Determinants of Health

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The question of what determines health is very important. If we, as a society, can agree about what causes health, then we should be able to agree on where our financial resources should be placed in order to get the best results from our investment. If there is a single most important lesson to be obtained from studying the history of health, it must be this one:

It turns out, of course, that defining "health" is not as simple as it might first appear. The World Health Organization says that health is not merely the absence of disease but an overall state of physical, mental, and social well-being. You may think such a definition seems utopian, but most scientists and scholars would agree, however, that levels of disease in a population (morbidity) and the frequency of death at particular ages in a population (mortality) represent essential, if gross, measures of health. In other words, improved health is reflected in the decline of mortality.

We can ask this historical question more specifically. What is the role of medicine in the improvement of health? If by "medicine" we mean biomedical clinical care including modern inventions like x-rays, antibiotics, and immunizations, then it is possible to compare mortality rates before and after significant medical interventions were introduced. This is exactly the topic of Thomas McKeown's famous book, The Role of Medicine: Dream, Mirage, or Nemesis? (1979), as well as this selection. McKeown demonstrates that the biggest advancements in health occurred after specific medical interventions became available. He suggests (but he doesn't have the data to prove this) that more significant factors regarding health improvement involved sanitation, better food, and birth spacing. This argument has been controversial, largely because there is a widespread presumption in our society that improved health in developed countries is due to advances in medical knowledge and technological and scientific breakthroughs in biomedical science. McKeown disputes this premise.

Medical anthropologist Stephen Kunitz has done a similar, focused study of historical changes in health status on the Navajo reservation and the impact of improved medical care because of Indian Health Service facilities (1983). His findings suggest that the determinants of health are more complicated than McKeown suggests and that access to medical facilities (in this case, a free health care system) has a measurable although rather small effect. Other influences of the dominant white society—for example, drinking and automobile accidents—are also important factors.

In the end, the study of health history does not hinge on an either/or decision. I believe that solutions to health problems are going to be found not in technology but in bringing about the more equitable distribution of adequate food, sanitation, housing, health information, and medical care services.

As you read this selection, consider these questions:

- In the United States today, we spend about 15 percent of our gross national product on health care. What do you think McKeown would say about this expenditure?
- Do many people actually believe the presumption that McKeown is arguing against—that modern health improvements are caused by modern medicine? What do your friends think are the determinants of health?
- What implications does McKeown's discussion have for combating infectious diseases in the Third World, where they are still a very significant cause of morbidity and mortality?

Modern medicine is not nearly as effective as most people believe. It has not been effective because medical science and service are misdirected and society's investment in health is misused. At the base of this misdirection is a false assumption about human health. Physicians, biochemists, and the general public assume that the body is a machine that can be protected from disease primarily by physical and chemical intervention. This approach, rooted in 17th Century science, has led to widespread indifference to the influence of the primary determinants of human health—environment and personal behavior—and emphasizes the role of medical treatment, which is actually less important than either of the others. It has
also resulted in the neglect of sick people whose ailments are not within the scope of the sort of therapy that interests the medical professions.

An appraisal of influences on health in the past suggests that the contribution of modern medicine to the increase of life expectancy has been much smaller than most people believe. Health improved, not because of steps taken when we are ill, but because we become ill less often. We remain well, less because of specific measures such as vaccination and immunization than because we enjoy a higher standard of nutrition, we live in a healthier environment, and we have fewer children.

For some 300 years an engineering approach has been dominant in biology and medicine and has provided the basis for the treatment of the sick. A mechanistic concept of nature developed in the 17th Century led to the idea that a living organism, like a machine, might be taken apart and reassembled if its structure and function were sufficiently understood. Applied to medicine, this concept meant that understanding the body’s response to disease would allow physicians to intervene in the course of disease. The consequences of the engineering approach to medicine are more conspicuous today than they were in the 17th Century largely because the resources of the physical and chemical sciences are so much greater. Medical education begins with the study of the structure and function of the body, continues with examination of disease processes, and ends with clinical instruction on selected sick people. Medical service is dominated by the image of the hospital for the acutely ill, where technological resources are concentrated. Medical research also reflects the mechanistic approach, concerning itself with problems such as the chemical basis of inheritance and the immunological response to transplanted tissues.

