

Implementation Research to Address the United States Health Disadvantage

Report of a National Heart, Lung, and Blood Institute Workshop



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ABSTRACT

Four decades ago, U.S. life expectancy was within the same range as other high-income peer countries. However, during the past decades, the United States has fared worse in many key health domains resulting in shorter life expectancy and poorer health—a health disadvantage. The National Heart, Lung, and Blood Institute convened a panel of national and international health experts and stakeholders for a Think Tank meeting to explore the U.S. health disadvantage and to seek specific recommendations for implementation research opportunities for heart, lung, blood, and sleep disorders. Recommendations for National Heart, Lung, and Blood Institute consideration were made in several areas including understanding the drivers of the disadvantage, identifying potential solutions, creating strategic partnerships with common goals, and finally enhancing and fostering a research workforce for implementation research. Key recommendations included exploring why the United States is doing better for health indicators in a few areas compared with peer countries; targeting populations across the entire socioeconomic spectrum with interventions at all levels in order to prevent missing a substantial proportion of the disadvantage; assuring partnership have high-level goals that can create systemic change through collective impact; and finally, increasing opportunities for implementation research training to meet the current needs. Connecting with the research community at large and building on ongoing research efforts will be an important strategy. Broad partnerships and collaboration across the social, political, economic, and private sectors and all civil society will be critical—not only for implementation research but also for implementing the findings to have the desired population impact. Developing the relevant knowledge to tackle the U.S. health disadvantage is the necessary first step to improve U.S. health outcomes.

“Today, not only are health problems global, but lessons, insights, and fresh solutions regarding such problems flow in all directions” [1]

Harvey V. Fineberg, Past President, Institute of Medicine

Currently, U.S. health outcomes and longevity are much worse than those found in peer high-income countries [2-4]. The National Research Council and the Institute of Medicine in seminal studies [2,3] report that such health

disadvantage “has multiple causes and involves some combination of inadequate healthcare, unhealthy behaviors, adverse economic and social conditions, and environmental factors, as well as public policies and social values that shape those conditions” [2]. Compounding this health disadvantage in the United States is the fact that these unfavorable trends continue today [5-8] alongside large variation in longevity and health status across groups of people and places within the United States—leaving

The authors report no relationships that could be construed as a conflict of interest.

The views expressed in this article are those of the authors and do not necessarily represent the views of the National Heart, Lung, and Blood Institute, National Institutes of Health, the U.S. Department of Health and Human Services, the United States Government, or the Organization for Economic Cooperation and Development or its member countries.

The Think Tank meeting was supported entirely by the National Heart, Lung, and Blood Institute, National Institutes of Health, Bethesda, MD, USA. Manuscript development was led by U.S. government employees of the National Heart, Lung, and Blood Institute as part of their normal duties.

This article was prepared while Dr. Tracy was employed at the Center for Translation Research and Implementation Science, National Heart, Lung, and Blood Institute, National Institutes of Health, Bethesda, MD, USA.

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some groups at extreme disadvantage [9-12]. Predictive modeling also finds that future U.S. life expectancy gains will remain among the lowest of peer countries [13].

NHLBI THINK TANK ON THE U.S. HEALTH DISADVANTAGE

In April 2016, the National Heart, Lung, and Blood Institute (NHLBI) convened a panel of national and international health experts for a one-and-a-half day Think Tank meeting to examine the drivers of the U.S. health disadvantage and explore key research strategies and opportunities for implementation research [14]—research studying implementation strategies for prevention and treatment of heart, lung, and blood diseases and sleep disorders. The Think Tank Panel limited discussions to the disorders aligned with NHLBI efforts but recognized the role of other important factors beyond this scope. This implementation research also aligns with the NHLBI Strategic Vision Goal 3 to advance translational research [15] and provides an opportunity for new discoveries and knowledge to be applied in an optimal and sustainable fashion, leading to population health benefits [14,16-19]. NHLBI's Center for Translation Research and Implementation Science is a focal point for advancing this research agenda [18,19]. The goal of this Think Tank was to identify robust strategies and platforms needed to organize, support, implement, and sustain studies that will determine factors associated with variation in longevity and health and to identify key implementation research opportunities that would positively modify them. The Think Tank identified key challenges and recommendations for 1) understanding the U.S. health disadvantage, 2) developing an innovative implementation research agenda for tackling it, 3) creating partnerships and collaborations, and 4) developing training and capacity-building strategies needed to implement this research agenda.

