an intervention designed to improve seat belt and child safety seat use, as well as reduce alcohol consumption while driving. Each tribal community was able to tailor the intervention to their specific needs and utilize resources such as school educational programs, media campaigns, and partnerships with law enforcement agencies. As a result of the intervention, the four AIAN communities were able to increase seat belt and child safety seat usage, enforce alcohol-impairment laws, and overall, decrease the number of motor-vehicle associated injuries and deaths.[52] Furthermore, a cost-benefit analysis was conducted that estimated a savings of $2,710,000, during the implementation of the intervention, from fewer motor vehicle accidents and injuries.[52] Similarly, in an intervention to decrease smoking disparities among Vietnamese and Cambodian communities, Zhou et al described the design of an intervention effective at reducing smoking prevalence and increasing the quit ratio, particularly among men within Asian communities.[53] The intervention incorporated community partnerships and local media, resulting in enhanced community capacity that imparted community- and system-level changes.[53]

Targeted interventions can prove necessary when addressing various types of health disparities, across multiple disease conditions and to improve patient care. Interventions designed for individuals (i.e., patients), providers, health care organizations and systems, and communities offer viable options for addressing health disparities through personalized behavior change, education, and policy.[54] For example, culturally-tailored Interventions have been shown to reduce disparities by improving knowledge, health behaviors, and health outcomes when designed at the patient level.[54] Interventions employing community-based participatory research increase patient involvement and empowerment and often times, result in better outcomes such as reductions in disparate care.[54] Additionally,

interventions utilizing peer-support and personal interactions showed more positive results for patients compared to computer-based education and online-self management coaching.[54] For providers, interventions with problem-based education, individual feedback, and computerized patient care reminders improved processes of care and outcomes.[54] Finally, the combined use of multiple individuals such as clinical nurse case managers, pharmacists, and community health workers, along with components such as community outreach, patient education, technology, and medication assistance programs proved effective at the health care organization and community levels.

In summary, effective interventions can be designed to address and reduce health disparities. Interventions 1) with various components to address change at multiple levels, 2) tailored specifically to the culture of a population, and 3) led by clinicians have shown the most promise.[54] Despite these minor, albeit significant findings, further research is warranted to design the best interventions for reducing health disparities and ultimately, achieving health equity.

Increasing Workforce Diversity

Four general arguments are given regarding the importance of healthcare workforce diversity: (1) diversity will increase access to care by serving minority and socioeconomically disadvantaged populations, (2) diversity will increase the use of health care and improve adherence by providing better opportunity for minority patients to see providers of their own race, (3) diversity will increase the propensity to use healthcare through greater trust in the healthcare delivery system, and (4) diversity will improve health outcomes through better leadership and advocacy for policies and programs aimed to serve vulnerable populations.[47]

A complementary strategy to increasing diversity is improving cultural competence throughout the healthcare system.[45, 47] Challenges created by the shifting demographics and needs of the US population can best be addressed by providers trained in a culturally dynamic environment that supports not only increased knowledge and skills, but also better care and improved access for patients.[45] The greatest challenge is that while provision of cultural competency training is widespread, health care professionals do not become competent simply by reading books and attending lectures.[39] Diversity in the training environment, representing the diverse environment of the patient populations served, is an important factor through exposing students to a variety of races, cultures, beliefs and practices, while simultaneously assisting in recognition of personal opinions and biases.[44] Concerns exist, however, regarding whether certain types of curriculum promote stereotyping of patients rather than offering general concepts of culture and focus on a patient-centered approach.[48] Systematic reviews of cultural competency training conducted in 2005, and again in 2010, found improvement in knowledge, attitudes, and skills, but limited impact on patient outcomes.[48] Better evaluation of cultural competency training programs is needed to provide clear guidelines and generate impact at the patient level.[48] In addition, it is important for the healthcare system to recognize that cultural competency training alone is not enough and additional strategies are needed.[48]

Evidence supports a relationship between increased workforce diversity and improved patient care, primarily through greater access for vulnerable populations and better patient-provider interaction.[44, 47] Increased trust, as a result of visible diversity in the workforce, can serve as an avenue for improving access by addressing concerns on the demand for services, rather than the supply of availability of services.[50] Racial concordance between patients and providers alone cannot increase trust in a historically unequal system, nor address provider shortages. However, through both training and exposure to a culturally diverse healthcare environment, non-minority providers can learn to offer culturally competent care that meets the needs of the population.[45] In addition, by embracing skills and talents obtained throughout the educational experience, and enhancing multidimensional skills such as research, advocacy, community engagement and service, workforce diversity efforts will engage patients and communities in their health.[49] The competitive and economic benefits of diversity have long been recognized in the business community, and as the healthcare system attempts to balance economic growth with quality healthcare, increasing workforce diversity will continue to influence success and effectiveness.[44, 45]

Implications and Recommendations

National Measurement and Tracking

Measurement and tracking of race/ethnicity, socioeconomic status, and other determinants of health status is critical to ensure equality in delivery and outcomes in the changing healthcare system.[39, 40] Measurement is needed across key groups shown to differ by health outcomes, such as race, ethnicity, gender, and socioeconomic status. Often this level of data is available through national surveys, but is not available in private data systems run by health insurance plans, hospitals, clinics, or medical groups. It is important to expand collection of race/ethnicity and socioeconomic data to these institutions to consider trends and differences in health care access, cost and quality. It will also be important for those tracking and reporting findings to provide clear and explicit definitions of the modifiable determinant of health, categories for vulnerable population groups, and methodology for comparing the health indicator across population groups. Finally, expansion of information to include categories such as country of origin, birthplace, and social determinants of health can develop a better understanding of vulnerable populations and help explain links between social influences and health outcomes.

