

The Need for Public-Health Veterinarians as Seen by Future Employers

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ABSTRACT

Future employers of veterinarians working in public health see a fast-growing demand. Emerging zoonotic diseases, bio-security threats, and food-safety problems all require the expertise of veterinarians with a focus on complex, global problems that span both human and animal health. The Public Health Task Force of the Association of American Veterinary Medical Colleges convened a group of stakeholders representing various branches of the US federal government, state and local governments, and professional societies to discuss their needs for public-health veterinarians. This article discusses those needs, the broader societal needs that require veterinarians with public-health expertise, and the implications of these for educational programs to train DVMs in public-health issues.

Key words: public health, zoonotic medicine, structure of academic programs, public practice, global issues in veterinary medicine, biodefense, curriculum structure

INTRODUCTION

Animals and veterinary pathogens move faster, farther, and in greater numbers today than ever before. The globalization of the food supply has created innumerable nodes at which food can be contaminated—both unintentionally and intentionally. In parallel, the majority of new and re-emerging infectious diseases are zoonotic, and antimicrobial resistance is on the rise. These trends are moving rapidly and show no signs of reversing; collectively, they call for much greater involvement of the veterinary medical profession in issues of public health.

Historically, public support for the veterinary profession was rooted in the profession's focus on large societal needs: its ability to protect the health of food animals and animals used for transportation. When the first US college of veterinary medicine was founded in 1879, its focus was on animal health and the related public-health problems in the predominantly agrarian society of that century.¹ In the late nineteenth and early twentieth centuries, veterinarians worked to control tuberculosis, brucellosis, salmonellosis, and other human illnesses caused by zoonotic pathogens.² As Americans' affluence grew and their rising incomes allowed them to spend increasing amounts of money on the health of their companion animals, the veterinary medical profession evolved to serve that need as well. We now face critical needs for veterinarians in public health, and these needs must compete with the expanding demand for companion-animal care.³ In 1993, we became newly aware of how closely bound human health is to animal health when three children died and hundreds of people became ill after eating hamburger contaminated with *E. coli* 0157:H7, which was then an emerging food-borne pathogen.⁴ During the latter years of the twentieth century and into the twenty-first, awareness of bio-security issues in the United States has grown exponentially. In January 2004, the White House issued Homeland Security Presidential Directive/HSPD-9, "Defense of United States Agriculture and Food,"⁵ acknowledging the vulnerability of the national food and

agricultural systems to catastrophes and terrorist attacks and instructing the US Department of Agriculture, the Department of Health and Human Services, and the Department of Homeland Security to develop the capacity of colleges and universities, particularly schools of veterinary medicine and schools of public health, to prepare students to protect animal health, human health, and the food supply.

In the veterinary medical profession, a dichotomy has emerged between private practice and public practice. Certainly, neither component should or will win out over the other; in fact, it is often difficult to distinguish between the two, for example, when a food-animal practitioner in private practice offers herd health management advice that, by protecting the food supply, provides a valuable public-health service. Yet the relatively little attention given to the public-practice component of the profession demands deliberate actions to strengthen it, particularly in today's world, where threats to animal and human health are steadily growing.⁶

Rising numbers of health professionals are realizing the urgency of these public needs. Many believe there is a looming shortage of veterinarians in public practice, and some estimates predict that as many as 20% of new graduates will need to enter public practice in order to satisfy the national need.¹ Some veterinary students see the appeal of careers in public practice; veterinarians working in public practice see the need every day; and many educators have remarked on the numerous gaps in veterinary medical education that must be filled. Yet until now, the voices of a critically important group of people have gone largely unheard: those future employers of veterinarians with expertise in public health and the leaders of professional societies that span the veterinary medicine/public health divide. These stakeholders are reminded of the problem every time they identify a need for a public-health veterinarian, attempt to

hire one, and are met with a distressingly small pool of candidates.

