Death and Development

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Tragedy and statistics

A noted twentieth century tyrant once allegedly remarked that ‘a single death is a tragedy, a million deaths is a statistic’. As far as is known, the author of this remark never killed anyone with his own hands; he was, however, responsible for many statistics. This paper is a synthetic description and discussion, from the point of view of those who study human development, of death, both as a statistic and as a tragedy. My aims are to summarize and assess important recent data about mortality and life expectancy, to discuss the ways in which it is and can be used to indicate human development, to comment on two present crises of mortality and to make some general suggestions about some future tasks for social scientists in the field of development. There can be few things which have more effect on the quality of people’s lives than the time and the way in which they and other members of their society die. What we know about death reveals a great deal about not only the quantity but also the quality of life. If, unlike Joseph Stalin, we can perceive the tragedies behind the statistics then perhaps we can contribute something to the pursuit of human development.

During 1999 the number of human beings crossed the 6,000 million mark. About 1 percent of them, 60 million people, die each year. The pattern of these deaths is not haphazard; it is written, a reflection both of the biology of mortals and of every material inequality and social injustice which exists. We already know many of the characteristics of the 60 million human beings who will die in the next year. Most of these deaths will be premature or unnecessary, in the sense that they occur before they would if the people concerned had been able to live materially and socially better lives, lives which have already in places shown themselves to be attainable. Poets for centuries have turned resentment and cynicism towards worldly wealth and power into the cliché that death is the great equalizer; in the words of John Donne, “death comes equally to us all and makes us all equal when it comes”. Biologically this makes some sense: unless we are lucky (or unlucky) enough to be frozen or embalmed we will all in no time at all be ashes, rotting flesh, or a vulture’s lunch and then bones, dust and greenhouse gas. But humans do not come equally to their deaths: they vary hugely in the age at which they die, in the degree of unnecessary suffering which they endure, in the support which they have from their fellows, and in the dignity with which they are permitted to die. The timing and nature of most human deaths is influenced by unnecessary deprivation and inequality. In this sense, to extend an idea coined by Amartya Sen, human society is characterised by hundreds of millions of missing persons who have died before their time (Sen 1990). Not only are human beings mortal; most of us are more mortal than we need to be.

Age, sex, class and race in the statistics of mortality

One way to puzzle your friends is to ask them which group of countries has the highest death rate (annual deaths per 1000 population): Latin America or the (high-income) OECD countries? Most of them will be surprised to learn that the answer is OECD countries (with a figure of 8.6 per 1,000 in 1997 compared with 6.5 per 1,000 in Latin America (World Bank 1999)). Explaining this apparent anomaly will explain something about mortality patterns. The quoted figures are crude mortality rates. As with virtually all demographic puzzles the surprise is explained by looking at differences in the age structures of the populations. In these two and indeed all other groups of countries the age pattern of mortality is as follows: mortality among children of 0-4 years (child mortality) is higher than for children of 5-9 years. Between 10 and 14 years mortality is at its minimum; from there is climbs, slowly at first, to approach 100 percent for the oldest age group, producing, as seen in such graphs as

Figures 1a and c, a j-shaped curve. In every age group the mortality rate in Latin America is higher than in the developed capitalist countries. But the overall mortality rate is lower because the younger age groups, with lower mortality, are a much higher percentage of the population. A common way round this misinformation produced by crude death rates is to compare areas or countries by applying their age specific mortality rates to a population with a standardized age structure to produce the 'adjusted or standardized mortality rate'. But I find it more illuminating to look directly at the age specific mortality rates themselves.

Part of this j-shaped pattern of age-specific mortality is natural, common to all human populations, and indeed to most other living species. But between human populations the level of the j-curve and its slope at various ages are very different and these differences are socially determined. In Figure 1 the similarities are apparent in the graphs with normal axes (a and c), while the differences show up better using log scales (b and d). A glance at the graphs in Figure 1 shows that there is a striking parallel between the age mortality curves of, on the one hand, the OECD countries and Sub-Saharan Africa in 1990 and, on the other hand, the age mortality curves of England and Wales in 1838 and 1938. Cross-section comparisons closely parallel recent temporal changes in the countries normally considered most developed, although mortality in England and Wales in 1838 was worse than in Africa today. From the parallel it appears that, if the social and economic conditions are right, nature will permit the reduction of the child mortality rate to a little over 10 per 1,000 and delay the onset of mortality rates above 100 per 1000 until beyond 70 years of age (the present situation in the OECD countries). Today it is the infant and child mortality rates which account for most of the difference between the overall standardized mortality between different countries and so for differences in their life expectancies, and this also parallels historic changes in England and Wales as can be seen in Figure 2. And it is rapid reductions in child mortality, due usually to basic public health measures, especially perinatal services and child innoculation, which have been the major cause of the important extension of human lives characteristic of the second part of this century.

Differences of sex, race and class are all hidden in these patterns or mortality; but each one of them has a profound influence on the number of deaths and their nature. Demographic statistics suggest that naturally more boys than girls are born and then male mortality rates are higher than female rates in all age groups. That is what we observe in nearly all areas of the world and nearly all countries, leaving almost everywhere a majority of women in older age groups. What is interesting, therefore, are the exceptions: either places and ages where female mortality is higher than male, or exceptional differences in the ratio of male to female mortality. In Figure 3a we see the ratios of male to female mortality by age, as calculated in the monumental study *The Global Burden of Disease* (GBD) (Murray and Lopez 1996a and b, and 1997). Of the 8 country categories compared there the one exception to the rule that male mortality is higher is in young age groups in India, another way of observing the phenomenon of missing women already well-known from the work of Sen and others (Sen 1990). In India, unlike the other seven areas of the world, girls and young women die more than boys and young men, a fact which may be caused by discrimination of many kinds: in the diet (Harriss 1990), in access to medical treatment in the case of illness (Filmer et al 1998) and in physical cruelty, including murder.

If the case of India goes so clearly against what is biologically natural, the other startling thing shown by Figure 3 is the ages and places where the biological difference becomes exaggeratedly large. Young men in developed countries and former socialist countries have much higher mortality rates than young women. The difference reaches its peak at ages of 20

to 30 when male mortality is 3 to 4 times as great as female. The phenomenon is not seen in other parts of the world; nor is it visible in the historical statistics of England and Wales up to the Second World War (Figure 3b). The 1938 ratios in fact show a similar pattern to that of India today. By 1965, however, two peaks in relative male mortality, in youth and later middle age, have clearly appeared. A feature of actually existing capitalist development and formerly existing socialism, it appears, is an extraordinary, and very recent, difference in the degree of risk in the life experience of young men and women, influenced one can surmise by the fatal fusion of modern machismo with alcohol, drug consumption, firearms and motor vehicles. The figures for the Formerly Socialist Countries pre-date the recent mortality crisis which will be discussed later. There is a further rise in the male mortality ratio visible in the OECD countries (Figure 3a), and since World War II in England and Wales (Figure 3b), around the ages of 45 to 60, associated with the 'developed' disease patterns to be mentioned later.

Ethnic difference and inequality are other fundamental determinants of mortality differences. They are often invisible in the social sciences because in many countries statistics for separate ethnic groups are not published. But the importance of this factor is seen in the variation in life expectancy at birth in three countries where figures are available by ethnic group. In South Africa, the USA and Brazil whites live between 7 and 10 years longer than blacks or non-whites (Table 1).

Table 1: Ethnic difference and life expectancy: South Africa, USA and Brazil

Country and ethnic group	Life expectancy at birth		
	Total	Men	Women
South Africa 1996			
White	73	69.5	76.6
Black	63.2	59.8	66.8
USA 1996			
White	77	74	80
Black	70	66	74
Brazil 1990			
White	66		
Non-white	59		
All		62.8	70

Sources: South African Institute of Race Relations 1998, US Census Bureau 1999, Andrews 1993, UNDP 1998

The United States is the country for which the most detailed ethnic comparisons are possible due to the large quantity of official information published. Figure 4 shows the ratio of age specific mortality rates for males (black/white) and for females (black/white) as well as the male/female ratios for blacks and whites. The male/female differences are similar to those we have already seen. The extraordinary peak in male mortality in the 15-24 age group is common to both groups, though considerably more pronounced for blacks. The ratios at the other ages are similar as between whites and blacks. For all age groups (except, curiously, the over 85s) the black mortality rate is higher than the white. The greatest differences are to be seen in child mortality (both sexes), where the gap has been rising since 1950 (Cutler and Meara 2001), and then in the age groups from 25 to 55, where the difference is especially marked for women. Since there is less gap in pay but more gap in mortality between black

and white women than between men at these ages, the income-adjusted mortality rates may be relatively even more unfavourable to black women than the quoted figures imply. A sample-based study found that the black-white gap between standardized income-adjusted overall mortality rates is greater for women (2.2 to 1) than for men (1.2 to 1) (Otten et al 1990).

