Economic Dimensions of Health Inequities: The Role of Implementation Research

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Health inequities are well-documented, but their economic dimensions have received less attention. In this report, we describe four economic dimensions of health inequities in the United States. First, we describe an economic conceptual framework that connects poverty and health inequities at both individual and population levels and conveys the concept of reverse causality, where poverty worsens health inequities and health inequities worsen poverty. This framework can help us understand the key elements of health inequity and its drivers. Second, we describe economic measurements used for quantifying the economic burden of health inequalities and summarize the empirical findings from studies. Third, we review the evidence on the return-on-investment of economic interventions that are aimed at reducing health inequities. Finally, we highlight the importance of cross disciplinary perspectives from economics and implementation research in effectively delivering interventions that can mitigate health inequities.
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Introduction

"The improvement of medicine would eventually prolong human life, but improvement of social conditions could achieve this result even more rapidly and successfully."[1,2]
Rudolf Virchow
Berlin, Germany 1879

While health inequities have long been pervasive worldwide, in 1985, in the United States, a major milestone was made when the Department of Health and Human Services (DHHS) published the *Report of the Secretary's Task Force on Black and Minority Health* - commonly referred to as the Heckler Report.[3] While national efforts since have been undertaken and their progress closely tracked, health inequities persist and today remain a hallmark within the US population.[4-6] Yet, characterizing the inequity burden and finding solutions for the problem have paid little attention to the economic dimensions of health inequities. In tackling the challenge of these health inequities, engaging and partnering with the economics research community can provide not only great insights and understanding into challenges, but can also provide solutions. In this article, we examine economic dimensions of health inequities within the United States for both what they cost and their burden in human capital losses; we then examine the benefits from partnering with the economics research community and cite the important role of implementation research.

In the United States, increasing wealth is associated with better health.

Connecting Health to Economics

Wealth and its relationship to health has long been understood and relearned over the past few centu-

ries.[1,7] In the United States, increasing wealth is associated with better health. Both income (earnings and other money acquired each year) and wealth (net worth and assets) are associated with better health and less likelihood of disease and premature death.[7,8] Conversely, US counties that experienced high degrees of economic shock from globalization and exogenous trade in the 2000s saw declines in manufacturing employment and increased mortality rates.[9] More recently, in Greece, following the national economic downturn and six years of social welfare austerity, total mortality rate increased nearly three times the 2000 to 2010 rate.[10] This relationship holds a gradient across the entire income level spectrum, not only when comparing the very rich to the very poor.

Connecting Health Inequities to Economics

When considering health inequities, the social determinants of health, driven by unequal distribution of health, social, and economic opportunities, have been the focus.[11,12] At the individual and family level, poverty is characterized by upstream social determinants that include unfavorable social (eg, education) and economic (eg, employment) factors, inadequate public policies, unfavorable demographic trends (eg, outmigration from locations with low economic or social opportunities), and suboptimal physical and social environments.[13,14] (Figure 1). Poverty leads to poor health outcomes among families, driven by economic factors such as the inability to afford medicines, medical treatment or follow-up care.[15-17] Downstream determinants include distress (psychosocial factors) driven by anxiety, hostility, racism, adverse life events, aggression, and limited self-control of the local environment, leading to unfavorable biologic responses and harmful coping behaviors.[13,14] These upstream and downstream drivers result in disadvantaged health characterized by excess morbidity and premature mortality. In turn, diminished health from chronic diseases, at the population level, can ultimately lead to lower economic growth, less economic opportunities and finally loop back to cause additional poor health (Figure 1).[18,19] While this illustration was created to characterize developing countries, developed countries experience similar patterns.

Economic Burden of Heath Inequities

Health inequities clearly impose a large, and potentially preventable, burden on the US population. Numerous measurements can be used for estimating their economic impact. For example, individuals and family households can experience losses in income due to disability and need to use household wealth to finance health care services; employers can experience lost productivity due to short or long term worker disability; health care systems can incur more health expenditures; governments lose taxes and incur excess social welfare payments; and the entire population can experience a lower gross domestic product (GDP). Several studies have quantified the economic burdens of health inequalities from different perspectives. (Table 1)

With an understanding of the strong gradient between wealth and health, examining household incomes across US racial and ethnic groups in the United States may be useful in determining whether health inequities are occurring. In 2016, the median household income was $59,000 but was $81,000 for Asians, $65,000 for Whites, $48,000 for Hispanics, and $39,000 for African Americans.[13,20] Earning power is also directly related to education level. Median incomes increase from those without high school diploma ($26,500) to high school diploma ($40,500), some college ($47,700), to those with a college degree ($92,000).[13,21] These figures indicate large income disparities across racial and ethnic groups and a marked income gradient by education attainment, the context where health inequities may occur. For households with <$50,000, the challenge of paying medical bills may further exacerbate health inequities.[15]

