

# VETERINARY MEDICAL EDUCATION AND THE UNIVERSITY OF CALIFORNIA

## Final Report of the Health Sciences Committee -- November 2004

### INTRODUCTION

In December 1997, a systemwide Subcommittee on Veterinary Medicine was appointed by the Universitywide Health Sciences Committee and charged with examining the University's role in addressing workforce and educational needs in veterinary medicine. This document is an update to the Report of the Universitywide Health Sciences Committee - Subcommittee on Veterinary Medicine: *Veterinary Medicine- An Overview of Professional Education and Assessment of Future Workforce Needs in California* completed in 1998.

This report responds to the Subcommittee's original charge and provides: (1) an overview of the veterinary health infrastructure; (2) a description of the scope of veterinary practice and professional activities of California providers; (3) a profile of the California veterinary workforce; (4) a summary of projected future needs; (5) an update on recent California initiatives developed in response to these needs; (6) a profile of educational opportunities in veterinary medicine; and (7) a set of recommendations that the University should consider in responding to future workforce needs.

### VETERINARY HEALTH INFRASTRUCTURE

The veterinary health system includes teams of professionals – primarily veterinarians, veterinary technicians, and veterinary assistants. The team may also include a veterinary hospital administrator, adoption counselors, grief counselors, kennel workers, and volunteers. Their efforts focus on protecting the health and welfare of animals and people. According to the American Veterinary Medical Association (AVMA):

*Veterinarians diagnose and control animal diseases, treat sick and injured animals, prevent the transmission of animal diseases to people, and advise owners on proper care of pets and livestock. They ensure a safe food supply by maintaining the health of food animals. Veterinarians are also involved in wildlife preservation and conservation and public health of the human population.*

Veterinarians provide a variety of services in clinical practice, teaching, research, government service, public health, military service, private industry, and other settings such as zoos, wildlife parks, and aquariums.

#### ***Professional Activities of California Veterinarians***

The range of professional activities among veterinarians is exceptionally broad. The services currently provided by California veterinarians include the following:

- Provision of primary health care for pet animals, horses and other performance animals, livestock, laboratory animals, captive and free-ranging wildlife, aquatic animals (including wild and farmed aquatic species), and wild or farmed birds;
- Provision of secondary and, less commonly, tertiary care for all the above clinical activities;

- Coordination and oversight of preventive health services for food animal species, including maintenance of animal health and production, and development of quality assurance programs to minimize the possibility that "on-farm" events might reduce the wholesomeness of animal products;
- Organization of preventive health services for wild animals, including population management to maintain healthy "herds," and monitoring of environmental contamination through wild animal health;
- Protection of the environment through epidemiological studies in such areas as animal waste management, drug residue research and bio-containment;
- Participation in emergency disaster relief activities for wild animals (e.g., oiled waterfowl) or domestic animals (e.g., livestock and pet flood victims);
- Maintenance of the public health through diagnostic testing and inspection of the processing of foods of animal origin;
- Protection of the public health through local, state and/or federal programs to reduce the likelihood of transmission of an estimated 300 zoonotic diseases from animals to humans (e.g. Rabies, Brucella, Hantavirus, Lyme Disease, West Nile Virus);
- Development of strategies to protect and defend animal and human health in the event of a bioterrorist/agroterrorist action involving a zoonotic disease;
- Application of comparative medicine expertise to basic and applied biomedical research in university, public agency, and private settings;
- Development of pharmaceuticals and biologicals for human use through animal testing; and
- Application of biotechnology advances (e.g., assisted reproductive technologies) to propagate endangered wild species or valuable domestic species.

### ***Veterinary Health Financing and Service Delivery***

Veterinary health care for the most part is financed by animal owners. Limited pet insurance is available, but it has not been embraced widely by animal owners due to its relatively high costs. As clients pay for services "out-of-pocket," veterinarians must adjust their prices to fit what the market will bear in their communities. In most instances, veterinarians work with owners to review estimated costs of veterinary care at the time services are delivered and may work out a payment plan if necessary. They must also consider when clients cannot pay the cost of saving their animal, even though the health issue may be treatable and would restore the animal back to a normal, healthy condition. As medical services become more sophisticated, the demand for more sophisticated services at low prices is increasing. Given the high cost of providing such services, treatments, and tests, without the benefit of third party insurance however, meeting this demand to lower prices is unrealistic for most veterinarians.

Changes in the organization and delivery of veterinary services have occurred in recent years. Ownership and practice arrangements have diversified, with a marked increase in the number of group practices and a concurrent decrease in the number of "solo" practitioners. Corporate, franchised practices have developed, with projections that these trends will result in growing employment opportunities within these settings.

## **THE VETERINARY WORKFORCE**

### ***Veterinarians***

There are 76,291 professionally active veterinarians in the United States and approximately 5,860 working in California. The current average veterinarian-to-population ratio is 27 veterinarians per 100,000 population, nationally. By contrast, the average ratio of veterinary professionals to population in California is 17:100,000. Twenty counties in California, almost half, are at or below this level. Currently the UCD School of Veterinary Medicine graduates 122 new veterinarians each year. Since 1995, an average of approximately 230 veterinarians trained outside of the state are licensed each year to practice in California. If the state were to meet the current national average, an additional 3,367 California veterinarians would be needed.