The fact that these differences are even greater without the income adjustment implies, of course, that mortality varies also with economic level or social class. Numerous studies carried out especially in the developed countries, have confirmed that the rich and materially and socially privileged live longer lives than the poor. Health and mortality rates are closely associated with deprivation and so with the distribution of income. A study carried out in 1994 among 300,000 white US men shows a very high negative correlation level between income and mortality. The highest of 12 income groups had an overall mortality rate one half of that of the lowest income group (Wilkinson 1994). Figure 5 shows how mortality rates from five causes among men in the UK are all closely connected with social class (Acheson and others 1998). There is considerable debate, however, about whether these results are due entirely to absolute deprivation among part of the population or whether relative deprivation (income distribution) plays an independent explanatory role. Much certainly remains to be shown about exactly what combination of detailed factors account for the undisputed existence of inequality in health and mortality outcomes (Deaton 2001).

Life expectancy as an index of development

The age distribution of mortality is what lies behind the now extremely widely-used indicator, life expectancy at birth. Of the three indicators which compose the Human Development Index it is the one which has undergone the fewest changes during the 10 years in which the HDI has been calculated. It has been used as an indicator of the level of human development of countries as a whole and as an indicator of differences between different groups in national populations. The difference between male and female life expectancy is an important component of the Index of Development related to Gender, where the contribution to the Index is calculated using different limits for men (22.5 to 82.5 years) and women (27.5 to 87.5 years). This will mean that a country is penalized in this index compared with the HDI if women's life expectancy in fact is less than about 6 percent superior to men's. And in compiling some national Human Development Reports the UNDP has calculated regional and provincial life expectancies, which in India, for example, vary between 72 years in Kerala and under 55 in 3 states, in Bangladesh provinces vary between 69 and 42 years and in districts of Nepal vary between 74 and 37 years (Haq 1997).

Life expectancy seems an easy indicator to understand, it is available for virtually all parts of the world, and clearly complies with the need to have measures of development which say something about the quality of human life and human capacity. For that reason it has become extremely widely used, sometimes as a simple substitute for Human Development as a whole. In a recent article, Amartya Sen rather convincingly dismissed four alleged limitations of life expectancy as a development indicator: that other objectives may be more important than the lengthening of life, that it might be better to look at the economic variables which determine longevity, that morbidity is more important than length of life and that it is a sluggish indicator of change (Sen 1998).

There are other issues related to life expectancy, however, more specific to its role as one of the three key variables which make up the HDI. One of the main problems with the present

HDI, as its compilers have always been well aware, is that it does not explicitly take into account the distribution of income. Neither the use of the income per head variable, nor its attenuation through the use of the logarithm of the figure in the calculation of the HDI make much sense if distribution is left out. Using the logarithm of income is a strong corrective to international inequality but does not touch internal inequality. A rise in income, whatever the level of income per head, may be produced by nothing more than a rise in the income of the rich; this is not only a theoretical possibility but has happened in a number of countries in recent years. The question of distribution, however, has not been an explicit question of concern in relation to the other components of the HDI. This is because these other indicators, including life expectancy, are partly different; they contain an implicit distribution factor which income per head does not. Since life expectancy has a biological maximum, and the education variables have a logical maximum, which income does not have, this means that no country can only obtain values close to the maximum with a relatively equal distribution of the variable among the population. So, if the absolute biological maximum for life expectancy is 85 for a community, then no country can have a figure very close to 85 and at the same time have a significant part of the population with a lower life expectancy. If there is 100 percent literacy then there must logically be equality in the distribution of literacy. Once again the conclusion seems to be that life expectancy is a 'better' variable than income per head and so ought to have more and not less influence on the index. This argument, however, depends on the assumption that years of life and literacy are homogeneous variables, a point to be returned to in the next section on disability.

If an improvement in life expectancy is likely to be accompanied by an improvement in the distribution of the variable, nonetheless, as we have seen above, there remain even in highly developed countries important elements of inequality in life expectancy within countries based on race, class and gender. Especially at lower levels of the non-income indicators it is, therefore, important to look for ways of adjusting them to take inequality into account. One way of dealing with the problems of the maldistribution of all the indicators would be to abandon, or at least to give less importance to, the production of indices of national averages and instead produce indices relating to the underprivileged sections of the community, including not income per head but the income per head of the poorest fifth of the population, not overall life expectancy but the life expectancy of those states or provinces or classes or ethnic groups with lowest life expectancy. Each country would be represented by its worst off part, something which would surely make the index approximate better to the concept of human development and perhaps also have a more explosive political effect.
The equal weighting of the three components of the HDI is often criticized but is based on a compromise which it would now be very difficult to renegotiate. But the fact that one of the variables, income per head, is adjusted so that its marginal contribution to human development changes with its level means that the 'rate of exchange' between a given change in income and a given change in life expectancy (or the education variable) will be different at each income level. For any absolute increase in life expectancy (say, a year) the outcome in terms of the value of the HDI is the same no matter what the starting position; hence for any given percentage increase in life expectancy the HDI outcome increases the higher the life expectancy. For income it is the opposite: for any absolute increase (say, $500) the marginal HDI outcome falls with rising income and for any given percentage increase it is constant for all levels of income; at higher levels of income increases in life expectancy produce greater HDI returns than income and at lower levels of income increases in income per head generate greater HDI returns. An increase in income per head from the minimum of $100 to $600 produces the same result as 17 years of additional lift expectancy. The level of income at which one year of extra life expectancy produces the same HDI increase as $500 extra

income per head is around $5500 (a little below the world average). At the maximum of $40,000 one extra year of life produces the same HDI result as around $4,000 of extra income. These figures seem instinctively less anomalous than some of the trade-offs which were produced by previous methods of calculating the index. In any case, there is only limited value in analyzing trade-offs when in fact there is a tendency for all the variables of the index to move together.

Longevity and disability

Years of life are not, of course, homogeneous and so life expectancy alone is not an ideal measure of health or physical welfare. It is so widely used because it is readily understandable and because the statistics on which it is based are so widely available. But we could measure welfare better if we also had indicators of morbidity or disability. One of Sen's defences of the use of life expectancy as a development indicator is that, as a practical question, the relevant information about morbidity is to a great extent absent or, because of its low quality, misleading (Sen 1998). True as this will no doubt be for some time to come, one of the original contributions of the GBD study has been to produce the first usable worldwide inventory of disability, combining it with their mortality estimates in order to produce a global measure of the burden of disease. The material in the GBD study is not yet usable in producing, say, an annual index of human development. It is a one-off estimate based on numerous other specific one-off studies, and a good deal of projection, estimation and surmise. Its results do not appear for individual countries but for the 8 groups already mentioned. It is not reproducible for another year without a further study of similar magnitude, although the WHO now regularly updates it in the annual *World Health Report* (World Health Organization 1999). Nevertheless, the GBD's estimate of disability can be used to show the way beyond life expectancy to more discriminating indicators of human development.

The authors begin by defining levels of disability. After an exhaustive discussion by a panel of non-professional people about how severely they rated different conditions, they divided disabilities into 7 different degrees of severity. To give an example, vitiligo on the face is considered a level I disability, deafness is level IV while quadriplegia is regarded as level VII. Using these categories the authors estimate the numbers of years which are lived on average by women and men in different regions with each level of disability. This information is then superimposed on life expectancies to produce estimates of the expectancy of years of life without each succeeding level of disability. The very startling results are shown in Figure 6. While for women life expectancy in general ranges from 80 years in the OECD countries to 45 years in Sub-Saharan Africa (for men between 73 and 48 years) the GBD estimates that the equivalent range of expectancy at birth of life without any level of disability ranges from 48 years to only 10 years (for men 45 to 10 years). On present patterns the average citizen of the poorest countries can, according to these estimates, expect to live only about 10 years free of some significant level of disability (Figure 6).

