The Current Emphasis on Preventive Medicine

Ernest Saward and Andrew Sorensen

The requirements of health can be stated simply. Those fortunate enough to be born free of significant congenital disease or disability will remain well if three basic needs are met: they must be adequately fed; they must be protected from a wide range of hazards in the environment; and they must not depart radically from the pattern of personal behavior under which man evolved, for example, by smoking, overeating or sedentary living.—THOMAS MCKEOWN (*1*)

The interest in and the controversy about preventive medicine have markedly increased during the last decade. This is not due to a great increment in knowledge in the field, although our understanding has improved. In part, the heightened interest in preventive medicine stems from the progressive disillusionment with curative medicine. Despite great advances in the scientific and technological base of medical practice, the differences in outcomes as measured by health status, although they have improved, have not been commensurate with these advances. When viewed from an economic perspective, it would appear that in curative medicine we are spending more and more for less and less improvement. Although our love affair with medical technology is certainly not over, it appears that in federal and state governments it is not generating the enthusiasm it once did.

To be sure, there is obvious merit in moving toward prevention as opposed to cure of illness, as embodied in the time-worn aphorism "a stitch in time saves nine." Yet it is evident that great as is our present base of knowledge about disease and illness, we lack the understanding of how to effect such prevention for most conditions. Consequently, many attempts at constructive preventive action are either abortive or ineffective because we need to know more not only about the biological sciences, but especially about the behavioral and social sciences.

Historical Background

Concepts of healthful living have an ancient lineage. Concern with air and water and promotion of the ideal of physical fitness, embodied in the Latin phrase *mens sana in corpore sano*, underlie our conception of health and a healthy environment. The sanitary revolution of the mid-19th century as well as the improved nutritional status stemming from more efficient agricultural techniques and better transportation methods are seen as the main underpinnings of our great advance in health and longevity. (They also underlie the growth in population.) McKeown (*1*, p. 94) has observed: "If we group together the advances in nutrition and hygiene as environmental measures, the influences responsible for the decline of mortality and associated improvement in health were environmental, behavioural, and therapeutic. They became effective from the eighteenth, nineteenth, and twentieth centuries respectively and their order in time was also that of their effectiveness."

However, as long as infectious disease was prevalent and society was preoccupied with the spread of disease, prevention was directed primarily toward such maladies, and epidemiologic studies were largely limited to this category as well. The conquest of infectious disease, which became increasingly apparent after the middle of this century although it had been well under way since the middle of the last, has brought into focus a different set of methods of approaching the improvement of health in our society.

Much of our practice of preventive medicine has been effective without a basic knowledge of why it worked as it did. Jenner introduced vaccination for smallpox, for example, without a knowledge of virology. Cholera was controlled in London by implementing findings drawn from the simple epidemiologic studies of John Snow. The sanitary revolution of the mid-19th century was well under way before the discoveries of Pasteur. As McKeown has pointed out (*1*, p. 69; *2*) on the basis of an analysis of data for England and Wales, the decline of the mortality rate in the second half of the 19th century was influenced by "reduction of exposure to infection which resulted indirectly from the falling prevalence of disease, and directly from improved hygiene affecting, in the first instance, the quality of water and food. With the exception of vaccination against smallpox (whose contribution to the total decline of mortality was small), the impact of medical procedures of immunization and therapy was delayed until the twentieth century." The relatively simplistic approach of such spectacularly successful preventive measures is in sharp contrast to the sophisticated technology required to grow the polio virus and make a successful vaccine. Although empirical studies of the etiology of disease obviously led to great successes in conquering or abating various infectious diseases, that model is demonstrably less effective when applied to many of the issues facing contemporary preventive medicine. Today, partly because industrialized societies have made massive inroads in the battle against infectious disease, there has been a considerable expansion of our concepts of prevention.

An example of the extended domain of preventive medicine is that of oral contraception, which was introduced less than a quarter-century ago. Its social effects are quite outside the disease model, and its outcome cannot be judged by morbidity or mortality statistics alone (*3*). So far, we are unable to quantify a health status indicator that adequately reflects so fundamental a change in the quality of life. Nevertheless, the proportion of couples practicing some form of birth control has risen dramatically in industrial societies, and oral contraceptives represent the commonest method of control (*4*). As Goode has noted (*5*, p. 53), the important change is not the decrease in birthrate in the last generation, but the change in "the general acceptance of the opinion that husband and wife [in the case of families] may *control* the number of their children if they wish to do so." Since 1960, "American women have become increasingly favorable toward the principle of fertility control" (*6*). Although it is impossible to determine whether this shift in attitudes is caused by the steadily increasing use of

Ernest Saward is professor of social medicine and Andrew Sorensen is associate professor of preventive medicine and community health, University of Rochester School of Medicine and Dentistry, Rochester, New York 14642.

