A New Era of Growth:

A CLOSER LOOK AT RECENT TRENDS IN HEALTH PROFESSIONS EDUCATION

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UNIVERSITY OF CALIFORNIA

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I. BACKGROUND AND CONTEXT

California Demographics

California is the largest and most ethnically diverse state in the nation. Home to an estimated 37 million residents, the challenges linked to providing health care services are both complex and long-standing. Currently ranked as the 13th fastest growing state, California is expected to see a more than 22 percent increase in its population by 2015, ranging from nearly 10 percent growth in Los Angeles County to an estimated 40 percent increase in the Inland Empire.[1] According to the 2010 Census, of the state's residents, 40 percent are non-Hispanic white, 38 percent are Hispanic, 13 percent are Asian, 6 percent are African American, 3 percent are multiracial and approximately 1 percent are American Indian. More than 300 languages are now spoken in California public schools, creating further challenges in training a workforce that is both culturally and linguistically capable of meeting the health needs of its people.

Existing Health Workforce Challenges

California has existing shortages in many health professions and looming shortages in others. According to the Office of Statewide Health Planning and Development, 51 of 58 California counties have at least one federally designated health professional shortage area.[2] These statewide shortages are a result of growth and aging of the population, the relative absence of growth in California's public higher educational programs (in most health professions), historic reliance on "in-migration" of practitioners educated outside of the state, and the aging of the current health workforce (e.g., nearly 30 percent of California physicians are more than 60 years of age – a higher percentage than any other state in the nation).[3] Recent reports have identified current and projected shortages of physicians, nurses, public health professionals, veterinarians and other health personnel.[4] Across its existing workforce, California's health professionals are also geographically maldistributed, with abundant supplies in most affluent urban and suburban areas and shortages in many rural and inner-city communities.[5] Although research has found that clinicians from underrepresented minority groups are more likely to serve minority and economically disadvantaged communities, the diversity of California's health workforce falls far short of the public it serves.

Health Care Reform

Implementation of the Patient Protection and Affordable Care Act will have a substantial impact on California's demand for health services and will exacerbate existing workforce challenges. It is estimated that California has more than 8 million uninsured residents. Among these, an estimated 1.7 million to 3 million U.S. citizens and legal residents will become eligible for Medi-Cal (Medicaid) benefits in 2014. These changes will also result in significant increases in the demand for primary care providers, including primary care physicians, nurses, physician assistants and others. This increased demand will, in turn, drive demands for more services provided by pharmacists and other health care providers who contribute directly and substantially to the overall health care delivery system.[6]

II. RECENT TRENDS IN HEALTH PROFESSIONS EDUCATION

During the past decade, institutions of higher education across the United States have collectively witnessed a significant expansion of health sciences educational programs. This growth has occurred through expansion of enrollments in existing schools/programs, as well as through establishment of new ones. In addition to growth involving traditional educational models, recent trends include a proliferation of "new" educational models, substantial growth in for-profit programs and rapidly rising levels of student indebtedness.

This section provides a brief overview of these trends, including selected examples involving the major health professions offered by the University of California (dentistry, medicine, nursing, optometry, pharmacy, public health and veterinary medicine). In addition to the examples in this section, a "snapshot" providing additional information about enrollments, new schools, student fees and other details for each of the above professions is included as an appendix.

Rapid Growth in Educational Programs and Total Enrollment

The number of U.S. nonprofit (public and private) health professional schools has increased substantially over the past 10 to 15 years, with much of this growth occurring in recent years. Prior to 1987, for example, there were 72 U.S. pharmacy schools. This number and the total U.S. pharmacy student enrollment had been relatively constant for many years. Since 1995, however, there has been unprecedented growth in total U.S. pharmacy student enrollment. This growth has been a result of both expansion of existing programs and the establishment of new schools, including satellite pharmacy programs offered at new locations (e.g., at parent institutions that had not previously offered pharmacy education).[7] According to the Accreditation Council for Pharmacy Education (ACPE), in 2012 there were 129 schools with some formal level of accreditation status (e.g., full, candidate or pre-candidate status).[8] Since 2005 alone, the number of accredited pharmacy schools has grown from a total of 87[9] to 129 schools (a 48 percent increase), with most of this growth occurring at private institutions.[10] Recent information suggests that at least two additional California institutions are now in serious discussions about opening new schools, either independently or in partnership with an existing school.[11]

Growth also has occurred in the number of new U.S. schools being established in other health professions. In allopathic medicine, the total number of U.S. medical schools had been relatively unchanged for decades, at roughly 125 schools. In fact, no new medical schools were established during the 1980s and 1990s.[12] Since 2000, more than 10 institutions have publicly announced their intent to establish new schools; others have explored the possibility and elected not to proceed.[13] As of February 2013, the Liaison Committee on Medical Education (LCME) had granted full, provisional or preliminary accreditation to 17 new medical schools, bringing the total number of U.S. medical schools to 141[14] (with an additional three schools identified as LCME "applicant" schools[15]). Significant among these new medical schools is the UC Riverside School of Medicine, which received preliminary accreditation from the LCME in October 2012, making it the first allopathic medical school to open in California in over 40 years. Still more striking, however, has been the extraordinary growth in the number of non-LCME accredited medical schools that have been established recently in the Caribbean. (See section entitled "Proliferation of For-Profit Schools and Programs" and the appendix for additional profession-specific information.)

The public health profession also has seen recent growth. In 2012, a total of 47 U.S. schools were accredited by the Council on Education for Public Health (CEPH)[16], which includes an increase of 10 new schools since 2007 (a 27 percent increase). An additional seven schools are "associate" members, which are programs or schools that intend to become fully accredited schools of public health through CEPH's formal review process. Optometry education has experienced a somewhat smaller increase in the number of new schools in the U.S., with 21 optometry schools in the U.S. with accreditation status (i.e., accredited or preliminary approval) by the Accreditation Council on Optometric Education (ACOE) in 2012[17], compared with 17 in 2007 (an increase of 23.5 percent).

Development of New Programs and Business Models

New Schools in Different Types of Institutions In pharmacy, the establishment of "new schools" is occurring in parent institutions that differ substantially from those of schools in operation before 1995. Very few of these new schools are located in research institutions (e.g., Carnegie Foundation Classification, Category I - Research/Doctoral Universities).[18] Dentistry has similarly experienced recent growth in the establishment of new schools at non-research institutions.

