Science Advocacy

A Role for the Family Practitioner

SCIENCE IS the foundation of medicine. Through regular advances in basic and applied biological research, physicians' ability to prevent, diagnose, and treat disease continues to grow at an unprecedented rate. At no other time in the past century has medicine been presented with so many successful developments in biomedical research that have revolutionized patient care. Cystic fibrosis, Parkinson's disease, childhood diseases, adenosine deaminase deficiency, acquired immunodeficiency syndrome, melanoma, Gaucher's disease, spinal cord injury, coronary heart disease, diabetes, colon cancer, muscular dystrophy, and burns are just a few of the many areas in which new curative, preventive, or therapeutic modalities have been developed in the past few years. Each of these advances has resulted from the combined efforts of basic scientists, clinical investigators, and practicing physicians willing to become involved in clinical trials, and each of these advances has evolved in a climate in which public support for science has, for the most part, been unquestioned. Perhaps because of this perception, physicians have spent precious little time advocating the critical role scientific investigation has played in medical progress. Yet, only through the integration of scientific investigation, medical practice, and proper communication have these opportunities for better patient care been made possible.

Although the successes of biomedical research are certainly evident, many factors are beginning to impede the evolution of scientific advances from the laboratory bench to the patient's bedside. Scientists must have adequate resources available to conduct the basic research that underlies the development of virtually all new medical applications. These resources include funding, the availability of trained personnel, adequately equipped laboratories, biological supplies (animals and human tissues), and leading-edge technology. Clinical investigators must be available to apply scientific findings to the development and evaluation of new technologies. Industry and the medical community must then facilitate the transfer and diffusion of phase III proven technologies into better opportunities for improved patient care. Perhaps most important, the public must be receptive to an atmosphere conducive to scientific progress.

However, in recent years, each of these steps in the development of new technologies has met significant obstacles. For example, few students are today choosing a career path that incorporates science. According to recent data, fewer than 4% of students entering college indicate an interest in majoring in the biological sciences. While medical school applications have increased somewhat over the last several years, a similar increase in graduate school enrollments in the sciences has not been evident. Of course the difficulty in finding talented students to major in the sciences represents only part of a much larger and more generalized problem—a lack of understanding of science and scientific concepts among the public.

Almost two thirds of American adults periodically read their horoscope, and 15%—26 million people—read it regularly. Nearly 39% of adults believe that astrology is scientific, and 7%—12 million people—report that they sometimes change their plans after reading their daily horoscope. Forty percent of adults believe that specific numbers are lucky or unlucky. Significant numbers of people are fearful of donating blood or seeing a dentist because of a perceived threat of acquired immunodeficiency syndrome. Some people believe that human immunodeficiency virus can be transmitted through casual contact. There are those who believe that colonic irrigation with frequent enemas will cure cancer, or that apple cider vinegar or honey-containing drinks can alleviate arthritis. A recent study reported by the Public Opinion Research Laboratory at Northern Illinois University, De Kalb, reports that approximately 95% of the American public may be classified as scientifically illiterate.

Increasing scientific illiteracy among the public has resulted in less support for the entire scientific enterprise. In recent years, there has been an erosion in the public's confidence in high technology and the ability of the government to control that technology. We have a litigious society where one can file suit with little or no evidence of damage. Contingency fee award structure of plaintiff's bar permits suits to be filed with virtually no cost to the plaintiff should he or she lose. The glut of cases already

filed over the silicone-gel breast implant issue is a clear example. The unique legal system in the United States often creates handicaps that increase the costs of science and that have an additive effect on the costs of health care provision. This has been evident in many areas of medicine, but most particularly with respect to vaccine production.

Society depends on the fruits of high technology, yet, at the same time, yearns for a simpler life-style. In fact, there seems to be a growing faction of individuals who wish to return to some idyllic life—a life where chemicals are never used, where science is viewed with some skepticism, and where *technology* is an evil word. At the same time, we have a public that has little understanding of the natural world, particularly as it relates to health. Our news media rely on "experts" who often disagree and neither the media nor the public can seem to make adequate judgments as to who might be right . . . and unfortunately, underreaction, overreaction, or nonreaction are equally dangerous. This is perhaps most critical in the area of food science and nutrition. Advice being offered to the American public by such presumed "experts" in recent weeks has included the suggestion that meats and dairy products should be eliminated from the diet. Few were aware that this advice came from an animal rights group that happens to be headed by a physician. In the real world, filled with uncertainty, even if one can measure risk—and we rarely can—interpretation of that risk is extremely difficult. Adding more substance to this argument is the fact that, as technology grows, so too does ignorance.

