

## The dethronement of income as a cause of health: an essay\*

## O destronamento da renda como causa da saúde: um ensaio\*

Philip Musgrove<sup>1</sup>

<sup>1</sup> Deputy Editor, Health Affairs. 7500 Old Georgetown Road, Suite 600. Bethesda, MD 20814, USA.  
E-mail: pmusgrove@projecthope.org

### Abstract

*Income, whether of nations, groups or individuals, appears in many analyses to have a strong relation to health status and even to be the principal explanatory variable for health differences. Poor people tend to be sicker than average, and sick people tend also to be poorer than average. Of course, income is needed to buy the goods and services that contribute to protecting and improving health, but its importance has been overstated. Cross-sectional relations that ignore history exaggerate how much income matters for health. Income is "dethroned" as the king of explanations by four lines of evidence: (1) distribution matters more than totals or averages, and the distribution of financial protection through insurance, rather than the distribution of income, is particularly crucial; (2) historically, income growth by itself contributed little to health improvements; (3) it matters more, how rapidly and thoroughly people and nations adopt sound health interventions; and (4) some recent changes in lifestyle (diet and physical activity) that accompany income growth actually worsen health. These causes are especially relevant for infant and child health, somewhat less so for maternal health. The less important income is, the easier it is to improve health; so it is good news that countries and people need to escape from poverty, but they don't have to be rich to be healthy.*

### Resumo

*Renda, tanto de nações, grupos ou indivíduos, aparece em muitas análises como fortemente relacionada ao estado de saúde, além de ser a variável explanatória principal para a análise das diferenças em saúde. Pessoas pobres tendem a ser mais doentes que a média e pessoas doentes tendem a ser mais pobres do que a média. Certamente a renda é necessária para a compra de bens e serviços que contribuem para a promoção e melhoria da saúde, porém sua importância tem sido exagerada. Análises transversais que ignoram a história comentam exageros no quanto a renda é importante para a saúde. A renda é "destronada" como rainha das explicações em quatro linhas de evidências: (1) a distribuição da renda importa mais do que os totais ou médias e a distribuição da proteção financeira por meio da seguridade, melhor que a distribuição da renda, é particularmente crucial; (2) historicamente, o crescimento da própria renda contribui pouco para melhorias na saúde; (3) importa mais quanto rápida e completamente populações e nações adotam intervenções de saúde adequadas e (4) algumas mudanças recentes do estilo de vida (dieta e atividade física) que acompanham o crescimento da renda realmente agravam a saúde. Essas causas são especialmente relevantes para a saúde infantil e da criança um pouco menos para a saúde materna. Quanto menos importante a renda é, mais fácil será a melhoria das condições de saúde. É uma boa notícia saber que países e povos necessitam fugir da pobreza, mas não necessitam ser ricos para serem saudáveis.*

The opinions expressed here are the author's own; in particular, they do not represent the views of the journal Health Affairs or of members of its editorial staff.

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## Income as king

Look at almost any graph in a publication about public health, and there is a good chance that the variable on the x-axis will be income. I will even hazard a guess that income appears as the related or explanatory variable to whatever is on the y-axis, more often than any other characteristic. This is likely to be the case whether the units of observation and analysis are countries, individuals, or population groups defined by their place in the income distribution, and whether the data are presented as points or bubbles in x-y space or as bars pointing up or down from the horizontal axis. And it is likely to be true whether the y-axis shows life expectancy at birth, mortality rates or the incidence or prevalence of a particular disease or condition.

Up to a point, this dominance of income in explaining health is quite reasonable. Income (or consumption, or some measure of assets for a household such as are sometimes used to represent income because they are easier to estimate and subject to less transitory variation) really is related to almost anything else one can name. Even distant variables like temperature and rainfall show associations with GDP *per capita* across countries or regions. Living in the tropics generally implies living more poorly.<sup>1</sup> And it is well established that poverty greatly increases the risk of illness and early death, through several different channels. The reverse relation also holds-illness is a huge risk for impoverishment, whether through disability that prevents one from working, through an unaffordable cost of health care, or both. In any one year, catastrophic spending for health may affect anything from one to ten percent of households in a country, and that estimate does not even include the families who do not purchase health care because they cannot afford it.<sup>2</sup> Ill health is often the leading cause of becoming bankrupt or poor, whether in poorer countries like Vietnam<sup>3</sup> or even in a rich country, the United States.<sup>4</sup>

So income seems appropriately enthroned as the King of Explanations for differences in health risks and health *status*. From this it seems to follow that the route to better health leads through income growth, and especially to growth that reduces poverty. Life expectancy rises rapidly with average income, starting from very low levels, although the curve then flattens.<sup>5</sup> Money still can't buy immortality, but in the aggregate it seems it can buy longevity up to our species' biological potential.

