Professor Preston’s relies heavily on the position taken by Sherlock Holmes, who Professor McKeown cited in defence of his method: once several competing explanations have been shown to be impossible, then the improbable must be true. This is not an entirely satisfying sort of argument and would be considerably strengthened if evidence of a strong association between health care interventions and national levels of life expectancy could have been shown to be associated temporally.

The second is that Professor Preston invoked a set of universally shared values to account for the diffusion of health-promoting technologies among countries. This is at best short-hand for what I think Professor Preston would agree is a far more complex phenomenon. The diffusion of innovations has been studied in great detail at the individual level of analysis, and much is known about it.11 Less is understood about the diffusion process as it operates among institutions and countries. But surely he is correct that in the 19th century a variety of important innovations spread among European nations at very different levels of economic development. These included not only systems for the delivery of clean water and the disposal of sewage,12,13 but legal changes having to do with quarantine,14 as well as with health insurance.15 But the spread of these institutional and technological innovations involved political processes in the 19th century, as they do today and as my discussion of health policy was meant to suggest. That they also involve universally shared values is not so obvious. If they did, in the United States there would be a universal entitlement to health care.

Despite this caveat, it should be clear that Professor Preston’s article is a rich one. While it does not slight the importance of economic development for the improvement of the health of populations, it provides support for the importance of social interventions. Sadly, the policy implications have not been acted upon as thoroughly as one might have wished.

References


Commentary: The changing relation between mortality and income

Richard G Wilkinson

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Understanding the relation between economic development and health is one of the most intriguing problems facing public health. Living standards and longevity have improved together, but the relation between them is not straight forward.

Preston1 provided us with the bare bones of the puzzle: there are very close cross-sectional relationships (correlation coefficients of between 0.8 and 0.9) between the log of national income per head and life expectancy at birth. Yet while this cross-sectional relation is maintained over time, only between 10 and 25% of the improvement in life expectancy over time is attributable to increases in income. Preston’s analysis centred on the period 1930 to 1960, but The World Bank2 added curves
for 1900 and 1990 to those Preston drew relating life expectancy to national income per head. They show that the explanatory problem he set is not a special case.

So what are the possible explanations? After showing that the historical decline in infectious causes of death in Britain came long before effective medical interventions, McKeown and Lowe \(^7\) came down in favour of improvements in nutrition. However, Preston reports that improvements in calorie intake (and literacy levels) fail, like income, to explain rising longevity over time.

What we have to explain is why, with the passage of time, the same amount of income buys progressively more health. It is as if the price of health goes down or, as I once put it, \(^4\) there is a change of gearing between income and health. I will suggest four possibilities. The first, the assets explanation, is that health is affected by living standards which depend on material assets as much as on income. We need to distinguish between income as a flow or rate of consumption, and the element of living standards which is more a matter of the stock of goods in use which contribute to wellbeing. At any given income level, people may, over the years, be able to improve their housing, install central heating, buy a washing machine, a fridge-freezer, and other consumer durables, all of which increase living standards and may sometimes do so even without higher incomes. In rich countries even poorer people have managed to improve their stock of goods even in periods when incomes have not risen. This is shown by the continued rise in ownership of consumer durables among the poorest 20% of the British population even in periods when incomes failed to increase. \(^5\) A large majority of the poorest quintile now own goods—including microwaves and cell phones—which were once regarded as luxuries. Contributions to the change in gearing between income and health almost certainly come from improvements in living standards brought by the growing stock of goods we own.

A second contribution, the qualitative improvements explanation, reflects the fact that economic growth is more a process of qualitative change than of simple quantitative increases in consumption. Instead of consuming more of the same goods that our great grandparents consumed, we change from heating with open coal fires to gas central heating, from candles to electric lighting, from woollen and cotton clothes to artificial fibres, from larders to fridge-freezers. \(^6\) Incomes in one period are used to buy new kinds of goods that were not available earlier. We live better because we live differently. Yet we persist in the vain attempt to express qualitative change in quantitative terms by adjusting incomes for changes not only in prices but also in the quality of goods. Inevitably, the ‘real’ value of incomes in different periods depends on the standpoint with which we view qualitative change. For instance, replacing clothes made from natural fibres with clothes made from artificial fibres is regarded by some as a regressive step, but others who emphasise the ease of washing artificial fibres and the fact that they have led to the manufacture of clothing which is ‘breathable’ and waterproof, regard it as beneficial. Replacing open fires with central heating may seem less cosy and romantic, but central heating boilers are hugely more energy efficient, they save labour and fuel, reduce indoor air pollution and decrease fire risks.

So a second contribution to the change in gearing between income and health may come from qualitative changes which mean that what incomes in each period are able to buy is better for health than what the same ‘real’ incomes could have bought earlier.

