# Tracking the Supply of Health Professions Education Programs in California

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April 2007

A report from the
Health Workforce Tracking Collaborative
UCSF Center for the Health Professions
http://futurehealth.ucsf.edu/

THE CENTER
FOR THE HEALTH PROFESSIONS
*University of California, San Francisco*

**Supported by:**
**The California Endowment  The California Wellness Foundation**
**The California HealthCare Foundation**

## Acknowledgements

The California Endowment

This project is supported by a grant from The California Endowment. The California Endowment's mission is to expand access to affordable, quality health care for underserved individuals and communities, and to promote fundamental improvements in the health status of all Californians.

The California Wellness Foundation
*Grantmaking for a Healthier California*

This project is funded in part by a grant from The California Wellness Foundation (TCWF). Created in 1992 as an independent, private foundation, TCWF's mission is to promote the health of the people of California by making grants for health promotion, wellness education, and disease prevention programs.

CALIFORNIA HEALTHCARE FOUNDATION

This project is supported by a grant from the California HealthCare Foundation. Celebrating its tenth year, the California HealthCare Foundation (CHCF), based in Oakland, is an independent philanthropy committed to improving California's health care delivery and financing systems.

## Introduction

A basic component of state-level workforce analysis and planning is accounting for the supply of a particular workforce. Educational institutions in the state that produce graduates of specific professional/vocational programs are an important link in identifying the total number of available workers in each health profession. The principal objective of this project is to map the "education link" in California's supply chain for selected health professions. This project included three main components: selecting specific health professions, identifying institutions in the state of California that train these professionals, and reporting data on the number of graduates of these training programs.

## Method

The principle source of data examined for this project was the set of Completions Surveys from the Integrated Postsecondary Education Data System (IPEDS), which is administered by the National Center for Education Statistics (NCES). Other sources included the "Data Mart" available through the California Community Colleges Chancellor's Office; statistical reports prepared by the Division of Analytic Studies, California State University; statistical reports prepared by Information Resources & Communications at the University of California Office of the President; the "on-line data reporting tool" available through the California Postsecondary Education Commission; annual reports collected by the Bureau for Private & Postsecondary Education (an agency housed within California's Department of Consumer Affairs); the Health Professions Education Data Book published by the American Medical Association; proprietary reports published by various professional boards and associations that regulate and administer the professions included in this project; and finally, in limited instances, data shared by program directors at individual schools.

To complement the data on trends in educational program graduates, we also include maps in this report that identify the primary location of each program in the state for the selected professions. In addition, we present descriptive labor market data for each of the selected professions.

## Selected Health Professions

Medicine, dentistry, nursing, and pharmacy are the health professions most recognized by the public and represent a large portion of the overall health care workforce in California. Additional health professions in the allied health field were selected to represent a cross-section of educational requirements, direct and indirect patient care, and practice settings.

## Labor Market Data Sources

Unless otherwise indicated, the following sources were used to obtain labor market data:

- For estimates of the number of jobs and estimates of the annual median wage: Bureau of Labor Statistics (BLS), Occupational Employment Statistics Survey, *May 2005 State Occupational Employment & Wage Estimates*.
- For population estimates used to calculate employment per 100,000 population ratios: Population Division, US Bureau, *Annual Estimates of the Population for the United States, Regions, States, and for Puerto Rico: April 1, 2000 to July 1, 2005 (NST-EST 2005-01).*
- For employment projections at the national level: Bureau of Labor Statistics, Appendix: Employment by Occupation, 2004 and Projected 2014, in "Occupational Employment Projections to 2014," published in the November 2005 *Monthly Labor Review*.
- For employment projections at the state level: California Employment Development Department (2006), *California Occupational Projections 2004-2014*.

For most of the selected professions, estimates of the number of jobs, employment per 100,000 population, and annual median wage are presented as a range. Each range should be interpreted as a 90% confidence interval, meaning that with 90% confidence one can assume the estimate is within the presented range. In those cases where a single value is presented, no estimate of the variance was provided.[1]

Projected growth in employment between 2004 and 2014 is indicated by a descriptor such as “Average”, “Faster than average”, “Much faster than average”, etc. These descriptors were developed by the Bureau of Labor Statistics and correspond to a percentage (%) range. The table below serves as a legend.

| If the statement reads: | Between 2004 & 2014 employment is projected to: |
|---|---|
| Much faster than average | Increase 27 % or more |
| Faster than average | Increase 18 % - 26 % |
| Average | Increase 9 % - 17 % |
| More slowly than average | Increase 0 % - 8 % |
| Decline | Decrease by any amount |

[1] In full disclosure, we did not perform tests on the wage and employment estimates to determine if differences between CA and US were statistically significant.

## Mapping Health Professions Schools in California

The maps included for each profession display the location of schools in California, a range for the number of graduates per year and the school's institutional sector. The number of degrees and certificates awarded per year is a proxy for the number of graduates and we will use this convention throughout the report. The size of the symbol representing individual schools on each map corresponds to the size of the program (i.e. the number of graduates). In a few cases we were not able to determine program size, either because the program was too new to have any graduates or the program was not reporting student data to any of the sources examined. Schools are color coded according to their institutional affiliation, such as the University of California, California State University, community college, or private institution, etc. Finally, counties in the state are shaded according to population density.[2]

## Physicians

Labor market data presented in the table below come from several sources. The number of actively licensed physicians is from the 2006 edition of *Physician Characteristics and Distribution in the US*, published by the American Medical Association. The wage information is from the *2005 Physician Compensation and Production Survey*, published by the Medical Group Management Association. Unfortunately, we are not able to present data specific to California because we did not have access to the full compensation and production survey. It would be our assumption that for each category of physician specialty below, median wages in California would be higher compared to the US overall.

### o Labor Market Data: Physicians

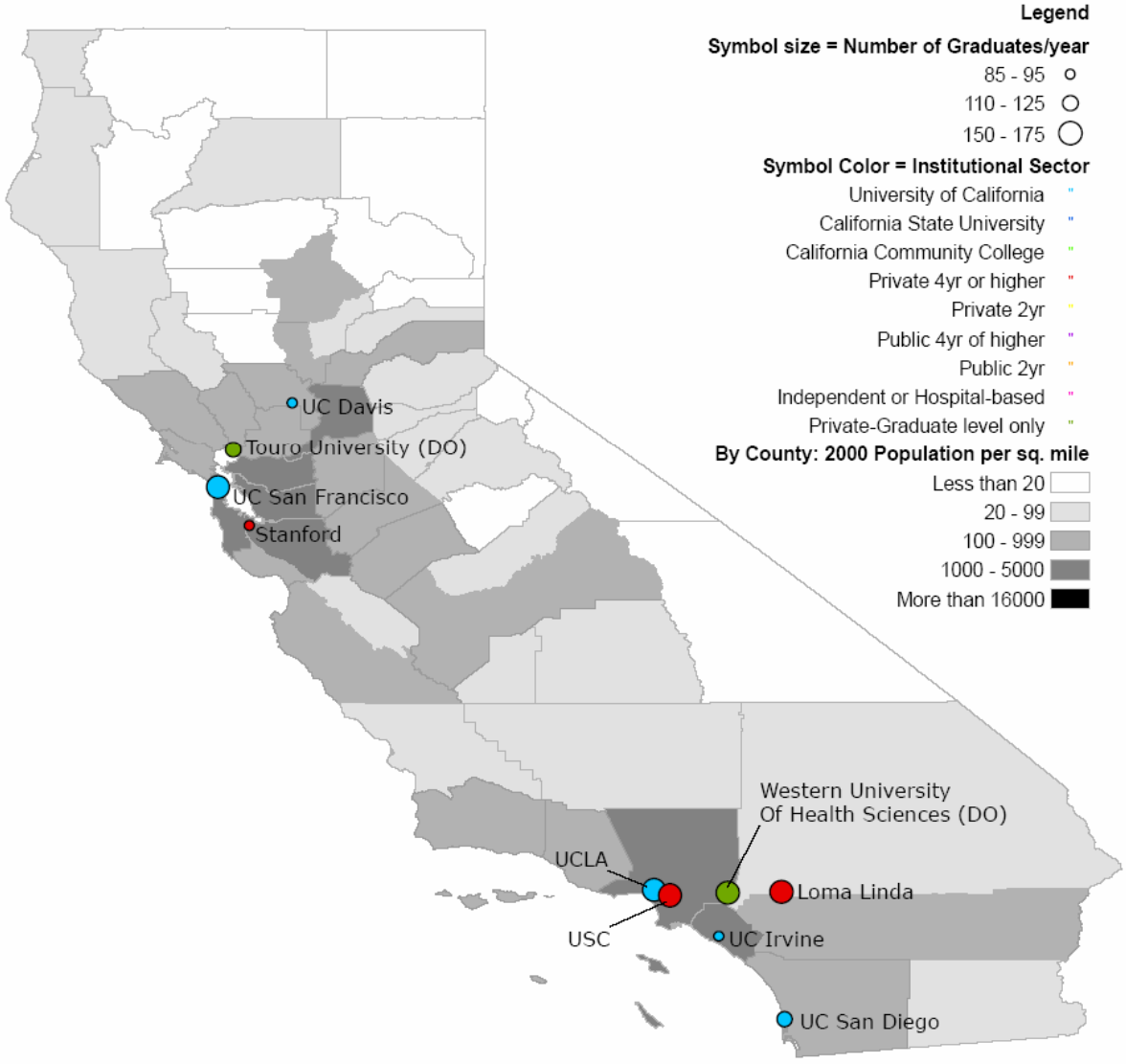
| Description | California | United States |
|---|---|---|
| Number of Actively Licensed Physicians (2004) | 105,766 | 884,974 |
| Employment per 100,000 Population (2004) | 295 | 301 |
| Annual Median Wage – Internal Medicine (2004) | ** | $142,000 |
| Annual Median Wage – Pediatrics (2004) | ** | $133,000 |
| Annual Median Wage – Family Practice (2004) | ** | $137,000 |
| Annual Median Wage – Ob/Gyn (2004) | ** | $203,000 |
| Annual Median Wage – General Surgery (2004) | ** | $229,000 |
| Projected Growth in Employment 2004 -2014 | Average | Faster than average |

** Data unavailable at time of analysis.

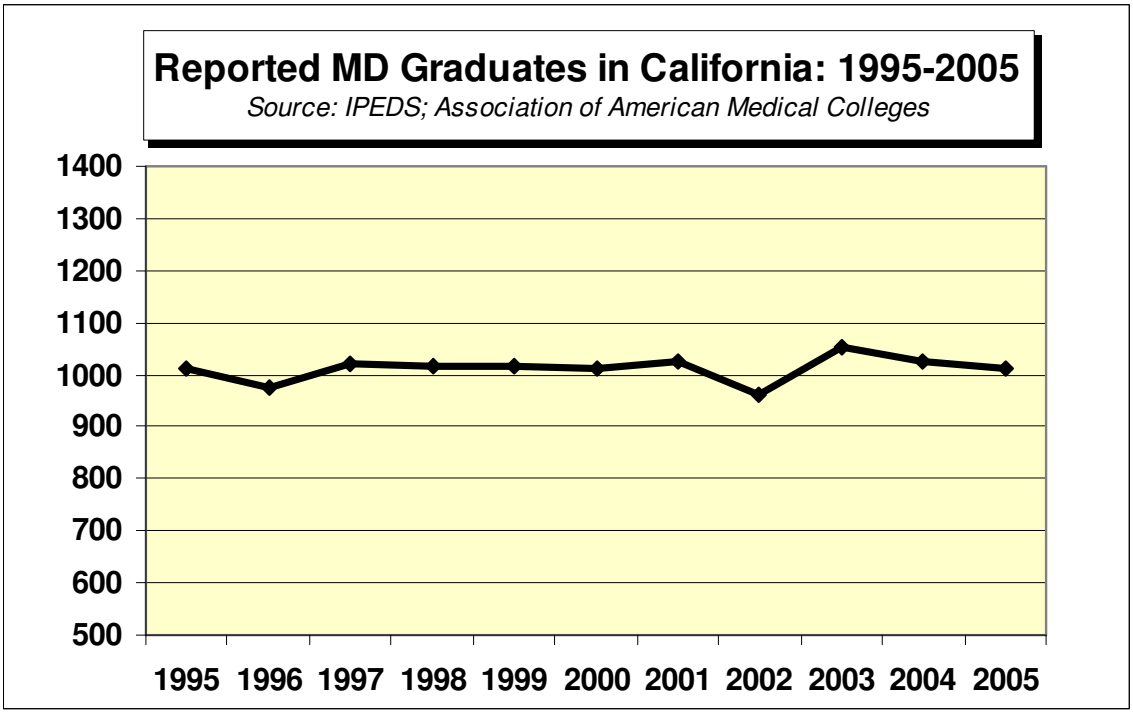
[2] San Francisco County has a population density greater than 16,000, which is shaded black according to each map's legend. However, it is often the case that the individual program symbols obscure San Francisco County completely, making it appear that there are no counties shaded black.

- The ratio of actively licensed physicians to general population in California is nearly equal to the ratio of actively licensed physicians in the US as a whole.
- Employment for physicians is projected to grow less rapidly in California than it is nationally.

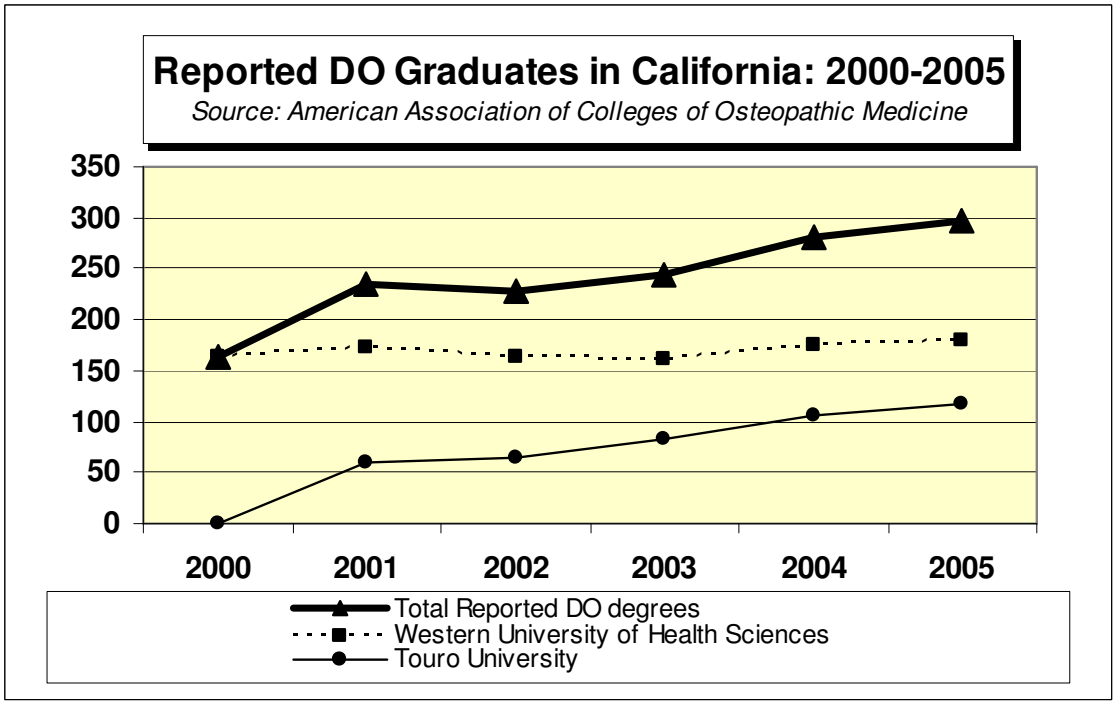
# Doctor of Medicine (MD) & Doctor of Osteopathy (DO) Programs in California



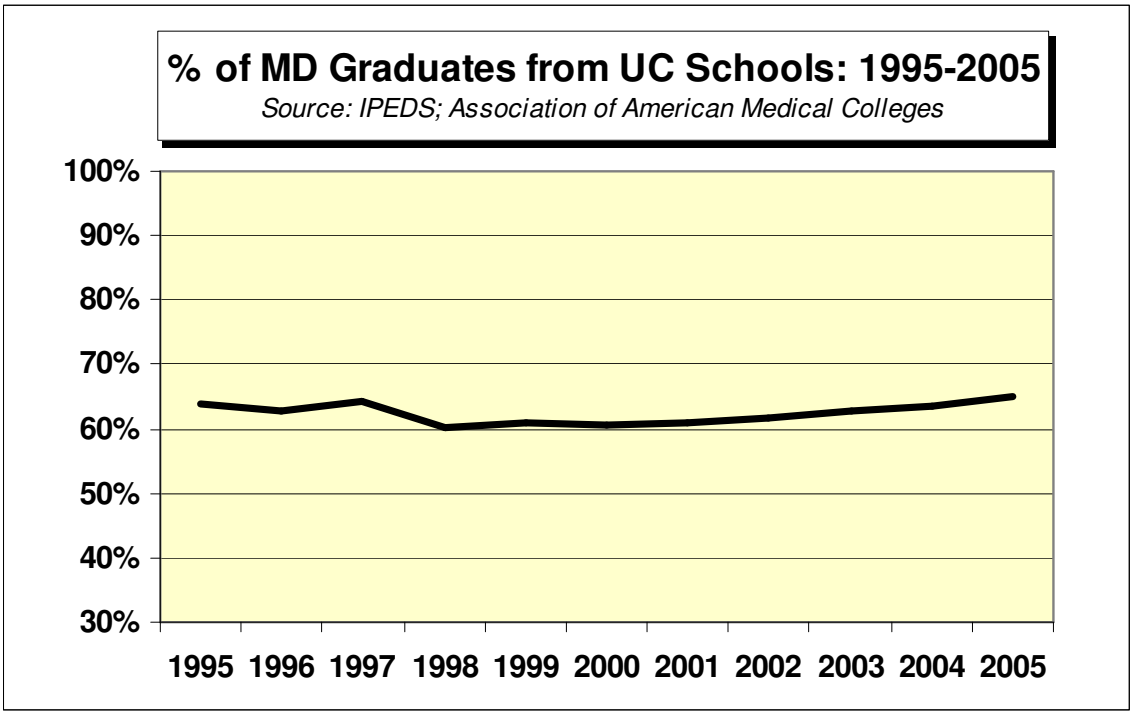
## o Education Data: Physicians




- California's eight allopathic schools have produced roughly 1000 new MDs per year over the past decade.
- The slight dip from 2001 to 2002 and the subsequent recovery in 2003 is most likely the result of some students experiencing a longer time to earn their degree.



- Touro University graduated its first class of Doctors of Osteopathic Medicine (DOs) in 2001.
- California's two osteopathic schools now produce roughly 300 new DOs per year.




- The University of California medical schools have steadily produced 60% to 65% of the MDs trained in California's medical schools over the past decade.