No one disputes the predominance of the engineering approach in medicine, but we must now ask whether it is seriously deficient as a conceptualization of the problems of human health. To answer this question, we must examine the determinants of human health. We must first discover why health improved in the past and then go on to ascertain the important influences on health today, in the light of the change in health problems that has resulted from the decline of infectious diseases.

It is no exaggeration to say that health, especially the health of infants and young children, has been transformed since the 18th Century. For the first time in history, a mother knows it is likely that all her children will live to maturity. Before the 19th Century, only about three out of every 10 newborn infants lived beyond the age of 25. Of the seven who died, two or three never reached their first birthday, and five or six died before they were six. Today, in developed countries fewer than one in 20 children die before they reach adulthood.

The increased life expectancy, most evident for young children, is due predominantly to a reduction of deaths from infectious diseases. Records from England and Wales (the earliest national statistics available) show that this reduction was the reason for the improvement in health before 1900 and it remains the main influence to the present day.

But when we try to account for the decline of infections, significant differences of opinion appear. The conventional view attributes the change to an increased understanding of the nature of infectious disease and to the application of that knowledge through better hygiene, immunization, and treatment. This interpretation places particular emphasis on immunization against diseases like smallpox and polio, and on the use of drugs for the treatment of other diseases, such as tuberculosis, meningitis, and pneumonia. These measures, in fact, contributed relatively little to the total reduction of mortality; the main explanation for the dramatic fall in the number of deaths lies not in medical intervention, but elsewhere.

Deaths from the common infections were declining long before effective medical intervention was possible. By 1900, the total death rate had dropped substantially, and over 90 percent of the reduction was due to a decrease of deaths from infectious diseases. The relative importance of the major influences can be illustrated by reference to tuberculosis. Although respiratory tuberculosis was the single largest cause of death in the mid-19th Century, mortality from the
improved hygiene and safer food and water, which reduced exposure to infection. With the exception of smallpox vaccination, which played a small part in the total decline of mortality, medical procedures such as immunization and therapy had little impact on human health until the 20th Century.

One other influence needs to be considered: a change in reproductive behavior, which caused the birth rate to decline. The significance of this change can hardly be exaggerated, for without it the other advances would soon have been overtaken by the increasing population. We can attribute the modern improvement in health to food, hygiene, and medical intervention—in that order of time and importance—but we must recognize that it is to a modification of behavior that we owe the permanence of this improvement.

But it does not follow that these influences have the same relative importance today as in the past. In technologically advanced countries, the decline of infectious diseases was followed by a vast change in health problems, and even in developing countries advances in medical science and technology may have modified the effects of nutrition, sanitation, and contraception. In order to predict the factors likely to affect our health in the future, we need to examine the nature of the problems in health that exist today.

Because today's problems are mainly with non-communicable diseases, physicians have shifted their approach. In the case of infections, interest centers on the organisms that cause them and on the conditions under which they spread. In noninfective conditions, the engineering approach established in the 19th Century remains predominant and attention is focused on how a disease develops rather than on why it begins. Perhaps the most important question now confronting medicine is whether the commonest health problems—heart disease, cancer, rheumatoid arthritis, cerebrovascular disease—are essentially different from health problems of the past or whether, like infections, they can be prevented by modifying the conditions that lead to them.

To answer this question, we must distinguish between genetic and chromosomal diseases determined at the moment of fertilization and all other diseases, which are attributable in greater or lesser degree to the influence of the environment. Most diseases, including the common noninfectious ones, appear to fall into the second category. Whether these diseases can be prevented is likely to be determined by the practicability of controlling the environmental influences that lead to them.

