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NATIONAL BUREAU OF ECONOMIC RESEARCH

BULLETIN ON AGING AND HEALTH

The Effect of Prescription Drug Insurance on Utilization and Health among the Elderly

Medicare was first established in 1965, providing near-universal coverage of hospital and physician services for seniors. However, it was not until nearly forty years later that seniors obtained the same widespread access to prescription drug coverage, with the passage of the Medicare Prescription Drug, Improvement, and Modernization Act of 2003 (MMA).

Earlier studies established that prior to the passage of this act, many seniors had difficulty paying for the medications prescribed to them by their doctors. For example, one survey found that more than half of diabetes and heart disease patients without drug coverage skipped doses or failed to fill prescriptions due to cost.

The primary goal of the MMA was to increase access to prescription drugs for the elderly and thereby improve their health. Yet there is limited evidence to support an effect of drug coverage on prescription drug utilization or on health among the elderly.

In “**Prescription Drug Insurance and Its Effect on Utilization and Health of the Elderly**” (NBER Working Paper 12848), researchers **Nasreen Khan**, **Robert Kaestner**, and **Swu Jane Lin** aim to fill this gap.

The authors’ basic approach is to test whether seniors with drug insurance coverage differ from those lacking coverage in their prescription drug use, hospitalizations, and health. The authors use the Medicare Current Beneficiary Data for the years 1992 through 2000 for their analysis. This is a nationally representative survey of Medicare beneficiaries that follows respondents for four years and links self-reported survey data with Medicare claims data.

To account for the possibility that prescription drug coverage is non-random—for example, that those who expect high drug expenditures are more likely to have coverage, or that those who have coverage happen to be a healthier slice of the population than average—the authors estimate models with individual fixed effects. This amounts to asking whether, for a given individual, obtaining or losing drug coverage has any effect on health utilization and health. This approach is valid so long as movements in and out of drug coverage are not related to changes in expected drug utilization or health.

The authors show that such movements in and out of drug coverage are quite frequent—on average, 12 percent of their sample either gained or lost coverage each year. They also examine whether movements into drug coverage are associated with rising drug use or declining health just before the switch is made. They find no evidence that those obtaining drug coverage do so in response to a significant change in drug use or in health.

The authors first look at the effect of drug coverage on prescription drug utilization. They find that having drug coverage is not associated with a significant increase in the probability of having a prescription filled. This is true regardless of the source of the drug coverage—public program, employer-sponsored program, HMO coverage, or Medigap policy. Turning to the annual number of prescriptions dispensed, they find that drug coverage has a significant though moderate effect on utilization. For example, having coverage through a public program increases the number of prescriptions filled by 13 percent, while having coverage through

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an employer-sponsored or HMO plan did so by 6 percent.

Next, the authors examine hospital admissions, in order to test whether having drug coverage allows beneficiaries to better manage their health problems and avoid costly hospitalizations. There is no evidence of any such effect in the short term, although it remains possible that there is an effect in the longer term, something the authors cannot easily test with their approach.

Finally, the authors explore the effects of drug coverage on health, using both self-reported health status and the ability to perform activities of daily living as measures of health outcomes. They find little evidence that prescription drug coverage is associated with an improvement in these measures of health, although they note that it would also be useful to look at disease-specific outcomes, such as reduction in blood pressure for hypertensive patients.

They authors consider the hypothesis

that the effects of drug coverage may be larger for economically disadvantaged individuals, who are more likely to be in poor health and may be less able to purchase drugs in the absence of insurance. However, results for this group are quite similar to those for the entire sample.

In summary, the authors find only a

modest effect of prescription drug coverage on drug utilization and no evidence of a beneficial effect of coverage on hospital admissions and health outcomes. The authors suggest several possible reasons for the lack of an effect on health. One is that increased drug utilization could result in a greater number of side effects and adverse events. A second pos-

sibility is that some drugs may be prescribed inappropriately or that the beneficiary may not comply with the prescribed therapy. The authors conclude that simply providing drug coverage may not be sufficient to improve health and that “other interventions such as improving prescribing and adherence to medication therapy...are warranted.”

Does Watching Television Trigger Autism?

