

# Ominous Reversal of Health Gains in the United States: Time to Rethink Research Priorities?

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**A**fter decades of gains, the average life expectancy in the United States has been declining since 2015 (1, 2). This phenomenon is driven by increases in midlife mortality rates among whites, Hispanics, Asians, and Pacific Islanders, which are caused by various preventable conditions, including overdose, alcohol-related illness, suicide, homicide, hypertensive disease, metabolic disorders, some types of cancer, and chronic respiratory illness (Figure) (1). The pattern and nature of this trend point to potential underlying systemic fault lines and call for a rethinking of the nation's approach to investigating and addressing health.

The United States ranks among the lowest Organization for Economic Co-operation and Development (OECD) member countries in several health indicators (3). Life expectancy among older adults in most high-income countries temporarily decreased between 2014 and 2015. However, subsequent robust gains more than compensated for this decline, except in the United States (2). Inadequate total health care funding does not explain why U.S. life expectancy lags behind that of other countries. Health spending represents 17.9% of the U.S. gross domestic product per capita, almost 2.5 times the average spent by the other OECD member countries, but trails peer nations in social spending. For example, social spending represents 19.3% of the gross domestic product in the United States compared with an average of 21% across all OECD member countries and 31.5% in France. Inadequate social spending limits equitable access to services that are relevant for health, such as high-quality education, health care, public transportation, and nutrition.

The United States retains an enviable position as an ecosystem for research and contributes to more than 50% of health research spending globally. A study by Research!America reported that the United States spends \$171.6 billion annually on medical and health research from the federal government, industry, and private foundations. However, the widespread reversal in life expectancy raises the critical question of whether the country has faltered in its selection of research priorities. We propose that the time is ripe to realign these priorities toward a better understanding of contemporary health trends and potential solutions to improve human health.

A large body of literature suggests that a narrow focus on individual-level biomedical risk factors alone may be distracting us from studying the often-neglected and arguably more consequential determinants of health for individuals and populations (4, 5). Yet, incentives disproportionately and continuously favor health research that investigates biological factors in isolation

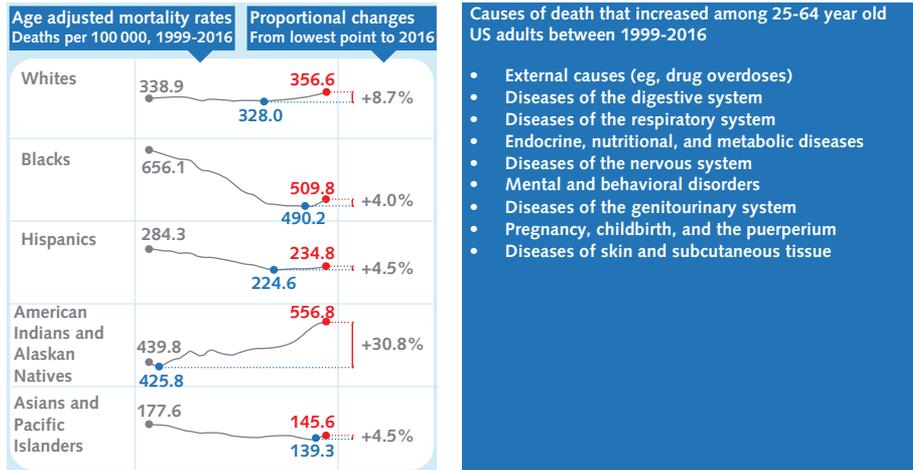
(6). At least 60% of extramural research funded by the National Institutes of Health targets subcellular biology together with bioinformatics and technology, motivating investigators and academic enterprises to prioritize these aspects (7). Doing so only leads to expensive therapies with marginal benefits (8), and the massive investments in such subcellular biological fields as genomics, metabolomics, proteomics, and stem cells have yet to deliver substantial results (7).

If we are serious about promoting health gains in the United States, we must examine current and alternative priorities in our investment in health research. Biology does not operate in a vacuum. We cannot separate it from the social and political context. Life expectancy, cardiovascular mortality, diabetes incidence, and the prevalence of opioid use in the United States vary starkly by county, with an almost 8- to 9-fold difference between the least and most healthy counties (9, 10). Persons from the healthiest counties therefore have life expectancies 20.1 years higher than those from the least healthy counties, where life expectancies compare with those of some of the poorest countries globally (for example, Niger, the Congo, and Afghanistan) (9). Most of this variation is associated with social, economic, and local contextual factors.

We thus need to equally emphasize both biology and the sociopolitical context and apportion investments accordingly. Ample evidence shows the closely knit bidirectional relationship between biology and the socioeconomic environment. Individual lifestyle and the environment influence genes through epigenetic mechanisms, and social and economic stresses have biological implications. Some argue that research funding should be prioritized according to population health rather than simply the pursuit of novel medical treatments for individual persons (6).

We call for research policy and leadership at all levels to honestly recognize the interactive roles of biology and the socioeconomic and political environment. This understanding should herald purposeful action to align health research resources toward an integrative model of science that seriously investigates the socioeconomic and political determinants of health alongside the biological ones. Effective integration of social and biological sciences will require a further transformation of the culture of research toward interdisciplinary approaches that embrace research on team science and implementation.

Several formidable barriers stand in the way of this goal. The National Institutes of Health is largely organized by disease focus, which often precludes collaborations to investigate broader causes of health. Biomedical researchers in the basic sciences dominate the governance

**Figure.** Reversal of health gains in the United States.

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and review process for research. Approximately 75% of the National Institutes of Health's standing study sections are focused on basic science and effectively prevent sufficient representation of the disciplines of population health and the social sciences. Biomedical education mainly focuses on individual-level biological determinants, and clinical researchers and practitioners often do not appreciate the importance of public health and the social sciences on the population's health.

The increase in mortality rates among middle-aged persons in the United States is a clarion call for serious conversations about how to invest in research that promotes population health and to judge the return on research investments. The United States remains pre-eminent in the traditional metrics of research success (for example, the number of Nobel Prizes awarded, patents issued, and articles cited). However, the country performs poorly compared with its peers according to the metrics of the health and well-being of the population. Clinicians and researchers require a greater appreciation of the complex role of biological and societal factors on health so that they can effectively deliver care to the persons and communities that they serve and be powerful voices for change. A realignment of the nation's research investments toward transdisciplinary science is needed to better identify actionable solutions to improve the population's health.

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