

THREE PHASES OF PREVENTION IN THE UNITED STATES¹

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The main goal of public health in the United States has always been prevention of disease, injury, and disability; but over the past century the concept of what "prevention" means has changed. This article is devoted to presenting the author's view of how the concept and the nature of preventive health work have changed in the past hundred years—and how they are likely to change in the years ahead.

Prevention of disease, disability, and injury has been, is, and will continue to be the most important goal of public health associations and organizations throughout the world. Nevertheless, the very concept of prevention has evolved over the last 100 years in the United States, progressively adding new dimensions to its definition. Looking back, we can see that the concept has gone through three principal phases. These have overlapped in many respects, and yet each has borne its own unique attributes.

The first major phase was organizational, authoritarian, and mercantile in nature. It dealt mostly with the primary prevention of contagious diseases through measures of applied immunology and environmental control. The second and present phase, now in its twilight, has been characterized by medical industrialization, medical inter-

vention, and intensified investment in labor and equipment. It is most famous for its work of secondary and tertiary prevention. It has been a phase of bio-reconstructive heroics, but has produced very little improvement in the quality or vigor of life in our society. The third phase, which we are just crawling into, reasserts in some ways the organizational preoccupations of the first phase, but it also features a new awareness of the whole process of social interaction. It will be characterized by a hesitant and apprehensive reexamination of the environment we have created for ourselves. It will be the most difficult and important phase in the evolution of the prevention concept, and it will be concerned far more with social values and decisions than with technology or medicine.

Phase I: Sanitation and Authoritarianism

The contributions of the natural scientists to the social science of public health are hard to overstate. Athanasius Kircher, who may actually have seen bacteria as early as

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1658, formulated an animate theory of contagion (1). And John Snow stopped an outbreak of London cholera in the 1850's by means of authoritatively applied epidemiology (2). But the work of Pasteur in the 1870's more closely marks the true beginning of the first phase of prevention. Rudolph Virchow (1821-1902) made the first real contributions to our understanding of pathology during that time. Lister (1827-1912) published his first paper on antiseptics in 1867 (3). And Robert Koch (1843-1910) first set down his famous postulates in 1882 (4). The rapidity of discoveries must have seemed breathtaking at the time, and indeed it was. In fact, so extraordinary were the revelations of the late 1800's that Sir William Osler wrote:

For countless generations the prophets and kings of humanity have desired to see the things which men have seen, and to hear the things which men have heard, in the course of this wonderful 19th century. To the call of the watchers on the towers of progress there has been the one sad answer—the people sit in darkness and in the shadow of death. Politically, socially, and morally the race has improved; but for the unit, the individual, there was little hope. Cold philosophy shed a glimmer of light on his path, religion in its various guises illumined his sad heart, but neither availed to lift the curse of suffering from the sin-begotten son of Adam. In the fullness of time, long expected, long delayed, at last science emptied upon him from the horn of Amalthea blessings which cannot be enumerated, blessings which have made the century forever memorable, and which have followed each other with a rapidity so bewildering that we know not what next to expect. (5).

With this new knowledge, public health moved out of the darkness and into the grime of industrial metropolitan life to begin an era of change that was unprecedented—and unsustainable. Operating with a high degree of authoritarianism, the police power of the state was seized by public health leaders around the world to:

- clean and protect our water
- clean and deflect our effluents

- clean and inspect our food, and
- raze our most pestiferous slums.

Slightly before this time, in 1864, the head of New York City's streetcleaning department appointed "health wardens," who were generally saloon keepers. During an investigation, a legislator asked one of these health wardens what he did when called to deal with a case of contagious disease: "I go to the house and call the people into the street, where I give my orders, which are to burn sulphur; I never go into the house" (6).

But by 1866, Dr. Stephen Smith was Commissioner of the Metropolitan Health Board in New York, a post he held until 1875. The improvements were dramatic. Life expectancy for white females in the United States increased from 40 years in 1855 (7) to 55 years in 1920.

As has been noted time and again, the basic improvements were environmental in nature—pasteurization of milk, chlorination of water, and control of sewage. Moreover, almost all the increases in longevity came about by improving the chances that a newborn child would live through its first fragile months and years. Little if any changes were made in the life expectancy of those who survived to middle age. In 1855, a 45-year-old in Massachusetts could expect to live another 24.6 years. In 1910, figures for the United States gave him 25.5 years (8).

