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Uchechukwu K.A. Sampson, National Institutes of Health
Robert M. Kaplan, U.S. Agency for Healthcare Research and Quality
Richard S. Cooper, Loyola University
Ana V. Diez Roux, Drexel University
James S. Marks, Robert Wood Johnson Foundation
Michael M. Engelgau, National Institutes of Health
Emmanuel Peprah, National Institutes of Health
Helena Mishoe, National Institutes of Health
L. Ebony Boulware, Duke University
Kaytura L. Felix, Health Resources and Services Administration

Only first 10 authors above; see publication for full author list.

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Reducing Health Inequities in the United States: Insights and Recommendations from the National Heart, Lung, and Blood Institute’s Health Inequities Think Tank Meeting

Uchechukwu K.A. Sampson, MD, MSC, MBA, MPH, MS\(^a\), Robert M. Kaplan, PhD\(^b\), Richard S. Cooper, MD\(^c\), Ana V. Diez Roux, MD, PhD, MPH\(^d\), James S. Marks, MD, MPH\(^e\), Michael M. Engelgau, MD, MS\(^a\), Emmanuel Peprah, PhD\(^a\), Helena Mishoe, PhD, MPH\(^a\), L. Ebony Boulware, MD, MPH\(^i\), Kaytura L. Felix, MD\(^g\), Robert M. Califf, MD\(^h\), John M. Flack, MD, MPH\(^l\), Lisa A. Cooper, MD, MPH\(^i\), J. Nadine Gracia, MD, MSCE\(^k\), Jeffrey A. Henderson, MD, MPH\(^i\), Karina W. Davidson, PhD\(^m\), Jerry A. Krishnan, MD, PhD\(^n\), Tené T. Lewis, PhD\(^o\), Eduardo Sanchez, MD, MPH\(^p\), Naomi L. Luban, MD\(^q\), Viola Vaccarino, MD, PhD\(^o\), Winston F. Wong, MD, MS\(^s\), Jackson T. Wright Jr., MD, PhD\(^d\), David Meyers, MD\(^b\), Olugbenga G. Ogedegbe, MD, MS, MPH\(^i\), Letitia Presley-Cantrell, PhD\(^u\), David A. Chambers, DPhil\(^w\), Deshirée Belis, MPH\(^a\), Glen C. Bennett, MPH\(^o\), Josephine E Boyington, PhD\(^w\), Tony L. Creazzo, PhD\(^x\), Janet M. de Jesus, MS\(^a\), Chitra Krishnamurti, PhD\(^a\), Mia R. Lowden, PhD\(^d\), Antonello Punturieri, MD\(^z\), Susan T. Shero, MS\(^a\), Neal S. Young, MD\(^aa\), Shimian Zou, PhD\(^bb\), and George A. Mensah, MD\(^a\)

\(^a\)Center for Translation Research and Implementation Science, National Heart, Lung, and Blood Institute (NHLBI), National Institutes of Health (NIH), Bethesda Maryland
\(^b\)U.S Agency for Healthcare Research and Quality, Rockville, Maryland
\(^c\)Department of Public Health, Loyola University, Chicago, Illinois
\(^d\)School of Public Health, Drexel University, Philadelphia, Pennsylvania
\(^e\)Robert Wood Johnson Foundation, Princeton, New Jersey
\(^f\)Division of General Internal Medicine, Duke University, Durham, North Carolina
\(^g\)Health Resources and Services Administration, Rockville, Maryland
\(^h\)Office of Medical Products and Tobacco, U.S. Food and Drug Administration, Silver Spring, Maryland
\(^i\)Department of Internal Medicine, Southern Illinois University School of Medicine, Springfield, Illinois
\(^j\)Department of Medicine, Johns Hopkins University, Baltimore, Maryland
\(^k\)Office of Minority Health, U.S. Department of Health and Human Services, Rockville, Maryland
\(^l\)Black Hills Center for American Indian Health, Rapid City, South Dakota
\(^m\)Center for Behavioral Cardiovascular Health, Department of Medicine, Columbia University, and Value Institute, New York Presbyterian Hospital, New York, New York
\(^n\)University of Illinois Hospital & Health Sciences System, Chicago, Illinois
\(^o\)Department of Epidemiology, Rollins

Reprint requests and correspondence: Dr. Uchechukwu K. A. Sampson, Center for Translation Research and Implementation Science (CTRIS), National Heart, Lung, and Blood Institute, National Institutes of Health, One Rockledge Center, 6705 Rockledge Drive, Suite 6070, Bethesda, MD 20892, Telephone: 301-594-4279, Fax: 301-402-1051, uchechukwu.sampson@nih.gov.

