

## Old and new factors in health transitions



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### Abstract

The introductory section of the paper notes that the health transition literature suggests a greater range of cultural, social and behavioural influences on health, especially child survival, than has attracted the attention of most social science researchers. They concentrate disproportionately on the impact of parental education, especially maternal education, perhaps because these are measures that are easily quantified and readily available in census and surveys. The major part of the paper discusses the implications of the finding by Preston and Haines that there is little evidence that child survival in the United States a century ago was much affected by mother's literacy, ethnicity or English-speaking ability. This review draws on that evidence to argue that Third World mortality has in contrast been reduced over recent decades by two imports: modern medical technology and the Western scientific attitude that induces a successful collaboration with the former. This attitude is largely a product of modern education and it is this symbiosis in reducing mortality between modern medical technology and the scientific outlook that explains why steep mortality declines in the contemporary Third World depend both upon providing an easily accessible modern health service (with a significant curative component) and the development of mass schooling (particularly for girls). It also explains the steep differentials in child survival by mother's education.

### Introduction

I will start by referring to my article (Caldwell 1986), 'Routes to low mortality in poor countries', to identify themes in it with a view to showing what has and has not featured in recent debates. I shall concentrate on five themes in that article: the role in the mortality transition of (1) the provision of modern health services, (2) education, especially parental education, and above all maternal education, (3) the use of family planning, (4) the nature of the society in terms of such measures as women's independence and an egalitarian or radical tradition, and (5) the communist route to low mortality. Much of the recent discussion has been on the role of parental education, so it might be worthwhile glancing at the other themes, not necessarily in the listed order, to see why they have been ignored or rejected, before focusing on new evidence on parental education. Some of these preliminary considerations are necessary for the discussion of the role of education in the second part of the paper. It might be noted in passing that the concentration on education is at least partly explained by its easy quantification, at least as measured by duration, and hence its almost universal inclusion in censuses and surveys.

Most of this paper is devoted to issues regarding the interaction between social factors and health in both the West and the contemporary Third World which have been raised by the publication of new material on the American historical experience.

### The role of modern health services

'Routes to low mortality...' placed a good deal of emphasis on breakthrough periods when much more of a country's population was covered by easily accessible health services. The most successful

services were simple, free or low-cost, and universal. Yet most comments on that article relate to its evidence of the impact on child mortality of parental education and largely ignore the references to a symbiosis between educational and social change on the one hand and increased modern medical provision on the other.

One reason is undoubtedly the appeal to the social scientist of explanations involving largely social causation. There is an even greater appeal to those medical scientists who have rebelled against technology and wish to demonstrate its impotence.

Yet the evidence that the health transition could have proceeded far without technology is slim. Two of the great health successes, where the shackles of income level seem to have been almost completely cast aside, have been Kerala and Sri Lanka. It is worthwhile examining the situation in those two societies in the early decades of the present century. Both were, by South Asian standards, individualistic societies even then, and in both, women had a great deal of independence. Indeed, in Kerala the raising of children and the care for their health was reported to have been almost entirely the concern of women, with men unable to play a role at least in the predominating matrilineal castes (Sushama 1990: 785; Mateer 1883: 209-210). In both societies there was great sensitivity to illness. In Kerala Ayurvedic medicine was practised and ill-health identified as needing immediate attention on a scale not paralleled anywhere else in India. The situation was similar in Sri Lanka, but, in addition, much energy and resources went into exorcism in the form of the 'devil dance'. At the 1901 censuses female age at marriage in these two societies was later than anywhere else in South Asia. Even then, educational levels in the two societies were rising, so that by 1921 Sri Lanka recorded the same proportion of females with schooling that Pakistan recorded half a century later.

These were the bases on which the later health revolutions were to be built. Yet at the beginning of the century Sri Lanka's life expectancy at birth was no more than 35 years, while Kerala's was probably as low as 26 years as late as 1916. There was continuing slow change but not at the rate that occurred once modern medical services became widely available. In Sri Lanka the improvement in mortality in the seven years following the Second World War was as great as in the previous half century. Certainly, the conquest of malaria played a role but was probably responsible for only part of the improvement, as is shown by the mortality decline in the south-west of the country which had been relatively free of the disease. The effective revolutions in modern medicine were the democratic ones which spread free or cheap services to the urban poor and the rural fastnesses, but it was largely curative services that were being so rapidly extended and they offered standard modern medical services.

