

Economic Prosperity and Cardiovascular Mortality Further Evidence That All Policy Is Health Policy

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Numerous factors are known to contribute to cardiovascular disease prevalence and outcomes, including those related to lifestyle, family history and genetics, and clinical care. However, economic factors, such as those involving wealth, prosperity, employment, and power, also might influence health outcomes, including for cardiovascular disease.



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For instance, the Whitehall study, a longitudinal investigation initiated in Britain in 1967 and designed to examine the epidemiology of and physiological risk factors associated with myocardial ischemia among 18 403 male British civil servants aged 40 to 64 years old,¹ found that smoking, elevated cholesterol levels, and high body mass indices were associated with higher cardiovascular mortality rates after just 5 years of follow-up.² After 7 years of follow-up, researchers also found that lower “employment grade” (eg, working as a messenger, ie, employees who attended to communications at the time by relaying them, as opposed to those who worked as an administrator) was associated with a higher prevalence of risk factors related to cardiovascular mortality, but also, importantly, substantially higher mortality rates after adjusting for those mortality-related risk factors.³

In this issue of *JAMA*, the study by Khatana et al⁴ provides further evidence of the relationship between economic indicators and cardiovascular disease outcomes. The authors conducted a retrospective analysis of county-level cardiovascular mortality data among more than 102 million adults aged 40 to 64 years living in 3123 US counties from 2010 to 2017 and used 7 economic factors to identify how counties’ prosperity changed between baseline (2007-2011) and follow-up (2012-2016), including (1) housing occupancy rate, (2) ratio of the county median household income to state median household income, (3) proportion of 25- to 64-year-old adults working, (4) proportion of adults with a high school education, (5) proportion of the population with income above the poverty threshold, (6) percentage change in the number of business establishments, and (7) percentage change in the number of jobs between the first and last years of the time period. The investigators estimated the change in economic prosperity by ranking counties according to the change in each of these markers (on a scale from 0 to 100) and calculated an unweighted mean of these ranks.

Based on analysis of 979 228 cardiovascular deaths that occurred between 2010 and 2017, age-adjusted cardiovascular mortality rates did not change significantly for counties in

the lowest tertile of change in economic prosperity (mean annual percentage change [APC], 0.2% [95% CI, -0.3% to 0.7%]), but decreased significantly in counties in the intermediate tertile and highest tertile for change in prosperity (mean APC, -0.4% [95% CI, -0.8% to -0.1%] and -0.5% [95% CI, -0.9% to -0.1%], respectively). The authors also reported that, after adjustment for baseline prosperity and demographic and health care-related variables, a 10-point higher mean rank for change in economic prosperity was associated with a 0.4% (95% CI, 0.2% to 0.6%) additional decrease in cardiovascular mortality per year. Improvements in local economic prosperity were associated with relative decreases in cardiovascular mortality rates, ischemic heart disease mortality rates, and all-cause mortality rates, irrespective of race, ethnicity, and sex. For counties in which any of the individual economic prosperity markers improved (except for the proportion of adults with a high school education), cardiovascular mortality rates declined.

Using similar measures of local economic prosperity, previous cross-sectional studies found evidence that, among Medicare fee-for-service beneficiaries, living in more prosperous areas was associated with higher health care quality, lower mortality rates, greater receipt of recommended services, lower admission rates for ambulatory care-sensitive conditions, lower overall per-capita health care expenditures, and lower costs at the end of life.⁵⁻⁸

While none of these investigations were randomized trials, they draw on ecologic studies and begin to outline the timing and magnitude of returns to health that could potentially be realized from investments in economic prosperity. Among younger adults as well as older adults in the US, improving economic prosperity is associated with substantial reductions in mortality rates and cardiovascular events over a relatively short period. Further, these findings underscore substantial differences in health care delivery between lower and higher prosperity areas: in low prosperity areas, health care is more costly per capita, is replete with waste (as evidenced by higher incidence of avoidable admissions), is of lower quality, and is less likely to involve delivery of recommended services (such as flu vaccination). To be sure, individuals living in low prosperity areas have higher baseline mortality risks and rates; however, given that mortality has a floor (ie, can only go to zero and will never reach that level), the reality that high prosperity mortality rates fell highlights the widening health performance gap between those living in highly prosperous and less prosperous areas.⁴

Because vulnerable populations that live in less prosperous areas are more likely to work in low-wage occupations, they

have been more severely affected by the economic hardship created by the coronavirus disease 2019 pandemic.⁹ The findings reported by Khatana et al⁴ also suggest that without economic intervention, health disparities experienced by vulnerable populations might widen as a consequence. This may require federal intervention; however, the economic shocks that have resulted from the pandemic have seemingly reduced the appetite for investing in Economic Opportunity Zones in which those populations reside.¹⁰

Additional pragmatic research is required to determine the degree to which relationships between prosperity and mortality persist and, importantly, their mechanisms: does relative economic growth merely attract healthier individuals from less prosperous places, populating the increasingly prosperous place with more robust individuals and leaving less prosperous places with populations that have more illness, more illness severity, and are perhaps involuntarily immobile? Further, studies that focused on relative economic growth raise a concern that only by bettering a competitor county can both prosperity and health apparently be improved, and, therefore, improvement across all counties is not possible. To the degree possible, such research should use rigorous methods, including randomization among matched control areas, longitudinal approaches of tracking participants over very long periods (such as with the Whitehall and Framingham studies), and multifaceted individual-level data collection that would allow researchers to understand the relative importance of other important economic variables, such as income supplements, food security, local economic opportunities, housing availability, risk behaviors, and other social determinants of health for particular demographic or psychographic market segments. In the future, it is possible that precision population health efforts could leverage such data and thereby reduce inefficiencies and waste in the distribution of social and support services, better meet the needs of the population, and improve the population's health by iden-

tifying which interventions work for which population subgroups in which areas.

Policymakers, funding agencies, and new public-private partnerships should seize this opportunity to fund studies that can better identify which type of local economic investment in less prosperous areas provide the greatest improvement in cardiovascular health. At a minimum, those potential partners could include communities (that could benefit from a healthier population and more attractive economic conditions), health care insurers (that might experience lower per-capita health care expenditures, given fewer events), risk-bearing health care delivery organizations (that might be encouraged to further improve the population's health by investing in integrated care delivery, adopting technologies that allow for data aggregation and continuous improvement, and exploiting payment schemes that reward waste avoidance), and businesses (that might benefit from the greater discretionary income afforded those who have fewer health care outlays and live longer). Such research will be critical for creating effective and sustainable collaborative investments across these strange bedfellows.

Disparities that the coronavirus disease 2019 pandemic have highlighted present opportunities that must not be wasted. It is imperative that city, state, and federal policymakers support direct and indirect mechanisms to address the severe shortcomings of the US health care system by funding additional research, leveraging ongoing community efforts to address social inequities,¹¹ and developing public-private alliances that can continue the work into the future. Directly stimulating sustainable economic growth in low prosperity areas, incentivizing coalitions of investors that can rebuild those areas, and improving access to high-quality care in low prosperity areas hold promise for improving the health of the population, reducing health care waste, and potentially propelling the US into a more perfect, more tranquil, and more equitable union.

ARTICLE INFORMATION

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REFERENCES

1. Reid DD, Brett GZ, Hamilton PJ, Jarrett RJ, Keen H, Rose G. Cardiorespiratory disease and diabetes among middle-aged male civil servants: a study of screening and intervention. *Lancet*. 1974;1(7856):469-473. doi:10.1016/S0140-6736(74)92783-4
2. Rose G, Hamilton PS, Keen H, Reid DD, McCartney P, Jarrett RJ. Myocardial ischaemia, risk factors and death from coronary heart-disease. *Lancet*. 1977;1(8003):105-109. doi:10.1016/S0140-6736(77)91701-9
3. Marmot MG, Rose G, Shipley M, Hamilton PJ. Employment grade and coronary heart disease in British civil servants. *J Epidemiol Community Health* (1978). 1978;32(4):244-249. doi:10.1136/jech.32.4.244
4. Khatana SAM, Venkataramani A, Nathan AS, et al. Association between county-level change in economic prosperity and change in cardiovascular mortality among middle-aged US adults. *JAMA*. Published January 26, 2021. doi:10.1001/jama.2020.26141
5. Weeks WB, Ouayogodé MHL, Weinstein JN. Association between a measure of community economic distress and Medicare patients' health care utilization, quality, outcomes, and costs. *J Gen Intern Med*. 2018;33(9):1433-1435. doi:10.1007/s11606-018-4478-7
6. Weeks WB, Cao SY, Lester CM, Weinstein JN, Morden NE. Association between community economic distress and receipt of recommended services among Medicare fee-for-service enrollees. *J Gen Intern Med*. 2019;34(12):2731-2732. doi:10.1007/s11606-019-05076-6
7. Weeks WB, Ouayogodé MHL, Ventelou B, Mackenzie T, Weinstein JN. Community economic distress and changes in Medicare patients' end-of-life care costs. *J Palliat Med*. 2018;21(6):742-743. doi:10.1089/jpm.2018.0047
8. Weeks WB, Weinstein JN. Per-capita Medicare expenditures, primary care access, mortality rates, and the least healthy cities in America. *Am J Med*. 2017;130(1):101-104. doi:10.1016/j.amjmed.2016.08.013
9. Deloitte. COVID-19's impact on US income inequality: it's going to get worse before it gets better. Published July 23, 2020. Accessed December 12, 2020. <https://www2.deloitte.com/us/en/insights/economy/issues-by-the-numbers/covid-19-impact-on-income-inequality.html>
10. Economic Innovation Group. State of the opportunity zones marketplace: the impact of COVID-19: findings from EIG's national survey of opportunity zones stakeholders. Accessed August 15, 2020. <https://eig.org/news/state-of-the-opportunity-zones-marketplace-oz-survey>
11. National Academies of Sciences, Engineering, and Medicine. *Communities in Action: Pathways to Health Equity*. National Academies Press; 2017.