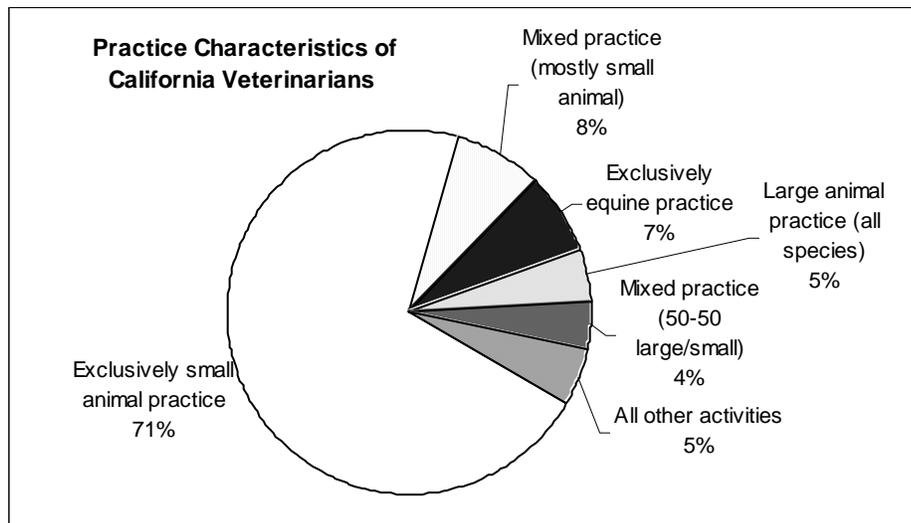
### ***Demographic Profile of Veterinarians***

Historically, the veterinary profession has been predominantly male. Since the mid-1970's however, the number of women accepted to veterinary schools has steadily increased. Among all practicing veterinarians approximately 45% are women and 55% are male. According to the AVMA, 65% of students enrolled in veterinary schools nationwide were women in the 2001-2002 academic year. By 2005-2006, the number of practicing women veterinarians in the profession is expected to outnumber men. The average age of actively employed veterinarians in the U.S. is 45 years (49 for men; 40 for women).

The veterinary workforce is among the least diverse of the health professions. Efforts within the profession, and the 28 veterinary schools, to increase diversity have produced modest results, but at a slower pace than desired. Approximately 90% of students enrolled in veterinary colleges are White. Only 3% are Asian, 3% are Latino, and 2% are African American. (Demographic data for California veterinarians is currently not available.) Veterinary medicine's lack of diversity has anecdotally been attributed to a number of factors including the lack of minority role models within the profession, lower salaries when compared to other health professionals, and the predominantly urban origin of minority households, which have significantly fewer pets and opportunities for experience with farm animals.

### ***Practice Characteristics of Veterinarians***

Approximately 75% of all veterinarians work in private practices (50% of veterinarians are self-employed practice owners). Of those, about 58% are engaged in exclusively small animal practice in which they treat companion animals only; nearly 18% limit their practice to the care of farm animals or horses. Another 19% of veterinarians work in mixed animal practices that provide care to all types of pets, horses, and livestock. According to the California Veterinary Medical Association (CVMA) directory, approximately 94% of California's veterinary members are engaged in private practice. More definitive data regarding the current professional activities of California veterinarians were recently collected by the AVMA. Based upon member responses to a self-administered multiple-choice survey questionnaire, the AVMA found that of the 3,952 veterinarians responding, 79% worked in small animal practice, 7% worked in equine practice, and 9% worked in large animal practice (Figure 1).



**Figure 1: Practice Characteristics of California Veterinarians (source: AVMA)**

In 2003, there were 7,547 veterinary specialists practicing in the U.S., or 11% of the profession. While not every specialty has its own organized College or Board, 20 boards are currently registered with and approved by the AVMA (Figure 2). California leads the nation in the number of board-certified specialists engaged in private practice (15%). It is noteworthy that more than half of these specialists were board-certified within the past nine years. These data indicate that the trend toward specialization is accelerating.

Anesthesiology	Animal Behavior	Dentistry
Dermatology	Emergency and Critical Care	Internal Medicine
Laboratory Animal Medicine	Microbiology	Nutrition
Ophthalmology	Pathology	Pharmacology
Poultry	Preventive Medicine	Radiology
Veterinary Surgery	Theriogenology	Toxicology
Zoological Medicine	Species Specific Practice*	

**Figure 2: Veterinary Medicine Specialty Services**

\* Avian, Beef Cattle, Swine, etc.

### **Public Practice Veterinarians**

The public practice veterinary corps plays a crucial role in protecting animal and human health. Employed largely through federal and state agencies, these veterinarians work to ensure the health of the food supply through food animal health and management programs, diagnostic testing, food safety and biosecurity strategies. Since September 11, 2001 and the Foot and Mouth Disease outbreak in Great Britain, these professionals have focused on protecting food animals from accidental or intentional introduction of pathogens that could be transmitted through animal products to humans or decimate food animal populations. In either case, the result would be an economic and environmental disaster.

### **Ancillary Providers**

There are approximately 23,000 Registered Veterinary Technicians (RVT) working in the U.S. and 2,735 licensed and working in California. RVTs assist veterinarians by obtaining client and patient information;

collecting biological samples; dressing wounds; preparing instruments and patients for surgery; providing assistance in diagnostic, medical and surgical procedures; and developing radiographs.

## **PROJECTED WORKFORCE NEEDS**

Relative growth in the number of California veterinarians (about 1% per annum) ranks 49<sup>th</sup> in the nation as evidenced by significant regional shortages identified in some areas of the state. For example, Los Angeles County, with nearly 30% of the State's population, has less than 10 veterinarians per 100,000 residents. The projected population of California by the year 2020 is expected to be 44 million. Several factors are impacting the demand for new veterinarians. According to the American Animal Hospital Association, the profession is experiencing a general downward shift in productivity because many veterinarians in small animal practice are choosing to work fewer hours. These changes are due, in part, to desired lifestyle changes and the growing numbers of women in veterinary medicine who may opt to work fewer hours during part of their careers in order to balance family and professional interests. As a result, many employers are hiring additional veterinarians to balance work schedules, maintain productivity, and meet client demands for services. Since only 27 states in the U.S. offer veterinary education to fulfill the veterinary healthcare needs of the nation, their responsibility extends beyond state and regional boundaries. To address the need for veterinarians to adequately supply the national demand, and acknowledging an estimated retirement rate of 2.78% per year, an additional 725 new veterinarians in California would be needed each year.

### ***Pets and Companion Animals***

Although not every aspect of the future of veterinary medicine in California is clear, several trends are predictable. California's population will continue to grow by an additional 18-20 million people by the year 2025. An estimated 30-40% of households are likely to own at least one pet. Kass and Hansen (1998) report that while the proportion of households in California owning a dog or cat declined slightly between 1991-1996, the total number of pets per household rose. Further growth in demand for veterinary services is expected as California's population grows.