But in the longer term it is clearly desirable that morbidity and disability should be part of the measurement of human development. The wider range of disability-free life expectancy compared with simple life expectancy (4.5 to 1 instead of 2 to 1) might perhaps give a better idea of relative difference in human development, capacity or deprivation. There will be a dilemma, however, about how this is to be done. Disability or morbidity should probably be included on its own account rather than in the form of an adjustment to the life expectancy measure. This is because the inclusion of unadjusted life expectancy in the development

index has an important egalitarian symbolism. One year of life of a poor elderly woman in Uganda is valued the same as one year of the life of a young Swiss banker regardless of income or disability. This is not a small point taking into consideration that health policies are still sometimes based on cost-benefit analyses which value human lives according to their contribution to the national income.

The principle of the equal value of life years in all regions is an important element in the GDB study; in calculating the difference between actual and possible life expectancies (life years lost) it assumes the same potential life expectancy for everyone. Disability also represents a loss and so each year of life spent with disability is regarded as part of a life year lost, the fraction determined by the level of disability (Murray and Lopez 1996a, 1997, Michaud 1999). Thus for each region the GBD calculates a figure for disability-adjusted life years (DALYs) lost which is the headline figure for the overall burden of disease. These figures, although at present they must be very rough estimates, could become important tools in the more rational and just planning of world health priorities. As the authors point out there is a dramatic maladjustment of the burden of disease as measured by DALYs and the distribution of health expenditure. 85% of the world's deaths and 92% of lost DALYs occur in non-OECD countries but only 9.8 percent of health spending takes place in those regions (WHO 1999). Another report has shown that the same scandalous imbalance also applies to health research. (Global Forum for Health Research 1999).

The causes of death

Less than 30 percent of deaths which take place in the world are registered with a cause given. A further major contribution of *The Global Burden of Disease* is to produce for the very first time an internally consistent (though still to some extent speculative) estimate of the relative importance of all causes of death in the world. The authors of the study remark that adding up previously produced estimates of deaths from individual causes tends to produce totals which are greater than the deaths which in fact take place. The study sets out the causes of death from two viewpoints. The first is the medical cause. For the 8 regions used in the study the proportion of deaths by cause is estimated and the causes are divided into three types: I - infectious diseases and causes connected with birth and maternity; II - non-infectious medical conditions, most notably cancers and heart disease; III - accidents, killing and suicide. The resulting distribution is summarized in Figure 7a.

The differences in the composition of the three types of causes of death between regions form the basis of one of the main conclusions of the study. It confirms, but in much greater detail, conclusions which are generally well known. There is a strong relationship between level of development and the pattern of causes of death. In the poorest regions the majority of deaths have type I causes. In the most developed regions these causes have been virtually eliminated and the enormous majority of deaths have type II causes. Type III causes produce a relatively small percentage of deaths, varying considerably between regions but without any apparent relationship to the level of development. The difference highlighted by the study can be seen most clearly by comparing Subsaharan Africa where 65 percent of deaths have type I causes with the OECD countries where only 5 percent have type I causes. It is assumed that this difference also reflects the historical pattern of change in developed countries, and this is confirmed by other data (Frank and Fraser Mustard 1994, Sen 1993, Wilkinson 1994).

This change is known as the epidemiological transition, an important concept to set alongside other concepts of transition which make up a large part of conventional thinking about what

development is. Among those is the demographic transition (from a high birth and death rate equilibrium to a low birth and death rate equilibrium) and the not so often named but equally commonly postulated structural economic transition (the decline in the proportion of labour and output in agriculture, the primary sector, to a rise in the importance of industry and modern services, the secondary and tertiary sectors).

The GBD study disposes of some common misconceptions about the epidemiological transition. When infant and maternal mortality are reduced as a result of a reduction of type I causes of death then type II causes assume more importance, not so much because, as is often argued, these are 'diseases of development' as because more of the population survive infancy and childbirth and thus die of adult diseases. But, as GBD shows, the risk of dying from non-communicable (type II) causes in general is greater for an adult in Sub-Saharan Africa than for an adult in OECD countries (Murray and Lopez 1997). While some of these diseases may be affected by diets and other aspects of lifestyles in developed countries, these diseases (above all cancers and circulatory diseases) are more important as causes of death and disability in developed countries but they are not in any simple sense 'diseases of development'.

These results of the GBD study reveal how changes in the composition of the three types of cause of death are related to the age and sex composition of deaths. The relationship is shown in Figure 8, taken from the GBD. Up to the age of 45 deaths with type I causes are predominantly female. Type II and II causes affect men disproportionately at all ages, with the already mentioned very high peak in the male/female ratio of type III causes up to the age of 40. The epidemiological transition will, therefore, benefit women disproportionately. Or, to put it in another way, women suffer disproportionately from the absence of the measures necessary to reduce the number of type I causes of death; and similarly the young suffer more than the old. The reduction in mortality in developed countries during the last century has been most marked among the youngest age groups (Cutler and Meara 2001).

The concept of development as transition is an obvious and omnipresent one. But it is not without its dangers. It suggests perhaps too strongly that development is an irreversible metamorphosis, as if from the pupa to the butterfly, to a permanently different state of equilibrium, when in reality the conditions of maintaining the post-transition state can be difficult and reversal is always possible. Ideas of transition can thus exaggerate a tendency to see the world in terms of two qualitatively distinct pre- and post-transition states rather than as a more complex and changing continuum. And this 'before' and 'after' technique tends to obscure the negative aspects of the 'after' state. There may be an excessive suggestion in ideas of transition that the movement to the post-transition state is in some way natural and necessarily desirable. Moreover, virtually all concepts of transition define the post-transition state as actually existing developed capitalism. The tendency to see the post-communist states as 'countries in transition' is a clear reflection of this. Ecologically or socially critical views of modern developed capitalism present a much less teleological view of these various transitions.

The epidemiological transition, of course, encapsulates the obviously desirable objective of reducing to a very low level deaths from infectious and birth-related factors with the consequent fall in age specific mortality rates. But even the most complete transition in this sense is no guarantee against future reversion. The elimination of fatal infections is a permanent social battle. And new ones always threaten. The development of resistant strains arouse fears that the epidemiological transition may be much more temporary than it seems.

The enemy was not killed but is simply, as in the conventions of monster movies, biding its time. That neither the epidemiological transition nor the long term extension of life expectancy are permanent and guaranteed has been demonstrated during the last decade by the eruption of new crises of disease and mortality.

Mortality crises: the former Soviet Union and Central and Southern Africa

It has often been remarked that through decades of sometimes extreme fluctuations in economic growth, the expectancy of life has stubbornly grown in nearly all countries during the 20th century. Ironically what has seemed to some observers the most violent century of human history has also been the one in which population has grown most rapidly (presumably with the exception of the very first few human generations). This is hardly at all due to the fact that humans have had more children; it is because there are progressively relatively fewer premature deaths, fewer missing persons. The long term figures for longevity and income in Latin America for instance, shown in Figure 9a, indicate only one five-year period in one country (Haiti from 1990-1995) where overall life expectancy has fallen. In Nicaragua during fifty years when income was no higher at the end than at the beginning, life expectancy had risen from 23 to 68 years. The long term rise for a number of countries can be seen in Figure 9b.

