

# Veterinarians in Population Health and Public Practice: Meeting Critical National Needs

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## EXECUTIVE SUMMARY

The Association of American Veterinary Medical Colleges (AAVMC) recognizes that its member colleges and departments are at a critical decision point, as is the veterinary profession itself. The outcome of decisions made now may well determine the future of the profession and its contribution to the nation's welfare. Resources, including the infrastructure available to support educational programs, are limited, and without careful and informed decisions at several levels, opportunities to benefit both society and the veterinary profession will be lost.

Over the last half-century, as our society has changed, veterinary medicine and its educational institutions have, to a great extent, reflected this change. Urbanization and affluence have led to increased demands for companion animal veterinary medical care. At the same time, critical national needs in public health, food safety and security, animal health, and comparative medicine continue to increase at an alarming rate. These needs can most effectively be addressed by veterinarians with expertise in population health and public practice.

Veterinarians are a unique national resource, as they are the only health professionals trained in multispecies comparative medicine. As a result of this training, the veterinary profession is able to provide an extraordinary link between agriculture and human medicine. The uses made of this link have been extensive, with multiple benefits to society. In fact, public support for veterinary medical education has, as its historical basis, the profession's relationship with food production and the control of zoonotic diseases.

Currently, approximately 20% (15,000) of all veterinarians in the United States are engaged in either private population-health practice with a significant food animal component or public practice in one of its various forms. Satisfying only current needs in population health and public practice will require more than 500 of the approximately 2,500 available new US graduates each year. If new graduates do not enter these fields, government, non-governmental organizations, industry, and agribusiness will employ either foreign-trained veterinarians or non-veterinarians to fill their needs.

Colleges must diversify the applicant pool and work to retain, in population-health and public-practice pathways, both students and those in the early years of their careers. Core courses in epidemiology, public health, and preventive medicine are pivotal to maintaining interest in this career pathway and must be included in the curriculum. Creative ways to include a core clinical learning experience in population health and public practice should be developed. Colleges, probably in regional or national consortiums, should offer specialty training programs for population health practitioners, such as MPH, residencies in

laboratory animal medicine, and other non-thesis, Master's degree programs. There is a critical need for infrastructure in our colleges and departments to support research and the graduate training of DVM-PhD scientists in epidemiology, pathology, and infectious diseases.

Issues such as food safety and public health are not merely the concern of individual states but are of national, and even global, importance. Therefore, they may be most appropriately addressed by a collective partnership among the veterinary medical colleges, departments of veterinary science, departments of comparative medicine, and the federal, as well as all state governments. Further strategic development of the veterinary medical educational infrastructure and resources, together with shared responsibility and accountability, will benefit all Americans and optimize the national efforts required to meet challenges in public health, food safety and security, animal health, and comparative medicine.

## BACKGROUND

Veterinary medical colleges and the graduates they produce are a unique national resource, whose full potential remains unrealized. Beginning with the founding of the first US college of veterinary medicine in 1879, the mission of our institutions has been to address the nation's needs in animal and public health. These needs have continued to change and expand in scope as our society has changed. In the early years, our colleges reflected the needs of an agrarian population and the academic focus was primarily on controlling disease in agricultural animals and on associated issues in public health, such as brucellosis and tuberculosis. In the last half-century, with general advances in science and the urbanization of our population, additional demands have been placed on the veterinary profession. Throughout this period of change, the colleges and the profession have demonstrated a remarkable ability to adapt. Building beyond the profession's traditional base in agriculture and public health, many veterinarians have become key contributors to biomedical research. Currently, the majority of veterinarians are involved in meeting the public's ever-increasing demand for companion animal medicine.

New opportunities and challenges, given that resources are limited, will require further adaptation. The colleges and the veterinary profession have now reached a critical decision point, which may well determine the overall contribution of the veterinary profession to the nation's future. Not only are the resources available for education limited; the overall number of veterinarians is limited and there are shortages of veterinarians in several critical areas of professional expertise. Furthermore, changing national demographics are reflected in a lack of diversity of interest among those applying for admission to veterinary college. The vet-

erinary medical colleges, with input from constituency and stakeholder groups, must identify, address, and prioritize current and future needs. Working together, they must develop a clear plan that better aligns professional resources with societal demands. Without such a plan and the means to sustain it, many of those national needs that the veterinary profession is so singularly qualified to address will not be met.