To move the discussion forward and highlight possible solutions to this problem, the Public Health Task Force of the Association of American Veterinary Medical Colleges (AAVMC) met with a group of stakeholders in April 2005. The meeting centered primarily on the needs in government agencies, from the national level to state and local governments. Stakeholders included representatives from public-health agencies who hire public-health veterinarians, branches of the US government, and professional societies related to public health. The AAVMC stakeholders meeting examined the role of public-health veterinarians, where they are employed, what they do, and what needs they fill. The stakeholders represented the following agencies:

- US Department of Agriculture (USDA), Animal and Plant Health Inspection Service: Veterinary Services Plant Protection and Quarantine, Veterinary Regulatory Services Animal Care
- USDA, Agricultural Research Service
- USDA, Food Safety and Inspection Service
- USDA, Cooperative State Research, Education and Extension Service, Plant and Animal Systems
- US Air Force
- Food and Drug Administration (FDA), Center for Veterinary Medicine
- Centers for Disease Control and Prevention (CDC), National Center for Environmental Health
- Association for Veterinary Epidemiology and Preventive Medicine
- National Association of State Public Health Veterinarians
- American Association of Public Health Veterinarians
- Association of Schools of Public Health
- American Veterinary Medical Association
- National Institutes of Health (NIH), Office of Laboratory Animal Welfare
- Department of Homeland Security (DHS), Information Analysis and Infrastructure Protection, Infrastructure Coordination Division

FEEDBACK FROM FUTURE EMPLOYERS OF PUBLIC-HEALTH VETERINARIANS

The views expressed by the stakeholders had many common themes, and the urgent need for qualified public-health veterinarians was universal. Representations from each of the participating organizations stressed that current numbers of qualified veterinarians do not satisfy employers' current needs, and, moreover, that many additional jobs remain to be created and filled. Their answers about where public-health veterinarians are needed extended from *research* in a variety of scientific disciplines, and providing veterinary care for the laboratory animals used in that research, to *practice*—highly varied work in food safety, disease transmission, and disease prevention. In addition,

they candidly shared their perspectives on the critical competencies needed for veterinarians working in public health and the types of educational programs needed to best prepare them.

WHERE ARE PUBLIC-HEALTH VETERINARIANS EMPLOYED, AND WHAT DO THEY DO?

Public-health veterinarians play a wide range of roles in protecting both animal and human health. The stakeholders' feedback echoed the published literature and the reports of professional task forces. As of 2003, there were approximately 2,500 public-health veterinarians working in the federal government, 700 in state government, 1,600 in industry, and 250 in academic or land-grant settings.⁷ As of January 2007, the federal government employed 2,670 veterinarians to work on issues related to public health: 1,814 in the USDA, 439 in the US Army, 100 in the US Public Health Service, 98 in the FDA, 94 in the CDC, 90 in the US Air Force, 85 in the NIH, 28 in the Department of the Interior, and 20 in the Environmental Protection Agency.⁸ The majority of state health departments employed at least one veterinarian, and one-third of them employed between two and five.

Research

At the national level, the most acute need for more veterinarians in research is in the USDA, the NIH, the FDA, and the DHS. Veterinarians with research training are needed to fill a wide range of research gaps in microbiology, pathology, immunology, and genetics, both to protect animal and human health and to support efforts in food safety and bio-defense. Veterinarians are also needed to study animal immunology and devise methods to prevent and control zoonotic diseases in their animal hosts. In academic settings, veterinarians with research training fill research positions in veterinary medical schools, medical schools, and schools of public health and agriculture.

Many research projects in the above areas rely on the use of laboratory animals. The Office of Laboratory Animal Welfare at the NIH recognizes that increasing numbers of veterinarians are required to safeguard the health of laboratory animals and thus ensure the quality and ethical standards of research results. The majority of laboratory-animal veterinarians work at universities and private research institutions. The FDA also employs veterinarians in drug-approval studies to design research studies and to review and interpret study results.