 0036-8075/78/0529-0889$01.50/0

oral contraceptives, or vice versa, their increased use combined with a consistently higher proportion of women in the work force has had a profound effect in many countries on the role of women in society.

All the classic elements that historically have been associated with preventive medicine are still with us today: environmental sanitation, forbearance from the common vices, proper nutrition, and physical fitness. But the spectrum of issues with which we are concerned has enormously increased. Now we deliberate about such wide-ranging issues as seat belts, gun control, Pap smears, and mammography. Many consider violence on television (*7, 8*) and the assessment of television commercials for over-the-counter drugs (*9*) to be proper subjects for preventive medicine. As the cost of curative medicine continues to escalate, there may be a political struggle to maintain this extended domain of preventive medicine, for the dominant ethos within the medical profession and the public at large is still toward curative medicine.

While there is much evidence that the sources of the improvements in health status of the last century largely lie outside the medical care process and can be attributed to sanitation, nutrition, education, housing, and other social factors, few have held the view that these factors are to be advocated primarily because of their direct health consequences. Until recently, expenditures in our nation to accomplish health goals have been directed into the medical care process in a relatively open-ended fashion. As the nation spends $1 of every $12 of its gross national product for health care (*10*) and this proportion continues to rise more rapidly than the productivity of society (*11*), more consideration is being given to other methods of improving health status. Health planners now anticipate that at some time in the near future the resource allocation to health will be limited in its rate of expansion to that of the productivity of society in general. As this process occurs, the emphasis will shift from continuing to expand the share for health care to establishing limits to it, and then to setting priorities within the resources available (*12*). In 1973 one of us (*13*) predicted: "By the end of the decade the U.S. will have arrived at what will be essentially closed-end funding, that is, there will in effect be total budgets for health, provided both from tax funds and from Federally mandated and regulated insurance programs, and it will be necessary for the providers of health services to operate within those annual budgets. (It is necessary to draw a distinction between a total Federal budget for health and a finite total allocation of resources by the combination of all tax support and publicly mandated and regulated insurance. The second combination appears more immediately likely. It too will eventually produce an essentially closed-end funding, although the process will take more time.)" The Hospital Cost Containment Act, which is currently being considered in Congress (bills S.1391 and H.R.6575), and experiments in prospective hospital reimbursement indicate that we may be moving in this direction (*14*). However, the "voluntary effort," recently developed by the American Medical Association, the American Hospital Association, and the Federation of American Hospitals to contain hospital costs with minimal government regulation—supported by Dan Rostenkowski, the influential chairman of the House Ways and Means Committee's subcommittee on health—casts some doubt on the likelihood of the Hospital Cost Containment Act being passed (*15*).

If this predicted shift is realized, the emphasis on prevention takes on a new dimension. If prevention is really more cost-effective than the cure of morbidity, then preventive medicine must have a high priority within the limited resources available. Such a change in emphasis is, of course, not a peculiarly American phenomenon, for the same considerations prevail in many technologically advanced nations. Perhaps the most explicit statement of this policy is contained in a report by Marc Lalonde when he was Minister of National Health and Welfare for Canada (*16*): "When the full impact of environment and lifestyle has been assessed, . . . there can be no doubt that the traditional view of equating the level of health in Canada with the availability of physicians and hospitals is inadequate. . . . There is little doubt that future improvements in the level of health of Canadians lie mainly in improving the environment, moderating self-imposed risks, and adding to our knowledge of human biology."

It seems to us that we Americans will improve our level of health only by following the course recommended for our neighbors to the north. The bulk of the responsibility for the health care of Americans has traditionally been divided between the practicing health care professions and publicly funded agencies, although these two are not mutually exclusive. Let us consider briefly the role of each of these sets of organizations as they concern citizens collectively and individually.

Improving the Environment

It was pointed out in a recent report of the Institute of Medicine (*17*, p. 26) that "rapid industrialization, accelerated technological changes, and an increased population—more and more concentrated in urban areas—have contributed to the complexities of maintaining a healthful physical environment." Although this is not the place for an extended discussion of programs designed to promote a healthful environment, there are several areas of concern we should like to address. First is the need to reduce environmental pollutants. As we continue to identify, evaluate, and modify the carcinogens and other environmental factors that adversely affect human health, we may expect to make substantial achievements in the prevention of disease. At the same time we must direct our attention to eliminating unsafe working conditions and providing a mechanism for implementing those regulations more effectively. The Public Health Service estimates that 390,000 new cases of occupational diseases are recognized annually and that more than 100,000 Americans die each year from identified occupational causes (*18*). When considering prevention in the workplace, we must not neglect the role that accidents play. Although conventional wisdom holds that "accidents" are unrelated random events caused by bad luck or fate (*19*), many accidents are caused by some combination of human error, disability, and hazard in the environment, and are therefore preventable (*20*). Regulation can be effective in many areas, as shown by the dramatic decrease in deaths that followed the reduction of the maximum legal speed limit to 55 miles per hour (*21*), and bringing of legal action against manufacturers who pollute the environment. However, there is a delicate balance to be maintained between individual and collective responsibility for health.

