Executive Summary

The U.S. veterinary medical profession contributes to society in diverse ways, from developing drugs and protecting the food supply to treating companion animals and investigating animal diseases in the wild. In a study of the issues related to the veterinary medical workforce, including demographics, workforce supply, trends affecting job availability, and capacity of the educational system to fill future demands, a National Research Council committee found that the profession faces important challenges in maintaining the economic sustainability of veterinary practice and education, building its scholarly foundations, and evolving veterinary service to meet changing societal needs.

The committee found little evidence of workforce shortages in most fields of veterinary medicine. True personnel shortages are indicated when salaries rise sharply in an attempt to attract qualified candidates to fill persistent vacancies. That is not occurring in any sector of veterinary medicine, except industry, where high salaries are offered to candidates with both a doctoral degree in veterinary medicine (DVM) and a PhD, or with advanced training in pathology or laboratory-animal medicine.

Nevertheless, some veterinary colleges have increased enrollment and the American Veterinary Medical Association (AVMA) has accredited additional veterinary schools to accommodate more students, most of whom will likely practice companion-animal medicine. Those actions will increase the supply of companion-animal practitioners, the largest group of veterinary practitioners, at a time of uncertain demand for companion-animal services. The profession’s leaders should pay attention to improving the economic value of the DVM, especially given the cost of a veterinary education, which is typically shared by the student and the public. The financial reward for the investment of time and money in obtaining a DVM is lower than that in other medical professions, such as dentists and pharmacists, which have the same or fewer years of training.

A larger consequence of increasing enrollments may be for the veterinary colleges themselves, which have inadequate resources for clinical faculty, specialists, and others needed to train future practitioners. Companion-animal veterinary medicine has come to dominate the curriculum and resources of veterinary schools, sometimes to the detriment of other fields of veterinary medicine, at a time when many veterinary schools are facing a precipitous decline in state support for faculty positions and tuition.

Future actions should be informed by reliable national data on consumer demand for companion-animal care and the economics of private practice (including the work patterns of practitioners and the role of veterinary technicians), by the need to maintain the quality and

---

1 The University of Pennsylvania awards the Veterinariae Medicinae Doctoris (VMD), an equivalent to the DVM.
affordability of a veterinary education, and by the need to educate veterinarians for other sectors of the profession. Developing new business models for providing specialty training is part of this challenge. The committee recommends that the Association of American Veterinary Medical Colleges, the American Animal Hospital Association, and the AVMA work together to collect the necessary data and conduct planning.

The committee found that increasing student debt associated with a veterinary education is one factor that undermines the inclination of graduates to pursue PhD research training that would prepare them for academic careers, key jobs in public practice, and some positions in industry. Partnerships between industry and academe to expose DVM students to research and the establishment of joint DVM-PhD programs may increase the pool of potential candidates needed by academe, government, and industry.

Because research is important for the future of the profession, leaders in academe should make a greater commitment to strengthening its scholarly base. It is essential to attract more public and private support for veterinary colleges, but that requires academe to demonstrate the value of investment in veterinary medical research. Hiring DVM-PhDs and PhDs to attract grants, serve as mentors, and provide graduate training of veterinarians at the doctoral level for both biomedical and clinical animal research would keep veterinary schools in the mainstream of research.

An important challenge to the profession is its ability to evolve veterinary services in synchrony with societal needs. For example, to increase the value of veterinary services to large, intensive livestock and poultry producers, the education of food-animal practitioners should be reoriented toward herd health and improving the productivity of farm operations. In rural areas, where primary veterinary care is needed but there are too few farms to support full-time veterinarians, a system of animal health care involving rigorously trained technicians under the supervision of veterinarians could be developed. Such arrangements, which would also strengthen disease surveillance, could be initiated through negotiations by veterinary professional associations with state regulatory officials.

The veterinary profession should expand its capacity to address complex global problems, such as those associated with food security, by encouraging interactions between U.S. veterinary graduates and other disciplines and cultures, particularly in the developing world, where the profession has an opportunity to leverage its expertise in One Health\(^2\) and lead advances in food-animal husbandry and welfare, water safety and security, and the health of wildlife and ecosystems.

\(^2\) One Health is a holistic concept of health that recognizes and addresses the complex linkages between humans, wild and domestic animals, and their ecosystems.
Workforce Needs in Veterinary Medicine

Committee to Assess the Current and Future Workforce Needs in Veterinary Medicine

Board on Agriculture and Natural Resources
Board on Higher Education and Workforce

Division on Earth and Life Studies
Policy and Global Affairs Division

This prepublication version of Workforce Needs in Veterinary Medicine has been provided to the public to facilitate timely access to the report. Although the substance of the report is final, editorial changes may be made throughout the text and citations will be checked prior to publication. The final report will be available through the National Academies Press in summer 2012.
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Preface

In 2007, the American Veterinary Medical Association, the Association of American Veterinary Medical Colleges, the American Animal Hospital Association, Bayer Animal Health, and the Burroughs Welcome Fund asked the National Research Council (NRC) to conduct a comprehensive study of the current and future workforce needs in veterinary medicine. The request was motivated by concerns about how well the veterinary profession was presently meeting its public responsibilities and, in terms of human resources and facilities, how well it could adjust to the complex challenges facing society in the 21st century.