Another study evaluated household level catastrophic health expenditures for acute myocardial infarction (MI) and stroke in the United States among those uninsured during 2008-2012.[22] Median hospital charges were $53,000 for acute MI and $31,000 for stroke. Using an indicator of household disposable income (ie, net of subsistence expenses), researchers estimated the rates of catastrophic health expenditure (ie, spending more than

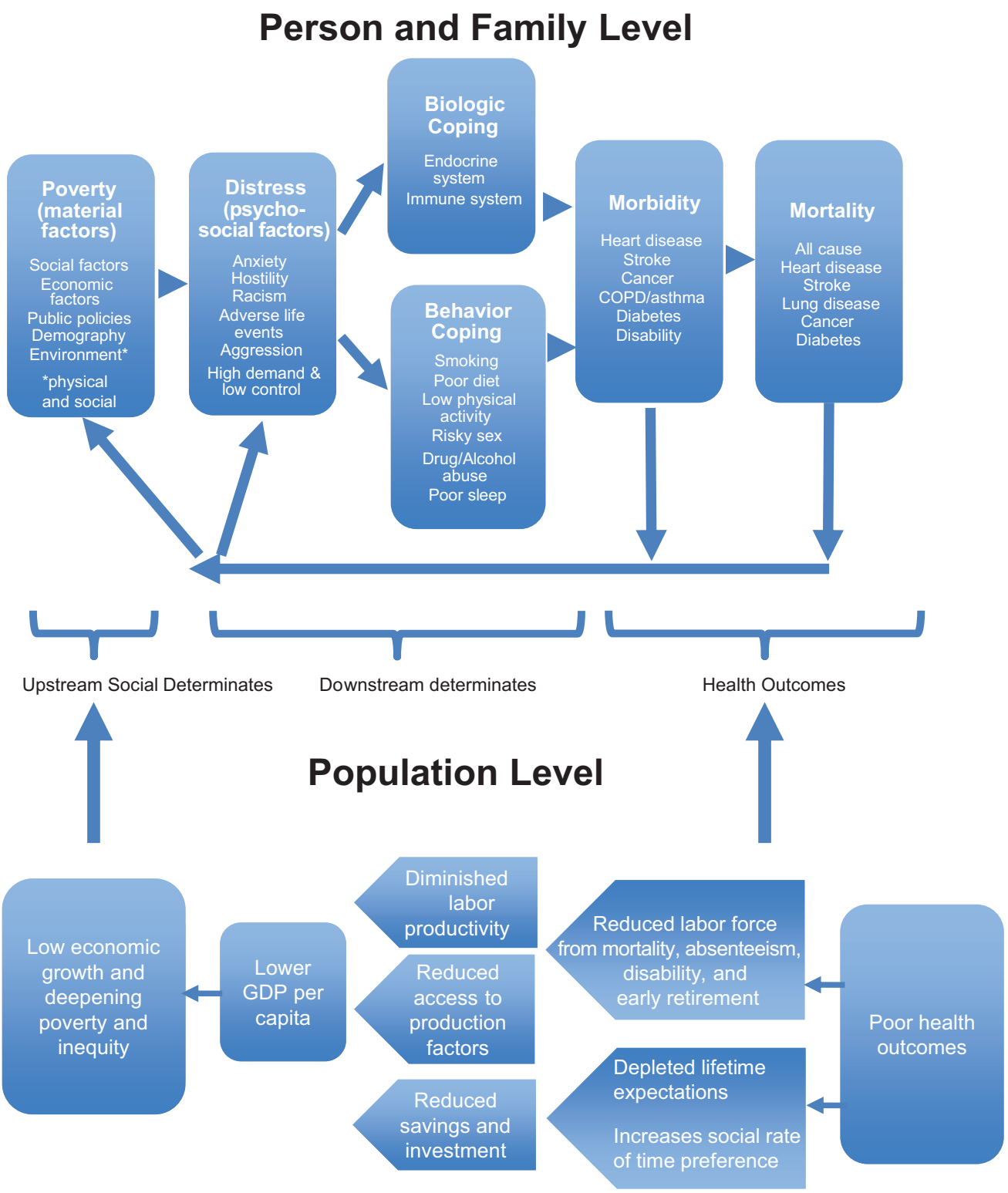

Figure 1. The bidirectional economic conceptual framework connecting poverty and health inequities at the person, family and population level. Adapted from others.[9,10,14,15]