Practice

Public-health veterinarians often lead multidisciplinary groups. They act as liaisons between the fields, not surprisingly, of animal health and veterinary medicine, on the one hand, and public health, on the other. For example, veterinarians in the USDA's Food Safety and Inspection Service (FSIS) serve as liaisons with other public-health agencies, whereas in a state department of health, the public-health veterinarian helps to link that agency with groups focused more exclusively on animal health. At the FSIS, a public-health veterinarian may work to ensure that industry is applying the best controls to protect public health and, in collaboration with a team of people from other disciplines, determine how best to enforce food-safety

regulations. In a state department of health, the public-health veterinarian may direct projects in epidemiology; the control of communicable or infectious diseases; environmental health or environmental epidemiology; or areas focusing on food-borne diseases, vector-borne diseases, and zoonoses. Public-health veterinarians also play important regulatory roles and serve as resources for other agency employees, for example, by giving species-specific guidance to federal inspectors. They are also a critical component of teams investigating animal immunology and developing vaccines, as part of projects on zoonoses and animal safety.

Clearly, the job descriptions of veterinarians in these organizations differ markedly from those of veterinarians in private practice. The skills, attitudes, and interests of veterinarians in the two groups overlap considerably, yet they also diverge. Every veterinarian needs well-developed critical thinking skills, communication skills, and emotional intelligence. In addition, however, public-health veterinarians must take a systems approach, considering the national and global implications of their work. They must understand the complexity of the global food system, from microbiological phenomena to industrial processes, from social and psychological issues to political ones. At a practical level, public-health veterinarians must be networkers, be able to function in a bureaucratic environment, and enjoy being a part of a team.

MEETING PUBLIC NEEDS: CORE COMPETENCIES

The core competencies of a veterinarian in public practice differ in many ways from those necessary for a successful private practice, which veterinary medical colleges have traditionally provided quite well. The public-practice veterinarian must be skilled in communication, negotiation, and leadership; must take a systems approach and think critically about multi-layered problems; and be able to assess, manage, and communicate risk.^{4,9}

Public speaking and writing are important tools for the public-health veterinarian to communicate risks, risk analysis, and intervention. Although not all of these core competencies are exclusive to the public-practice sector, their scope is often quite different than in a private clinical setting.

Principles of Public Health and Veterinary Medicine

Public-health veterinarians must have a solid grasp of a variety of scientific fields, including pathology, toxicology, field/applied epidemiology, preventive medicine, quantitative and qualitative analytical methods, biostatistics, and microbiology. They must be able to think in terms of populations and in terms of zoonotic diseases that can move between populations of animals and humans.¹⁰

Policy Analysis and Development; Data Analysis

Public-health veterinarians may need to perform risk assessments, analyze and develop policy aimed at ensuring a safe food supply, and collect and analyze epidemiological data from various points in the agricultural and food-supply chain.¹¹⁻¹³

Communication, Negotiation, and Leadership

Leadership skills are important in veterinary public health because, in many instances and in many jobs, there is simply

no one else to follow. The public-health veterinarian plays a unique role and will often be the only person in that role in an organization; he or she must simultaneously work independently—discerning the proper approach and solution to a problem—and as part of a team of people with complementary roles.

Critical Thinking and a Systems Approach

Public-health veterinarians will consistently face new and unexpected problems. They must have well-developed critical thinking skills and know how to acquire the information necessary to solve complex, unique problems. They must be prepared to deal with legal, ethical, public-relations, and regulatory issues, and they must be well versed in health economics, cost-benefit analysis, and political science.

