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PHARMACY TECHNICIANS

Los Angeles County

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CENTER OF EXCELLENCE
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With projected growth rates of 35% and 22% respectively from 2008-2013, Pharmacy Technicians and Pharmacists are among the fastest growing occupations in Los Angeles County. There will be 2,336 new and replacement jobs for Pharmacy Technicians and 1,436 jobs for Pharmacists during this same time period.

-Source: EMSI, Spring, 2009

Executive Summary

Pharmacy Technicians, in addition to being an occupation that is growing faster than average, are essential to the efficiency of the modern pharmacy. The dynamic nature of this occupation and industry is driven by the development of new pharmaceutical products and the competitiveness of the retail pharmacy environment. The changes caused by these factors along with the growing number of prescriptions filled each year, and the related demands for paperwork and accuracy, create a high-stress environment in the pharmacy.

Pharmacy Technicians are seen as “pharmacist-extenders.” By taking on administrative and repetitive duties, the technician relieves the Pharmacist for his/her role as a patient counselor. Though many Pharmacy Technicians are trained in private proprietary programs, there is one public AA-degree and certificate program in Los Angeles County at Cerritos College. National efforts to upgrade the quality of Pharmacy Technicians and standardize their education and credentials favor programs like Cerritos’ that provide both practical training and a general education.

Local employers who were surveyed for this study were mixed in their opinion about whether additional community college programs should be initiated in the county, with about half expressing interest in programs to train incoming Pharmacy Technicians. Institutional employers (such as hospitals) tend to hire either experienced Pharmacy Technicians or train and promote their in-house Pharmacy Assistants to become Pharmacy Technicians. In citing skills that are often lacking in job candidates, employers mentioned technical skills (i.e. naming generic drugs and learning computer programs) and “soft skills” like communication and work ethic.

Although projected job openings for Pharmacy Technicians for the next five years are among the highest of all allied health occupations in Los Angeles county, the number of graduates (primarily from the private accredited schools in the county) are about double the number of open positions. During this study, anecdotal feedback was received to indicate that the private school graduates may not be well prepared for entry level Pharmacy Technician positions. One hospital employer who was surveyed reported receiving several dozen unsolicited applications every week, mostly from private school graduates.

Recommendations growing out of this study include: Supporting the new Pharmacy Technician program to be started at West Los Angeles College; encouraging development of career ladder programs that will encourage students to consider becoming Pharmacists; and continuing development of Pre-Pharmacy transfer programs at the community colleges. At Cerritos College, site of the existing Pharmacy Technician program, continue the development of the Pre-Pharmacy study guide and encourage Pharmacy Technology students to consider eventual careers as Pharmacists.

Introduction

The demand for Pharmacy Technicians is projected to grow at such a significant rate between 2006-2016 that the Bureau of Labor Statistics has identified it as one of the 30 Fastest Growing Occupations in the U.S.¹ This study has been prompted by these projected growth rates, the reported shortage of pharmacy personnel in Los Angeles County, and the existence of only one community college program to train Pharmacy Technicians in the county. The study meets the California Community Colleges System charge to the Economic & Workforce Development (EWD) Network to identify industries and occupations with unmet employee development needs and introduce partnering potential for the colleges' programs.

The Pharmacy Technician and the lower-level, unlicensed Pharmacy Aide or Assistant work under the supervision of the Pharmacist, making it possible to "extend the reach" of the pharmacist and free the pharmacist for patient-oriented duties. The Pharmacy Aide/Assistant can help with answering phones and completing routine clerical tasks. The licensed Pharmacy Technician can perform tasks such as counting tablets or labeling bottles, under the direct supervision of the Pharmacist.² A growing shortage of Pharmacists has increased the demand for Pharmacy Technicians, who are projected to have the sixth largest growth rate of all allied health occupations (not including nurses) in Los Angeles County from 2007-2012.³

Industry Overview

Industry Description and Trends

The Pharmacy industry is divided into two main sectors: retail and institutional. Retail pharmacies, formerly dominated by small independents, have been consolidated and now are primarily owned by large industry chains. Institutional pharmacies, which are part of hospitals and other large medical facilities, offer a wider variety of drug interventions to patients, including chemotherapy and other intravenous medical applications.

Recent industry trends, in addition to those that affect staffing which are listed in the section that follows, include: re-location of pharmacies to large, free-standing locations outside of strip malls; pharmacies being added to supermarket chains to give consumers "one-stop shopping"; automated phone systems for filling and refilling prescriptions; and, Internet-based services. Competition in the retail sector has heightened as large companies like Wal-Mart offer \$4 prescriptions and others provide discount cards to their customers. Finally, the initiation of the Medicare Drug Program several years ago created greater accessibility to drugs for the consumer and increased paperwork for the pharmacies that are already flooded with regulations from insurance companies and third-party payers.⁴

¹ Bureau of Labor Statistics, "The 30 Fastest-Growing Occupations, 2006-2016," found online at <http://www.bls.gov/news.release/ecopro.t06.htm>

² Health Sciences Committee, "Pharmacy Education and the University of California," April 2004, found online at <http://www.ucop.edu/healthaffairs/documents/pharmacy.pdf>

³ EMSI Complete Employment - Spring 2008 Release v. 2

⁴ Hoovers' Drug Store and Pharmacy Industry Trends found online at http://www.hooversindustries.com/retail/drug-stores-and-pharmacies/industry_trends

Changes in the Industry Affecting Staffing

Four changes in the Pharmacy industry affect the demand for pharmacy staff:

- An increased demand for prescription drugs since 1990. This growth in demand looks like it will continue indefinitely as new drugs are developed and brought to market and the population ages and requires more medications.
- The changing role of the Pharmacist, which is shifting from “pill dispenser” to patient counselor. This change significantly affects the time required to complete each prescription transaction.
- The move to make Pharmacy Technicians more independent of the Pharmacist, allowing the supervision ratio to change and more Technicians to be employed.
- The introduction of technologies that will increase the efficiency of the modern pharmacy.