Table 1. Examples of different measures for estimating economic impacts of health inequality

Level	Measure	Rationale	Intended to measure	Estimation methods and data sources	Examples of studies
Individual/family	Loss in personal or household earnings or wealth	Persons with poor health status are less likely to be employed and earned less at work, thus had a lower personal and family income	Financial impact of health inequality among persons and their families due to lower incomes	Linking health status to work participation and earnings; government published statistics or survey data	Large variation in income across racial and ethnic groups and across educational level strata[9,17,18]
	Out-of-pocket health spending	Persons with poor health status tend to have a higher out-of-pocket expenditures or pay higher percent of their disposable income on health care costs	Financial impact of health inequality on persons and their families due to a higher heath care spending	Linking health status to out-of-pocket health spending. Medical expenditure and survey data	Catastrophic spending[19,47]
Population/aggregate	Loss in gross national product (GNP)	Persons of lower health status died earlier, had more disability, missed more work days and were less productive at work, which results in lower national economic growth	The impact of health inequality on national economy	Estimated based on economic models of human capital theory; government published statistics or survey data	GDP loss due to health inequity in European Union[10,25]
	Cost of illness	Persons of lower health status had higher direct medical cost and productivity losses due to morbidity and mortality	The total economic burden of health inequality on society	Estimated based on cost-of-illness method; government published statistics; medical expenditure surveys; insurance claim data or other survey data	Economic cost of health inequity in the United States per year and over 4 years[23,24]
	Willingness to pay for avoiding years of life lost or quality-adjusted life years lost	Persons of lower health status tended to die prematurely and had poor quality of life	Social values of health inequality on society	Estimated using contingent evaluation or econometric methods; occupation and earning data or survey data	Economic loss in human capital due to health inequity in the European Union[10,23-25]

a threshold of 40% of the household disposable income) and found roughly 80% of those with acute MI and 75% with stroke were above this threshold, suggesting severe personal and family financial distress.

Individual economic impact can be assessed in multiple ways. In 2016, a team at Kaiser Family Foundation conducted a population survey to determine the prevalence of problems paying medical bills.[15] Overall, 26% of US adults aged 18-64 years reported living in a household that had problems paying or an inability to pay their medical bills during the past year. Most respondents facing problems did not have insurance (53%) but even among those with insurance (employer-based, Medicaid, or private purchased), about 20% reported problems paying their bills. Problems paying bills was more common among households

with incomes <$50,000 annually, those with poorer health status and disability, and those who were receiving care for chronic conditions. Coping mechanisms included: cutting spending on food, clothing, and education; working more hours or getting second jobs; drawing down on long-term savings accounts; borrowing money from friends or family; increasing credit card debt; and taking out a second household mortgage. In another study by the Kaiser Family Foundation among persons with health insurance, they found that difficulties with medical bills were, not surprisingly, more pronounced among the poor and near poor – approximately 40% of nonelderly adults with incomes below 200% of the federal poverty level reported problems with paying medical bills.[17] Through an online survey, the American Heart Association found that 56% of adults (insurance status unknown) who had heart conditions, stroke, or hypertension, reported having trouble paying for prescription drugs or other medical care in the past year.[16]

At the population level, economic measures include the impact on the GDP, cost of illness studies, and the societal-based "willingness to pay" for improved quality of life and length of life. (Table 1). A recent study of the entire US population[23,24] examined morbidity, mortality, and disability for populations experiencing health inequities and modelled the economic benefits based on the scenario that their health outcomes were raised to that of the healthiest reference population group (ie, Whites). Using this methodology and national data from 2002-2006, the excess health cost due to health inequities was estimated for direct medical costs (ie, the cost of care) and indirect medical costs (cost of disability and premature death) for African Americans, Asians and Hispanics. During the 4-year study period, the excess direct costs due to health inequities ranged from $54 to $61 billion annually, a total of $229 billon for the entire study period. This cost was about 30% of all the direct medical costs expended among African Americans, Asians, and Hispanics. The costs of disability and premature death ranged from $249 to $255 billion each year and totaled $1.008 trillion over the entire study period. However, these figures do not account for actual investments needed in health programs to lower the rates of disease, disability, and early death in these populations. Regardless, these figures are imposing and provide an indication of a strong economic case for reducing health inequities.