## Dentistry

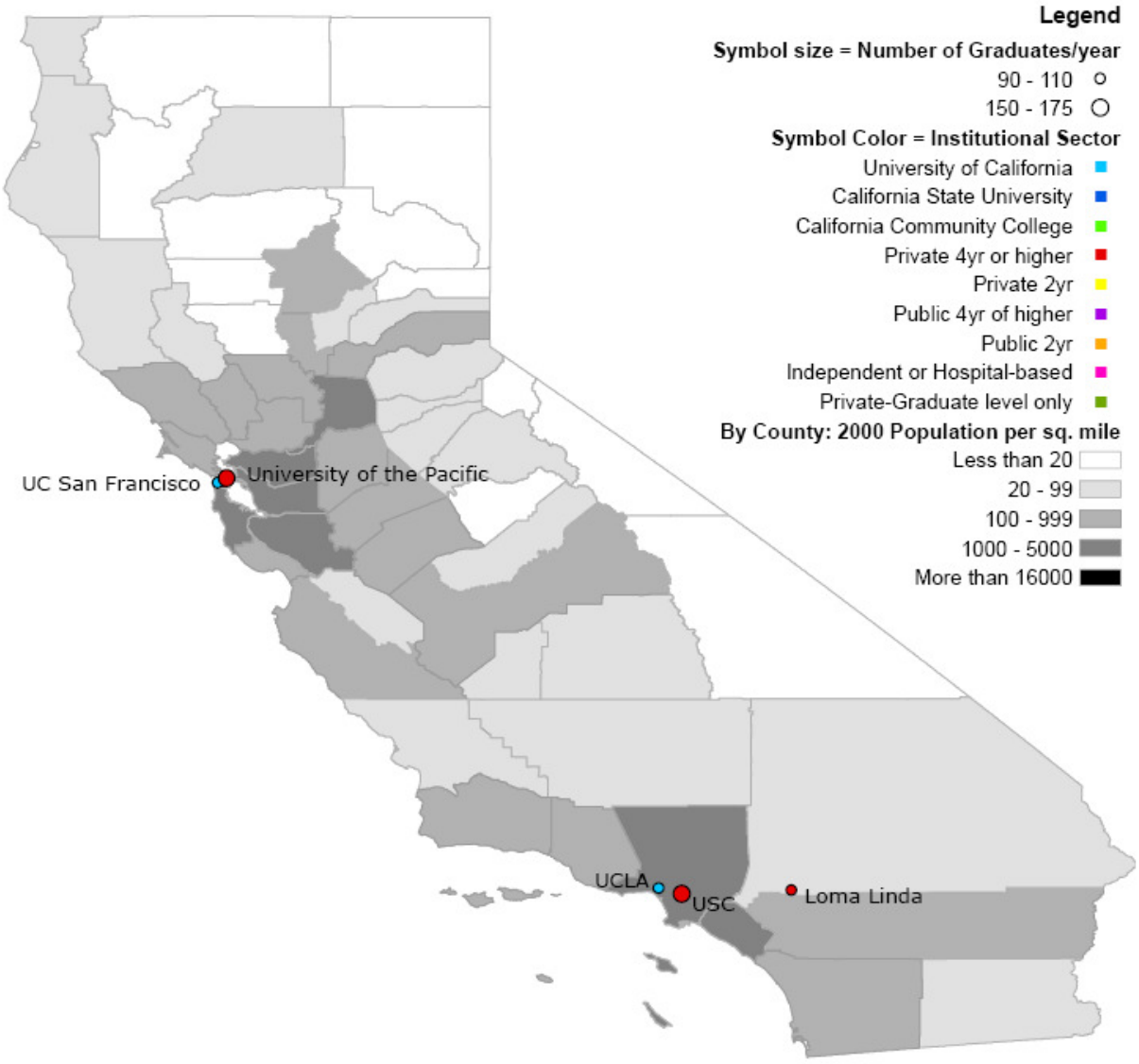
Data on the number of actively licensed dentists presented in the table below are from the *2003 State and County Demographic Report*, published by the American Dental Association.

### o Labor Market Data: Dentistry

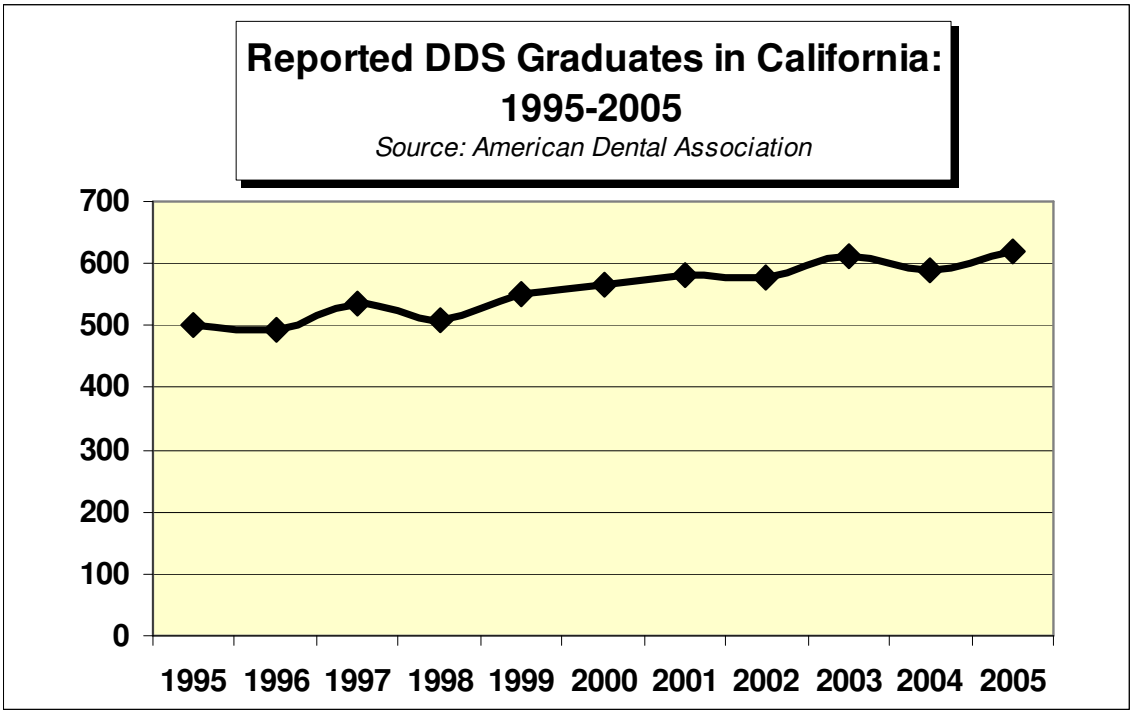
| Description | California | United States |
|---|---|---|
| Number of Actively Licensed Dentists (2003) | 25,244 | 171,843 |
| Active Dentists per 100,000 Population (2003) | 71 | 59 |
| Annual Median Wage, General Dentistry (2005) | $118,000 - $142,000 | $122,000 – $129,000 |
| Projected Growth in Employment 2004 – 2014 | Average | Average |

- The ratio of active dentists per general population in California is much larger than it is nationally.
- Median wages for dentists in California are likely higher then they are nationally.

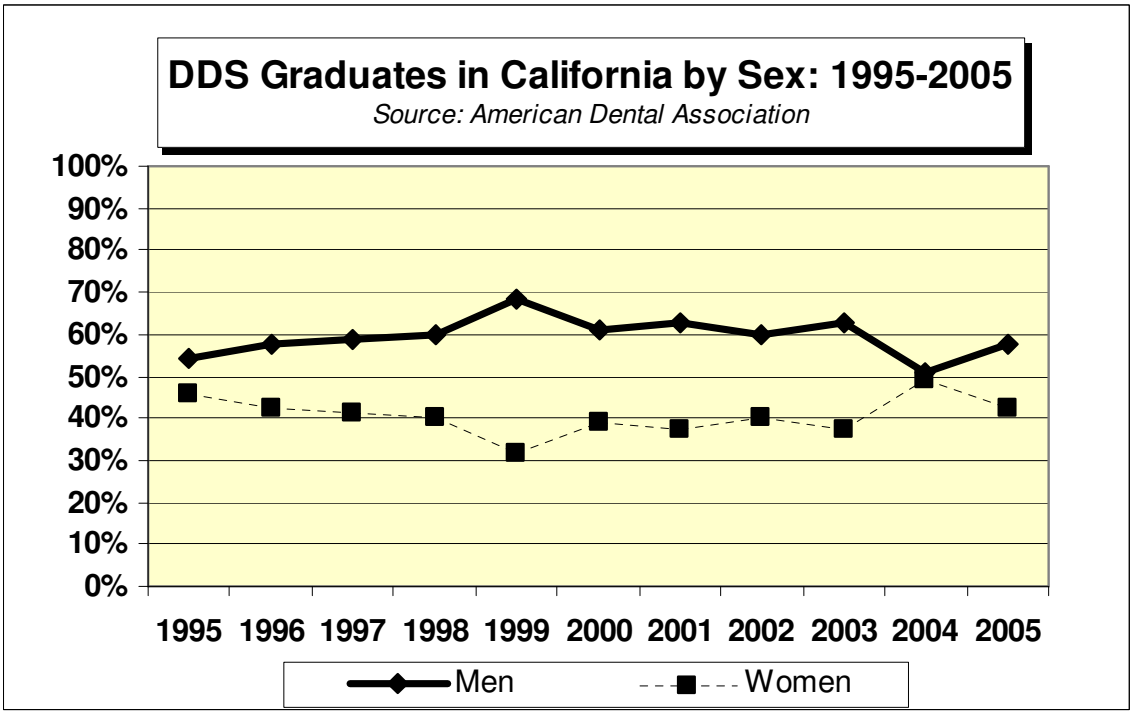
# Doctor of Dental Surgery (DDS) Programs in California



## ○ Education Data: Dentistry




- The number of graduates from Doctor of Dental Surgery (DDS) programs in California has trended upwards over the last 5–6 years.




- The share of DDS graduates that are women has fluctuated over the last decade.

- Between 1995 and 2000 there was a downward trend in the share of women graduates; in 1999 women made up 32% of the total, a 10-year low.
- In the last two years the share of women graduates has increased and recovered to its 1995 level.

## Registered Nursing

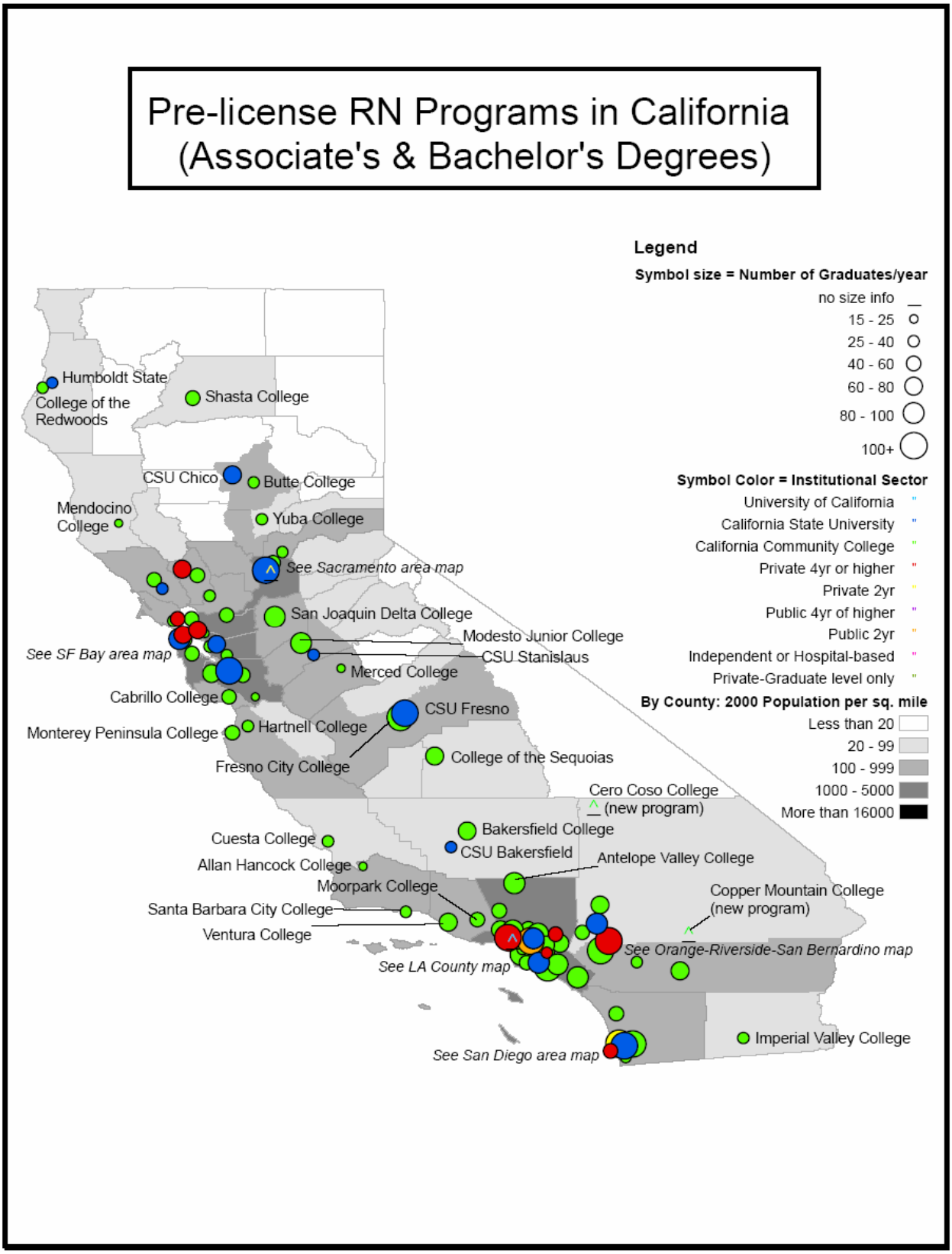
Data on the number of professionally active nurses in California are from *California's Nursing Labor Force: Demand, Supply, and Shortages*, published as part of the California Nurse Workforce Initiative. For the number of professionally active nurses nationally, the *2004 National Sample Survey of Registered Nurses*, from the Health Resources and Services Administration, was used.

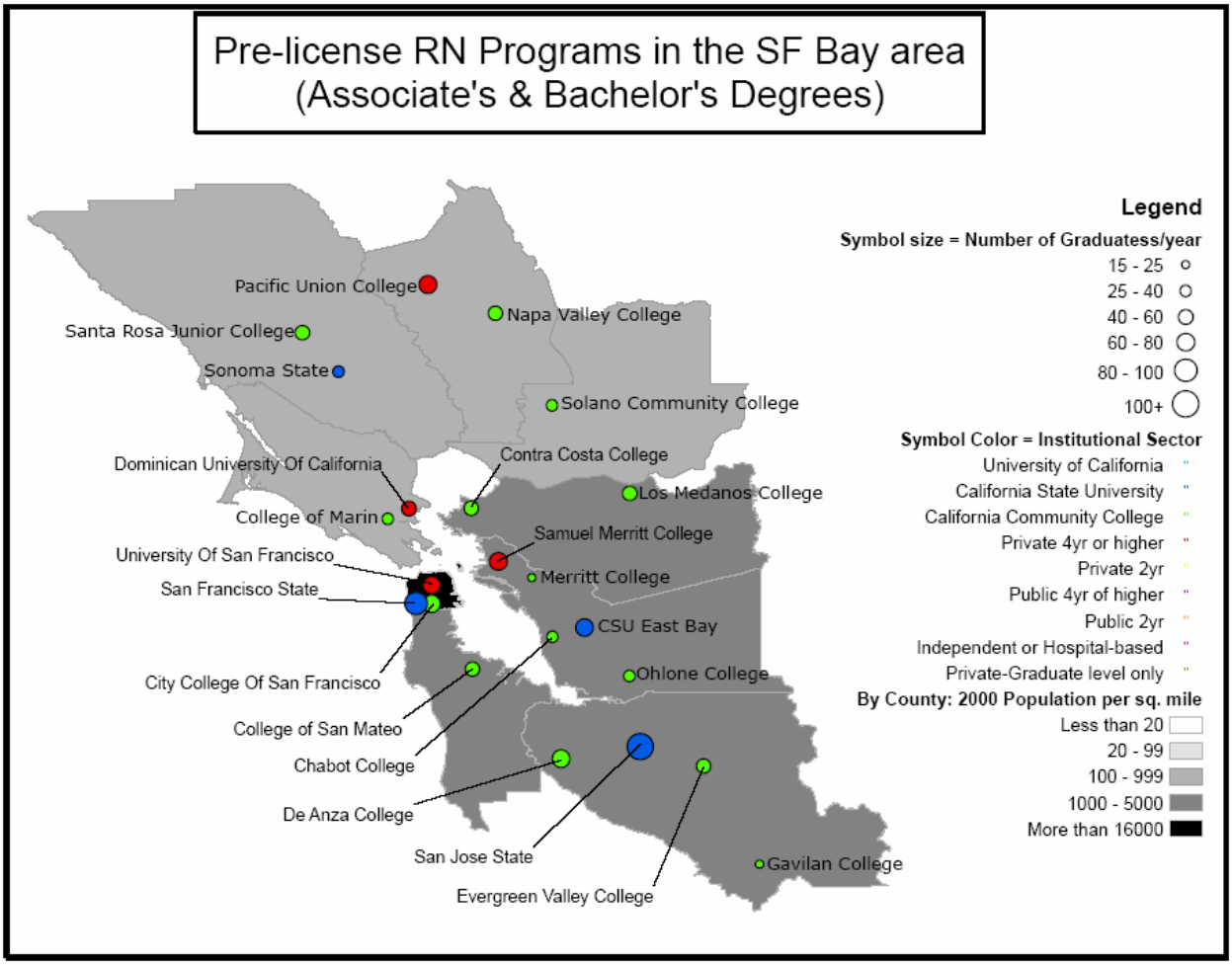
### Labor Market Data: Registered Nursing

| Description | California | United States |
|---|---|---|
| Number of Professionally Active Nurses (2004) | 214,700[3] | 2,909,467 |
| Employment per 100,000 Population (2004) | 599 | 824 |
| Annual Median Wage (2005) | $54,000 - $56,000 | $45,000 – $46,000 |
| Projected Growth in Employment 2004 - 2014 | Much faster than average | Much faster than average |

- The ratio of registered nurses per general population in California is much smaller than it is nationally.
- Median wages for RNs in California are much higher than they are nationally.