A third contribution to the change in gearing may come from unmeasured psychosocial changes which piggy-back on economic growth. As populations become more affluent, there is a tendency towards a psychosocial and emotional liberalization. Beyond the epidemiological transition, this is perhaps one of the most important benefits of economic growth. As absolute poverty and want decline, societies become not only less harsh materially, but also less repressive and cruel in terms of what we inflict on each other. Indicative of this process is the fact that increasing numbers of countries have abolished all forms of judicial corporal and capital punishment. Amnesty International estimate that there has been a 5-fold increase in the number of countries that have abolished the death penalty in the last 30 years. \(^7\) The most progressive have also abolished parents’ and teachers’ corporal punishment of children. This is part of a larger change in child rearing practices reflecting the recognition of children’s need for love. As one historian of childhood said, ‘the history of childhood is a nightmare from which we have only recently begun to awaken.’ In the past, children were abandoned, beaten and terrorized to such an extent that ‘most children were what we would now consider abused’. \(^8\) These and other examples testify to a softening of the quality of social relations in society, to the development of more permissive attitudes and laws, and a decreasing reliance on threat and fear as the basis of social order. At the structural level, these tendencies have been aided by the growth of democracy, the rule of law, equality before the law, the development of welfare states, and legislation to protect people from unfair dismissal from work and eviction from housing.

Related to these political processes has been the huge redistribution of wealth that has taken place in many countries during the 20th century. In Britain the share of marketable personal wealth owned by the richest 1% of the population declined from 70% just before the First World War to around 20% by the end of the century. \(^9\) From the 1950s to the end of the century, the share of the richest 10% declined from around 80% to about 50%. Much of this change was brought about by death duties and it is has almost certainly made a key contribution to the sense that modern societies have, in some respects, become more egalitarian, despite the failure to narrow income differentials. \(^10\)

The last possible explanation of the picture presented by Preston is the adaptive response explanation. Let us imagine that there are two major kinds of influence on health. Let the first consist of all those factors related to income which account for the close cross-sectional relationships demonstrated by Preston. The second is a source of improvements in health over time operating independently of changes in income. Potentially plausible candidates for the latter are the biological processes of acclimatization to both the diseases of urban life and to the unfamiliar diseases imported from other parts of the world.
During the course of economic development, populations have become increasingly urban and geographically mobile. Cities created a new ecology for disease, and colonization brought unfamiliar diseases to colonizers and colonized alike. Urban death rates were usually very much higher than rural ones, and mortality rates from infections were often catastrophically high when new diseases were first introduced to populations. That economic development led to increased rates of urbanization may explain why economic growth rates were sometimes positively correlated with mortality. However, there have also been processes of biological adaptation to the new risks. With new (as distinct from endemic) diseases, people lack the benefit of immunity acquired in early childhood, and selective process have not yet taken their toll of the most genetically susceptible sections of the population.

After citing evidence that there were important genetic differences in susceptibility to tuberculosis, Burnett and White gave examples of populations such as American Indians and Mauritians amongst whom it took—largely unaided by economic growth—around 100 years for mortality rates from TB to fall from initially very high rates to rates as low as Europeans living in similar circumstances. These changes reflect some combination of the benefits of immunity acquired in early life to disease which have become endemic, and a process of genetic selection. Diseases in which there are both genetic differences in resistance, and high death rates before people reach reproductive ages, will tend to remove the most vulnerable sections of the population from the gene pool. Although McKeown and Lowe thought economic growth was the most likely cause of the decline in infectious disease mortality, these process may account for why they also thought some diseases had become less severe.

The four explanations I have suggested—increased assets, qualitative improvement, psychosocial liberalization and biological adaptation—may have worked singly or together. Surprisingly, 30 years after Preston’s article we know very little of the balance between them.

References

Commentary: Missed Opportunities

James C Riley

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If only we could sometimes go back and redirect the path of scholarship. Of course we cannot. Even when lives are at stake, as they are in finding the most effective policies to enhance survival, all we can do is to make the best judgments we can at each moment.

Consider some alternative paths suggested by Samuel Preston’s 1975 essay, ‘The Changing Relationship between Mortality and Level of Economic Development’ with its ISI Web of Knowledge record of 132 citations as of April 24, 2006. Preston suggests that, in the real world of living longer or dying earlier, many factors impinge, some pushing towards higher and some towards lower survival. Average income per person encapsulates a vast number of these factors; moreover, those very factors differ depending on a country’s stage of development. Survival researchers might have set out, much more determinedly than we have, to learn about how people make decisions about spending and allocating household and individual resources. Instead for the most part we have concentrated on aggregate, country-level measures of per capita income and income distribution, and tried in various circumstances.