Such encouraging signs of the resilience of the demographic and epidemiological changes, however, are not universal. In two major areas of the world, the former Soviet Union and many countries of Central and Southern Africa life expectancy has recently fallen precipitately for partially different sets of causes. The mortality crisis in the Soviet Union was already visible before the end of the socialist regime. The Soviet area did not share at all in the expansion of life expectancy which affected practically the whole of the rest of the world from 1960 to 1990. Between those years life expectancy in the USSR increased by 2 years to 65 years for men and 74 for women. During the same period life expectancy rose 8-10 years in Southern European countries starting from a similar base. In the world as a whole life expectancy increased by 13-14 years during the same period. Then, between 1990 and 1995 in Russia (and many other east European states) there was a sudden sharp rise in mortality and consequent fall in life expectancy. During these 5 years it fell from 74 to 71.5 years for women and from 65 to 57.5 years for men before recovering slightly in the next two years (Bennet, Bloom and Ivanov 1998). This is an increase in mortality comparable to that caused by the worst wars, famines, epidemics and natural disasters. It is estimated that the number of person years of life lost in Russia alone is three times that caused by AIDS in the United States during the same 5-year period (Bennet, Bloom and Ivanov 1998). The figures reveal that something had already been adversely affecting mortality in the region since 1960. But the immense increase from 1990 to 1995, it is generally agreed, has to do with the collapse of the Soviet form of government, leading to the break-up of the USSR, the pursuit of market reforms and widespread social disruption and financial and political instability.

The mortality crisis has been very concentrated: it affects men considerably more than women, and especially men aged between 20 and 65, with the greatest effect of all being in the 30 to 50 age group (see Figure 10a). And the rates of mortality increase are also disproportionately high among single men, among poorer people, in the more remote rural regions of Russia and among less educated people (Becker and Hemley 1998; Schkolnikov et al 1998).

Not all the causes of the mortality crisis are agreed but some indications are clear from the available evidence. In spite of the decline in public health spending in the region not much blame is put by analysts on this factor. There has not, for instance, been a significant increase in infant mortality (see Figure 10a) and male 5-9 years mortality has unaccountably improved during the crisis (Becker and Bloom 1998; Bennet, Bloom and Ivanov 1998). While real per capita incomes have fallen very fast during the transition crisis the inter-regional evidence does not suggest that this has been the immediate direct influence on mortality. The erratic joint movement of life expectancy and income per head is shown in Figure 10b.

Between 1990 and 1995 the percentage increase in the different causes of death were as follows: infection and parasitic diseases +113%, neoplasms -0/2%, diseases of the circulatory system +64%, diseases of the respiratory system +108% and accidents, injuries and poisoning +77 percent. Within the latter category, deaths from alcohol poisoning, suicides and murder have risen particularly fast (Schkolnikov et al 1998). This category, though it has not risen the fastest of all, causes considerably more deaths than any of the other kinds of diseases mentioned above and is about 5 times higher in Russia than among the black population of the USA (Becker and Hemley 1998). This pattern of cause, as well as other factors, point to increased alcohol consumption as a major risk factor. Mortality in fact improved in the two years before the crisis while Gorbachev's anti-alcohol campaign was still in force. Alcohol may explain much of the difference between male and female mortality. And its importance is consistent with a disproportionate rise in the mortality of poorer people. It has been estimated that the quantity of alcohol consumed by men between 1992 and 1996 was constant at 13 litres for the highest income quintile but rose from 14 to 38 litres (+171%) for the poorest quintile (Zahoori et al 1998). Even so, this does not explain why women's mortality has also risen considerably, since women's alcohol consumption has not greatly increased. Most recent analysts seem to think that behind all the specific statistics is a level of causation which is difficult to quantify but is related to the sudden change from an extremely conservative and protective society which Soviet Russia became, to a society in the course of massive, unpredictable change beset by violence, confusion, uncertainty, unemployment and the need to resolve the problem of survival anew every day. That may well be so, although it seems worth pointing out that Nicaragua, for example, where during the last two decades or more that need to survive from day to day has been part of the life of a great part of the population, has experienced a steady rise in life expectancy to a level higher than that in Russia and most ex-communist countries in Europe, previously thought of as developed. Perhaps Nicaraguans are more experienced in coping with instability and the improvement in Russian mortality figures from 1995 to 1997 attest to the Nicaraguanization of Russian society. Or perhaps, as some analysts interestingly speculate, the key question is 'social cohesion': being part of groups which know how to survive collectively and which produce mutual support (Kennedy, Kawachi and Brainerd 1998).

And in a sense that may mean groups which prevent despair. The apparent importance of alcohol consumption in the Russian demographic crisis, in particular the prevalence of binge drinking, suggests that what is really happening for many people is not far from being a form of suicide. One wonders, therefore, if its causes have anything in common with other situations in recent years in which rates of suicide have risen steeply. Cases are to be found in many western European countries among young people, especially young men; in France the suicide rate has risen by 50% in the last 20 years and suicide is the first cause of death among the age group 25-34. The most striking of all of these cases is Ireland where there has been an extraordinary rise in suicides among young rural men. In the USA since 1950 suicide rates

have fallen among people over 45 and risen the age groups 25-44 and 15-24, especially the latter (Cutler and Meara 2001). In a community which seems as different as possible from these, namely China, there has been a similar increase in the number of suicides by young rural women, frequently as a result of drinking pesticide (Rosenthal 1999).

It is an immense task to investigate what there might be in common between these increases in suicide. It is true that all of them take place in communities affected by very rapid social and economic change, in all cases in the direction of a 'transition' to a more competitive market economy. But if there is a cause in common what could it be — the social change itself, its speed, the lack of social protection against its worst effects, the difference in its impact on genders? The possibilities are wide ranging. But they all point to the fact that mortality is one of the social variables which is affected by virtually any social change. As social scientists we are always recommending change. Usually we presumably want our recommended changes to prolong life. But it is as well to be aware that some of them, for reasons which we do not remotely understand, may shorten lives.

The contributors to the special issue of *World Development* in November 1998 in which the former Soviet Union's demographic crisis is analysed all seemed agreed that the worst part of the demographic crisis was now over. The most recent figures suggested that some of the lost ground in life expectancy was being recovered and no major worsening is expected in the coming decades. The ink was scarcely dry on their articles, however, when new warnings appeared of a possible impending second mortality crisis in the same countries. UNAIDS, the international agency charged with monitoring AIDS worldwide, singles out Russia and other ex-communist states as those where the number of new HIV-infections is growing most rapidly. The danger signs of an impending AIDS epidemic are acute. The data show a sudden enormous increase in newly diagnosed HIV infections in the Russian Federation precisely in the two years 1995 to 1997 when mortality figures recovered somewhat from the crisis. UNAIDS estimates that at the end of 1999 the total number of infections in Eastern Europe and the ex-USSR was 360,000, having risen by a third during that year (UNAIDS 1999). Also from about 1992 onwards there was a sudden rise in the reported annual incidence of syphilis in Russia, Belarus, Moldova and Ukraine. The connection between the two facts is not clear since the Russian AIDS Centre attributes very few of Russia's HIV infections during the period 1987 to 1997 to unsafe sex; it attributes the enormous majority of cases with known transmission routes to injections with used and shared needles. The number of new HIV infections in Western developed countries has fallen in the last few years, something which has resulted from a very hardly acquired sense of social solidarity among the gay and drug-using communities in which the infection has been concentrated, and also in places from slowly more enlightened state policies. The decline in mortality has been even more striking that the decline in new infections; and that is due to the use of new pharmaceutical treatments. In Russia, if the epidemic is still relatively new, it is growing faster than anywhere else; and it seems extremely doubtful if, in its present chronic instability, either the social solidarity, the state enlightenment or the money exists to decisively reduce infections and mortality (UNAIDS 1998).

The calamitous effects that AIDS can have on mortality in countries without these conditions is shown in the second area of the world to experience in the last decade of the 20th century a mortality crisis - central and southern Africa. UNAIDS estimated that at the end of 1999 8 percent of adults in Sub-Saharan Africa were HIV-positive. The UN Population Division estimates that in five countries (Botswana, Zimbabwe, Zambia, Uganda and Malawi) life expectancy fell by 10 years during the decade of the 1990s and that by 2010 life expectancy

in Southern Africa as a whole will have fallen to 45 years, compared with a peak of 59 in the early 1990s and with an expected 2010 level of 67 in South Asia, assuming that the AIDS epidemic does not accelerate there (UNAIDS 1999). These reversals, and that of Russia, are clearly visible in Figure 9b which takes the story up to 1997. In Uganda it is calculated that the part of the population without HIV infection has a life expectancy 20 years greater than the population as a whole. In parts of Uganda and Tanzania more than half of all deaths of adults are due to AIDS/HIV. Other countries, including South Africa are also severely affected by this mortality crisis, which in many parts of the region is already much worse even than the mortality crisis of the former Soviet Union (UNAIDS 1998).