[3] Spetz, J., Rickles, J., Ong, P. 2004. "California's Nursing Labor Force: Demand, Supply, and Shortages." California Nurse Workforce Initiative.
http://www.calmis.ca.gov/specialreports/NWI-EarlyLaborMarketReportFINAL.pdf


Pre-license RN Programs in California
(Associate's & Bachelor's Degrees)
Legend
Symbol size = Number of Graduates/year
no size info
15 - 25
25 - 40
40 - 60
60 - 80
80 - 100
100+
Symbol Color = Institutional Sector
University of California
California State University
California Community College
Private 4yr or higher
Private 2yr
Public 4yr of higher
Public 2yr
Independent or Hospital-based
Private-Graduate level only
By County: 2000 Population per sq. mile
Less than 20
20 - 99
100 - 999
1000 - 5000
More than 16000
Humboldt State
College of the Redwoods
Shasta College
CSU Chico
Butte College
Mendocino College
Yuba College
See Sacramento area map
San Joaquin Delta College
Modesto Junior College
CSU Stanislaus
See SF Bay area map
Merced College
Cabrillo College
CSU Fresno
Monterey Peninsula College
Hartnell College
Fresno City College
College of the Sequoias
Cero Coso College
(new program)
Bakersfield College
Cuesta College
CSU Bakersfield
Antelope Valley College
Allan Hancock College
Moorpark College
Copper Mountain College
(new program)
Santa Barbara City College
Ventura College
See Orange-Riverside-San Bernardino map
See LA County map
Imperial Valley College
See San Diego area map


Pre-license RN Programs in the SF Bay area
(Associate's & Bachelor's Degrees)
Pacific Union College
Napa Valley College
Santa Rosa Junior College
Sonoma State
Solano Community College
Dominican University Of California
Contra Costa College
Los Medanos College
College of Marin
Samuel Merritt College
University Of San Francisco
Merritt College
San Francisco State
CSU East Bay
Ohlone College
City College Of San Francisco
College of San Mateo
Chabot College
De Anza College
San Jose State
Gavilan College
Evergreen Valley College
Legend
Symbol size = Number of Graduatess/year
15 - 25
25 - 40
40 - 60
60 - 80
80 - 100
100+
Symbol Color = Institutional Sector
University of California
California State University
California Community College
Private 4yr or higher
Private 2yr
Public 4yr of higher
Public 2yr
Independent or Hospital-based
Private-Graduate level only
By County: 2000 Population per sq. mile
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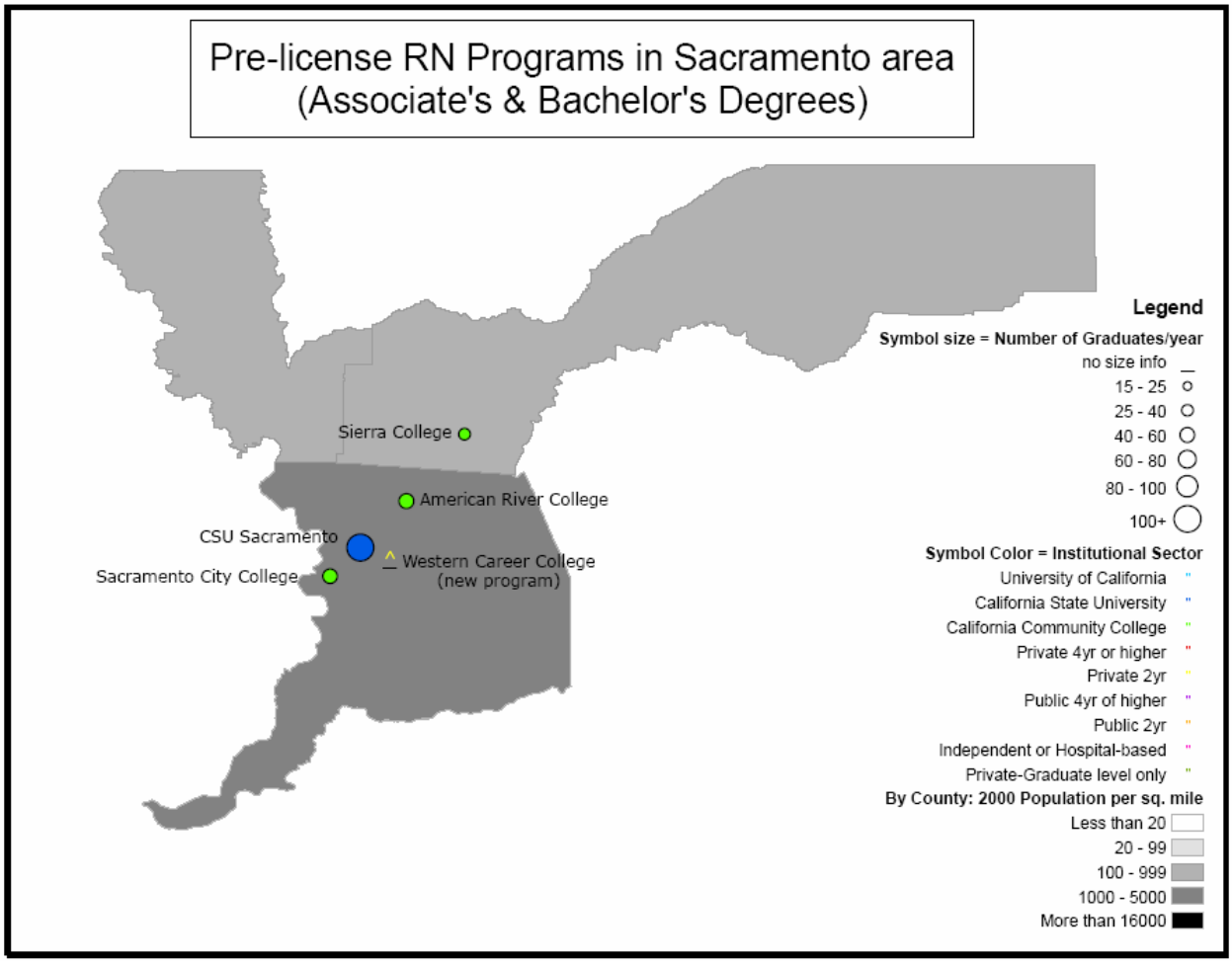
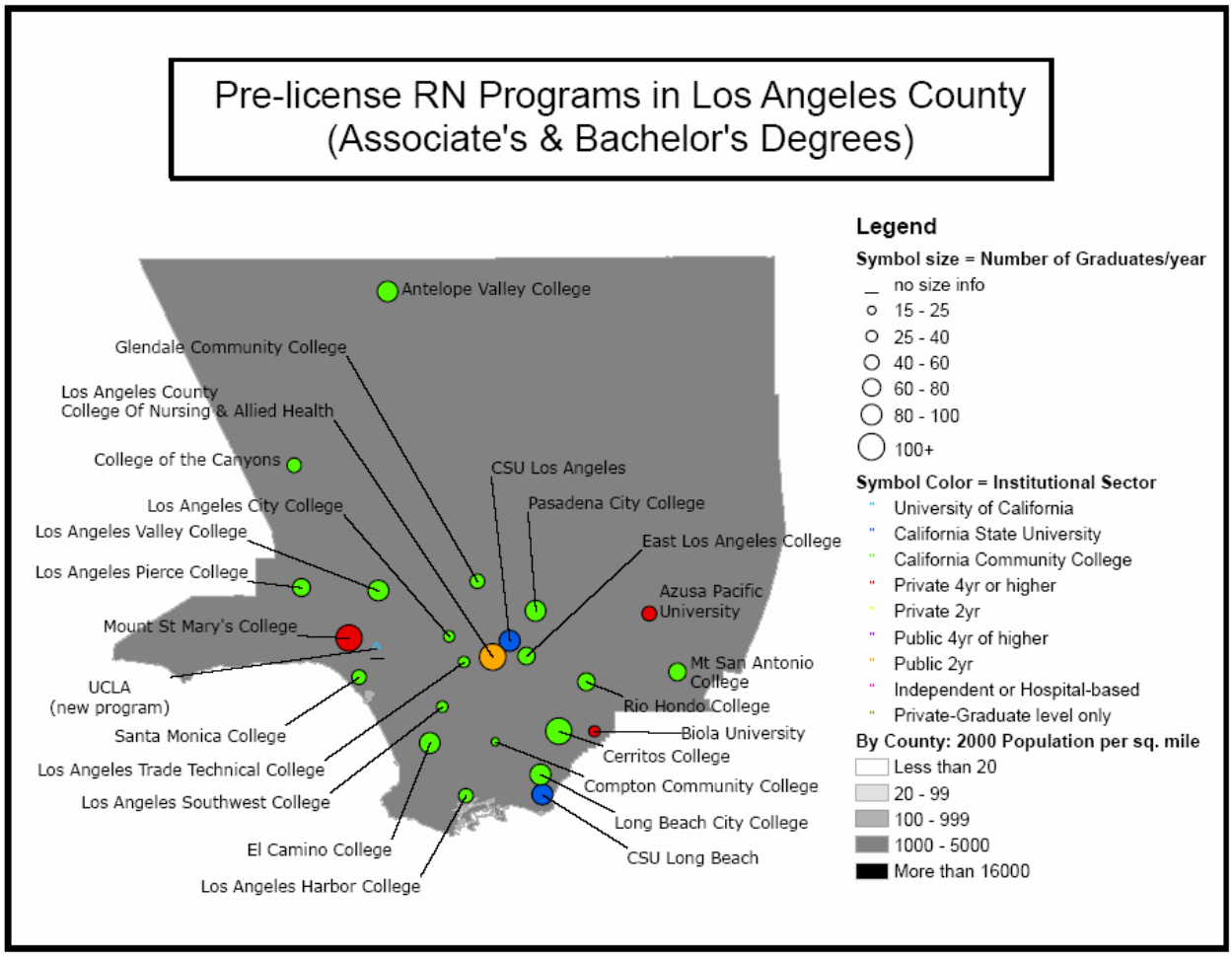
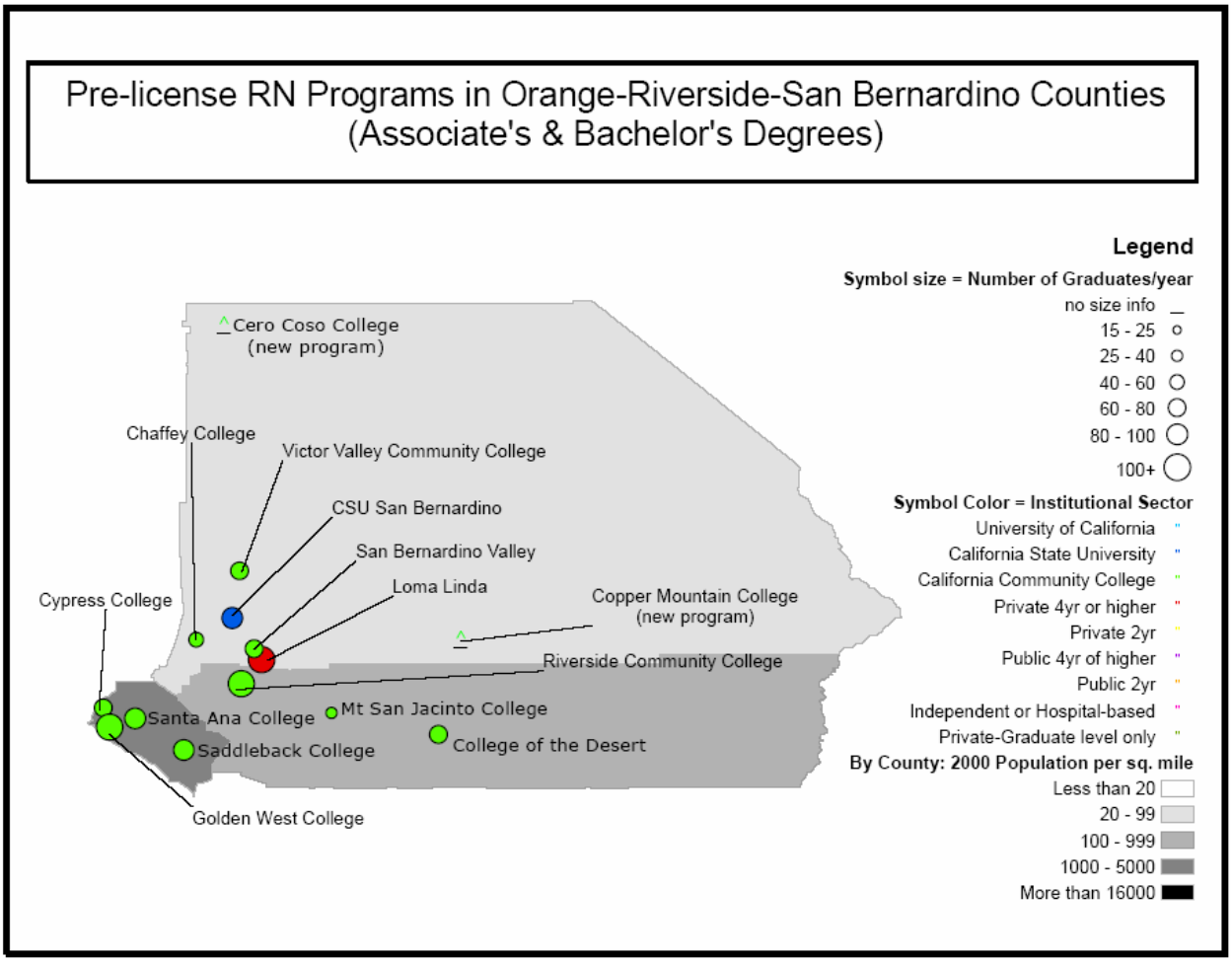
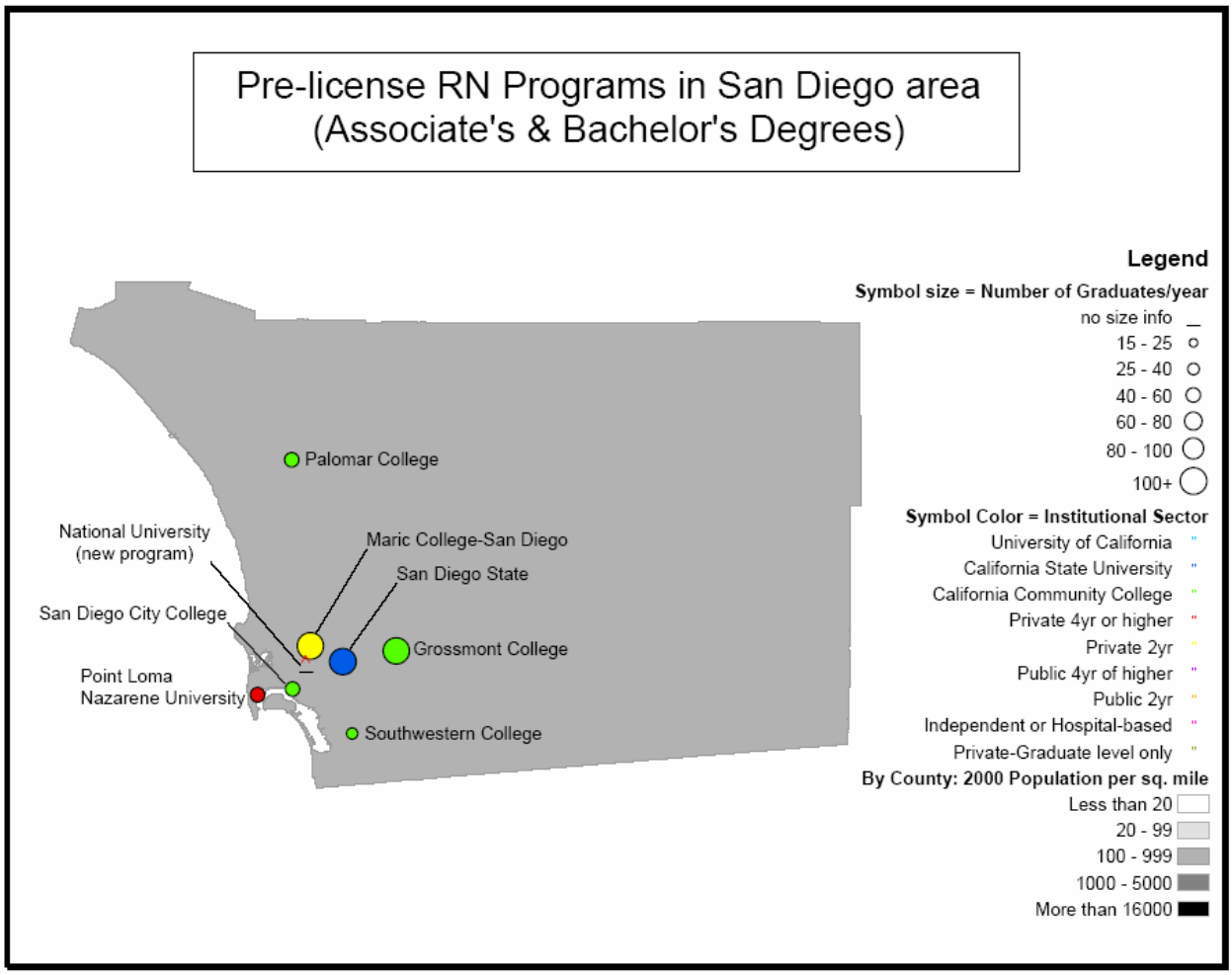
100 - 999
1000 - 5000
More than 16000

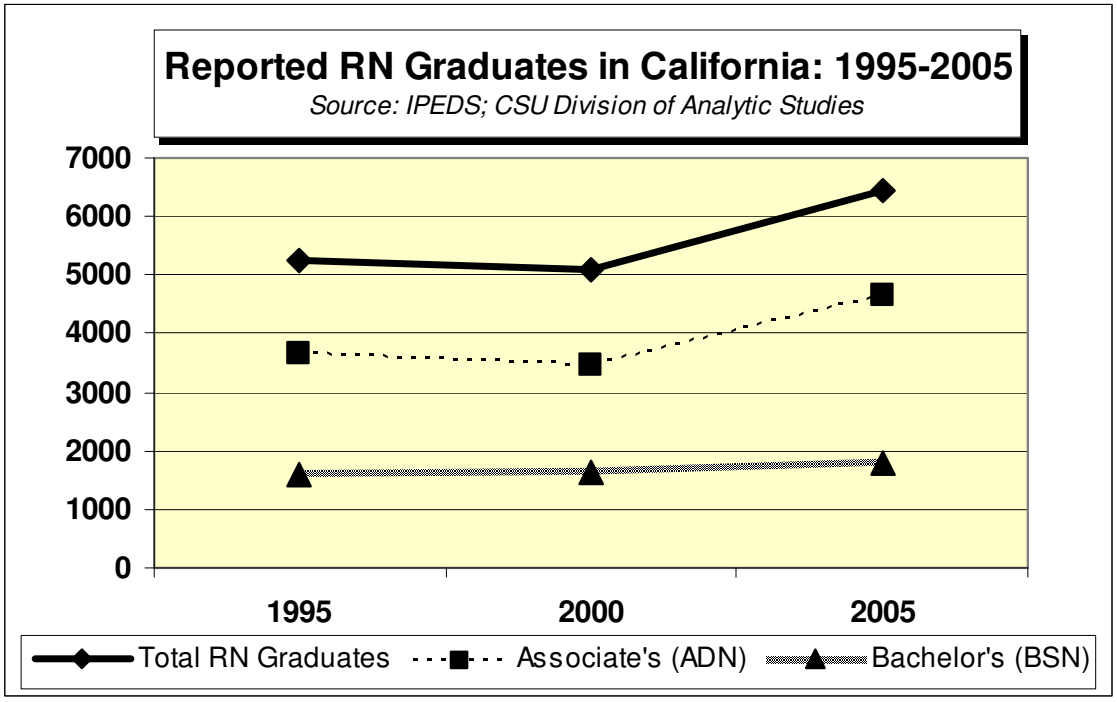

Pre-license RN Programs in Sacramento area
(Associate's & Bachelor's Degrees)
Sierra College
American River College
CSU Sacramento
Western Career College
(new program)
Sacramento City College
Legend
Symbol size = Number of Graduates/year
no size info
15 - 25
25 - 40
40 - 60
60 - 80
80 - 100
100+
Symbol Color = Institutional Sector
University of California
California State University
California Community College
Private 4yr or higher
Private 2yr
Public 4yr of higher
Public 2yr
Independent or Hospital-based
Private-Graduate level only
By County: 2000 Population per sq. mile
Less than 20
20 - 99
100 - 999
1000 - 5000
More than 16000


