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Social mobility and health: cause or effect?

More likely that adverse social circumstances cause ill health than the other way around

Since the publication of the Black report in 1980,[1] health researchers throughout the industrialised world have given extensive attention to the issue of inequalities in health. Health inequalities are large, widespread, and remarkably persistent. Different socioeconomic indicators give roughly the same picture, showing inequalities with a variety of health measures[2] in both sexes and at all ages, with adolescence as a possible exception.[3] The consistent and robust links between socioeconomic status and health suggest that scientists of different disciplines have a lot to explain.

Much discussion has been devoted to the relative explanatory power of two hypotheses: social causation and health selection. The social causation hypothesis maintains that health is related to socially determined structural factors such as working environment or behavioural factors such as diet. The health selection hypothesis maintains that social mobility is affected by health, and that the healthy move up the class hierarchy while the less healthy move down.

In this week's issue of the *BMJ*, two studies shed new light on the health selection-social causation controversy. The two studies have different methodological designs, age span, and health measures. What they share is an interest in health related social mobility—that is, selection. It may seem contradictory that one paper finds selection to be important[4] while the other does not.[5] However, the term "selection" is ambiguous and multidimensional. It can refer to mobility between and within generations, between social classes, and into and out of the labour market. Power *et al* (p 449) focus on health related class mobility between and within generations.[5] Bartley and Owen (p 445) examine intragenerational health related mobility into and out of the labour market in different social classes,[4] a process that in occupational medicine has been labelled the "healthy worker effect."[6]

Power *et al* use longitudinal follow up data to analyse the effects of health related mobility and cumulation of social circumstances among men and women aged 33 years.[5] The authors find that health related mobility does occur but does not explain health inequalities at age 33, a paradox that is due to the small numbers affected. This finding is supported by earlier evidence.[7 8] What does explain the inequalities is lifetime social circumstance as indexed by earlier social class recorded at several points of time.

Even the most persistent opponents of the health selection hypothesis admit that health selection occurs from time to time.[9] However, the proponents and opponents divide when it comes to the explanatory power of this hypothesis: the proponents argue that its effect could be substantial,[10] the opponents maintain that its contribution is only marginal.[9] In light of this disagreement it is noteworthy that Power *et al* show that health related mobility between generations seems to have little role in producing health inequalitites.[5] One of the most distinguished defenders of the selection hypothesis, West,[10] argues that health related selection is most likely to occur between childhood and early adulthood— that is, as people move from their parents' class to their own achieved class. This is exactly the life stage covered by Power *et al*. Another advantage of Power *et al's* analysis is that it accounts for both direct and indirect health selection— that is, mobility related to manifest illness as well as to latent health potential such as height. The study is limited in that it looks at only self assessed health, so that we cannot be sure that the conclusion applies to more specific health measures such as serious psychiatric disorders like schizophrenia.[11]

Bartley and Owen analyse time series data on men aged 16-59 years derived from the general household survey for the period 1973-93.[4] They show that men with limiting long standing illness are much less likely to be employed if they are manual workers, a tendency that increases as unemployment rises but does not diminish as unemployment falls. This suggests that manual occupations have become more "health selective" over the past 20 years. It is noteworthy that this healthy worker effect has increased over the past 20 years. Similar patterns have been found elsewhere.[12 13] As Bartley and Owen point out, this contradicts the theory that people in poor health are more likely to enter manual occupations with low status. In addition, two important methodological implications should be mentioned. The first concerns bias in the measurement of trends in class inequalities in health. Unless people who have been employed are systematically included in the analysis according to their previous occupations, the increasing healthy worker effect will give a false picture of shrinking health inequalities over time. Secondly, comparisons of health inequalities between countries might be severely distorted if the healthy worker effect is not properly accounted for.

The social and health policy implications of the two papers are that measures of intervention and prevention should be implemented early in life in order to resist the cumulation of adverse social circumstances, if at all possible. However, Power *et al's* analysis remains abstract.[5] We do not know what the specific environmental or behavioural factors are. There would be great advantage if these health factors could be identified.

Even in the highly developed and egalitarian Scandinavian welfare states, which provide relatively generous benefits to groups outside the labour market, work is by far the most important source of welfare.[14] Being excluded from the labour market because of poor health will, in the long run, result in a reduction of income and standard of living, which in turn might result in even poorer health. Thus, measures aimed at

improving the employment prospects of people with chronic health problems would maintain their living standards, which is an important task in itself, and in addition contribute directly to better health and wellbeing.

