DISEASE, MORTALITY, AND THE PROMOTION OF HEALTH

by David Mechanic

Prologue:
In some quarters there always has been the notion that once countries eliminated a backlog of neglect and improved their health standards, the demand for health care services would stabilize. Lord Beveridge, the driving force behind Britain’s National Health Service, thought this thirty years ago when his vision became a reality. And the framers of Medicare were generally of this view when they designed that program. But as David Mechanic points out, the notion that successful medical care will reduce demand is illusory and contrary to experience. Mechanic, university professor and dean of the Faculty of Arts and Sciences, Rutgers University, has been pointing out the shortcomings of the conventional wisdom with incisive rigor for more than a decade. At the Duke University Medical Center Private Sector Conference this year, Mechanic declared: “The issue is how do we reconcile the competing claims for limited dollars” when the economic incentives favor rendering the most sophisticated care. “Basically we are at an impasse and we are attacking at the weakest point—the poor.” Mechanic, one of the nation’s leading medical sociologists, points out in this article that numerous factors affect the occurrence of disease and patterns of mortality: age, sex, poverty, economic standing, schooling, marital status, religious participation, psychological well-being, social and community integration, employment, and living conditions. In many instances, he says, the promotion of health is more likely to be successful through an aggregate strategy involving a mix of education, technology, and regulation. “It is also clear that we do better to prevent noxious behavior (smoking, excessive drinking, drug addiction) initially in contrast to altering them subsequently.” Targeting high-risk groups is a sensible priority, Mechanic observes, but he concludes: “It is ironic that there is so little relationship between our aspirations and rhetoric and the willingness to support the steps to develop the necessary knowledge and programming for future efforts in health promotion.”
There is broad consensus that the prevention of disease and mortality depends primarily on our environment, our social structure, and the patterns of behavior we adopt. Health policy, whether at the federal, state, or local level, is overwhelmingly focused on a narrow view of medical technology and intervention, and the search for biomedical understanding is directed far more to maintaining life than to promoting health. Medicine has brought many impressive achievements, and contributed immeasurably to disease management and a sense of personal security; but curative medicine, however impressive, will always contribute at the margins of health programs.

Throughout history the idea of progress has been associated with the goal of eliminating disease, but it is an elusive objective. The prevalence of disease and the quality of health reflect broad environmental, socio-cultural, and medical factors, and new risks and problems appear with changing social structures, technologies, values, and medical progress as well. Disease problems are inevitable not only because life is finite, but also because therapeutic success provides new opportunities for vulnerable persons to survive and pass their disabilities on to their offspring. The common notion, then, that successful medical care will reduce demand for it is illusory and contrary to experience.

Despite these general constraints, progress in promoting health has been impressive. In this century longevity has increased substantially in all developed countries, and in many underdeveloped ones, in large part due to improved food production, standards of nutrition, and economic circumstances. In the first half of the century, progress was most notable in the control of infectious disease and infant death, but in many countries dramatic changes occurred as well in chances of survival at older ages. In the United States, life expectancy remained relatively constant after 1955 for a number of years, but more recent data show considerable gains in expected survival throughout the life span. Age-specific mortality for most causes, including cardiovascular disease, has decreased, reflecting a wide range of factors associated with standards of living, medical progress, and changes in behavior. The precise contributors still remain unclear.

The history of disease reminds us of the extent to which ill health occurs within a complex ecological context relating people and their social structures to their physical environment. There are numerous examples, but one lesser-known yet excellent study of malaria in the Upper Mississippi Valley illustrates the point. Prior to 1800, malaria was absent from the region, but grew to epidemic levels by 1860 with the large migrations of the early nineteenth century. By 1890 malaria had virtually disappeared from the region despite the fact that neither the mode of transmission, through the anopheles mosquito, nor any successful suppressive measures had yet been discovered.
Malaria followed the settlement of the Upper Mississippi Valley between 1810 and 1860 as it moved along rivers and other bodies of water which served as breeding grounds for mosquitoes. Clearing of land increased stagnant pools favorable to breeding by upsetting natural drainage systems. Railroads which moved along the river brought infected workers who helped spread the disease. During the early settlement, temporary log cabins, with few windows and no screening, allowed mosquitoes to thrive indoors, and poor living conditions and diet contributed to the population’s vulnerability.