### ***Agriculture and Food Safety***

California's intensive animal agricultural industries accounted for \$6.8 billion in farm receipts in 2002, or nearly a quarter of the total income earned by California agriculture. While industry projections vary, animal agriculture is not likely to diminish in the foreseeable future. In the dairy industry, for example, herd sizes will probably continue to grow - a trend that is now 50 years old - and herds will be concentrated in areas relatively far removed from major population centers. The sophistication of management practices will increase and veterinary services utilized by the industry will likewise become more specialized. Within these settings, the veterinarian will remain an integral part of the management team for an individual operation. Food safety is also a growing concern. As new food safety strategies are developed and refined, curricular modifications will be required to ensure that students are exposed to changing technologies and their use and application. Anecdotal information gathered by UC Davis suggests that recruiting adequate numbers of new graduates to food animal practices in California has been difficult for the past 15 years. These and other data suggest that unmet demands for veterinary livestock services currently exist and may grow substantially in the future.

### ***Disease Control, Public Health, and Wildlife***

The role of the veterinarian in public health is expected to grow and will increasingly focus on the prevention of the transmission of zoonotic diseases from animals to humans. Current examples involving human illness

include AIDS, Bovine Spongiform Encephalopathy, West Nile Virus, and foodborne illnesses. The future success of this area of veterinary public health will rely upon the contributions of well-trained private practitioners, regulatory veterinarians, university veterinary scientists, physicians, and other public health professionals. Currently, however there is a national shortage of public practice veterinarians, with the U.S. Department of Agriculture predicting a shortage of 584 veterinarians in the areas of food safety and animal health inspection by 2007. Additionally, 50% of the Veterinary Medical Officers in the commissioned corps of the U.S. Public Health Service are now eligible for retirement. Since September 11, 2001, the need for security against bioterrorism/agroterrorism has become a major focus requiring a substantial influx of these professionals. The field of wildlife health is also predicted to grow, with veterinarians from public and private agencies called upon to provide both preventive and restorative services.

### ***Specialization***

Public attitudes concerning the importance of animals to human health and well-being are changing. Demand for increasing sophistication in diagnoses and treatments has served as a stimulus for specialization in a variety of disciplines. In addition, increased emphasis has been focused in a growing number of specialty areas similar to those in human health, as illustrated in Figure 2.

## **VETERINARY MEDICAL EDUCATION**

Significant changes in the educational requirements for veterinary medicine have occurred over the years, with additional changes anticipated as the profession moves into the 21st century. Influencing these changes have been major advances in veterinary science and technology; growing societal expectations regarding the quality and efficacy of veterinary services; a significant overall growth in demand for services; the increasing need for public practice veterinarians to ensure healthy food from healthy animals and protect against bioterrorism/agroterrorism and the desire to protect the ecosystem balance and environmental health.

Currently, there are 28 accredited schools of veterinary medicine in the U.S. graduating about 2,400 students per year, with 9,600 students enrolled across a four-year educational program. Upon graduation, students acquire a Doctor of Veterinary Medicine (DVM) degree. New veterinary graduates may engage in private clinical practice or become employees of the government (U.S. or State) as public practice veterinarians, wildlife health specialists, meat and poultry inspectors, disease control workers, or commissioned officers in the U.S. Public Health Service or the military. New graduates may also enter internships and residencies at veterinary medicine colleges or private and public veterinary practices.

### ***Post-Doctoral Training***

Post-doctoral veterinary training is not required before beginning practice. However, many internships and residency programs are available as an increasing number of new veterinarians are interested in improving their clinical skills, achieving advanced qualifications, or gaining specialty certification. Veterinarians who seek specialty board certification in one of the 20 specialties must complete 2-to-5- year residency programs and pass a board certification examination. Graduate academic programs that lead to masters (M.S.) and/or doctoral (Ph.D) degrees are also available to prepare individuals primarily for careers in academia (teaching and research).

Residency programs currently exist at nearly every accredited veterinary college in the US and Canada. While demand for specialty services has increased significantly, there has been little growth for two decades in the capacity of programs to train veterinary specialists. As a result, only a small percentage of veterinary school

graduates (5-10%) complete a formal residency program. Veterinary schools and colleges now compete with private practice in their efforts to recruit veterinarians to join their faculty resulting in an insufficient number of specialists to fill all of the available faculty positions. Academic veterinary medicine at the national and state level is not competing well with respect to recruitment and retention of faculty due to small candidate pools and salary limitations. Recruitment of faculty to fill available positions at the UC Davis School of Veterinary Medicine has been extremely difficult. For example, positions have remained vacant for many years in radiology (3 years), oncology (5 years), ophthalmology (5 years), molecular pathology (4 years), lab animal pathology (5 years), and small animal orthopedic surgery (3 years). Many of these teaching, research, and service needs will go unmet without an infusion of veterinary specialists training positions as an estimated 38% of veterinary faculty nationwide is expected to retire within the next 10 years.

### **Licensure**

Graduate veterinarians must acquire a license issued by the state in which they plan to work before they can engage in clinical practice. A license is granted only to veterinarians who pass a state's licensing examination. Licensure of California veterinarians is administered by the Board of Veterinary Medical Examiners (BVME) under the auspices of the Department of Consumer Affairs. To acquire a California license, the BVME requires that an applicant graduate from an AVMA-accredited veterinary college or school, and pass three examinations - the National Board Examination (NBE), the California State Board Examination (SBE), and the Clinical Competency Test (CCT).

A California veterinary license allows the holder to practice veterinary medicine on any species of animal, as long as that activity meets the community standard of care. The NBE, the SBE, and the CCT cover essentially all of the common domestic species and some exotic species. According to the BVME, the subject areas covered by the SBE roughly parallel the distribution of species and/or economic importance of species in California. In recent years, for example, the SBE has covered dogs and cats (45%); cattle (26%); and horses (15%). The remaining 14% of the examination covers all other species, including birds, poultry, sheep, goats, swine, laboratory animals, and exotic species.