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School of Public Health, Emory University, Atlanta, Georgia \textsuperscript{a} American Health Association, Dallas, Texas \textsuperscript{b} Department of Pediatrics, George Washington University School of Medicine, Washington, DC \textsuperscript{c} Kaiser Permanente, Los Angeles, California \textsuperscript{d} University Hospitals Case Medical Center, Cleveland, Ohio \textsuperscript{e} Division of Health and Behavior, New York University, New York, New York \textsuperscript{f} Division of Heart Disease and Stroke Prevention, Centers for Disease Control and Prevention, Atlanta, Georgia \textsuperscript{g} Division of Cancer Control and Population Sciences, National Cancer Institute, NIH, Rockville, Maryland \textsuperscript{h} Division of Cardiovascular Sciences, NHLBI, NIH, Bethesda, Maryland \textsuperscript{i} Division of Extramural Research Activities, NHLBI, NIH, Bethesda, Maryland \textsuperscript{j} National Institutes of Allergy and Infectious Diseases, NIH, Bethesda, Maryland \textsuperscript{k} Division of Lung Diseases, NHLBI, NIH, Bethesda, Maryland \textsuperscript{l} Division of Blood Diseases and Resources, NHLBI, NIH, Bethesda, Maryland

Abstract

The National, Heart, Lung, and Blood Institute convened a Think Tank meeting to obtain insight and recommendations regarding the objectives and design of the next generation of research aimed at reducing health inequities in the United States. The panel recommended several specific actions, including: 1) Embrace broad and inclusive research themes; 2) Develop research platforms that optimize the ability to conduct informative and innovative research, and promote systems science approaches; 3) Develop networks of collaborators and stakeholders, and launch transformative studies that can serve as benchmarks; 4) Optimize the use of new data sources, platforms, and natural experiments; and 5) develop unique transdisciplinary training programs to build research capacity. Confronting health inequities will require engaging multiple disciplines and sectors (including communities), using systems science, and intervening through combinations of individual, family, provider, health system, and community-targeted approaches. Details of the panel’s remarks and recommendations are provided in this report.

Keywords

health information exchange; health policy; health services accessibility; social determinants of health; T4 research; translation research

Background

Inequities in health have their roots in the structure of society and reflect the unequal life chances experienced by people of different social classes, racial/ethnic backgrounds, and other dimensions of social stratification (e.g., sex and geography). Many decades of surveillance and research in the United States and across the globe have shown that an excess burden of disease falls on disadvantaged population groups \cite{1}. The persistence of inequities across the full spectrum of health outcomes, access to health care, adoption of health-promoting behaviors, and exposure to health-promoting environments are amply documented in recent reports \cite{2}. The National Healthcare Quality and Disparities Report (QDR) provides a comprehensive overview of the quality of health care received by the general U.S. population, and inequities in care experienced by different racial, ethnic, and
socioeconomic groups. The 2014 QDR demonstrates that, despite evidence of progress, there are many persistent challenges to improving quality and reducing inequities (2).

Although the variation in state performance on quality and inequities may suggest the need for tailored approaches for improvement, the systemic nature of inequities across multiple indicators (mortality, morbidity, risk factors, access to care, and quality of care) suggests that innovative ways of addressing these structural determinants of inequities are needed. Health inequities lead to loss of lives, health, productivity, and increased health care costs, which collectively have profound economic consequences. This perspective is amply affirmed by the National Research Council (NRC) and Institute of Medicine (IOM) report that compares the current U.S. health disadvantage to peer high-income countries (3), and the report from the Joint Center for Political and Economic Studies on the economic burden of health inequities in the United States (4). In tackling this challenge, the National Heart, Lung, and Blood Institute (NHLBI) convened a Think Tank meeting to obtain advice regarding the objectives and design of the next generation of research that will address health inequities in the United States. The Think Tank was convened to both identify underpinnings of health inequities and inform the NHLBI’s implementation (T4 translation) research initiatives, which, by definition, focus on strategies for broad implementation of evidence-based interventions in “real world” settings to reduce the burden of disease across at-risk populations. Implementation research is still a developing field; therefore, bringing it to maturity will require development of new design and analysis tools, as well as advances in the mechanics of collaborative research. Such efforts should have broad focus by considering factors both within and beyond the health care system systematically and objectively to reduce the differences (gap) in health outcomes between populations, and especially to improve health in underserved populations at the greatest risk for poor health outcomes.