If one goes back further into history, it is easy to argue that in the stationary or near-stationary populations which have characterized most of human history, neither social attitudes toward sickness and its treatment nor health practices played a very significant role in determining the mortality levels for whole societies. If we assume, as I think we must, that reproductive practices were largely independent of mortality levels, then clearly fertility determined mortality levels, ultimately through Malthusian checks. In a society characterized by the Princeton West family of model life tables a total fertility rate of six would have resulted in a life expectancy of 20 years and an infant mortality rate above 350, a total fertility rate of five would have allowed a life expectancy of 25 years and an infant mortality rate of 300, and a total fertility rate of four would have permitted a life expectancy of 32.5 years and an infant mortality rate below 250. It is, of course, probable that different societies would have distributed deaths by age and sex in different ways. It is also probable that the degree of maternal competence in providing child health care created differentials in the society in child survival. This is probably still the case but we lack objective measures of such competence and have to resort to measures of education, one input which can increase maternal effectiveness. It should also be conceded

that Notestein, in his original formulation of demographic transition theory, did regard the mortality level as the major demographic determinant with populations desperately contriving social institutions that would succeed in raising the birth rate to a level that would ensure that mortality did not decline (Notestein 1945: 39).

### **The communist route to low mortality**

The only examples, in conditions where *per capita* incomes are small, of the rapid achievement of low mortality that can compete with the model offered by Sri Lanka and Kerala is that provided by various communist regimes: USSR before the Second World War, China after 1949, Cuba from 30 years ago, and Vietnam over the last 20 years. There is at present very little interest in how this was achieved.

There are probably two reasons. The first is that the disillusionment with regard to the extent of economic success has also led to a scepticism about the health achievements. The second has been the recent failure in Eastern Europe and the USSR to decrease mortality levels or even to maintain the levels already reached. Yet those systems earlier did remarkably well in attaining life expectancies of 65 or even 70 years.

Why they did so well is not absolutely clear. This is particularly brought out by China's experience during the 1950s. One ingredient was undoubtedly an emphasis on health access for all and on the provision of facilities. Yet those facilities had very little in the way of modern medicine to dispense. There are almost certainly social and behavioural aspects to the achievement. In spite of the command economy and political system, the revolution probably achieved not only greater egalitarianism and freedom for women and children but something of the spirit that goes along with these changes. It is also likely that the patriarchal family structure was dented in another way in that both neighbours and local party officials no longer felt any compunction in invading families' privacy and identifying sick children or women who needed treatment. It is possible that the changes secularized the society and gave support for scientific beliefs about the cause of illness and how it should be treated. There was an assumption that the revolution believed in modern science: a kind of compulsory Westernization.

This is a model that may not be employed again on any great scale. Yet there are obviously lessons to be learnt here for the health transition and some good analytical studies would be worthwhile.

### **Women's position, egalitarianism, family planning and the decline of family size**

This is a heterogeneous area which needs much more research. It may all be the one big black box called 'individualism'. Changes in these regards may be encouraged by the development of a market economy, but clearly some societies already had characteristics long ago which would eventually lend themselves more than the characteristics of other societies to the achievement of low mortality. There are many interrelations and overlaps. Societies where women have greater independence are more likely to be egalitarian. Eventually, they are more likely to educate their girls. As fertility falls, children are more likely to have their health carefully looked after, but they are also more likely to achieve a certain independence which helps them both to look after themselves and to demand more care from others.

We have become so obsessed about the impact of parental care that we have tended to neglect the study of what persons can do for themselves. Yet the decline of excess female mortality in South Asia as girls age from 1–4 years to 5–9 years and then 10–14 years seems to be at least partly evidence of their growing control over their own fate (Caldwell and Caldwell 1990: 16). Work has begun on the control by adults of their own health destiny but it does not yet compare with what we know about children.