The impact of these changes is discussed in the sections below.

Expansion of the Industry

The Pharmacy industry is experiencing a period of expansion that is likely to continue with the aging of the U.S. population. During the 1990's, prescription drug use rose by 44% in the U.S. while the number of active pharmacists increased only 5%. This resulted in significant increases in pharmacy workload. (For example, the rate of prescriptions per work shift increased by 54% during this period.) Even with ten new Pharmacy schools coming on line by 2010 and existing schools expanding their capacity, the shortage of pharmacists, which many have called “severe”, will continue for another decade or two.⁵ Pharmacy Technicians have become a pivotal part of the pharmacist's ability to manage these changes in practice.⁶ Numerous studies have shown that settings where Pharmacy Technicians assist the Pharmacist result in fewer medication errors as the stress of a work overload is relieved.⁷

At the current annual growth rate of 5% for outpatient prescription orders, 7.2 billion prescriptions are expected to be filled in 2020. Even if automation tripled productivity to 90,000 orders/pharmacist/year, there would be a need for 80,000 additional full-time pharmacists in 2020. More conservatively, if only 6 billion outpatient prescriptions are dispensed in 2020 and productivity increases are the same, about 67,000 additional full-time pharmacists would be needed. Hospital drug orders are projected to increase 2.5% per year during the same period to a total of 3.5 billion in 2020. If hospital pharmacist productivity doubles to 108,000 orders/pharmacist/year, the need for hospital pharmacists in 2020 would be an added 32,400. Thus, using a conservative estimate of prescription growth in the next 20 years, and an ambitious estimate of productivity gains (of three times in the outpatient area and twice in institutions), about 180,000 new pharmacists would be needed in 2020 just to

⁵ Public Broadcast Service, “Bill of Health’ – Pharmacist Shortage,” March 27, 2008, found online at <http://www.pbs.org/nbr/site/onair/transcripts/080327c/>

⁶ McRee, Tina, “Pharmacy Technicians in California: Snapshot of an Emerging Profession,” The Center for Health Professions, University of California San Francisco, March, 2003, found online at http://www.futurehealth.ucsf.edu/pdf_files/pharm%20tech%20revised%20IB.pdf

⁷ Rouse, Michael J., “White Paper on Pharmacy Technicians 2002: Needed Changes Can No Longer Wait,” American Journal of Health-Systems Pharmacists, 2003, Vol. 60:37-51 p. 40

dispense prescriptions.⁸ Each of those Pharmacists will need numerous Pharmacy Technicians to assist them in their work.

Changing Role of the Pharmacist

At the same time that the demand for prescription drugs is increasing, the pharmacist is taking on added duties as his/her role changes into that of a counselor and caregiver who assesses, monitors, and adjusts therapy for patients. Pharmacists' new emerged when the Medicare Drug Plan included payment for Medication Therapy Management services such as formulating a medication treatment plan, monitoring and evaluating the patient's response to therapy, performing comprehensive medication reviews, communicating with patients' other care providers, providing verbal education and training to enhance the patient's understanding and use of medications, and providing necessary support to ensure the patient's adherence with therapeutic regimens.⁹ As pharmacists continue to take on these expanded roles, they rely more and more on Pharmacy Technicians to maintain the quality of care that patients and customers expect.¹⁰ In a recent survey of 1,470 pharmacists, 38% said insufficient pharmacy technician staff is the most stressful part of their jobs.¹¹

The role of the Pharmacist, and by association the Pharmacy Technician, is also changing in other ways in institutional or managed care organizations where Pharmacists analyze trends and patterns in medication use. Pharmacoeconomics takes the Pharmacist into cost-benefit analyses of various drug therapies. Pharmacists are also expanding their role in disease management and pharmacy informatics (the use of information technology to improve patient care.)¹²

Changing Supervision Ratios and Training Requirements

Another influence on the growing demand for Pharmacy Technicians is a 2007 California regulation designed to reduce medication errors. This regulation will allow general acute care hospitals to employ specially trained pharmacy technicians to check medication cassettes and the work of other technicians, thereby freeing pharmacists to expand their role in patient care areas and ensure the safety of the medication use process.

This is called the "Tech-Check-Tech" initiative. Historically, any function performed by a pharmacy technician relative to dispensing a prescription had to be verified and documented in writing by a pharmacist, but the new regulation will enable hospital pharmacists to devote their time to activities designed to reduce errors, such as working with physicians and nurses to evaluate medications and ensure the absence of allergies, drug interactions, or patient conditions that would be of concern.¹³

⁸ Pal, Somnath, "Pharmacist Shortage to Worsen in 2020," U.S. Pharmacist, Vol. 27:12, found online at http://www.uspharmacist.com/index.asp?show=article&page=8_1008.htm

⁹ Beck, Diane E., "Pharmacy Job Market Outlook," U.S. Pharmacist, Vol 31:05, 5/6/06, found online at http://www.uspharmacist.com/index.asp?show=article&page=8_1754.htm

¹⁰ Cohen, Harold E., "Pharmacy Technicians are Valued Resources," U.S. Pharmacist, Vol. 32:5, 5/18/07, found online at http://www.uspharmacist.com/index.asp?show=article&page=8_2013.htm

¹¹ Freeman, Liz, ""Study: Pharmacy Shortage Likely Will Worsen," Naples Daily News, March 26,2006 found online at http://www.naplesnews.com/news/2006/mar/26/study_pharmacist_shortage_likely_will_worsen/

¹² Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, 2008-09 Edition, Pharmacists, on the Internet at <http://www.bls.gov/oco/ocos079.htm>

¹³ Traynor, Katie, "History of Tech-Check-Tech in California Promoted on ASHP Site," California Society of Health-Systems Pharmacists, 2/22/07 found online at http://www.cshp.org/index.php?mact=News,cntnt01_detail,0&cntnt01_articleid=12&cntnt01_returnid=155