Proliferation of For-Profit Schools and Programs For-profit institutions have become a rapidly growing sector in higher education, with these entities representing an estimated 44 percent of the number of institutions in 2009-10. Examples of major for-profit institutions include Apollo Group Inc. (University of Phoenix), Education Management Corp., DeVry Inc. and Kaplan Inc.[19] Still more striking is the recent growth in enrollment at for-profit schools. According to a recent brief released by The Education Trust, "Subprime Opportunity: The Unfulfilled Promise of For-Profit Colleges and Universities," between 1998-99 and 2008-09, enrollment increased by 236 percent. By contrast, national growth in enrollment during the same period for public and private nonprofit institutions was 21 percent and 17 percent, respectively.[20]

Currently, the vast majority of for-profit schools offer associate's degrees and certificates requiring less than two years for completion. In 2008-09, the three programs with the highest levels of enrollment offered training for (1) medical/clinical assistants, (2) massage therapists and (3) dental assistants. In general, health-related training programs at for-profit schools have been largely for "support occupations" (i.e., those that provide assistance to practitioners).[21] More recently, however, new efforts have been launched by for-profit institutions to train more "advanced degree" health professionals. Examples include:

For-Profit Schools in the United States Rocky Vista University College of Osteopathic Medicine (RVUCOM) in Parker, Colo., is the nation's first for-profit medical school.[22] The college is accredited by the American Osteopathic Association Commission on Osteopathic College Accreditation.[23] RVUCOM accepted its first class of students in 2008 and graduated its inaugural class in 2012.[24] Palm Beach Medical College (PBMC) is also seeking accreditation and approval to grant medical degrees in Florida as an allopathic medical school. As of March 2010, PBMC had been granted "Applicant School" status by the LCME.[25] Other schools, such as the University of Phoenix, now also offer programs leading to baccalaureate, master's or doctoral degrees in nursing.

For-Profit Schools in the Caribbean The number of medical schools in the Caribbean has recently grown at a very rapid pace. Several of these schools operate as for-profit institutions whose primary purpose is to train U.S. and Canadian students who hope and intend to return to their home countries to practice.

As of June 2010, 56 medical schools located in the Caribbean were listed in the International Medical Education Directory (IMED), a directory of internationally recognized (but not necessarily accredited) medical schools. Over the past decade, five other previously listed IMED schools in the Caribbean have closed. According to a recent article in Academic Medicine, of the 61 schools previously listed, 22 (or 36 percent) admitted their first classes in the past decade. An additional 11 Caribbean medical schools are in various stages of development, either having submitted applications that have not yet met all IMED requirements or having not yet applied for IMED listing.[26] Many of these new for-profit medical schools do not own or operate clinical teaching sites (i.e., hospitals or clinics). As a result, many new schools are actively pursuing access to existing training sites that have limited capacity for training additional students. A number of for-profit schools are also now offering to pay for student placements, creating further tensions for established teaching programs that have not engaged in this practice or previously experienced this type of competition for training sites.

In veterinary medicine, the American Veterinary Medical Association's (AVMA) Council on Education has recently accredited two new schools in the Caribbean: Ross University (St. Kitts) and St. George's University (Grenada).[27] Another school in the Cayman Islands is also seeking AVMA accreditation.

Growth in Accelerated Programs/Alternate-Entry Programs One innovative approach that is gaining momentum and proving successful in attracting new students to the nursing profession is the accelerated degree program for non-nursing graduates. These programs build on prior educational experiences by offering a pathway for individuals with undergraduate degrees in other (non-nursing) disciplines to transition to nursing. Accelerated nursing programs are offered in 43 states plus the District of Columbia and Guam. In 2011, there were 244 accelerated baccalaureate programs and 63 accelerated master's programs available at nursing schools nationwide.[28] In California, a significant increase in the number of "Entry-Level Master's" (ELM) nursing programs has occurred. In 2010-11, there were 17 ELM programs in California, an increase from the five programs in operation in 2001. Although this represents a 240 percent increase in the number of programs, these programs are even larger in terms of total enrollment, collectively graduating 717 students in 2011, compared with only 102 in 2001, or a 600 percent increase during this period.[29]

Although widespread adoption of accelerated programs may present a challenge for some professions and/or for some students, there are increasing examples of new programs offering accelerated pathways. For example, the University of the Pacific is the only dental school in the country where students can complete the traditional four-year dental school curriculum in three calendar years.[30] In medicine, there are approximately 36 combined baccalaureate/M.D. programs where students typically enter as undergraduates and proceed straight through to medical school. While total program length is typically seven (rather than eight) years, some programs can be completed in only six years.[31] In 2012, Texas Tech University will enroll its first class of students in its new Family Medicine Accelerated Track (F-MAT) – a three-year medical education program that will prepare graduates for family medicine residencies at one of its three family medicine training programs in Texas.[32]

Increasing Numbers of Programs Delivering Education Using an Online Format Conventional "brick-and-mortar" universities are also moving into the delivery of online distance learning programs, either through new programs or expansion of existing offerings. According to the 2012 Survey of Online Learning, a collaborative effort between the Babson Survey Research Group and the College Board, more than 6.7 million

students were taking at least one online course in the fall of 2011, an increase of more than 500,000 students from the prior year. Thirty-two percent of all students in higher education now take at least one course online.[33] Currently, there are a number of accredited public health schools that offer distance learning opportunities and/or degree programs. For example, CEPH lists more than 70 online Master of Public Health (M.P.H.) programs that it has accredited, including one at UC Berkeley.[34] In addition to these programs, there has been growth in the number of for-profit online M.P.H. programs, with a number of these reportedly being unaccredited. In nursing, there are also examples of higher education institutions offering online degree programs, including the University of Northern Colorado (Greeley, Colo.), which offers an online Ph.D. program in Nursing Education; an online Post-Master's Doctor of Nursing Practice (D.N.P.) program; and an online option for registered nurses who are pursuing a baccalaureate degree.[35]

Growth in Professional Doctorates Over the past decade, the higher education community has witnessed the emergence of new "professional doctorates" in a number of fields. This trend has been driven by a variety of factors, ranging from growth in the depth of knowledge required for practice in a particular field (e.g., audiology), to changes in national requirements for program accreditation and changes in professional licensure standards. In some cases, however, the academic rationale for change is not entirely clear.