In addition to the sanitation movement, developments in immunology had—and continue to have—a decided influence on human survival. Diphtheria, pertussis, and smallpox—and more recently measles and polio—have been sharply reduced if not totally controlled.

Initially, the era was one marked by individual heroism and leadership, as well as by creation of health law. The actual dollar investment in public health was slight, and the changes rarely involved any voluntary action on the part of the popula-

tion at risk. Except for immunization activities, none of the progress relied upon individual attention to or treatment of a case of mental or physical illness. Prevention was essentially passive: a few public officials took steps to alter the living conditions of the many.

The reasons for action were not simply romantic or humanitarian. They were founded on mercantilistic ideas which came late to the United States. The advocates of action—public health mercantilists or Phase I preventionists—saw the dangerous sanitary conditions as weakening the populace and therefore the nation. The key to sound national growth and strength was a population unmolested by preventable diseases, at least during its productive years.

In sum, the significant features of this phase of prevention were that:

- 1) It was based on scientific discovery.
- 2) The underlying philosophy was in accord with mercantilistic ideas (8); good health for the individual was not the main goal; rather, the point of prevention was to maintain a vigorous population, so as to enhance production, capital accumulation, and sound national growth.
- 3) Results were obtained by a few authoritative people who used governmental power to do things to and for the entire community. The community itself, by and large, was passive. So that to the extent this first phase constituted a real "movement," it was really just a "movement" of the many by the few.

Phase II: Technology and Capital Investment

The glimmerings of Phase II in the evolution of prevention can actually be seen before the beginnings of Phase I—in the discovery of anesthesia and antiseptics. Nevertheless, while the former discovery was announced in 1846 (9) and the latter in

1867 (4), surgery and medical intervention advanced only slowly until the two world wars. There was very little that could be done to treat an illness other than to provide symptomatic relief and occasional barbaric excision or amputation of some bodily part.

The First World War, however, made major surgery necessary on an awesome scale; and by the time of the Second World War, sulpha (1935) and penicillin (1940) were known. These first important antibacterial drugs stimulated a massive growth in the pharmaceutical industry, which evolved a worldwide market structure. Given this huge market, chemical and biochemical research leading to synthetic production techniques soon made revolutionary drugs available in enormous quantities and opened up the era of technology and capital investment in the health field.

With such an obviously profitable adventure available for all to see, the search for magic potions and procedures to cure heart disease, scoliosis, hypertension, diabetes, arthritis, and schizophrenia accelerated like a rocket; and while its trajectory has been slowed—in part by a series of notorious accidents—the concentration of capital on the marketing of medical care continues. In fact, the rocket ship Health may already have accelerated past the velocity needed to escape ordinary gravitational restraints, and we may not know how to bring it back down to earth.

Soon after World War II, in 1946, the Congress of the United States enacted the Hill-Burton Law. This measure began pumping tax funds into a rapidly expanding hospital industry. From then to the present time U.S. hospitals have grown in number, size, and complexity to such an extent that they have now come to represent some of the most powerful and extensive concentrations of capital the country has ever known. And during this time the production and sale of medical care has become a profitable goal in and of itself.

In the earlier phase of prevention, the

improvement of health was seen as a way of maintaining a vigorous population, one which could increase the nation's strength and wealth. But in the second phase, the goal of a healthy population was obscured as the health industry took on a life of its own. Hospital planners and consultants proliferated and prospered at the same rate as the industry which produced new radiographic equipment, laboratory testing systems, computer programs for prescribing drugs, disposable equipment, and then machines to dispose of the disposable equipment, pre-packaged food service systems, and a host of new investments in electronics, telemetry, biochemistry, nuclear medicine, lasers, and fiber optics.

In sum, with dramatic and important successes at hand, the rush to invest in health care created a concentration of effort, interest, capital, and manpower unlike any other phenomenon in our history. The United States increased its expenditures on health from US\$3.8 billion per year in 1940 (10) to over US\$118 billion in 1975 (11). More than 4,000,000 people are now directly involved in producing medical care (11), and many more are involved in producing the instruments and supplies used in the production of medical care. This results in an enormous and largely involuntary provider-controlled transfer of \$562 per year from every man, woman and child in the United States to the health industry—an industry in which most of the decisions about how to spend the money are made by some 300,000 physicians, nearly all of whom operate independently of one another, and more or less independently of all other health care components.