Many advocacy groups active today use public naiveté of science as their best strategy for winning converts. Perhaps the clearest example of this is the so-called animals rights movement. Animal activists are waging war with the medical and scientific communities over the continued availability of animals for scientific research. These groups are fighting a hit-and-run guerrilla campaign in the streets, laboratories, and legislatures, never losing sight of their ultimate goal—the abolition of all research using animals. They argue that all research is cruel, that animal experiments have never resulted in any advances that have been beneficial to humankind, that researchers care more about grants than they do about good science, and that virtually all research is duplicative and wasteful. They state that computer technology can replace the use of vertebrate animals in biomedical research, and they insist that it is inertia on the part of researchers that prevents these "alternative" technologies from being used. While currently only about 30% of the American adult public seems receptive to these arguments, the animal activist community has recognized that an important niche for its future lies in the precollege classroom. They have begun a campaign to indoctrinate our youth to the underpinnings of their philosophic approach to life that extends well beyond the use of animals in scientific research. Animal activists have already had significant impact in passing laws and regulations in several states that severely affect the research process. Physicians should be cognizant of the dangers that the animal activist movement and similar groups pose in terms of inappropriate governmental regulations. For example, there have been close ties noted among the animal rights advocates with antibiotechnology activists. These groups have been successful in impeding ongoing scientific work in several communities.

Other ancillary issues have also had a significant impact on the research and development process and public perceptions of scientific progress. Celebrated cases of purported scientific misconduct have sullied the reputations not only of scientists but of science as well. Universities have been implicated in cases of fiscal impropriety whereby large expenditures of indirect funds derived from federal grants were spent for seemingly inappropriate purposes. Several scandals over alleged conflicts-of-interest in clinical research protocols have made entry of patients into clinical trials harder. Each of these factors has made competition among voluntary health groups for ever-shrinking philanthropic dollars a more difficult problem.

Research agendas are being set increasingly by the availability of funds rather than the need to answer critical questions. More frequently, in recent years, science has been driven by an agenda set by forces and ideologies outside the scientific community. The adage that science should drive public policy decisions on health-related issues has been abrogated. For example, the ban on the use of federal funds for fetal tissue research was orchestrated by antiabortion foes in the Bush administration, although an advisory committee to the director of the National Institutes of Health had voted against such a ban. That vote was based on the contention that such a ban inhibits responsible research that had the potential to alleviate pain and suffering and save human lives.

Few among us recognize just how health risks are perceived by the patient. We do not understand why an office worker worries inordinately about asbestos in the workplace when we know that he or she smokes two packs of cigarettes every day. We do not understand why parents are afraid to feed their toddler applesauce when they failed to vaccinate that same child against diphtheria, tetanus, and pertussis because of a misplaced fear of encephalitis. Lines of effective communication must be established. In particular, family physicians are uniquely positioned to become champions of science, to assess potential health risks, and perhaps most importantly, to serve as objective voices of reason and credibility about science in their communities. The family physician can educate and help correct misperceptions among a public increasingly skeptical about science and technology. On some occasions, that will mean being candid and loud about a danger; on other occasions, that will mean being reassuring and compassionate in helping to alleviate undue fear.

How can we begin to solve this dilemma? Surely health care providers have a special stake in promoting appropriate decision making as it relates to personal health and well-being. But today, it is really quite rare for community-based practicing physicians to be involved to any substantive degree in the promotion of science. Certainly, many ancillary forces are pulling at the practicing physician—most notably, the need to make a living. However, communication between health professionals and the public has never been more necessary than it is today. Physicians must position themselves as leaders in the public support of science and the medical research process. This is especially important for family practitioners since they are often the only science professional known to their patients and are almost always a trusted source of information about science in general and health in particular. We are nearing the need of a century of unprecedented scientific discovery and advances. At the same time, science and society are besieged by problems that threaten to slow progress.

Science as an endeavor is truly at risk in our contemporary society. In terms of public policy development, science is a low priority. The United States faces a scientific "brain drain." The future of US competitiveness can be seriously questioned, particularly in the scientific arena. A small but vocal antiscience movement is making significant inroads in convincing the American public that science does more harm than good. Taken together, these effects will have a substantial effect on the practice of medicine. To help reestablish a scientific atmosphere that is conducive to medical progress, the public must be educated. The communicator of this information needs to know enough to acknowledge valid criticism. Someone must discern whether available information is credible enough to have bearing in helping society gain some perspective on the real and perceived dangers they face and the critical decisions that they must make. Who better than the family physician?

There are many ways in which the family physician can serve as an effective advocate for the scientific enterprise. Each individual can find a level of activity that is comfortable for himself or herself. You may wish to serve as a science resource person to your local elementary, middle, or high school. All too often, these educational institutions are in dire need of a science professional to help answer student or teacher questions. You may volunteer as a guest speaker to your local community service organization. The Rotary, Lions, Kiwanis, and similar groups across the nation continually seek to provide interesting and relevant presentations to their members. Talk to them about the scientific underpinnings of what you do. Help your patients to understand the basic tenets of scientific method and how medical progress is achieved. Assure your patients that the government regulates medical research using animals, and that 99% of physicians support the continued availability of animals for that research. Provide materials in your office that speak to the importance of biomedical research. Respond with a letter to the editor of your local newspaper when you become aware of misconceptions relating to medicine or science. It is not difficult to become a science advocate—the only requirement is personal commitment.

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