Increased attention to fatal errors committed by Pharmacy Technicians in the past few years, have led to new legislation to upgrade training and education requirements. A 2009 law passed in Ohio (known as Emily's Law) raised standards for Pharmacy Technicians in that state. It is expected that the federal government may begin to regulate education of Pharmacy Technicians. Although the California requirements for certification were updated in 2004, new laws may increase the education requirements for candidates taking the certification exam.¹⁴

Technologies Increase Efficiency

Development of new technologies in the pharmacy industry has been driven by the changing role of the pharmacist and growing workloads. A few of the technologies that are coming into common use are:

- Automated, computerized refilling and robotic dispensing systems¹⁵. Automated filling is seen as providing some relief. Right now, automation is credited with processing 2,500 prescriptions/week/pharmacist, or 125,000 prescriptions per year.¹⁶
- Bar code verifications used during drug administration to reduce medication errors¹⁷
- APM (Automatic Product Machine) technology which enables patients to pick up their prescriptions using self-service kiosks¹⁸
- Automated label makers¹⁹

Other Factors Driving Demand

The growing demand for Pharmacy Technicians results from the changes in the industry (noted above) and the convergence of these other factors:

- As the population ages, the demand for drugs and other services provided through pharmacies is also increasing.
- Many pharmacy workers are nearing retirement age. The retirement of "baby-boomers" is expected to begin in the next five years and increase exponentially as the larger segments of that generation reach retirement age.

Increased demand for Pharmacy Technicians is being driven by growing use of prescription drugs, systemic and regulatory changes in the pharmacy industry, and the aging U.S. population.

¹⁴ Thompson Reuters, "Emily's Law for Regulating Pharmacy Technicians Signed by Ohio Governor," January 9, 2009, PRNewswire, found online at <http://www.reuters.com/article/pressRelease/idUS206516+07-Jan-2009+PRN20090107>

¹⁵ "Pharmacists See Benefits of Automation," U.S. Pharmacist, Vol. 30:06, 6/15/2005, found online at http://www.uspharmacist.com/index.asp?show=article&page=8_1507.htm

¹⁶ Pal, Somnath, "Pharmacist Shortage to Worsen in 2020," U.S. Pharmacist, Vol 27:12, found online at http://www.uspharmacist.com/index.asp?show=article&page=8_1008.htm

¹⁷ Mansfield, Brian, "Bar Code Verification Reduces Medication Error," U.S. Pharmacist, found online at <http://www.uspharmacist.com/oldformat.asp?url=newlook/files/prod/oct00barcode.htm>

¹⁸ "Parata Acquires Self-Service Kiosk Technology," April 20, 2007, found online at http://www.uspharmacist.com/index.asp?show=article&page=8_2011.htm

¹⁹ Davidson, R, "Pharmacy & Technology," U.S. Pharmacist, Vol. 33:9, 9/18/08, found online at http://www.uspharmacist.com/index.asp?show=article&page=8_2358.htm

- The more time-consuming aspects of pharmacy practice currently exacerbate the shortage. Forty percent of new prescriptions require telephone calls before data entry to clarify orders, 10% of new prescriptions require calls to verify health plan eligibility, and 20% require calls about formulary/coverage issues. Another 20% of Pharmacists' time is spent on third-party related administrative tasks.²⁰
- Training and degree programs for Pharmacy Technicians are difficult to staff because potential faculty can make significantly more in clinical settings than in the classroom.
- More pharmacists are working part-time (4% more are looking for part-time jobs since 2000). More than 30% of the women between the ages of 31 and 50 in the profession are working part-time along with more pharmacists who desire to work part-time due to personal lifestyle preferences or because they are nearing retirement.²¹
- As new medications and drug therapies are developed and new uses are found for existing drugs, demand for prescriptions increases. Also increasing demand is broader insurance coverage for certain medications and direct marketing of others to the public by the pharmaceutical companies.²²

Occupational Overview

Pharmacy Technicians are licensed pharmacy workers that support pharmacists in preparing and dispensing medicine. They are also involved in general customer service and administrative activities including inventory control and insurance claims. They are not allowed to provide drug or other treatment information to patients and refer those questions to a licensed pharmacist. Those employed in a hospital may also prepare intravenous packs.

Although specific responsibilities will depend on the pharmacy setting and scope of practice, here is a list of duties that a pharmacy technician might find in many practice settings:

- Assist pharmacist in labeling and filling prescriptions; screen calls for pharmacists and schedule and maintain workflow; assist in inpatient and outpatient dispensing; assist patients in dropping off and picking up prescriptions and verify that customer receives correct prescription(s);
- Enter prescriptions into the computer, order medications and prepare medication inventories; perform purchasing and billing activities
- Compound oral solutions, ointments, and creams; prepackage bulk medications
- Work with insurance carriers to obtain payments and refilling authority;

²⁰ Pal, Somnath, "Pharmacist Shortage to Worsen in 2020," U.S. Pharmacist, Vol. 27:12, found online at http://www.uspharmacist.com/index.asp?show=article&page=8_1008.htm

²¹ Beck, Diane E., "Pharmacy Job Market Outlook," U.S. Pharmacist, Vol. 31:05, 5/6/06, found online at http://www.uspharmacist.com/index.asp?show=article&page=8_1754.htm

²² Health Sciences Committee, "Pharmacy Education and the University of California," April 2004, found online at <http://www.ucop.edu/healthaffairs/documents/pharmacy.pdf>

- Prepare chemotherapeutic agents; compound total parenteral nutrition solutions; and compound large volumes of intravenous mixtures and prepare IV mixtures.²³