### **Senate Bill 2003**

In February 1998, the California State Legislature introduced Senate Bill 2003 to provide improved access to California licensure for veterinarians already licensed in other states. The bill was signed by the Governor on September 30, 1998, and took effect on January 1, 1999. The measure amends the Business and Professions Code [Section 4848], as follows:

*...the board shall waive the examination requirements of subdivision (a), and issue a temporary license valid for one year to an applicant to practice veterinary medicine under the supervision of another licensed California veterinarian in good standing, if the applicant meets all of the following requirements and would not be denied issuance of a license by any other provision of this code.... The applicant holds a current valid license in good standing in another state, Canadian province, or United States territory and has practiced clinical veterinary medicine for a minimum of four years full time within the five years immediately preceding filing an application for licensure in this state....*

According to the California Veterinary Medical Board, approximately 75 veterinarians annually gain a license to practice in California through this process of reciprocity. The overall impact of this pathway for veterinarians to enter practice in California has not been significant within the context of growing state workforce needs, however.

## VETERINARY MEDICAL EDUCATION IN CALIFORNIA

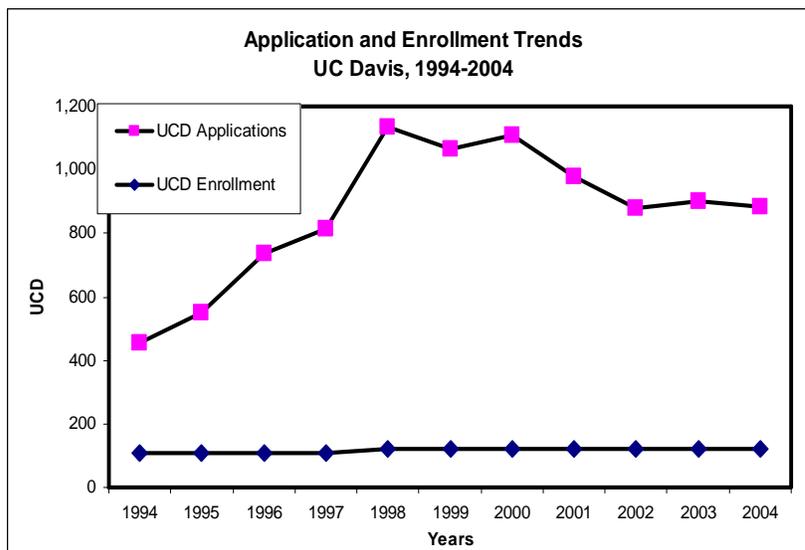
As California's population grows, the limited opportunities for a veterinary education have become increasingly competitive. There are two schools of veterinary medicine in California: the University of California Davis (UCD) and the Western University of Health Sciences (WUHS), which admitted its first class in Fall 2003 (Figure 3). There are approximately 570 DVM students enrolled in these programs.

Schools	DEGREES OFFERED				
	DVM	MS	PhD	Master of Preventive Vet. Med	MPH
UCD	x	x	x	X	x
WUHS	x				

**Figure 3: California School Degree Offerings**

### *Veterinary Medical School Application and Enrollment Trends in California*

In California, the UCD School of Veterinary Medicine accepts 122 applicants each year from an applicant pool of approximately 900. The School increased its class size from 108 in 1998 with a budget augmentation that recognized the shortfall of veterinary graduates available to meet state needs (Figure 4). At that time, the School's facilities could not accommodate the full class size and it was agreed to increase the class size to 122 until expanded teaching facilities could be completed to accommodate the approved class size of 131. The teaching facilities are under construction and are expected to be completed in 2006.



**Figure 4: Applicant and Enrollment Trends for California**

### *UC Davis*

Under the State Master Plan for Higher Education, the University of California is delegated exclusive responsibility in public higher education for the training of Doctors of Veterinary Medicine in California. UCD is home to the only School of Veterinary Medicine (SVM) in the UC system. Established in 1948, the UCD SVM is recognized nationally for its training and research programs in animal health, comparative medicine, and veterinary science. The SVM plays a central role in meeting California's veterinary workforce needs, with an estimated 75% of its annual graduates electing to practice in the state. The professional curriculum offered

by the UCD SVM is a rigorous and intensive four-year program of study that prepares the student to pursue diverse career opportunities in veterinary medicine.

### *UCD Curriculum*

The curriculum is divided into three main components: the core curriculum, the elective curriculum, and the senior clinical track curriculum. The core curriculum consists of formal lecture and laboratory coursework taken by all students. Coursework in the biological sciences forms the foundation of veterinary medicine and introduces fundamental principles that define the normal structure, function, and integrated processes within animal systems. Development of a strong foundation in the biological sciences is followed by coursework focusing on abnormal structure, function, and processes. Courses in pathology, medicine, surgery, and hospital practices are also included.

The elective curriculum is offered to students starting in the winter quarter of their first year. Students may select a certain number of elective courses to complement their core education and expand their educational interests. Elective course offerings span a wide range of subjects from dentistry and physiology, to equine and llama medicine and handling, behavioral therapy, food animal production medicine and herd health, principles of avian sciences, and companion animal and ruminant nutrition to name a few. In the third year, students select increasingly species-specific courses with clinical emphasis in medicine, surgery, pharmacology, anesthesia, reproduction, ophthalmology, and radiology.

The senior clinical track curriculum comprises eight options, which include: mixed animal, small animal, large animal, equine, food animal, zoological medicine, small animal/equine and small/food animal tracks. During the fourth year of instruction, students participate in core and elective clinical rotations, which vary with each track.

### *UCD Enrollment Capacity*

In September 1998, the SVM received a permanent annual budget augmentation of \$2.5 million, beginning in fiscal year 1998-1999, which was used to fund a modest level of enrollment expansion. This expansion was to be phased in over the last several years. As planned, this augmentation was used to support:

[1] an increase in the enrollment of DVM students by a total of 23 students per class per year, to a total class size of 131 students per year. The funding allowed the SVM to restore its class size to its previous 122 students per class per year level, which had been reduced due to budget cuts in the early 1990's. The remaining 9 students per class, for an eventual total of 131 per class, will be phased in to coincide with the completion of the instructional facility currently under construction, which is expected by Fall 2006. Forward funding for expansion of the DVM student program was approved to enable the campus to address current accreditation concerns and recruit new faculty.

[2] an increase in the enrollment of DVM specialty residents by an additional 30 trainees, for a total resident enrollment of 90 trainees across all years of training. Expansion of the resident programs began immediately and included several positions in southern California.