In some instances, growth has been fueled to a large extent by a professional organization's recommendations. For example, the American Association of Colleges of Nursing (AACN) has proposed that beginning in 2015, the D.N.P. replace the Master of Science in Nursing as the required degree for training advanced practice nurses. Specifically, this change would apply to nurse practitioners, clinical nurse specialists, nurse midwives and nurse anesthetists. In recent years, the overwhelming national trend across nursing programs is toward the creation of new D.N.P. programs, with 191 new programs established in the past six years, from 20 programs in 2006 to 211 in 2012 (a 950 percent increase). In addition, the AACN reports that many other programs are in various stages of planning to establish new D.N.P. programs. This is in contrast to the number of new research-focused nursing Ph.D. programs developed during the same period (a total nationwide increase of 26 programs).[36]

Similarly, the trend among educational institutions providing instruction in physical therapy has been to offer doctoral-level educational programs leading to the Doctor of Physical Therapy (D.P.T.). As of January 2013, 211 D.P.T. programs (99.5 percent) were accredited by the Commission on Accreditation in Physical Therapy Education (CAPTE), while only one program (less than 1 percent) was accredited at the master's level.[37] This rapid change is in sharp contrast to 87 percent of U.S. programs offered at the master's level in 2000.[38] In June 2000, the leadership of the national professional association endorsed "Vision 2020" – a statement for the profession for the next 20 years – which contained a clear reference to "doctors of physical therapy" and reflected support for the clinical doctorate as the first professional degree. Although the doctorate is not currently a mandatory requirement for accreditation, the national accrediting body will require all programs to offer the D.P.T. degree effective Dec. 31, 2015.[39]

Rising Student Costs and Indebtedness

In parallel with recent growth of new schools is the general upward trend of increased costs to health professional students, including those enrolled at public institutions. Between 2005 and 2010, for example, the five UC medical schools experienced a nearly 50 percent increase, on average, in the four-year "cost of attendance."[40] In 2012-13, total charges (including health insurance) for California residents to attend a UC medical school were more than $34,000.[41]

While total charges to students attending health professional schools vary depending on the institution, the major categories include: Tuition (out-of-state-resident tuition, if applicable); Student Services Fees; Professional Degree Supplemental Tuition; and Campus-based Fees (e.g., facility fees, mandatory student association fees, etc.). Other charges for required course materials and health insurance are increasingly common. These charges exclude other expenses such as room and board, transportation, miscellaneous, and general books/supplies, which add substantially to the total cost of attendance for students.

In veterinary medicine, the average educational debt of graduates (excluding undergraduate loans) at UC Davis rose from $29,770 in 1993 to $118,772 in 2011 – a nearly 300 percent increase.[42] In the past decade, the rate of fee increases has rapidly outpaced the increases in entry-level salaries that new graduates could expect to earn (i.e., graduates are experiencing an increasing debt-to-salary ratio). According to the AVMA, the mean first-year starting salary of 2012 U.S. graduates (excluding those pursuing advanced education) was $65,404.[43] These and other issues related to educational debt and entry-level salaries are of increasing concern for the profession and may likewise apply for other health professions.

Recent Growth in the Health Professions

Number of Schools and Estimated Enrollment^

HEALTH PROFESSION	NUMBER OF SCHOOLS+				ESTIMATED TOTAL ENROLLMENT			
	U.S.		CA		U.S.		CA	
	2007	2012	2007	2012	2007	2011	2007	2011
Dentistry	56	63	5	6	17,800	20,352^^	2,200	2,466^^
Medicine (M.D.)	126	141	8	9	74,519	82,067**	4,300	5,111**
Medicine (D.O.)	20	29	2	2	15,586	20,663**	1,175	1,548**
Nursing: Pre-Licensure			132	142*			22,524	25,670**
Nursing: Post-Licensure (Master's Program)	330	485*	29	36^^	62,451	94,480	3,989	4,557
Nursing: Post-Licensure (Ph.D. Program)	111	129	5	6	3,982	5,110**	291++	567++
Nursing: Post-Licensure (D.N.P. Program)	53	211	1	9	1,874	11,575**	291++	567++
Optometry	17	21	2	3	5,672	6,289	625	911
Pharmacy	87	129^^^	7	8	42,000	58,915	3,028	3,677
Public Health	37	47	4	4	19,000	28,443	2,113	1,948~
Veterinary Medicine	28	28	2	2	9,600	11,213	883	932
Total	865	1,283	197	227	252,484	339,107	41,128	47,387

^ 2012 refers to the 2012-13 academic year. See the Appendix for additional information for each of the above major professions.

+ For the nursing profession, the number listed represents "programs" (not schools). Only California information presented for pre-licensure programs.

^^ 2010-11 data

* 2011-12 data

** 2012-13

++ The California Board of Registered Nursing (BRN) receives data on California doctoral enrollments. They are unable to distinguish which enrollments are from Ph.D. versus D.N.P. programs. This number thus represents combined Ph.D. and D.N.P. student census data.

~ Enrollment at California's schools of public health show a slight decrease in total enrollment from 2007 to 2011 as enrollment at all four institutions decreased over this period.

^^^ With accreditation status

III. CHALLENGES, ISSUES AND RAMIFICATIONS OF GROWTH

Notwithstanding recent increases in enrollment and establishment of new schools, workforce shortages persist in many health professions, including medicine, public health and others. For some professions, however, recent growth appears to have surpassed current workforce projections. Pharmacy, for example, has experienced such rapid growth in new schools and total enrollment that recent estimates suggest a total national supply of pharmacists that may outpace future demand.[44]

Beyond pharmacy, and whether through increases in class size or through creation of new schools, recent growth and changes in business and educational models have created further challenges for higher education. For both established and new programs, these challenges will increase as health reform occurs and as educational institutions are pressured to train increased numbers of providers to meet future needs. Further concerns and as-yet unanswered questions also have been raised regarding the ramifications of increasing enrollments in unaccredited programs (e.g., many of the new medical schools in the Caribbean) and in for-profit programs in the U.S. that rely heavily on federal financial aid, yet are showing troubling signs in terms of student success, indebtedness and rates of default on student loans.

Challenges for Established Institutions and Programs

Recent trends in health professions education and associated responsibilities for educating a well-qualified workforce will create major challenges for established health sciences schools as they seek to maintain quality, increase enrollment, hire new faculty, and create innovative programs to improve quality and health outcomes. For UC and many other higher education institutions, these challenges are occurring at a time when fiscal realities require cutting costs to remain financially viable. Challenges that many existing schools are now confronting include:

Resource Requirements The national recession and state budget crisis have dramatically impacted California's capacity to address its current and future health workforce needs. Although there is a compelling rationale for enrollment growth in some professions, reductions in state support have severely limited the extent to which UC and other public institutions, the California State and California Community College systems, are able to contribute. Within UC, even the relatively modest planned enrollment growth that has occurred in medicine (through new Programs in Medical Education, or PRIME) and in nursing has been largely unfunded by the state. These same fiscal realities also had prompted concerns from the LCME regarding the development of the new school of medicine at UC Riverside, which has been planned as the first new allopathic medical school to open in California in more than 40 years.