### **The characteristics of parents and the survival of their children**

The major purpose of this paper is to reflect on important new evidence and its interpretation with regard to the determinants of child survival. That evidence comes from the recent publication of a book by Preston and Haines (1991a) *Fatal Years: Child Mortality in Late Nineteenth-Century America*.<sup>1</sup> Discussion of this book continues a debate recorded in Preston (1985), Caldwell (1986, 1990), and Ewbank and Preston (1990).

This book draws upon a sample of the returns for the 1900 US Population Census which asked questions about births to women and the survival of those children. These data, then, provide the opportunity for employing indirect methods of analysis for determining child survival and relating those survival levels to the characteristics of parents.

These calculations show that the level of child mortality in late nineteenth-century America was at a level found today in only a handful of poor countries, mostly in savannah West Africa, where life expectancy at birth is still under 50 years. Yet the authors argue that the real *per capita* income in America of that time was comparable to that now found in Hungary, Portugal, Romania, Argentina and Chile, all countries with life expectancies of 70 years or more (Preston and Haines 1991a:199).

Preston and Haines seek to answer two questions. The first is why such an income level in America of the 1890s could not be translated into better health. The second is why there were not the wide differentials in child survival by education, occupation or social class of parents that are found in the contemporary Third World. Their answer to these questions is by no means unambiguously set out. The authors are conspicuously reluctant to say, in so many words, that it has a great deal to do with biomedical advances.

They begin with the United States and conclude from multivariate analysis that the three most powerful determinants of child survival were, in order of importance, race, size of the place of residence, and region of residence. With regard to race, they say:

Being black in 1900 denoted a set of economic and social conditions that powerfully affected child mortality and that was not adequately captured by other variables that may have been associated with race (Preston and Haines 1991a:171).

It might be noted that less emphasis is placed here upon culture, possibly justifiably, than Preston and colleagues implied when examining differentials by ethnicity in other parts of the world in the United Nations (1985) monograph, *Socioeconomic Differentials in Child Mortality in Developing Countries*. With regard to place size, it is clear that cities were still the most unhealthy places, although that situation was already beginning to change in New York. Region of residence, controlled for state income, is described as an environmental effect. Of lesser importance, but not negligible, was whether the husband was employed or not, the level of income of the state of residence, and the presence or absence of boarders in the house. They note:

Economic discrepancies are clearly associated with a large variation in child mortality although no single economic variable shows striking effects by itself. In addition, the

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<sup>1</sup> A shorter and perhaps more cautious treatment of this book was prepared after the conference and was published as Caldwell (1991). This immediate reaction to the book is presented here, partly because it is of greater length but partly also because in its incautious immediate reaction it raised issues in somewhat ambiguous areas that may be worth further exploration. Both treatments regard the book as a major contribution to our understanding of health transition in the West. To that addition to the debate and discussion by four other contributors to the *Health Transition Review* Forum, Preston and Haines (1991b) replied.

large mortality variation by race ... is most plausibly ascribed to the enormous economic disparities that existed between the races at the time (Preston and Haines 1991a:175).

The authors were clearly nonplussed that the expected care or behavioural variables did not show up, at least as would have been indicated by mother's literacy (in the absence of educational data), ethnicity, English-speaking ability, or husband's occupation. They decided 'Whatever behavioral variation was associated with these variables seems to be swamped in its effects by broad geographic and economic factors' (Preston and Haines 1991a:175). They went on:

This list paints individuals as relatively passive victims of time, place and labor markets. Behavioral factors were probably a key to child mortality declines during the twentieth century (Ewbank and Preston 1990), but their mark was not highly visible at the turn of the century in variables such as literacy and occupation where we might expect their effects to be most obvious. One reason may be that too little knowledge of specific ways to enhance child survival had developed to allow individuals to escape from the circumstances imposed by broad geographic and economic forces (Preston and Haines 1991a:175-76).

As we will come to see, there are problems about what the authors mean by the word 'knowledge'.