The role of the Pharmacy Technician has expanded in importance as the shortage of Pharmacists has grown. At this time, Pharmacy Technicians are involved with the input, preparation, and/or filling of more than 96% of the prescriptions dispensed in community pharmacies.²⁴ There is ongoing pressure in California to modify the technician/pharmacist ratio (currently 2:1 in hospital settings, and either 1:1 or 2:1 in retail settings depending on the number of pharmacists on duty²⁵) in a way that will allow pharmacists to supervise a larger number of technicians. If these efforts are successful, the demand for Pharmacy Technicians will increase even more dramatically than already projected.²⁶

Employers

Over 70% of all Pharmacy Technicians are employed in facilities that are located in retail pharmacies, grocery stores, department stores, or mass retailers. Nationally, Walgreens (the nation's largest drugstore chain by sales and profits) employs about 39,000 technicians compared with more than 24,000 pharmacists. CVS, the largest retail chain in terms of store count, employs about 41,000 pharmacy technicians, more than double the 20,000 pharmacists who work for the firm.²⁷

Table 1 – Job Growth by Employers in Los Angeles County

NAICS Code	Name	2008 Jobs	2013 Jobs	Change	% Change
446110	Pharmacies and drug stores	5,069	5,434	365	7%
622110	General medical and surgical hospitals	3,462	4,108	646	19%
445110	Supermarkets and other grocery	2,094	2,546	452	22%
930000	Local government	918	1,018	100	11%
424210	Druggists' goods merchant wholesalers	539	651	112	21%
621111	Offices of physicians, except	314	362	48	15%
920000	State government	284	301	17	6%
	TOTAL	12,680	14,420	1740	14%

Source: EMSI Covered Employment – Spring, 2009

²³ Ibid.

²⁴ Cohen, Harold E., "Pharmacy Technicians are Valuable Resources," U.S. Pharmacist, Vol. 32:5, May 18, 2007 found online at http://www.uspharmacist.com/index.asp?show=article&page=8_2013.htm

²⁵ Health Sciences Committee, "Pharmacy Education and the University of California," April 2004, found online at <http://www.ucop.edu/healthaffairs/documents/pharmacy.pdf>

²⁶ Center for Health Improvement, "Improving the California Pharmacist-Patient Consultation Process," a Policy Brief, January, 2006, found online at <http://www.chipolicy.org/pdf/5944.Improving%20Pharmacist%20Consult%20Issue%20Brief.pdf>

²⁷ Brady, Eric and McKoy, Kevin, "Drugstore Chains Rely on Pharmacy Technicians," USA Today, 2/14/08, found online at http://www.usatoday.com/money/industries/health/2008-02-12-pharmacy-technicians_N.htm

Licensing

In the state of California, candidates for Pharmacy Technician positions are licensed and in January 2004, the licensing requirements changed. Experience as a Pharmacy Clerk or even as an unlicensed Technician is no longer an acceptable qualification for registration in the State. Registered Pharmacy Technicians must meet educational standards defined by the California State Board of Pharmacy.²⁸ These standards require either an AA degree in Pharmacy Technology, a diploma from a training course accredited by the American Society of Health-System Pharmacists, certification by the national Pharmacy Technician Certification Board, or completion of 240 hours of training that meets the requirements of part 1793.6 (c) of Title 16 of the California Code of Regulations.²⁹

Job Growth

The above-average growth rate projected for Pharmacy Technicians and Pharmacists is in contrast to a decline in unlicensed Pharmacy Aides. The Bureau of Labor Statistics projects that Pharmacy Aides are expected to decline rapidly between now and 2016. Pharmacy Technicians are expected to take over many of the duties of the Aides and many Aides are expected to complete the necessary training to become higher-paid Pharmacy Technicians.³⁰

Table 2 - Growth among Selected Pharmacy Occupations in Los Angeles County

SOC Code	Description	2008 Jobs	2013 Jobs	Change	% Change	New & Rep. Jobs	% New & Rep.	2009 Avg Hourly Earnings
29-1051	Pharmacists	6,446	7,323	877	14%	1,436	22%	\$52.36
29-2052	Pharmacy technicians	6,765	8,044	1,279	19%	2,336	35%	\$16.38
31-9095	Pharmacy aides	1,950	1,886	(64)	(3%)	157	8%	\$10.10

Source: EMSI Complete Employment Spring, 2009

Demand for Pharmacy Technicians and Pharmacists is expected to remain strong in the next five years and beyond. The projected demand shown in Table 2 for Los Angeles County is higher than the growth rates projected nationally.

Wages

The average hourly earnings for Pharmacy Technicians in Los Angeles County are \$16.38. This is comparable to the average for all allied health occupations, which is \$16.76.