Faculty Shortages Enrollment growth, whether through expansion of existing programs or creation of new ones, will require increases in the number of qualified faculty. Across many professions, faculty shortages already exist and are expected to grow substantially as current faculty plan to retire over the coming years. Development of new schools and programs also will require new faculty, thereby increasing competition for established programs. Existing faculty shortages are recognized as having a direct and adverse impact on the state's ability to expand programs in some professions, with well-qualified students being turned away because there are insufficient numbers of faculty available to teach them. In 2011, for example, more than 75,000 qualified applications to professional nursing programs were not accepted because there were insufficient numbers of nursing faculty, including nearly 14,400 applications to master's and doctoral degree programs.[45]

Access to Clinical Training Sites As classes increase in size and as new schools open, the availability of suitable clinical training sites in some professions (e.g., pharmacy) has become severely limited. These shortages, if not corrected, will negatively impact the quality and preparedness of future graduates. Recent studies show that the expansion of pharmacy education will soon outpace the availability of quality clinical rotation sites.[46]

Diversity California is home to the most diverse population in the U.S., yet this diversity is not reflected in its health professions workforce. Latinos, African Americans and Native Americans are significantly underrepresented among health professional students, faculty and clinically active providers throughout the state. Improving the diversity of the workforce is an important strategy for improving health outcomes. According to the Institute of Medicine, diversity in the health workforce is associated with improved access to care for racial and ethnic minority patients, greater patient choice and satisfaction, and better educational experiences for health professions students, among many other benefits.[47] As institutions expand enrollment and develop new schools, faculty who are able to teach and underscore the importance of cultural competence, act as mentors and role models, and encourage underrepresented students to consider academic and research careers will continue to be much needed.

Increased Student Debt As the cost to attend professional school continues to rise, growing concerns regarding future educational debt levels are beginning to discourage some students from pursuing a health professions career.[48] For those successful in gaining admission, some are beginning to acknowledge that their projected total debt may impact their choice of specialty and practice location. These realities are likely to exacerbate the challenges already faced by poor and medically underserved communities.

Issues and Ramifications of Growth in New Programs

Although new schools (and/or programs) may be needed to help address some types of provider shortages, it will be important to monitor the quality, cost and contributions these schools make as they begin to produce new graduates. The following are among the issues already drawing interest from the higher education community and the federal government:

Educational Quality As health professions programs expand enrollment and develop new schools to address workforce shortages, the pressure on new schools and programs to maintain high standards and to attract competitive students will remain high. The recent rapid growth of for-profit schools and relative lack of quality oversight have raised concerns regarding the educational quality of some programs, particularly those with low graduation rates, high profit margins and reliance on federal financial aid resources (i.e., for U.S. schools).[49] Although assessment of educational quality is complex, there are a number of metrics or indicators that are often used, including accreditation. For medicine and most other health professions, students must graduate from an "accredited" school in order to be eligible for professional licensure. For the new (non-LCME accredited) medical schools in the Caribbean, there is no single accreditation body that evaluates whether these schools meet certain standards because they are located in various countries and jurisdictions.[50] Most, however, do seek some form of accreditation through local and international organizations such as the Caribbean Accreditation Authority for Education in Medicine and other Health Professions (CAAM-HP).[51] Monitoring future outcomes will be important for assessing the quality and contributions of these new schools (e.g., for U.S. students enrolled in non-LCME accredited programs, this should include metrics such as performance on the U.S. Medical Licensing Examination, entry to and completion of specialty training in an accredited residency program and successful medical licensure).

Drain on Federal Financial Aid Resources According to the Government Accountability Office (GAO), large schools and schools specializing in health-related fields are more likely to rely heavily on student aid. In 2008, students at for-profit colleges accounted for only 9 percent of U.S. college students, yet they received roughly 23 percent of all federal student aid and grants.[52] At some schools, as much as 90 percent of their revenue comes from federal grants and aid.[53] The combination of the high tuition costs of these programs, low graduation rates, high profits and associated questions regarding the societal contributions of some programs toward addressing workforce needs has led to growing public concerns, prompting Congress to question the value of this "federal investment."[54]

Although for-profit schools often offer low-cost educational programs (e.g., many have heavy reliance on online teaching), tuition rates are usually high. These schools also tend to have a higher number of low-income students who receive Pell Grants and rely heavily on student loans to finance their education. In 2009, for-profit schools received more than $4 billion in Pell Grants and more than $20 billion in student loans.[55] It should also be noted that students at some offshore schools are eligible for the U.S. Federal Family Education Loan Program (federally guaranteed loans to U.S. citizens enrolled in foreign institutions). In 2009, the U.S. Department of Education reported that 93.1 percent ($293 million) of FFEL program funds dispersed to students enrolled in foreign medical schools went to three offshore schools in the Caribbean.[56]

Predatory Recruitment Practices According to the National Center for Education Statistics (Integrated Postsecondary Education Data System or IPEDS), 50 percent of students enrolled at for-profit institutions are low-income and 37 percent are underrepresented minorities. Limited access to public and private nonprofit institutions, coupled with the availability of federal student aid, has created a "formidable market" for this particular sector.[57] According to The Education Trust, these schools have responded with aggressive recruitment tactics that encourage disadvantaged students to take on debt that is beyond their means in exchange for the "promise of opportunity." Although these students believe they are gaining "access" to higher education, many are not graduating and are not successful in gaining employment in the professions they have chosen. Instead, many are burdened with educational debt that they are unable to afford. According to the same 2010 study, students enrolled in for-profit schools default on their loans at twice the rate of students attending nonprofit institutions and they represent 43 percent of all federal student loan defaults.