Many of the concerns about the profession came into focus following the outbreak of West Nile fever in 1999: despite the spread of a zoonotic disease, human and veterinary public health agencies acted independently and did not communicate with one another. Subsequent outbreaks of SARS, monkeypox, bovine spongiform encephalopathy, highly pathogenic avian influenza, H1N1 influenza, and a variety of food safety and environmental issues heightened public concerns. They also raised further questions about the directions of veterinary medicine and the capacity of public health services the profession provides both in the United States and abroad. After September 11, 2001, concern about the vulnerability of the food supply, including the American livestock and poultry industries, drew attention to the declining presence of veterinarians serving the animal industries across the nation.

These and other demographic, economic, political, and environmental developments of the 21st century will profoundly change society and the services the veterinary profession must provide in order to remain relevant to the public. Responsibilities will increasingly involve global issues with greater emphasis focused on the interface of human, animal, and ecosystem health. To meet these needs, there are doubts that the present supply of veterinarians are adequate in biomedical research, industry, academia, companion animal practice, food animal medicine, public health, and wildlife health. This report attempts to anticipate some of the needs and measures that are essential for the profession to fulfill given its changing roles in the 21st century.

The study was undertaken at a time when the nation experienced a major economic downturn, which made deciphering the long-term trends in demand for veterinary services very challenging. Some estimates (the number of livestock being raised, for example) will always be in flux due to economic or industry cycles, but in the long term, the number of animals is less important for the profession than the evolution in the care and services needed for those animals.

Under the direction of the NRC Board on Agriculture and Natural Resources and Board on Higher Education and Workforce, a committee was impaneled to address the issues provided in the Statement of Task. The committee was representative of the breadth of interest of the
veterinary profession, and first met in April 2007 to consider the large undertaking the study commissioned. Over the next three years, the committee met on six occasions and participated in numerous conference calls to discuss ways of obtaining the needed information, review manuscripts, and revise the report. As would be expected from a committee with such diverse backgrounds, there were distinct and at times conflicting points of view. Nevertheless, committee members were always willing to learn from each other and in the end came to a consensus on the issues posed by the charge.

Throughout the study the committee was very ably supported by the staff of the National Academies and is indebted to Jim Voytuk, Janet Mulligan, and Kara Murphy for their expert assistance. The committee is especially grateful to Robin Schoen, Director of the Board of Agriculture and Natural Resources, for her encouragement, advice, and for keeping the committee focused on their charge.

Alan M. Kelly, Chair  
Committee to Assess the Current and Future Workforce Needs in Veterinary Medicine
Acknowledgments

This report has been reviewed in draft form by persons chosen for their diverse perspectives and technical expertise in accordance with procedures approved by the National Research Council Report Review Committee. The purpose of the independent review is to provide candid and critical comments that will assist the institution in making its published report as sound as possible and to ensure that the report meets institutional standards of objectivity, evidence, and responsiveness to the study charge. The review comments and draft manuscript remain confidential to protect the integrity of the deliberative process. We wish to thank the following individuals for their review of the report:

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Although the reviewers listed above have provided many constructive comments and suggestions, they were not asked to endorse the conclusions or recommendations, nor did they see the final draft of the report before its release. The review of the report was overseen by Frederick A. Murphy, University of Texas Medical Branch at Galveston, and George E. Seidel, Jr., Colorado State University. Appointed by the National Research Council, they were responsible for making certain that an independent examination of the report was carried out in accordance with institutional procedures and that all review comments were carefully considered. Responsibility for the final content of the report rests with the authoring committee and the institution.
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## Acronyms