DEFINING THE NEEDS FOR EDUCATING PUBLIC-HEALTH VETERINARIANS

The issues that the stakeholder group expanded upon first emerged a few years earlier, from students and leaders in veterinary education alike. In 2002, Hoblet, Maccabe, and Heider addressed what they saw as a critical turning point in the veterinary profession's ability to respond effectively to national public needs.¹ They highlighted three problem areas (in order of their impact on students' lives): recruitment, curriculum, and financial aid. First, they called for veterinary medical colleges to expand and diversify their applicant pools. Although the number of first-year veterinary students expressing an interest in public health issues is increasing, it is still not sufficient to meet society's needs; Since those needs continue to grow, veterinary medical colleges need to find ways to increase the proportion of their applicants oriented toward public practice and to retain those students. Second, veterinary medical colleges must define areas of professional focus in their curricula for population medicine and public health, areas that have been gradually squeezed out by a burgeoning number of clinical specialties.¹⁴ Third, veterinary medical colleges need to offer practicing veterinarians post-graduate training in the form of professional public-health degree programs (both the Master of Public Health or equivalent and doctoral-level degrees) and other multidisciplinary programs. Many of these initiatives will require sustained regional alliances among schools.

In 2003, the AAVMC issued its first direct statement on the problem in its report *Emergency Needs in Veterinary Human Resources*.⁷ The AAVMC called for the profession to refocus, retool, and rebuild in order to cope effectively with the complexity of the twenty-first century. The report not only advocates a sea change in veterinary medical education but pins the very success of the veterinary profession on its ability to meet society's needs. It outlines an integrated strategy containing a diversity of approaches, directing the profession toward both incremental and revolutionary change in the short and the long term. Short-term incremental changes recommended in the report include increasing veterinary students' awareness of public-health careers and developing continuing-education options for practitioners in the field. Students' exposure to public-health careers, it suggests, could happen through campus events, the presence of strong role models around them, and

workshops led by a national team of people from government, academia, and industry. The long-term incremental changes recommended center around enriching the veterinary medical curriculum. Colleges need to develop new didactic teaching modules and experiential learning exercises that educate students in the competencies necessary for public practice; summer institutes and dual-degree programs need to be created or expanded, and colleges' application processes need to do better at identifying students who are already inclined toward public practice.

The short-term revolutionary changes initiated by the AAVMC report pertained to the regional and national levels. The AAVMC recommended that a national veterinary medical service program be created, designed to encourage students to enter training programs in bio-defense, food safety, research, and ecosystem health. A national Veterinary Corps would do the same for veterinarians already in practice. The AAVMC and the NIH should jointly create a program to fund veterinarians seeking biomedical careers. Finally, the recommended long-term revolutionary changes looked toward the development of broad consortia of people and institutions from collaborating disciplines, including public health, veterinary medicine, human medicine, wildlife management, and social sciences.

In the spring of 2006, a group of veterinary students revisited the question of how the profession can better serve public-health needs. They advocated finding those pre-veterinary students who already lean toward public-health careers, who are interested in public policy, or who hope eventually to do research related to veterinary public health. Once students arrive, they should be introduced to public-health issues in their first year. A strong mentoring program is essential for success and requires sustained efforts from faculty, students, and administrators. In addition, students must know that financial support is available to pursue a wide variety of careers in veterinary medicine.¹⁵

The task-force stakeholders had much to say about recruitment and about how veterinary schools can serve the needs of both students and faculty.

Recruitment

Stakeholders expressed an interest in forming closer relationships with individual veterinary medical colleges, and they had a variety of recommendations for how recruitment practices could change. They urged veterinary medical colleges to start recruiting earlier in the year and to recruit at schools of public health. AAVMC meetings and events should co-locate with meetings of the AVMA and of medical and public-health associations. When recruiting, colleges should look for people with diverse backgrounds and public-practice experience, consider changing the relative weight given to test scores versus non-clinical experience, do in-person interviews, and reserve admission slots for applicants with public-health degrees. The AVMA has a recruitment video that highlights public practice, which can serve as a resource for colleges.

Faculty Needs

New veterinary students need to be welcomed to campus by faculty who are actively involved in public practice.

But these faculty members need support from their institutions. Veterinary medical colleges must make the funds and time available for faculty to develop new courses and rotations in areas such as epidemiology, public health, preventive medicine, and population medicine. Faculty should be encouraged to spend sabbatical time with public agencies and to enter into research collaborations in which their students can participate.