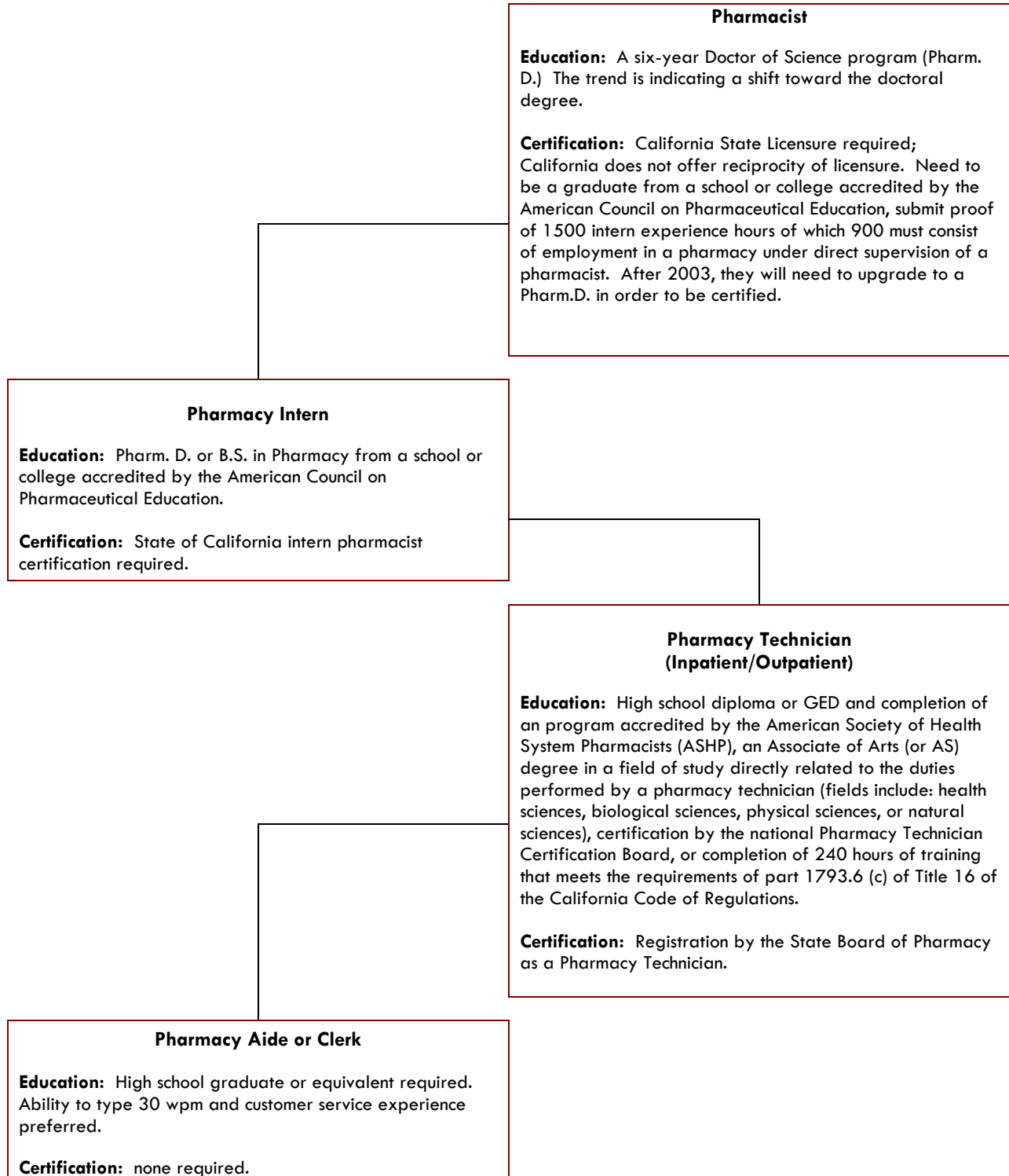
²⁸ California State Board of Pharmacy, "Pharmacy Technician Registration Requirements," found online at http://www.pharmacy.ca.gov/forms/tch_app_pkt.pdf

²⁹ California Code of Regulations, "Board of Pharmacy, Title 16," found online at http://www.pharmacy.ca.gov/laws_regs/1710_text.pdf

³⁰ Bureau of Labor Statistics, U.S. Department of Labor, Occupational Outlook Handbook, 2008-09 Edition, Pharmacy Aides, on the Internet at <http://www.bls.gov/oco/ocos274.htm>

Career Ladder

Exhibit 1- Pharmacy Career Ladder



Source: Allied Health Project on Career Ladders, "Health Career Path Mapping and Worksite Training Development Project," found online at <http://www.careerladdersproject.org/docs/The-Career-Ladder-Mapping-Project.pdf>

Many large organizations, like hospitals or pharmacy chains, have established levels or grades of experience and education for Pharmacy Technicians. Walgreens reports that nearly 26,000 of its technicians are certified (not all states require certification like California) and the chain subsidizes test fees and gives raises to technicians who pass. CVS says about 12,000 of its technicians are certified and the chain pays for study guides and registration fees. Both chains also have companywide training systems. Walgreens has the only chain whose in-house training has been approved by the American Society of Health-System Pharmacists.³¹

CVS requires technicians to pass internal training at three levels as they move up to more difficult duties. The Career Prescriptions for Success (CAPS) program was created to promote careers in pharmacy particularly in areas with high unemployment. Starting as an “apprentice” working closely with the pharmacist/mentor, a student is eligible to become a pharmacy associate and with on-the-job training can become a Pharmacy Technician and eventually a Lead Technician. Where appropriate, CVS will pay community college or university tuition for the student to become a Pharmacist.³²

Pharmacy technicians with significant training and proper certification often enter more specialized positions like nuclear pharmacy technician or chemotherapy technician. In larger establishments, some technicians advance to management and assist in the training of less-experienced peers. Wages for such specialty occupations are often higher.³³

Employer Needs and Challenges

Shortage of Pharmacy Technicians and Pharmacists

The shortage of Pharmacy Technicians was addressed in the American Society of Health System Pharmacists (ASHP) Annual Pharmacy Staffing Survey. Only 21% of those surveyed perceived a shortage of entry-level Pharmacy Technicians while 38% of those surveyed expressed a perception that there is an excess of available entry-level applicants. This shifts significantly when questioned about the demand for experienced Pharmacy Technicians, with 69% of those surveyed expressing their perception of a shortage and only 5% feeling that there is an excess supply. In both entry-level and experienced positions, the perception of a shortage of qualified candidates declined over the previous five years. Survey respondents reported that it took an average of slightly under two months to fill a Pharmacy Technician position.³⁴

In a 2003 California survey conducted by the University of California San Francisco, individuals interviewed reported that hiring was competitive and that hospital and retail pharmacies across the state were engaged in “bidding wars” for Pharmacy Technicians, particularly for experienced and nationally certified ones.³⁵ The 2002 Campaign for College Opportunity put the number of Pharmacy Technician graduates in the state at about half of the number needed

³¹ Brady, Eric and McKoy, Kevin, “Drugstore Chains Rely on Pharmacy Technicians,” USA Today, 2/14/08, found online at http://www.usatoday.com/money/industries/health/2008-02-12-pharmacy-technicians_N.htm

³² “Career Ladders Help Health Care Workers Move Up Faster,” ExploreHealthCareers.com, found online at <http://www.explorehealthcareers.org/en/Article.164.aspx>