Studies on the impact of health inequities directly on the US GDP are scarce. However, a study in the European Union (EU) lends insights into the magnitude of economic burden that health inequities can impose.[14,25] Using low education levels to define populations experiencing health inequities, they reported that more than 700,000 deaths per year and 33 million cases of ill health in the EU were attributable to inequities. These deaths and morbidity-related disabilities accounted for 20% of all health care costs and 15% of social security benefits. Losses in labor productivity reduced the EU GDP by 1.4% each year. The monetary value of health inequities related to human capital losses (ie, monetary value to years lived with disease compared with disability-free and avoiding premature death) was estimated at €980 billion per year or 9.4% of the GDP. Thus, both of these measures are insightful. The direct GDP impact was modest while the loss in human capital was substantial.

The Economic Impact of Interventions

Social determinants are an important root cause of health inequities (Figure 1). Several interventions targeting social determinants and economically motivated behaviors to tackle health inequities have been evaluated. A recent review of all published systematic reviews addressed interventions based on the social determinants perspective.[26,27] In general, the impact of such interventions (eg, housing, food, access to health and social services, education, employment, etc.) on health inequities were unclear. However, there was evidence suggesting that certain categories of interventions may have positive impact on disadvantaged groups, particularly interventions in housing and the work environment. Four key areas were identified: housing and community domains (eg, choosing where they live, such as in safe neighborhoods); work environment (eg, participatory committee interventions to increase employee control); transport and access to health and social care

services (eg, speed cameras to reduce collisions and casualties; improving geographic access to outreach clinics in primary care and rural hospital setting); unemployment and welfare, agriculture and food, water and sanitation (eg, welfare-to-work programs to improve employment opportunities; farmer's market coupons for fruits and vegetables to help control excess weight). Focused implementation research efforts could assist in determining how to optimally and sustainably implement solutions within these key areas.

The *Health Equity Task Force for Delivery and Payment Transformation* advances health care delivery and payment reform policies that promote health equity and the elimination of racial, ethnic, and geographic health care disparities.[28] In a recent report, the task force identified six key policy domains with the potential of transforming the health system to advance health equity including: payment systems that sustain and reward high quality; equitable health care; investments to support safety net and small community providers in delivering system reforms; building robust and well-resourced community partnerships; ensuring a transparent and representative evidence-base; equity-focused measurement that accelerates reductions in health inequities; and growing a diverse health care workforce that drives equity and value. They make the case that these efforts are not only the right thing to do but also the smart thing to do because the ultimate outcome will be services of higher quality and effectiveness.[28]

In the United States, Medicaid health coverage for poor families is a joint federal and state-based program that provides free or low-cost health coverage to millions of Americans, including: low-income people, families and children, pregnant women, the elderly, and people with disabilities. This is an example of an intervention that directly targets the economic roots of health inequities, similar to approaches used in developing country settings.[29,30] The US government provides a portion of the funding and sets guidelines for the program.[31] The Children Health Insurance Program (CHIP), launched in the 1990s, has provided health coverage for children in households that have incomes that are higher than the financial eligibility threshold for Medicaid. CHIP has played a major role in achieving a high rate of health insurance coverage among America's children.[32] For nearly every health care element, including access, use, care, and other measures examined, CHIP enrollees have fared better than uninsured children. CHIP health care service delivery was similar to private coverage for most measures, although it was found that access to weekend and nighttime health care was not as good.[33] This is another example where efforts with implementation research could help refine optimal and sustainable approaches to deliver CHIP and other Medicaid-related investments tacking health inequities.

Schemes using pay-for-performance, which provide economic incentives to providers and health systems to improve quality, have been evaluated based on how they impact health equity. One systematic review of pay-for-performance found 22 studies, most of which were conducted in the UK.[34] The researchers examined the impact of the Quality and Outcomes Framework, a major national pay-for-performance scheme for primary care providers within the UK's National Health Service.[34,35] The evidence on whether financial incentives in service delivery reduced inequities in chronic disease management was weak. One US study[36] included in this review compared hospitals that had a share of African American patients exceeding 20% of hospital patients to those where African Americans accounted for <20% of hospital patients. The authors found that pay-for-performance on process measures for acute MI and community-acquired pneumonia did not improve.[36] A more recent study in the UK used a financial scheme that remunerated general practices for their performance in delivering a set of quality care elements for CVD risk reduction and hypertension treatment.[37] In contrast to earlier studies, over the 3-year study period, the gap between the quintile of least deprived and the most deprived narrowed from 4% to .8%. The authors concluded that their tailored financial incentive scheme had the potential to reduce inequalities in the delivery of clinical care, including CVD risk reduction and hypertension treatment. This tailored approach may account for the contrast from the findings of the earlier studies.