Yet for all of that investment, which has made the production of medical care the largest and fastest-growing industry in the United States, the average span of life remaining for a five-year-old has increased only 2.9 years since 1940—from 61.7 to 64.6 years (12). Moreover, the limits of heroic

medicine are already apparent. For instance, calculations by the author based on standard life table techniques show that eliminating cancer of the cervix as a cause of death would add only three-tenths of a year of life (3.6 months) to the three-score and ten now available to the American female. And if, after 50 years of gynecological probing, she must live out those extra 3.6 months in a small board and care facility, with a monthly income of \$250, the limited support of Medicare, and a few food stamps—does she really want medical heroics?

While prevention has been mentioned constantly during this second phase, preventive measures—except for the occasional efforts of public health associations and public health workers—have been infrequently applied. Some major breakthroughs have occurred. The continued development and application of immunologic techniques has helped to bring poliomyelitis under control and now promises to eradicate smallpox from the world. Fluoridation of drinking water, despite its retarded application, has shown great promise for preventing dental disease. And measures for detection and early treatment of hypertension also show great promise.

But much of the emphasis on prevention has followed paths laid down by enthusiastic technocrats. For instance, multiphasic screening programs have diverted a substantial amount of time and effort away from more important organizational work toward the further development, application, and marketing of technology. Industries have rushed to the market with new techniques for probing, detecting, and diagnosing all manner of ailments—often with little regard for the prevalence, significance, and potential for prevention or treatment of the ailment involved.

Moreover, political leaders have tended to talk prevention while practicing retrenchment. To be specific, over the past eight years we have witnessed a steady erosion of

support for public health in the United States. There has been a lot of support for combating specific illness and some for pet projects, but little for public health.

In general, this second phase in the evolution of preventive work has featured:

- 1) Scientific discoveries and technological developments;
- 2) An intensification of work devoted to producing very modest health gains;
- 3) An enormous investment and concentration of capital in the health field; and
- 4) The conversion of social energy for promoting health into a sustained drive to promote the growth of the health industry.

The nature of the change from the first phase to the second is reflected in the papers published by the American Public Health Association. In the book *A Half-Century of Public Health* (13) commemorating the first fifty years of the Association, the papers were devoted to quarantine systems, water purification, waste removal, food control, milk programs, housing, child welfare, and ventilation. A recent review (14) of articles appearing between January 1973 and June 1975 showed a marked change, with the largest number of papers being devoted to the organization of health services.

As this indicates, the thrill of treating disease and injury has sharply curtailed investment in primary prevention. The fact is, relatively little money changes hands in primary prevention. The fact is, true prevention may actually reduce the transfer of money from the many to the few. The irony of Phase II is that it has witnessed, indeed has been party to, the creation of an environment increasingly hazardous to our health and has changed the type of prevention desired. As economists, legislators, and consumers have become aware of the enormous involuntary expenditure for health, their dissatisfaction with the results has risen. So prevention, as it is emphasized by political leaders, now refers to the

prevention of further expenditures more often than it does to the prevention of disease.

To digress for a moment, our post-World War II humanitarianism may have created a false goal for public health. The framers of the Constitution of the World Health Organization stated that good health means not just the *absence* of disease, but the *presence* of a complete state of mental, physical, and social well-being. With this positive outlook, public health no longer needs to focus on prevention (which is a negative concept) but on a positive concept—promoting a higher quality to life. Nevertheless, this makes it impossible to develop meaningful objectives for a public health organization which can be achieved through public health practice, since the quality of life is the proper concern of all of our institutions. Public health can contribute to that goal, but only by adhering to its own goal: the prevention of disease, disability, and premature death.

Phase III: Health and the Human Environment

It seems likely that the last thirty years, while exciting and expensive, have contributed more to the generation of disease (and thus continued investment in medical care) than to health. When practising physicians are told that prevention is the key to good health, they tend to become cynical. They correctly see the important problems in the way of prevention to be human behavior, our environment, and socioeconomic conditions. And they incorrectly disavow their own responsibility for all three. Health providers, armed with the knowledge that non-medical factors are governing our health, side-step the issue by saying: "It's not what I'm trained to deal with, so it's not my problem; it's someone else's."