³³ Smith, Kelli, “Join the Healthcare Boom: Become a Pharmacy Technician,” ArticleClick, found online at <http://www.articleclick.com/Article/Join-the-Healthcare-Boom--Become-a-Pharmacy-Technician/985066>

³⁴ Scheckelhoff, Doug and Bush, Colleen, “2005 ASHP Pharmacy Staffing Survey” found online at http://www.ashp.org/s_ashp/docs/files/StaffSurvey2005.pdf page 3

³⁵ McRee, Tina, “Pharmacy Technicians in California: Snapshot of an Emerging Profession,” The Center for Health Professions, University of California San Francisco, March, 2003, found online at http://www.futurehealth.ucsf.edu/pdf_files/pharm%20tech%20revised%20IB.pdf p.2

to fill vacant jobs, however the number of graduates reported statewide was significantly less than the number reported by other sources for Los Angeles alone.³⁶

Los Angeles County has one of the lowest ratios of Pharmacy Technicians per 100,000 (population) in the state. In many Allied Health occupations, these ratios follow population density but there is no such correlation for Pharmacy Technicians. The Los Angeles County ratio is well below average and significantly below the ratios of all of the surrounding counties. These ratios could indicate future pressures on pharmacies in the area to meet staffing demands.³⁷

A survey of several Los Angeles County hospitals identified Pharmacy Technicians as one of the “Top 6” critical occupations in Los Angeles County, with more openings (478/year) than any of the other critical occupations and only one existing community college program in the county training incoming Pharmacy Technicians.

In the same study conducted by the Center of Excellence for Los Angeles County at Mt. San Antonio College in 2008, the survey asking for information about allied health workers garnered unsolicited responses from almost every hospital surveyed about the difficulty recruiting and hiring Pharmacists.³⁸ This anecdotal evidence is supported by the Health Workforce Gap Report in which the number of graduating pharmacists statewide falls over 300 short of the growing demand for Pharmacists. These estimates include graduates from new PharmD programs that came online in 2006 and one projected to graduate its first class in 2009.³⁹

Survey of Local Employers

A survey of organizations that employ Pharmacy Technicians and Aides was conducted for this study (see Appendix B for Survey Questions). Three recruiters from the largest retail pharmacy chains in the region (Walgreen, Rite-Aid and Sav-on) and one representative of a large hospital chain were interviewed by phone. In addition, eight pharmacies responded to the survey and ranged in size from 5 to 250 employees.

Although over half of the pharmacies surveyed (including one that employs 18 pharmacists) reported some difficulty recruiting qualified pharmacists, none of the pharmacies reported difficulty recruiting Pharmacy Technicians with no experience. Over half of the pharmacies indicated that they have trouble recruiting experienced Pharmacy Technicians. One pharmacy reported it was “somewhat difficult” to recruit Pharmacy Aides or Assistants but the others reported no problems finding qualified candidates.

³⁶ Health Workforce Solutions, “Closing the Health Workforce Gap in California: An Education Imperative, November 5, 2007, The Campaign for College Opportunity, San Francisco, Appendix A, pp. 34ff, found online at http://www.collegecampaign.org/assets/docs/hcwfs/cco_alliedhealth_report_10-30-07_final.pdf

³⁷ McRee, Tina, “Pharmacy Technicians in California: Snapshot of an Emerging Profession,” The Center for Health Professions, University of California San Francisco, March, 2003, found online at http://www.futurehealth.ucsf.edu/pdf_files/pharm%20tech%20revised%20IB.pdf

³⁸ Center of Excellence for Los Angeles County Located at Mt. San Antonio College, “Allied Health,” June, 2008, found online at <http://www.coecc.net>

³⁹ Health Workforce Solutions, “Closing the Health Workforce Gap in California: An Education Imperative, November 5, 2007, The Campaign for College Opportunity, San Francisco, Appendix A, pp. 31-33, found online at http://www.collegecampaign.org/assets/docs/hcwfs/cco_alliedhealth_report_10-30-07_final.pdf

The representative of Memorial Care hospital group who was interviewed also indicated difficulty in hiring Pharmacy Technicians. Despite over a dozen unsolicited applications coming in every day from prospective Pharmacy Technicians, none have the institutional/hospital experience that Memorial Care requires for the 80 Pharmacy Technician positions in their organization. Because of this, they tend to hire licensed Pharmacy Technician candidates into entry-level Pharmacy Assistant positions and after a year or two of experience they promote from within into the entry level Pharmacy Technician positions. Memorial Care has three types of pharmacies (inpatient, outpatient, and retail) so occasionally they will hire into their retail pharmacy. At the time of the interview, they had three Pharmacy Technician jobs open: one for someone with experience in intravenous compounding, one for a candidate with experience in infusion care, and one for a pediatric Pharmacy Technician. Their Pharmacy Technician incumbents have had their education in both public and private schools and some hold BA degrees in Pharmacy Technology.

The skills cited by the surveyed retail pharmacies as most often lacking in Pharmacy Technician applicants were: follow through and accuracy (mentioned twice), knowledge of pharmacy laws (i.e. controlled substances act) and HIPPA, basic math skills (including pharmaceutical calculations), knowledge of generic drug names and substitutions, ability to learn new (computer) systems and insurance requirements quickly, work flow in the pharmacy, customer service, communication skills with patients and co-workers, work ethic, and IV experience.

In responding to a question about career ladder opportunities, one pharmacy noted that there is an opportunity to become a compounding technician. The majority of the respondents noted supervision or management opportunities as career ladder steps. A Walgreen's respondent reported that they can send Pharmacy Technicians to District training to prepare them to become Senior Technicians. At Memorial Care there is a progression based on specialties like intravenous compounding.

