The veterinary profession in the U.S.A.: changes and challenges*

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Summary: Within recent decades, in the United States as in other western countries, progress in science and changes in social demand have led veterinarians to carry out increasingly varied functions way beyond their traditional mission of protecting animal health to increase available food supplies. Their activities in public services, research and industry are expanding. Numerous public health problems call for their collaboration. Comparative medicine is developing. Veterinary medical education is becoming more and more specialised.

With this in mind, some of the factors which may influence the future of the veterinary profession are discussed: the unprecedented growth of the profession with a greater involvement of women, new structures of the livestock industry and the development of the concept of preventive medicine, the expansion of small animal practice, unavoidable economic constraints, the importance of computerization and, finally, necessary changes in the educational process itself.

KEY-WORDS: Economics - Public health - Research - U.S.A. - Veterinary education - Veterinary medicine - Veterinary profession.

INTRODUCTION

To comprehend the changes and challenges now facing the veterinary profession in the United States, the topic of this paper, an understanding of the history of the profession leading up to the present day is of importance. Suggested readings are referenced (6, 7, 9, 10). However, it has become increasingly apparent that within just the most recent decades, startling changes have occurred in the veterinary medical profession. During the course of the late 1970's these and other issues were the focus of extensive debate by the then deans of the Association of American Veterinary Medical Colleges. Those discussions led to the development of a statement jointly prepared by this author and Drs. Charles E. Cornelius, Robert R. Marshak and Philip T. Pearson (4) which is germane to the topic and from which I will draw extensively. In this study it was agreed that veterinary medicine has expanded into a biomedical science of such breadth that its members are now among the best equipped to deal effectively with the complex interrelationships among human beings, animals, and the environment. Their training prepares them

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to make unique contributions toward the realization of national goals, such as the improvement of the health and well-being of all citizens. While the original and most obvious service — the delivery of direct health care to animals and the relationship of that service to food supplies and the nation’s economy — remains a basic and vital function, it is but one part of a larger responsibility. Thousands of veterinarians work for governmental agencies at all levels, helping to implement regulations designed to assure that only safe, wholesome animal products are marketed for human consumption. Others are involved in public health matters such as the direct hazards to human health from transmissible animal diseases and the dangers arising from toxins and environmental pollutants. Comparative medicine, the area of study that deals with the interface between animal and human medicine, draws heavily upon the skills and attention of investigators trained in our schools of veterinary medicine. The increased sophistication required of the veterinarian has created special demands on the profession. Research and public service activities have expanded manyfold, attesting to the growing expectations of the public for veterinary services. Veterinary medical education has changed dramatically in the past 20 years. The profession now requires greater sophistication than ever before. Students must be prepared to address such issues as environmental medicine, the safety of drugs and toxic effects of pollutants, and preventive as well as clinical medicine. Veterinarians treat animals of great monetary value, including race horses and prize breeding animals worth hundreds of thousands of dollars, in addition to animals of significant esthetic and emotional value. Their role in public health, medical research and industry is expanding.

NEW TRENDS IN THE U.S. VETERINARY PROFESSION

The veterinarian’s skill in treating or preventing diseases of livestock has a direct effect on the success of the largest single industry in our nation, agriculture. Yet within recent years there has been increasing recognition of the larger importance of animals to the health and well-being of man. On a worldwide basis action is being taken to protect wildlife — indeed, in many instances, to prevent the entire loss of species from the earth. The subtleties of the influence of companion animals on the mental as well as physical health of man, at least in advanced, modern societies, is just beginning to be understood yet this new knowledge or appreciation occurs several decades after societal demand has attracted a significant proportion of our profession to administering for the needs of such animals (2, 5).

A newer and still unfolding role for the profession lies in the current debate addressing animal welfare and animal rights (1). As a part of this debate, it is clear that the use of animals in biomedical research has become a public policy issue. Although it is too early to determine with any degree of accuracy how the overall controversy will affect the veterinary profession, it is proper to suggest that only through understanding of scientific investigation and the role of animals in that investigation will the public be able to make informed and responsible decisions. Such decisions must take into account the need to respect and protect laboratory animals and therein lies a major professional responsibility. In order to ensure progress in biomedical research and testing to improve the health and well-being of humans and animals, veterinarians and their supporting staff will be both looked to and held responsible for finding solutions acceptable to the public at large.
A major concern of veterinarians is, of course, the provision of direct health care to three broad categories of animals: food and fiber producing, companion, and laboratory. It would be difficult to exaggerate the importance of protecting the health and increasing the productivity of the first of these. In the United States, animal products supply two-thirds of the protein, one-third of the energy, one-half of the fat, four-fifths of the calcium, nearly two-thirds of the phosphorus, plus significant quantities of other essential minerals and vitamins to nourish the nation's citizens. Without the services of veterinarians to keep livestock disease in check, not only our food supply, but the $50 billion-plus a year livestock industry would be in jeopardy.