IV. CONCLUDING COMMENTS

As health professions programs work to train the future workforce and prepare for health reform, new and ongoing challenges should be expected. In view of projected workforce shortages in some professions and the persistent maldistribution of providers in medically underserved communities, there is a compelling rationale for growth that is well-planned and aligned with population-based needs. Over the past decade, however, much of the ad hoc growth that has occurred has been through development of programs with new business models (e.g., for-profit training programs) and through new educational formats (e.g., online programs). These trends have been coupled with other changes, including: examples of professions that have recently increased the requirements and time for degree completion (e.g., some of the new clinical doctorate programs), rising levels of student debt, and persistent challenges with improving the cultural and linguistic competence of the health workforce. Adding to these concerns are questions about the public benefit of programs that are unaccredited and/or have high costs and low-graduation rates.

This overview provides a "snapshot" in time of a landscape that is undergoing major change. For the new health professions schools that have opened recently, it will take time to evaluate the quality and contributions they make. As the nation's largest health sciences instructional program, UC will share in the responsibility for monitoring these trends and their ramifications. While fiscal constraints and changes driven by health reform will add further challenges, these realities also provide new opportunities for existing programs to re-examine educational models and to encourage innovation. As the higher education community plans for the future, the importance of maintaining educational quality, improving access and affordability for students, and improving access and health outcomes for patients are among the central goals that must remain in focus.

V. ACKNOWLEDGMENTS

The University of California Office of the President's Health Sciences and Services Division regularly convenes meetings and discussions with the leadership of the UC health professions programs, including the deans of the UC schools of dentistry, medicine, nursing, optometry, pharmacy, public health and veterinary medicine. During the 2011-12 academic year, these conversations included an interesting and active dialogue about several recent trends in health professions education, such as the growth in for-profit health sciences schools, expansion of online education, and the potential ramifications of these trends for both higher education and the future health care workforce.

Dr. Mary Anne Koda-Kimble, dean emeritus of UC San Francisco's School of Pharmacy, was particularly helpful in bringing the recent experiences in pharmacy education to the group's attention and in helping to stimulate further discussion within the UC health sciences community. As these discussions began to include more examples and detail for each of the above professions, there was agreement across the system regarding the value of gathering this information and sharing it more broadly.

Preparation of this report would not have been possible without the thoughtful leadership of Dr. Cathryn Nation, UC associate vice president for health sciences, and her commitment to sharing this information as a contribution to the ongoing discussions about health reform and the future roles of the nation's health professions educational programs. Special appreciation and sincere gratitude are also expressed to Dena Bullard, coordinator for academic programs and special initiatives, and Lydia Yu, coordinator for health sciences policy and legislation, for their persistence and attention to detail in researching facts, gathering information, and in contributing substantially to the development and writing of this report. Valuable assistance also was provided by Ivy Williams, administrative specialist, whose help with formatting of final drafts and coordinating a variety of tasks necessary to complete this effort was both helpful and appreciated.

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Appendix:
Health Professions Schools and Enrollments
Comparison of Profiles

During the past decade, institutions of higher education across the United States have witnessed a significant expansion of health sciences educational programs. This growth has occurred through expansion of enrollments in existing schools/programs, as well as through establishment of new ones. In addition to growth involving traditional educational models, recent trends include a proliferation of "new" educational models, substantial growth in for-profit programs and rapidly rising levels of student indebtedness.

This section includes a "snapshot" providing additional information about some of these changes for the seven major health professions reviewed (dentistry, medicine, nursing, optometry, pharmacy, public health, veterinary medicine). Detail for each includes information regarding enrollments, new schools/programs, student fees and other profession-specific detail. It should be noted that the information included in this section was publicly available at the time this document was prepared. The details included, however, should be considered as a snapshot in time of an educational landscape that is undergoing considerable change.

Dentistry

NUMBER OF SCHOOLS				TOTAL ENROLLMENT			
U.S.		CA		U.S.		CA	
2007	2012	2007	2012	2007	2010	2007	2010
56	63	5	6	17,800	20,352	2,200	2,466

Projected Growth in U.S. Enrollment In the last 10 years, first-year enrollment has risen an average 1.5 percent annually. The current number of slots is expected to be insufficient to replace retirees. According to the Bureau of Labor Statistics, employment of dentists is projected to grow by 21 percent through 2020, faster than the average for all occupations.

NEW U.S. DENTAL SCHOOLS	START DATE	ENTERING CLASS SIZE	STATUS
East Carolina University School of Dental Medicine – NC	Fall 2011	50	Public
Lake Erie College of Osteopathic Medicine School of Dentistry – FL	Fall 2012	100	Private
Midwestern University College of Dental Medicine – AZ	Fall 2008	110	Private
Midwestern University College of Dental Medicine – IL	Fall 2011	125	Private
University of New England College of Dental Medicine – ME	Fall 2013	45	Private
Roseman University of Health Sciences College of Dental Medicine – UT	Fall 2011	50	Private
Western University of Health Sciences College of Dental Medicine – CA	Fall 2009	73	Private

Appendix:
Health Professions Schools and Enrollments
Comparison of Profiles: **Dentistry**

International Schools There currently are 10 Canadian dental schools accredited by the Commission on Dental Accreditation of Canada that are members of the American Dental Education Association. There also is a school at the University of Puerto Rico that is considered an American school. Unlike international medical graduates, dental school graduates must graduate from an American or an accredited Canadian school to be eligible for licensure in most U.S. states. There is slow movement by the ADEA/CODA to consider accrediting foreign dental schools.

Estimated Annual Tuition and Fees
California Schools: 2012-13*

Loma Linda University	$75,242
University of California, Los Angeles	$38,263
University of California, San Francisco	$42,789
University of the Pacific	$88,986
University of Southern California	$75,443
Western University of Health Sciences	$65,900

*Charges shown are for California residents only; excludes health insurance.

Medicine: Allopathic (M.D.)

NUMBER OF SCHOOLS				TOTAL ENROLLMENT			
U.S.		CA		U.S.		CA	
2007	2012	2007	2012	2007	2012	2007	2012
126	141	8	9	74,519	82,067	4,300	5,111

Projected Growth in U.S. Enrollment In 2006, the Association of American Medical Colleges (AAMC) recommended a 30 percent enrollment increase by 2015 (approximately 5,000 more students annually) by boosting enrollment in existing schools and creating new allopathic medical schools. According to the Bureau of Labor Statistics, employment of physicians and surgeons is projected to grow by 24 percent through 2020, faster than the average for all occupations.