Pre-license RN Programs in Los Angeles County
(Associate's & Bachelor's Degrees)
Antelope Valley College
Glendale Community College
Los Angeles County
College Of Nursing & Allied Health
College of the Canyons
Los Angeles City College
Los Angeles Valley College
Los Angeles Pierce College
Mount St Mary's College
UCLA
(new program)
Santa Monica College
Los Angeles Trade Technical College
Los Angeles Southwest College
El Camino College
Los Angeles Harbor College
CSU Los Angeles
Pasadena City College
East Los Angeles College
Azusa Pacific
University
Mt San Antonio
College
Rio Hondo College
Biola University
Cerritos College
Compton Community College
Long Beach City College
CSU Long Beach
Legend
Symbol size = Number of Graduates/year
no size info
15 - 25
25 - 40
40 - 60
60 - 80
80 - 100
100+
Symbol Color = Institutional Sector
University of California
California State University
California Community College
Private 4yr or higher
Private 2yr
Public 4yr of higher
Public 2yr
Independent or Hospital-based
Private-Graduate level only
By County: 2000 Population per sq. mile
Less than 20
20 - 99
100 - 999
1000 - 5000
More than 16000

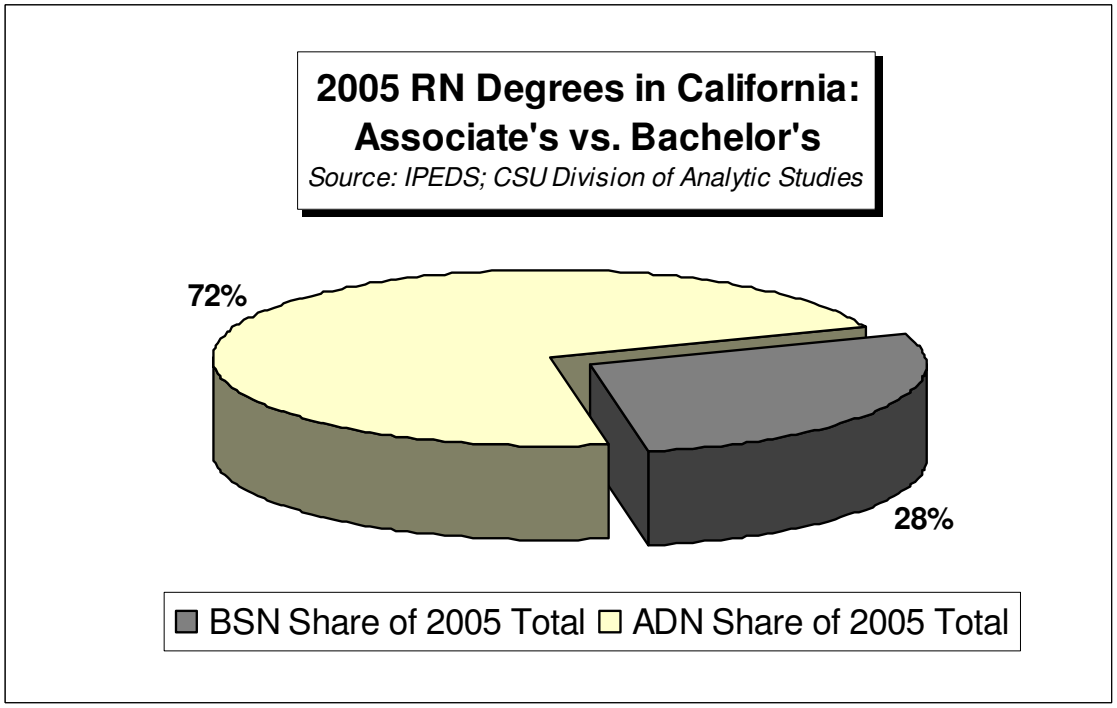

Pre-license RN Programs in Orange-Riverside-San Bernardino Counties
(Associate's & Bachelor's Degrees)
Cero Coso College
(new program)
Chaffey College
Victor Valley Community College
CSU San Bernardino
San Bernardino Valley
Loma Linda
Cypress College
Copper Mountain College
(new program)
Riverside Community College
Santa Ana College
Mt San Jacinto College
Saddleback College
College of the Desert
Golden West College
Legend
Symbol size = Number of Graduates/year
no size info
15 - 25
25 - 40
40 - 60
60 - 80
80 - 100
100+
Symbol Color = Institutional Sector
University of California
California State University
California Community College
Private 4yr or higher
Private 2yr
Public 4yr of higher
Public 2yr
Independent or Hospital-based
Private-Graduate level only
By County: 2000 Population per sq. mile
Less than 20
20 - 99
100 - 999
1000 - 5000
More than 16000


Pre-license RN Programs in San Diego area
(Associate's & Bachelor's Degrees)
Palomar College
National University
(new program)
Maric College-San Diego
San Diego State
San Diego City College
Grossmont College
Point Loma
Nazarene University
Southwestern College
Legend
Symbol size = Number of Graduates/year
no size info
15 - 25
25 - 40
40 - 60
60 - 80
80 - 100
100+
Symbol Color = Institutional Sector
University of California
California State University
California Community College
Private 4yr or higher
Private 2yr
Public 4yr of higher
Public 2yr
Independent or Hospital-based
Private-Graduate level only
By County: 2000 Population per sq. mile
Less than 20
20 - 99
100 - 999
1000 - 5000
More than 16000

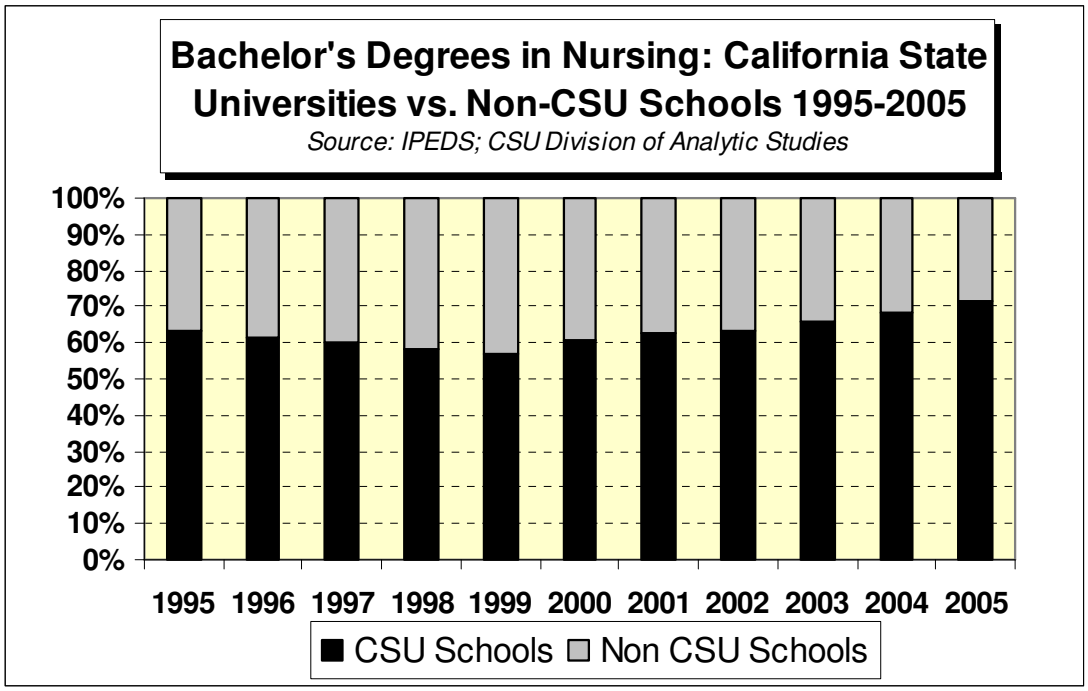
- **Education Data: Registered Nursing** (Pre-license)



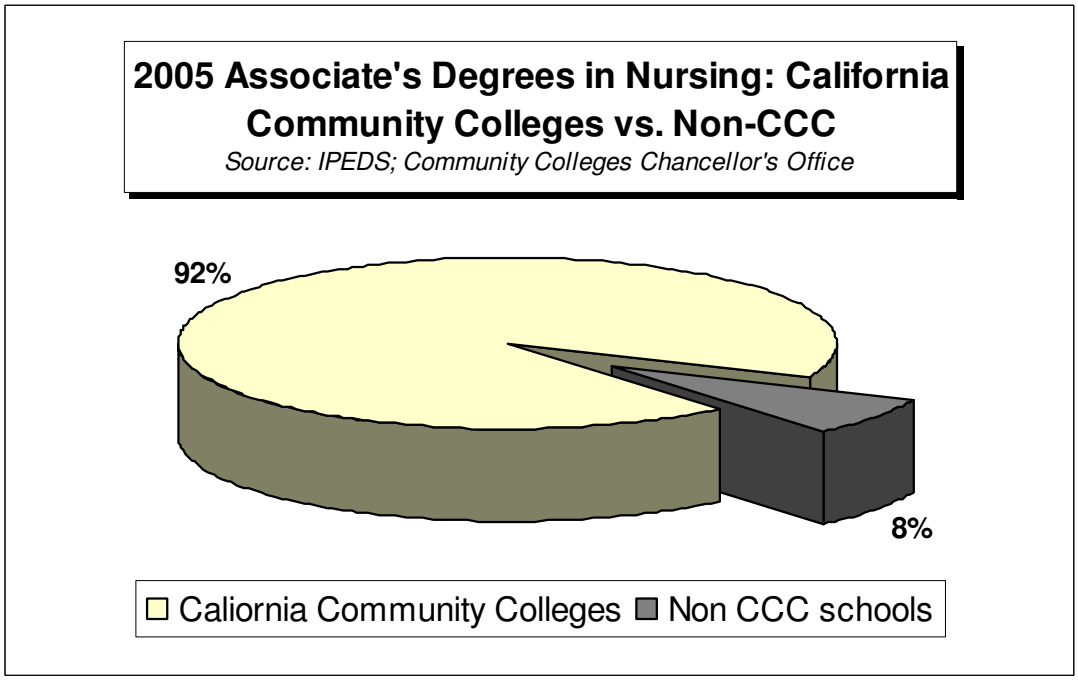

- The number of graduates from pre-license RN programs in California increased roughly 25% in the period between 2000 and 2005.
- Approximately 90% of this increase occurred at the level of the associate's degree in nursing (ADN).



- In 2005, pre-license degrees in registered nursing were distributed approximately 72% associate's degrees and 28% bachelor's degrees.




- The majority of graduates from pre-license bachelor's degree programs in nursing are trained in the California State University system. This proportion declined through the mid and late 1990s, but has steadily increased since 2000.



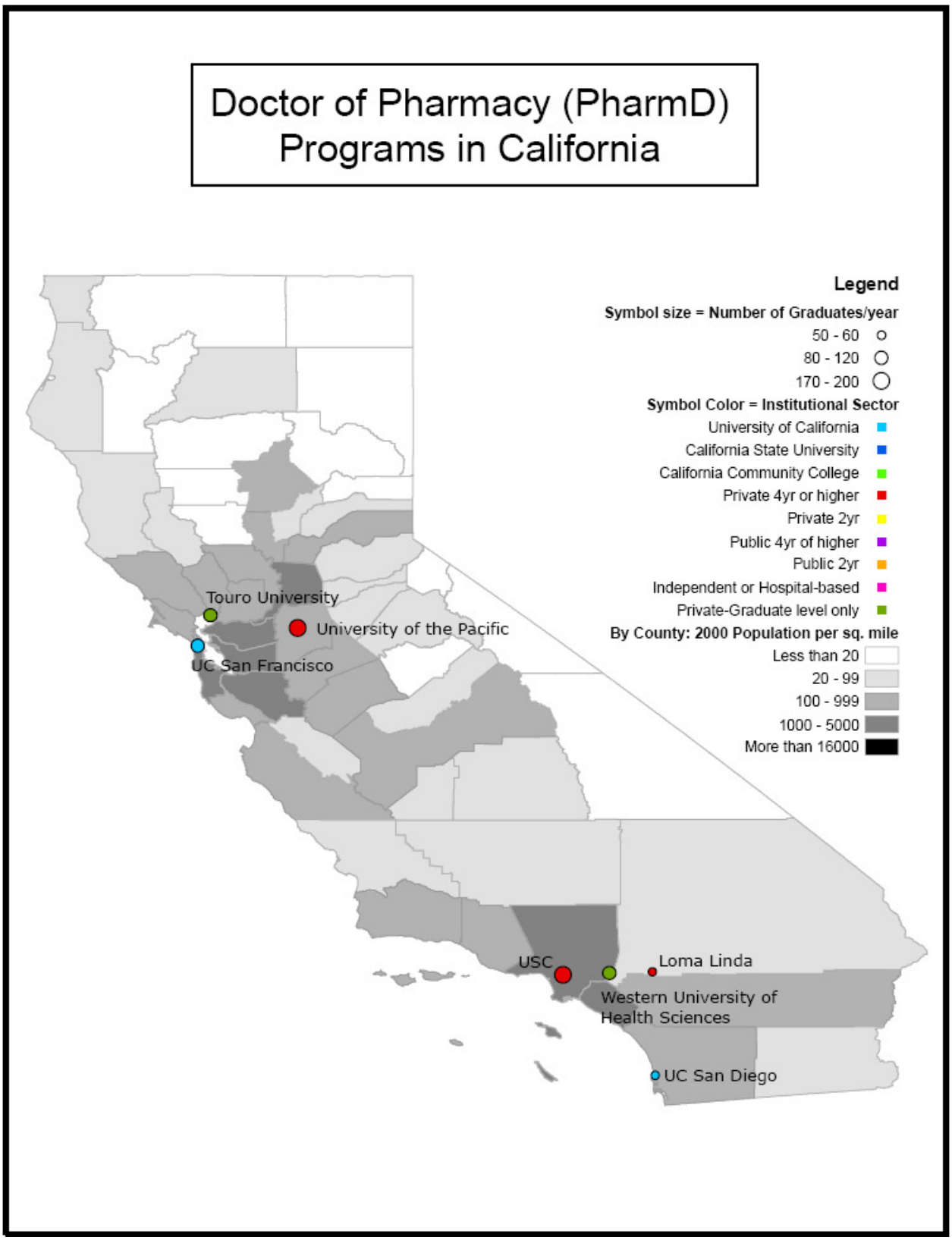

- In 2005, the California community college system produced roughly 92% of the graduates from associate degree nursing programs.

# Pharmacy

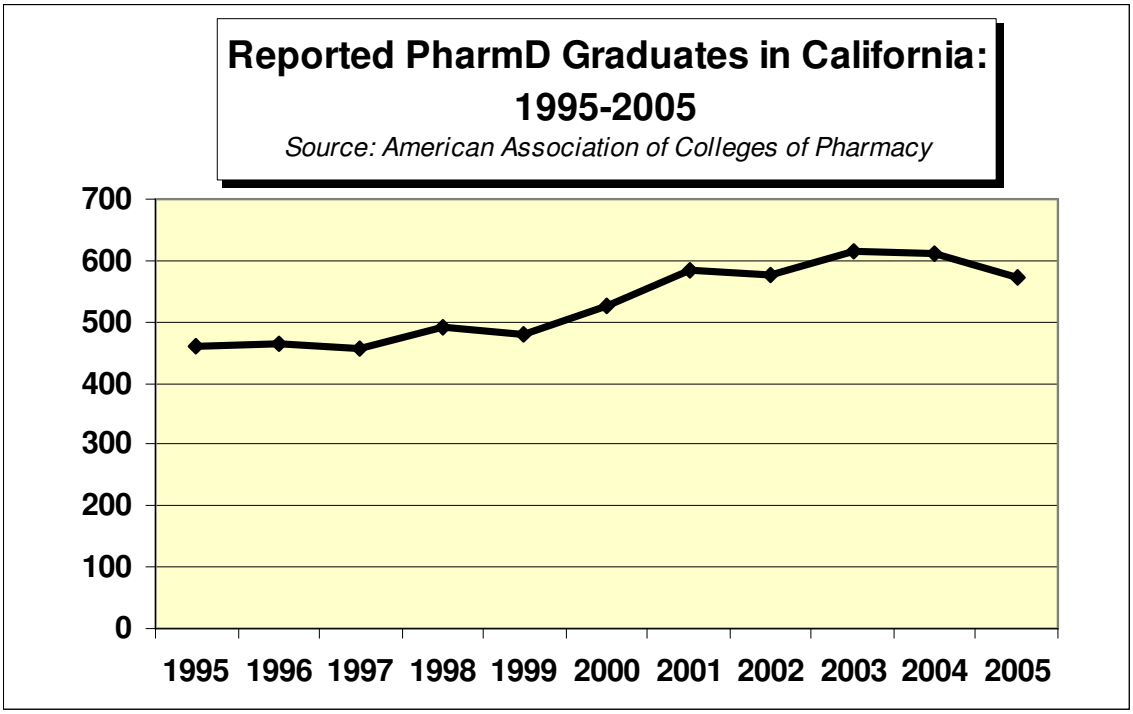
## Labor Market Data: Pharmacy

| Description | California | United States |
|---|---|---|
| Number of Jobs (2005) | 21,000 – 25,700 | 226,000 – 233,400 |
| Employment per 100,000 Population (2005) | 58 – 71 | 76 – 79 |
| Annual Median Wage (2005) | $102,000 - $106,000 | $89,000 – $90,000 |
| Projected Growth in Employment 2004 - 2014 | Faster than average | Faster than average |

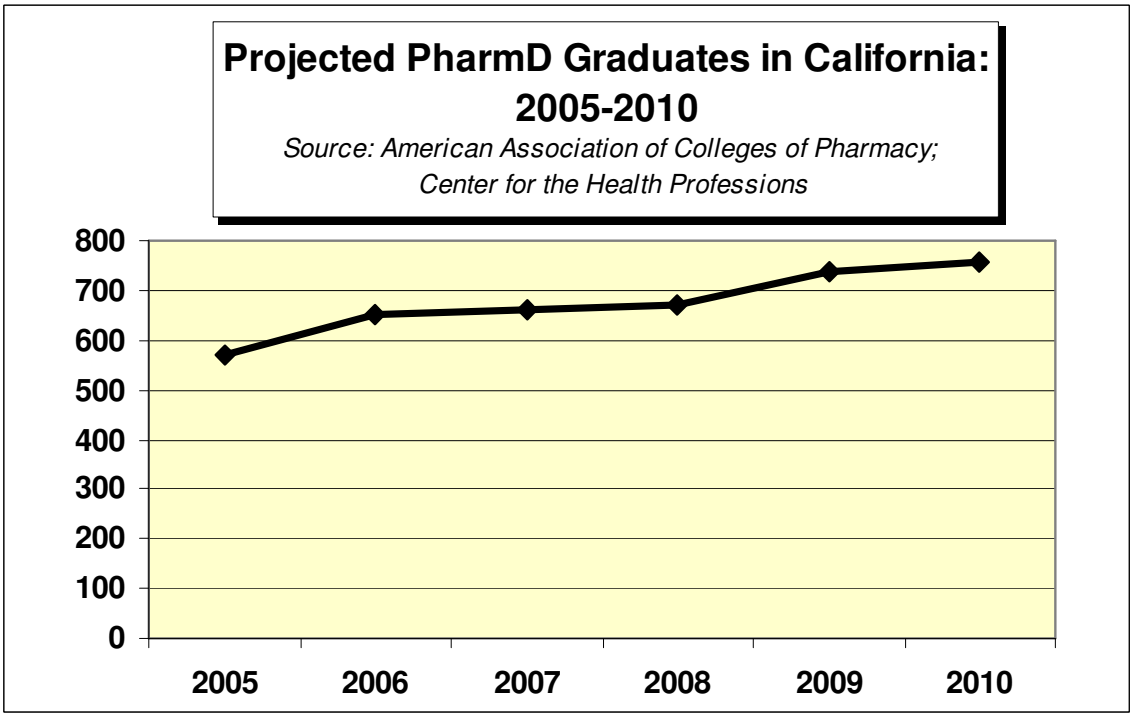
- The ratio of pharmacists per general population in California is much smaller than it is nationally.
- Median wages for pharmacists in California are much higher than they are nationally.