Malaria declined with the drop in migration and increased stability of population. A more stable population developed paved streets and sewer systems, and built more permanent dwellings with more windows and better screening. All of these factors created less favorable conditions for mosquitoes. Moreover, a better-fed population was more resistant, and the introduction of cattle provided mosquitoes a more preferable host than people. In the middle of the century, with the expansion of railroads inland, away from waterways and low-lying areas subject to flooding, population expansion moved away from areas most conducive to disease spread. Within a half century malaria came and went with little input from medicine or biomedical science. Similar patterns of occurrence can be described for measles, tuberculosis, and many other infectious diseases. The point is not that medical science is irrelevant for it obviously is not; but the progression of disease crucially depends on the context in which it occurs.

Factors Associated With Health

Numerous factors affect the occurrence and course of disease and patterns of mortality. In each specific instance it is essential to understand the causal patterns that lead from biology, environment, or behavior to a specific disease process. But many social and environmental factors appear to have broad and nonspecific effects on a wide range of health outcomes affecting disease processes of varying etiologies and body systems. While these nonspecific effects may ultimately be explained by knowing all the specific causal processes, the more general associations have importance not only in our current understanding of patterns of disease and mortality, but also in preventive public health efforts.

Age and sex have traditionally been such influential predictors of disease and death that it is unthinkable to exclude them in any serious analysis. These, of course, are biological as well as social variables, which make it difficult to interpret effects. Women report more illness and use more medical care services than men, but they have an advantage in longevity of approximately eight years. Analysis of morbidity by sex
indicates that diseases more prevalent among women are for the most part not life-threatening, while those seen more commonly in men are, particularly cardiovascular disease. The lesser vulnerability of women to cardiovascular disease is in part biological, although life-style factors probably play a significant role as well. Much of the sex differential in mortality is linked to life-style and behavioral variables such as smoking, heavy drinking, risk taking, and violence.

Age is, of course, associated with a range of degenerative diseases and disabilities that become prevalent in middle age and increase over the life span. While medical measures can delay and help contain these disease processes, the development of chronic health problems with old age is inevitable. Social policy is perhaps better directed at alternatives to promote functioning and quality of life in old age than at heroic technologies that may only add short increments of life at great financial cost and personal suffering.

In addition to age and sex, an extraordinary number of studies link particular social variables with disease and mortality. While the conceptual definitions and measurements of the variables in question may vary from one study to another, and many specific studies lack necessary controls, there is much evidence that health and mortality are significantly affected by poverty, schooling, marital status, religious participation, psychological well-being, social and community integration, employment availability, and stable living conditions. These factors are more or less interrelated, and rigorous studies must separate confounded effects. Moreover, cause and effect is not clear, and the associations with health status may reflect the fact that people with particular health characteristics select themselves, or are selected, into varying social situations. Persons who are divorced, for example, may differ in a variety of ways from those who remain married, and those who participate in community affairs are different from those who are isolated. Factors connected with selection may account for some of the associations commonly found.

Poverty has long been associated with adverse health status and less favorable life expectancy. Such effects are greatest for those most deprived, and they moderate after a certain income threshold is reached. Income deprivation is linked with many factors influencing health directly such as diet, housing, availability of appropriate medical services, environmental hazards, social stress, and psychological distress. Beyond the effects of income, however, education has additional influence on health outcomes. While the schooling effect has never been fully explained, it is plausibly linked with health habits, improved coping capacities, and a stronger sense of confidence and self-esteem. Persons with more schooling are less vulnerable to disease and survive longer.

One of the most neglected, but influential, predictors of health is
marital status, comparable in size to the effects of a person’s sex. While marriage favors men more than women, both gain appreciably relative to the unmarried, and particularly relative to divorced persons. Some of the outcomes result from the alienation and distress accompanying divorce, exemplified by excessive drinking, accidents, and violence. But the marriage effect is nonspecific, affecting disease rates and mortality more extensively. Marriage, of course, is a powerful social institution and it not only typically provides established routines in respect to nutrition, sleep, and other matters, but also involves strong expectations, personal commitments, and goals beyond one’s own interests.