They first sought help from a comparative study of the published tables from the 1911 Census of England and Wales which, of course, referred to child mortality occurring eleven years later than the US deaths they had examined, probably a significant difference in occurrence in the early twentieth century. Clearly, by this time there may have been advances in the medical help available which the richer and more educated could largely monopolize. Nevertheless, the authors were undoubtedly right to be impressed that the occupational, social-class and economic differentials (for instance, number of rooms in the house or whether the wife had to go out to work) were so steep both in absolute terms and in comparison with America. They discarded the explanation that either society was substantially richer than the other, as this was apparently not the case, but they worried longer that occupational identity might be broader and less specific in the United States. In the end, they largely supported the view that the classes were more distinctive in England and that there were greater differentials in income and probably access to treatment between them (Preston and Haines 1991a:125ff). In a somewhat indirect parallel, they imply that the situation is closer to that of the division by race rather than occupation in the United States (Preston and Haines 1991a:198).

They then go on to compare the American situation with that of eleven developing countries (four in Africa, five in Asia, and two in Latin America) during the 1970s. Two striking contrasts are brought out, one with relation to the survivorship of children by their mothers' literacy and the other by urban-rural residence. In fact, the proxies for literacy in the contemporary Third World are years of schooling, but the fact that different durations in quite different types of schooling yield similar survival differentials indicates that there is little problem in estimating exactly when literacy is achieved. There may, as I shall argue below, be some problem with equating schooling with literacy.

The findings are clear. First, there is a much steeper differential in child survival by maternal education in the contemporary Third World than there was in America at the end of the nineteenth century. This is not a characteristic of only some parts of the Third World, because similar patterns were found in each continent, the differences within continents often being more striking than those between them. Secondly, the effect of urban residence has dramatically reversed. In America of almost a century ago child mortality was much higher in the cities and towns, while in the contemporary Third World the relativity is much the same but in the opposite direction.

### **How do Preston and Haines explain these findings?**

With regard to America and Britain at the beginning of the century they argue that the key to understanding why the privileged sections of the population could not buy much greater health for their children than could the poor was the fact that 'they shared a...rather primitive...base of health knowledge' (Preston and Haines 1991a:198). Clearly, they mean something broader by 'base of health knowledge' than the curative and preventive medical services available to the people. They include the care which can be bestowed within the household and such protective measures as boiling milk or water or isolating children from infection, all actions likely to be taken most readily by persons aware of the germ theory of infection and so convinced of it that it has an impact on much of their behaviour.

The authors' reluctance to speak of the efficacy of medical services and the extent to which they were available across the community, together with the repeated employment of the word 'knowledge' without making it clear whether this is individual knowledge or the scientific knowledge available to the community or world, has the effect of tipping our interpretation towards accepting the primacy of household care as the explanation of child survival. They argue 'By modern standards, ignorance about both preventive and curative health care was widespread in the United States at the turn of the century' (Preston and Haines 1991a:200). Again,

Schooling effects should reflect only the accretion of material resources that result from the increased earnings opportunities; the additional portion of the effect that would reflect closer connection to good health knowledge and practice among the well-educated should be largely inoperative in a situation where education 'buys'... little knowledge (Preston and Haines 1991a:200).

The knowledge was apparently there among some but not the good sense about its use or the will to employ it in the broader community, and it appeared to be a message that would affect behaviour rather than technologies built upon scientific knowledge.

The most enlightened public health officials ... saw clearly the implications of the germ theory for preventive health care, but they despaired at the difficulties of getting the word across to physicians, let alone parents (Preston and Haines 1991a:200).

Elsewhere there is some reference to the fact that the basic problem may have been building up a body of proven knowledge and techniques and a system for applying them. There are references to the 'Level of technical knowledge about health' (Preston and Haines 1991a:199) and the fact that 'the United States in this period simply did not know how to effect this conversion' (Preston and Haines 1991a:199) of literacy and income into higher levels of life expectancy.

My interpretation of their evidence is the following. The small differentials in child survival in late nineteenth-century America by father's occupation or mother's literacy suggest that the level of home care and health maintenance, over and above what one's income would allow and one's social class dictate, was not in fact of major importance. This is somewhat surprising. It may mean that the middle class mother behaved as the middle class mother should, or as her husband or her church would expect, almost regardless of educational level. Being careful and clean was not as demanding on one's educational resources, as would prove to be the case in the challenge yet to come of deciding just when to use the more effective medical system and how to collaborate most effectively with it. There appears to be evidence here that later improvements in child mortality may have had much more to do with how caring parents collaborated with a health system that increasingly had something to offer than with the pure impact of that care. The economic evidence is impressive and does suggest that the slow improvement in mortality in the nineteenth century was the product of the greater wealth yielded by the

industrial revolution (and not just better nutrition) even if this was partly offset by the attack on the health by the industries themselves. The most fortunate were those whose heightened living standards were made possible by the industrial revolution but who themselves lived far from the cities and factories.