In developing countries, where veterinary care is less adequate, animal losses from diseases and parasites are at least double those in the United States, a loss of potential food that the world can ill afford. Inadequate nutrition, shockingly, is responsible for more human deaths and diseases than all other maladies combined. Estimates are that at least 60% of the people in developing countries suffer from undernutrition or malnutrition as a result of inadequate protein in their diets. The danger from political instability growing out of widespread hunger, though impossible to measure, is no less real than the inhuman aspects of food shortages.

Farm animals, especially cattle, swine, and poultry, convert cellulose and other plant materials not digestible by humans to highly desirable complete proteins. They can make use of the majority of the world's agricultural land that is better suited for grazing than for the production of food to be eaten directly by people. Past programs of disease control such as those aimed at foot and mouth disease (in Canada, Mexico, and elsewhere), Newcastle disease (United States), and many others, have effected marked increases in available animal protein and have also proven to be sound financial investments. Veterinary medical colleges in the United States are attempting to train more individuals who are familiar with international nutrition needs and can help solve these massive problems. Members of the profession are also becoming increasingly involved in aquaculture programs and the safeguarding of food supplies from aquatic and wild animals.

Nearly all farm animals contribute in some degree to the fiber industries in this country and abroad. Wool, leather, feathers, and bristles are among the products derived from sheep, horses, poultry, cattle, and other species of animals. In addition to the role in the fiber industry, horses continue to serve as a source of power in the production of food in some communities in the United States and to a greater extent in other parts of the world.

The health care given to companion animals may be as significant in terms of the mental and emotional health of individuals in this society as the protection of the food supply is to their physical well-being. More than half the families in this nation keep pets, recognizing their values as friends to the old, the lonely, the physically infirm, and the mentally ill; their worth in teaching children tenderness, responsibility, and respect for living creatures; and their contributions to millions in coping with the everyday stresses of life. In addition, dogs work for the police, the military, industry, and individuals as guardians and helpers; guide the blind; herd sheep; transport people and goods in the Arctic; and perform dozens of other specialized tasks. Cats help control the population of mice, rats, and other vermin, while horses, in addition to their other functions, are featured in several recreational industries. All the companion animals, because of the multibillion dollar pet products industry, play a key role in the economy of the country.
The development and maintenance of healthy colonies of laboratory animals is vital to the entire biomedical research effort. Members of the veterinary profession have responsibility for their care and humane handling. They have also contributed to the development of specialized types of various species without which much of the research relating to human health would be impossible. To place these contributions into some perspective, approximately half of all federally funded health related research ($3.5 billion in 1983) involves the use of laboratory animals.

About 25% of all veterinarians in the United States are now employed by the government, public health agencies and industry. The percentage is likely to increase as local, state, and federal regulations continue to expand. The effectiveness of long-standing regulatory programs, such as those concerning the safety of animal products for human consumption, is dependent on veterinary medical personnel as are new programs and requirements of agencies such as the Food and Drug Administration, the United States Department of Agriculture, and the Environmental Protection Agency. Many new public policies that require the expertise of veterinarians have been adopted during the past decade, including the Animal Welfare Act, Toxic Substances Control Act, Good Laboratory Practices regulations, and others. Private practitioners also play a part in such efforts, cooperating with government officials in preventing and controlling animal disease.

Private practitioners, as well as veterinarians employed by governmental agencies, deal with public health concerns on a day-to-day basis as they work to control or eradicate the more than 150 animal diseases, such as brucellosis, tuberculosis, rabies, leptospirosis, salmonellosis, tape worm infection, toxoplasmosis, and histoplasmosis, that are communicable to humans. The increasing complexities in modern society require substantial effort to control the degradation of the environment, the testing of substances that may be harmful to human health, and the development of biologicals, pharmaceuticals, and medical devices that are safe, effective, and useful for humans. Many of these concerns are relatively new and all depend heavily on the veterinary medical profession.