It is true that more disease, disability, and premature death could be prevented by

avoiding alcohol and tobacco or by restricting the use of automobiles than by any increase in health care expenditures. But it is *not* true that individual behavior is solely at fault, nor is it true that physicians and other health workers can do nothing about it.

Victor Fuchs has achieved popular acclaim in the United States for his book *Who Shall Live?* (15). He advances the thesis, not original but articulately handled, that the choice is the individual's; that one has the power to abuse or respect oneself and thus to influence one's health. It is as an easy way to avoid responsibility. It is also a weak thesis which, translated, says: "I'm O.K., you're in bad shape—straighten up!" And it permits the physician, the nurse, the clergyman, the politician, the investor, and the administrator to all ignore prevention because it is the individual's problem.

Yet facts, history, empiricism, and common sense tell us that hazardous behavior is a result of social decisions, since social needs and personal needs interact. The cars we drive, the tobacco we smoke, the food and alcohol we eat and drink—all are part of the environment we have created. So are fires in tenements and nursing homes, gun-fights and knifings, and leaps from bridges or tall buildings. Such acts, whether personal or social, have an important impact on our lives.

To have participated in a society which defies consumption and growth is to have participated in creating the social and physical environment which threatens us; so it is not enough to say "I'm O.K.—you're a mess." We must change the situation or perish. Ironically, those who have benefited the most from the creation of such a society can now afford, as long as they live, to withdraw and protect themselves. But most of the world's inhabitants cannot.

If the first phase of prevention was characterized by mercantilism and a passive populace, and the second phase by capital investment and some degree of collaboration between health consumers and providers, the third phase shows a need for the popu-

lace to assume an active role—in fact the dominant role—in prevention.

Our task as technicians, scientists, and health workers is to define more precisely what causes health problems and what needs to be changed should society want to make such changes in return for health benefits. But being precise about prevention is a problem. A draft position paper which was accepted in principle by the American Public Health Association in 1975 asserted: ". . . we currently know that prevention techniques can be used to either totally prevent disease, or to significantly affect its progress. . ." While most public health workers would subscribe to that statement, the working papers of the recent National Conference on Preventive Medicine (16) describe realistically the limits of some of what we claim to know. It is true that many risk factors have been identified, and that much progress is possible, but such progress has not been achieved. That is because the process of technology and discovery—which does not include an understanding of what people want, what they value, and what they are willing to do for what they value—is incomplete.

The same American Public Health Association draft paper states that public agencies should:

- 1) "Develop . . . legislation . . . which will reflect the need for and the feasibility of applying preventive measures. . .
- 2) "Provide adequate budget. . .
- 3) "Monitor existing prevention programs. . .
- 4) "Educate the public. . . (and)
- 5) "Establish standards for health professionals that ensure their knowledge and proficiency in the latest prevention practices."

The paper goes on in the same general way. I believe elected officials in the United States are eager to invest in prevention. But they are dismayed and disappointed with our rhetoric and our claims in recent years.

It is important that we do a thoroughly professional job of sorting the wheat from the chaff, so that we can concentrate on what works and relegate to further research a selected priority list of problems about which we are not so sure. We should ask the following questions about each problem:

- 1) How important is it?
- 2) Do we know what causes it?
- 3) Can we do anything about it?
- 4) Does what we do produce a predictable and significant benefit?
- 5) Do we do it well, or can someone else do it better?, and
- 6) Does society want it done?

Much of what we do would score poorly if analyzed this way. And some things we fail to do would score well. For instance, well-child conferences in a general population setting would score poorly. Given more specific target groups and a more comprehensive program of evaluation, treatment, and counseling, far more could be done. Home health services have been strongly supported by public health nurses; yet only in a few cases have we identified important problems about which something predictably effective could be done to prevent unnecessary disability. Dental services for all generally receive enthusiastic public health support. Yet it is demonstrably impossible to fill all the holes in the teeth of adolescents and older age groups, while it is demonstrably possible to reduce the future prevalence of dental disease to manageable levels through universal fluoridation and incremental dental health education and maintenance.

Most people go through numerous life crises, and most emerge without debilitating scars. We know little about our ability to intervene with predictable effectiveness, and we know still less about the side-effects of lifelong mental hygiene assistance. Yet many of us would push our already bloated industry into producing more and more services for more and more people with

smaller and smaller problems. Some crises produce real functional disorders, and we can do a great deal about these. We need to provide these latter services better, while performing less of the former work.

Our health industry, as we enter the third and perhaps last phase of prevention, is overgrown but immature. It threatens to consume us rather than *vice versa*. Prevention is a valid concept. It warrants more precision, more research, and more application. But it will have to come about through difficult reconstructive growth—not acquisitive growth—a process made all the more difficult by the real threat that the cost of sickness insurance will prevent the assurance of health.

Besides the work that we must do as public health workers, there is a still larger job to be done by the society that supports and directs us. The most significant health hazards faced by mankind are its own creations. Whereas in Phase I we attempted to protect people from their environment, and in Phase II we altered the environment, in Phase III we must protect our environment from ourselves. And as we move toward global planning or global warfare in search of adequate nutrition or energy, the cost of a mistake becomes more devastating. Moreover, individuals are not really free to make their own choices. The producers of alcohol, tobacco, and automotive products have collaborated with us as individuals to produce an environment full of expectations with powerful social drives. It is possible that control of our lives has already passed to a new social order—one in which our acquisitive instincts fed by our productive power have produced a new abstraction—an ecological “them” which drives us onward toward the limitation and eventual loss of self. That unhealthy social outcome must be prevented. And so we can say that Phase III prevention, as it relates to both public health and the work of our whole society, consists at heart of one essential thing—the assertion of self.

SUMMARY

From the beginning, the main goal of public health in the United States has been prevention of disease, injury, and disability; but over the past century we have changed our concept of what this term "prevention" means.

Roughly a hundred years ago, on the crest of a wave of scientific discovery, effective large-scale preventive measures were undertaken for the first time. These measures were directed at improving sanitary conditions—not so much to improve the health of individuals as to invigorate the populace and provide a firm foundation for sound national growth. The community, by and large, was passive. Results were obtained by a few authoritative leaders.

This situation changed in the 1930's and 1940's. Revolutionary drugs became available in enormous quantities and opened up an era of health technology and capital investment. U. S. hospitals grew in number, size, and complexity, until today we find them to represent some of the most powerful and extensive concentrations of capital the country has ever known. Over four million people are now direct participants in the medical care industry, and many more are involved in producing the instruments and supplies used to provide medical care.

Yet for all that investment, which has made the medical care industry the largest and fastest-

growing in the United States, the gains have been very limited. For instance, the average expected life-span of a five-year-old has increased only 2.9 years since 1940. And while "prevention" has been mentioned constantly, little real stress has been placed on preventive measures designed to better public health. In general, this second phase in the evolution of "preventive" health work has featured scientific discoveries and technological developments; intensification of work devoted to producing modest health gains; enormous investment and concentration of capital in the health field; and the conversion of social energy for promoting health into a sustained drive to promote the growth of the health industry.

The third phase of prevention, into which we are now emerging, returns us in some ways to the organizational preoccupations of the first phase—but with a new awareness of the whole process of social interaction. This phase will be characterized by a hesitant and apprehensive reexamination of the environment we have created for ourselves. It will be the most difficult and important phase in the evolution of the concept of prevention; and compared to the second phase, it will be concerned far less with technology and medicine, far more with social values and social decisions.

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DIRECTOR OF CARIBBEAN FOOD AND NUTRITION INSTITUTE

The Director of the Pan American Sanitary Bureau designated Dr. John Michael Gurney to head the Caribbean Food and Nutrition Institute (CFNI) effective 1 May 1977.

Dr. Gurney joined PAHO/WHO in November 1969 as a consultant for the National Food and Nutrition Survey in Jamaica. In March 1970 he was appointed a staff member and served as a medical officer providing advisory services on nutrition in CFNI in Kingston, Jamaica, until January 1974. He was then transferred to the WHO European Region and worked as project manager with the WHO-assisted regional nutrition training project in Beirut, Lebanon, and Alexandria, Egypt.

Dr. Gurney received a degree in Medicine in London, England, his country of origin, and degrees in Tropical Medicine and Hygiene and Public Health from the London School of Hygiene and Tropical Medicine.