One of us made an observation in 1970 that seems as valid today as it was then (*22*): "The level(s) of formal education and of information produced by mass media have created a new attitude towards health and the environment that has led the public to feel that whatever the health providers have to offer should be readily available and accessible and should entail little decision-making on their part. . . . Not only is the scientific handling of episodic illness taken for granted, but disease prevention and early detection are part of this right. One expects to be kept well." But this new attitude may be carried to an extreme.

Consider the extrapolation to the saccharin issue and the consequences of the Delaney Amendment, which stipulated that any substance that is demonstrated to cause neoplasia must be banned from human consumption. As a result of these kinds of actions, we have witnessed in preventive medicine, just as in curative medicine, the tendency to promise too much and thereby create expectations that will finally come back as criticism. For example, eminent authorities have told North Americans that up to 90 percent of cancer is environmentally caused (*23*). If this statement is believed, the American public will have expectations of environmental control that can hardly be attained either by expanding our basic knowledge or conducting empirical studies demonstrating the effects of carcinogens. This is the kind of overstatement made to produce concern for the environment that misleads and overpromises. We are not likely to propose the elimination of human exposure to sunlight so that skin cancer can be prevented. Yet superficial skin cancer accounts for a very large percentage of all neoplasms, especially among whites (*24, 25*). However, this is not to say that we should not do all in our power to remove presumed carcinogens and toxic substances such as PCB's, mirex, and Kepone from our air and water (*26*). But we must be sure that public expectations are consonant with what can reasonably be achieved.

Moderating Self-Imposed Risks

The tendency in the health sector is to exhort the health care professions to pay more attention to prevention, and hence not only improve health status but use our limited resources more wisely. But it has been observed that the media have more influence on individual life-styles that does the profession. To be sure, physicians are involved with the consequences of drug addiction, venereal disease, lung cancer from smoking, and automobile accidents, and know the vast impact of all of them in producing emotional illness. But preventive counseling by physicians is a weak tool. To illustrate, very few teen-age girls who are overweight, despite the (appropriate or inappropriate) motivations of sexual attractiveness, will be found to have lost weight 6 months after a visit to the physician (*27*).

The most effective preventive measures seem to be those that require the least individual effort, such as the public health management of water, air, sewage, and food; regulation of drugs; fluoridation of water to prevent dental caries; and mandating of immunization procedures. The most difficult measures seem to be those for which the individual is responsible: controlling smoking, avoiding alcohol and drug abuse, using seat belts [which are employed consistently by only one in five Americans (*28*)], having a balanced diet and avoiding obesity, maintaining physical fitness, having safe driving habits, and avoiding the primary cause of death of young men in our central cities—the carrying of "Saturday night special" handguns (*29*). It is true that the federal government could do more to regulate behavior in these areas of individual responsibility. For example, one would think that it would abandon the inconsistency of encouraging the growth of tobacco through price supports, developing export programs, and providing systems for grading tobacco by the Department of Agriculture, while funding anti-smoking campaigns through the Department of Health, Education, and Welfare (HEW).

Experience with government mandating of health-related behavior has yielded quite mixed results. Fifty years ago we had our noble experiment with federal intervention in the use of alcohol, and it was generally adjudged a failure (*30*), although there is evidence that during the prohibition era cirrhosis of the liver was reduced (*31*). Some countries such as Australia, Canada, and Sweden have evidence of considerable benefit from mandatory seat belt use (*32*), but at times the American attitude would appear to be that freedom from regulation is more valuable than life itself. One of the many reasons given for the limited acceptance of behavior-mandating legislation that would reduce the risk of accident, such as requiring motorcyclists to wear safety helmets and goggles, is that (*17*, p. 125) "These laws are viewed by some as a paternalistic and unwanted interference by government in behavior that is not threatening to others, and have been successfully challenged many times in courts."