Students' Needs

Students who have never thought beyond a career in private practice need exposure to the wide range of public-health options, just as students already interested in careers in public practice require the courses and mentors to carry them along the long path from first year to graduation. Currently, most veterinary medical colleges do not carry out these functions well enough. Colleges must make a concerted effort to bring in a greater diversity of faculty by hiring permanent and adjunct faculty with public-health experience and by creating shared positions with public agencies. They must deliberately set up formal mentoring programs. In general, students need to regularly see in their midst veterinary professionals who work in and talk about careers in public practice. In many colleges, an ideal strategy might be to create a student affairs position for a public-practice veterinarian who would be devoted full-time to creating the necessary courses and rotations, pairing students with mentors, and building relationships with schools of public health and with local and state agencies.

Students need to see enthusiasm for public-practice careers from high levels of the administration of the veterinary college. For a veterinary school to have a dean with a public-health degree would send a strong signal to students. Just as importantly, students must have a clear idea of the personal benefits that would accrue to them in public practice. The clear communication of these benefits is vital, as there is a disconnect between students' perceptions of the rewards (or lack thereof) of public practice and what those rewards actually are. Students must be given a good sense of the advantages of a public-practice career: favorable working conditions and benefits, the opportunity to work as part of a team, and a constant stream of new challenges, of a different sort and a wider range than they would encounter in private practice.

FILLING THE RANKS AND SOLIDIFYING COLLABORATIONS

How can stakeholders collaborate with veterinary medical colleges to strengthen the field of veterinary public health? Stakeholders can increase their offerings of paid internships for veterinary students and for veterinarians in post-graduate training programs. They can offer financial support to research projects in veterinary public health. They can form partnerships with veterinary medical colleges, for example, by participating in split faculty appointments between government, industry, and academia. And, with respect to their own employees, stakeholders can offer perks for new hires with desirable backgrounds in veterinary public health, support their employees' post-DVM training, and encourage employees to act as mentors to veterinary students.

The numbers of public-health veterinarians are growing, but they need to grow much more. In 2001, about 25 veterinary students out of a national class size of approximately 10,000 were pursuing a dual degree in public health, in just a handful of programs. By 2007, the number had risen to more than 250, and students were finding opportunities for public-health training at 17 colleges of veterinary medicine in North America. In 2007, the AAVMC and the Association of Schools of Public Health met together for the first time. At that meeting in Atlanta, Georgia, leaders from academia and government filled the hall. Roger Mahr, President of the American Veterinary Medical Association, called for a national strategy organized around “One Health”—animal health, human health, and ecosystem health. He advocated for the development of centers of excellence in translational medicine and for a national action plan that confronts the reality of zoonotic diseases. In July 2007, the AVMA acted on these goals by creating the One Health Initiative Task Force, charged with identifying areas where professionals in animal and human health already work together well and areas where integration is needed. The task force will describe barriers to integration and suggest ways of overcoming those barriers—aiming to move the question of One Health to center stage in both professions.

In the closing session of the joint meeting, John Finnegan, Dean of the School of Public Health at the University of Minnesota, called for engaged and engaging leadership to enrich, expand, and deepen the partnership between veterinary medicine and public health. He urged leaders in both fields to work together to construct and articulate a vision, mission, and strategy, and he advised each institution to ensure that planning takes place at both the level of governance and the level of operations and management. He advocated online resources where the two communities can continue to interact. Electronic communication could facilitate the sharing of models and experiences and be a place for people to consult with one another across disciplines. Finnegan also advocated joint symposia, joint advocacy efforts, and celebrations of progress made toward deeper collaborations, and he hoped to see more stakeholders—the people who employ the veterinary public health professionals—at future joint meetings. Clearly, pushing through the incremental and revolutionary changes requires all sides of the story, as told by students, leaders in veterinary medicine and public health, and the stakeholders whose work awaits the next generation of public-health veterinarians.