## VETERINARY MEDICINE: THE CRITICAL LINK

Public support for veterinary medical education has historically been based on the profession's role in public health. In Western societies, this role has been to provide a critical link between agriculture and human medicine. The uses made of this link have been extensive, and their effects, far-reaching. Benefits have included improved food safety and food security, better understanding and control of zoonotic diseases, and enhanced regulatory procedures that promote animal and public health and protect the nation's well-being. In recent times, partially as a result of the profession's failure to communicate effectively and certainly much to its disadvantage, the unique link provided by veterinary medicine has been frequently overlooked by policy makers, as well as by the general public.

The veterinary medical colleges have been key players in the process of building linkages through their distinctive role of educating veterinarians as health professionals. However, from the very beginning, the mission of the colleges has involved more than teaching alone—it has also included research. The benefits of a core veterinary medical education, based on sound biomedical science and with broad clinical training across multiple vertebrate species, has been used to great advantage in scientific investigations of animal and human disease, as well as in animal models of human diseases.

The faculties of the veterinary medical colleges have also contributed their expertise, as a service in the public arena and for the benefit of public health. In many cases, opportunities for teaching, research, and service have been identified and pursued in a parallel and nearly seamless manner. Animal disease, the single most important impediment to livestock production, has been recognized as having a direct and adverse impact on food security, the national economy, and public health. Successful joint efforts between colleges and public agencies have included the control and eradication of animal diseases important to agriculture, trade, and public health, such as Texas fever, contagious bovine pleuropneumonia, and brucellosis. There is abundant evidence that public and private investment in veterinary medical education and research has strengthened the link between agriculture and human medicine and has had positive impacts on our society.

## CONTINUING CHALLENGE

For more than 100 years, veterinary medical colleges have effectively delivered a core educational program that has enabled veterinarians to adapt and respond to evolving societal needs. Nationally and internationally, we have now reached a point where there is an ever-increasing and diverse array of societal needs that could most effectively be addressed by veterinarians with expertise in population health and public practice. Resources available for educa-

tional programs to address these needs are limited, and without careful and informed decisions, opportunities for actions that may ultimately be of great benefit to both the public and the veterinary profession will be lost. The challenge is for the colleges to continue to deliver an educational program that clearly defines a veterinarian as a special health professional, uniquely qualified to continue to adapt as required to meet broad national needs.

While the future is defined by uncertainty, there will continue to be many needs that can best be met by veterinarians trained in population health and public practice. If food safety and security and public health in the United States are to continue to meet the highest standards, issues of emerging and re-emerging animal and zoonotic diseases must continue to receive the profession's greatest attention. We now live in a global economy, with world population expected to grow to 7.3–8.4 billion by 2025.<sup>1</sup> The impact of veterinary medicine and the veterinary academy on national security, the national economy, and international trade is also far-reaching. For example, all Category A threat agents, with the exception of smallpox, and all Category B threat agents are zoonotic. These challenges, combined with the fact that veterinarians are the only health professionals trained in multispecies medicine, present an unparalleled opportunity to provide a bridge between agriculture and human medicine.

Many of the national and global needs of the twenty-first century in public health, food supply, ecosystem health (especially as related to food production), and biodefense can best be met if adequate numbers of appropriately trained veterinarians are available. This observation was reinforced when the Advisory Panel to Assess Domestic Response Capabilities for Terrorism Involving Weapons of Mass Destruction<sup>2</sup> recommended to the Secretary of Defense "that the Secretary of Agriculture develop and that Congress fund, programs to improve higher education in veterinary medicine to include focused training on intentional attacks, and to provide additional incentives for professional tracks in that discipline."