The crisis is not only one of individuals, families and villages but of society in a more general sense. Such a massive and sudden increase in deaths is difficult for communities to absorb, both emotionally and economically. Observers have reported from African villages how the traditional form and function of a funeral have had to be abandoned. In nearly all societies funerals both mark tragedies and aid social continuity. They are (often expensive) social occasions which help to purge the death emotionally; they enable families and friends periodically to renew their links and friendship (or hostility). When deaths come so fast none of this remains possible. The dead are disposed of as cheaply as possible. In some southern African countries there has been a mushroom expansion of the coffin-making trade, a kind of twisted economic compensation for the epidemic (McNeil 1998). But the most affected communities are really, to repeat Oscar Wilde's macabre jest, 'dying beyond their means' in all possible senses.

From mortality to death

At the beginning of his memoir on his period of banishment by Mussolini to a remote southern Italian village (*Christ Stopped at Eboli)* Carlo Levi returns in his imagination "... to that other world, hedged in by custom and sorrow, cut off from History and the State, eternally patient, to that land without comfort or solace, where the peasant lives out his motionless civilization on barren ground in remote poverty, and in the presence of death" (Levi [1947] 1982). Death here is not a statistic but a chronic tragedy.

Most studies of mortality look at mortality rates and life expectancies but not so much at death itself. But different patterns of mortality change the phenomenon of death. The j-shaped distribution of mortality by age, common to all countries, surely underestimates the social and cultural dimension of death in different communities. Those curves suggest that, although some countries have tragically high infant mortality, death is still basically what happens to people who have grown old. If, however, we look not at mortality rates but at the deaths which actually take place a different picture emerges. In a country with high infant mortality rates and a high proportion of children in the population, death is not predominantly something suffered by old people but by children. Though many of the poorest countries lack the appropriate figures, some startling examples exist: in Mali almost 60 percent of the people who die are under 5 years old; in Pakistan 40 percent of those who die are under 1 and 50 percent under 5. In the UK by contrast almost more than three quarters of those who die are over 70 years old and half are over 80. Figure 11a shows the cumulative distribution of death by age for the 8 regions used by the GBD study. And 11b shows similar information by country, based on data from the United Nations *Demographic Yearbook* of 1997. But the overall picture conveys the enormous difference which the phenomenon of death assumes in different countries. In Britain, like other rich countries, it is exceptional for a young person to die. In many parts of Africa the death of an old person is the exceptional event. When, as a

matter of course, children die before their parents, the presence of death must be especially oppressive.

From medicine to political economy

In developed countries, however, it is illegal to die of old age; one must die of a recognized fatal disease. Death certificates must carry a medically authenticated cause of death. And when a person dies naturally but is not known to be suffering from a life-threatening illness an autopsy is performed until a doctor is satisfied as to the cause of death. Such a measure may be necessary as a protection against murder, though in many cases it results in bureaucratic torment for bereaved people. It is only the absence of death registration in poorer countries which stops all deaths in the world being given a medical cause. And the primary thing which the authors of the GBD have done is to fill in those blanks in a plausible way.

But theirs is not the only way of looking at the cause of death, nor is it necessarily the most important. The GBD study analyses the deaths which take place according to various criteria: age and sex, proximate medical cause and 'risk factor'. The first ten medical causes of death in the world in 1990 were found to be: ischaemic heart disease, cerebrovascular disease, lower respiratory infections, diarrhoeal diseases, perinatal disorders, chronic obstructive pulmonary disease, tuberculosis (HIV seropositive excluded), measles, road-traffic accidents, trachea, bronchus and lung cancers. Together these ten cause 52 percent of deaths. The study remaps this data in various ways. One of them is to take disability-adjusted life years (DALYs) lost instead of deaths and calculate the importance of the 10 most significant causal 'risk factors' (a hybrid category which includes medical, social and environmental conditions). The percentage of the world's lost DALYs accounted for by each factor were found to be: malnutrition (15.9), poor water, sanitation and hygiene (6.8), unsafe sex (3.5), tobacco (2.6), alcohol (3.5), occupation (2.7), hypertension (1.4), physical inactivity (1.0), illicit drugs (0.6) and air pollution (0.5) - a total of 38.5 percent (Murray and Lopez 1996 a and b, 1997).

But the cause of death or disability has many dimensions. It is not only a question of medical science but also of common sense. We all understand what it is to die of old age; it seems not to matter all that much whether a very old person dies of heart disease or cancer; we feel that they were bound to die of something. And surely the poets, doctors notwithstanding, have convinced us that is possible to die of unrequited love, or neglect or rage or despair. Social scientists could also usefully join in this activity of divining the causes of death and disability. The majority of deaths, as the GBD shows, are in some sense biologically premature. A task of social science in relation to development could in a sense be seen as that of explaining the social and economic causes which underlie that biological prematurity. The explanation of why not everyone can die in, if not of, old age is more than anything else a task for us. We need to try to remap these deaths not just according to disease, or risk factor, but in social, economic and political categories. To know what percentage of deaths and disability in the world now take place due to poverty, to lack of education and knowledge, to inequality and all its causes, to lack of medical facilities or appropriate health policies, to the research and pricing policies of pharmaceutical companies, the advertising and marketing policies of tobacco companies, to the absence of sufficient international economic aid, to prejudice which prevents adequate education about safe sex, to discrimination and violence based on sex, race or sexuality or to the multitude of other socially and economically pathological factors which can contribute to premature death. The recent advances which,

thanks to demographers and epidemiologists, have been made in our knowledge about death and deaths in the world make this important task more feasible than ever before.

Unmasking the social causes of premature deaths can be seen as a counterpart to the powerful political movements which have arisen to confront dictatorship on behalf of those missing through political oppression. It is part of an effort to reveal the fate of the world's billions of missing persons, and so a contribution to preventing others from sharing their fate in the future - in other words to development.

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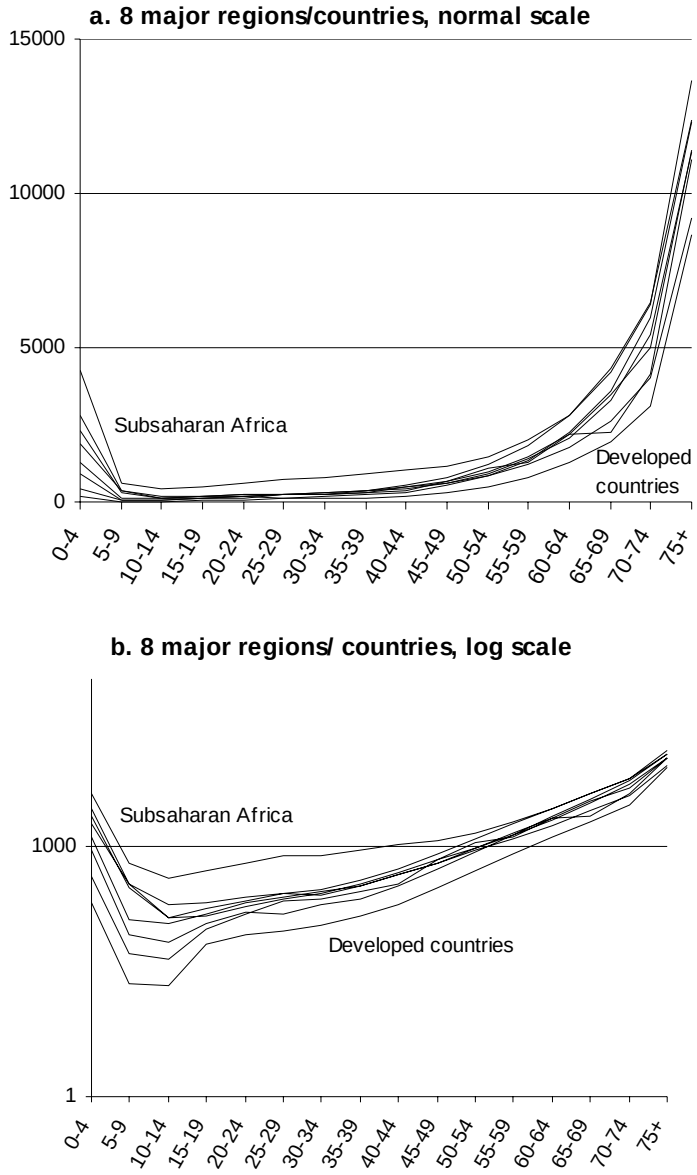
Figure 1: Regional and historical comparison of age-specific death rates