When asked whether the community colleges should create more programs for Pharmacy Technicians and how those programs should be designed, most of the pharmacies that indicated difficulty hiring technicians said they would want more community college programs in the county. One respondent noted that it would be good to have a more standardized approach so pharmacists knew what to expect from incoming program graduates. There was also a suggestion that independent pharmacies be represented on advisory committees to assure inclusion of their perspective. (As noted earlier, legislative changes in California similar to Emily's Law in Ohio may result in higher and more standardized educational requirements for Pharmacy Technician education programs.)

Three respondents recommended that no new community college programs be added to the county because there were "plenty of techs" available. Two of these respondents added that the colleges need to include more retail experience in their programs so students get experience reading prescriptions, entering prescriptions on the computer, billing, handling third-party plans, and dealing with Medi-Cal and Medicare. Several pharmacies indicated that they are using a "Tech-Check-Tech" program (that allows Pharmacy Technicians to check each other's work) although the Pharmacy Technicians who were checking others' work were simply more experienced rather than having had any specialized training.

College Response and Issues

Consistent, high-quality training and education of pharmacy technicians has been a concern of the industry for the past decade. Despite the development of national certification and a model curriculum (See Appendix C) for teaching Pharmacy Technicians, there are still many differences in skill level of job candidates entering the field. Cerritos Community College and Drew Medical Center are the only institutions offering AA/AS degrees to Pharmacy Technicians in Los Angeles County. Cerritos College serves about 160 students per year in its program. West Los Angeles Community College has a new program coming up for approval which is expected to come on line in the next year. (There are two more community college programs in neighboring Orange County at Santa Ana College and Saddleback Community College.)

Table 3 – Community College Pharmacy Technician Program in Los Angeles County

Cerritos College	
<p>Pharmacy Technician AA Degree 60 Units Certificate of Achievement (31/33 Units)</p> <p>Medication Calculations 1 Pharmaceutics 1.5 Pharmacy Introduction 2 Pharmacy Skills Lab Introduction 1 Pharmacy Operations I .5 Pharmacy Operations II 3 Pharmacy Operations III 2 Over-The-Counter Products 3 Pharmacy Technician Pharmacology I 3 Pharmacy Technician Pharmacology II 3 Clinical Experience I 3 Clinical Experience II 5 Medical Terminology 3 or Introduction to Anatomy and Physiology 4 Optional: PHAR 73/74 Pharmacy Technician Occupational Work Experience 3-4</p>	<p>Pharmacy Clerk 11 Units Required</p> <p>Retail Products for Pharmacy Clerks 2 Pharmacy Clerk Clinical Experience 2 Pharmacy Introduction 2 Pharmacy Skills Lab Introduction 1 Basic Mathematics 3 Microcomputer Keyboarding 1 or Typewriting Speed/Control Building 1</p>

In addition to the two levels of programs shown in Table 3, Cerritos is in the process of getting permission to offer a one-year program to prepare students for the Pharmacy Technician exam. This would not incorporate the basic skills requirements of the current program, but would allow Cerritos to serve students who cannot spend two years in school and want to qualify for the exam by completing a “240-hour course of study approved by the state board.” This three-tiered program is currently being used successfully at Santa Ana College in Orange County.⁴⁰

⁴⁰ Phone interview with Hal Malkin, Department Chair, Pharmacy Technology, Cerritos College

Along with the strong general education component of the Cerritos program and a 200-hour clinical lab experience, students complete special programs and take exams in IV-preparation and Generic Drugs. Both of these specialty areas were noted in the employer surveys as important skill areas that distinguished job candidates.

Other Education and Training Opportunities

The analysis of the number of Pharmacy Technician job candidates being prepared in local education institutions is complicated by the fact that the training program code for these occupations (51.0805) applies to both Pharmacy Technicians and Pharmacy Assistants. The programs listed in Table 4, however, are all certified Pharmacy Technician programs. Though many of the programs noted in Table 4 are less than one year's length, they appear to meet the requirements and are accredited.

The discrepancy in the number graduates coming out of the community colleges versus private proprietary schools raises questions about the comparability of public versus private programs. Program descriptions for private school programs included no indication students participated in clinical practice or skills labs. For example, see Everest College Pharmacy Technician courses online at <http://www.everest.edu/programs/category/pharmacy-technician/courses>.

Table 4 - Los Angeles County Pharmacy Technician Programs Accredited by the American Society of Health-System Pharmacists (ASHP)⁴¹

Institution	Type of Program	2007 Completions
Cerritos College	Associate Degree	11*
	Certificates of Achievement	9*
Charles R. Drew University of Medicine and Science	Associate Degree	0
American Career College	Pharmacy Technician/Assistant Less than 1 year	229
North-West College, Glendale, Covina, Pasadena, Pomona	Pharmacy Technician/Assistant Less than 1 year	127
Everest College, City of Industry, Reseda, Los Angeles Wilshire and Torrance	Pharmacy Technician/Assistant Less than 1 year	352
Total Completers of Accredited Programs		728

Source: EMSI Complete Employment Spring 2009 * An additional 20-30 students per year pass their certification exams without completing the degree or certificate programs.

A phone interview with Hal Malkin, Department Chair of the Pharmacy Technology Program at Cerritos College revealed some of the differences between community college programs and those of the private schools. The “education” component of the community college programs (including writing, communication, and other basic skills) prepares more well-rounded job

⁴¹ American Society of Health-System Pharmacists, “Pharmacy Technician Training Program Directory,” found online at <http://accred.ashp.org/aps/pages/directory/technicianProgramInformation.aspx?ID=200302>

candidates and employees who are better able to learn on-the-job and add specialties to their basic training. The Cerritos program emphasizes the career ladder opportunities and a half-dozen of the students from Cerritos are now in Pharmacist degree programs. As with other allied health programs, the cost differential between community colleges and private schools is significant and can be a serious barrier for many students. Perhaps the most significant difference in public and private programs, however, is the lack of clinical experience in the private programs. Cerritos College students receive 200 hours of clinical experience. This means they take two years to finish their program, rather than one, but they use this experience to help them qualify for jobs where employers are looking for experienced candidates.