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The future of epidemiology

It's bright, but epidemiology and publicity can be a dangerous mix

Few can challenge the assertion that epidemiology has been central in the control of infectious diseases, nor that it has contributed more than any other discipline in the identification of causes of cardiovascular diseases (from the classic to the more recently identified)[1 2] and several forms of cancer (from tobacco smoking and occupational carcinogens to several infectious agents).[3-5] However, concern has recently arisen that epidemiology has either exhausted its potential or, worse, is generating conflicting results that confuse the public and disorient policy makers.

The argument about stagnation is hardly justified. The clarification of the role of blood lipids and the documentation of the effects of aspirin, ethanol, homocysteine, and factor V Leiden mutation are major recent breakthroughs in cardiovascular epidemiology, as is the identification of hepatitis viruses B and C and certain strains of human papillomavirus as definitive human carcinogens. Even a result that has been so consistent as to become boring—the protection provided by vegetables and fruits against several forms of cancer[6]—was not universally accepted 20 years ago.

More often, epidemiology has been indicted for rousing unsubstantiated fears about everyday exposures, through studies that are subsequently challenged by other epidemiological investigations. In a widely publicised special news report in *Science* Gary Taubes wrote that "the news about health risks comes thick and fast these days, and it seems almost constitutionally contradictory."[7] The article points out that for just a single disease, breast cancer, there have been conflicting reports in major journals during the past year about whether magnetic fields, dicophane (DDT), and abortions increase the risk and whether breast feeding reduces the risk. There are several reasons why epidemiological results cannot always be expected to converge. Epidemiological studies are undertaken in different populations and under different conditions; a different set of background variables that can interact with the main exposures under investigation would generate divergent findings. Moreover, epidemiology is, as a rule, non-experimental and this fact alone increases the margin of error on account of residual confounding and subtle biases. Nevertheless, conflicting findings are no more common in epidemiology than in animal research or clinical investigations.

The issue is really that epidemiological findings and epidemiological contradictions are widely publicised, whereas this is not true of animal studies or other types of experimental research. It is unavoidable that the general public is more interested in what may happen to humans than in what may happen to a particular strain of mice or a certain laboratory system. Whether publicity is conducive to good science is debatable, but this is perhaps besides the point: a free press is an integral part of democracy, and it is predictable that whatever attracts the interest of the public will be reported by the media courtesy of journalists, authors, or even editors. Some people are concerned that the publicity surrounding contradictory reports may reduce the credibility of epidemiology, or even of science in general. If this were to make people more sceptical and more critical it would be a welcome development, since it would imply that the general public shares the mindset of epidemiologists themselves. The aim of epidemiology is to decipher nature with respect to human health and disease, and no one should underestimate the complexities of epidemiological research.

What is the future of epidemiology? The subject is likely to expand and flourish, as witnessed by the emergence of several subsidiary specialties like clinical epidemiology, behavioural epidemiology, and molecular epidemiology.[8] However, practitioners of the discipline and consumers of epidemiological results should always keep in mind the limitations of epidemiological investigations.[9] A simple principle should guide aetiological inferences in epidemiology: a sharp relative risk gradient can be considered to indicate a causal relation even in the absence of an adequate biological explanation, but weak empirical associations indicate a causal relation only when the supporting biological evidence is overwhelming.[10]

What will be the main focus areas of epidemiology in the future? Those who believe that there is no more room for innovation should be reminded of the fears expressed in the previous century that composition of music was approaching its limits. Modern music continues to thrive as modern epidemiology is likely to, even though both fields have their detractors. Moreover, epidemiology will benefit from technological advances like any other science. This has often happened in the past, and recently causes of cancers of the liver and uterine cervix were identified after the development of laboratory procedures for detecting chronic infection by the responsible viral agents.[4 5] There will also be an increasing emphasis on specificity through large studies that will allow reliable distinction between genuine and false positive results. Clinical epidemiology is likely to improve the way clinical medicine and health services research are defined, implemented, and evaluated. As more and more genes that predispose to disease are discovered there will be an urgent need to identify exogenous factors that interact with these genes in the occurrence of human disease. Finally, conceptual shifts—for example, focusing on early life events—may enrich future epidemiological research, and theoretical developments may contribute to the epidemiologi-