Those areas of prevention that require exercising individual responsibility are the objectives of ever-growing activities in public health education. Although the proportion of the health dollar allocated to this purpose is miniscule compared to that spent on medical care, it has begun to grow in the last few years. The Bureau of Health Education in the Center for Disease Control, Atlanta, and the Office of Health Information and Health Promotion have been created recently, and overall responsibility for both functions has been placed in the office of the assistant secretary of health. Yet health education is only in small part a matter of information transferred to the individual. Few Americans do not know that chronic, heavy smoking is harmful to one's health. Yet the knowledge of this fact is obviously a poor motivator for many. Thus, smokers and those who tried to quit smoking but failed are substantially less likely to identify a risk of lung cancer than persons who never smoked (*33*). These and other instances demonstrate that dissemination of information does not in itself lead to modification of behavior. With intensive efforts behavior can be modified, but at considerable cost. The multiple risk factor intervention trials (MRFIT) in coronary disease, although partly successful (*34*), would probably be judged prohibitively expensive for transfer to even targeted populations. A more cost-effective methodology was used by the Stanford University Heart Disease Prevention Program in three northern California towns. In this study, two communities were subjected to (*35*) "extensive mass-media campaigns over a 2-year period, and in one of these, face-to-face counselling was also provided for a small subset of high-risk people. The third community served as a control." The mass-media campaign included television and radio programs, mailed materials, billboards, and posters. It was found that in the control community there was an increased risk of cardiovascular disease over the 2 years, but in the treatment communities there was a substantial and sustained decrease in risk. In evaluating the effectiveness of this program, the authors concluded that persuading people to alter their life-styles "can be achieved at reasonable cost."

Another way in which personal risks can be moderated is by improving nutritional status. A survey sponsored by HEW from 1968 to 1970 in ten states from every region of the country indicated some alarming deficiencies in the nutritional status of many sociocultural groups (*36*). These findings have been corroborated in other studies of these groups (*37–39*). To be sure, nutritional problems can be reduced dramatically by implementing concerted preventive measures on four fronts.

1) Federally sponsored programs, such as the Food Stamp Program, the Special Supplemental Food Program for Women, Infants, and Children, and the various school food service programs may play a crucial role in improving the nutritional status of many Americans.

2) Education of health care profes-

sionals in nutritional matters is also sadly deficient. One would hope that if greater emphasis were placed on the importance of nutrition in the education of our health care professionals, there would be correspondingly greater emphasis on nutrition in our health care delivery system.

3) The food industry, too, plays an important role in producing nutritionally improved food products and promoting their use. Some companies have made notable strides in this regard (*40*), but there should be a greater initiative throughout the food industry, and more funds for government agencies that regulate the industry, regarding matters such as additives in our food supplies (*41*).

4) The final consideration is the role of individual citizens. Even with a stronger role for government, better-informed health care providers, and a more nutritionally conscious food industry, if the consumers themselves do not desire to improve their nutritional status, the best that can be expected are slight changes. That is not to suggest that the entire onus for improving nutritional status rests with each individual. Rather, we need to integrate an understanding of the motivation of individuals with these other program activities.

With the exception of the Stanford Heart Disease Prevention Program, our greatest accomplishments in mass modification of personal health behavior have come about through the motivation of certain religious sects that forbit the use of stimulants, alcohol, and tobacco. Studies of such groups show that this has a positive and significant effect on health status (*42*). The most successful attempts to modify health behavior at a national level appear to have occurred in Maoist China, where attitudes toward the use of alcohol and drugs, physical fitness, and sexual promiscuity have been embodied in a code of behavior that is rigorously enforced for the individual by his work and living groups (*43, 44*). It is obvious that this degree of discipline and conformity is antithetical to the dominant values in contemporary American society. Yet our value system is not immutable—in fact, it is constantly undergoing change. For example, the apparent sexual revolution of recent decades (*45*) and the attendant proliferation of syphilis and gonorrhea in the 1960's seem to be abating in the rate of increase in the late 1970's (*46*). There is an unprecedented concern for physical fitness, yet mortality from alcoholic disorders continues to rise dramatically (*47*). Thus, we seem to have a "crazy quilt" of noteworthy improvement in some areas and marked shortcomings in others.

The failure to exercise adequate health protection by individuals and corporations appears to be related to living for the moment and maximizing profits, with little evidence of concern for future health status. On the individual level, it may not appear particularly important to young people to protect the quality of their life in anticipation of old age, for indeed that quality may not seem very attractive until one achieves an advanced age. A British observer has suggested (*48*): "The main reason why people choose to act in a way that puts them at risk is because their concept of the future is different from that of those who give them advice." There is also a sort of mystical belief (maybe even the illusion of immortality) that "It won't happen to me." And for individuals as well as corporations, if good health practices are seen as costing too much in terms of dollars or nuisance value, a certain cost in the present may not appear worth an uncertain gain in the future. This essentially places a very large discount value on future benefits because of the time that we must wait to achieve the advantages of current, less attractive or economically desirable behavior (*49*).

Changing Consumer Expectations

The Lalonde report (*16*) suggested that in addition to improving the environment and moderating self-imposed risks, we may improve the national level of health by adding to our knowledge of human biology. We agree with Thomas (*50*) that "we are still at a very early, primitive stage in the development of medical science." But we feel that unless the public is "better informed about the limitations of medical care as well as its benefits" (*51*) we may contribute to the development of inappropriate expectations.

