Medicine: Meritorious or Meretricious

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Summary. In spite of remarkable advances in medical therapy and in the development of fantastic diagnostic devices, American society appears increasingly disenchanted with the physician. The paradox can be explained by the high cost of medical care, the overselling of medicine's capabilities, the expectation that the physician will be both ultrascientific and as empathic as yesterday's doctor, and little recognition that the curing of one illness in the elderly exposes this group to other disease. Finally, though the physician is trained to manage illnesses, he is also given the excessively broad task of improving personal and societal practices disadvantageous to health.

"It is, in my opinion, the unlikeliest of all times for us to be getting ourselves into a depression about medical science," wrote Lewis Thomas (*1*). Theodore Cooper, a respected and experienced authority in both medical research and administration asserts, in appraising today's American medicine, "Never has anything sounded so bad that has actually been so good" (*2*). But the title of Aaron Wildavsky's essay "Health in the United States" frames the paradox in the choicest of epigrams, "Doing better and feeling worse" (*3*).

When anyone who is in fine shape thinks he is ill, the diagnosis is obvious: poor old Hippocrates has hypochondriasis—or at least his many critics would so impute. But Hippocrates is no more emotionally unbalanced than the society he tends, and with which he contends. The paradox identified by Thomas, Cooper, and Wildavsky is born of the fact that society, although it itself has abandoned the old-fashioned virtues, still demands to find them in the sons of Hippocrates. Physicians, indeed, are expected to be chimeralike creatures who, on one hand, should be expert in the fabulous knowledge and skills of the scientific century, but on the other, should simultaneously display the humanity, compassion, and devotion attributed to "the good old doc."

American society has become depersonalized, urbanized, and homogenized. We think nostalgically of the motherly, if strict and pince-nezed, schoolmarm educating her flock in the simple elegance of the rural schoolhouse—potbellied stove, chintz curtains, American flag, and all—but we accept without too much fuss the dreary glass and cement boxes of many metropolitan schools. A similar adjustment to the disappearance of yesterday's doctor is not evident. Neighborliness now has geographical rather than personal connotations, and even familiness is being disjointed by the mesmerism of TV watching. Similarly, the fatherly physician is not only vanishing spontaneously but is hastened in his exit by the boot of the antiauthoritarian activist. American society has opted for the conveniences and efficiencies that are the products of scientific invention, and paramount among this society's goals are financial success and security. Should doctors, who en masse are ordinary if specially educated folk, be expected to seek different objectives and to observe a different ethos?

Like the rest of American society, the doctor has become addicted to, if not the slave of, the device that can be plugged into the electric circuit (at least as long as the necessary sources of energy hold out). The products of technology that he uses in his business—whether x-rays, fiber optics, nuclear imaging, or chemical reactions—are expensive and at times foreboding; but his basic modus operandi is no different from that of the housewife who indulges in defrosting refrigerators, washing machines, microwave ovens, and heating and cooling apparatus activated the moment home temperatures deviate slightly from some arbitrarily set value. If doctors are technologically oriented, hurried, and impersonally distant in their behavior, it is only because they, as a group, mirror the society of which they are an integral part. In contrast, their deviations from the canons of old are particularly exposed to censure, partly because the profession has so insistently professed its dedication to charitable and humanitarian objectives, and partly because in the application of scientific inventions, the doctor has become more and more affluent.

Advances in Medicine: Treatment

In 1891, Sir Luke Fildes painted a widely reproduced and sentimental portrait of the doctor sitting pensively, and passively, at the side of a sick child. The picture has been variously interpreted. Some see it as a memento of a bygone medical samaritanism. Others believe that the portrait emphasizes the doctor's helplessness a century ago. If properly immunized (and lack of proper immunization in the United States today is another social rather than medical problem), children in developed countries are at present well protected against infectious diseases, and Sir Luke's subject would probably not be seriously sick nowadays. Alternatively, the doctor of 1978 has available a vast array of antibiotics to combat infections not preventable by immunization. Tuberculosis, identified by Bunyan as "the Captain of the men of death," and pneumonia, so identified by Osler, are not the killers that they used to be. McKeown (*4*) is undoubtedly correct in asserting that improved nutrition and sanitation have in a major way contributed to the decline of infectious diseases, but the idea that antimicrobials did not do their part seems a bit farfetched. Smallpox has virtually been eliminated from the globe, and cholera is being increasingly contained. So-called "slow virus" diseases have been identified, and, by the cessation of cannibalistic rituals (which transfer virus from the dead to the susceptible living), New Guineans have been rid of kuru. The next objective, and one well within the competence of scientific medicine, should be the eradication of malaria, of schistosomiasis, and of other

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parasitic diseases that particularly ravage the Third World. Here is where effort and money should be spent, not in attempts to convert Western octogenarians into nonagenarians.

The elimination of the old plagues and epidemics has been paralleled by many other spectacular triumphs of medical science. A patient with pernicious anemia can be considered virtually cured if vitamin B_{12} injections are administered regularly. Vitamin deficiencies of other types have been generally eliminated in the North American continent. Insulin sustains the diabetic, even if late complications of renal failure, retinal disease, neurologic disorders, and cardiovascular abnormalities are difficult to prevent. Other hormonal disorders can be corrected either by replacing the deficient glandular product, or by methods that counter hormonal overproduction. Hormones of the adrenal cortex (cortisone, for example) and cognate agents ameliorate many disorders of as yet unidentified etiology. L-Dopa has made tolerable the life of many patients with Parkinson's disease, and recent neuroendocrinologic discoveries suggest that heretofore unmanageable disorders of the nervous system may be attacked successfully.

With increased appreciation of the immunological hazards to be encountered and controlled, organ transplantation, particularly of the kidney, has become a practical reality. If transplantation is impossible or delayed, hemodialysis offers an efficient method of ridding the blood of wastes and thus prolongs the life of many who otherwise would have died of renal failure. Immunological advances have also eliminated the lethal fetal complications caused by Rh incompatibility between mother and fetus.

In the meantime, surgeons and anesthesiologists have made comparable, if not greater, progress. A variety of congenital cardiac abnormalities can now be corrected; coronary bypass procedures relieve the pain of angina pectoris, whether or not they affect survival; prolonged nutritional sustenance by intravenous methods (unfortunately known as "hyperalimentation") has become feasible; cardiopulmonary resuscitation can be practiced with success not only by medical professionals but by trained members of the laity; hips are replaced by orthopedic experts; blood vessels can be replaced by grafts; and pacemakers can be inserted to control potentially lethal arrhythmias of the heart. For patients in dire respiratory distress, anesthesiologists now have the analytic and therapeutic means to keep the acid-base balance, and the oxygen and carbon dioxide concentrations of the blood within physiologic limits.

In oncology, the management of common cancers remains difficult. Some can be resected surgically, but in other cases the operative procedure is merely palliative. Whether so-called adjuvant therapy given immediately after operation to patients who have no obvious local or distant spread (metastases) of the tumor will prove effective remains to be seen. Adjuvant therapy consists of chemotherapy, radiotherapy, or both, and is given in the hope of eradicating grossly inapparent "micrometastases." On the other hand, treatment with x-rays, chemicals, or both, has proved remarkably beneficial in prolonging the life of children and adolescents with malignant growths affecting the bone marrow, blood, or lymph glands. Sometimes these modalities are also very successful in the management of choriocarcinoma, testicular tumors, and Wilms' tumor of the kidney.

Advances in Medicine: Diagnosis

The most fantastic of scientific medical achievements have, however, taken place in the domain of diagnostics. Indeed, although people still die in our major hospitals, very few die undiagnosed. Samples of bodily tissues and fluids can be obtained with needle-tipped devices designed to penetrate with relative safety almost any organ or cavity. These samples can then be examined for their structure, immunologic properties, enzymatic activities, and content of organic and inorganic substances. The electron microscope yields pictures of cellular detail with good resolution at magnifications exceeding 50,000, and the radioimmunoassay permits detection and measurement of materials present in only picogram amounts.

Chromatographic techniques facilitate the discovery and identification of compounds not previously known to exist in the body. Systems of sequential analysis permit the rapid, efficient, and relatively cheap performance of some 20 common quantitative blood tests. Catheters can be inserted into blood vessels, and, with the injection of contrast materials, allow the definition of large or small portions of the vascular tree. The structure and function of organs can be determined by appropriate radioactive substances. The wonders of radiology appear to be capped by the development of computerized tomography, known as CT or CAT scanning. In this generally noninvasive procedure, x-ray beams are passed through a cross-sectional plane of the body from many different angles; the absorption of these beams is then measured and computerized to yield a density image of the planes studied. Since density differences of as little as 0.5 percent may be detected, CT scanning has been particularly helpful in the diagnosis of lesions of the brain (*5*). CT is also relatively safe, and with the increased use and understanding of ultrasonography (based on the principles of sonar), this completely safe and noninvasive procedure may be used to outline a fetus, gallbladder, or pancreas, or to identify the nature and motion of heart valves. (Whether tests that require no more than a simple venipuncture can be classified as "noninvasive" has occasioned considerable semantic debate.) The lining of hollow organs can be viewed and photographed directly by means of flexible fiber-optic tubes. Polyps of the colon situated more than 25 centimeters above the anus formerly required a major abdominal operation for their removal. Now, many such polyps can be found and removed via colonoscopes, fiber-optic tubes designed specifically for examination and treatment of colonic disorders.

Disenchantment with Modern Medicine

This imposing array of diagnostic and therapeutic procedures that science has made available to medicine during the 20th century—and the preceding paragraphs contain only a partial list of the accomplishments—can certainly be rated as meritorious. Why, then, the discontent, the denunciation of medicine and its practitioners, and even calls—not restricted to Ivan Illich (*6*) by any means—for demedicalizing ourselves? Why the anguished complaint that, in proportion to the billions spent in the pursuit of health, the prolongation of life, or the enhancement of its quality, is so relatively infinitesimal? Some of the reasons are natural, others social, but a third variety stems from certain meretricious aspects that have tainted medical practice even as knowledge, equipment, and skills have proliferated.

A major natural cause is that life is finite and, in spite of tales of frolicking centenarians in Ecuador and the Caucasus, the span of life is approaching an asymptote. Hence, no matter how many dollars are poured into the effort, the returns in years of life saved will inexorably diminish. The claim, moreover, that, if everyone led an abstemious life

and observed all the rules now believed to maintain healthiness "billions of dollars" would be saved (*7*), warrants some critical examination. One would expect that taking care of an older, less productive, and increasingly mentally senile population would cost more rather than less; and, even if money were saved by increasing the longevity of those who have already passed the age of 65, that saving would obtain for only a few years. Sooner or later the same deaths and the same expenses would have to be faced. Finally, in spite of the remarkable achievements of certain men and women who live to the age of 80 or even 90, the average quality of life at such advanced ages may well be less rather than greater. Many a man and woman past the age of 75 suffers not only physical deterioration, but increased loneliness and incapacity to do the things that make life worth living. Excessive concern with longevity is, as some have suggested, a disease in itself.

A second natural cause is that the determinants of life are legion, and the defeat of one merely gives opportunity to another. He who is spared a myocardial infarct will have a cerebrovascular disorder (stroke), frequently a far worse fate than a heart attack. She who is saved from cancer A is at risk for cancer B, and, above all, the very therapies that stave off the traditional causes of mortality and morbidity, that is, potent antibiotics, adrenal cortical hormones, and the chemical and radiologic procedures used to treat those with malignant tumors, produce a so-called "compromised" host who may be victimized by microflora that ordinarily are merely commensal. Hence, one is faced by the commonsensical conclusion that saving an elderly person from one illness merely exposes him to another, and also that the morbid effects of certain potent treatments actually increase the susceptibility of the patient to another disorder. Therapeutic success, in a way, thus fertilizes the ground for failure.

Of the social causes that lead to the denunciation of much of medicine, the major one, namely the expectation that the physician should somehow live in an ultratechnologic and impersonal society without acquiring the characteristics of that society, has already been discussed at length. There is also the peculiar social phenomenon that superfluity breeds discontent. The psychological problems of the idle rich have been a common theme for a long time. A recent example was the student unrest of the 1960's, an unrest in which to a large extent the participants were the children of middle-class or upper-middle-class families. Exposed to no urgent needs, and lacking substantial goals, they vented their unhappiness and frustration in violent demonstrations not only against specific objectives, such as the Vietnam war, but also against a great variety of social institutions. Similarly, the great abundance of scientific and technologic means available to treat and diagnose illness may be a source of confusion and frustration rather than otherwise. Contributing to this public perplexity are the various schools of thought that make astounding if not outrageous claims concerning the causes, nature, and treatment of the many disorders that still defy medical management. (The advocacy of "megavitamin" therapy to prevent or treat anything from the common cold to mental illness or cancer is but one example.) If suddenly the number of available techniques, instruments, and specialists were curtailed, and if health care were to be rationed—as some threaten it may be—much of the criticism of medical care would probably subside rapidly.

Crisis-Care Versus Holistic Medicine

Another common complaint, so common as to be a bit trite by this time, is that Hippocrates is crisis-oriented, that he sees his mission as the cure or amelioration of symptoms rather than as the prevention of disease, and that he is committed to the management of sickness rather than the preservation of health. These facts are undeniable; but whether or not they constitute adequate bases for criticism is debatable and depends upon one's point of view. My own feeling is that patients visit doctors in the hope of feeling better, that they want the doctor to exercise a healing function, and that they expect him to render, as Geiger (*8*) puts it, personal health services. For these purposes, he is specifically trained, and for these purposes—if he is a good doctor—he uses his scientific information and exercises his art. Even a world-famous physiologist, Walter Cannon, wrote, "Finally, a great service which the physician renders is that of bringing hope and good cheer to his patients. That alone justifies his presence" (*9*). More recently, René Dubos has eloquently summarized the "individual factors in medical care" (*10*), factors that deal with the mysteries of favorable doctor-patient interactions, whatever the scientific basis of medical knowledge.

Others would argue that the doctor is a factotum of health, that his general mission is comprehensive health care, and that his approach to the patient should be holistic with emphasis on the patient's total relations with an environment, including his family, his work, and his habits, as well as his natural surroundings. The goals of holistic medicine are, of course, admirable; nobody would argue that treatment of a disease is preferable to its prevention. Comprehensive prevention, however, entails skills and efforts that are beyond the capabilities of many a good doctor. Preventive health measures are much more influenced by occupations that can shape social attitudes rather than by individual doctors who categorically instruct, "Smoke and drink less." If smoking of cigarettes has been reduced in certain groups (middle-aged males, and doctors in particular), it is because of popular social trends and intensive advertising through the media, not because of what a doctor may have written on a prescription pad. Whether dietary practices can affect cardiovascular disease in an average person (that is, excluding the patient with genetically determined disorders of lipid metabolism) is still moot, but it is the news media and the techniques of advertising and of psychology that are necessary to implement any change that is desired. As for jogging, which in New England makes driving a hazardous activity, the obsessive plodding, trotting, or galloping along the road has medical consequences as yet unidentified. Ironically, the present emphasis on eliminating "bad" life-styles and opting for the temperate life reflects the success of scientifically based medical practice in controlling acute illness and thus uncovering the importance of degenerative diseases and medicine's relative inability to do anything about them. Whether intensive jogging, elimination of excess pounds, and an ascetic life-style in general will make any real impression on the processes of aging remains to be seen. In any case, the doctor should not be expected to play a major role in changing whatever life-styles may be seriously detrimental. He has enough to do if he takes care of the crisis illnesses that do occur, and if he keeps up to date with the various scientific facts known about their nature and management. Hence, I would not consider the failure of the doctor to practice holistic medicine as substantive evidence of inferior medical practice.

The Overselling of Medicine

Another trouble is that the capabilities of medicine, great as they are, have been oversold. Many parties are to blame. Although individual physicians may be well aware of the limitations of medicine and emphasize them, organized medicine has

on the whole encouraged a belief in the doctor's omniscience rather than his ignorance. The news media, whether printed or televised, compete with each other to broadcast the latest "breakthrough" (a word that should be eliminated from the medical lexicon) with findings that are at best preliminary and at worst totally unfounded. But perhaps most culpable are the massive voluntary health groups. In one fearsome advertisement after another, these organizations suggest to the public that, if only a few more dollars were thrown in the research till, the major killer diseases would be contained. Tommy-rot. It is organizations such as these, along with medical societies, news media, and politicians that promise too much, that are in large part responsible for the fact that we are feeling worse though actually doing better.

If Sir Luke should paint his picture of the doctor and sick child today, I can imagine the doctor still sitting pensively near the prostrate patient, but separating the doctor from the patient would be a monstrous computerized robot that would be spilling into the doctor's lap a veritable cascade of printouts of laboratory data; and the doctor would be pensive not for lack of information, but because its overwhelming mass makes its integration and interpretation difficult. The child would also have to be pictured differently in that a variety of tubes, wires, and other gadgetry would be attached to various parts of the body to obtain the necessary signals or samples for the monster machine. With this fanciful modification of Fildes' portrait, it is apparent that technology has indeed come between the patient and the doctor and that, although scientific devices disgorge much information, knowledge as to how to treat the patient properly may still be lacking.

Meretricious Overutilization

The meretricious aspect of the splendid tools and methods with which science has enriched, literally as well as figuratively, medical practice is their overutilization. Not only does the very abundance of medications, equipment, and special techniques create its own demand, but this demand is enhanced by the social, political, and economic factors that prevail in the United States.

The average practitioner is tempted or prodded into carrying out large batteries of tests that are of questionable necessity. Perhaps he wants to provide his patient with the most thorough "work-up" possible, perhaps he feels he has to practice defensive medicine to protect himself from malpractice suits, or perhaps profit motives underlie his actions. Whatever the reason, not all tests are innocuous, and when an unnecessary diagnostic procedure is responsible for pain, incapacity, or even death, the benefits of modern diagnostics become diluted. In analogous fashion, medicines may be prescribed when none are needed, or more potent, and particularly more toxic, products are administered when milder and safer agents would do.

The specialist who has invested in expensive diagnostic equipment is motivated to use that equipment even when the indications are marginal. The hospital that has installed elaborate facilities for some esoteric medical purposes is not anxious to have these facilities remain idle. And the theory that the number of elective operations performed reflect the availability of qualified surgeons rather than the needs of patients has gained so much credibility that more and more insurance systems, particularly those controlled by government, will not pay for certain elective operations unless the need for the procedure is confirmed by a second opinion. At present it is unknown just how many removals of tonsils, gallbladders, wombs, prostates, or hemorrhoids are mandatory, discretionary, or literally unnecessary; that is "instead of contributing to the well-being of a patient, [are] performed because of ignorance, faulty judgment or a desire for personal gain" (*11*). There is no doubt, however, that "unnecessary surgery," instead of being perceived as an issue of medical practice and science, has become a hot political topic.

Not only the doctor should be blamed, however, for the meretricious overutilization of the ingenious but usually very expensive medical methods made possible by science. Many a patient demands whatever health services are available, partly because he has, as has been already mentioned, been oversold as to their value; but principally because, in Wildavsky's words (*3*), the patient's simple rule "is to seek care up to the level of his insurance." Thus everyone involved in health services, both providers and consumers in today's popular catchwords, faces no disincentives but is, to the contrary, stimulated to use or seek the "latest" and "best" diagnostic and therapeutic methods that science-based medicine has to offer. The fantastic dollar costs of this medical-social-political-economic exploitation of scientific instruments and skills are stressed ad infinitum [have you ever seen an article dealing with the economics of medicine that does not mention the percentage of the GNP (gross natural product) commanded by the health services?]; but equally important, though less often mentioned, are the human costs, the misery and sickness, that are among the disadvantageous consequences when the diagnostic implements and therapeutic modalities of our science-based medicine are overused.

Conclusion

L. J. Henderson, one of Harvard's famous biochemists, is frequently credited with the following aphorism: "Somewhere between 1910 and 1912 in this country, a random patient, with a random disease, consulting a doctor chosen at random, had, for the first time in the history of mankind, a better than fifty-fifty chance of profiting from the encounter." Have the patient's chances as Henderson's words imply, increased appreciably since 1912? The average span of life has of course been prolonged because of the markedly diminished death rates of infants and children, but whether medical care should receive credit for this improvement is much debated. For those who have reached middle and older ages, the possible beneficial effects of patient-physician encounters have not on the average been very impressive. How, in the face of the many medical advances made possible by science, is this relative lack of progress possible? Some of the reaons have already been discussed: the older patient cured of one disease is thereby merely exposed to another; and although the aggressive, interventionist methods used by all kinds of physicians produce some astounding therapeutic victories that were formerly impossible, the same heroic methods produce iatrogenic disease (and death), also formerly impossible. An exact or even approximate balance of accounts is, however, not available. How, for example, does the number of patients who had serious penicillin reactions after inappropriate exposure to the drug compare with the number who could not have been helped without the use of penicillin or its congeners? One would like to think, however, that the beneficial effects of venturesome diagnosis and treatment would outrank the harmful by a ratio of at least five to one.

Another powerful factor must be considered. It is generally believed (another uncertainty expressed by generalization rather than precise measurement) that at least three-quarters of physician-patient encounters are occasioned by complaints that are either self-limited, or for which medicine has no specific reme-

dies. Such patients presumably benefit from seeing a doctor because he listens sympathetically to their words and then consoles and reassures them. This exercise of what might be called the art of medicine has probably not improved since 1912; indeed, social changes and the ascendancy of technology have probably impaired it. Hence, one's evaluation of Henderson's maxim depends to a considerable extent on one's definition of "benefit." If the whole spectrum of medical care is included, ranging from a pat on the back to transplantation of the heart, it is doubtful that the benefit-harm ratio of personalized medical care has changed appreciably over the last 100 years. If, however, attention is focused on certain serious organic diseases—infectious, metabolic, and even malignant—then the contribution of science and technology to modern medicine have been truly wondrous. If the patient of 1978 has the right disease, and consults the right physician with the right scientific knowledge and the right technical skills, there can be no doubt that his chances for improvement by far exceed those of a similar patient two-thirds of a century ago.

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Genetics and Medicine: An Evolving Relationship

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Mendel identified the factors we know as genes and Darwin realized the biological importance of natural selection in biological evolution, but it was the physician A. E. Garrod who revealed the relevance of their concepts for our view of health and disease (*1*). Garrod was the first to describe Mendelian inheritance of a human disease (*2*), and he introduced the term "inborn error of metabolism" to encompass the now well-established generalization that a gene exerts its effect upon a component of metabolism by directing the synthesis of the enzyme that controls it. Garrod also believed that the inborn errors were only extreme examples of a pervasive human biochemical individuality, and he recognized not only the likelihood of "private" susceptibility for a particular illness in specific individuals but also the implications for treatment and prevention offered by this concept.

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Extent of Human Genetic Variation

Along with the exponential growth in knowledge of the inborn errors of metabolism since Garrod's time (*3*) has come the realization that each human gene locus brought to our attention by such disorders possesses a variety of mutant alleles, or alternate forms of the gene (*4*). Nowhere has this been made more apparent than in the case of the α- and β-globin genes (*5*). Such knowledge is of great practical relevance for the physician and medical geneticist because it implies that medical treatment of individual patients with such Mendelian disorders must be titrated to the requirements set upon them by their particular mutations. By analogy with the hemoglobinopathies and the inborn errors of metabolism, mutational heterogeneity should exist in most if not all other human genes, and, indeed, that is the case. Surveys in human populations of 104 genes coding for enzyme structure reveal that 32 percent are polymorphic in one or more major ethnic groups (*6*). From the observed prevalence of polymorphic genes, it is estimated that the average heterozygosity per human gene locus is at least 6.3 percent; that is to say any single person is likely to be heterozygous at no less than 6 percent of his or her structural genes. This means that, with the exception of monozygotic twins, no two individuals are alike in their metabolic machinery. Each person is adjusted in a different manner to the universal environment. Everyone has a different and relative state of health.

Genetic Versus Medical Paradigms of Health and Disease

Familiarity with the extent of human genetic variability encourages one to propose a genetic paradigm of health and disease (*7*, *8*) such that health is viewed as a state of equilibrium and disease as disequilibrium in the relationship between organism and environment (Fig. 1). Any biological function involves both matter and energy for which it is ultimately dependent on the environment; the interaction between environment and function is controlled by a gene product. The interaction is normally in equilibrium; disequilibrium results either when the environmental component is changed significantly or when the gene product is modified by mutation. The genetic paradigm recognizes the role of intrinsic (genetic) factors for individual homeostasis and susceptibility or resistance to disease; the medical paradigm emphasizes the importance of extrinsic (environmental) factors in the etiology of disease. Because individuals have their own genetic signature, it follows from the genetic paradigm that each person is at his or her own specific risk for a particular disease. This is quite different from the medical paradigm which views all persons as if they were at equivalent risk.

The genetic paradigm also views disease as a spectrum (Fig. 2). The position

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