[3] administrative and technical needs to establish a veterinary presence in southern California. The UC Veterinary Medical Center – San Diego was established in 1999 and includes both a clinical program in Rancho Santa Fe, a comparative medicine research program at UC San Diego (UCSD) in concert with the UCSD School of Medicine, and a resident training program with the Zoological Society of San Diego (Zoo, Wild Animal Park and Sea World). The clinical program currently offers training in companion animal behavior and

companion animal hemodialysis; training in clinical nutrition is being developed and outside funding is being cultivated.

When this expansion is achieved and the DVM programs are fully enrolled, veterinary medicine student fees will have increased, new instructional facilities will be in place to accommodate a larger class size, and new faculty members will have been recruited.

### ***The Western University of the Health Sciences***

In response to perceived workforce needs, a Task Force was established by Western University of Health Sciences in 1997 in collaboration with the California State Polytechnic University, Pomona. This group was convened to consider the feasibility of establishing a southern California-based veterinary medical training program, due to a general consensus within the Task Force that there are untapped career opportunities for veterinarians and that the supply of veterinarians did not appear to be meeting the employment demand. The Task Force report described the historic role of the UCD SVM in meeting statewide workforce needs and acknowledged that the University was considering possible expansion of its SVM class.

Since then, the WUHS Board of Trustees voted to move forward and a new Dean was hired to guide the process of establishing a new college of veterinary medicine based in southern California. The program is primarily one of instruction, with emphasis on the education of entry-level veterinarians. WUHS contracts with private practitioners to provide clinical training for their veterinary students. The School recently announced a collaborative effort with CSU Pomona to build a modest veterinary hospital.

At full operation, the WUHS proposed a class size of approximately 90 students per year. The School admitted its Charter class of 85 students in the Fall of 2003. Each class is to be selected among applicants from throughout the United States and foreign countries. Planning documents indicate that although the WUHS program intends to offer a small graduate-instructor program, there are no plans to develop intern or residency programs.

### *WUHS Curriculum*

The DVM curriculum at WUHS, like that at UCD, is divided into three phases. Phase I (years 1 and 2) of the curriculum emphasizes the basic sciences as they apply to veterinary medicine and provides an introduction to veterinary clinical work. Phase II (year 3) involves the students assuming the role of “apprentice veterinarian.” Phase III (year 4) allows students to progress in their role as “apprentice” in select areas of veterinary medicine important to their chosen career direction.

## **STRENGTHS OF THE UC SCHOOL OF VETERINARY MEDICINE**

UCD SVM has influenced the transformation of veterinary medicine from a primarily livestock-oriented health profession to one that encompasses stewardship of all animal species. This has been accomplished in large part through the vision, leadership, and collegiality of the School’s faculty.

Over more than 50 years, the School has encouraged growth and exploration of new areas, capitalizing on individual and collective faculty interests to develop pragmatic solutions for critical problems facing animal health and welfare. Research is critical for the development of new knowledge, and UCD’s faculty set the trend in veterinary medicine by generating new information and technology for the profession. Practitioners and public health professionals rely on this new information and its application directly to improve animal health and protect human health. The School’s animal, human, and environmental programs span the state

and serve as an essential component of California's health workforce. The key to ensuring the future health of animals and people is to identify specific areas for action. The School has identified the following areas to concentrate their efforts and promote the greatest potential for significant impact.

#### *Animal Health and Care*

As the primary animal health resource for the State of California, the School's responsibilities to protect animal health and improve animal care are paramount. Animals are woven into the fabric of people's lives as pets, food, economic livelihood, recreation, and wildlife appreciation. The role of pets, including the human-animal bond, has dramatically increased. In the U.S., 63% of households have pets and 37% of pet owners consider their pets important family members. The public demand for readily accessible, sophisticated veterinary care increases each year.

#### *Food Safety and Public Health*

Food-borne illnesses affect 1.5 billion people annually and cause over 3 million deaths worldwide. The prevalence of these illnesses associated with culturally prepared foods and practices is also increasing. Examples include *Listeria* outbreaks caused by the consumption of soft cheeses made with unpasteurized milk and *Brucella melitensis* which is present in unpasteurized dairy products from goats. The practice by some ethnic groups of consuming animal brains as a food delicacy has also been linked to human illness as in the case of Bovine Spongiform Encephalopathy [BSE] found in cattle brains, which causes variant Creutzfeldt-Jacob in people. Veterinary medicine is the only profession that spans the food chain from farm-to-fork. Veterinary medicine is the profession that links agriculture and human health. The SVM is the main source of information and health services for animals in production units, the inspectors in processing plants, and the public health officials for inspection of food preparation operations in California. In the event of a food-borne disease outbreak, veterinarians are key to tracing the source and working with state and federal officials to control/contain it. Veterinarians in the field and in the School's research laboratory are key to protecting the safety of food products.

#### *Environmental Health*

All humans and animals depend upon a healthy environment and society is deeply concerned about its health-- land, air, water, and the plant and animal inhabitants. Humans must serve as stewards of the environment as humans have had the greatest impact on changing the delicate balance of our ecosystems. Veterinarians and UCD faculty bridge the human, animal and environmental arenas. They understand the impacts of encroaching human populations on wildlife; the transmission of current and emerging diseases from animals to humans; the contamination of human and animal waste on land and water resources; the impact of chemicals used for agricultural pest control; and the effect of diminishing air quality from emissions associated from livestock production units and vehicles. Human medical personnel, wildlife conservationists, and stewards of public lands require veterinary expertise to provide the comprehensive health assessment, solutions, and future management strategies to preserve environmental health.

#### *Future Veterinary and Human Health Research*

Research on animal and human health issues is the pathway to improved health - new treatments, new pharmaceutical options, new nutritional regimens, new surgical techniques, etc. Many research endeavors benefit both animals and humans, but veterinary research is dependent upon the advanced training of veterinarians in research principles. UC is dedicated to the advancement of research and graduate student education. UC SVM has the largest graduate academic program among all of the veterinary schools and

colleges nationwide and consistently ranks as one of the top two U.S. veterinary schools training future faculty. To meet this academic demand, efforts are needed to increase the number of veterinary graduate academic students in the educational pipeline.