UNDERSTANDING THE U.S. HEALTH DISADVANTAGE

Several key challenges and opportunities were cited by the panel (Table 1, Understanding the U.S. Health Disadvantage). A major driver of health status and outcomes in the United States, and elsewhere, are social determinants across the lifespan including social position, wealth, education, sex, geography (e.g., urban or rural residence), and the environment (e.g., physical and social) [4,20-25]. Other drivers include health behaviors and access and uptake of quality health care [26-29] driven by limited access to facilities, providers, and health care coverage. Without universal insurance in the United States, access to primary care physicians, compared with other peer countries, is lower [30,31]. In addition, variation in health care services uptake in the United States is very large, perhaps not surprisingly, given the variation in insurance coverage within the U.S. population [32].

Another major challenge is that health determinants are highly linked, complex, and operate at several levels of the social-ecological framework [33]. Social determinants and geography [6,34] (e.g., urban/rural residence) both are critical factors. Compared with the United States, other high-income country populations also tend to have better access (i.e., availability and affordability) to the health care system, and they use [30,31] and invest comparatively more in social services and public policies to promote health. Such investment in health and social services is associated with better population health in peer countries [35], as well as among specific U.S. subpopulations with these investments [36].

The panel identified key recommendations for NHLBI to consider that would improve the likelihood for impactful implementation research. These include evaluation of long-standing cohort studies that may lead to understand geographic variation and evolving social and health inequities and these studies may benefit from tapping administrative “big” data from sources such as the Center for Medicare and Medicaid Services. One approach might be to identify where the United States is doing better in disease prevention and control than other peer countries and determine why that is the case [37].

Research groups are already undertaking transnational comparative studies focused on understanding country variations [38-41]. The European Health Care Outcomes, Performance, and Efficiency is a consortium of 7 western and eastern European countries driving efforts to evaluate the performance of the European health care systems in terms of outcomes, quality, use of resources, and costs [42-44]. European Health Care Outcomes, Performance, and Efficiency has developed >100 indicators at the national, regional, and hospital levels and created a database from national data, hospital data, and mortality registries. Substantial variations in health outcomes between and within countries have been found. Comparative research will lend better understanding to both the U.S. health disadvantage and what does and does not improve population health. Such research could focus on the extent to which the health disadvantage can be attributed to inadequate implementation of effective health policies and clinical and public health practices.

POTENTIAL SOLUTIONS FOR THE U.S. HEALTH DISADVANTAGE

Key challenges and recommendations for NHLBI to consider are found in Table 1, Potential Solutions for the U.S. Health Disadvantage. One major challenge is that a gradient of health exists throughout the entire U.S. population. Targeting interventions for the most disadvantaged U.S. population groups is a reasonable strategy, yet a substantial proportion of the total burden of health disadvantage may be missed—being found in larger, but moderately disadvantaged groups [45,46]. In addition, another major challenge for successful intervention

TABLE 1. Key challenges and recommendations from the NHLBI Think Tank meeting on the United States health disadvantage