Autism is a disorder that typically manifests itself in early childhood and is characterized by “markedly abnormal or impaired development in social interaction and communication and a markedly restricted repertoire of activity and interests,” according to the *Diagnostic and Statistical Manual of Mental Disorders*. Diagnoses of autism have risen dramatically over the past few decades, from an estimated one in 2500 children thirty years ago to one in 150 today. As a result, autism has become a subject of great concern for parents, medical providers and researchers, and policy makers alike.

Despite the growing interest in autism, its causes are not well understood. It is widely accepted that genetics or biology plays an important role in the development of autism. However, many in the medical community believe that the increasing prevalence of autism points to a role for an environmental “trigger” that is becoming more common over time. Yet there is little consensus as to what the trigger (or triggers) might be.

With the recent explosion in television programming and videos aimed at very young children, exposure to electronic media may be one possible trigger. One study found that on a typical day, four out of five children aged 6 months to 6 years old use screen media (TV, videos and DVDs, computers, and video games), for an average of two hours per day. While similar statistics for earlier periods are hard to come by, it seems likely that young children are spending more time in front of the television today than they did in the past.

In “Does Television Cause Autism?” (NBER Working Paper 12632), researchers **Michael Waldman**, **Sean Nicholson**, and **Nodir Adilov** explore the hypothesis that “a small segment of the population is vulnerable to developing autism because of their underlying biology and that either too much or certain types of early childhood

television watching serves as a trigger for the condition.”

This theory has received little attention in the medical literature. It may seem like an unusual topic for a trio of economists to tackle, not only because of the subject matter but also due to the difficulty of identifying a causal relationship between television watching and autism. If watching more television is associated with higher rates of autism in the data, this does not prove that television is an autism trigger. There could be a third factor – for example, the child’s diet – that is correlated with both television watching and autism and is the real trigger. It could also be the case that children who are vulnerable to developing autism have a predilection for watching lots of television, so that the direction of causality runs from autism to television watching rather than the reverse.

The authors’ key contribution is to identify “natural experiments” that can be used to help establish a causal relationship between television watching and autism. The authors reason that children are likely to watch more television if they live in an area that gets more precipitation. If that is the case, then a finding that areas with higher levels of precipitation have higher autism rates would be strongly suggestive of a role for television watching as an autism trigger, particularly if precipitation levels essentially vary randomly across areas that are otherwise quite similar.

The authors first use data from the American Time Use Survey to confirm the link between precipitation and television watching. The results suggest a strong relationship—a child under age 3 watches an average of 27 additional minutes of television on a day with one inch of precipitation (which is equivalent to a day of heavy rain) than on a day with no precipitation.

Next, the authors construct a county-level data set for California, Oregon, and Washington, three states with high precipi-

tation variation across counties. The data set includes information on autism rates among young school-age children and the average annual precipitation level when those children were ages 0 to 2, as well as control variables such as the county’s per capita income and racial makeup.

Using these data, the authors find that higher levels of precipitation are strongly associated with higher autism rates. To guard against the possibility that the correlation is coincidental (e.g., families with children prone to autism happen to locate in high precipitation areas for some unknown reason) the authors include county fixed effects. This amounts to asking whether within a given county, cohorts of children who experienced relatively heavy precipitation before age 3 subsequently had relatively high autism rates. The authors find that this is indeed the case.

While the results indicate that “there is a trigger for autism where exposure to this trigger is positively related with the amount of precipitation in the child’s community prior to the age of three,” it does not prove that television watching is the trigger, since there could be other indoor activities that children are also more likely to engage in when it rains. As another way to test their hypothesis, the authors explore whether the share of households in a community with subscriptions to cable television is positively correlated with autism rates. They find that it is, and that this correlation cannot be explained simply by the fact that both cable subscriptions and autism rates were rising over the study period, since communities where subscription rates grew faster experienced faster growth in autism rates as well.

The study’s findings suggest a quantitatively important role for television viewing in autism diagnoses. The authors estimate that 38 percent of autism diagnoses can be attributed to the additional television watching that occurs due to precipitation and that

17 percent of the increase in autism rates over a twenty-year period is due to the growth of cable households and subsequent increase in early childhood television watching.

The authors caution “although our findings are consistent with our hypothesis, we do not believe our findings represent definitive

evidence for our hypothesis. We believe the only way to establish definitively whether or not early childhood television watching is a trigger for autism is to more directly test the hypothesis.” Nonetheless, they suggest that until more research can be conducted, it may be prudent to place additional emphasis

on the recommendations of the American Academy of Pediatrics that early television watching should be eliminated or at least quite limited. The authors note “we see little downside in taking this step and a very large upside if it turns out that television indeed causes autism.”

Retirement Security of the Baby Boomers: the Role of Financial Literacy and Planning

The large “Baby Boom” generation (traditionally defined as those born between 1946 and 1964) is now on the cusp of retirement, with the first Boomers due to become eligible for Social Security next year. This generation has experienced a number of events that could affect its financial preparedness for retirement, including the 1983 Social Security amendments that raised the normal retirement age, the ongoing shift from defined benefit to defined contribution pensions, and recent boom and bust cycles in equity and housing markets.

To ensure adequate resources in retirement, Boomer households must save and plan for retirement during their working years. Yet in order to do so successfully, households must understand a number of key economic concepts including present values and the difference between real and nominal amounts, and they must also be able to make projections of future wages, pensions and social security benefits, retirement ages, and survival probabilities. Despite the fact that these are complex and demanding requirements, there has been little research on Boomer financial literacy.

In “**Baby Boomer Retirement Security: the Roles of Planning, Financial Literacy, and Housing Wealth**” (NBER Working Paper 12585), researchers **Annamaria Lusardi** and **Olivia S. Mitchell** explore the links between financial literacy, planning, and retirement saving adequacy. Specifically, the authors ask how financially prepared Baby Boomers are for retirement, whether more financially-literate individuals are more likely to plan for retirement, and whether planning affects wealth accumulation.

The authors use the Health and Retirement Study (HRS) for their analysis, a nationally representative survey of individuals over age 50. The survey interviewed

participants every two years and has added new cohorts over time. The authors compare two cohorts in their analysis, the “Early Baby Boomers” in 2004 (born 1948 to 1953), and the younger half of the original HRS cohort in 1992 (born 1936 to 1941). Thus, they compare respondents of the same age (51–56) in different periods of time.

The authors begin by examining the level and composition of wealth holdings of these cohorts nearing retirement. The typical early Boomer household had a net worth of \$152,000 in 2004, excluding Social Security and defined benefit pensions. Wealth proves to be highly skewed, with the household at the 75th percentile of the distribution having more than 10 times the wealth of the household at the 25th percentile, \$400,000 vs. \$36,000. There are also stark differences in wealth by socio-economic group, with less-educated, Black, Hispanic, and non-married households having sharply lower net worth.

The Boomer cohort is generally wealthier than was the earlier HRS cohort at the same age, although Boomer households in the lowest quartile are less well off. The primary reason the Boomer cohort is better off is that it has more housing equity: Mean housing wealth for Boomers is about 50% higher than for the earlier cohort. However, Boomers also appear to be relying more on their housing equity. The typical Boomer household holds nearly half of its wealth in the form of housing equity, and even the richest households hold one-third of their wealth in housing. This leaves Boomers vulnerable in the event of a housing bust: the authors estimate that a return to 2002 house prices would lower the typical Boomer household’s net worth by 14 percent.

Next, the authors explore the extent of financial planning among these households. When Boomers were asked whether they had thought about retirement, over one-

quarter responded “hardly at all.” Interestingly, those who reported that they undertook any planning, even “a little,” had wealth holdings over twice as large as that of nonplanners. The authors also find that less-educated and non-White households are much more likely to be nonplanners.

One reason people may fail to plan is because they are financially unsophisticated. In prior research, the authors showed that half of survey respondents could not make a simple interest rate calculation and did not know the difference between nominal and real interest rates; an even larger percentage did not realize that holding a single company stock is more risky than holding a stock mutual fund. In this paper, they again find that many Boomers are unable to make simple economic calculations, in particular when it relates to interest compounding.

The authors make use of the HRS data on planning and financial literacy to explore the link between the two. They find that financial literacy is important for planning. For example, being able to answer a question on compound interest correctly is associated with a 10 to 15 percentage point increase in the probability of being a planner.

Finally, the authors examine the effect of planning on wealth. They find that planning has a strongly positive effect on wealth, even after accounting for demographic factors like education and race. Their estimates suggest that those who plan accumulate nearly 20% more in net worth.

A possible alternative explanation for the findings is that wealthier households might plan more since they have more to gain from planning. To address this possibility, the authors look for an effect of wealth on planning, using regional differences in house price appreciation as a source of unexpected changes in wealth. They fail to find any effect, suggesting that the direction of causality like-

ly runs from planning to wealth.

In summary, Lusardi and Mitchell find that Boomers are standing on the verge of retirement with higher levels of net worth than the earlier cohort, primarily because they have higher housing wealth. But the poorest Boomers are worse off than their earlier counterparts, and wealth remains very

low for Black, Hispanic, and the least educated Boomers. Planning appears to be strongly linked to financial literacy and it is an important determinant of household net worth at retirement. The authors conclude that there may be a role for firms to offer their employees retirement seminars and pension plan advice, to jump-start the retirement saving

process and help those at risk of not preparing adequately for retirement.

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NBER Profile: W. Kip Viscusi

W. Kip Viscusi is a Research Associate at the NBER. He is affiliated with the NBER's programs on Law and Economics and Health Care.

Viscusi is the University Distinguished Professor of Law, Economics, Management at Vanderbilt University. Before coming to Vanderbilt he was the John F. Cogan, Jr. Professor of Law and Economics and the Director of the Program on Empirical Legal Studies at Harvard Law School. He has also been Professor of Economics at Duke University and Northwestern University.

Professor Viscusi's research focuses on individual and societal responses to risk and uncertainty. He has published over 20 books and 250 articles, including *Fatal Tradeoffs* (1994) and *Smoke-Filled Rooms: A Postmortem on the Tobacco Deal* (2002). He is a four-time recipient of the Kulp-Wright Award for Outstanding Book on Risk and Insurance from the American Risk and Insurance Association. He was ranked as the leading contributor to the risk and insurance literature by the *Journal of Risk and Insurance* in 1998 and as the leading contributor to

the health economics literature by *Health Economics* in 2003.

Viscusi's estimates of the value of risks to life and health are currently used throughout the Federal Government. He has served as a consultant on these issues for many U.S. government agencies, including the Office of Management and Budget, the Environmental Protection Agency (EPA), the Occupational Health and Safety Administration, and the Department of Justice. He has been a member of the EPA's Science Advisory Board and is currently on the EPA's Homeland Security Committee.

Viscusi is the Founding Editor of the *Journal of Risk and Uncertainty* and has served on the editorial board of many other journals, including the *American Economic Review* and the *Review of Economics and Statistics*.

He received a A.B. in economics summa cum laude from Harvard, where he also received his A.M. in economics, M.P.P. in public policy, and Ph.D. in economics.

Viscusi and his wife, the economist Joni Hersch, spend their vacation time at



their home in Steamboat Springs, Colorado, which they designed and for which they also served as general contractors. There they pursue a variety of outdoor interests, including downhill skiing, snowshoeing, mountain biking, hiking, and running.

Abstracts of Selected Recent NBER Working Papers

WP 12595

Kosali I. Simon, Claudio Lucarelli

What Drove First-Year Premiums in Stand-Alone Prescription Drug Insurance?

Medicare's Part D offers heavily subsidized new

drug coverage to 22.5 million seniors to date, of whom 16.5 million are in stand-alone drug plans (Department of Health and Human Services, 2006). The government delegated the delivery of the benefit to private insurance companies arguing that market incentives would lead them

to provide coverage at the lowest price possible. The massive entry of plans and the large variety of actuarial designs and formularies offered make it complicated to assess how insurers set premiums during this first year of the program. This paper presents the first econometric evidence on

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whether premiums in the stand-alone drug plan markets are driven by the relevant factors predicted by insurance theory. Using data gathered from the Centers for Medicare and Medicaid Services, we measure a plan's generosity as the simulated out of pocket payments for different sets of drugs. We also identify the listed full drug prices by each insurer and merge these with other plan and geographical characteristics to test predictions about how insurers set premiums. We find evidence that a) the number of insurers in a market is big enough such that it does not appear to influence premiums, b) the full drug prices listed appear to be reflected to some degree in the premiums charged c) plan characteristics such as the provision of extra coverage are reflected in higher premiums, but overall there is a weak relationship between premiums and simulated out of pocket payments for different sets of drugs d) the institutional setting and regional market characteristics affect the firms' bidding behavior and their resulting premiums. Insurers appear to have responded strongly to program incentives such as the automatic enrollment of dual Medicaid-Medicare beneficiaries into low cost plans. As data for 2007 are made available, it will be important to see if plans follow similar pricing strategies in subsequent years of this program.