**Charge to the Think Tank Panel**

Given the investments by the NHLBI in observational and clinical science, the Think Tank was charged to consider the objectives and design of the next generation of research targeting health inequities. In particular, NHLBI’s newly formed Center for Translation Research and Implementation Science (CTRIS) (5) has as its mission to advance late-stage or T4 translation research, which implies identifying effective methods for disseminating and implementing evidence-based interventions known to improve the health of the population. A prominent aspect of late-stage (T4) translation research (focused on dissemination and implementation) is attention to reducing health inequities, which are driven by social and economic factors, with additional contributions from challenges in access, quality, and affordability of health care, and the availability and delivery of public health services. To this end, the Think Tank group was charged with advising the NHLBI on how best to: develop methods for testing and implementing evidence-based interventions that will reduce health inequities in at-risk population subgroups; develop infrastructure for research on health inequities, including (but not limited to) capacity for T4 translation research, and collaboration with other entities, such as community stakeholders, health care systems, and governmental agencies (in particular public health agencies and public funders of medical care); increase involvement of medically-disadvantaged populations in research;
utilize contemporary changes in health care as potential natural experiments for understanding changes in health inequities; and educate and mentor the next generation of health inequities researchers, prepared in the full range of biological, behavioral, social, and systems sciences necessary for effective advancement of knowledge on the dissemination and implementation of interventions that will eliminate health inequities. A major focus of this effort is to transform health inequities research from simply the study of the problem to the study of interventions to eradicate them. In the context of this charge, the Think Tank was asked to identify the highest priorities among its recommendations. A different pair of panel members, who were tasked ahead of time with this responsibility, moderated each meeting session. In this context, session moderators were asked to consider in depth the key discussion topics for their assigned session, and to present a summary of the issues, as well as make recommendations to the Think Tank as a whole. During each session, all panel members were called upon in sequence to weigh in on the issues presented by the session moderators, to stimulate dialogue and eventual consensus on the priority recommendations.

Panel Summary Statements and Recommendations

Significant research has demonstrated that inequities in heart, lung, blood, and sleep (HLBS) disorders are driven by factors defined and operating at multiple levels, including social, economic, environmental, health care-related, behavioral, stress-related, and other personal characteristics (6). These factors are organized into complex causal chains, likely involving interactions and feedback loops, and often operating across the life course of individuals. Many of the fundamental drivers of health inequities are rooted in structural causes related to unequal access to resources, knowledge, and power. Understanding the drivers of health inequities and intervening to reduce or eliminate them will therefore require a multiplicity of approaches, ranging from societal strategies and policies to individual targeted approaches. This makes translation science to address inequities especially challenging, but also critically important. For example, geographical location can contribute to inequities through effects of social policy, safety, environmental pollution, places to be physically active, and access to recommended nutritional resources, such as fresh fruits and vegetables. Essentially, where we live, learn, work, and play has an impact on the likelihood of developing illness, the speed of deterioration, and the possibility of successful recovery/rehabilitation; and participation in faith-based activities, community safety and violence, poor nutrition, and the absence of clean indoor air laws also contribute to the burden of HLBS conditions (7,8). The Think Tank recognized both the urgency, and the complexity of the task at hand, and, especially, the need for novel, creative, interdisciplinary, trans-sectoral, and multilevel approaches. The key recommendations from the Think Tank are offered in the Central Illustration and are summarized below.

Recommendation 1: Embrace Broad and Inclusive Research Themes That Incorporate Multilevel Factors

Although individual-level factors are undoubtedly important, it is paramount to understand the population-level or macro factors that shape health inequities. These macro factors include social and economic policy, food policy, residential segregation, community characteristics, and work environments, among others (9). These factors, in turn, shape the
distribution of more proximal individual-level factors or interact with them. The first recommendation from the Think Tank (Central Illustration, in green) suggests that eliminating health inequities may require embracing its various determinants (both etiological and translational) through broad and inclusive research themes, while addressing focused subgroups using a generalized strategy that includes multilevel interventions (population- and individual-level approaches) beginning early in life, as well as in adulthood. The panel recommended embracing a research agenda that incorporates multilevel factors, including the individual patient, family and social supports, provider/team, organization and/or practice setting, local community environment, state health policy environment, and national health policy environment. This necessarily implies bringing together different scientific disciplines, as well as creating partnerships across multiple sectors (medical care, public health, social services, community developers, legal system, among others).

Recommendations 2: Develop Platforms for Innovative Transdisciplinary Research That Promote Systems Science Approaches

“A systems approach improves health by considering the multiple elements involved in caring for patients and the multiple factors influencing health. By understanding how these elements operate independently, as well as how they depend on one another, a systems approach can help with the design and integration of people, processes, policies, and organizations to promote better health at lower cost” (10). In this regard, efforts in hypertension control programs suggest that attention to the cultural environment, the community in which the targeted people live, and a sustained commitment from health systems, health providers, and community-based organizations are essential for intervention design (11). Furthermore, adverse childhood experiences and social disadvantage contribute to disease causation at the individual level and, therefore, are relevant in research efforts to provide evidence for health care services that optimize health status (12–17). In this context, the realities of complex population- and individual-level determinants of health inequities warrant platforms for innovative and informative transdisciplinary research that incorporate systems science approaches for the evaluation of broad, multilevel determinants of health inequities. These approaches are important, not only for understanding etiology, but also (and most importantly) for understanding and predicting the plausible impact of an intervention or policy on health inequities in different contexts.

Thus, the second key recommendation (Central Illustration, blue) is to develop research platforms for effective implementation of multilevel intervention protocols using holistic approaches in collaboration with health care systems, community, local health departments, academia, nonfederal centers, and federally-qualified health centers (FQHCs). T4 translation research requires a scientific approach that facilitates collective knowledge and input from basic and applied sciences, including disciplines such as: anthropology; sociology; business and social marketing; economics and finance; policy; psychology; epidemiology; political science; behavioral science; cognition; systems engineering; and communication. Collectively, these groups can contribute to developing a rigorous understanding of the problems and identifying innovative solutions in the T4 research space. Importantly, these diverse groups should have the capacity to design and conduct pragmatic interventional
studies with credible measures of success, and will require a transparent decision-making framework(s) to allow for reconciliation of differing viewpoints.

**Recommendation 3: Develop Networks of Collaborators and Stakeholders, and Launch Exemplary Transformative Studies**

Engagement of patients, communities, providers and policy-makers in the research agenda is critical to the identification, dissemination, and implementation of effective interventions or policies to reduce health inequities. The depth and scope of the determinants of health inequities, and the similarity of influences on access and uptake of health and health care, warrant a simultaneously disease agnostic and disease-aware infrastructure for T4 translation research, which would inform and have an impact on health care more generally. Therefore, shared resources will also offer the advantage of evaluating whether interventions across multiple conditions are more effective than a series of disease-specific interventions. The sustainability of effective interventions is a relevant consideration in T4 translation research; thus, it is important to understand the factors associated with sustainability, including new models of health care financing and reimbursement that can reward organizations for delivering both medical and nonmedical services that improve the health of populations. In this regard, early engagement of a broad range of stakeholders, and community involvement and empowerment during the design and implementation of interventions, are essential for long-term success. In addition to the usual financial considerations that are relevant to sustainability, research interventions and policies can be developed and evaluated with an emphasis on community context. The advantages of community involvement include an increased likelihood of engaging people and organizations that are outside of clinical care and, consequently, an increased chance of innovative approaches for health promotion and early intervention in young, asymptomatic, or otherwise disenfranchised persons who may be receiving services in nonclinical settings. High-level NHLBI leadership is needed in this space, due to the complexity of the issues and the concrete engagements needed among various collaborators and stakeholders.

Therefore, the third key recommendation (Central Illustration, red) is that various National Institutes of Health Institutes and Centers, together with Clinical and Translational Science Awards, Federal, and non-Federal agencies should be engaged and set specific goals to reduce inequalities. Furthermore, stakeholders, including community-based organizations, which are the linchpins of T4 translation research, should be adequately funded to fully participate in this research endeavor. Continued high-level NHLBI leadership is vital, due to the complexity of the issues and the high level of engagement needed among Federal agencies, academia, the private sector, and the community. The NHLBI can lead by initiating and executing transformative studies in conjunction with other Federal agencies, academic medical centers, and other partners. In this framework, the NHLBI and other Federal partners can create the capacity for long-term monitoring and surveillance of health inequities within these signature studies and make progress toward reducing them. These studies could also demonstrate data sharing across Federal agencies and institutions, creating common databases for health inequities research. The NHLBI can assure objectivity in data collection, inclusion of mixed methods, when needed, and sustained follow-up.
**Recommendation 4: Optimize the Use of New Data Sources, Platforms, and Natural Experiments**