NEW U.S. ALLOPATHIC MEDICAL SCHOOLS	START DATE	ENTERING CLASS SIZE	STATUS
Central Michigan University School of Medicine – MI	Fall 2013	60	Private
Cooper Medical School of Rowan University – NJ	Fall 2012	50	Public
Commonwealth Medical College - PA	Fall 2009	65	Private
Charles E. Schmidt College of Medicine at Florida Atlantic University - FL	Fall 2011	64	Public
Florida International University, Wertheim College of Medicine - FL	Fall 2009	40	Public
Frank H. Netter MD School of Medicine at Quinnipiac University – CT	Fall 2013	60	Private
Hofstra University School of Medicine - NY	Fall 2011	40	Private
Oakland University William Beaumont School of Medicine - MI	Fall 2011	50	Private

Appendix:
Health Professions Schools and Enrollments
Comparison of Profiles: **Medicine: Allopathic (M.D.)**

CONTINUED FROM PREVIOUS PAGE

NEW U.S. ALLOPATHIC MEDICAL SCHOOLS	START DATE	ENTERING CLASS SIZE	STATUS
Texas Tech University Health Sciences Center Paul L. Foster School of Medicine - TX	Fall 2009	80	Public
University of Arizona College of Medicine Phoenix – AZ	Fall 2013	120	Public
University of California, Riverside – CA	Fall 2013	50	Public
University of Central Florida College of Medicine – FL	Fall 2009	120	Public
University of South Carolina School of Medicine – SC	Fall 2012	53	Public
Virginia Tech Carilion School of Medicine - VA	Fall 2010	42	Private
Western Michigan University School of Medicine – MI	Fall 2014	48	Private

Appendix:
Health Professions Schools and Enrollments
Comparison of Profiles: **Medicine: Allopathic (M.D.)**

International Schools Although there are Liaison Committee on Medical Education (LCME) accredited medical schools throughout Canada and Puerto Rico, there are at least 60 non-LCME accredited medical schools in the Caribbean (35 of which have opened since 1999). Although some are regional medical schools that train students who will practice in the country or region where the school is located, more than half are offshore schools at for-profit institutions whose purpose is to train U.S. and Canadian students who intend to return home to practice medicine. Examples include Ross University, St. George's University and Escuela Latinoamericana de Medicina (ELAM). Information on four-year tuition was available for 28 of the offshore medical schools in the Caribbean (range: $47,500 to $186,085; median: $84,500). Note: Although the LCME is the accrediting authority for medical education leading to the M.D. degree in the U.S. and Canada, for purposes of this review, Canadian schools are not included though some growth has occurred.

Estimated Annual Tuition and Fees
California Schools: 2012-13*

Loma Linda University	$47,996
University of California, Davis	$37,465
University of California, Irvine	$32,906
University of California, Los Angeles	$32,541
University of California, Riverside	$32,703
University of California, San Diego	$32,648
University of California, San Francisco	$32,307
Stanford University	$49,911
University of Southern California	$50,954

*Charges shown are for California residents only; excludes health insurance.

Medicine: Osteopathic (D.O.)

NUMBER OF SCHOOLS				TOTAL ENROLLMENT			
U.S.		CA		U.S.		CA	
2007	2012	2007	2012	2007	2012	2007	2012
20	29	2	2	15,586	20,663	1,175	1,548

Projected Growth in U.S. Enrollment According to the American Association of Colleges of Osteopathic Medicine, the osteopathic schools expect to enroll an additional 1,200 first-year students (23.4 percent increase) by 2015. These projections do not include the possibility of an additional 400-500 new first-year seats in schools that are in various stages of development and may be in operation by 2015.

NEW U.S. OSTEOPATHIC MEDICAL SCHOOLS	START DATE	ENTERING CLASS SIZE	STATUS
Alabama COM – AL	Fall 2013	150	Private
Campbell University School of Osteopathic Medicine – NC	Fall 2013	150	Private
Edward Via COM - SC	Fall 2011	162	Private
Lake Erie COM - PA	Fall 2009	169	Private
Marian University COM – IN	Fall 2013	150	Private
Michigan State University COM - MI	Fall 2009	52	Public
Pacific Northwest University of Health Sciences COM - WA	Fall 2008	75	Private
Rocky Vista University COM - CO	Fall 2008	169	Private, For Profit
William Carey University COM - MS	Fall 2010	110	Private
Western University of Health Sciences COM Pacific-Northwest - OR	Fall 2011	107	Private

Appendix:
Health Professions Schools and Enrollments
Comparison of Profiles: **Medicine: Osteopathic (D.O.)**

Estimated Annual Tuition and Fees
California Schools: 2012-13*

Touro University	$45,360
Western University of Health Sciences	$49,550

*Charges shown are for California residents only;
excludes health insurance

Nursing: Pre-Licensure

(Note: Information provided for California only)

NUMBER OF BRN APPROVED PRE-LICENSURE PROGRAMS		TOTAL ENROLLMENT	
2007	2011	2007	2012
132	142	22,524	25,670

Projected Growth in U.S. Enrollment An American Association of Colleges of Nursing 2011 survey reports that for the 11th consecutive year, enrollment increased in entry-level baccalaureate nursing programs, with the total student population growing 5.1 percent over the previous year. According to the federal Bureau of Labor Statistics, employment of registered nurses is expected to grow by 26 percent from 2010 to 2020.

Trends in California Programs Student completion in R.N. programs increase in 2011-12 after declining for the first time between 2009-10 and 2010-11. Baccalaureate and entry-level master's programs continued to have increases in student completions, while associate degree program had fewer students complete their programs in 2011-12 than in previous years.

Graduates from California's pre-licensure R.N. programs doubled from 2001 to 2012 (from 5,178 graduates in 2001 to 10,814 graduates in 2012). In 2012, 57 percent of students completing a nursing program did so through an associate's degree program. Although graduates of bachelor and entry-level master's programs are far fewer in number, the numbers have grown rapidly in recent years. Bachelor of Science degrees increased 200 percent (from 1,277 in 2001 to 3,896 in 2012); entry-level master's programs experienced more than 600 percent growth in graduates (from 102 in 2001 to 756 in 2012). The UC Davis Betty Irene Moore School of Nursing is also considering phasing in pre-licensure programs in future years.

Estimated Annual Tuition and Fees
UC Schools: 2012-13*
Due to the large number of pre-licensure nursing programs in California, tuition/fees are listed only for UC nursing programs.

University of California, Irvine, Bachelor's Program	$13,122
University of California, Los Angeles, Bachelor's Program	$12,692
University of California, Los Angeles, MECN	$20,306
University of California, San Francisco, MEPN (Self-Supporting Year 1)	$55,000

*Charges shown are for California residents only; excludes health insurance.