Doctor of Pharmacy (PharmD)
Programs in California
Legend
Symbol size = Number of Graduates/year
50 - 60
80 - 120
170 - 200
Symbol Color = Institutional Sector
University of California
California State University
California Community College
Private 4yr or higher
Private 2yr
Public 4yr of higher
Public 2yr
Independent or Hospital-based
Private-Graduate level only
By County: 2000 Population per sq. mile
Less than 20
20 - 99
100 - 999
1000 - 5000
More than 16000
Touro University
University of the Pacific
UC San Francisco
USC
Loma Linda
Western University of
Health Sciences
UC San Diego

## ○ Education Data: Pharmacy




- Western University of Health Sciences graduated its first class of Doctor of Pharmacy (PharmD) students in 2000, explaining most of the upward trend.



- In 2002, Loma Linda and UC San Diego opened PharmD programs; they graduated their inaugural classes in Spring 2006.
- Touro University opened a PharmD program in 2005 and will graduate its inaugural class in Spring 2009.
- At projected capacity, these added programs will increase the number of PharmD graduates by approximately 200 per year.

## Physical Therapy

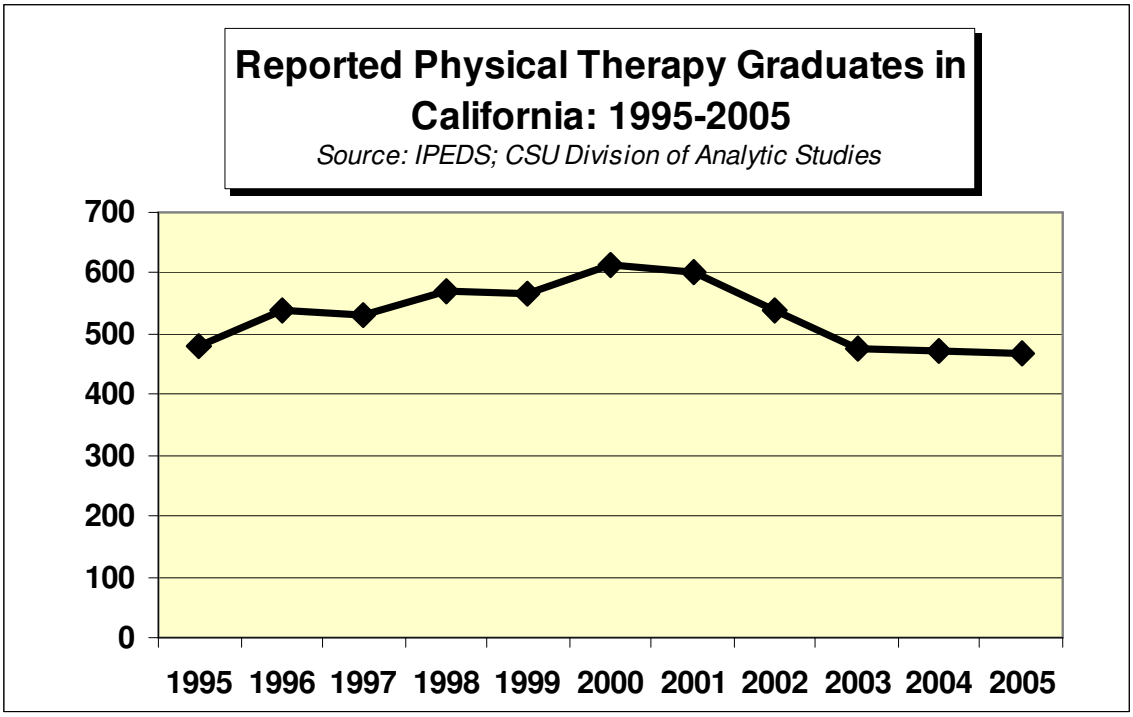
### o Labor Market Data: Physical Therapy

| Description | California | United States |
|---|---|---|
| Number of Jobs (2005) | 12,200 – 14,500 | 148,000 – 154,600 |
| Employment per 100,000 Population (2005) | 34 – 40 | 50 – 52 |
| Annual Median Wage (2005) | $68,000 - $72,000 | $62,000 – $65,000 |
| Projected Growth in Employment 2004 - 2014 | Much faster than average | Much faster than average |

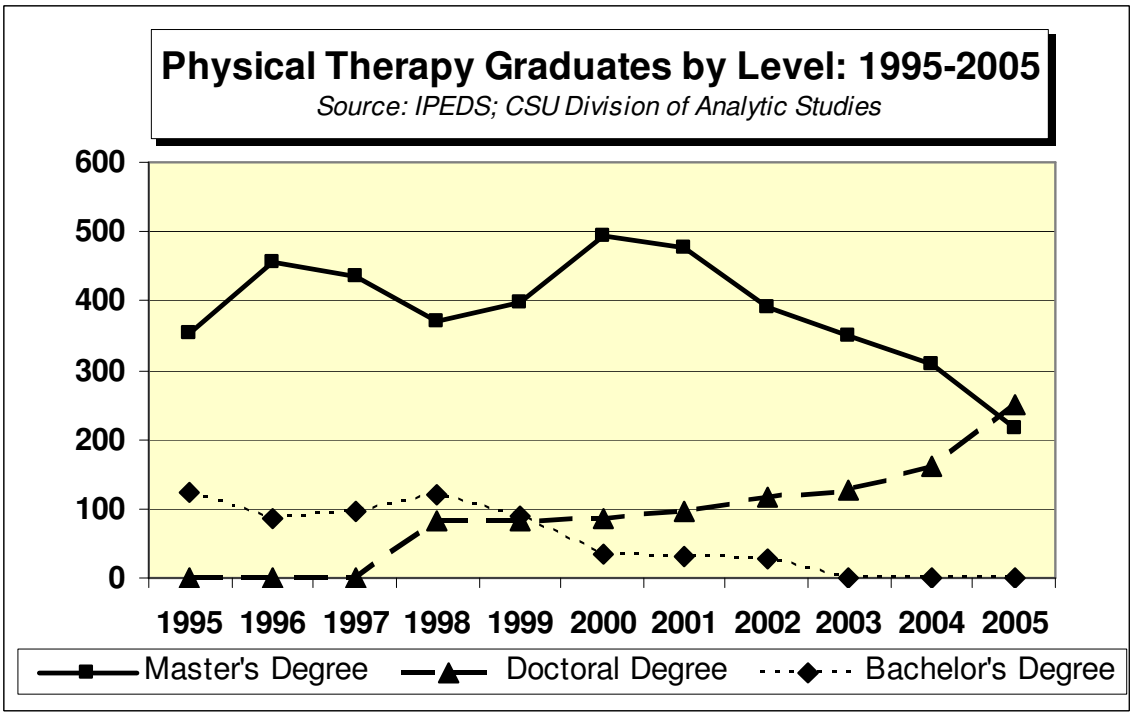
- The ratio of physical therapists per general population in California is much smaller than it is nationally.
- Median wages for physical therapists in California are higher in California than they are nationally.


Physical Therapy Programs in California
Legend
Symbol size = Number of Graduates/year
15 - 25
25 - 35
80 - 90
115+
Symbol Color = Institutional Sector
University of California
California State University
California Community College
Private 4yr or higher
Private 2yr
Public 4yr of higher
Public 2yr
Independent or Hospital-based
Private-Graduate level only
By County: 2000 Population per sq. mile
Less than 20
20 - 99
100 - 999
1000 - 5000
More than 16000
CSU Sacramento
UCSF/San Francisco State
University of the Pacific
Samuel Merritt College
CSU Fresno
CSU Northridge
Azusa Pacific University
Western University of Health Sciences
Mt Saint Mary's College
Loma Linda
USC
CSU Long Beach
Chapman University

## ○ Education Data: Physical Therapy




- The trend in the overall number of physical therapy graduates has declined since 2000.



- There has been a major shift away from the master's degree in physical therapy (MPT) toward the Doctor of Physical Therapy (DPT).
- The bachelor's degree in physical therapy was phased out by 2003.

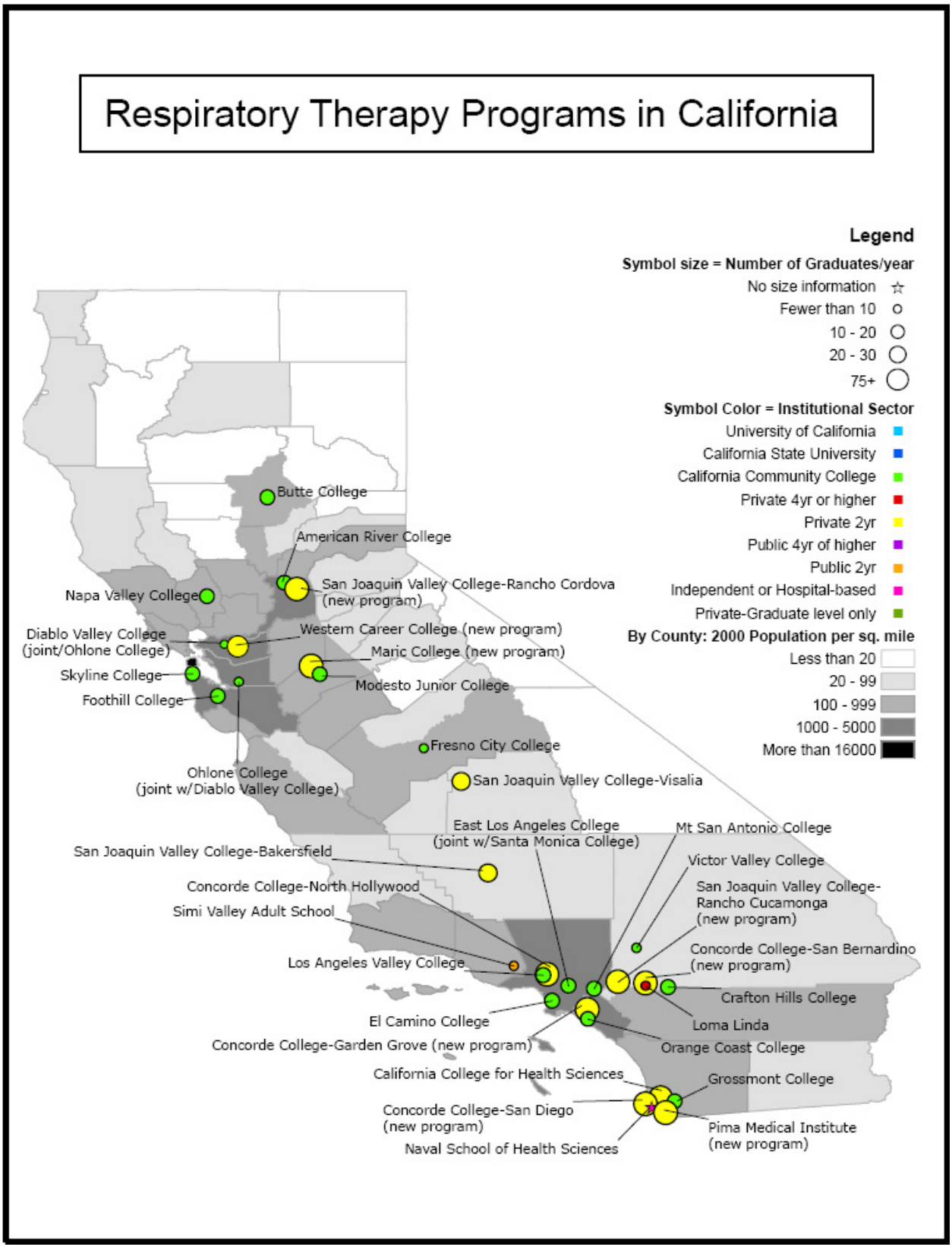
## Respiratory Therapy

Respiratory therapy is the practice of evaluating, treating, and managing the care of those who suffer breathing and other cardiopulmonary disorders. There are two distinct primary credentials within the profession of respiratory therapy: the entry-level, certified respiratory therapist (CRT) and the advanced-level, registered respiratory therapist (RRT). Correspondingly, there are two levels of education programming: the entry-level program and the advanced-level program. Graduates of an entry-level program are eligible to take the CRT exam, but not the RRT exam. Graduates of an advanced-level program, after earning the entry-level CRT credential, are then eligible to take the RRT exam. According to the accrediting body responsible for oversight of respiratory therapy education, only five of the California's 38 programs offer the entry-level program. Both California state law (since the year 2000) and admission to the exams administered by National Board of Respiratory Care require an associate's degree at either the CRT or RRT levels.

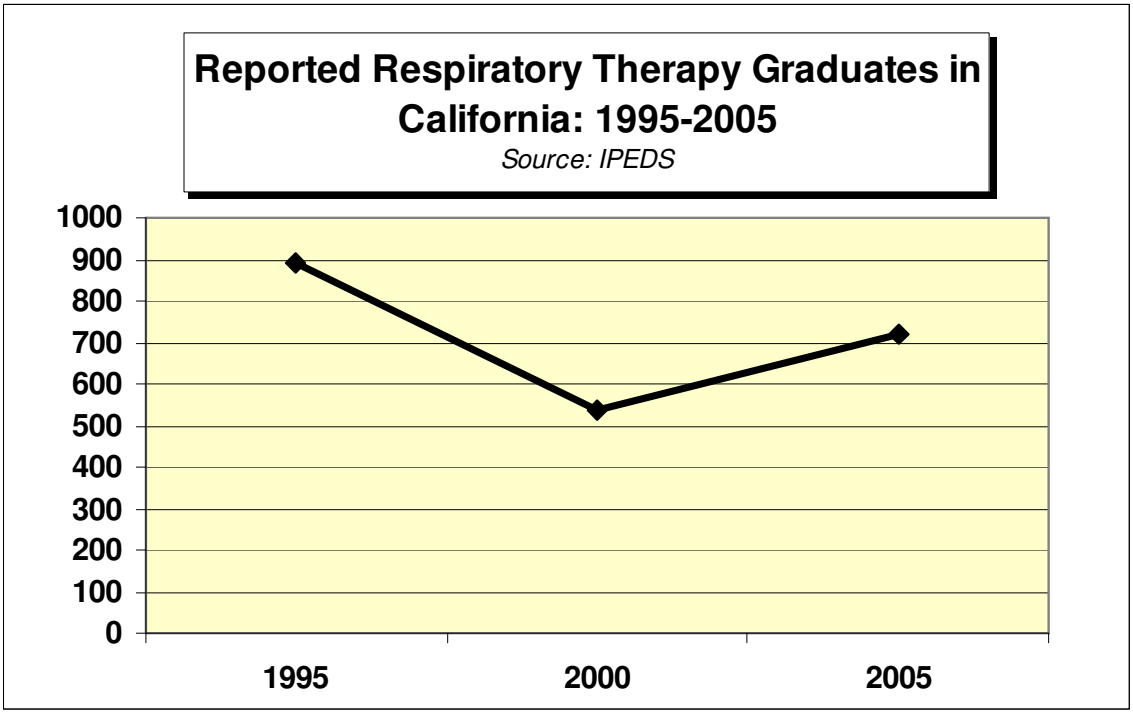
### o Labor Market Data: Respiratory Therapy

| Description | California | United States |
|---|---|---|
| Number of Jobs (2005) | 9,600 – 11,200 | 93,000 – 97,000 |
| Employment per 100,000 Population (2005) | 27 – 31 | 31 – 33 |
| Annual Median Wage (2005) | $54,000 - $55,000 | $45,000 – $45,500 |
| Projected Growth in Employment 2004 - 2014 | Faster than average | Much faster than average |

- The ratio of respiratory therapists per general population in California is smaller than it is nationally.
- Median wages for respiratory therapists in California are higher than they are nationally.
- Employment for respiratory therapists is projected to grow less rapidly in California than it is nationally.


Respiratory Therapy Programs in California
Legend
Symbol size = Number of Graduates/year
No size information
Fewer than 10
10 - 20
20 - 30
75+
Symbol Color = Institutional Sector
University of California
California State University
California Community College
Private 4yr or higher
Private 2yr
Public 4yr of higher
Public 2yr
Independent or Hospital-based
Private-Graduate level only
By County: 2000 Population per sq. mile
Less than 20
20 - 99
100 - 999
1000 - 5000
More than 16000
Butte College
American River College
San Joaquin Valley College-Rancho Cordova (new program)
Napa Valley College
Diablo Valley College (joint/Ohlone College)
Western Career College (new program)
Maric College (new program)
Skyline College
Modesto Junior College
Foothill College
Fresno City College
Ohlone College (joint w/Diablo Valley College)
San Joaquin Valley College-Visalia
East Los Angeles College (joint w/Santa Monica College)
Mt San Antonio College
San Joaquin Valley College-Bakersfield
Victor Valley College
Concorde College-North Hollywood
San Joaquin Valley College-Rancho Cucamonga (new program)
Simi Valley Adult School
Concorde College-San Bernardino (new program)
Los Angeles Valley College
Crafton Hills College
El Camino College
Loma Linda
Concorde College-Garden Grove (new program)
Orange Coast College
California College for Health Sciences
Grossmont College
Concorde College-San Diego (new program)
Pima Medical Institute (new program)
Naval School of Health Sciences

- **Education Data: Respiratory Therapy**




- The number of graduates from respiratory therapy programs in California declined between 1995 and 2000.
- This downward trend reflects the introduction of a state regulation in 2000 requiring the associate's degree for entry-level practice.
- The trend after 2000 is upward, signaling an increased number of respiratory therapists entering the workforce.
- In the past five years, four existing programs closed.
- In the past three years, eight new programs opened.
- At projected capacity, these new programs will increase the number of respiratory therapy graduates to more than 1000 per year.