The role of physicians, dentists, and other health practitioners in prevention as well as treatment has often been overemphasized. As noted above, the greatest accomplishments in prevention are either public health measures or individual initiatives in health habits and lifestyle. Wildavsky (*52*) estimates that factors over which physicians have little or no control affect about 90 percent of the usual indices for measuring health. He adds, "Most of the bad things that happen to people are at present beyond the reach of medicine." But we are a nation of people who, for the most part, have bought the importance of "seeing the doctor," and Thomas (*53*, p. 45) notes: "Transient upper-respiratory infections and episodes of gastroenteritis account for most of the calls on a doctor because of illness, and an even greater number of calls are made by people who have nothing at all the matter with them."

Nevertheless, the physician does have a role to play. Detection of disease, especially in its early stages, is important. Several examples come to mind. The diagnosis and control of elevated blood pressure is a well-demonstrated accomplishment (*54*). Although it is the subject of some debate, most physicians are convinced of the usefulness of the Papanicolaou smear in the detection of uterine cancer (*55*). Doctors and other health practitioners feel that family planning is an appropriate activity for preventive medicine (*56*), as, of course, are immunizations against infectious disease (*57*). And physicians may have a pronounced effect on the compliance of their patients with therapeutic regimens (*58*), irrespective of whether medications are administered (*59*). Preventive measures in dentistry, such as dietary fluoride supplementation, have also proved effective (*60, 61*). When we go much beyond this, particularly into multiphasic health testing or any form of periodic health surveillance for adults, there is much debate about the efficacy of the various screening programs, but even more debate about their cost-effectiveness (*62, 63*). There is a simplistic notion that the cost of periodic health testing is merely the cost of the tests performed. However, we must also consider the cost of the follow-up of an abnormal measurement and recognize that the test results often contribute to a diagnosis that entails a lifetime follow-up.

With progressively more sophisticated technology and nanogram-level determinations, our ability to detect trends in biochemical parameters that are statistically abnormal and hence possibly predictive of disease increases substantially. The clinical disease may appear next year, 20 years later, or never, and the patient (for indeed the subject has now become a patient) may come to grief from another, unrelated cause. The process, however, has a "snowball" effect on cost, for at each reexamination the cost becomes cumulatively larger. The inapplicability of this form of secondary prevention to general populations becomes clear on an induced-cost basis.

Further Recommendations

In addition to the more global environmental approach to preventive medicine, we have advocated moderation of self-

imposed risks and development of appropriate consumer expectations. Finally, we offer two relatively specific sets of recommendations: (i) the establishment of more adequate health insurance coverage, and (ii) a holistic approach to health education.

More adequate health insurance coverage. One of the policy issues that will face us in the next few years is determining what preventive services should be included in federally sponsored health insurance programs. It should be noted that the Medicare program specifically excludes payment for preventive services to the elderly. The Medicaid program has been modified to include early and periodic screening of children (*64*), although in some quarters it has been regarded as less than highly effective. Assuming that some form of national health insurance is likely to be enacted in the next few years, if periodic examinations with multitest screening procedures are included for adults, the system will be open to cost escalation and possible abuse.

As already noted, there is substantial agreement in medical practice about the merit of a few procedures such as immunizations, but little else. The cost of the present system of health care, with fees related to specific procedures and specific morbidities, almost precludes a significant increase in resource allocation to preventive services. Good medical practice already encompasses good prenatal and perinatal care and preventive services for children. It is only when such preventive services are widely accepted that they become implicitly incorporated into various forms of health insurance. But to suggest that specific measures be explicitly related only to prevention often precludes their routine performance or threatens payment for them, or both, if there is a constrained budget for medical care. In spite of these limitations, it should be noted that only one of the four major national health insurance proposals currently being discussed specifically proposes a preventive medicine component, and that is directed principally toward children (*17*, p. 15).

Holistic approach to health education: Integration of efforts in the public and private sectors. Especially in the 19th and 20th centuries health promotion has been in part a function of government. Local and state governments regulated environment, housing, and food supply. The attack on infectious disease was a local matter except for quarantine in international commerce. But not until the great depression of the 1930's were substantial portions of public health efforts funded at the federal level. Since then, the role of the federal government in public health matters has steadily grown, although there is residual opposition to this function in some quarters.