Understanding the U.S. Health Disadvantage	
<p>Key challenges</p> <ul style="list-style-type: none"> • Large disparities in life expectancy by income and geography exist in the United States. • Determinants of health are highly linked, complex, and operate at multiple levels. • Geography can drive health, socioeconomic, and educational behaviors. • Common origins of many health disparities lay in early childhood development. • Community social issues (education, housing, safety, access to healthy foods) are priority issues but are not typically considered important for health within the community. • The role of “upstream” factors such as socioeconomic status and other social determinants of health and “downstream” factors such as access to health care can both make major contributions to health status. • A life course approach will take longer term planning and implementation, and rapid improvements are also needed. • Transnational health outcome research is occurring in peer countries but requires highly harmonized data systems over the long term. • Patient-level socioeconomic data are needed to understand its influence on health yet have several challenges including confidentiality, nonavailability or accessibility of data, declining survey response rates, poor harmonization across data sources, validity of self-reported risk, lack of policy, and intervention exposure • Currently much data in the United States are underused. 	<p>Key recommendations*</p> <ul style="list-style-type: none"> • In-depth comparative assessments of geographic areas with the worst and best health outcomes may contribute to understanding geographic variation. • Age-specific death causes can lend insight to current trends and can examine stagnating U.S. population mortality, whereas it is falling in peer countries. • Assess and compare health policy implementation across states and subregion. • Explore long-standing cohort studies to understand complex evolving social and health inequities. • Consider taping administrative and “big” data and other current data sources for studies. • Use mixed methods (qualitative and quantitative) in comparative effectiveness research to identify the active components of multicomponent strategies. • Time-series analyses or multiple meta-analyses of small studies might be more powerful than single randomized controlled trials because their findings are more representative of the population. • Observational study designs that monitor local initiatives may help determine whether they are making a difference. • Understand why the United States is doing better for some key indicators than peer countries are. • Minimize collection of new primary data and develop a large new data enterprise using existing data as the focus of current efforts.
Potential Solutions for the U.S. Health Disadvantage	
<p>Key challenges</p> <ul style="list-style-type: none"> • A gradient of health disadvantage exists throughout the entire population. • Implementation of interventions within complex systems has multiple dimensions within and outside the health care system. • Health care systems may not perceive they have a role in population health. • Various socioeconomic factors and health risk factors profiles may have discordant trends (i.e., one can improve while the other worsens). • Beneficial new technologies can be taken up quicker in advantaged populations and exacerbate inequities. • International comparisons will need to account for the differences in duration of the policies that have been in place. 	<p>Key recommendations*</p> <ul style="list-style-type: none"> • Targeting populations across the entire socioeconomic spectrum will prevent missing a substantial portion of the total disadvantage burden. • Key elements for interventions will be at every level of the sociological model (e.g., personal incentives, regulations, laws, self-efficacy, and culture). • Understanding the organization of health care, accountability and quality improvement, financing, provider incentives, along with access to care is needed. • Establish a small number of highly focused priority disadvantage topic areas (e.g., hypertension prevention and control) to keep efforts focused. • Consider both long-term life-course approaches and short-term approaches. • A social determinate focus would include recommendations of the World Health Organization Commission on the Social Determinants of Health.

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GLOBAL HEART
Published by Elsevier Ltd.
on behalf of World Heart
Federation (Geneva).
VOL. 13, NO. 2, 2018
ISSN 2211-8160/\$36.00.
<https://doi.org/10.1016/j.ghheart.2018.03.003>

TABLE 1—continued. Key challenges and recommendations from the NHLBI Think Tank meeting on the United States health disadvantage

Partnerships, Collaborations, and Building the Workforce to Tackle the U.S. Health Disadvantage	
<i>Partnerships and collaborations</i>	
<p>Key challenges</p> <ul style="list-style-type: none"> • Collaborations across the socioecological spectrum (health sector, housing, employment, education, environment, agriculture, transportation, academia, funders, industry, philanthropy, etc.) are difficult and challenging. • Forming and sustaining partnerships will be a challenge since a single model does not fit all partner needs. • Implementation research is new for some health research organizations that typically fund clinical trials or basic science. Collaborators and partners, therefore, need to make sure that everyone understands what they are funding. • Some stakeholders might not want researchers to publish results that show the sponsor in an unfavorable light. 	<p>Key recommendations*</p> <ul style="list-style-type: none"> • Partnerships at multiple levels are needed and essential for implementation research. • Develop common goals among partners with competing interests. • Bring together several National Institutes of Health institutes and centers with foundations and create a common framework for joint initiative calls for proposals for implementation research that address knowledge gaps with the potential of the greatest population impact. • The high-level goal is to create systematic change through collective impact.
<i>Building the workforce for implementation research</i>	
<p>Key challenges</p> <ul style="list-style-type: none"> • Concern remains about the rigor of some implementation research methods. • A culture change is needed so that implementation scientists are treated in the same way as basic scientists in the promotion and tenure process. • Implementation research and quality improvement are largely siloed within most academic health institutions. • Need to derisk implementation research career path for young investigators considering it. 	<p>Key recommendations*</p> <ul style="list-style-type: none"> • There are increasing opportunities in implementation research training to better meet the needs of interested investigators. • Team science should be included in this training because tackling complex issues and methods such as evaluation, integration of qualitative and quantitative evidence into systematic reviews, determinants of knowledge uptake, and sustainability and scalability should be included. • Promote integration of implementation research and quality improvement through funding initiatives.
<p>NHLBI, National Heart, Lung, and Blood Institute. *All recommendations are for NHLBI to consider.</p>	

delivery will be the need for substantial alignment across social, political, economic, and private sector goals.