## Clinical Laboratory Science (Medical Technology)

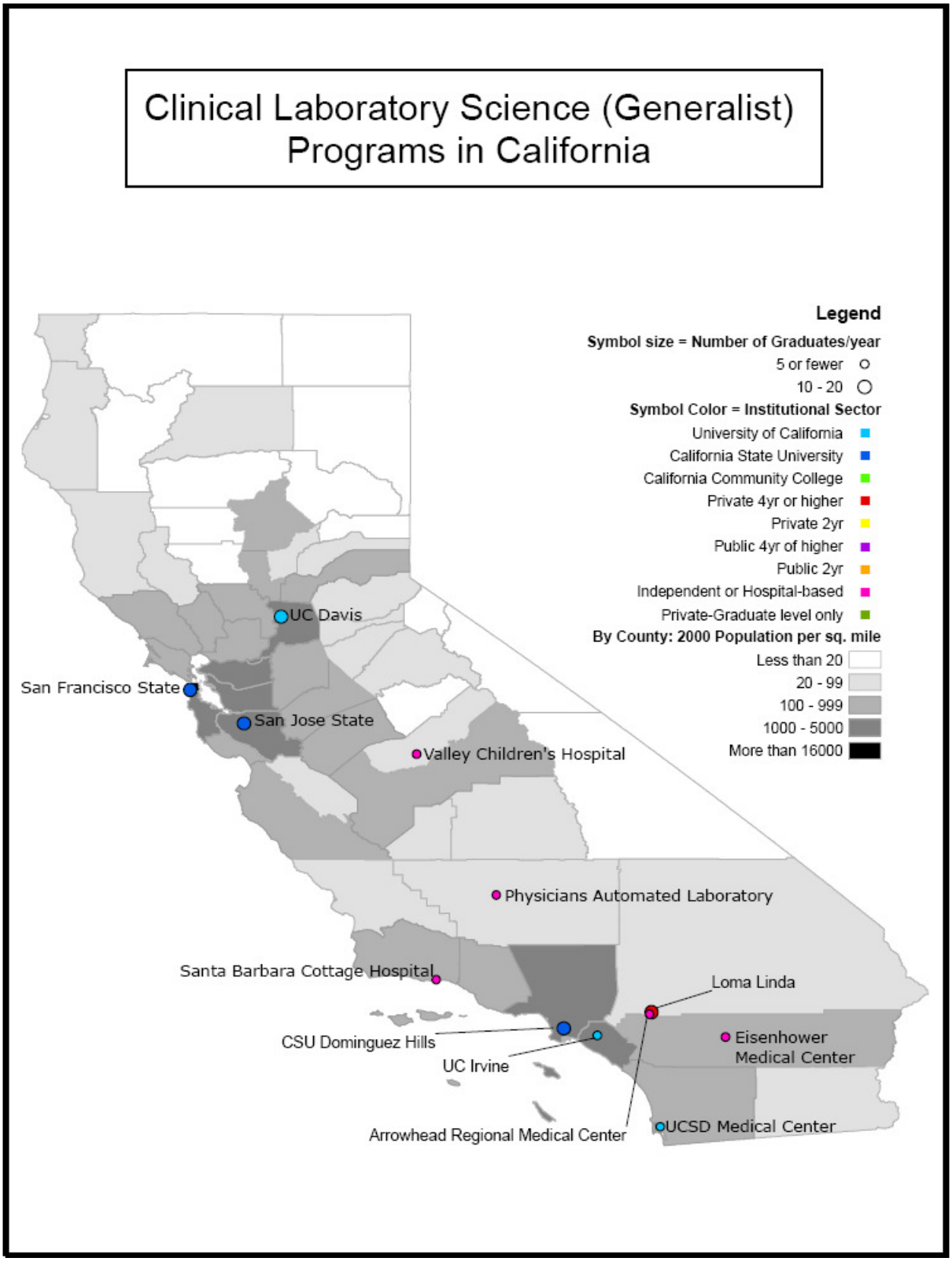
Clinical laboratory science (CLS), also called 'medical technology', refers to a range of complex laboratory tests and procedures that involve knowledge of chemistry, biology, microbiology, molecular biology, hematology, immunology, toxicology, histology, and cytogenetics. The clinical laboratory scientist (aka the medical technologist, aka the clinical laboratory technologist) is a generalist, qualified to conduct necessary tests and procedures across this entire range of specialized areas. There is also a category called 'limited clinical laboratory scientist', which is for professionals who conduct tests and procedures only within a specialized area of knowledge, such as toxicology or cytogenetics.

## o Labor Market Data: Clinical Laboratory Science*

| Description | California | United States |
|---|---|---|
| Number of Jobs (2005) | 11,000 – 13,000 | 152,000 – 158,500 |
| Employment per 100,000 Population (2005) | 31 – 36 | 51 – 54 |
| Annual Median Wage (2005) | $64,000 - $66,000 | $47,000 – $48,000 |
| Projected Growth in Employment 2004 - 2014 | Average | Faster than average |

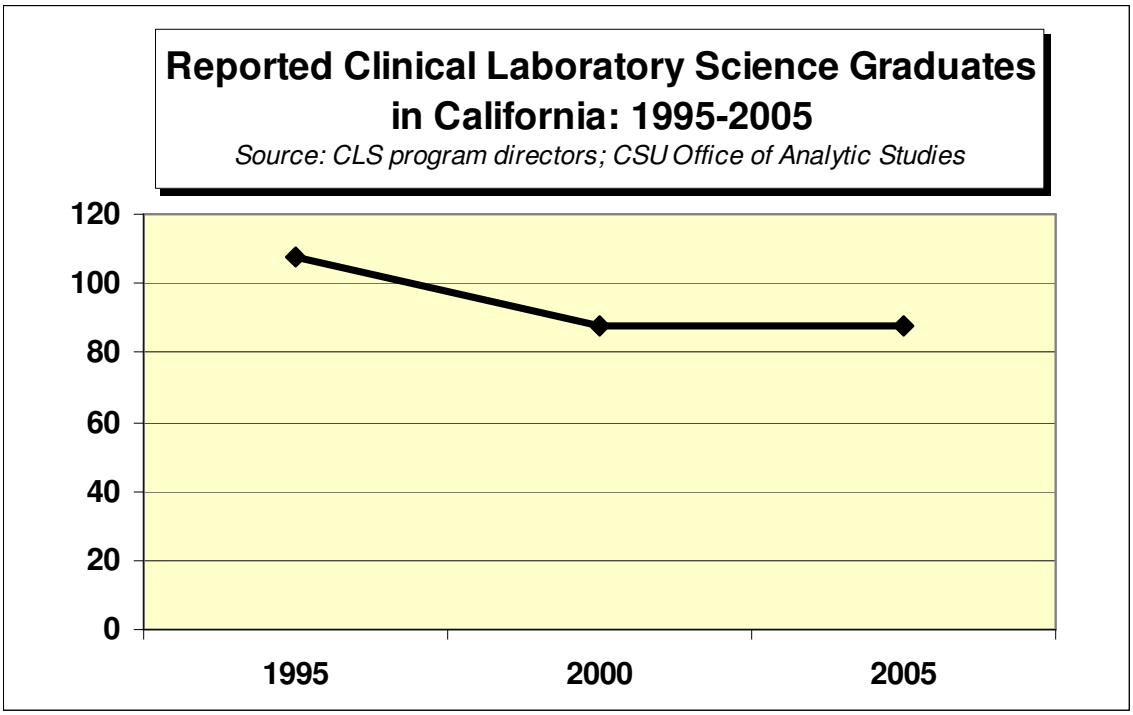
* Clinical Laboratory Technologists & Technicians is the occupational category used by BLS in collecting labor market data for the clinical laboratory science workforce. This category includes multiple occupations: clinical laboratory scientists (generalists and specialists), clinical laboratory technicians (a regulated occupation not yet recognized in California) and unregulated laboratory assistants.

- The ratio of clinical laboratory technologists and technicians per general population in California is much smaller than it is nationally.
- Median wages for clinical laboratory technologists and technicians in California are higher than they are nationally.
- Employment for clinical laboratory scientists is projected to grow less rapidly in California than it is nationally.


Clinical Laboratory Science (Generalist) Programs in California
Legend
Symbol size = Number of Graduates/year
5 or fewer
10 - 20
Symbol Color = Institutional Sector
University of California
California State University
California Community College
Private 4yr or higher
Private 2yr
Public 4yr of higher
Public 2yr
Independent or Hospital-based
Private-Graduate level only
By County: 2000 Population per sq. mile
Less than 20
20 - 99
100 - 999
1000 - 5000
More than 16000
UC Davis
San Francisco State
San Jose State
Valley Children's Hospital
Physicians Automated Laboratory
Santa Barbara Cottage Hospital
Loma Linda
CSU Dominguez Hills
UC Irvine
Eisenhower Medical Center
Arrowhead Regional Medical Center
UCSD Medical Center

### o Education Data: Clinical Laboratory Science

Data are reported by program directors for those programs still in operation. Information on the number of graduates from programs that have closed within the last decade is not included in the chart below. The downtrend illustrated below would be more dramatic if we were able to include data from these closed programs.




- The number of graduates from clinical laboratory science generalist programs in California steadily declined between 1995 and 2000; output has been flat in the last five years.
- There are currently 11 clinical laboratory science generalist programs in California.
- University-based programs typically have multiple clinical affiliates where portions of the program are conducted.
- Programs based at hospitals and medical centers typically conduct all portions of training.
- University-based programs are typically 4-5 times the size of the hospital/medical center-based programs.

## Imaging Technology – Medical Radiography

Medical radiography is the largest of the medical imaging professions and the point of entry into the broader field of radiologic technology. The primary task is taking x-rays, however, both the scope of practice and the required education for medical radiography encompass a great deal more than that of an x-ray technician. Medical radiographers are not limited to x-rays of the chest and extremities and are almost always licensed to deliver flouroscopic treatment. They

frequently obtain post-primary certification and license to practice in mammography, computed tomography, and magnetic resonance imaging.

Only those education programs that allow graduates to sit for the certifying exam sponsored by the American Registry of Radiologic Technologists are included in our analysis. The exam functions as California's licensing exam and candidates must have graduated from an accredited program. Programs in medical radiography are open to qualified high school graduates and are typically two years in length. Both the certificate and the associate's degree are common awards. Data indicate that certificates are more frequent than associate's degrees, but the difference is small.

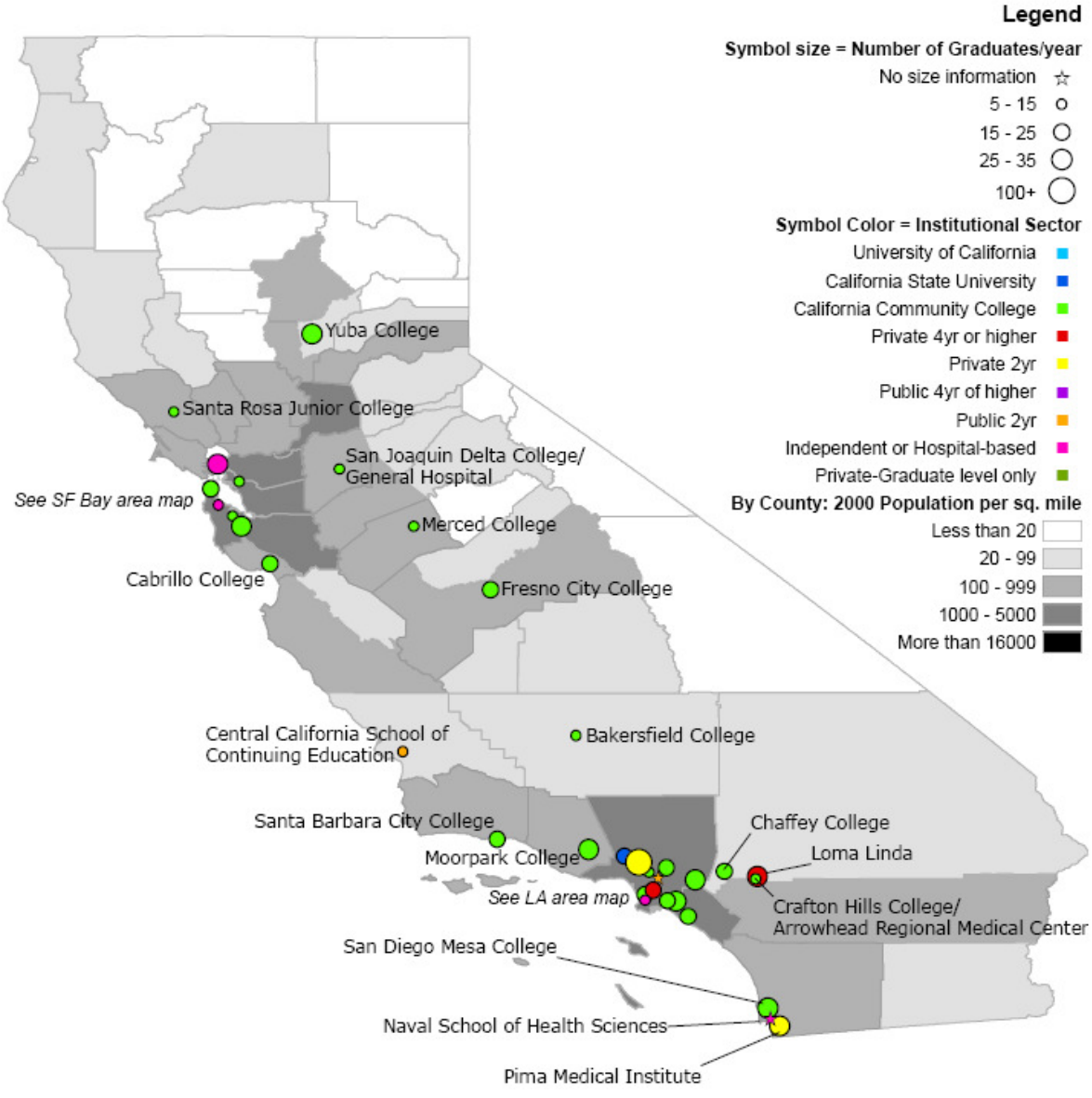
## o Labor Market Data: Medical Radiography*

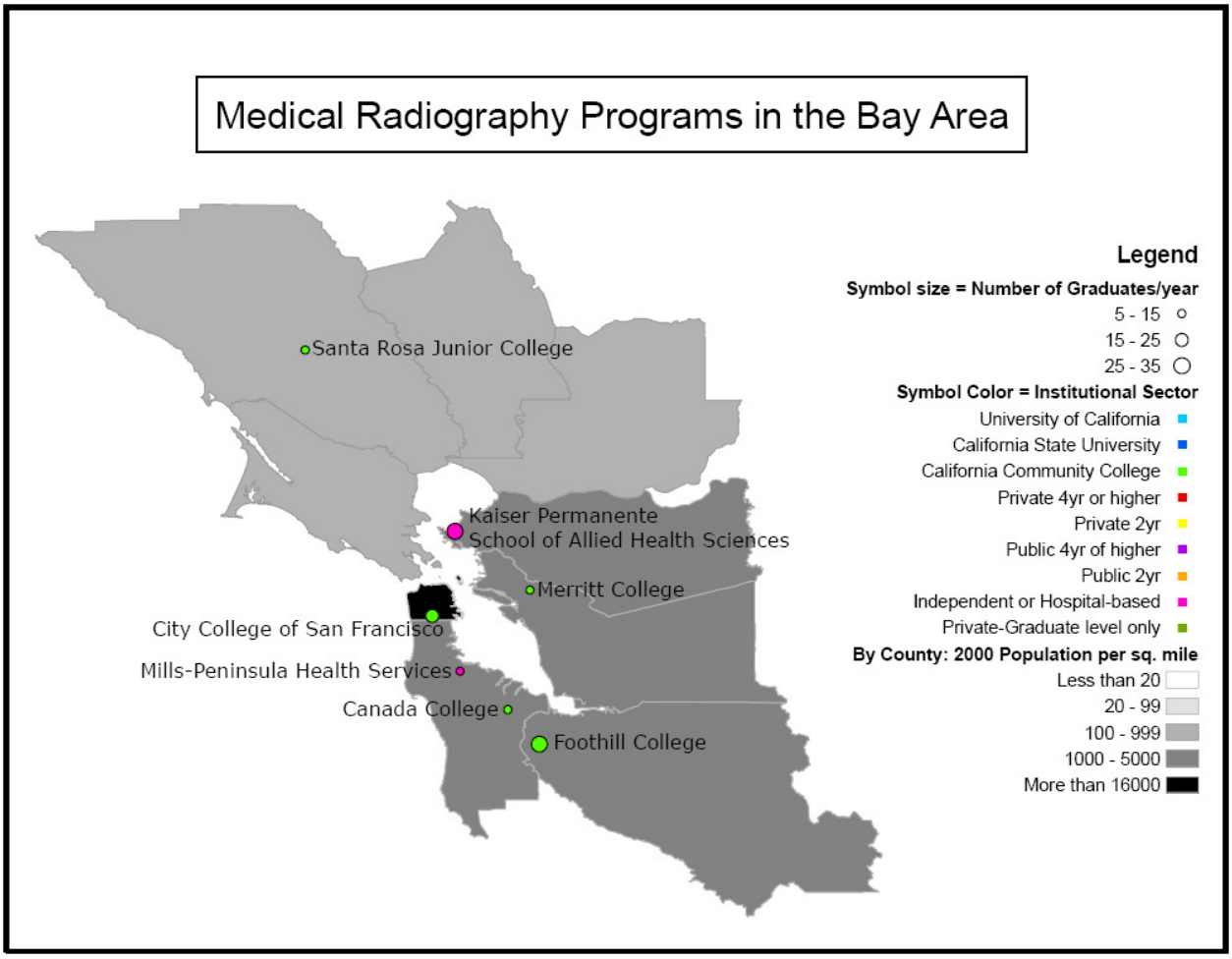
| Description | California | United States |
|---|---|---|
| Number of Jobs (2005) | 13,600 – 16,900 | 180,000 – 189,000 |
| Employment per 100,000 Population (2005) | 38 – 47 | 61 – 64 |
| Annual Median Wage (2005) | $54,000 - $56,000 | $45,000 – $46,000 |
| Projected Growth in Employment 2004 - 2014 | Faster than average | Faster than average |

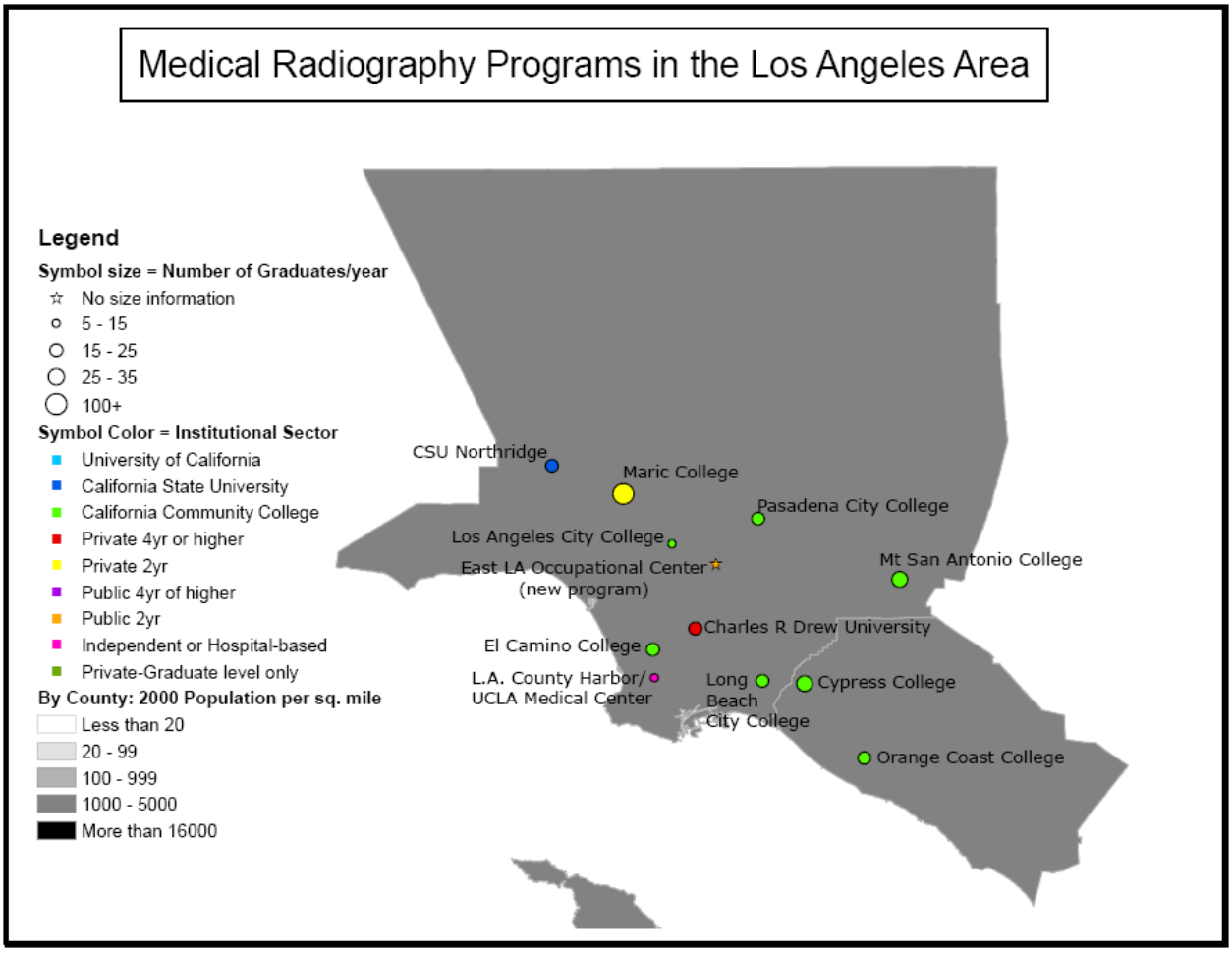
* Radiologic Technologists and Technicians is the occupational category used by BLS to collect labor market data for Medical Radiographers, CT Specialists, MRI specialists and other advanced imaging specialists (whom BLS calls Radiologic Technologists), as well as limited x-ray technicians (Radiologic Technicians)

- The ratio of radiologic technologists and technicians per general population in California is much smaller than it is nationally.
- Median wages for radiologic technologists and technicians in California are higher than they are nationally.