Social and economic policies, as well as the organization and delivery of health care, will likely undergo significant changes in the coming years, resulting in opportunities to obtain data from “natural experiments.” For example, the implementation of the Affordable Care Act could allow researchers to gain significant insight into how policy affects community and population health. Specific changes are difficult to predict; thus, appropriate and timely responses may be challenging to implement. However, if policy changes happen initially at the state or local level, there can be great opportunity to collect informative comparative-effectiveness data using stepped-wedge study designs or other relevant methods. Using modern research methods, evaluations of tobacco taxation and the health benefits of clean indoor air laws have had important effects of tobacco policy. Similar strategies can be used to evaluate the impact of other interventions and policies (e.g., community development or urban planning policies) on health inequities.

Electronic health records (EHRs) are a rich source of data, but various EHR systems are not yet connected with each other or with health information exchanges. Data from primary care can become more powerful by linking to data sources such as emergency departments. As is, EHR systems may currently be inadequate to provide sufficient data useful in addressing inequities in health. However, recent IOM reports encouraging greater inclusion of social circumstances in the EHR, and new bundled payment mechanisms that encourage capturing data from disparate sources, suggest that this could be a fruitful area of research and development. Additional sources of data (e.g., public health agencies and social service providers) may, on the one hand, describe community-level health challenges (e.g., a high volume of 911 calls from a particular zip code) or, on the other hand, describe people who are not interacting with health care systems and thereby provide opportunities to identify and target them. Developing a screening tool for social determinants of health that could be incorporated into the EHR will give providers and health care systems, policy makers, and public health practitioners a granular sense of issues related to the health of their under-represented patients or constituents. New mobile health technologies that capture health data might increase personal data from many people and become a source of T4 research opportunities. Furthermore, setting metrics for relevant outcomes could drive the process of improving the value of health systems data.

The fourth key recommendation ([Central Illustration](#), orange) is to take advantage of the opportunities presented by observational and interventional studies that document the outcomes of natural experiments. Data needs and potential new sources of data (e.g., EHRs) will become increasingly important components of T4 research and should receive substantial early attention. A screening tool for social and various other determinants of health should be incorporated into EHRs to help identify at-risk populations. There should be a push toward integrated data systems that incorporate various determinants of health. Relevant outcome metrics, which could drive the process of improving the value of health systems data, should be developed. Practice settings should be linked to community-based providers and resources so that health care systems can be engaged in quality improvement approaches and evidence-based self-management strategies to reduce inequities.
Recommendation 5: Develop Unique Transdisciplinary Training Programs to Build Research Capacity

The need to train a new cadre of individuals with T4 translation research knowledge and skills is essential if we are to identify, evaluate, disseminate, and implement new interventions and policies to reduce health inequities. To address the complexity of health inequities, training must be transdisciplinary, with strong integration of the social sciences and other disciplines (e.g., marketing models, business acumen in health systems efficiency). Training in the use of big-data science, predictive modeling, and research design to advance implementation science is of paramount importance. Needless to say, training in public health research, including epidemiology and community health assessment and planning, are essential skills needed to effectively translate research to address health inequities. Training linkages with practice settings across disciplines, and mentors connected to the T4 translation research community and community partners are critically important. Thus, the training environment for T4 translation research is expected to have unique features.

The fifth recommendation (Central Illustration, yellow) is to develop unique, robust transdisciplinary research programs for training and sustaining the complex workforce required for T4 translation research on health inequities. Research capacity should be strengthened for mentors, people across career trajectories, including those in various allied health professions, community health workers, health management professions, and public health professionals. Funding of small grant programs would enable the assembly of teams to generate innovative T4 research plans. Training programs should also be considered within the curricula of health professional schools, as these will provide additional opportunities to develop a workforce that is both diverse and competent in addressing health inequities.

Discussion

Thus far, the NHLBI has pursued a broad approach to health inequities research, with one of the most inclusive minority enrollment policies at the NIH, requiring at least 25% to 30% of research participants to be from minority populations. This enables more robust analysis of clinical trial results and observational study data by minority status. In addition, the NHLBI has launched several epidemiological studies specifically targeting minority health issues, including the Jackson Heart Study, the Hispanic Community Health Study/Study of Latinos, the Strong Heart Study, the PATHWAYS clinical trial to reduce obesity in American Indian schoolchildren, and the Mediators of Atherosclerosis in South Asians Living in America (MASALA) study (18–23). The Institute has issued the Guidelines Implementation Panel Report for Diagnosis and Management of Asthma, which targets inequities related to asthma. Most recently, and still underway, the NHLBI launched 5 Centers for Population Health and Health Disparities to study causes of health inequities and, most importantly, to evaluate interventions. Overall, the NHLBI research investments on health inequity have been productive, but the time has come to build on these investments by stimulating implementation research in an effort to address the challenge of health inequities.