CONCLUSION AND POSTSCRIPT

The future employers of public-health veterinarians were frank about their concerns for the supply and quality of public-practice veterinarians. They recognized that it is impossible to develop a precise estimate of the number of veterinarians that will be needed, but there was a strong consensus for three key findings: that current needs for public-health veterinarians exceed the existing supply; that needs will continue to grow as the value of veterinarians in public health is more widely recognized; and that educational opportunities must be expanded in order to produce graduates who possess the critical competencies necessary for public-health practice.

Despite these solid findings, considerable skepticism remains among veterinary administrators and faculty. The three most common assertions by these skeptics, both in private discussions and in public presentations, are that (1) there are no jobs now, (2) there is no guarantee of future jobs, and (3) the jobs don’t pay well. In an effort to address these myths, the information below has been collected from the future employer stakeholders and others.

Myth 1: There is currently no unmet need for public-health veterinarians.

The stakeholders all pointed out vacant and unfilled positions. Skeptics correctly argue that there are few advertisements listed in the *Journal of the American Veterinary Medical Association* and the federal governments USAJobs Web site. What they do not recognize is the multitude of jobs listed under other job series, including epidemiologists, program analysts, environmental health specialists, and biological scientists. In fact, some employers shy away from listing positions under the “veterinary” series because of the limited applicant pool and their desire not to be limited to veterinarians if other excellent candidates apply. Also, many positions are not publicly advertised in journals because of time and resource constraints, which means that recruitment takes place through more informal mechanisms such as e-mail discussion lists and personal contacts. We must encourage veterinarians interested in public-health careers to apply wherever their knowledge and skills match the job requirements, regardless of the position title. A national clearinghouse of employment opportunities would help students and veterinarians navigate the complex job market in public practice in a timely and inexpensive way.

Myth 2: There is no guarantee of future jobs.

All of the stakeholders talked about the increasing needs for veterinarians in public-health fields. They cited trends such as the increased recognition of emerging zoonotic diseases and the importance of zoonoses as potential bioterrorism agents in justifying their assessments. They also cautioned that continued shortages of interested and qualified veterinary applicants may spur potential employers to look elsewhere for tomorrow’s public-health professionals. Rather than passively watching as unmet demand leads employers to overlook veterinarians as potential hires, colleges of veterinary medicine must provide new educational initiatives and mentoring, which can generate considerable interest among veterinary students and foster more qualified applicants. Lastly, entry-level openings are continually being created, as qualified veterinarians hired into public-health jobs often move quickly to positions of more responsibility. An abundance of qualified veterinarians entering the field of public health will spur the creation of additional positions.

Myth 3: Public-health jobs for veterinarians don’t pay well.

The origin of this myth is unclear. AVMA employment data for new graduates in 2007 show that starting salaries for positions in public/corporate practice averaged \$57,113, less than \$1,000 lower than the average for clinical practice.¹⁶ A review of current federal government pay scales shows strong starting salaries and considerable career potential for salary growth, with entry positions at GS 11 or GS 12 starting at \$48,148 and \$57,109, respectively—without

considering locality pay, which can increase the starting salary by \$10,000 or more. The federal government offers regular salary increases and cost-of-living adjustments, plus generous benefits that exceed most clinical practice packages. Compensation can grow significantly with a career path that progresses to management and leadership positions: the top of the GS 15 pay range currently stands at \$124,010, with locality pay for some areas taking that to \$149,000, and Senior Executive salaries are even higher.¹⁷ Admittedly, state government positions usually pay less than federal positions, and career opportunities are greatest for those veterinarians who are willing to relocate to gain a breadth of experience and move into positions of greater responsibility.

Taken together, the prevalence of these myths within academic veterinary medicine speaks to Pogo's infamous statement: "We have met the enemy and they are us." Opportunities for veterinarians in public health are constrained primarily by our own lack of imagination and initiative in pursuing opportunities. The major employers of veterinarians in public health clearly see growing needs, and we have a window of opportunity to demonstrate what our profession has to offer.

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