Most citizens think public schools play an important role in health education, but an assessment of such programs indicates that they have little efficacy (*65*). Early in this century voluntary organizations dominated the health education effort (the prototype being the Tuberculosis Association) and many such organizations remain advocates of special causes, but their effect on the citizenry seems not to be substantial. The National Health Council is now trying to amplify the role of the voluntary sector. Some efforts are coming, as they should, from health insurance organizations. But the dominant mode of conveying health information, for better or worse, certainly has become television. Attractive life-styles are portrayed in response to Nielsen ratings. The "good guys" may triumph in the end, but haven't the "bad guys" escaped boredom? The sponsors inculcate in the viewers a desire to take their drugs for a whole host of minor malaises. A spokesman for the American Pharmaceutical Association stated (*66*): "Over-the-counter drug advertising . . . even attempts to convince people they have non-existent diseases. . . . [Such] advertising contributes to the drug orientation of our culture, and we feel that something ought to be done about it."

Clearly, we need to balance our concern for the right of individual citizens to behave as they choose with the need to integrate preventive medicine efforts in the public and private sectors. Our present situation is one in which, in many circumstances, we have antithetical messages in segments of the public and private sectors (for instance, the Secretary of HEW trying to get us to smoke less while the tobacco industry encourages us to smoke more). In other circumstances we have conflicting messages within the same sector. For example, while the Secretary of HEW is attempting to reduce cigarette consumption, the President's Special Assistant for Health Issues—in a speech which a leading medical journal (*67*) has described "as though it had been written by the tobacco lobby"—has stated that (*68*) "Efforts to make outcasts of smokers are similar to the worst appeals of existing drug abuse programs," and the Department of Agriculture continues to provide a variety of supports and services for the tobacco industry (*69*). This patchwork approach, in which conflicting messages are repeatedly given to the public, will not lead to an optimal allocation of preventive medicine resources.

Conclusion

We have described many of the problems facing us. If we as a society can manage our investment in improving our collective health status without expecting that this goal can be achieved through investing in the medical care system, if we begin refusing to promise more than we can deliver, and if we can more equitably distribute the responsibility for preventive medicine among the public health sector, corporations, and individuals, we may be able to direct our considerable energies to appropriate ends. The most effective means of disease prevention and improved health status lie outside the medical care process and are related to reducing hazards in the environment, improving nutrition, and adopting appropriate personal habits. The medical care process itself has significant measures to offer through both immunizations and secondary prevention by early detection of disease. But partly because of the anticipated restrictions on resource allocation to the health sector in its entirety, the latter approach will be less effective in relation to the funds expended. The conventional view that physicians must do more or that we must have more physicians certainly misses much of the problem that faces us (*70*). As Thomas has observed (*53*, p. 45), "Medicine is surely not in possession of special wisdom about how to live a life."

However, we must avoid erring in the opposite direction. Many of the reasons for the relatively poor health status of millions of Americans lie in their adherence to inappropriate life-styles, but this does not absolve our society and the health care professions of social responsibility for the consequences of such life-styles. Blaming the victim "both ignores what is known about human behavior and minimizes the importance of evidence about the environmental assault on health" (*71*). Individuals must be guaranteed a considerable amount of freedom to live as they please, but that freedom is subject to at least three types of constraints. First, freedom for one set of behaviors must be weighed against the rights of others to adopt a substantially different life-style. For example, persons who smoke in crowded public places infringe on the right of nonsmokers not to breathe smoke-filled air. Second, there are respects in which all of us are limited

in controlling our health environment. For example, those of us who live and work in cities have limited ability to accept or reject the various environmental pollutants that assault us. Third, even if individuals choose to engage in behaviors that lower their health status, those who do not behave in that fashion must pay for their actions. The high cost of behaviors that detract from health does not fall on the individual alone but on everyone through the mutualization of health insurance costs.

Those of us who teach in medical schools, and others as well, have often suggested that a holistic approach to health care should encompass both preventive and curative care. In doing so we have usually assumed that the same people will be engaged in providing both. Winkelstein (*72*) has offered an alternative to the usual comprehensive approach to health care that we feel merits consideration. He asserts that as preventive medicine and curative medicine have different objectives and economic implications, utilize differently trained practitioners, and have different historical and philosophical origins, we might do better to separate them into two distinct systems.

Although the merit of Winkelstein's recommendation may be debated, it is crucial that, whatever system is employed to bridge the current hiatus in resource allocation between prevention and curing, we increasingly direct our energies to improved methods of preventive medicine or be prepared to pay heavy social and financial costs.

The responsibility for the prevention of disease and disability through health education, improved life-style, and environmental control permeates all aspects of society: the individual, the family, the school, the workplace, and every voluntary agency and level of government. We believe that we can elevate our collective sensibility to that responsibility without further medicalization of our society (*73*). But in seeking a major change in societal values and attitudes toward health, the trade-off appears to be between these values and individual freedoms. Societal values and attitudes toward health are not necessarily perceived as relevant to individuals; nevertheless the freedoms are indeed individually indulged. Yet unless we continue to expand our efforts to relate societally and individually induced risks to specific health outcomes, as a nation we will—at best—do better and feel worse.