For the veterinary profession, both the challenges and the opportunities are great. If the proper decisions are made at several levels (i.e., colleges, state and federal governments, and professional organizations), these challenges will be met and society will continue to benefit from its collective investment in veterinary medical education.

## ISSUES, OPPORTUNITIES, AND RECOMMENDATIONS

### 1. Demographics

Based on both the education required and the potential career pathways that are available, there is a continuum for veterinarians engaged in population health that extends from private practice with a food animal component to public practice in many of its forms. Conservative estimates indicate that there are more than 15,000 veterinarians in the US employed in population health, either in public practice or private practice with a food animal component. This represents approximately 20% of all US veterinarians.<sup>3</sup>

*A. Public Sector Veterinarians* – If a steady-state level of employment is assumed, projecting needs for public-sector population health veterinarians is relatively uncomplicated. For example, several federal agencies face impending staff

shortages. According to Bonnie Buntain, Chief Veterinary Public Health Officer, the average age for USDA Food Safety and Inspection Service (FSIS) veterinarians is 54, with about 500 openings projected to occur during the next five years.<sup>4</sup> Sean Altekruse of the National Cancer Institute tells us that approximately half of the veterinarians in the Commissioned Corps of the United Public Health Service (USPHS) are currently eligible for retirement.<sup>5</sup> To maintain its current effective strength, the US Army Veterinary Corps requires an addition of 45 new veterinarians each year, says its chief, Col. Jack Fournier.<sup>6</sup>

*B. Traditional Private Practice* – Estimating needs for veterinarians engaged in private practice with a food animal component is somewhat more difficult than projecting public sector requirements and is currently the focus of a study by a consortium of food animal veterinary associations. The difficulty is primarily a result of the rapidity with which food production systems in the US are changing. There is general agreement that, although consolidation of livestock production units will likely continue in the foreseeable future, there will also be a need for veterinary services for smaller livestock operations. These smaller operations may be located in rural communities or at the rural-urban interface and veterinary services will most often be provided by general practitioners, many of whom will devote a decreasing proportion of their time to food animal practice.

Small livestock operations have a much greater potential importance for national food security than their relative contribution to the nation's food supply would suggest. To underscore the need for a high-quality core veterinary medical education, there was general speculation among those we interviewed that an initial agroterrorism attack may occur in small herds or flocks, located near urban areas and most likely serviced by general practitioners. At the other end of the present spectrum of traditional food production veterinarians are those species specialists currently referred to as *production medicine veterinarians*.

*C. Food Systems Veterinarians* – The food processing and marketing industries are facing a heightened level of public scrutiny that is international in scope and ranges from ani-

mal welfare to food safety. At the same time, food animal production systems have become increasingly complex and are inextricably tied to the processing and marketing segments of the industry. These interrelationships have both private sector and public regulatory components that often may be most appropriately addressed by *food systems veterinarians*, an emerging subspecialty within veterinary population medicine.

Food systems veterinarians act as arbiters and synthesizers of information across an entire spectrum of activities necessary to assure an abundant and economical supply of wholesome food. Skills that are needed for this field may be acquired through a combination of formal veterinary medical and postgraduate education, coupled with a variety of appropriate professional experiences. Food systems veterinarians often achieve leadership and management roles in integrated livestock operations and throughout the food industry.

*D. Number of Veterinarians Needed* – Satisfying current projected needs in traditional population health areas of public practice and private practice with a food animal component will require over 500 new entries annually. Available data indicate that approximately 50% of all new graduates initially entering food animal practice exit within five years.<sup>7</sup> Therefore, it is likely that these projected needs are conservative. Some of these veterinarians, upon leaving food animal practice, may enter public practice and thus remain in a population-health or public-practice career pathway (see Figure 1). However, many, in all probability, move into companion animal practice and, by doing so, move to another pathway. To maintain the current position, more than 20% of new graduates must initially enter population health or public practice fields upon graduation. If fewer new graduates enter these fields, societal demand will have to be met through the employment of either non-veterinarians or foreign-trained veterinarians.