#### *Development of Advanced Clinical Specialists*

Society demands advanced clinical specialists to treat their animals. Veterinary practice has evolved to a tiered system of health care to include the general practitioner and the specialty practitioner. UCD has led the development of emerging specialty disciplines and continues to work at the cutting edge to recognize the need, develop the discipline, define the standard, and train the specialists. Since 1996, 31% of the residents who graduate from UCD's specialty programs also completed their DVM degree at UCD.

## **CHALLENGES FOR THE UC SCHOOL OF VETERINARY MEDICINE**

#### *Demand for Veterinary Services is Greater than the Supply of Veterinary Professionals*

As previously discussed, the projected population of California by the year 2020 is 44 million. California's current veterinary services average of 17:100,000 is insufficient for addressing the demands for more sophisticated veterinary care from animal owners, high quality food animal health, safe food, and diagnostic support from livestock producers. California's current supply of veterinarians is only 63% of the national average, which underscores the need to increase the supply of veterinarians. The national average of 27:100,000 is considered the minimum needed in California. To reach the national average, and acknowledging a 2.78% retirement rate, would require 725 new California veterinarians each year. The sources of new veterinarians per year include:

- 131 = UCD SVM graduates each year when class size fully implemented (expected in 2010)
- 90 = WUHS graduates each year (expected in 2007)
- 229 = New graduates from out of state veterinary schools
- 75 = Average number of practicing veterinarians obtaining a CA license through reciprocity (SB 2003)
- 200** = Estimated shortfall to meet the national average
- 725 = Required new veterinarians each year

#### *Demand for Specialty Services is Increasing*

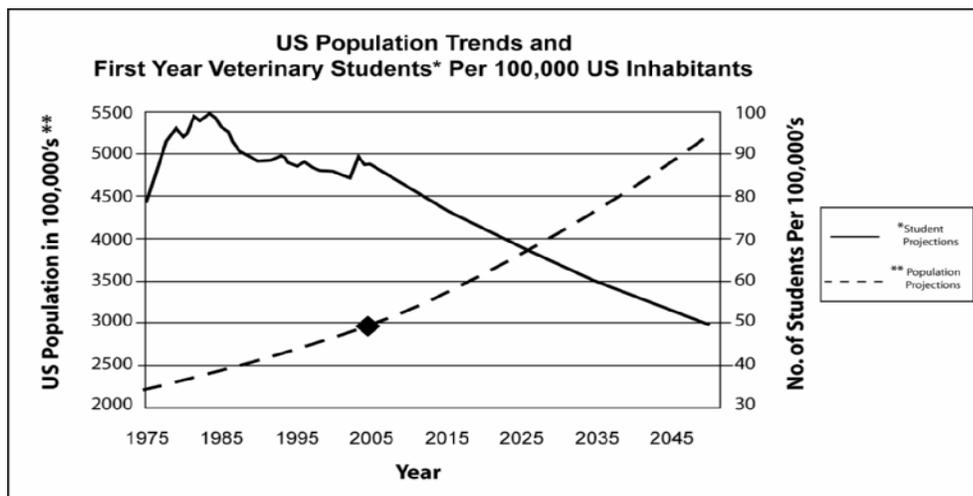
The School is the largest producer of specialists in the country - training 90 residents, 30 of whom graduate each year. The residency program spans 28 different disciplines and includes resident positions at the Veterinary Medical Teaching and Research Center in Tulare and at the UC Veterinary Medical Center at San Diego. Nationally, there are only 565 resident positions, one-third of which graduate each year, to meet the increasing demand for veterinary specialists. Although the number of resident positions has doubled in the last ten years, specialists still represent a small fraction of the profession. In California, only 15% of the veterinarians are trained as specialists. From this pool, the academic community seeks to draw potential new faculty, industry and biotech enterprises draw experts, and the public draws veterinary specialists. According to UCD faculty, specialists should make up closer to 20% of the veterinarians in California and the nation. For California alone, this need conservatively translates into a minimum of 50-75 new specialists per year. Increased residency positions in surgery, radiology, neurology, oncology, radiation oncology, dermatology, and ophthalmology represent the specialty programs most needed to address the state's current specialty shortages.

### *Recruitment of Faculty and Researchers is Difficult*

The veterinary profession is growing into new areas and disciplines at a rapid rate at the same time a significant proportion (an estimated 38%) of the veterinary faculty nationwide is expected to retire within the next 10 years. These factors hamper the ability of UCD DVMs to meet the demand for new faculty and researchers in the areas of public health, environmental health, food safety, genomics, and many of the clinical and basic sciences. Recruitment of veterinary faculty is already highly competitive as the number of veterinary graduate students in the pipeline is limited and not keeping pace with demand or addressing new and emerging disciplines. For the School to continue to successfully compete for new faculty and to maintain its leadership position within the profession, more graduate academic training positions for veterinarians must be created.

### *Access for a Veterinary Education in California is Severely Limited*

By the year 2020, California's population is expected to be 44 million, resulting in an estimated 1:199,134 training positions per population ratio. Although this ratio reflects the addition of WUHS, Californians are still substantially disadvantaged in their ability to obtain a veterinary medical education in the state. There is no unemployment or oversupply of veterinarians in California. In fact, all California graduates and veterinarians licensed in California each year are employed and the demand for veterinarians is not being adequately met. The University of California has a responsibility to provide reasonable access to a veterinary education for its citizens, especially in light of society's demands for a professional education and access to veterinary services.



\* First year students enrolled in an accredited college or school of veterinary medicine in the United States  
\*\* Population data and projections from US Census Bureau  
Diamond represents current US population in 2004 (293 million).

**Figure 5: U.S. Population Trends and First-Year Veterinary Student Enrollment**

### *Student and Faculty Diversity is Inadequate*

The veterinary profession as a whole lacks the diversity desired to reflect the ethnic and cultural groups of California's population. While efforts are being made to address this issue, progress has been slow. In 2004, approximately 24% of the SVM's entering freshman class are ethnic minorities. However, among minority freshman, only 5% are underrepresented minorities (African Americans, Latinos, and Native Americans). Greater diversity has been accomplished through the continued recruitment and encouragement of students

from all ethnic and cultural backgrounds. While the majority of freshman veterinary students across the country are now women, more ethnic and cultural diversity among students is needed. One impediment to this goal is the lack of role models in veterinary practice and among the faculty to encourage students to pursue veterinary medicine as a career.