## A shaky crown

The argument of this note is that the throne is tottering, that income is in fact much less important than these pieces of evidence suggest. Income will always matter, because-by definition-it is what allows us to buy those things that are good for our health. But income merely enables; it does not guarantee. And growth in income, while desirable for many reasons, is not always necessary for improved health. The unofficial motto of the Disease Control Priorities Project<sup>6</sup> sums it up: "Countries don't have to be rich to be healthy." The same is true of individuals and population groups, unless they are defined by ill health in the first place. This is clearly good news, because income growth is a slow and difficult business. Occasionally an economy can sustain *per capita* growth of seven or eight percent annually for a number of years, as China has done, but generally growth of even three or four percent over a long interval is hard to achieve. Health would improve very slowly if it depended only on income increasing at that rate, whereas in fact it has improved much more rapidly and extensively than rising incomes can account for.

Two questions arise, which the rest of this note will briefly discuss. First, why has income seemed such an all-powerful correlate or explanation of health *status*? That is, what was overlooked or under-appreciated that made income appear to be so crucial? Second, what changes in our understanding are leading to its dethronement? That is, what logic and what evidence are showing that those neglected factors deserve credit that used to be granted to income?

## The importance of history

Let me ask the reader's indulgence for a personal aside. I studied mathematics and history in college, and when I decided that in graduate school I would study economics, I was asked how that was related to my prior subjects. My answer-naïve but not entirely wrong-was that economics seemed to draw on both math and history. In the years since, it has seemed to me that most of the mediocre economics I have encountered has gotten the balance wrong: too much reliance on math, much too little attention to history. (That is aside, of course, from the fact that the key cause of most bad economics, especially when applied to health, is ideology, and specifically free-market fundamentalism).

Why is this relevant?-because so much of the

evidence relating income and health is cross-sectional. It describes a moment in time, when there usually is in fact a strong association.<sup>7</sup> The history behind that association-how countries, individuals or groups came to have the income and the health *status* they display at that moment-is nowhere to be seen. Cross-sectional analyses are commonly easier than historical studies, particularly if the variables of interest are hard to measure for any time but the present or the very recent past. Economists and statisticians only clarified what we now mean by "income" starting in the 1930s, and good estimates for nations are extremely rare prior to about 1960. What gets estimated is what gets analyzed, and much effort has gone into measuring income. It is fortunate that even quite imprecise estimates show very large income differences-but if a robust relation appears in the data, there is always the risk of misinterpreting correlation as causation, and not questioning further.

Did such a cross-sectional relation between income and health always exist? The answer is, almost surely not. Go back even 200 or 300 years, and while a person's income might determine whether he could afford to consult a doctor when ill, he would probably have protected his health better by spending the money on something else. Go back still farther, and the patient would have risked being bled, on the absurd assumption that only the bad blood would drain out, leaving the healthy blood in circulation. A little historical thinking quickly shows that until very recently, income cannot have benefited health by way of health care, because our ignorance of health and disease was so profound. The gradual accumulation of knowledge about the human body and how it works, the discoveries of Harvey, Jenner, Pasteur, Koch and many others, is one of the most fascinating stories in science<sup>8</sup> but it is mostly a very recent story. That is not surprising, considering that our bodies are by far the most complex objects we have ever attempted to study.