References and Notes

1. T. McKeown, *The Role of Medicine: Dream, Mirage, or Nemesis?* (Nuffield Provincial Hospitals Trust, London, 1976).
2. A collection of articles responding to McKeown (*1*) appeared in *Milbank Mem. Fund Q.* **55**, 361 (1977).
3. C. Garcia and E. Wallach, in *Fertility and Family Planning*, S. J. Behrman, L. Corsa, Jr., R. Freedman, Eds. (Univ. of Michigan Press, Ann Arbor, 1970), pp. 252–292.
4. G. Hawthorn, *The Sociology of Fertility* (Collier-Macmillan, London, 1970).
5. W. J. Goode, *World Revolution and Family Patterns* (Free Press, New York, 1970).
6. C. F. Westoff and N. B. Ryder, in *Fertility and Family Planning*, S. J. Behrman, L. Corsa, Jr., R. Freedman, Eds. (Univ. of Michigan Press, Ann Arbor, 1970), p. 398.
7. M. B. Rothenberg, *J. Am. Med. Assoc.* **234**, 1043 (1975).
8. M. Feingold and G. T. Johnson, *N. Engl. J. Med.* **296**, 424 (1977).
9. A. A. Sorensen, paper presented at the Third Annual University of Washington Alcoholism and Drug Abuse Institute, Seattle, 27 July 1977.
10. N. L. Worthington, *Soc. Secur. Bull.* **38** (No. 2), 3 (1975).
11. H. S. Luft, *Inquiry* **13**, 344 (1976).
12. Staff Report, Council on Wage and Price Stability, *The Problem of Rising Health Care Costs* (Executive Office of the President, Washington, D.C., April 1976).
13. E. W. Saward, *Sci. Am.* **229** (No. 3), 173 (1973).
14. A. A. Sorenson and E. W. Saward, *Public Health, Rep.*, in press.
15. *Nation's Health* (March 1978), p. 1.
16. M. Lalonde, *A New Perspective on the Health of Canadians: A Working Document* (Government of Canada, Ottawa, 1975).
17. E. O. Nightingale, *Perspectives on Health Promotion and Disease Prevention in the United States* (Institute of Medicine Publ. 78-001, National Academy of Sciences, Washington, D.C., 1978).
18. Comptroller General, *Report to the Congress: Delays in Setting Workplace Standards for Cancer-Causing and other Dangerous Substances* (HEW document HRD-77-71, General Accounting Office, Washington, D.C., 1977).
19. N. C. Kiefer, *Prev. Med.* **2**, 106 (1973).
20. R. S. Alphey and S. T. Leach, *R. Soc. Health J.* **94**, 97 (1974).
21. T. C. Doege and P. S. Levy, *Am. J. Epidemiol.* **103**, 236 (1976).
22. E. W. Saward, cited in M. R. Greenlick and T. J. Colombo, in *Conditions for Change in the Health Care System* [HEW Publ. (HRA) 78-642, Department of Health, Education, and Welfare, Washington, D.C., 1977], pp. 53–58.
23. J. Higginson, *Proc. Can. Cancer Res. Conf.* **8**, 40 (1969).
24. F. Daniels, Jr., in *Cancer Epidemiology and Prevention: Current Concepts*, D. Schottenfield, Ed. (Thomas, Springfield, Ill., 1975), pp. 126–152.
25. J. M. Peters, *N. Engl. J. Med.* **298**, 277 (1978).
26. R. W. Miller, in *Genetics of Human Cancer*, J. J. Mulvihill, R. W. Miller, J. F. Fraumeni, Jr., Eds. (Raven, New York, 1977), pp. 1–14.
27. J. Mayer, *Overweight: Causes, Cost and Control* (Prentice-Hall, Englewood Cliffs, N.J., 1968).
28. L. S. Robertson, B. O'Neill, C. W. Wixom, *J. Health Soc. Behav.* **13**, 18 (1972).
29. N. D. Rushforth, A. B. Ford, C. S. Hirsch, N. M. Rushforth, L. Adelson, *N. Engl. J. Med.* **297**, 531 (1977).
30. P. C. Conley and A. A. Sorensen, *The Staggering Steeple: The Story of Alcoholism and the Churches* (Pilgrim, Philadelphia, 1977), pp. 60–81.
31. J. C. Burnham, *J. Soc. Hist.* **2**, 51 (1968).
32. L. A. Foldvary and J. C. Lane, *Med. J. Aust.* **1**, 1054 (1972).
33. S. Graham and R. W. Gibson, *Soc. Sci. Med.* **5**, 319 (1971).
34. H. Blackburn, *Prog. Cardiol.* **3**, 1 (1974).