Some suggest that a focus on improving outcomes across the whole population, such as a pay-for-per-

formance approach, will worsen inequities.[38-41] This statement is worth consideration. The key element may be whether the economic incentive used for a high-risk approach results in those economically better off being more likely to be identified and treated. Worsening inequities have been reported from this approach when employing efforts focused on individual-targeted health screenings, healthy diet advice, smoking cessation, statin and anti-hypertensive prescribing, and adherence.[42] Alternative approaches that employ population-wide policies that promote CVD prevention and include legislation for smoke-free public spaces, banning dietary trans-fats, or lowering daily dietary salt intake, can generally be effective, cost-saving, and are increasingly being found to reduce health inequities.[42] These can be driven by economic incentives such civil fines, large consumer demand and greater market share, etc. In order for high-risk approaches to be successful in reducing inequity gaps and economic burden, others suggest that these risk approaches must be adapted to include greater intensity and more aggressive targets and investments among the disadvantaged populations than the entire population.[14,25]

Can a "business case" be made for addressing health inequities? While we don't know the answer, this issue was recently explored using six case studies with diverse private-sector health provider and payer organizations.[43] All providers and payers cited business rationales for initiating equity-focused efforts. The underlying motivation driving their commitment to addressing health inequities included five key domains: market and environment – external pressures to pursue health inequities; risk mitigation and compliance from legal actions; financial factors such as enhanced reimbursement and decreased costs; community reputation and marketing appeal; and quality improvement and service delivery in order to achieve better outcomes. For provider organizations, the most common motivation was market and environment, community reputation, and marketing appeal. All the payer organizations cited financial and quality improvement/services as their rationales. Both provider and payer organizations noted that inequity-focused efforts depended on organizational willingness to allocate resources, which is a challenge given competing needs and, in some cases, commercial imperatives. Finally, while economic data may be used in decision-making for health interventions and technologies, the challenge remains on how well economic evaluation in one context can be applicable in other contexts.[44]

Opportunities for Implementation Research

Implementation research can play an important role in helping to refine efforts to reduce health inequities. Implementation research uses rigorous study methods to test implementation strategies and determine optimal and sustainable means to deliver proven-effective interventions.[45] It is conducted within real world conditions and contexts, rather than controlling conditions or removing their influence on causal effects. It has specific key outcomes including: acceptability, adoption, appropriateness, costs, feasibility, fidelity, penetration, and sustainability.[46] The economics research lens aligns with implementation research areas such as costs and sustainability. Acceptability and feasibility are also likely driven by behavioral economic forces. Implementation research can help explain the economic context and incentives that drive behaviors and allow better characterization of the economic benefits gained.

Implementation research can play an important role in helping refine efforts to reduce health inequities.

NHLBI's recently developed Strategic Vision is providing research directions for the next decade. A major element is to reduce health inequities.[47] In 2014, NHLBI created the Center for Translation Research and Implementation Science (CTRIS) within NHLBI. This center is taking proven-effective interventions from NHLBI biomedical research investments and others from the research community and determining optimal and sustainable delivery strategies to deliver

them within communities burdened with high inequity. These strategies, when widely adopted, will have population-level impact and bring a return on the biomedical research investments.[48] In 2017, NHLBI convened a workshop that engaged a multidisciplinary group of experts to discuss, develop, and prioritize themes and strategies aligned with the NHLBI mission to reduce disparities using community engagement and implementation research frameworks.[49] Many opportunities for implementation research were identified and are being considered.

Conclusion

An economics lens used to analyze health inequities provides not only broad understanding of the challenges but better understanding of potential solutions. It is critical that health researchers engage and partner with the economics research community in tackling health inequities for heart, lung, blood, and sleep disorders. Such partnerships among implementation researchers and the economic research community will help address persistent health inequities within the United States. Implementation research efforts will take what we know is working and will help to determine optimal and sustainable strategies for delivering interventions among communities experiencing large health inequity burdens. By the nature of this type of research, stakeholders at all levels of the socioecological spectrum will be engaged in prioritizing and studying implementation strategies that are most likely to succeed. In addition, this broad group includes those who will be implementing the research findings, making adoption, uptake, and sustainability much more likely.

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Conflict of Interest

No conflicts of interest to report.

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Research concept and design: Engelgau, Zhang, Jan; Acquisition of data: Engelgau, Zhang; Data analysis and interpretation: Engelgau, Zhang, Mahal; Manuscript draft: Engelgau, Jan, Mahal; Statistical expertise: Engelgau; Acquisition of funding: Engelgau; Administrative: Engelgau, Jan, Mahal; Supervision: Engelgau

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