If our colleges continue to focus solely on addressing the needs currently projected for veterinarians in the traditional areas of population health in either public or private practice, the result may be lost opportunities for the veterinary

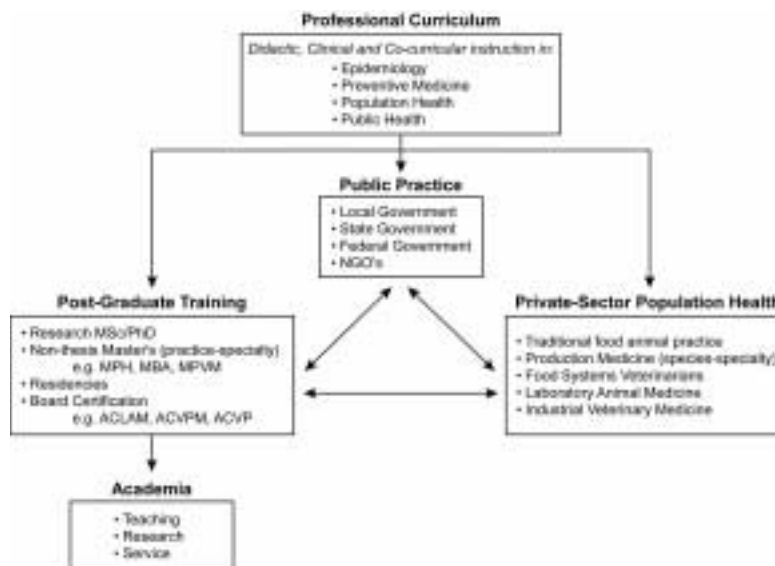


Fig. 1. Career Pathways in Population Health and Public practice

profession, as well as for society. A scientifically sound veterinary medical education, coupled with postgraduate training and/or experience, will enable veterinarians to enter public or private sector positions that would benefit from the profession's essential linking of agriculture with public health. However, for the profession to expand into those additional areas of population health, for which it is so incomparably qualified, either a larger number of students must be trained or some internal reallocation must occur.

## 2. Recruitment and Retention

If current and projected veterinary needs in population health and public practice are to be met, there must be

1. additional students recruited to the field, either prior to or after they enter veterinary medical college
2. more students retained in this career pathway while they are in the program
3. more veterinarians remaining in or shifting to this career pathway early in their careers
4. some combination of the above

*A. Applicant Pool*—While students applying to veterinary medical programs remain highly qualified academically, the present applicant pool may lack the diversity of interest necessary for the profession to meet the full range of societal needs. Up to 30% of students entering veterinary medical colleges in the United States express an interest in food animal or public health practice.<sup>8</sup> Available evidence suggests that retention of all interested students throughout their four-year veterinary programs may not meet anticipated present requirements, and national needs for veterinarians in these fields are expanding. Furthermore, we have now reached the point where the demographics of the general population make it less likely that those entering the professional curriculum will have significant prior exposure to either private or public fields of population health. Selecting students based on experience with a food animal species prior to veterinary college results in veterinarians more likely to engage in practice with that particular species after graduation.<sup>9</sup> Several colleges are attempting to include or reserve places for students who, in light of their previous documented experience or education, have a higher probability of entering either food animal or public health practice after graduation. Admitting a more diverse group, on the basis of background and/or probable career pathway, should improve the core veterinary educational experience of entire classes. To better match the limited educational resources of the colleges with the full range of critical societal needs in population health and public practice, the following are recommended:

### Recommendations

1. There must be a conscious and concerted effort by the AAVMC membership to have veterinary faculty, state associations, species-oriented professional groups, and state and federal agencies more closely involved with pre-veterinary and veterinary students. The many and diverse career opportunities that are available should be highlighted through career-survey courses. Faculty committed to these concepts need to be encouraged to become involved in these important mentoring roles.

Faculty performing with excellence in these mentoring capacities must be rewarded.