WP 12621

David E. Bloom, David Canning, Rick Mansfield, Michael Moore
Demographic Change, Social Security Systems, and Savings

In theory, improvements in healthy life expectancy should generate increases in the average age of retirement, with little effect on savings rates. In many countries, however, retirement incentives in social security programs prevent retirement ages from keeping pace with changes in life expectancy, leading to an increased need for life-cycle savings. Analyzing a cross-country panel of macroeconomic data, we find that increased longevity raises aggregate savings rates in countries with universal pension coverage and retirement incentives, though the effect disappears in countries with pay-as-you-go systems and high replacement rates.

WP 12623

Christopher C. Afendulis, Daniel P. Kessler
Tradeoffs from Integrating Diagnosis and Treatment in Markets for Health Care

What are the important tradeoffs in consulting a single expert for both diagnosis and treatment? On one hand, an integrated diagnostician may have the incentive to recommend treatments that are not in the buyer's best interests. On the

other hand, joint production of diagnosis and treatment by an integrated diagnostician may be more efficient. We examine an important special case of this problem: the costs and health outcomes of elderly Medicare beneficiaries with coronary artery disease. We compare the empirical consequences of diagnosis by an "integrated" cardiologist—one who can provide surgical treatment—to the consequences of diagnosis by a non-integrated cardiologist. Diagnosis by an integrated cardiologist leads, on net, to higher health spending but similar health outcomes. The net effect contains three components: reduced spending and improved outcomes from better allocation of patients to surgical treatment options; increased spending conditional on treatment option; and worse outcomes from poorer provision of non-surgical care. We conclude that accounting more completely for doctors' incentives to refer patients in setting reimbursements, or in the alternative, allowing doctors more freedom to make and receive payments for referrals, could reduce spending and improve quality.

WP 12642

Marianne Bitler, Hilary W. Hoynes
Welfare Reform and Indirect Impacts on Health

The stated goals of welfare reform are to increase work, reduce dependency on welfare, reduce births outside marriage, and to increase the formation of two parent families. However, welfare reform may also have indirect impacts on health. We provide a comprehensive review of the literature on the impacts of welfare reform on health. We illustrate the main findings from the literature by presenting estimates of the impact of reform on health insurance, health utilization, and health status using data from five state waiver experiments. The most consistent finding is that welfare reform led to a reduction in health insurance coverage. The impacts on health care utilization and health status tend to be more mixed and fewer are statistically significant. While the results are not conclusive, they suggest that welfare-to-work programs need not have large negative health effects.

WP 12643

Richard G. Frank, Thomas G. McGuire, Sharon-Lise Normand
Cost-Offsets of New Medications for Treatment of Schizophrenia

Broad claims are frequently made that new medications will offset all or part of their costs by reducing other areas of Medicaid spending. In this paper we examine the net impact on spending for new drugs used to treat schizophrenia.

We extend research in this area by taking a new approach to identification of spending impacts of new drugs. We specify and estimate models of spending on treatment of schizophrenia using 7 years of Florida Medicaid data. The estimates indicate that use of the new drugs result in net spending increases. This may be due to increased adherence to treatment.

WP 12659

John Beshears, James J. Choi, David Laibson, Brigitte C. Madrian
Simplification and Saving

Many financial decisions that individuals face are complicated and daunting for those who are not financial experts. One important consequence of this complexity is that individuals procrastinate in making these decisions. In this paper, we evaluate a low-cost intervention designed to simplify the retirement saving decision. Individuals received the opportunity to enroll in their workplace savings plan at a pre-selected contribution rate and asset allocation. By collapsing a multidimensional set of options into a binary choice between the status quo and the pre-selected alternative, this intervention increases participation rates by 10 to 20 percentage points among affected employees. We find that similar mechanisms can be used to increase contribution rates among employees who are already participating.