I believe that the analysis employs 'knowledge' in various senses, and, more seriously, that it underestimates just what a proven repository of scientific knowledge and technology is. Knowing that infection was caused by germs was not the same thing as knowing that there were germs in milk, that they existed there in sufficient densities to endanger a child's health, that they could be destroyed, at least temporarily, by boiling, and that the boiling did not have other harmful consequences for the value of the milk. True believers were carrying out experiments of this kind in New York City in the 1890s, but it was to be a generation before even all capable health scientists of good will came to a consensus on the matter.

The health science armoury that we now possess was created only slowly after the discovery of germs. Much of this was, of course, a series of biomedical breakthroughs as scientific knowledge was built up about the nature of these micro-organisms, how they infected human beings, how the human body reacted, and how this knowledge could be employed to devise means for combating the infections. The whole process was assisted by the development of research methodology and investment in the huge programs and institutions required. The building of a scientific health system depended also on other developments, equally made possible by the expanding wealth of the industrialized world. They included experimentation with community programs like boiling milk, the building of modern medical schools, and the training of doctors and other health personnel both rigorously and from properly tested experience. It is this last kind of authority which is important. It was something codified and believable and that was not merely provided by the occasional exhortations of public health personnel. Even their authority was not always right, but it was more often right than wrong. Ultimately, the availability of this health capacity, rather than knowledge, would depend also on the reduction of grinding poverty and the provision of health insurance and national health systems.

The small differential in child survival by parental education or occupation in late nineteenth century America was not evidence that the better-off or educated would not listen or learn or would not buy the best treatment for their children. It was just that there was little in the effective scientific health care that money could buy. A study of periodicals in a rather similar society, Australia, in the second half of the nineteenth century, revealed that the educated and prosperous section of society was, if anything, more earnest about their children's survival, more willing to pay for what was available to improve health or cure illness, and as oriented towards science and knowledge as are today's parents (P. Caldwell 1971). There was little in the way of anti-scientific movements or a disregard for science, and there was little belief in alternative therapies.

Preston and Haines may be saying all this, but it is not clear. They seem to be placing an emphasis on personal knowledge rather than the body of scientific knowledge and expertise and on individual thoughtless behaviour so as to support the argument that a considerable part of the decline of mortality in the twentieth century would have occurred even without the continued development of scientific medicine. However, a paper which is essentially a sequel to this book (Ewbank and Preston 1990) does argue that there was an all-important interaction between the enlarged health science capacity of society and the increasingly educated health consumers during the period 1900-30, and that the more educated were increasingly able to grasp these new opportunities to a greater extent than the less educated and poor. Even here, there is a curious tendency to refer to the non-behavioural side of that relationship as 'public health efforts' (Preston and Haines 1991a:143) rather than the totality of the scientific health system.

### **The contemporary Third World**

Turning to the Third World, Preston and Haines put forward the explanation that the large differentials in child survival by maternal education are entirely a product of improved health behaviour in proportion to the extent of education:

In developing countries today, the mother's education or literacy appears to retain such a high degree of explanatory power because it is associated with such health behaviors as vaccination of children, maintenance of hygienic conditions in the home, and receipt of professional health care for maternity and for child illness (Preston and Haines 1991a:206).

I have two problems with this.

The first may be only a matter of emphasis. The list of effective interventions places curative services last and, in fact, at no stage employs that terminology. Our research in Sri Lanka (Caldwell et al. 1989) has convinced me that the low infant and child mortality in Sri Lanka is to a very large extent the result of the fact that the universally acceptable modern health services prevent most sick children from dying. The situation was not quite so clear in our research in South India (Caldwell, Reddy and Caldwell 1983; Caldwell, Caldwell et al. 1990) and Nigeria (Orubuloye and Caldwell 1975), but, nevertheless, the evidence certainly supported the importance of these interventions.

The second point depends very much on the evidence that Preston and his colleagues have brought forward. The differential in child survival by the level of maternal education (or the level of parental education) is much greater than in America (or the West more generally) not only in the late nineteenth century, but also in the period 1900-30, or at any other time. I have argued in a recent article (Caldwell 1990) that this is not a reflection of the general levels of either *per capita* incomes or health services in the Third World but is related to the nature of the educational experience. It was clear from the finding that maternal education improved child survivorship at even very short durations of education, that it was perhaps the experience or fact of schooling rather than its content or what was learnt that made the difference. Cleland (1990: 411-412) has explored this matter further. It might be noted here that it is this finding that makes it hazardous to equate literacy with schooling.

In the research in South India we found a multiplicity of reactions between the mothers of sick children and the health system which explained why educated mothers obtained more help from that system. They were more likely to take children for treatment at the modern health centre and they were likely to do so with less delay; they spent a longer period with the doctor because they were willing and able to describe symptoms more fully and because the doctor listened to them at greater length; they followed the prescribed treatment more exactly and were more likely to persist with it; and they were much more likely to report back, and to do so soon, if the child's condition was not improving. Their greater willingness to employ modern medicine, and to lay out a larger proportion of family income for it, arose because their schooling made them feel that they had a responsibility for taking an initiative, because they identified their school with other non-traditional institutions of the modern world and believed that they could and should use them, and because they were more likely to believe that the doctor and the health centre embodied a scientific truth about the world. The illiterates were more likely to belong to an older world, some believing more strongly in the Ayurvedic system, but most believing in spirit causation, inevitable punishments from previous errors or sins or just ill-fatedness. They believed less in scientific truth, more in alternative explanations, and more in the inevitability of things. Their failure to report symptoms adequately and also to report back the failure of treatment has deep roots in the Ayurvedic belief that the healer immediately recognizes the ailment and always prescribes the best cure. If that is insufficient, there is little more that can be done.

I have argued elsewhere (Caldwell 1980) that modern education is essentially a Westernization of the world. It embodies the Western experience and outlook. The Western outlook in the late nineteenth century was essentially scientific, partly because of prior economic development. Even the illiterate and poor believed in the efficacy of science and of scientific medicine, if indeed it could be found. The experience of education was essentially an intensification of their own system. The only cultural change was a tendency to teach the working class middle-class values.

Schooling systems develop slowly and with difficulty, and no one has bothered to invent them for a second time. The truth is, of course, even more complex than this. Schooling is largely a way of allowing people to communicate with and adapt themselves to the modern world, largely shaped by the West. It is a deculturating experience in the Third World in the sense that schooling is not in the West. It quite purposively draws people into the Western system and assumes from the day they set foot in school that they have agreed to that system. Even where most people believe in witchcraft, children, while in school, must not echo that belief (cf. Greenfield and Bruner 1966:84) and polygynous school teachers must not even defend polygyny in class (Caldwell 1980).

Rapid mortality decline in the Third World depends on access to both modern curative and preventive medicine and the fullest possible collaboration with these systems in both belief and action. The important role of modern health services is attested by the higher levels of child survival in urban areas. The collaboration is induced by the schooling system. Thus, developing countries import both their medical systems and the willingness to make maximum use of them. This is the explanation for the steep parental educational differentials in child survival. Educational revolution in the West of a hundred years ago would not have produced the same effects for two reasons: (1) the scientific medical system had little curative medicine to offer; (2) education would not have produced the same change in beliefs and behaviour that it does in non-Western societies.

### **A final note**

The failure of parental educational or class differences to show up very clearly in American child survival a century ago appears to throw a broader doubt on the importance of household child care except in decisions about the use of medical services. This seems to fly in the face of commonsense and experience. The explanation may be that suggested by Preston and Haines that such influences were overwhelmed by economic ones, but, even if this is true, it suggests they are smaller than most of us suspected. It may be that we have here evidence that economic and social mobility in America at that time produced a fairly classless society and that the literacy-illiteracy divide is not subtle enough and is subject to misreporting at the census. The importance of class in Britain suggests its dominant importance there, and that data on mothers' education may have made little difference in that women were largely prisoners of their class and behaved towards their children as their social peers expected them to do.

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