Post-Licensure Master's Program

NUMBER OF SCHOOLS				TOTAL ENROLLMENT			
U.S.		CA		U.S.		CA	
2007	2011	2007	2010	2007	2011	2007	2011
330	485	29	36	62,451	94,480	3,989	4,557

Projected Growth in U.S. Enrollment Nationally, the American Association of Colleges of Nursing reported that enrollments at master's level nursing programs went up 8.9 percent from 2010-11. More than 70 percent of schools with advanced practice programs are either offering or planning to offer a D.N.P.

Trends in California Programs Since 2004-05, the number of post-licensure programs in California grew by 50 percent (12) for master's degree programs, and 80 percent (4) for doctoral programs. The newest California master's programs (in 2010-11) are at California Baptist University, Charles R. Drew University of Medicine and Science, United States University, University of California, Davis, and West Coast University – Los Angeles.

Estimated Annual Tuition and Fees
UC Schools: 2012-13*

University of California, Davis	$20,846
University of California, Irvine	$20,701
University of California, Los Angeles	$20,306
University of California, San Francisco	$20,115

*Charges shown are for California residents only; excludes health insurance.

Post-Licensure Doctoral Programs (Ph.D.)

NUMBER OF SCHOOLS				TOTAL ENROLLMENT			
U.S.		CA		U.S.		CA	
2007	2012	2007	2012	2007	2012	2007	2011
111	129	5	6	3,982	5,110	291 (BRN data; combined Ph.D., D.N.P.)^	567 (BRN data; combined Ph.D., D.N.P.)^

^ BRN receives data on CA doctoral enrollments. They are unable to distinguish which enrollments are from Ph.D. versus D.N.P. programs.

Projected Growth in U.S. Enrollment AACN's latest survey shows that 77 research-focused baccalaureate-to-Ph.D. programs are now available, with an additional seven under development. The number of research-focused doctoral programs in the U.S. climbed to 129 programs in 2012, with additional programs in development. Notwithstanding concerns about the growth in D.N.P. programs and the potential for this growth to diminish interest in the Ph.D., AACN data show that both the number of Ph.D. programs and students enrolling in these programs are rising. In 2012, enrollment in Ph.D.s increased by 4 percent from 2011 to 2012, or 203 students. Since the D.N.P. position statement was endorsed in 2004, the number of nursing students enrolled in research-focused doctoral programs has increased by almost 48 percent.

Trends in California Programs The newest school offering the Nursing Ph.D. is the UC Davis Betty Irene Moore School of Nursing (Sacramento), established in 2010 with eight students enrolled in the initial cohort of Ph.D. students. UC Irvine plans to offer a Nursing Ph.D. program in fall 2013.

Estimated Annual Tuition and Fees
California Schools: 2012-13*

Azusa Pacific University	$59,200 *($925 per unit, 64 units)*
Loma Linda University	$690 per quarter unit + $702 LLU quarterly fees *(90 units for program) (2011-12)*
University of California, Davis	$13,106
University of California, Los Angeles	$12,566
University of California, San Francisco	$12,375
University of San Diego	$1,315 per unit *(B.S.N.-Ph.D. (Executive Nurse Leadership) = 69 units or (Adult Gerontology C.N.S.) = 82 units; Post-Master's = minimum of 48 units)*

*Charges shown are for California residents; excludes health insurance.

Post-Licensure Doctoral Programs (D.N.P.)

NUMBER OF SCHOOLS				TOTAL ENROLLMENT			
U.S.		CA		U.S.		CA	
2007	2012	2007	2012	2007	2012	2007	2011
53	211	1	9	1,874	11,575	291 (BRN data; combined Ph.D., D.N.P.)^	567 (BRN data; combined Ph.D., D.N.P.)^

^ BRN receives data on CA doctoral enrollments. They are unable to distinguish which enrollments are from Ph.D. versus D.N.P. programs.

Projected Growth in U.S. Enrollment From 2006 and 2012, the number of schools offering the D.N.P. increased from 20 programs to 211, with additional programs in the planning stages.

Trends in California Programs The newest schools offering the D.N.P. are Samuel Merritt University (began in spring 2011), and two consortia of California State University campuses that started in fall 2012 (CSU Fresno/San Jose State University Joint Program, in Northern California; and CSU Fullerton/Long Beach/Los Angeles Joint Program, in Southern California).

Appendix:
Health Professions Schools and Enrollments
Comparison of Profiles: **Nursing: Post-Licensure Doctoral Programs (D.N.P.)**

Estimated Annual Tuition and Fees
California Schools: 2012-13*

Azusa Pacific University	39 units; 2 years $36,075 base cost; $925 per unit
Brandman University	$32,175 – Post Master's – D.N.P. (tuition to completion) $71,175 – B.S.N. – D.N.P. (tuition to completion)
California State University Fresno/San Jose State University	$7,170 per semester (5 semester program)
California State University Fullerton/Long Beach/Los Angeles	$7,453 for fall 2012 (5 semester program)
Loma Linda University	$690 per quarter unit + $285 clinical course fee (per course) + $702 LLU quarterly fees (63 units for program)
Samuel Merritt University	36 semester units, primarily online - $1,004 per unit
University of San Diego	$1,315 per unit (B.S.N. – D.N.P.= ranges from 78-91 units Post Master's= 34 units)
University of San Francisco	$1,130 per unit (programs vary from 35-94 units, depending on B.S.N. to D.N.P., or Post Master's to D.N.P.) Executive D.N.P. ($13,000 per semester)
Western University of Health Sciences	$1,007 per unit (31 semester units) + $568 clinical fee/term

*Charges shown are for California residents only;
excludes health insurance.

Optometry

NUMBER OF SCHOOLS				TOTAL ENROLLMENT			
U.S.		CA		U.S.		CA	
2007	2012	2007	2012	2007	2011	2007	2011
17	21	2	3	5,672	6,289	625	911

Projected Growth in U.S. Enrollment Optometrists held an estimated 34,800 jobs in 2008. According to the Bureau of Labor Statistics, employment is expected to increase by 33 percent between 2010–20 largely due to the limited number of graduates (approximately 1,200 yearly) and an increase in retirements.