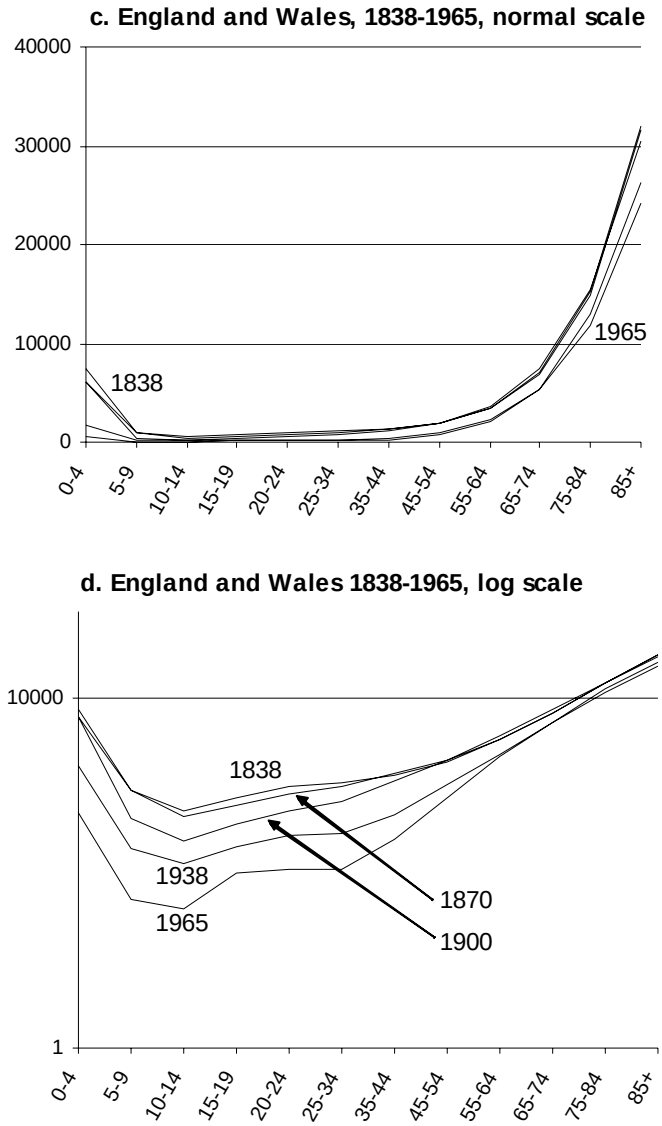


Figure 2: Ratios of age-specific mortality rates: Subsaharan Africa/Developed Market Economies, 1900 and England and Wales, 1838/1965

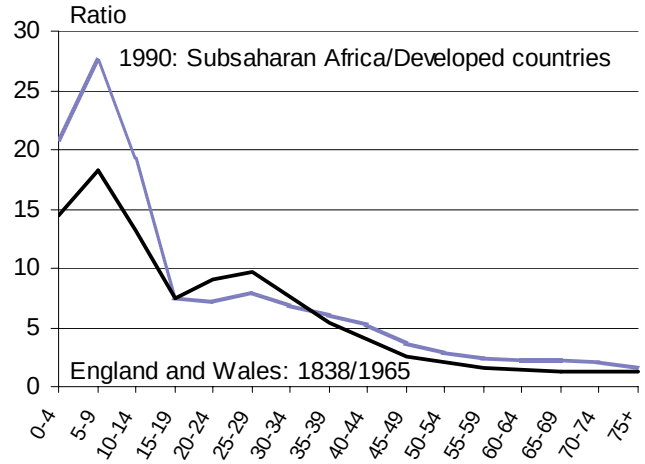


Figure 3: Ratio of male to female mortality by age

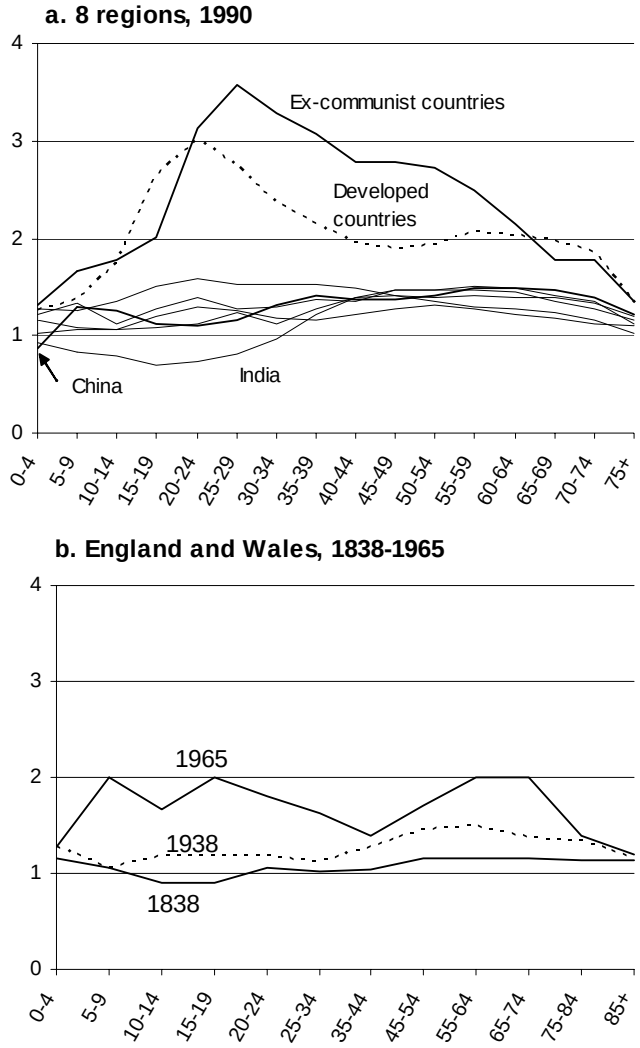


Figure 4: Rations of male to female and black to white age-specific mortality rates, United States, 1996