35. J. W. Farquhar *et al.*, *Lancet* **1977-I**, 1192 (1977).
36. S. M. Garn and D. C. Clark, *Pediatrics* **56**, 306 (1975).
37. J. VanDuzen, J. P. Carter, J. Second, C. Federspiel, *Am. J. Clin. Nutr.* **22**, 1362 (1969).
38. J. VanDuzen, J. P. Carter, R. VanderSwagg, *ibid.* **29**, 657 (1976).
39. H. P. Chase, V. Kumar, J. M. Dodds, H. E. Sauerblich, R. M. Hunger, R. S. Brocton, V. Spalding. *Am. J. Dis. Child.* **122**, 316 (1971).
40. W. O. Beers and J. F. White, *Ann. N.Y. Acad. Sci.* **300**, 391 (1977).
41. J. E. Vanderveen, *ibid.*, p. 406.
42. R. T. Walden, L. E. Schaeffer, F. R. Lemon, A. Sunshine, E. L. Wynder, *Am. J. Med.* **36**, 2276 (1964).
43. V. W. Sidel and R. Sidel, *Serve the People: Observations on Medicine in the People's Republic of China* (Josiah Macy, Jr. Foundation, New York, 1973).
44. J. S. Horn, *Away with All Pests* (Monthly Review Press, New York, 1971).
45. A. A. Sorensen, L. M. Drusin, J. Magagna, K. Yano, A. B. Ley, *J. Am. Coll. Health Assoc.* **24**, 169 (1976).
46. Center for Disease Control, *VD Fact Sheet 1976* [HEW Publ. (CDC)76-8195, Center for Disease Control, Atlanta, 1976].
47. Metropolitan Life Insurance Company, *Stat. Bull. Metrop. Life Insur. Co.* **55**, 2 (1974).
48. J. A. M. Gray, *Lancet* **1977-II**, 1339 (1977).
49. R. L. Berg, *Prev. Med.* **5**, 483 (1976).
50. L. Thomas, *J. Med. Educ.* **51**, 24 (1976).
51. D. Mechanic, *N. Engl. J. Med.* **298**, 249 (1978).
52. A. Wildavsky, in *Doing Better and Feeling Worse*, J. H. Knowles, Ed. (Norton, New York, 1977), pp. 105–124.
53. L. Thomas, in *ibid.*, pp. 35–46.
54. C. B. Taylor, J. W. Farquhar, E. Nelson, S. Agrus, *Arch. Gen. Psychiatry* **34**, 339 (1977).
55. D. S. Guzick, *Am. J. Public Health* **68**, 125 (1978).
56. L. Pratt, *Family Structure and Effective Health Behavior* (Houghton Mifflin, Boston, 1976).
57. Committee for the Study of Poliomyelitis Vaccines, Institute of Medicine, *Evaluation of Poliomyelitis Vaccines* (National Academy of Sciences, Washington, D.C., 1977).
58. D. Schmidt, *J. Fam. Pract.* **4**, 853 (1977).
59. M. Weintraub, *N.Y. State J. Med.* **75**, 2263 (1975).
60. R. A. Bagramian, R. C. Graves, M. Bhat, *J. Am. Dent. Assoc.* **93**, 1014 (1976).
61. R. L. Braham, P. R. Barkin, M. E. Morris, M. W. Roberts, *J. Fam. Pract.* **6**, 49 (1978).
62. R. Currier, *Public Health Rep.* **92**, 527 (1977).
63. L. Dickinson, *Mayo Clin. Proc.* **47**, 550 (1972).
64. E. H. Newberger, C. M. Newberger, J. B. Richmond, *Milbank Mem. Fund Q.* **54**, 249 (1976).
65. R. J. Haggerty, *Prev. Med.* **6**, 276 (1977).
66. Cited in F. E. Barcus and S. M. Jankowski, *Ann. Am. Acad. Polit. Soc. Sci.* **417**, 89 (1975).
67. D. S. Greenberg, *N. Engl. J. Med.* **298**, 692 (1978).
68. P. Bourne, remarks before the Ad-hoc Committee on Tobacco and Smoking Research of the American Cancer Society, 10 November 1977.
69. *U.S. Dep. Agric. Stat. Bull. 528* (1974).
70. R. C. Parker, Jr., and A. A. Sorensen, *Med. Care* **16** (No. 2), 152 (1978).
71. R. Crawford, *Int. J. Health Serv.* **7**, 663 (1977).
72. W. Winkelstein, Jr., in *Conditions for Change in the Health Care System* [HEW Publ. (HRA) 78-642, Department of Health, Education, and Welfare, Washington, D.C., 1977), pp. 59–64.
73. R. Fox, in *Doing Better and Feeling Worse*, J. H. Knowles, Ed. (Norton, New York, 1977), pp. 9–22.

74. The authors are grateful for the suggestions and review of this article by their colleagues Robert Berg, William Brandon, and James Pifer.