The veterinary practitioner working with food and fiber producing animals also serves as a first line of defense in noting health problems caused by pollution of the environment. Although potentially hazardous to humans, either directly or indirectly, these disorders are often manifested first in animals. As one example, several dairy farmers in the vicinity of a phosphate mineral producing plant observed extreme lameness and emaciation in their cows. Examination revealed that the cows' teeth were mottled, soft and worn into the gums so that they could not chew their food, thus drastically reducing their milk production. Further investigation revealed that high levels of fluoride, emitted into the air from the phosphate plant, contaminated the forages consumed by the cows. Encountering such problems as this, veterinarians call on other specialists to help diagnose and interpret the findings in terms of the hazards to humans as well as to animals. In this case, prompt action eliminated a serious threat to the dental health of children in the vicinity of the plant.

The current deficit in veterinary medical manpower in many specialty areas such as toxicology, environmental medicine, diagnostic pathology, and laboratory animal medicine is so acute that certain programs such as those relating to the protection of human health and the testing of carcinogens are in jeopardy (3).

Americans are well fed largely because the production of animal protein in the United States is the highest in the world. A crucial factor in this success is our abil-
ity to control animal disease, which, in turn, is based on veterinary medical research. A few of the more dramatic examples of the achievements in this area would include the eradication of hog cholera, exotic Newcastle disease, Texas fever, and contagious bovine pleuropneumonia; the control of Marek's disease, vibriosis, brucellosis, and bovine tuberculosis with vaccines and other procedures; and the drastic reduction in the incidence or severity of dozens of other diseases that can devastate the animal food industries.

While these vitally important contributions to the diagnosis, treatment, prevention, and control of animal diseases are often recognized, the public is generally unaware of the profession's extraordinary accomplishments in human health matters. It was veterinary scientists who discovered filterable viruses, slow viruses, the first tumor viruses, the cause of viral encephalitides, salmonella, brucella, mycoplasma as pathogenic agents, and the first treponema-caused disease. They also developed tuberculin and the tuberculosis test, the first tumor virus vaccine, the first live virus vaccine, the first combined vaccines, tetanus toxoid, pinning techniques and fracture reduction, the first hip replacement prosthesis, and the first hypodermic syringe and parenteral medication. In addition, members of the veterinary medical profession initiated tuberculosis chemotherapy, devised the first successful hookworm therapy, established artificial insemination, devised the first electric cardiogram and cardiac catheterization, provided the first proof of insect-borne disease, devised the first spinal anesthesia, and made key contributions to rabies research.

Even so, veterinary medicine is now on the threshold of its most productive era; it has come to occupy a very special niche in the nation's health research establishment. The need for animal models of human disease grows increasingly acute as research on human subjects becomes more and more difficult and as medical schools devote substantially more of their resources to primary health-care education and research. The development of veterinary clinical specialties has resulted in the discovery of many new animal models that now require exploitation. Research in all areas of the biomedical sciences is a foundation on which efforts to improve the quality of life on earth must be based. Only by continuing to train the needed personnel and providing them with the best resources available can the search for knowledge be maintained.

THE FUTURE OF THE PROFESSION

With the above considerations in mind, what additional changes are projected to occur, and which of these will challenge the future of the veterinary profession? Answers to such questions are difficult, if not impossible, for any single individual, committee or other group to accurately provide. Thus, it is necessary to reflect upon the history of the profession, consider the changes which are now in progress as well as those external influences which may alter the course of the profession, and project these into the future. As suggested by events of the past and outlined above, the role and mission of the profession has changed rather significantly over the course of time whether we are willing to accept this fact or not. It is always more comforting to stay with something we know and understand rather than to enter into the challenges and uncertainties of the future. Simply stated, we have little choice in the matter unless it becomes possible to step aside and watch the world pass by. The death of an individual or a profession is rather permanent!
What are some of the external influences we can now identify which will affect the course of future events? Clearly, a major factor will be the unprecedented growth of the profession which is occurring, brought about by the expansion of existing schools and the development of several new schools of veterinary medicine both in the United States and abroad. Concerned about the consequent possibility of oversupply, the American Veterinary Medical Association contracted with a well respected and experienced company to undertake a study of the situation and report thereon (11). Although still the subject of considerable controversy as to possible bias toward the practicing arm of the profession and lack of attention to specialized segments, the resultant study predicted that we would enter an oversupply of veterinarians by the end of this decade. Some sections of the nation are now reporting difficulty in placing new graduates in suitable employment, yet it is impossible to draw short-term conclusions since we have been experiencing a worldwide recession in the industrialized world and recovery is still not complete.