## FINDINGS

### **1. Demand for veterinary services in California is growing rapidly and is expected to increase significantly as the state's population grows.**

- The demand for sophisticated veterinary services is greater as pets are increasingly regarded as family members by growing numbers of owners.
- The demand for more public practice veterinarians to ensure the health of food animals, the safety of food, and public health from new and emerging zoonotic diseases is growing too rapidly for current educational systems to supply adequate numbers of practitioners.
- The current and future demand for veterinary faculty replacements requires a pipeline of veterinarians seeking advanced residency training and/or graduate education. The profession is expanding into new areas and disciplines at a rapid rate at a time when a significant proportion (approximately 38%) of veterinary faculty nationwide is expected to retire (within the next 10 years).
- In the aftermath of September 11, 2001, there is a critical need for more veterinary professionals to support U.S. animal agriculture industries and to collaborate with public health systems in the event of an accidental or intentional animal disease outbreak.

### **2. The supply of practicing veterinarians in California has not kept pace with the increased demand for services.** The relative growth in the number of California veterinarians (about 1% per annum) ranks 49<sup>th</sup> in the nation. There are an estimated 5,860 practicing veterinarians in California where there are approximately 17 veterinarians per 100,000 population, compared with the national average of 27 per 100,000 population. Los Angeles County, with nearly 30% of the state's population, has a ratio of less than 10 veterinarians per 100,000.

### **3. Opportunities to obtain a veterinary education in California are severely limited.** Under the state's Master Plan for Higher Education, the University of California is delegated exclusive responsibility in public higher education for the training of Doctors of Veterinary Medicine (DVM) in California. The UC Davis School of Veterinary Medicine is recognized as among the nation's premier clinical, research, and training programs in veterinary science. However, opportunities for a veterinary medical education in California are among the lowest in the nation, with 1 DVM student per 262,295 population, compared with 1 per 115,763 nationally.

### **4. Recruitment of faculty is increasingly difficult.** Academic veterinary medicine at the state and national levels is not competing well due to insufficient training opportunities, small candidate pools, inability to maintain competitive faculty salaries, and rising California housing costs. Key faculty positions in select specialties have already gone unfilled for up to 5 years. An estimated 38% of veterinary faculty nationwide is expected to retire within the next 10 years.

5. **The veterinary workforce, students, and faculty do not reflect the ethnic diversity of California.** The need for URM veterinarians continues to grow as the state's population becomes increasingly diverse. Greater diversity is critical not only from the perspective of educational opportunity but also relative to food safety and public health. The prevalence of food-borne illnesses associated with culturally prepared foods and practices is growing, making cultural competence among veterinary professionals and faculty a necessity. In addition, the changing economic status of diverse populations impacts the need for a diverse veterinary workforce as the population of pet owners is becoming more ethnically diverse in California.

## RECOMMENDATIONS

1. **Initiate plans for sufficient growth to ensure that California's veterinary workforce remains nationally competitive in both numbers and quality.** Once the educational facilities at UCD are complete in 2006, faculty and funding should be provided to increase the DVM class size from 131 students per class up to 160 DVM students per class (29 additional students per year).
2. **Capitalize on the investments in faculty expertise to expand the UCD SVM Resident Training Program, which is competitive and highly regarded.** Because this unique program offers training in 28 different specialties, UCD SVM could make a significant impact on the demand for more advanced trained veterinarians for private speciality practice, academia, and industry career paths. An increase in resident training positions would directly benefit faculty recruitment efforts by providing an increased number of veterinarians with specialty training. Faculty, facilities, and support should be committed to increase the number of resident positions by 60 additional residency positions, from 90 students to a total of 150 residents (approximately 20 additional students per year). Increased enrollment in surgery, radiology, neurology, oncology, radiation oncology, dermatology, and ophthalmology is needed.
3. **Expand the graduate academic education program in recognition of the more than 300 zoonotic diseases (transmitted between animals and humans) and new emerging diseases that threaten animal and human health.** Veterinarians trained in research practices and involved in research investigations are vital to the identification and control of these diseases. Collaborations with medical and public health personnel are often not publicly recognized but are key to the future health and well-being in the face of disease outbreaks. Training these individuals for public service careers should be a priority for the University of California. Individuals with this training will also form the recruitment pools to fill the faculty ranks of the future and the anticipated vacancies due to impending retirements. Faculty, facilities, and funding should be committed to support an increase in SVM graduate student positions from the current enrollment of 137 graduate students by 83 additional positions for a total of 220 students (approximately 20 additional students per year).
4. **Fully fund and reevaluate the salary scales for the veterinary faculty's Strict Full Time salary plan and assess possible new alternatives for ensuring competitive faculty salary scales.** To retain current faculty and be competitive in the recruitment of new faculty, an increase in the salary compensation plan is needed. The level of additional compensation above the current campus base salary should be reevaluated along with the amount of support needed to fund this increase. The Strict Full Time salary plan was implemented over 35 years ago in recognition of marketplace compensation. The conditions of the salary plan maintain 100% of the faculty's effort on teaching, research and service activities. Although this plan has served the School well over time, multi-year budget cuts, together with salary offers from other employers that UC cannot match, have created a major, unresolved challenge in recruiting and retaining quality faculty.