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<th>Full Form</th>
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<tbody>
<tr>
<td>AABP</td>
<td>American Association of Bovine Practitioners</td>
</tr>
<tr>
<td>AAEP</td>
<td>American Association of Equine Practitioners</td>
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<tr>
<td>AASV</td>
<td>American Association of Swine Veterinarians</td>
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<tr>
<td>AAVC</td>
<td>American Association of Veterinary Clinicians</td>
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<tr>
<td>AAVMC</td>
<td>Association of American Veterinary Medical Colleges</td>
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<tr>
<td>AAWV</td>
<td>American Association of Wildlife Veterinarians</td>
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<tr>
<td>AAZV</td>
<td>American Association of Zoo Veterinarians</td>
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<tr>
<td>ACLAM</td>
<td>American College of Laboratory Animal Medicine</td>
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<tr>
<td>ACPV</td>
<td>American College of Poultry Veterinarians</td>
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<tr>
<td>ACVP</td>
<td>American College of Veterinary Pathologists</td>
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<td>AHC</td>
<td>American Horse Council</td>
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<tr>
<td>AHI</td>
<td>Animal Health Institute</td>
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<tr>
<td>ASLAP</td>
<td>American Society of Laboratory Animal Practitioners</td>
</tr>
<tr>
<td>APHIS</td>
<td>Animal and Plant Health Inspection Service (U.S. Department of Agriculture)</td>
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<tr>
<td>AVMA</td>
<td>American Veterinary Medical Association</td>
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<tr>
<td>BSE</td>
<td>bovine spongiform encephalopathy</td>
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<tr>
<td>CDC</td>
<td>U.S. Centers for Disease Control and Prevention</td>
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<tr>
<td>CPDF</td>
<td>Central Personnel Data File (Office of Personnel Management)</td>
</tr>
<tr>
<td>CRO</td>
<td>Contract Research Organization</td>
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<tr>
<td>DHS</td>
<td>U.S. Department of Homeland Security</td>
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<tr>
<td>DOI</td>
<td>U.S. Department of the Interior</td>
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<tr>
<td>DVM</td>
<td>Doctor of Veterinary Medicine</td>
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<tr>
<td>ECFVG</td>
<td>Educational Commission for Foreign Veterinary Graduates</td>
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<tr>
<td>EPA</td>
<td>U.S. Environmental Protection Agency</td>
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<tr>
<td>FAD</td>
<td>foreign-animal disease</td>
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<tr>
<td>FAO</td>
<td>Food and Agriculture Organization of the United Nations</td>
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<tr>
<td>FDA</td>
<td>U.S. Food and Drug Administration</td>
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<tr>
<td>FMD</td>
<td>foot-and-mouth disease</td>
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<tr>
<td>FSIS</td>
<td>Food Safety and Inspection Service (U.S. Department of Agriculture)</td>
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<tr>
<td>FSVMC</td>
<td>Food Supply Veterinary Medicine Coalition</td>
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<tr>
<td>FTE</td>
<td>full-time equivalent</td>
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<tr>
<td>FWS</td>
<td>Fish and Wildlife Service (U.S. Department of the Interior)</td>
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<td>GAO</td>
<td>Government Accountability Office</td>
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<tr>
<td>GCP</td>
<td>good clinical practice</td>
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<tr>
<td>Abbreviation</td>
<td>Description</td>
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<td>--------------</td>
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<tr>
<td>GLP</td>
<td>good laboratory practice</td>
</tr>
<tr>
<td>HHS</td>
<td>U.S. Department of Health and Human Services</td>
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<td>HPAI</td>
<td>highly pathogenic avian influenza</td>
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<tr>
<td>H1N1</td>
<td>influenza A (H1N1) 2009 (“swine flu”)</td>
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<tr>
<td>IAAAM</td>
<td>International Association for Aquatic Animal Medicine</td>
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<tr>
<td>LA</td>
<td>large-animal</td>
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<tr>
<td>LAE</td>
<td>large-animal exclusive</td>
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<tr>
<td>LAP</td>
<td>large-animal predominant</td>
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<tr>
<td>MPH</td>
<td>Master of Public Health</td>
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<tr>
<td>NCRR</td>
<td>National Center for Research Resources (National Institutes of Health)</td>
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<tr>
<td>NGO</td>
<td>non-governmental organization</td>
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<tr>
<td>NIFA</td>
<td>National Institute of Food and Agriculture (U.S. Department of Agriculture)</td>
</tr>
<tr>
<td>NIH</td>
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<tr>
<td>NPS</td>
<td>National Park Service</td>
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<tr>
<td>NRC</td>
<td>National Research Council</td>
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<tr>
<td>NWHC</td>
<td>National Wildlife Health Center (U.S. Geological Survey)</td>
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<td>NWRA</td>
<td>National Wildlife Rehabilitators Association</td>
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<tr>
<td>OSHA</td>
<td>Occupational Safety and Health Administration (U.S. Department of Labor)</td>
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<tr>
<td>SARS</td>
<td>severe acute respiratory syndrome</td>
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<tr>
<td>SETAC</td>
<td>Society of Environmental Toxicology and Chemistry</td>
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<tr>
<td>STP</td>
<td>Society of Toxicologic Pathology</td>
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<tr>
<td>T-MAC</td>
<td>Talent Management Advisory Council</td>
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<td>USAID</td>
<td>U.S. Agency for International Development</td>
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<tr>
<td>USDA</td>
<td>U.S. Department of Agriculture</td>
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<tr>
<td>USGS</td>
<td>U.S. Geological Survey</td>
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<tr>
<td>VMCAS</td>
<td>Veterinary Medical College Application Service</td>
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<tr>
<td>VMD</td>
<td>Veterinariae Medicinae Doctoris</td>
</tr>
<tr>
<td>VMO</td>
<td>Veterinarian Medical Officer</td>
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<tr>
<td>WCS FVP</td>
<td>Wildlife Conservation Society’s Field Veterinary Program</td>
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<td>WDA</td>
<td>Wildlife Disease Association</td>
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<td>WHO</td>
<td>World Health Organization</td>
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