Another factor influencing predictions of supply and demand as well as professional direction is the unprecedented number of women now entering the profession for the first time. Traditionally considered a “man’s profession”, women now exceed men in the number of applications as well as overall acceptances to an ever increasing number of U.S. schools of veterinary medicine. Although the reasons are many, it is suggested that one of the major arguments for essentially excluding women from participation has now been negated; with the introduction and use of a wide range of tranquilizers and anesthetic agents it is no longer necessary to rely on physical strength alone in handling many of the day-to-day problems facing the veterinary practitioner. Arguments continue as to whether or not women will play an equal role with men or choose to work on an intermittent or part-time basis as they fulfill more traditional roles and interests. Only a protracted time interval and retrospective analysis will provide such answers but initial experience indicates that women will play a very positive role in the profession.

Another influencing factor will be the rapidly changing scene we are witnessing throughout the agricultural industry. The so called family farm is rapidly disappearing, giving way to large, economically complex “agribusinesses”. Although care for the individual animal remains a major concern, depending upon the species and value of the individual unit, the organization and economic dictates of the emerging livestock clients to be served will require a significant change in the manner in which traditional large animal practices have been conducted. Indeed, such change has already occurred in some areas of the United States. The concept of “preventive medicine”, now being developed in several of our schools, basically attempts to orient both students and practitioners to the concept of preventive herd health maintenance rather than emphasis on the treatment of disease. An exception to this trend in working with large animals can be found in the equine species where attention to the individual animal is still of paramount importance, regardless of the size of the operation. For all practical purposes this will continue into the future given the influences of financial worth and human sentiment. Whereas ownership of the horse has in recent times been largely limited to the rich, now a much large segment of society has become involved in the overall equine industry in the United States.

Although small animal or companion animal medicine has been a part of veterinary medical practice for many years, it was not until the 1940’s that significant expansion of practices limited to their care began to occur. Since World War II an unprecedented number of hospitals and clinics of varying size and degree of sophistication have been developed throughout the United States and in other parts of the
western world. Professional staff may be limited to one veterinarian but an increasing number of partnerships and large, group practices are now common. The Angell Memorial Hospital in Boston, under the sponsorship of the Massachusetts Society of Prevention of Cruelty to Animals, and the Animal Medical Center in New York City are believed to be the largest in this country with total staff measured in the hundreds. Their origins predate the expansion of private small animal practices mentioned previously and both hospitals provide an array of sophisticated, specialized clinical care and treatment. There are other large, privately owned small animal hospitals which also offer formal internship and residency training programs. Depending upon a number of factors, I believe the trend toward greater size and specialization of small animal practice will continue.

An overriding, influencing factor is that of economics: As construction and operating costs mount, combined by the increasing level of public expectation for high quality medical care, it simply will not be economically feasible for an individual or even a small group of veterinarians to compete without maximizing operational efficiencies. As all practicing veterinarians are painfully aware, unlike their counterparts in human medicine, veterinary medical practices must stand on their own economic bases without the benefit of publicly supported facilities, equipment and third party insurance underwriting actual costs. There are, at present, some signs that this situation may change. In certain sections of the country humane societies as well as private investors have begun to set up hospitals operated either as nonprofit or for profit, employing veterinarians to provide professional service. A few insurance companies are offering health care coverage programs for companion animals; however, it is too early to determine their eventual success and whether or not they will ever exert a significant economic influence on the future of small animal practice.

An often debated subject is that of whether or not veterinary medicine can or should continue the current trend of emulating human medicine in its development of increasing levels of clinical specialization. A significant number of specialty boards have evolved and received approval by the Committee on Veterinary Medical Specialties of the American Veterinary Medical Association. Much of the sophisticated instrumentation developed for human medicine is fully applicable in veterinary medicine, or equipment can be designed or redesigned to meet the specialized needs of the various species of animals under our care. During times of economic stress, such as is now occurring on essentially a worldwide basis, small animal practitioners have reported varying degrees of economic stagnation with animal owners either declining or deferring elective or even required surgical or medical procedures. Animal control agencies report an increase in the number of abandoned animals as well as requests for euthanasia. It is not a simple cause and effect; yet, there clearly is an economic threshold which, in very general terms, the profession must understand and accept.