In the past, greater income probably contributed to better health in only one way, by allowing people to eat better. The first stage of this improvement is simply getting enough calories to sustain oneself and be able to work, something that was out of reach of large populations in Europe even in the 18<sup>th</sup> century.<sup>9</sup> The second stage is eating more protein, and particularly more meat, which translates into greater height (and to a lesser degree, weight) and strength.<sup>10</sup> Longevity is strongly associated with height and weight, with an optimal weight for each height, and much of economic and health progress in the last two centuries has consisted of "climbing the

hill" in the contour map describing that relation. But when disease struck, the only benefit from greater income was probably a more robust immune system. Today, much of the world's population still suffers from the combination of inadequate diet and nutrition-related susceptibility to communicable childhood illness that together account for one-third of the total disease burden in developing countries.<sup>11</sup>

### The uses of income

Besides ignoring history, simple cross-sectional relations to income say nothing about what income is used for. This is not an easy matter for study, since many different end uses-many different forms of investment and consumption-can affect health, for better or worse. It is tempting to try to bypass this difficulty by concentrating only on what is spent on "the health system", which is itself hard to define<sup>12</sup> or more narrowly on expenditure on health care. The chief finding of such efforts is that more money does not necessarily buy better health, even if it buys more care. In richer countries, more money may just be absorbed in higher prices<sup>13</sup> or in the delivery of care that costs a lot and contributes relatively little to healthy life years. Even in poorer countries where income is intrinsically more significant, *total* spending on health may not bear any relation to a specific measure of health, particularly if it is infant mortality. There is no good reason to expect much association, and it does not prove anything that no strong relation is found.<sup>14</sup> It most certainly does not prove that spending on health is ineffective, or that income is more important.

### Sawing the legs off the throne

Think of the throne on which King Income has sat as having four legs. Each of the legs is vulnerable to a particular line of evidence that makes income look less like the dominant factor in explaining or causing differences in health *status*.

### Distributional issues

First, it is obvious that the total or average income of a society will better serve to promote health, the more that income is pooled to purchase two goods that have a disproportionate impact on health outcomes. One is public health measures that individuals will not buy for themselves; the other is financial protection

against health risks. When that protection is incomplete—when much of the population is not covered by any form of insurance—people's capacity to get health care depends on their individual incomes, and so the distribution of income matters greatly. Similarly, when public health interventions are under-financed, people are exposed to risks that may cost more to deal with, and again they may have to defend themselves with only their own resources. Extending coverage in both senses, of public health measures for prevention and promotion and of coverage against the costs of individual care, is the greatest challenge facing many low- and middle-income countries.<sup>15</sup> The object in both cases is to make the distribution of income matter less, since income growth is slow and redistributing income directly is politically difficult. Inequality of incomes tends to lead to inequality of burden in paying for health, but it is easier to mitigate the latter than to correct the former. It is also probably easier to improve people's knowledge of their health risks and how to reduce them, than it is to assure them enough income to deal with those risks. Income is not the only variable whose distribution matters for health: the distributions of knowledge and of financial protection are arguably just as important.

### **Historical understanding**

All interesting economic questions have a time dimension, so it is surprising how much analysis has been non-historical and, in effect, instantaneous. If ignorance or neglect of history overstates the importance of income, then a better understanding of the historical record tends to reduce income's weight among explanatory factors. This does not mean ignoring or neglecting income; it means looking at income and other causes through time, examining changes and not just levels. A good recent example is the analysis of why, if the health interventions to reduce infant or child deaths are well known and available in principle to all, there is so much variation among countries in how fast mortality has declined.<sup>16</sup> It is only by looking simultaneously across space and through time that one can take account of differences in the rate of technical progress in adopting those interventions, because that progress is measured as a residual rather than directly.

A careful look at the history of health improvements also shows clearly that private markets have contributed remarkably little to that progress.<sup>17</sup> Income will matter more to health, the more increases in income lead people to demand, and markets to supply, healthful goods and services without interfe-

rence by governments. Because market failure is so pervasive in health, and because of the strong relation between poverty and ill health, state intervention has been crucial to better health.<sup>18</sup> Market fundamentalism is probably more out of place, more at odds with history, in health than in any other part of the economy.

### **Uptake of interventions**

The study of infant mortality decline just mentioned<sup>16</sup> concludes that, for all countries together, progress in the adoption of interventions accounts for two-thirds of the reduction in deaths from 1962 to 1987. Growth in income explains only seven percent of mortality decline, comparable to the effect of increasing the stock of physicians *per capita*. The second-largest impact comes from the expansion of schooling, consistent with other research showing that increased women's education leads to better health for themselves and their children. The importance of income growth varies substantially among countries; and income looks much less important when countries are assumed to adopt technical progress at different rates than when uptake is assumed to be uniform. It is an obvious but crucial point that availability of immunization, oral rehydration, insecticide-treated bednets or other interventions against early death does not guarantee their early or widespread use. And inability to afford these measures—too little income—does not seem to be the reason why some countries have made much less progress than others.

Slowness in taking up valuable health interventions is not a problem only for poor countries where income might be more of a barrier to adoption. Antihypertensive drugs in the United States have been shown to provide excellent value for money, but analysts still ask "Why don't Americans do better... if the societal return on investment is so high?"<sup>19</sup> Coronary heart disease care for the elderly similarly is under-utilized in view of its cost-effectiveness.<sup>20</sup> Limitations in knowledge on the part of both patients and providers, failures of insurance coverage and other factors count for more than income in delaying life-saving advances.

### **More income, worse health**

Three legs of king income's throne are related to ways in which the potential of higher income to improve health are under-used. The fourth leg is quite different: more income can actually lead to worse

outcomes because of the unhealthy behavioral changes that accompany it. Historically, this happened with cigarette smoking, which was taken up first, early in the 20<sup>th</sup> century, by the better-educated and better-off. Tobacco-related disease became associated with lower incomes only as the habit spread and the higher-income classes became the first to give it up.<sup>21</sup> The newest changes that are increasing health risks or already worsening health outcomes are diets richer in fat and sugar and reduced physical activity, which lead in turn to obesity and its numerous complications, including the epidemic of diabetes that is rapidly swelling in middle-income countries as well as poor ones.

These changes are not caused directly by people having more money in their pockets. They result rather from changes in the structure of employment and in relative prices, especially for foods, that accompany economic development. In consequence, they are related to changes in total or average income, not necessarily to individual incomes. In fact, people with higher incomes and education are less susceptible to the lure of unhealthy lifestyles than those at lower incomes for whom development means cheaper food and less physically demanding jobs, even if their money incomes rise only slightly or not at all. This retrogression in health ought, it seems, to be easy to control—people should enjoy the benefits of higher income, less hunger and more leisure without falling into the habits that threaten their health. But while it is obvious what behavioral changes would avert these problems, it is much less clear whether public health efforts can be successful at a reasonable cost.<sup>22</sup>

Another way in which increased income can be bad for our health is through pollution of the air, water and soil. Again, the culprit is not more income as such: it is the increase in energy generation and industrial output without adequate controls on the contaminants spilled into the environment. This shows again that what matters for health is not the level of income but how it is created and used. China, which has led the world in income growth recently, is at great risk both from an unhealthy transition in eating and working habits<sup>23</sup> and from environmental disaster.<sup>24</sup>

## Summing up

Income may never cease to matter to health. It is, after all, what pays for health interventions and for the education that allows people to understand and apply

them. It also takes income to pay for the research that has explosively increased our knowledge about health and disease and led to the development of vaccines, pharmaceuticals, diagnostic devices, equipment and procedures that have done so much to reduce the appalling burden of disease that characterized the human race only a century or less ago. All the same, income is clearly much less the chief driver of improved health than would appear from simple, non-historical associations, whatever the level of analysis. The arguments summarized here amount to dethronement, not to regicide. Greater sophistication about disease has been accompanied by greater sophistication concerning the part of income in causing, controlling or simply running alongside ill health.

The arguments for a lesser and more complicated role for income relative to health are quite general. However, their relative importance differs according to the specific health problem(s) considered. Since this is a journal emphasizing mother and child health, it seems appropriate to end this essay with some reflections on how income is associated with that subset of health issues. First, many of the most effective measures to prevent death at early years are not only cost-effective but rather inexpensive.<sup>25</sup> That makes income, whether national or individual, less important than for problems requiring much more costly interventions—cancer, for example. Second, infant and child health depends so much on what mothers know and do, that it is no surprise to find that educational improvements seem several times more productive in reducing mortality than increases in income. Third, we have a more complete geographic and historical record for child health than for later ages, despite the great difficulty of measuring early illness and deaths. In consequence, analyses that scan widely in space and look back in time are possible, and their effect is to play down the importance of income. Fourth, the behavioral changes leading to worsened health that accompany economic growth and transformation do not seem yet to have much impact on infants or on maternal care. However, they are already leading to rapid increase in child obesity, with all the dangers that such a change portends. Finally, the good news that income is not the most important source of improved infant health may not apply equally to women's health. Maternal mortality has not fallen equally quickly, and income may still be more significant for progress against that problem. Income needs to be made less crucial there, also.

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