Interventions spanning the entire socioecological spectrum may prevent missing disadvantaged groups. Health systems can attempt to close the health gap by supporting nonhealth sectors focusing on both the key recommendations from the World Health Organization Commission on the Social Determinants of Health (improving daily living conditions and tackling the inequitable distribution of power, money, and resources, as well as measuring and understanding the problem and assessing the impact of actions) [22]. Optimal strategies for quality improvement of care delivery broadened from clinicians to the larger health care system and provider teams, and even beyond to community and local government integration, may be successful [47,48].

Examining other country-level experiences is useful. For example, both New Zealand and Australia are addressing domestic health disadvantages within the indigenous population for which they are trying to close the health gap. They are tackling health risk factors such as tobacco along with improving access to quality health care. These countries have also extended programs beyond the health sector and provide education and employment. In both countries this approach has resulted in substantial reductions in the life expectancy gap between indigenous and nonindigenous groups [49-52]. Studies among European countries suggest similar trends [53,54].

The panel suggested establishing a small number of highly focused priority efforts. Many felt hypertension prevention and control should be considered for this approach because 1) good data are available, 2) many

proven-effective interventions exist, 3) controlling it has substantial health benefits, and 4) control rates are poor throughout the population. Large-scale programs in the United States have had remarkable success in improving blood pressure control rates within targeted populations and have demonstrated what is possible to achieve [55,56]. Implementing these types of programs at local levels within the United States could potentially also tackle geographic disadvantages and disparities.

BUILDING PARTNERSHIPS AND COLLABORATIONS

Partnerships and collaborations are critical for advancing health research and, particularly, for developing and aligning impactful implementation research. Many implementation strategies studied will need to align with social, political, economic, and private sector efforts. Key challenges and recommendations from the panel are in Table 1, Partnerships, Collaborations, and Building the Workforce to Tackle the U.S. Health Disadvantage. Three primary reasons why partnerships are critically important are 1) effective implementation requires engagement and buy-in from those affected; 2) all sectors have a role in contributing to health; and 3) health and social problems require collective action [57]. When creating research partnerships, 5 basic needs from a research system include coordination of donor funds, prioritization of research ideas, recognition of successful research including optimal and sustainable implementation strategies, dissemination of new knowledge, and evaluation of return on investments [58]. Traditional partnerships limited to the health sector will likely be inadequate and will need to transcend multiple government sectors (e.g., housing, employment, education, environment, agriculture, transportation, and urban planning) and beyond government institutions to health care providers, payers, academia, industry, philanthropy, public research funders, multiple levels of government, and communities [59]. For successful implementation research, decision makers and health authorities are essential collaborators and will need to be engaged along with affected communities. The panel felt that since a single model does not fit all needs and forming and sustaining partnerships is always a challenge, each effort needs to be tailored to partnership goals.

With such diverse partners from the public sector, private sector, and civil society (nongovernmental organizations, community-based organizations, etc.), consistency and clarity around common goals and the purposes and partnership expectations need to be established [59]. Collaborators need to make sure all understand what research effort they are funding and the expectations from the effort—along with its short-term and long-term impact. Partnerships are also valuable to ensure that the implementation research questions asked are the very ones that impact health care and social program decision making within the clinical and community systems where the research is occurring.

BUILDING THE WORKFORCE FOR IMPLEMENTATION RESEARCH

With today's growth in the implementation research field, multiple training programs have been developed. Conferences, workshops, short courses, summer training institutes, graduate courses, and degree programs in implementation research are increasingly available [60-63]. Some National Institutes of Health institutes and other federal agencies have established dedicated units focused on implementation research that include efforts to train the future workforce. Team science and complexity science are included in this training since tackling complex issues will require contributions from a number of different disciplines [63].