There are, of course, a number of relatively new or emerging fields in which veterinary medicine plays a unique role. These include the important contributions made by veterinary pathologists, toxicologists, laboratory animal specialists, epidemiologists, etc., who work for the pharmaceutical or chemical industries, testing laboratories, regulatory or public health agencies. Without question, basic training in veterinary medicine is vital to their ability to contribute in such a unique manner. Although varying estimates have been made as to the number of veterinarians required to fulfill these roles, it is doubtful that such employment will ever involve a significant percentage of the total profession (3).
There is a technological advancement which, in my opinion, will profoundly influence the profession in the years to come. I speak of the development and use of the computer and related technologies. According to many, the United States is rapidly moving from an industrially based society to one of information exchange (8). Within the past year or two many undergraduate colleges have begun to require all entering students to acquire a personal computer and students are becoming “computer literate” beginning with courses offered in both elementary and secondary schools. Colleges of veterinary medicine have been using the computer for record keeping, other administrative procedures and in research for several years. Practitioners are already using small computers in managing their day-to-day office procedures as well as in providing record keeping and consultation in nutrition, reproduction, and preventive medical procedures to livestock owners. At least two programs have been developed to assist in differential diagnosis and treatment and undoubtedly more will become available. Without question, the computer will begin to play an increasingly important role in the educational process itself, both during veterinary medical school as well as in continuing education. We must recognize this new technology for what it is: a marvelous tool to assist the human mind and a means to perform a variety of tasks with both speed and accuracy which exceeds human capability. Just as the stethoscope is used to assist the clinician in physical diagnosis, so too will the computer assist in making it possible for individuals to handle the ever increasing volume of medical knowledge which now overwhelms the capacity of the human mind. The real challenge lies in our ability to cease resistance to change, find means to learn and gain understanding of the remarkable potential for assistance offered by this equipment, and work with those who are expert in computer science to guide us in finding ways which will meet the needs of our profession.

Other changes and challenges which will occur within the profession are to be found in the educational process itself. Already mentioned has been the growing influence, use and reliance on the computer. But I speak now of the composition of the faculties which will be called upon to train future veterinarians. In the past, our faculties, to a large extent, have been drawn primarily from the ranks of those trained in veterinary medicine with or without formal, advanced post-graduate training. Clearly, this will continue to be the case with essentially all of our clinically-related staffs. In the basic or preclinical sciences I believe it is inevitable that a greater proportion of faculty will no longer possess the veterinary degree although hopefully, a sufficient number will still be present to serve as a bridge between the various pre-clinical disciplines of science and veterinary clinical medicine. The reasons for this prediction are many. First of all, science has become increasingly complex and competitive. In order to remain competitive as a learned profession, schools of veterinary medicine must reach out and carefully select from the most talented faculty available to meet specific needs. Secondly, the length of time and cost of training will make it increasingly difficult for individuals to complete the required years of preveterinary school education, followed by four years of professional training, perhaps a year or more of internship and residency training then enter a traditional program leading to the Ph. D. research degree. The length of time and total cost is becoming increasingly difficult to bear or even to justify.

There is no question about the fact that over the past few years U.S. schools of veterinary medicine have attracted some of the brightest young men and women ever to enter the profession. Many are well suited both intellectually and temperamentally to serve productive careers in academic medicine. At the clinical level, the
development of formal programs leading to board certification in several specialties will serve the profession well. In academic clinical medicine, however, means to provide research training in order to fully develop individual potential is generally lacking. In the preclinical or basic sciences, we must develop sufficient disciplinary strength in order to provide means whereby graduate veterinarians interested in basic science can gain necessary training and experience to become competitive, productive academicians. With the proper environment, followed by careful selection of individual candidates, the number of years of formal graduate research training can be reduced. There is nothing new in this approach; it has been followed for many years in human medicine with varying degrees of success. The challenge before us is to identify our goals and objectives, then proceed to meet them without the encumbrance of blindly following tradition.

The opportunities which lie ahead are many. So, too, are the challenges and possibilities for success or failure. The real challenge, however, to all of us, regardless of age, interest or experience, is to find means wherein we can accept that which we cannot change and both individually and collectively, influence those things which are possible to change. The veterinary medical profession has never enjoyed a brighter, more promising future.

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REFERENCES