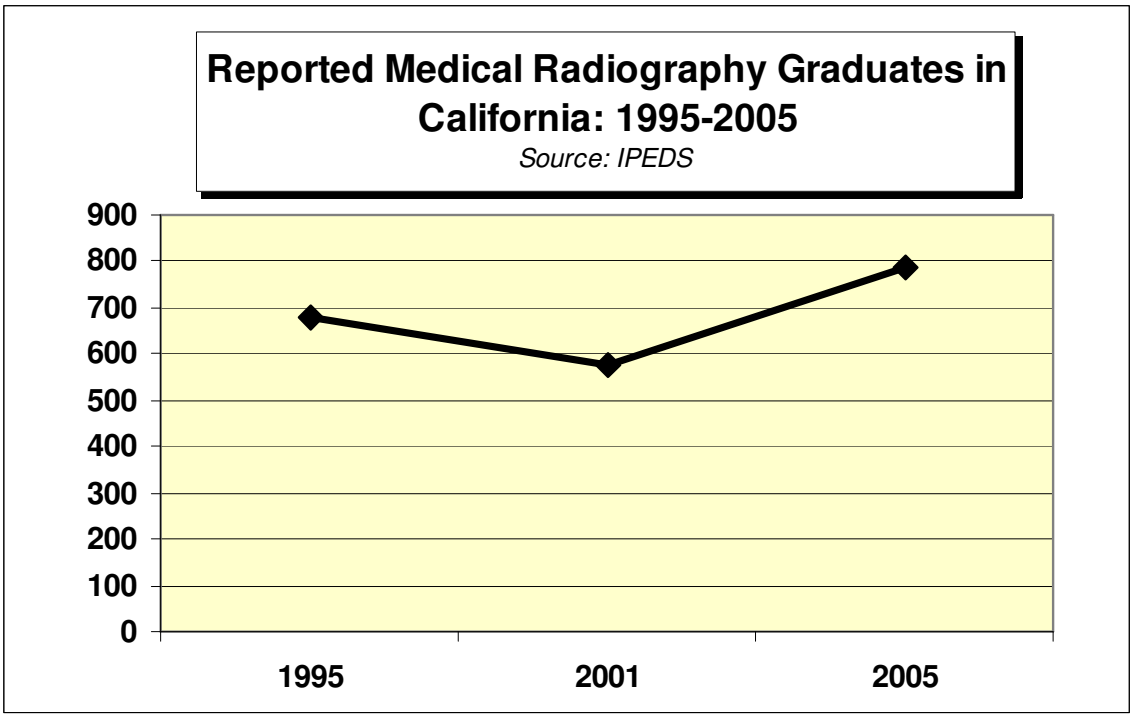
# Medical Radiography Programs in California



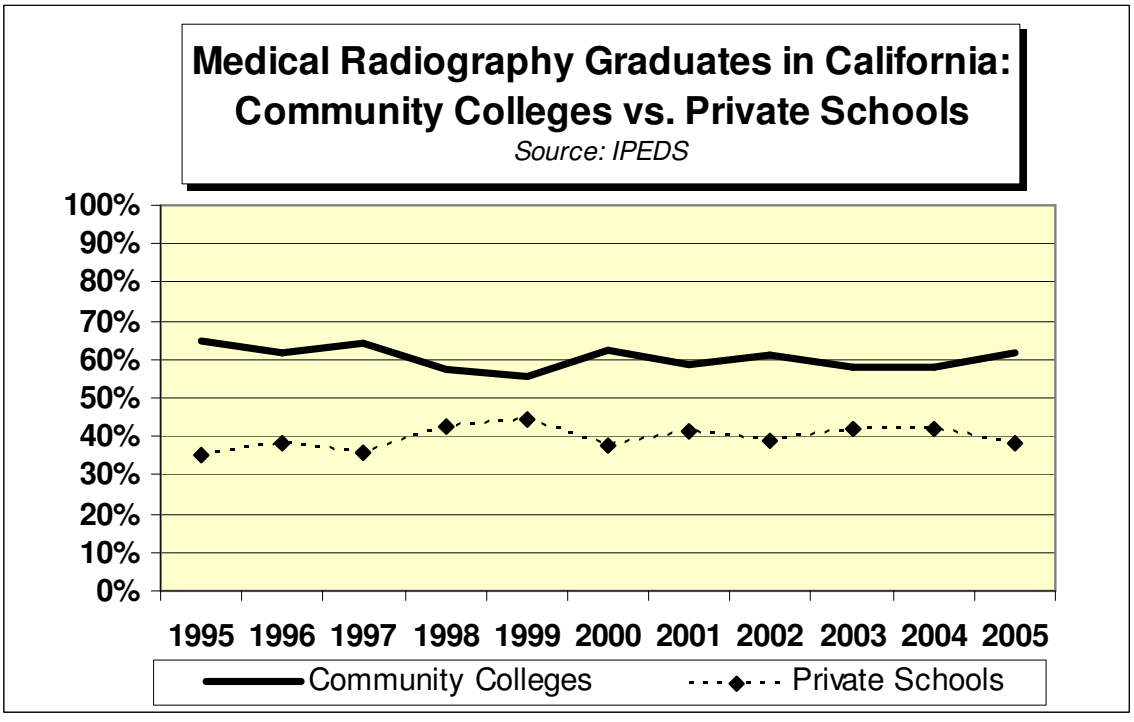

Medical Radiography Programs in the Bay Area
Santa Rosa Junior College
Kaiser Permanente
School of Allied Health Sciences
Merritt College
City College of San Francisco
Mills-Peninsula Health Services
Canada College
Foothill College
Legend
Symbol size = Number of Graduates/year
5 - 15
15 - 25
25 - 35
Symbol Color = Institutional Sector
University of California
California State University
California Community College
Private 4yr or higher
Private 2yr
Public 4yr of higher
Public 2yr
Independent or Hospital-based
Private-Graduate level only
By County: 2000 Population per sq. mile
Less than 20
20 - 99
100 - 999
1000 - 5000
More than 16000


Medical Radiography Programs in the Los Angeles Area
Legend
Symbol size = Number of Graduates/year
No size information
5 - 15
15 - 25
25 - 35
100+
Symbol Color = Institutional Sector
University of California
California State University
California Community College
Private 4yr or higher
Private 2yr
Public 4yr of higher
Public 2yr
Independent or Hospital-based
Private-Graduate level only
By County: 2000 Population per sq. mile
Less than 20
20 - 99
100 - 999
1000 - 5000
More than 16000
CSU Northridge
Maric College
Pasadena City College
Los Angeles City College
East LA Occupational Center
(new program)
Mt San Antonio College
Charles R Drew University
El Camino College
L.A. County Harbor/
UCLA Medical Center
Long
Beach
City College
Cypress College
Orange Coast College

## o Education Data: Medical Radiography




- The number of graduates from medical radiography programs in California declined in the mid and late 1990s.
- This downward trend has reversed itself over the last four years.



- The share of graduates from private schools grew in the mid to late 1990s compared to community colleges, but declined slightly in 2000 and the distribution has remained fairly stable since.
- Currently, the distribution of graduates is approximately 60% community colleges and 40% private schools.

## Radiation Therapy

Radiation therapy is another of the primary occupations in the broader field of radiologic technology. Radiation therapists function as part of a team, alongside a physician specializing in radiation oncology and a medical dosimetrist that delivers radiation-based medical treatment. The radiation therapist uses x-rays and computerized tomography to help locate cancerous growths in a patient and project high intensity radiation at targeted cancer cells.

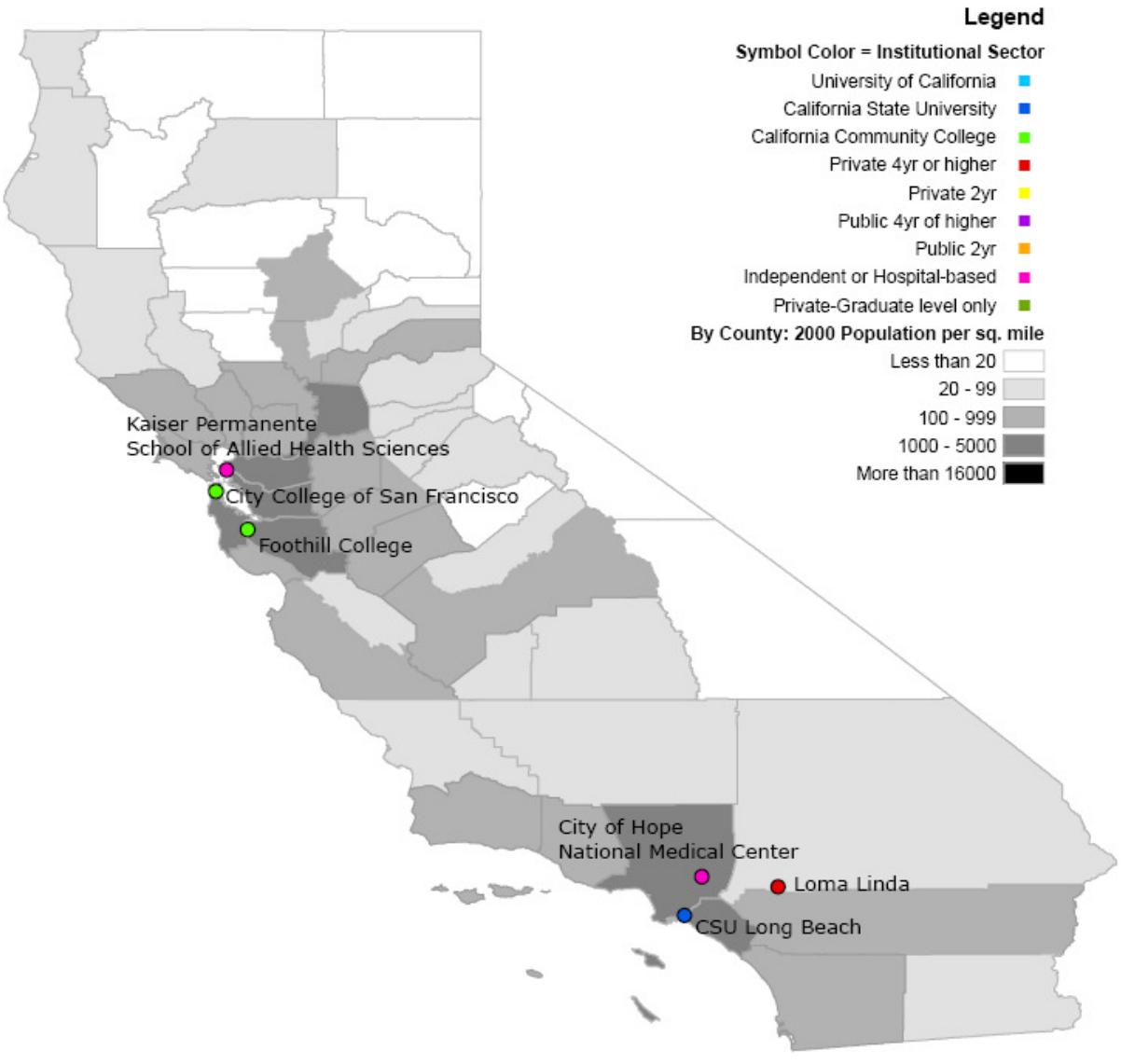
Most radiation therapy programs are 12-month certificate programs; the program at Loma Linda University is one of the few baccalaureate level programs in the country. Admission to a program typically requires education and experience in allied health or a baccalaureate degree in the natural sciences. The certifying exam sponsored by the American Registry for Radiologic Technology functions as California's licensing exam. There is no specific degree requirement in order to be a candidate for examination. There is only the requirement that one be a graduate of an accredited program.

### o Labor Market Data: Radiation Therapy

| Description | California | United States |
|---|---|---|
| Number of Jobs (2005) | 645 – 855 | 12,600 – 15,700 |
| Employment per 100,000 Population (2005) | 1.8 – 2.4 | 4.2 – 5.3 |
| Annual Median Wage (2005) | $73,000 - $78,000 | $61,000 – $63,000 |
| Projected Growth in Employment 2004 - 2014 | Not available | Faster than average |

- Radiation therapy is a comparatively small segment of the imaging technology health professions workforce.
- The ratio of radiation therapists per general population in California is much smaller than it is nationally.
- Median wages for radiation therapists in California are much higher in California than they are nationally.
- State-level estimates for projected growth in employment are not currently available.

# Radiation Therapy Programs in California



### o Education Data: Radiation Therapy

There are six radiation therapy training programs in California. Data on the number of graduates of radiation therapy programs are not easily obtained. Only two of the state's six training programs have reported completions data through the IPEDS survey. According to the AMA Health Professions Education Data Book, in the mid to late 1990s, California produced somewhere between 25–35 new radiation therapy graduates each year. In more recent years, that number has increased, ranging from 40–50 new graduates per year. However, completions data reported in the AMA Data Book represent only a proportion of the known programs in the state.[4]

## Nuclear Medicine Technology

Nuclear medicine technology is another primary occupation in the field of radiologic technology. Nuclear medicine technologists perform a variety of procedures using radiopharmaceuticals and specialized cameras to detect biological changes in the structure or function of human tissues and organs. These professionals both prepare and administer radiopharmaceuticals, which emit signals that are then captured on film and are typically enhanced through digital processing techniques.

Like the field of radiation therapy, nuclear medicine technology is not typically an entry-level occupation. Educational programs usually require prior education or experience in a health profession although a baccalaureate degree in the natural sciences may be an acceptable substitute. Nuclear medicine certificate programs range from 12 to 18 months in length. In California there is one baccalaureate program. In order to take the certification and licensing exam one must graduate from an accredited program.

### o Labor Market Data: Nuclear Medicine Technology

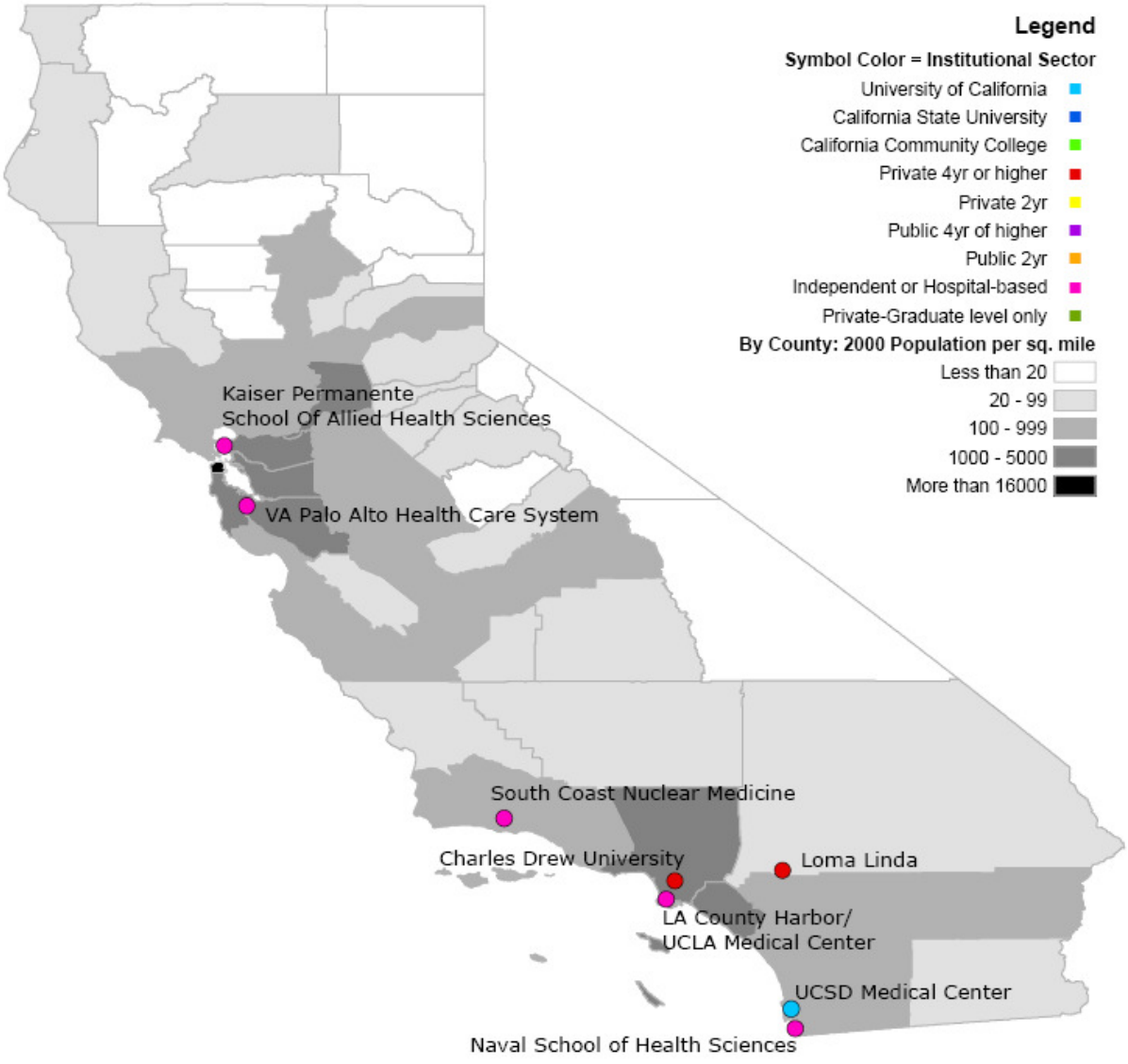
| Description | California | United States |
|---|---|---|
| Number of Jobs (2005) | 1000 – 2000 | 17,300 – 19,200 |
| Employment per 100,000 Population (2005) | 2.8 – 5.5 | 5.8 – 6.5 |
| Annual Median Wage (2005) | $64,000 - $72,000 | $59,000 – $60,000 |
| Projected Growth in Employment 2004 - 2014 | Average | Faster than average |

- In California, the nuclear medicine technology workforce is roughly twice the size of the radiation therapy workforce, but still comparatively small in size.
- The ratio of nuclear medicine technologists per general population in California is much smaller than it is nationally.