A recent report on the training needs for implementation research found that, despite many new efforts, training slots were inadequate to meet demand and individual programs have struggled aligning across programs and meeting trainee needs [61]. The panel noted that many academic medical centers have set up centers for innovative research that complement implementation research such as those focusing on quality improvement, which is closely related to implementation research—one distinction being that quality improvement focuses on improving health care quality within a given setting (i.e., not generalizable to other settings) and implementation research strives to generate new generalizable knowledge regarding the best processes and approaches for implementation across settings. These centers will play a pivotal role in creating new models needed to support and sustain implementation research and make viable and sustainable career paths for young investigators.

Building a cadre of implementation researchers may require key changes within the academic culture. The challenge will be to value and reward accomplishment with career progression and the research infrastructure. In addition, other elements needed will be an environment with tailored initiatives reviewed by study panels with appropriate expertise and understanding that research efforts use the most rigorous design that fit both the study context and answers the research questions [64].

DISCUSSION

The seminal studies of the National Research Council and the Institute of Medicine [2,3] clearly described, in detail, a U.S. health disadvantage compared with other peer high-income countries—a disadvantage that cuts across the entire population. More recent studies confirm the major U.S. disadvantage documented in these seminal studies and report that the U.S. health gains within some subpopulations are stagnant or reversing [65-68]. The many drivers of this disadvantage span the social-ecological framework and include both upstream factors such as social determinants and the environment and downstream factors such as health behaviors and access to, utilization, and quality of health care. Whereas more and better data may help refine the

magnitude and causes of the disadvantage, here we focus more on research strategies to tackle it.

This Think Tank Panel, while exploring the key drivers of the U.S. health disadvantage, also focused on identifying key challenges and opportunities for implementation research that will take treatments and preventive interventions and find optimal and sustainable delivery strategies that will improve population health. As was evident, this research strategy can be greatly refined by international research experiences and their findings.

Many challenges remain. Despite much effort in the United States to improve the quality of clinical care, national surveys find that adult outpatient care has not consistently improved and inpatient care delivery has challenges in providing guideline-based care [69-71]. Implementation research can inform strategies designed to improve uptake of interventions that can improve health, minimize inefficiencies, and can also inform strategies to improve health equity [72]. One success story is found in a community-wide program in 1 U.S. county that targeted cardiovascular disease risk factors and behavior changes over 40 years that was recently reported and found improved rural population health [73].

The interplay between unmet resource needs and health care benefits provide additional insights [74,75]. A recent U.S. study aimed at improving uptake of primary care, included adult patients from 3 academic internal medicine practices in a metropolitan area and screened them for unmet resources needs related to food, medications, transportation, utilities, employment, elder care services, and housing [74]. Patients who reported 1 or more unmet needs and who enrolled in the assistance program (57% of the total study population had 1 or more needs), demonstrated modest improvements in blood pressure and lipid control over the 3-year study. Further study will be needed to understand the exact impact of this intervention. The study's accompanying editorial noted that addressing unmet social needs has become increasingly recognized as a critical component to effective health care delivery, and these are often related to key social determinants of health as well [75].

Broad partnerships and collaborations will play a critical role across all these efforts. Finally, while progress has been made, much attention to developing, fostering, and sustaining a robust community of investigators for implementation research is clearly needed.

CONCLUSION

Development of the U.S. health disadvantage took decades and seemingly is continuing to worsen. Its origins are complex and span the nation's entire socioecological spectrum. This Think Tank meeting of national and international experts and key stakeholders from peer countries provided insights into understanding its determinants and to identifying implementation research and training opportunities that will help address this challenge.

The path ahead is challenging. Public health and population-based efforts will need to engage broad stakeholders and societal interest that align with pro-health strategies. Risk factors are driven by forces far upstream from public health and clinical practitioner-patient interactions [76]. However, the benefits would be great. A complement of sustainable strategies targeted at the key drivers of the U.S. health disadvantage should prove impactful and allow for capitalizing on our vast biomedical knowledge base we now have at hand.

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