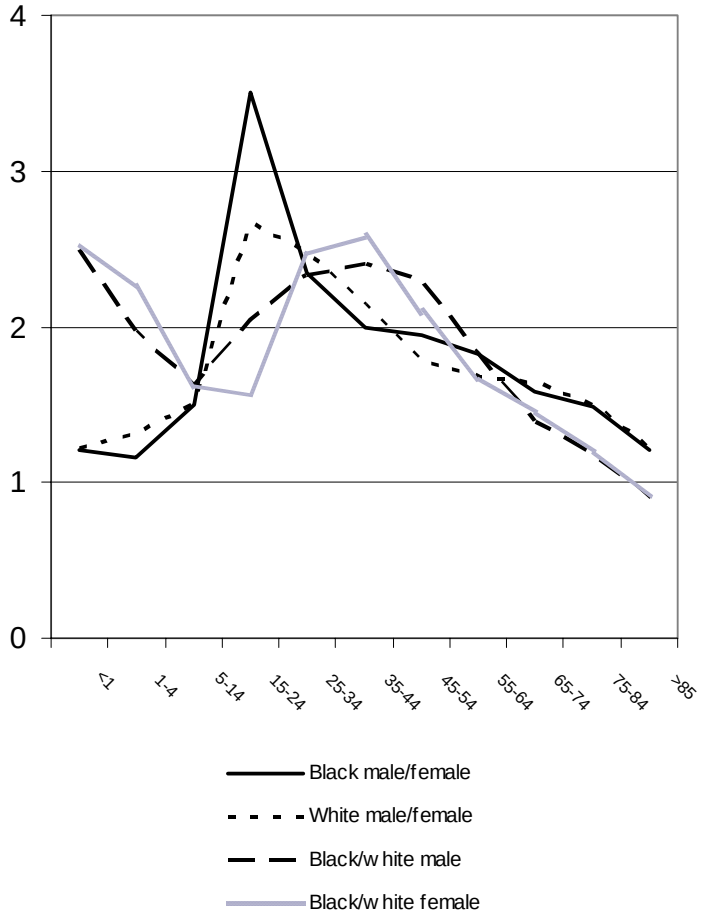


Figure 5: Standardized mortality rates, UK men aged 20-64,per 100,000 population

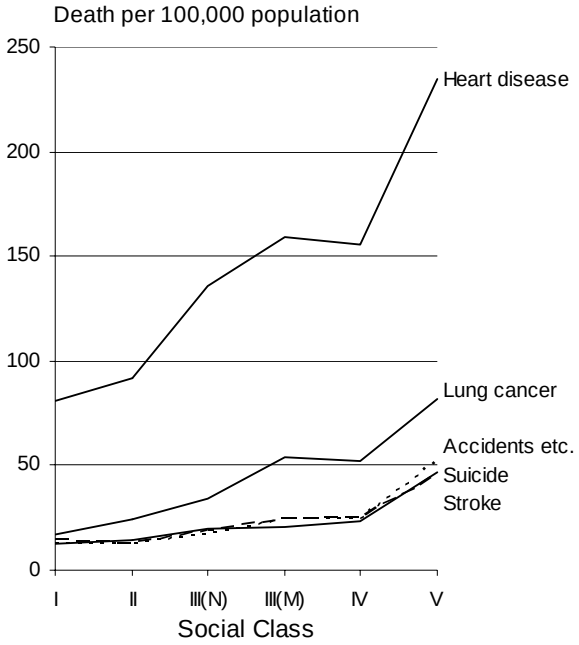


Figure 6: Life expectancy and disability, 8 regions 1990

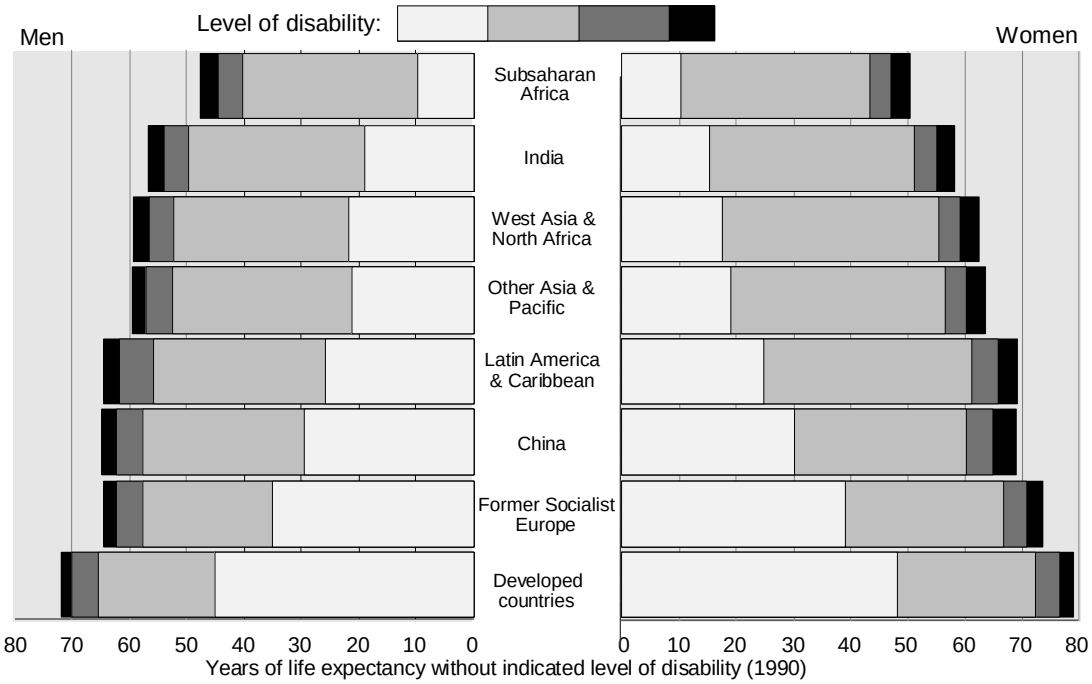


Figure 7: Regional patterns in the cause and age of death, 1990

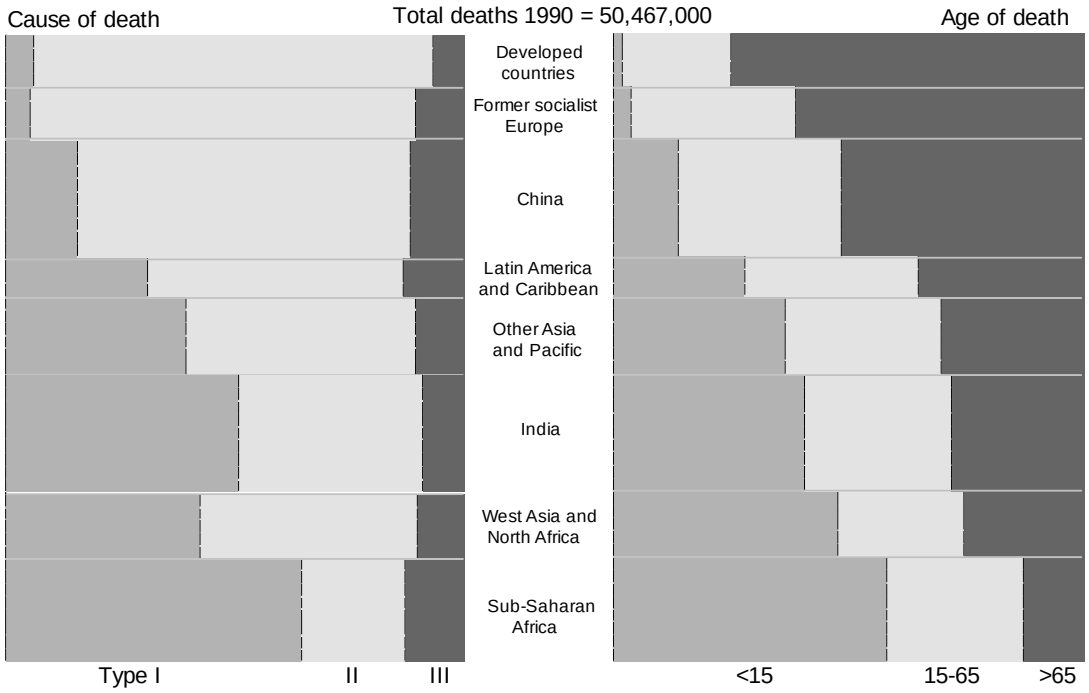


Figure 8: Differences in male and female mortality by age and cause of death, 1990

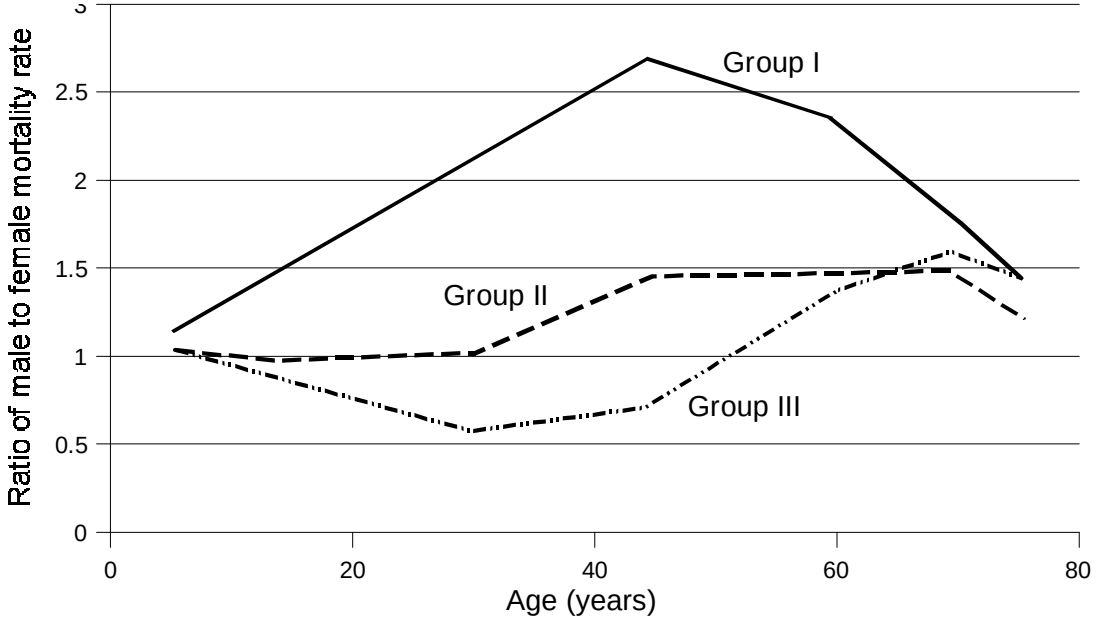


Figure 9: Trajectories of income per head and life expectancy

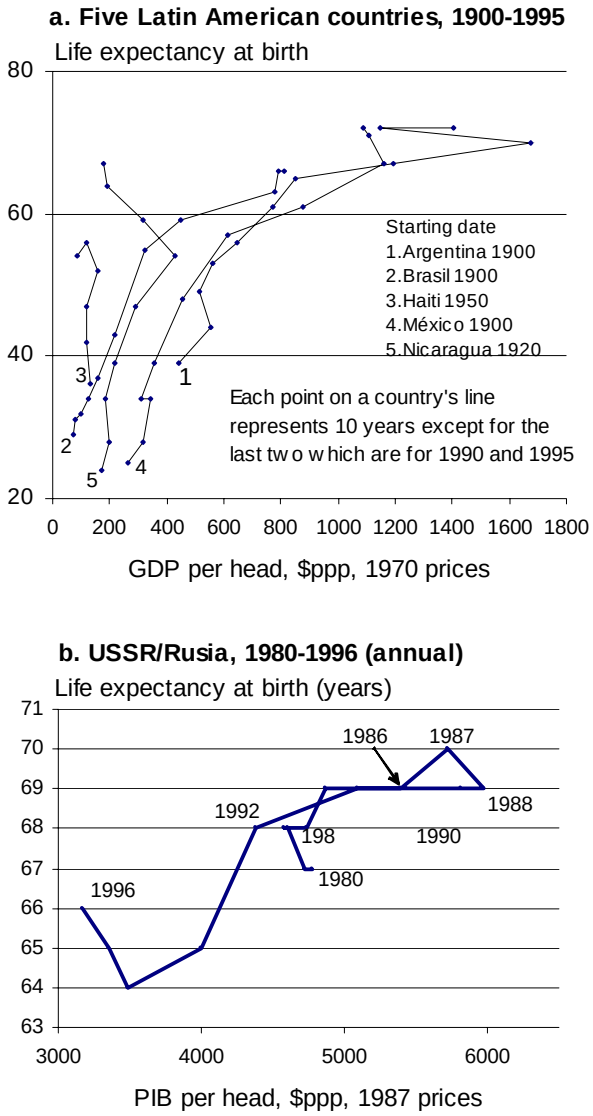


Figure 10: Age-specific death rates of men, Russian Federation, 1978-1995

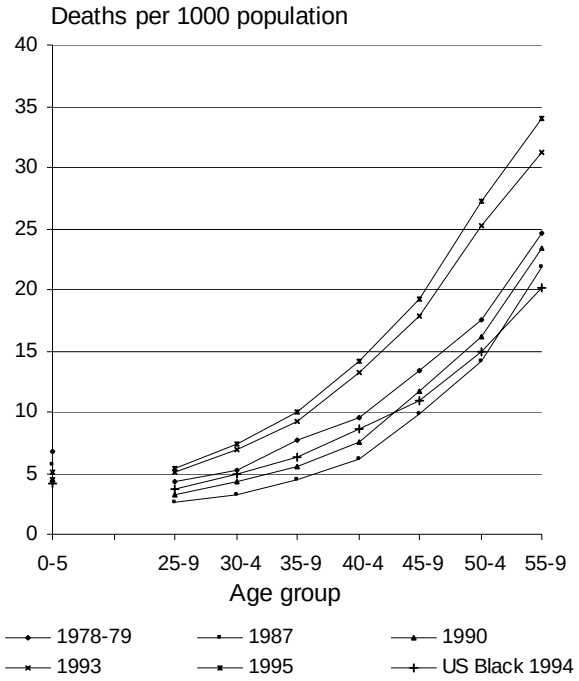
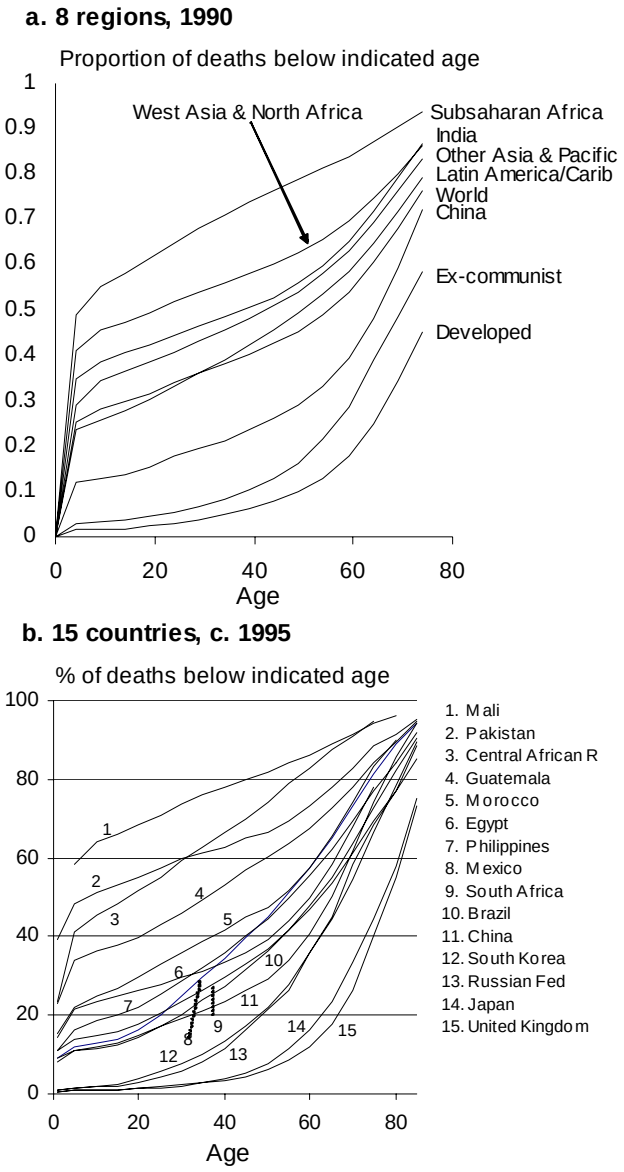


Figure 11: Deaths by age



Sources of the Graphs:

Figure 1, a–d: Murray and Lopez 1996a and b
Figure 2: Murray and Lopez 1996a and b; Mitchell and Deane 1962; Mitchell and Jones 1971
Figure 3, a: Murray and Lopez 1996a and b; **b:** Mitchell and Deane 1962; Mitchell and Jones 1971
Figure 4: United States Census Bureau 1999
Figure 5: Acherson and others 1998
Figure 6: Murray and Lopez 1996a and b
Figure 7: Murray and Lopez 1996a and b
Figure 8: Murray and Lopez 1997
Figure 9, a: Astorga and Fitzgerald 1998 in Thorp 1998; **b:** Shkolnikov and others 1998
Figure 10: Shkolnikov and others 1998
Figure 11, a: Murray and Lopez 1996a and b; **b:** United Nations 1999