2. The definition of the *professional experience* required by the admissions process must be broadened. Experience should not be limited to traditional private practice. Moreover, the question posed should not be, Why do you want to be a veterinarian? but rather, How do you propose to use your veterinary medical degree?<sup>10</sup>
3. Because public funds are used to support veterinary medical instruction, the general good and long-term needs of society must be considered in the admissions process. The admissions process, the gateway to the profession, is a heavy responsibility, and the colleges must assume leadership and ultimately be held accountable for how they perform this task. At least for the short term, the distribution of veterinarians across the range of functions needed appears to be affected by a complex array of factors, many of which are not fully understood and not necessarily related to the ordinary forces of the free market. For an interim period, or until supply and demand are determined to be more closely in balance, adjustments should be made in the admissions process as may be required for the benefit of the entire public.
4. The AAVMC should assume a leadership role in seeking scholarships and loan forgiveness for students entering underserved fields. An example that works, and that could be adapted for other applications in both public and private sectors of population health, is the US Army Health Professions Scholarship Program, used for recruitment by the Army Veterinary Corps.

*B. Retention While in School*—There is evidence that formal curricular and summer cocurricular experiences influence students in selecting the type of practice they ultimately enter.<sup>9</sup> While there is wide variation among US veterinary medical colleges in the delivery of curriculum, some of which is related to the resources that are available to particular colleges, it is clear that the clinical experience is the most unusual feature of professional veterinary medical education. The need to provide excellence in the clinical experience is also the major factor limiting the number of students who can be admitted to veterinary colleges.

In many veterinary medical education programs, a companion animal clinical experience can be gained in the veterinary teaching hospital (VTH). Clinical experiences in food animal population health and public health are also essential components of a core veterinary medical education. The challenge facing most colleges is to offer clinical experience in population and public health with a breadth and depth that matches the excellence of the companion animal clinical experience. The VTH has not been the ideal place to provide a complete and meaningful public health learning experience, and changes in the food animal production industries have made the VTH a less than ideal option for providing a complete experience in food animal population medicine.

### Recommendations

1. **Role models and rewards**—Faculty and non-faculty role models, active student clubs advised by committed faculty, and planned college-initiated cocurricular activities are needed. Faculty who are involved in these

activities should be evaluated and rewarded for innovation and excellent performance. Furthermore, *clinical teaching* in its broader sense (to include learning experiences not taught in the VTH) should be rewarded equitably.

2. **Tracking**—Many, if not most, curricula have evolved into some sort of tracking, whether or not this is identified as such. A fundamental challenge and requirement in college teaching programs is the identification, maintenance, and strengthening of those core learning experiences that define a basic veterinary education. The AAVMC should commission longitudinal studies to determine, among other things, whether more formal tracking systems result in greater retention in particular career pathways and how career satisfaction among students completing tracking programs compares with that of those trained in more traditional programs.

*C. Retention in Career*—In terms of both direct costs and opportunity costs, a professional veterinary medical education is expensive for the individual student and for society. Many veterinarians change positions several times during a career. Therefore, a goal in the professional curriculum beyond offering a basic core education should be to inculcate a *career pathway mindset* in our students. Oftentimes, an individual's career may include transition from private practice to public practice but still remain within the same pathway. Although it seems unlikely that many companion animal practitioners will move into food animal practice, many may eventually move into careers in public practice. Many employers of public practitioners (e.g., DoD, USDA Agricultural Research Service [ARS], USDA-FSIS, USDA Animal and Plant Health Inspection Service [APHIS], Food and Drug Administration—Center for Veterinary Medicine [FDA-CVM]) routinely seek graduates in the one-to-five year window after graduation. Federal employers are also creating incentives, financial and other, to attract and retain valued veterinary employees.

Currently, many new graduates entering private food animal practice exit after a few years. In some cases, this could actually be healthy. That is, as they develop new professional and life skills in private practice, some veterinarians will want to transition along a career pathway. However, in probably too many cases, such movement may be related to lack of job satisfaction, poor working conditions, or economics.