On the issue, charting the course of the next generation of research aimed at reducing health inequities, the NHLBI Thank Tank Panel provided key recommendations centered on
addressing broad research themes that embrace multilevel determinants, building research platforms for implementing multilevel intervention protocols, adopting system science approaches, developing networks of collaborators and stakeholders, launching transformative studies that serve as benchmarks, optimizing the use of new data sources, platforms, and natural experiments, and developing unique transdisciplinary training programs to build research capacity. Participants at the Think Tank also recognized that, despite the importance of health care, improved health services alone might be insufficient to address all health inequities. Behavioral, social, community, and policy interventions, in addition to environmental and policy changes for improving health and healthy life expectancy, deserve increased attention, as they may be much more potent than medical interventions (24). The failure of our research to reach full translation is due, at least in part, to the barriers that many patients face in adhering to provider recommendations because of the circumstances in which they live and the incentives within health care. Both sets of challenges will need to be improved if the health inequities that affect so many in our nation are to be addressed.

Conclusions

Let us be reminded of the words of Dr. Martin Luther King, Jr., that “of all forms of inequity, injustice in health is the most shocking and inhuman” (25). While broader sociopolitical interventions to eliminate health inequities may appear to lie outside the remit of our disciplines, as health scientists it is our obligation to provide evidence of how a broad range of strategies, policies, and interventions ranging from societal to genetic may impact health and health inequities. We must work to ensure that all Americans benefit from access to proven interventions, and that targeted efforts to eliminate health inequities in our communities continue to be made. We have the knowledge to improve overall population health and well-being of communities, but more efficient and effective implementation is needed. In this regard, novel approaches and research platforms can be leveraged to facilitate implementation research on disparity reduction especially community and behavioral interventions, which is paramount for advancing adherence to best practices for health promotion—diets rich in fruits and vegetables, physical activity, tobacco avoidance or smoking cessation—prevention, and treatment of cardinal risk factors like overweight and obesity, high blood pressure, dyslipidemia, and diabetes, which are central to HLBS conditions. Indeed, if we can optimally disseminate and implement existing evidence-based approaches, we will achieve substantial improvement in the social wellbeing and productivity of the U.S. population. However, we also need to understand why interventions have not worked to eliminate health inequities in the past as well as what other strategies might complement or enhance existing evidence-based interventions.

Our recommendations include the engagement of other disciplines, more transformative studies and platforms and development and participation in networks and organizations that have dissemination and improvement in equity at their core. The principal conclusion of this Think Tank is that, despite a highly successful research enterprise that has led to lower HLBS disease and mortality, there has been at best only modest progress in reducing disparity by race/ethnicity, socioeconomic status (SES), and geography. And these have to be addressed if the NHLBI is to succeed in its societal purpose. The NHLBI does not stand...
apart from the American society but rather it is embedded in it. The growing diversity of the
U.S. population, the growing SES inequity more generally and in health specifically and the
enormous cost of health care in the United States relative to other countries could contribute
to questioning societal support for research if it is perceived to be preferentially available to
select populations, for example, high SES, rather than helping all equally and more targeted
to those with greater health need.

Abbreviations and Acronyms

CTRIS Center for Translation Research and Implementation Science
EHR electronic health record
HLBS Heart, Lung, Blood, and Sleep
IOM Institute of Medicine
NHLBI National Heart, Lung, and Blood Institute
QDR National Healthcare Quality and Disparities Report
SES socioeconomic status

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Figure. Central Illustration: Insights and Recommendations for Reducing Health Inequities in the United States From the NHBLI Health Inequities Think Tank

The block of 5 recommendations combine to form a pentagon, a symbol of the kind of power, unity, and multidimensional approaches needed to confront health inequities. Furthermore, it implies that the execution of all recommendation blocks is, therefore, paramount to achieving the kind of formidable offense that will have a successful impact on the entire U.S. population’s health outcomes. See the text for a detailed description of each of the Think Tank’s 5 key recommendations. NHLBI = National Heart, Lung, and Blood Institute.