Workforce Training

Since health disparities continue to persist, more effective strategies for their reduction and elimination must be considered, developed, and implemented. One such strategy is the incorporation of health care workforce development and training programs to promote diversity. Given the higher prevalence of disparate care in racial and ethnic minority groups such as NHB, Hispanics, and AIAN, it is strategic to promote diversity in the workforce by promoting diversity during recruitment and training. Maldonado and colleagues report that despite comprising nearly 40% of the total population in the United States, racial and ethnic minorities represent only 12.3% of the nation's physician workforce.[55] Unfortunately, this disparity of underrepresented minorities holds true for most of the clinical health professions workforces (i.e., pharmacy, dentistry).

Diversity in workforce training programs can be promoted by developing pipeline programs and establishing partnerships with Historically Black Colleges and Universities (HBCU). Children who participate in pipeline programs can be informed about the various health professions careers and encouraged to consider health care as a future career option. Interested children can then be identified at early ages and supported, even mentored, throughout their primary and secondary years as they prepare to enter health professions programs of study. Similarly, HBCUs are committed to providing quality education to all matriculating students and, historically, provide education to a high percentage of racial and ethnic minorities. HBCUs can serve as valuable resources and critical collaborators for recruiting minority students interested in the health professions.

Use of Technology

In 2009 as a part of the American Recovery and Reinvestment Act (ARRA), the U.S. Congress passed the Health Information Technology for Economic and Clinical Health (HITECH) Act,[56] which encouraged the adoption and use of health information technology by providers in their clinical practices. Since that time, numerous advancements in technology have occurred, which create vast opportunities for patients as well as providers to manage and coordinate care in real-time, share clinical and behavioral data, and collaborate to reduce disparities. Examples of the different types of technologies utilized in underserved communities and to address health disparities include: 1) electronic medical records; 2) consumer e-health tools such as patient health records, health kiosks, and smartphone applications; 3) telemedicine/telehealth systems; 4) population health information systems and electronic registries; and 5) health information exchanges.[56] Additionally, evidence shows these advancements in technology have been used to impact and improve quality of care, access to care, health outcomes, patient engagement, and chronic disease management in underserved communities and those experiencing health disparities.[56] Furthermore, social media continues to emerge as a viable resource for networking socially and acquiring health information for disease management. It is noteworthy to mention, however, that despite the successes and advances technology has afforded in narrowing some gaps in care and improving some outcomes, the adoption and use of technology can have an unintended consequence of further propagating a potential digital divide among different populations.[56] Additional research is necessary to assess these issues and establish mechanisms for minimizing potential harm to often times, already disadvantaged populations.

Personalized Medicine

Given recent advances in technology and medicine, genomics and personalized medicine are emerging as unique approaches for developing new treatments, designing personalized interventions, and designating strategies to prevent chronic conditions, particularly those more prevalent in racial and ethnic minority groups, where disparate care continues to persist. The potential for improved care due to the adoption of personalized medicine could prove beneficial and may outweigh the proposed challenges. The Personalized Medicine Coalition suggests personalized medicine can 1) potentially shift care from one of diagnosis and treatment (often at later stages of the disease) to one of prevention and early detection, thereby leading to improved diagnostic testing, more precise diagnoses over time, and

greater predictability of disease course; 2) optimize drug therapies for specific conditions rather than using the traditional prescribing method of "trial-and-error" or "one-size-fits-all", thereby, identifying more successful therapies; 3) help to minimize adverse drug reactions, to improve patient safety and improve medication adherence; 4) identify "off-brand" uses for certain medications; and 5) reduce overall healthcare costs for patients, health care systems, and society.[33]

In addition to the aforementioned uses, the adoption of personalized medicine presents opportunities for addressing health disparities without stigmatizing individual patients. Individual genetic information can be used to identify specific biomarkers or epigenetic patterns, which can be compared between different groups and among diverse populations. By analyzing the data of individual patients collectively, factors can be identified that contribute to disease incidence and prevalence in a specific population, as well as predispose a population with similar and dissimilar genetic compositions to disparate care. On a public health or population level, the Human Genome Project was designed to create a repository of genetic information for all human beings. The compilation of individualized data therein can be used aggregately and studied to advance medicine in the diagnosis and treatment of diseases, and also to provide insight on other health-related issues, such as reducing health disparities among different groups of people.

In summary, this article provides a historical perspective on the origins of health disparities in the US, reviews the literature on current state of health disparities across several disease conditions, discusses challenges to and opportunities for reducing and eliminating healthcare disparities and provides recommendation on effective strategies to achieve sustained improvements in ongoing efforts to eliminate healthcare disparities.

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Table 1

1. Inadequate impact of prior reports on disparities in the United States.

2. Ongoing disparities by race/ethnicity across diseases including diabetes, cancer, ESRD/transplantation, stroke/CVD and mental health.

3. Provisions in the Affordable Care Act of 2010 have possible influence on health disparities, but alone will not address concerns of affordable care or universal access to care.

4. Given the appropriate identification and use of key stakeholders and components, interventions can be designed that are effective at addressing and reducing health disparities.

5. National measurement for tracking health outcomes across key sociodemographic groups is needed, including measurement of race, gender, socioeconomic status, and social determinants of health.

6. Advances in technology including e-health tools, telemedicine/telehealth, and social media are useful resources for reaching underserved populations and those experiencing health disparities.

7. Diversity in workforce training programs can be addressed by developing pipeline programs and establishing partnerships with Historically Black Colleges and Universities (HBCU).

8. Personalized medicine presents a unique opportunity for improving individualized patient care; however, further evidence is needed to ensure its inception does not create an environment for health disparities to persist.