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 straightforward.

Preston\textsuperscript{1} 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 Bank\textsuperscript{2} added curves

\textbf{References}

suggest four possibilities. The first, the explanatory problem he set is not a special case. Lowe came down in favour of improvements in nutrition. The historical decline in infectious causes of death in Britain for 1900 and 1990 to those Preston drew relating life expectancy to national income per head. They show that 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, there is a change in suffering. After showing that 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 second 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. 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’. 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. 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.

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.\textsuperscript{1,11} 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\textsuperscript{12} gave examples of populations such as American Indians and Mauritians amongst whom it took—largely unaided by economic growth—around a 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\textsuperscript{3} 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