WP 12674

James Banks, Michael Marmot, Zoe Oldfield, James P. Smith
The SES Health Gradient on Both Sides of the Atlantic

Looking across many diseases, average health among mature men is much worse in America compared to England. Second, there exists a steep negative health gradient for men in both countries where men at the bottom of the economic hierarchy are in much worse health than those at the top. This health gradient exists whether education, income, or financial wealth is used as the marker of one's SES status. These conclusions are maintained even after controlling for a standard set of behavioral risk factors such as smoking, drinking, and obesity and are equally true using either biological measures of disease or individual self-reports. In contrast to these disease based measures, health of American men appears to be superior to the health of English men when self-reported general health status is used. The contradiction most likely stems instead from different thresholds used by Americans and English when evaluating health status on subjective scales. For the same "objective" health status, Americans are much more likely to say that their health is good

than are the English. Finally, feedbacks from new health events to household income are one of the reasons that underlie the strength of the income gradient with health in England.

WP 12680

Michael D. Hurd, Susann Rohwedder Economic Well-Being at Older Ages: Income- and Consumption-Based Poverty Measures in the HRS

According to economic theory, well-being or utility depends on consumption. However, at the household level, total consumption is rarely measured because its collection requires a great deal of survey time. As a result income has been widely used to assess economic well-being and poverty rates. Yet, because households can use wealth to consume more than income, an income-based measure of well-being could yield misleading results for many households, especially at older ages. We use data from the Health and Retirement Study to find income-based poverty rates which we compare with poverty rates as measured in the Current Population Survey. We use HRS consumption data to calculate a consumption-based poverty rate and study the relationship between income-based and consumption-based poverty measures. We find that the poverty rate based on consumption is lower than the income-based poverty rate. Particularly noteworthy is the much lower rate among the oldest single persons such as widows. The explanation for the difference is the ability to consume out of wealth.

WP 12689

Joshua S. Graff Zivin, Harsha Thirumurthy, Markus Goldstein AIDS Treatment and Intra-household Re- source Allocations: Children's Nutrition and Schooling in Kenya

The provision of life-saving antiretroviral (ARV) treatment has emerged as a key component of the global response to HIV/AIDS, but very little is known about the impact of this intervention on the welfare of children in the households of treated persons. We estimate the impact of ARV treatment on children's schooling and nutrition outcomes using longitudinal household survey data collected in collaboration with a treatment program in western Kenya. We find that children's weekly hours of school attendance increase by over 20 percent within six months after treatment is initiated for the adult household member. For boys in treatment households, these increases closely follow their reduced market labor supply. Similarly, young children's short-term nutritional status—as measured by their weight-for-height Z-score—also improves dramatically. We argue that these treatment effects will be considerably larger when compared to the counterfactual scenario of no ARV treatment. The results provide evidence on how intrahousehold resource allocation is altered in response to significant health improvements. Since the improvements in children's schooling and nutrition at these critical early ages will affect their socio-economic outcomes in adulthood, the widespread provision of ARV treatment is likely to generate significant long-run macroeconomic benefits.

WP 12733

John F. Cogan, R. Glenn Hubbard, Daniel P. Kessler Evaluating Effects of Tax Preferences on Health Care Spending and Federal Revenues

In this paper, we calculate the consequences for health spending and federal revenues of an above-the-line tax deduction for out-of-pocket health spending. We show how the response of spend-

ing to this expansion in the tax preference can be specified as a function of a small number of behavioral parameters that have been estimated in the existing literature. We compare our estimates to those from other researchers. And, we use our analysis to derive some implications for tax policy toward HSAs.

WP 12735

Angus Deaton Global Patterns of Income and Health: Facts, Interpretations, and Policies

People in poor countries live shorter lives than people in rich countries so that, if we scale income by some index of health, there is more inequality in the world than if we consider income alone. Such international inequalities in life expectancy decreased for many years after 1945, and the strong correlation between income and life-expectancy might lead us to hope that economic growth will improve people's health as well as their material living conditions. I argue that the apparent convergence in life expectancies is not as beneficial as might appear, and that, while economic growth is the key to poverty reduction, there is no evidence that it will deliver automatic health improvements in the absence of appropriate conditions. The strong negative correlation between economic growth on the one hand and the proportionate rate of decline of infant and child mortality on the other vanishes altogether if we look at the relationship between growth and the absolute rate of decline in infant and child mortality. In effect, the correlation is between the level of infant mortality and the growth of real incomes, most likely reflecting the importance of factors such as education and the quality of institutions that affect both health and growth.

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