### Recommendations

1. The veterinary medical colleges should implement a program of professional career development in the curriculum. A goal should be to instill in students the concept of developing career pathways.
2. The economic benchmarking tools developed by the National Commission on Veterinary Economic Issues (NCVEI) should be adapted for food animal practice. Initial evidence indicates that these programs are having a positive impact on income in companion animal practice.
3. Salaries in several federal and state agencies are well below the levels necessary to attract and retain highly qualified professionals. Over the long term, failure to

place and retain qualified veterinarians in such positions will have deleterious effects on our nation's food safety, food security, and public health. The AAVMC should join with other organizations to encourage private and public sector employers to adapt successful, innovative recruitment and retention models to their own situation. A recent excellent example that goes beyond salary is the agreement between USDA-FSIS and the United States Public Health Service (USPHS) that provides the career pathway opportunities of USPHS to veterinarians working in USDA-FSIS.

### 3. Education/Training Programs

*A. Professional Veterinary Curriculum*—The single, unique function of veterinary medical colleges is to provide a professional education leading to the DVM (VMD) degree.<sup>11</sup> Currently, approximately 2,400 students graduate each year from the 28 accredited colleges and schools of veterinary medicine in the US. Another 230 US citizens are enrolled in AVMA-accredited foreign schools. Over the last 30 years, as the number of clinical specialties has increased, compression of the core curriculum has occurred. This appears especially true of those courses that relate to the population and public health aspects of the profession. Erosion of such course offerings has varied among US colleges but has generally occurred to a much greater extent in North America than in much of the rest of the world. For example, epidemiology, preventive medicine, and public health core course offerings range from 30 to 120 contact hours among the 28 US colleges.<sup>12</sup>

### Recommendations

1. In addition to a core course(s) in epidemiology, colleges should provide at least one required, stand-alone, core, didactic (or problem-solving) course in public health / population medicine. College faculty and administration also need to ensure that mentoring programs are developed that include population health and public practice. Furthermore, students should be exposed to role models in population health and public practice early in their academic careers.
2. A significant strength of North American veterinary medical education is the clinical experience. This experience enables students to problem-solve and tie together concepts presented in classes and laboratories during the initial years. At its very best, the clinical year is the key component in what makes a professional veterinary education unique. Colleges need to provide a clinical-year core experience in population health and public practice. This experience may be in the form of tracking, with core and elective rotations, or in the form of a required clinical rotation. By its very nature, this experience cannot be taught in the VTH. Several colleges already have excellent programs that appear to engage students effectively in experiential learning in population health and public practice. Examples include government and corporate rotation experiences and faculty-led, international, problem-solving study trips to developing countries.
3. For students desiring to enter production medicine practice and perhaps public practice, most colleges will not be able to provide a full range of clinical expe-

riences. There is a need to develop regional alliances to create shared learning opportunities. Most such programs initiated as a result of the Pew study did not include a plan for sustainability and thus no longer exist. Mechanisms such as USDA Higher Education Challenge Grants can be used to provide an incentive for developing regional or national curricular programs, with the requirement that the programs include provisions to be financially self-sustaining after grant funds are expended.

4. Students are frequently taught that veterinarians are members of a team in population health and public practice. Courses need to demonstrate collaboration by including others in the delivery of the curriculum, such as regular and adjunct faculty from the animal sciences, schools of public health, and industry.

*B. Practitioner Specialty Training - MPH*—Existing and new positions are available for veterinarians with training from Master of Public Health (MPH) programs. Such training could potentiate the education already received in DVM programs and might have the additional benefit of making recipient veterinarians more competitive for numerous non-traditional positions. MPH degrees are currently available in veterinary colleges as dual degree programs, as distance education programs, and as executive programs. Distance education, together with summer institutes and executive programs, fits well with the concept of regionalization of resources among colleges.

**Laboratory animal medicine**—There are currently 40 ACLAM-approved residency training programs in the US that provide specialty training in laboratory animal medicine. Because of documented, critical needs in biomedical research and impending retirements of board-certified specialists, the current number of trainees could be doubled for at least ten years without creating a surplus. The national need appears to be great enough to seek reinstitution of previously successful, NIH-funded training programs.