The change in the character of health problems that followed the decline of infections in developed countries has not invalidated the conclusion that most diseases, both physical and mental, are associated with influences that might be controlled. Among such influences, those which the individual determines by his own behavior (smoking, eating, exercise, and the like) are now more important for his health than those
that depend mainly on society's actions (provision of essential food and protection from hazards). And both behavioral and environmental influences are more significant than medical care.

The role of individual medical care in preventing sickness and premature death is secondary to that of other influences; yet society's investment in health care is based on the premise that it is the major determinant. It is assumed that we are ill and are made well, but it is nearer the truth to say that we are well and are made ill. Few people think of themselves as having the major responsibility for their own health, and the enormous resources that advanced countries assign to the health field are used mainly to treat disease or, to a lesser extent, to prevent it by personal measures such as immunization.

The revised concept of human health cannot provide immediate solutions for the many complex problems facing society: limiting population growth and providing adequate food in developing countries, changing personal behavior and striking a new balance between technology and care in developed nations. Instead, the enlarged understanding of health and disease should be regarded as a conceptual base with implications for services, education, and research that will take years to develop.

The most immediate requirement in the health services is to give sufficient attention to behavioral influences that are now the main determinants of health.

The public believes that health depends primarily on intervention by the doctor and that the essential requirement for health is the early discovery of disease. This concept should be replaced by recognition that disease often cannot be treated effectively, and that health is determined predominantly by the way of life individuals choose to follow. Among the important influences on health are the use of tobacco, the misuse of alcohol and drugs, excessive or unbalanced diets, and lack of exercise. With research, the list of significant behavioral influences will undoubtedly increase, particularly in relation to the prevention of mental illness.

Although the influences of personal behavior are the main determinants of health in developed countries, public action can still accomplish a great deal in the environmental field. Internationally, malnutrition probably remains the most important cause of ill health, and even in affluent societies sections of the population are inadequately, as distinct from unwiseiy, fed. The malnourished vary in proportion and composition from one country to another, but in the developed world they are mainly the younger children of large families and elderly people who live alone. In light of the importance of food for good health, governments might use supplements and subsidies to put essential foods within the reach of everyone, and provide inducements for people to select beneficial in place of harmful foods. Of course these aims cannot exclude other considerations such
as international agreements and the solvency of farmers who have been encouraged to produce meat and dairy products rather than grains. Nevertheless, in future evaluations of agricultural and related economic policies, health implications deserve a primary place.

Perhaps the most sensitive area for consideration is the funding of the health services. Although the contribution of medical intervention to prevention of sickness and premature death can be expected to remain small in relation to behavioral and environmental influences, surgery and drugs are widely regarded as the basis of health and the essence of medical care, and society invests the money it sets aside for health mainly in treatment for acute diseases and particularly in hospitals for the acutely ill. Does it follow from our appraisal that resources should be transferred from acute care to chronic care and to preventive measures?

Restricting the discussion to personal medical care, I believe that neglected areas, such as mental illness, mental retardation, and geriatric care need greatly increased attention. But to suggest that this can be achieved merely by direct transfer of resources is an oversimplification. The designation "acute care" comprises a wide range of activities that differ profoundly in their effectiveness and efficiency. Some, like surgery for accidents and the treatment of acute emergencies, are among the most important services that medicine can offer and any reduction of their support would be disastrous. Others, however, like coronary care units and iron treatment of some anemias are not shown to be effective, while still others—most tonsillectomies and routine check-ups—are quite useless and should be abandoned. A critical appraisal of medical services for acute illnesses would result in more efficient use of available resources and would free some of them for preventive measures.

What health services need in general is an adjustment in the distribution of interest and resources between prevention of disease, care of the sick who require investigation and treatment, and care of the sick who do not need active intervention. Such an adjustment must pay considerable attention to the major determinants of health: to food and the environment, which will be mainly in the hands of specialists, and to personal behavior, which should be the concern of every practicing doctor.

REFERENCES