The findings in respect to religious participation, psychological well-being, and social integration all probably share a common core. There is no particular reason why persons attending church should live longer than those who do not, although churchgoing is probably related to greater conventionality and thus more regularity in life-styles. Moreover, religious participation may be associated with positive health behavior in respect to smoking, drinking, and other risks, consequences clearly apparent among Mormons, Seventh day Adventists, and other religious groups. Religious participation also implies a commitment, a sense of belonging, and a network of social relationships that many studies show to be important in dealing with adversities and maintaining health.

Beginning with the classic investigations of the famous French sociologist, Emile Durkheim, there has been an impressive cumulation of studies showing that unattached and alienated persons, estranged from the social ties and expectations of group associations, not only have a higher risk of suicide but also a variety of other adverse health outcomes. Recent studies of considerable rigor and sophistication demonstrate that intimacy and social networks not only protect against the occurrence of depression and other morbid conditions, but also promote longevity.

Integration into larger social networks of associations not only provides an arena for personal and social commitment, but also may offer an established and health promoting routine, social support, and tangible assistance when needed. Group association may serve as a basis for personal gratification and self-esteem as well. While the concept of social integration implies a variety of causal interpretations, studies more specifically focused on psychological distress demonstrate clearly that personal distress is always associated with a range of bodily symptoms connoting health problems.

Subjective physical health status denotes not only the magnitude of tangible physical problems, but also psychological feelings. While physicians seek to identify specific disease problems, patients focus more on how they feel and how they function in their everyday activities. Thus
their perceptions of health are profoundly affected by their sense of psychological well-being. Poor health and mortality also are associated with involuntary disruptions in people's adaptations to their environment, including such events as unemployment, forced retirement, and involuntary relocations. Employment, of course, is related to economic as well as psychological factors, but for many—if not a majority—of the population, work provides a sense of meaning, participation, and involvement with others that is central to one's life. Even voluntary retirement is experienced commonly as discontinuous and highly stressful, and retired persons, who lack significant avocations, often deteriorate rapidly. The causal sequence is complex, since retirement is often accompanied by a significant reduction in income and change in lifestyle, and aging is associated with more health problems. But dramatic and discontinuous effects often follow retirement.

The significance of "meaning" affecting biological events is illustrated in an intriguing study of "death dips" prior to events of important cultural significance. A "death dip" is the occurrence of fewer deaths than expected. Studies of various groups of famous people show that they are more likely to die following a birthday than before, and the more famous the individuals, the larger the death-dip. The more famous the person, the more likely it is that his or her birthday will be publicly celebrated, or associated with tokens of respect and admiration. A death-dip prior to presidential elections, and for Jewish populations prior to the Jewish Day of Atonement, have also been demonstrated. Although the biological mechanism remains undiscovered, people can postpone their deaths, an observation commonly made by clinicians working with critically ill patients. That death can be very much accelerated through psychological processes has long been recognized, dating back to Walter Cannon's discussion of voodoo death.

Finally, there is abundant historical data tracing patterns of disease and mortality following forced relocations of populations, the movement of populations from rural to urban living, and movement of elderly patients from one institution to another. While these data tend to be sketchy, they depict populations experiencing rapid social change in their surroundings as disoriented. Such periods appear to be characterized by high rates of disease and mortality until the population adjusts to its new surroundings. Elderly persons moved from one institution to another die beyond usual expectations, and so do persons losing a spouse. John Cassel, an eminent epidemiologist who devoted many years of study to such questions, suggested that rapid social change undermined the adaptive capacities of populations that had evolved over long periods of time, and the effects of such changes as movement from rural to urban factory life was suggested even for the offspring of those initially
affected. At a more manageable level for rigorous research, there has evolved a vast body of evidence linking life change events with the occurrence of illness. An important underlying hypothesis is that major changes require adjustments that strain the biological system and result in adverse health outcomes. While the debate continues on the types of events that most dramatically affect health and the causal processes involved, the literature supports the assumption that major discontinuity in living conditions increases vulnerability to ill health.

The literature, only very briefly summarized here, suggests five general conditions that appear to be conducive to the promotion of health in populations: (1) the availability of ample material resources; (2) interpersonal networks of association and support; (3) a reasonable level of skills to cope with ordinary challenges; (4) a personal sense of commitment to some valued ideology or social group; and (5) reasonable levels of stability in living situations. These conditions, in turn, affect the individual’s motivation and self-esteem and related behavioral factors that may either promote health or contribute to disease.

Intervening Factors

How broad sociocultural and community conditions affect health has been a continuing source of careful study and intelligent speculation, although the precise causal links that explain these associations still are not well understood. In some ways these sociocultural conditions affect basic biological processes including brain activity, endocrine function, and immune reactions that influence susceptibility to external disease agents and the unfolding of inborn processes. Selye’s concept of the General Adaptation Syndrome is one of the many characterizations of possible causal processes. Selye believes that many different environmental stimuli result in the same nonspecific biological responses that strain the body system and cause specific damage.

Sociocultural conditions obviously affect how people perceive their lives and life chances, and influence not only demoralization, which may have direct biological effects, but also attitudes and behaviors detrimental to health such as smoking, drinking, risk-taking, violence, poor diet, and neglect of preventive practices. The process is frequently self-reinforcing with demoralization affecting the quality of work, marriage and interpersonal relations, and the deterioration of these increases the risks to health and welfare.

The intimate relationship between psychological and physical health is not particularly surprising. More intriguing is the fact that persons who view their physical and mental health as less favorable are also less likely to engage in behaviors that are protective of health such as exercise and
seat belt use or to avoid noxious behaviors such as smoking. While smoking, for example, may contribute to poor physical health, or follow psychological stress, and while lack of exercise may reflect less robust physical health, it is difficult to explain why persons who perceive their health as less than good are less likely to seek the protection of seat belts.

Individual health behaviors are only modestly associated, but there appears to be a general underlying attitude associated with a positive health outlook. Persons with this attitude not only have an optimistic view of their lives, and their physical and mental health, but they also practice healthy life styles protective of their well-being. This positive attitude is not necessarily more consciously health related, but appears to be associated with a satisfied stance more generally.

### Strategies For Health Promotion

Present knowledge suggests that we can anticipate major limitations in preventive strategies that do not take account the extent to which behaviors we wish to promote are usually embedded in routine habits and social patterns having little explicitly to do with health. There is obvious value in promoting specific preventive strategies such as hypertension identification and control or immunization, but the more complex behavior patterns we would like to promote related to eating, substance abuse, exercise, and group participation are extraordinarily difficult to change, even when the individuals involved are motivated. Glib assertions and exhortations on prevention or responsibility miss the point and may even be counterproductive.

It is usually assumed that health promotion activities, unlike drugs or invasive medical procedures, are harmless, and even if the intervention strategy is unsure, at worst nothing is achieved. But to the contrary, there are risks in even the most innocent interventions and foolish interventions discredit and affect future credibility of those that are more sound. Well-intentioned interventions may harm recipients, as in the counseling program associated with the well-known Cambridge-Somerville Experiment. The experiment initiated in 1935 by Dr. Richard Clarke Cabot, a distinguished Boston physician, attempted to test the idea that a friendly counseling relationship could deflect antisocial behavior among pre-delinquent boys. The study continued for ten years with the same counselors used throughout the project period. Follow-up studies indicate that those who were randomly assigned to the intervention program, in contrast to controls, did more poorly in adult life. Other follow-up studies have had equally discouraging results, suggesting that good intentions have their costs.¹²

Even when a strong association exists with health, as in the case of a social variable such as marital status or a behavior pattern such as Type
A associated with increased risk of cardiovascular disease, it is naive to assume that public action is justified. We have limited understanding of these relationships, and the assumption, for example, that maintaining marriage is a positive goal for health maintenance cannot be supported, although such arguments have been asserted. We need to know a great deal more before we can establish a reasonable intervention strategy.

It is assumed in many health education programs that fear inducement contributes to behavior change. Experimental evidence, however, suggests that knowledge and fear facilitate appropriate behavior primarily when people have accessible means to undertake the necessary preventive behavior. If they do not know how, or face significant barriers of cost, access, or personal impediments, fear inducement may lead to denials of the threat or vulnerability to it. Intervention, without good understanding of process, can be a dangerous and counterproductive activity.

The inferences drawn earlier from the aggregate findings on the relationships between sociocultural factors and health fit models of coping very nicely. Successful adaptation to one's environment depends on three basic factors: the skills necessary to manage typical problems with which one is confronted; the psychological equilibrium to cope without excessive fear, anxiety, or depression which handicaps function; and motivation and commitment to personal and social goals. Skills depend on education, both formal and informal. Psychological equilibrium relates to social connections and supportive relations. And motivation and commitment depend on the incentives our loved ones and community provide. What reasonable suggestions can we then draw about possible strategies for health promotion?

Perhaps most important is understanding that successful health promotion cannot be based on superficial and isolated efforts to improve health behavior in one realm or another. The evidence is quite impressive that isolated efforts to change behavior, whether diet, smoking, or preventive medical care, produce short-term change, but change that almost never persists over time without reinforcement and continuing facilitation. The strongest type of facilitation is to successfully integrate desired behaviors as part of the culture of natural supportive groups. Behavioral change is more likely to occur, if it is expected and socially reinforced, preferably by close personal associates, but also in the broader social context. The modest success we have achieved in limiting smoking comes in part through changing expectations concerning its acceptability in social situations and making it socially appropriate for non-smokers to express their displeasure.

Successful coping depends in part on a sense of confidence and efficacy. The ability to implement effective behavior change appears to
be linked to a general sense of confidence and self-esteem. A positive sense of self, and one’s relationship to the environment, is also linked with good perceived health and better health behavior. Various models of behavior converge on the importance of a learned pattern of efficacy—perhaps best known is the helplessness model.\textsuperscript{14} Animal models suggest that individuals with a history of failure stop making efforts to cope even when they could. Other studies suggest that young people who face manageable adversities are more effective as adults than those who have been sheltered from difficult challenges. While the links between these orientations, experiences, and health outcomes are still speculative, there is a growing basis for the belief that good health and good health behaviors are linked fundamentally with good social and psychological adaptation. Behaviors routinely reinforced by the social context are more robust than those that require continued special programs.

In many instances the promotion of health is more likely to be successful through technological or regulatory means than through behavior change. If we wish to reduce accidents and deaths among teenagers—an extremely high risk group for auto deaths—we do better by delaying the legal age for driving than by driver’s education. Even the most elaborate campaigns for seat belt use achieve only modest use. Automatic safety devices and environmental controls frequently offer greater benefits at less cost. In practice, we typically end up with some mix of education, technology, and regulation. Whatever the issue, an aggregate strategy that calls upon a number of methods simultaneously offers the best possibilities, particularly when the noxious behavior is one that is personally and socially rewarding in some way. It is also clear that we do better to prevent noxious behaviors initially in contrast to altering them subsequently. Behavior initially adopted for social reasons or in response to peer pressures may become addictive or associated with complex behavioral repertoires that are extraordinarily difficult to alter.

Targeting high risk groups is a sensible priority. We know too little considering the importance of behavioral factors and the magnitude of harm that results from such noxious behaviors as smoking, excessive drinking, and dangerous driving. While it is commonplace to give lip service to the role people have in their own health and the importance of health promotion, efforts to understand the causal processes affecting these behaviors or to evaluate the impact of varying strategies to prevent or change such patterns still receive little public attention. A model of health education and promotion based on sound principles of intervention offers as much potential for health maintenance as any curative medical technology. It is ironic that there is so little relationship between our aspirations and rhetoric and the willingness to support the steps to develop the necessary knowledge and programming for future efforts in health promotion.
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