**Other non-thesis MS programs**—Veterinary medical education provides an excellent foundation for numerous private and public careers that require a basis in biomedical science and problem solving. Additional training, such as is currently available in food systems, food safety, business administration, and public administration, would seem synergistic to the DVM (VMD) degree. A postgraduate learning program that includes veterinarians studying with other professionals is beneficial to both groups and, at the same time, introduces others to the full range of capabilities of veterinarians.

### Recommendations

1. Colleges must make students in the professional curriculum aware of the additional career opportunities available after completing an advanced program of study, such as MPH, ACLAM residency, or other practitioner specialty certification in population health and public practice.
2. Colleges should develop regional or national partnerships to provide specialty training in population health or public practice.

3. The AAVMC should seek NIH support to fund training for veterinarians in programs that address critical biomedical research needs for laboratory animal medicine.

*C. Research and Graduate Education*—The research mission is an important—in some ways, the most important—mission of veterinary colleges.<sup>11</sup> An added bonus of conducting funded research in veterinary colleges is the graduate education opportunities for veterinarians that such programs provide. Veterinarians trained in postgraduate MS and PhD research programs have many advantages over other scientists, as a result of the multispecies, comparative medicine training inherent in their professional education. Federal agencies such as USDA and NIH recognize the breadth and value that veterinarians bring to a research team. In the past decade many infectious zoonotic diseases (e.g., Nipah virus, Hanta virus, West Nile virus, *E. coli* 0157:H7, monkeypox, BSE) have emerged as a result of changes in ecosystems and production systems. In addition to traditional research involving production animals and biomedical research using animal models, veterinarians have a distinct advantage because of their understanding of species epidemiology and the ecology of zoonotic infections. A coordinated national effort to build the infrastructure necessary to support research and graduate education is urgently needed.

The current admissions process for veterinary students, the emphasis in the curriculum on companion animal medicine, the lack of faculty role models, and the perception that great financial rewards are available in companion animal clinical specialties, together with low graduate student stipends, have resulted in too few American veterinarians' being trained to the PhD level in non-clinical academic fields, such as epidemiology, pathology, and infectious diseases. For pathology, there is an additional concern because shortages (projected deficit of 17–55 pathologists per year through 2007) exist both for those trained for traditional, anatomic, diagnostic work and for those trained to work in industry.<sup>18</sup> The training and career pathways for these pathologists have some inherent differences. Over time, the veterinary medical colleges have tended to self-select in the focus of their training programs. In many respects, a portion of the training required for diagnostic pathologists is similar to that of veterinarians trained in the population-health techniques of production medicine.

Failure to educate adequate numbers of veterinarians as PhD scientists will adversely affect national food security and public health. Because of a lack of faculty role models, the situation has become self-perpetuating. Moreover, as current holders of these academic positions retire, the quality of instruction and of the research conducted in our veterinary colleges can be expected to deteriorate. In many areas of animal health, simple replacement needs do not require great numbers of DVM-, PhD-level scientists (e.g., 10–20 avian infectious-disease specialists over the next 5–10 years); but, says Robert Eckroade, Head of the Laboratory of Avian Medicine and Pathology at the University of Pennsylvania, even these modest needs are not currently being met.<sup>14</sup>

## Recommendations

1. The AAVMC should continue to seek support for the National Academy of Sciences study, designed to identify national needs for research in veterinary science.
2. Competitive stipends of at least \$35,000 per year plus tuition need to be offered to highly qualified US veterinarians for graduate studies in epidemiology, pathology, and infectious diseases. USDA and NIH should assist in this endeavor.
3. There is a great, synergistic advantage in a whole cohort of students' being trained within a given graduate program. Therefore, in certain cases, regional or national centers should be funded through a competitive process, with awards based on area of emphasis and excellence.

*D. Retooling* – Colleges should be more involved in meeting the educational needs of their graduates after graduation. While a common goal is to instill a commitment to lifelong learning in their graduates, too often, colleges do not follow through as providers of meaningful lifelong education. Moreover, colleges should make efforts to develop postgraduate educational opportunities that are realistically within reach of working veterinarians. There is a need to instill in our students, while they are in professional school, an awareness of the many educational opportunities available after they get some practical experience.