- 5. Begin planning and assess the feasibility of establishing a second comprehensive veterinary medicine program or school.** One option for meeting the growing demands for veterinary services exists through the UC Veterinary Medicine Center-San Diego (UCVMC-SD), a joint initiative between the UCD SVM and UCSD. The UCVMC-SD includes teaching, research and service in the Division of Comparative Pathology and Medicine, the Laboratory Animal Medicine program, the San Diego Zoological Society, the Navy Marine Mammal Program, Sea World/ Hubbs Research Institute, and the UCSD Scripps Institution of Oceanography. Clinical programs in Behavior and Renal Medicine/Hemodialysis include advanced specialty training at an off-site clinical facility. The UCSD Laboratory Animal Medicine program has 26 acres assigned at the UCSD Elliott Field Research Station. Additional acreage zoned for animal use to expand the veterinary clinical, teaching, diagnostic, and research facilities has already been proposed. The UCVMC-SD along with the UCSD Schools of Medicine and Pharmacy offer strengths that could also be utilized to expand veterinary education in southern California. Independent of site, however, workforce projections support the need for a comprehensive program to address anticipated shortfalls of approximately 200 veterinarians annually. If UC were to meet about half of this need, funding to support facilities and faculty to train an additional 400 DVM students (100 students per year) would be required. To fulfill the University's long-standing role in preparing future faculty, an additional enrollment of 90 residents (30 students per year), and 120 graduate students (30 students per year) would be appropriate. Planning to develop and support a comprehensive new program at the above enrollment levels is recommended.
  
- 6. Increase the ethnic diversity of the faculty and student body.** Develop and support new efforts to diversify and recruit students and faculty from diverse communities. Develop and participate in academic preparation/outreach programs to high school and undergraduate students. Consider new "pipeline" initiatives similar to those supported by other UC health professions schools, including minority mentoring initiatives that address the lack of role models in veterinary practice and among the faculty to encourage students to pursue veterinary medicine as a career.

## REFERENCES

1. American Veterinary Medical Association (AVMA), "Vet Med Today; Facts and Figures: Employment and Age of Male and Female AVMA Members, 2003," JAVMA 225, no. 6 (2004): 876- 877.
2. American Veterinary Medical Association (AVMA). Roles of Veterinarians in Human and Animal Health. Available from: <http://www.avma.org/careforanimals/animatedjourneys/aboutvets/roles.asp> [cited: 2004, July 9].
3. AVMA.What is a Veterinarian? Available from: <http://avma.org/careforanimals/animatedjourneys/aboutvets/aboutvets.asp> [cited: 2004, July 9].
4. AVMA. The Veterinary Health Care Team. Available from: [http://www.avma.org/communications/brochures/health\\_care/health\\_carefaq.asp](http://www.avma.org/communications/brochures/health_care/health_carefaq.asp) [cited: 2004, July 9].
5. AVMA. Veterinary Education: Veterinary Colleges Accredited by the AVMA. Available from: <http://www.avma.org/careforanimals/animatedjourneys/aboutvets/vetschools.asp>. [cited: 2004, July 9].
6. AVMA. Employment Outlook. Available from: <http://www.avma.org/careforanimals/animatedjourneys/aboutvets/employment.asp>. [cited: 2004, July 9].
7. AVMA. JAVMA News. The Face of the Veterinary Profession. May 15, 2003. Available from: <http://www.avma.org/onlnews/javma/may03/030515e.asp>. [cited: 2004, Aug. 25].
8. AVMA. JAVMA News. Town Hall Meeting Surveys Diversity in the Profession. May 1, 2004. Available from: <http://www.avma.org/onlnews/javma/may04/040501e.asp>. [cited: 2004, Aug. 25].
9. AVMA. Veterinary Education: School Statistics. Available from: <http://www.avma.org/careforanimals/animatedjourneys/aboutvets/education.asp>. [cited: 2004, July 9].
10. Western University College of Veterinary Medicine. About the College. Available from: <http://www.westernu.edu/veterinary/about.xml> [cited: 2004, July 9].
11. AVMA Council on Education, Accreditation Policies and Procedures. August 1996.
12. American Veterinary Medical Association (AVMA) Directory. Schaumburg, Illinois: American Veterinary Medical Association, 1998.
13. Center for Information Management, American Veterinary Medical Association, The U.S. Livestock Market for Veterinary Medical Services and Products. Schaumburg, Illinois: American Veterinary Medical Association, 1995.
14. Center for Information Management, American Veterinary Medical Association, U.S. Pet Ownership and Demographics Source Book. Schaumburg, Illinois: American Veterinary Medical Association, 1997.
15. Center for Information Management, American Veterinary Medical Association, Veterinary Demographic Annual Reports, Volume 5, Part 1: Demographic Distribution and Employment Trends in the U.S. Veterinary Medical Profession. Schaumburg, Illinois: American Veterinary Medical Association, 1996.
16. Center for Information Management, American Veterinary Medical Association, Veterinary Demographic Annual Reports, Volume 5, Part 2: Demographic Distribution and Employment Trends in the U.S. Veterinary Medical Profession by Primary Employment. Schaumburg, Illinois: American Veterinary Medical Association, 1996.
17. Center for Information Management, American Veterinary Medical Association, Veterinary Demographic Annual Reports, Volume 5, Part 4: Demographic Distribution and Employment Trends in the U.S. Veterinary Medical Profession by State. Schaumburg, Illinois: American Veterinary Medical Association, 1996.
18. Kass, Philip A., Veterinary Medicine in California: Demographics, Trends and Educational Opportunities, UCD, Davis, 1998.
19. The Pew National Veterinary Education Program, Future Directions for Veterinary Medicine. December 1988.
20. Pritchard and Stone, Healthy America: Practitioners for 2005. A Beginning Dialogue for U.S. Schools of Veterinary Medicine. (A report of the Pew Health Professions Commission), 1991.
21. State of California, California Agriculture Resource Directory, 1997.
22. State of California, Consumer Affairs Information Services: California Board of Veterinary Medical Examiners, 1997.
23. State of California, Projected Total Population of California Counties: 1990 to 2040, Report 93. P-3. Sacramento, California, May 1993.
24. State of California, Department of Education, A Master Plan for Higher Education in California 1960-1975. Sacramento, 1960.
25. State of California, Department of Finance, Interim County Population Projections: Estimated July 1, 1996 and Projections for 2000, 2010, and 2020. Sacramento, 1997.

26. United States Census Bureau, "State Rankings, Doctors Per 100,000 Civilian Population," in 1996 Statistical Abstract of the United States, 1998.
  27. United States Census Bureau, "State Resident Population," in USA Statistics in Brief, 1998.
  28. Western Dairyman, April 1998, and California Milk Advisory Board (personal communication)
  29. Western University of Health Sciences, Veterinary Medicine Task Force Report. 1997.
- Veterinary Medicine, References