Non-Accredited Programs

In addition to the accredited programs that are less than one year in length, there are numerous programs in the county that are not accredited and are of varying lengths, though most are less than one year in length. These are not listed in this study because they are most likely Pharmacy Assistant programs. Graduates of these programs may not be eligible for licensure until they have satisfied one of the other options available for those practicing in California.

Conclusion and Recommendations

The forces driving supply and demand in the Pharmacy Technician industry can be summed up:

Table 5 – Supply and Demand Drivers for Pharmacy Technician Industry

Demand Drivers	Supply Drivers
↑ Increasing volume prescriptions	↔ Competition for workers between hospitals and retail setting
↑ Increasing number of retail outlets that dispense drugs	↔ Poor career ladder options (Pharmacists have much higher educational requirements)
↑ Pressure to utilize lower cost workers	↑ High job satisfaction ratings
↓ Supervision ratios	↓ Increased educational preparation rules

Source: Health Workforce Solutions, “Closing the Health Workforce Gap in California: An Education Imperative”

These factors apply to Pharmacy Technicians in Los Angeles County but the nature of resulting unmet demand is not clear. The number of students coming into the job market from the accredited programs every year is twice the number of projected job openings but it appears that many of the students from the private schools end up unemployed or under-employed as Pharmacy Aides or Assistants.

The shortage of available Pharmacists was confirmed by both labor market data and survey results. When asked what positions they have the most difficulty hiring, eight local hospitals responded “Pharmacists” before any other occupation. This anecdotal evidence supports the labor market projections noted in Table 2, showing the growing need for Pharmacists in the County.

Table 6 – Supply and Demand Drivers for Pharmacists

Demand Drivers	Supply Drivers
↔ Shifting of pharmacy activities between settings	↔ Competition for workers between hospitals and retail setting
↑ Increasing scientific advancement; new drugs, new therapies	↔ In and out migration of PharmD graduates could be relevant to total California supply
↑ Increased prescription drug reimbursement (incl Medicare Part D)	↑ Increased number of California programs
↑ New roles in managed care, research, and development	↑ High salary is attractive
↑ High Replacement Need	↓ Doctoral level preparation (9 yrs) is huge hurdle

Source: Health Workforce Solutions, “Closing the Health Workforce Gap in California: An Education Imperative”

While the need for more Pharmacists is evident, the research does not indicate a clear need for more Technicians until and unless the legislation is passed to change the pharmacist/pharmacy technician supervision ratios. On the other hand, anecdotal evidence along with the testimony of professional organizations support the need for improved education of Pharmacy Technicians in AA, AS, BA, and BS programs.⁴²

Recommendations

Some of the demand factors for Pharmacy Technicians in Los Angeles County support the program currently in the approval process at West Los Angeles Community College. This program will offer the same benefits as the Cerritos College program in another geographical location in the Los Angeles basin. The program location was chosen after special meetings hosted by LOWDL, and a regional consideration of the best opportunity for a successful program. The clinical lab facilities will be part of the new Allied Health building being constructed at West L.A. This is a unique opportunity to provide these expensive but essential facilities in the most cost-effective way as part of a larger, college-wide initiative to add allied health programs.

⁴² Rouse, Michael J., “White Paper on Pharmacy Technicians 2002: Needed Changes Can No Longer Wait,” American Journal of Health-Systems Pharmacists, 2003, 60:37-51

Work to encourage students to use the Pharmacy Technician as a stepping stone to a career as a Pharmacist. The acute need for more Pharmacists requires joint action among all educational partners to get more students into the pipeline. The community college programs are heavily focused on the career ladder. (The private schools offer “terminal” certificates and diplomas that are not designed to provide the foundation for a growing career.) Community colleges where there is no Pharmacy Technician program should continue to develop strong Pharmacy Transfer programs through agreements with USC and Western University of Health Sciences in Pomona (the only two accredited Universities training Pharmacists in the Los Angeles area.) Although courses taken by Pharmacy Technician students are quite different from those in Pre-Pharmacy transfer programs, students who complete Pharmacy Technician programs can “circle back” and enter Pharmacy transfer programs while they are supporting themselves as Pharmacy Technicians. Students who do this have a distinct advantage during the admissions process to their PharmD programs because they have already worked in the industry and proven their interest, aptitudes, and skills.⁴³

At the Pharmacy Technician level, Cerritos College is creating a pipeline with a new program in collaboration with the local ROP to start high-school students in some of their pharmacy technician classes and allow them to graduate with an AA/AS with less than two years of college work. Other opportunities for similar career ladder programs could be developed through pipeline programs like those at Charles Drew University that reach into the elementary school level to interest children in science and medicine careers. Another possibility would be to use one of the STEM (Science, Technology, Engineering, and Mathematics) programs to encourage students from minority populations into Pharmacy, which has been becoming more attractive to women students seeking careers that offer flexible work schedules.⁴⁴

Encourage development of Pre-Pharmacy programs at more of the community colleges. See examples of the study guides from El Camino, Santa Monica City College, Glendale and Cerritos College in Appendix D. At Cerritos College, students are also advised on how to earn an AA/AS in Health Sciences along with preparing to transfer into a university program for Pharmacists. It is admittedly a long distance educationally from Pharmacy Technician to Pharmacist, but talented Pharmacy Technicians have the perfect opportunity to learn the field first-hand and assess their level of interest before committing to the additional education needed to become registered pharmacists. Cerritos College, with a Pharmacy Technician degree and program, is well positioned to offer students this option for entering the field. The students who work for larger retail pharmacy chains may even be able to qualify for programs that will pay their tuition while they complete their Pharmacist degree.⁴⁵

⁴³ Interview with Hal Malkin, Department Chair, Pharmacy Technology, Cerritos College

⁴⁴ Beck, Diane E., “Pharmacy Job Market Outlook,” U.S. