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Measuring Cardiovascular Health Over the Life Course: A Lesson From Economics

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Economists and other social scientists have a long-standing interest in measuring intergenerational mobility, or the degree to which children's economic opportunities hinge on the economic status of their parents. The traditional approach is the intergenerational income elasticity coefficient (technically, the relationship between the logged family income of the grown child and the logged family income of the parents). The coefficient, which generally falls in the range 0 to 1, represents the average fraction of income that is transferred from one generation to the next. The lower the intergenerational income elasticity, the less an individual's income depends on the income of his or her parents.

In the United States, estimates of the intergenerational income elasticity coefficient typically have averaged ≈0.4, meaning that if 2 families have incomes that differ by 10%, their children's income will differ by ≈4%.[1,2] However, because the logged specification is nonlinear and also is sensitive to small levels of income, estimates have tended to vary considerably from the average. This has led to more recent interest in alternative measures of intergenerational mobility that focus not on income per se but on relative position in the distribution of income. These estimates tend to be more stable across specifications and samples, including those containing parents who have periods of zero earnings.[3] Of particular interest among economists is the intergenerational rank association or "rank rank slope" method, which quantifies the association between parents' percentile rank in the earnings distribution and their grown children's percentile rank. These measures, which also range from 0 to 1, have produced somewhat smaller estimates of income mobility, on the order of 0.30 to 0.34, and lower for daughters.[3,4] Although there is disagreement over whether these estimates are more accurate,[5] it is evident that the United States ranks lower than most Organisation for Economic Co-operation and Development countries in intergenerational income mobility.[6]

In this issue of *Journal of the American Heart Association* (*JAHA*), Pollock and colleagues take an innovative approach to the epidemiological characteristics of cardiovascular disease (CVD) by applying the rank rank slope method to a study of intragenerational cardiovascular risk mobility.[7] Using cohort data on 7624 individuals from the Bogalusa Heart Study, which spanned the life course from childhood through adulthood, the authors regressed adult CVD risk percentile on the CVD risk percentile occupied by those individuals during childhood. The main finding is that over an average of 34 years, cardiovascular risk mobility rank rank slope was 0.15 measured from the mean age of 10.1 years.

The study by Pollock et al[7] is a novel application of a technique that ordinarily is not used outside of economics. As noted by the authors, a benefit of applying this method in epidemiology not realized in economics studies is availability of person-level data for inclusion as additional controls. Rank association also is better suited to study of cardiovascular risk mobility compared with the traditional intergenerational income elasticity approach because the latter can be strongly influenced by changes across generations, a concern herein because CVD risk varies much more among adults than among children.

Pollock and colleagues[7] offer a fresh perspective that complements more conventional ways of thinking about CVD risk by laying emphasis on room for CVD risk modification over the life course. The authors find that, unlike lagging intergenerational income mobility, an individual's outlook for cardiovascular health in adulthood has little to do with childhood CVD risk factors. In fact, only ≈3% of the variation in adult CVD risk percentile ranking was explained by childhood CVD percentile. The authors conclude with the point that children with the best relative CVD profiles may have only a slim advantage over their peers. The counterpart to this notion is that those who have poor CVD profiles as children have broad opportunity for reducing their risk into adulthood. This is heartening information and raises the following question: if not the birth lottery, then what?

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The authors rightly point out that epidemiological research is informative to policymakers in understanding health equality. However, the implications are incomplete without addressing the question of what does account for variation in CVD in the adult population. Although CVD risk factors are numerous and have been recognized for many years, heart disease is still highly prevalent in the United States and remains the leading cause of death for both men and women. Approximately half of Americans have high blood pressure, high low-density lipoprotein cholesterol, or smoke, 3 of the key CVD biomarkers and associated behaviors.[8] Individual choice in adopting healthy behaviors around diet, exercise, alcohol, and smoking explain much of the variation in cardiovascular health compared with other diseases, such as cancer, where chance or plain ill-fated luck plays a significant role. One could conclude from this that reducing CVD risk is up to the individual and lies outside the domain of regulation and policy. But that, too, would be an unfinished narrative.

The main conclusion of the study by Pollock et al[7] is that there is substantial cardiovascular risk mobility, supporting the paradigm that life course is highly modifiable. In discussing these findings, the authors also perceptively note that control of CVD has not been spread evenly across the population. A recent study of >17 000 individuals found no change in 10-year predicted absolute CVD risk, systolic blood pressure, or smoking among individuals at or below the federal poverty level but decreases in these outcomes within the high-income stratum.[9] Scholarly observations at the broader societal level note that health status develops within the social and economic framework of communities, reflecting the notion that poor health status is related to low income.[10] Compared with other developed countries, the United States places high emphasis on medical versus social spending, even though it is well documented that social services, such as education, food, and housing, have a great impact on health.[11]

The collective lesson of these studies is that even though the CVD risk profile of youth does not predict adult CVD profile, the income class one is born into makes controlling it much more difficult. Yet, contrary to the common perception of the United States as the "land of opportunity," economic research shows that income mobility in the United States is relatively low and has remained stable over recent decades.[4] What is even more troubling is that income disparity has increased over this period such that consequences of the economic birth lottery are larger than in the past.[12] The policy message that emerges herein is that cardiovascular health and health status mobility more generally are embedded in the socioeconomic fabric of our society. In the face of increasing healthcare costs and a climate of growing disinterest in expanding health insurance, achieving it will be a considerable challenge for many people.

Disclosures

None.

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