[4] We made an effort to contact program administrators directly to obtain complete data.

- Median wages for nuclear medicine technologists in California are higher than they are nationally.
- Employment for nuclear medicine technologists is projected to grow less rapidly in California than it is nationally.

# Nuclear Medicine Technology Programs in California



### o Education Data: Nuclear Medicine Technology

There are currently eight nuclear medicine technology programs in California. As is the case with radiation therapy, data on the number of graduates of nuclear medicine technology programs are not easily obtained. Data in the IPEDS survey are incompletely and inconsistently reported. According to the AMA Health Professions Education Data Book, in the mid to late 1990s California produced somewhere between 10–15 new nuclear medicine technology graduates each year. In more recent years, that number has increased, ranging from 25–35 new graduates per year. However, completions data reported in the AMA Data Book represent only a proportion of the known programs in the state.[5]

## Imaging Technology – Diagnostic Medical Sonography

Sonography is the application of sound waves and reflected echo patterns to create images, which are then used for medical assessment and diagnosis. Diagnostic medical sonography (DMS) encompasses several specialty areas, which can be usefully categorized as primary and post-primary. The distinction between primary and post-primary is meant to distinguish the type of training received in a general diagnostic medical sonography education program (and consequently the scope of practice associated with entry-level practitioners), from more advanced practice areas that come with experience and additional training.

**Primary**

- **Obstetrics & Gynecology** – probably the most well known area of practice as it includes fetal exams for pregnant women; it also includes general diagnostic evaluation of women's reproductive systems.
- **Abdominal** – typically focused on the diagnosis of internal organs in the abdominal region: gall bladder, spleen, kidneys, liver, and spleen.

**Post-primary**

- **Neurosonography** – focus is on the central nervous system and brain.
- **Breast Sonography** – diagnosis and study of breast diseases, used in conjunction with mammography.
- **Ophthalmic Ultrasound** – diagnosis and study of eye diseases.
- **Vascular Technology** – the use of ultrasound technologies to create diagnostic images of the circulatory system.
- **Echocardiography** – the use of ultrasound technologies to create diagnostic images of the heart.

Currently, the state of California does not require a license to practice as a sonographer. However, certification and registration by examination through the American Registry for

[5] We made an effort to contact program administrators directly to obtain complete data.

Diagnostic Medical Sonography (ARDMS)[6] or the American Registry of Radiologic Technologists (ARRT) functions as a de facto license in the sense that these credentials substantially enhance employment opportunity. Pathways to becoming a registered diagnostic medical sonographer vary. In the past, the pathway often led from medical radiography or registered nursing, particularly for workers cross-trained in sonography on the job. However, increasingly candidates seeking certification are graduating from formal DMS education programs, taking between 18–24 months to complete and resulting in an associate's degree or a certificate.

## o Labor Market Data: Diagnostic Medical Sonography*

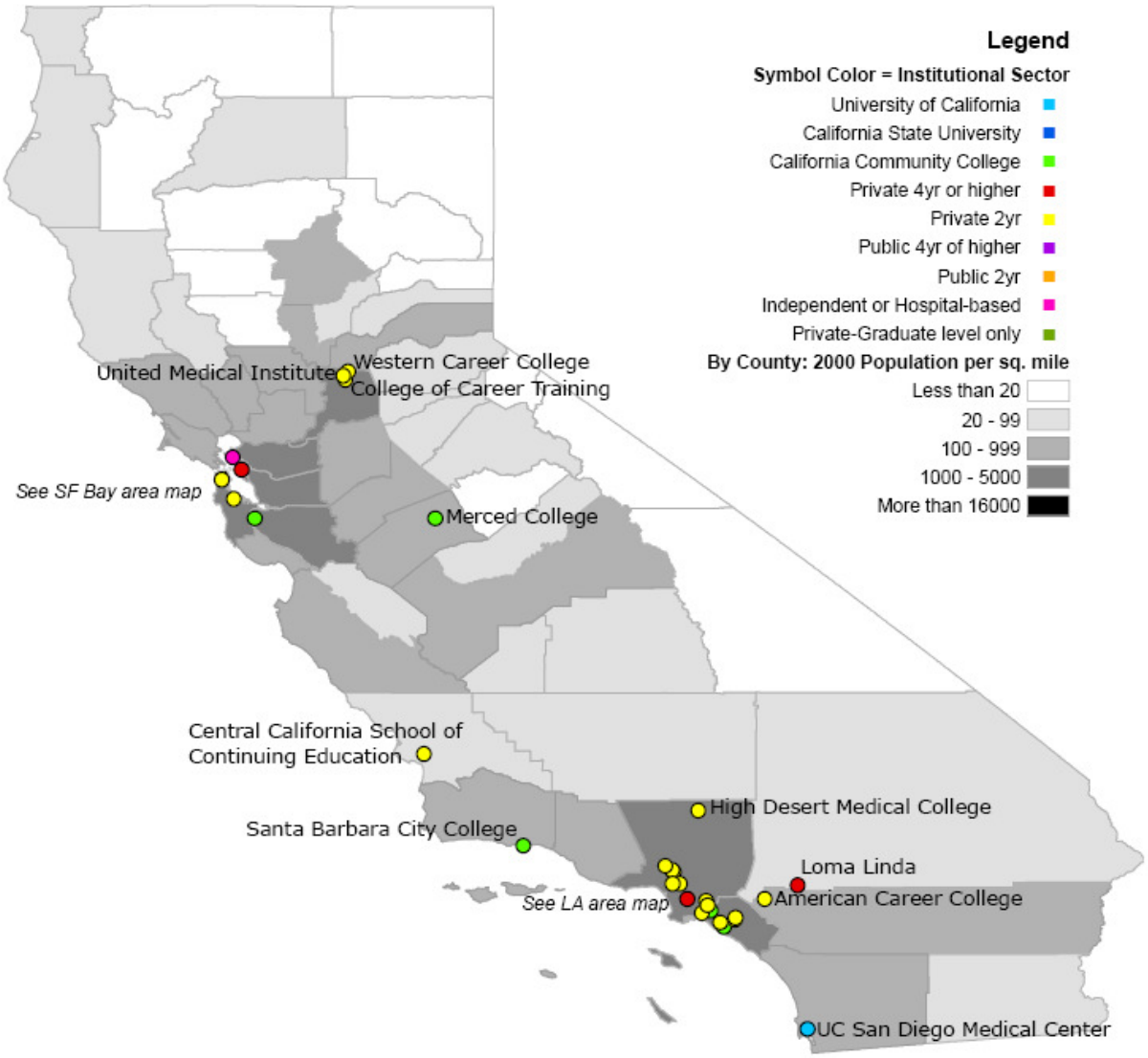
| Description | California | United States |
|---|---|---|
| Number of Jobs (2005) | 2,600 – 3,600 | 42,000 – 45,000 |
| Employment per 100,000 Population (2005) | 7 – 10 | 14 – 15 |
| Annual Median Wage (2005) | $59,000 - $63,000 | $54,000 – $55,000 |
| Projected Growth in Employment 2004 - 2014 | Much faster than average | Much faster than average |

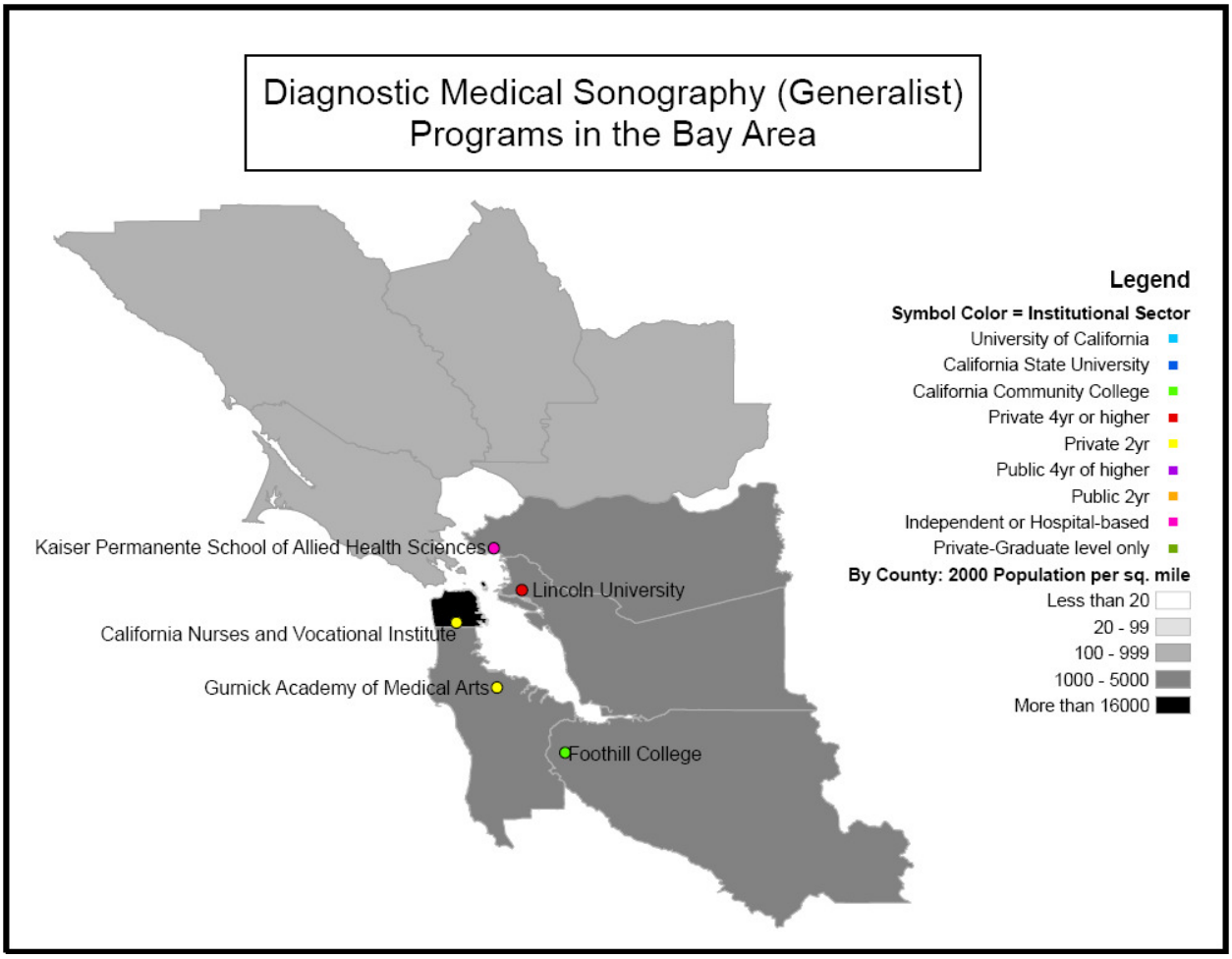
*The BLS occupational category of Diagnostic Medical Sonographers encompasses the entire range of specialties in this profession.

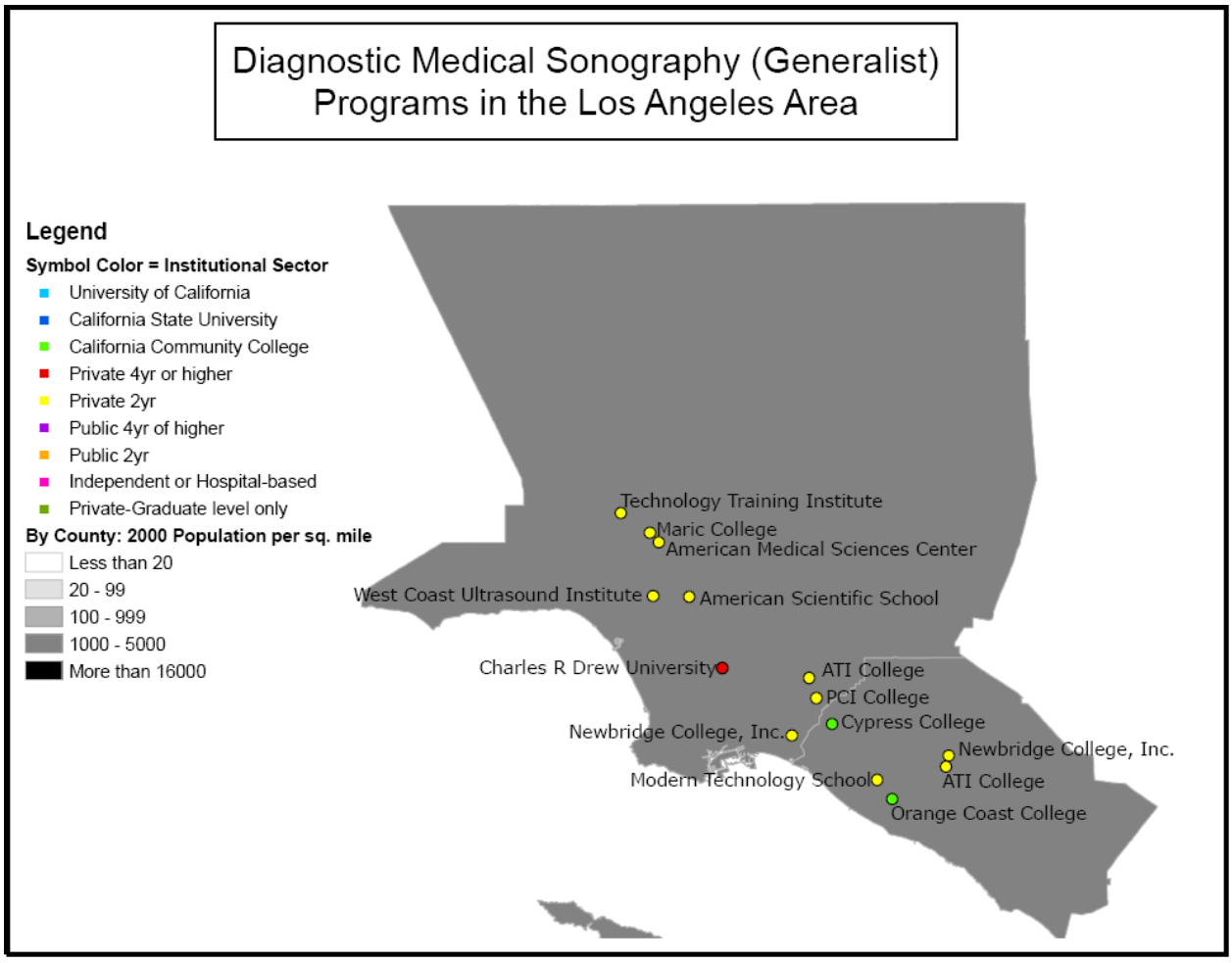
- This workforce is approximately twice the size of nuclear medicine and three times the size of radiation therapy.
- The ratio of diagnostic medical sonographers per general population in California is roughly half of what it is nationally.
- Median wages for diagnostic medical sonographers in California are higher than they are nationally.

[6] The American Registry of Radiologic Technologists is piloting its own DMS certification exam that is described as being geared toward the growing trend in associate degree programs in general medical sonography. It is not clear if this exam is seen as a viable alternative to the ARMDS exam system among educators, practitioners and employers.

# Diagnostic Medical Sonography (Generalist) Programs in California




Diagnostic Medical Sonography (Generalist)
Programs in the Bay Area
Kaiser Permanente School of Allied Health Sciences
Lincoln University
California Nurses and Vocational Institute
Gurnick Academy of Medical Arts
Foothill College
Legend
Symbol Color = Institutional Sector
University of California
California State University
California Community College
Private 4yr or higher
Private 2yr
Public 4yr of higher
Public 2yr
Independent or Hospital-based
Private-Graduate level only
By County: 2000 Population per sq. mile
Less than 20
20 - 99
100 - 999
1000 - 5000
More than 16000


Diagnostic Medical Sonography (Generalist)
Programs in the Los Angeles Area
Legend
Symbol Color = Institutional Sector
University of California
California State University
California Community College
Private 4yr or higher
Private 2yr
Public 4yr of higher
Public 2yr
Independent or Hospital-based
Private-Graduate level only
By County: 2000 Population per sq. mile
Less than 20
20 - 99
100 - 999
1000 - 5000
More than 16000
Technology Training Institute
Maric College
American Medical Sciences Center
West Coast Ultrasound Institute
American Scientific School
Charles R Drew University
ATI College
PCI College
Cypress College
Newbridge College, Inc.
Newbridge College, Inc.
Modern Technology School
ATI College
Orange Coast College

## o Education Data: Diagnostic Medical Sonography

We have identified 29 diagnostic medical sonography (generalist) programs in California. The same education data issues that we have described with regard to radiation therapy and nuclear medicine technology also apply in the case of diagnostic medical sonography. Data within IPEDS is inconsistently reported, if at all. The AMA Health Professions Education Data Book does collect data on accredited programs, but only seven of the identified 29 programs in the state are accredited. According the AMA Data Book, these seven programs currently produce approximately 75 new diagnostic medical sonography graduates per year.[7]

[7] We made an effort to contact program administrators directly to obtain complete data.

## General Themes in Health Professions Education in California

- Changes in the regulatory environment, or actions undertaken by professional associations or other stakeholder groups, play a significant role in shaping the supply of graduates from health professions education programs.
- Education opportunities for many of the selected health professions are clustered in either the Bay Area or the Los Angeles area.
- For most of the selected health professions, the ratio of professionals per general population in California is smaller than it is nationally.
- For almost all of the selected health professions, median wages are higher for professionals in California compared with the US as a whole.
- With a few exceptions, the rates of projected growth in employment for CA and US are similar for selected health professions.
- Workforce data for allied health professions are sometimes unobtainable and almost always collapse occupational detail into categories that are too general.
- Education data for allied health professions and occupations is generally not well reported.

# Resources

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## Dentistry

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