NEW U.S. OPTOMETRY SCHOOLS	START DATE	ENTERING CLASS SIZE	STATUS
University of the Incarnate Word – TX	Fall 2009	64	Private
Massachusetts College of Pharmacy and Health Sciences School of Optometry – MA	Fall 2012	64	Private
Midwestern University – AZ	Fall 2009	52	Private
Western University of Health Sciences College of Optometry - CA	Fall 2009	88	Private

Estimated Annual Tuition and Fees

California Schools: 2012-13*

Southern California College of Optometry	$35,915
University of California, Berkeley	$29,508
Western University of Health Sciences College of Optometry	$31,780

*Charges shown are for California residents only; excludes health insurance.

Pharmacy

NUMBER OF SCHOOLS				TOTAL ENROLLMENT			
U.S.		CA		U.S.		CA	
2007	2012	2007	2012	2007	2011	2007	2011
87	129^	7	8	42,000	58,915	3,028	3,677

^ With accreditation status

Projected Growth in U.S. Enrollment According to the Bureau of Labor Statistics, employment is expected to grow by 25 percent between 2010–20. An additional 20 schools have been identified where feasibility and exploration of new programs is under way.

NEWEST CA PHARMACY SCHOOLS	START DATE	ENTERING CLASS SIZE	STATUS
California Northstate College of Pharmacy – Rancho Cordova	Fall 2008	90	Private
Touro University College of Pharmacy – Vallejo	Fall 2005	100	Private

Estimated Annual Tuition and Fees
California Schools: 2012-13*

California Northstate College of Pharmacy	$45,629 (2013-14)
Loma Linda University	$42,606
Touro University	$40,000
University of California, San Diego	$32,372
University of California, San Francisco	$32,037
University of the Pacific	$60,220 (2011-12)
University of Southern California	$45,650
Western University of Health Sciences	$45,040

*Charges shown are for California residents only; excludes health insurance.

Notes The Keck Graduate Institute (part of the Claremont Colleges) may be planning to create a pharmacy school (potentially utilizing curriculum purchased from another institution for the first two years of its program and offering them through distance education). In addition, the Elk Grove Citizen newspaper reported on Feb. 24, 2011: "The California Northstate College of Pharmacy (CNCP) is looking at occupying the former AAA building at 8700 West Taron Drive. There has been enough progress on the possibility that CNCP officials have asked the Elk Grove Planning Commission to approve an application for a conditional use permit. The two-story building is roughly 100,000 square feet, and CNCP officials would dedicate half of the space to a pharmacology college and the other 50,000 square feet to a medical college."

Public Health

NUMBER OF SCHOOLS				TOTAL ENROLLMENT			
U.S.		CA		U.S.		CA	
2007	2012	2007	2012	2007	2011	2007	2011
37	47	4	4	19,000	28,443	2,113	1,948

Projected Growth in U.S. Enrollment The Association of Schools of Public Health (ASPH) predicts a shortage of 250,000 professionals (one-third of the current workforce) by 2020. Shortages of public health physicians and nurses, epidemiologists, health care educators, and administrators are expected. To meet projected needs, schools of public health will need to train three times the current number of graduates by then.

NEW U.S. PUBLIC HEALTH SCHOOL	START DATE (AS AN ACCREDITED P.H. SCHOOL)	ENTERING CLASS SIZE (M.P.H.)	STATUS
East Tennessee State University College of Public Health - TN	Fall 2009	27	Public
University at Buffalo SUNY School of Public Health and Health Professions - NY	Fall 2009	19	Public
University of Florida College of Public Health and Health Professions - FL	Fall 2009	89	Public
University of Georgia College of Public Health - GA	Fall 2009	102	Public
Colorado School of Public Health: University of Colorado Denver, Colorado State University and University of Northern Colorado - CO	Fall 2010	137	Public
SUNY Downstate Medical Center School of Public Health - NY	Fall 2010	43	Public
University of Maryland College Park School of Public Health - MD	Fall 2010	24	Public

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NEW U.S. PUBLIC HEALTH SCHOOL	START DATE (AS AN ACCREDITED P.H. SCHOOL)	ENTERING CLASS SIZE (M.P.H.)	STATUS
CUNY School of Public Health at Hunter College - NY	Fall 2011	115	Public
Georgia Southern University Jiann-Ping Hsu College of Public Health - GA	Fall 2011	80	Public
University of Nebraska Medical Center College of Public Health – NE	Fall 2011	83	Public

International Schools There are currently three Council on Education for Public Health (CEPH) accredited schools of public health located outside of the U.S.: University of Puerto Rico Graduate School of Public Health, National Institute for Public Health (Instituto Nacional de Salud Pública) in Mexico and University of Alberta School of Public Health. Of the eight schools preparing for accreditation, one is located in France.

Estimated Annual Tuition and Fees
California Schools: 2012-13*

Loma Linda University	$45,000
San Diego State University	$9,561
University of California, Berkeley	$20,266
University of California, Los Angeles	$19,766

*Charges shown are for California residents only;
excludes health insurance.

Accredited Programs There are 92 accredited programs, including programs in Beirut, Lebanon; British Columbia and Montreal, Canada; and Grenada. CAMP (the Council of Accredited M.P.H. Programs) promotes CEPH accreditation for M.P.H. programs. Approximately 30-40 percent of M.P.H. programs are not CEPH accredited. The CEPH has accredited more than 70 online M.P.H. programs. About 30 (21 percent) CEPH accredited schools and programs offer at least one degree in a fully distance-based format. Four of these offer only a distance-based M.P.H., with no campus-based public health offerings.

Trends in type of degrees sought In 2011, 74 percent of enrolled students were in master's degree programs and 26 percent in doctoral degree programs (i.e., an 18 percent increase in the percentage enrolling in doctoral programs, and a 5 percent decrease in those enrolling in master's programs, since 1999).

Veterinary Medicine

NUMBER OF SCHOOLS				TOTAL ENROLLMENT			
U.S.		CA		U.S.		CA	
2007	2012	2007	2012	2007	2011	2007	2011
28	28	2	2	9,600	11,213	883	932

Projected Growth in U.S. Enrollment According to the Bureau of Labor Statistics, employment expected to increase 36 percent between 2010–20.

International Schools Although the American Veterinary Medical Association accredits vet schools in Canada, there are 12 other AVMA accredited international schools including Ross University (St. Kitts), St. George's University (Grenada) and others in Mexico, Europe and Australia. There are three more seeking AVMA accreditation in Denmark, the Cayman Islands and Australia.

Estimated Annual Tuition and Fees
California Schools: 2012-13*

University of California, Davis	$30,809
Western University of Health Sciences	$46,795

*Charges shown are for California residents only; excludes health insurance.

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