## Recommendations

1. Colleges, often on a regional basis, should develop certificate (non-degree) programs, designed to enable veterinary medical graduates to develop more marketable skills. Examples include the Dairy Production Medicine Certificate Programs conducted by several universities. A follow-up progression that has implications for national food security and safety would be a certificate program for food systems veterinarians.
2. Each college should create an awareness that a value-added career (career pathway), such as that of a food systems veterinarian (either in private practice or employed by government or business) is a step that some graduates might seek, either with or without experience in traditional production medicine. This same logic could be applied to other careers in public health.

## INVESTMENT NEEDED

The veterinary medical profession and veterinary academy have changed markedly since the first, publicly supported, US college of veterinary medicine was founded in 1879. Since that time, many challenges have been addressed, and both animal and public health systems have benefited from veterinary involvement. However, many new challenges remain to be met. Arguably, the impact that the veterinary colleges and the profession have had on the fields of population health and public practice is greater than the number of veterinarians involved in those fields would suggest. Further serious and sustained effort to support the resources and infrastructure of veterinary medical education will be required if the United States is to maintain many of its comparative advantages among the world's nations.

National needs in food security, food safety, and public health require national solutions. Canada, our largest international trading partner, has recognized this and its federal government has formed partnerships with the provinces to improve the infrastructure of the four Canadian veterinary schools. The leadership of the member colleges of the AAVMC recognizes the critical nature of the time in which we live. Reasoned decisions must be made, or many opportunities for meeting our nation's needs will be lost, to the great disadvantage not only of the veterinary profession, but of society in general. For the well-being of the nation, developing and maintaining the infrastructure required for professional and postgraduate veterinary education and research in population health and public health must be a top priority. Because these issues are of national importance, they are most appropriately addressed through a collective effort or partnership between our veterinary colleges and departments, on the one hand, and government, at both the state and federal levels, on the other.

Resources will always be limited. The AAVMC leadership accepts that part of the solution lies in the way scarce state monies are allocated within their respective colleges. However, for the partnership to truly work, additional investment will be required from the federal government and all of the states, including those without veterinary medical colleges. Strategic development and better utilization of the veterinary medical educational establishment can provide, for the benefit of all Americans, a critical link between agriculture and human medicine. Further development, together with shared responsibility and accountability, will optimize national efforts to meet needs in food safety and security, public health, animal health, and comparative medicine. n

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## Selected Faculty and Administrators from Colleges and Departments of AAVMC Member Institutions

University of California–Davis  
Colorado State University  
University of Georgia  
Iowa State University  
Michigan State University  
University of Minnesota  
Mississippi State University  
North Carolina State University

The Ohio State University  
University of Pennsylvania  
University of Prince Edward Island  
Purdue University  
Stanford University  
Texas A & M University  
Tufts University  
Virginia-Maryland

## Selected Personnel from the Following Government Agencies and Professional Organizations

American Association of Laboratory Animal Science  
American College of Laboratory Animal Medicine  
American Veterinary Medical Association, Government Relations Division  
National Association of Federal Veterinarians  
United States Department of Agriculture  
Agricultural Research Service  
Animal and Plant Health Inspection Service, Veterinary Services  
Cooperative State Research, Education and Extension Service  
Food Safety and Inspection Service  
United States Department of Defense  
US Army Veterinary Corps  
US Air Force Biomedical Sciences Corps  
United States Department of Health and Human Services  
NIH—National Center for Research Resources  
NIH—National Institute for Allergy and Infectious Diseases  
United States Public Health Service

## Symposia

Challenges for Population Health Education, University of California-Davis, Davis, CA, May 2002  
Food Animal Veterinarians: An Endangered Species, Kansas State University, Manhattan, KS, October 2002  
The Role of Veterinary Medicine in Biodefense and Public Health, AAVMC, Washington, D.C., November 2002

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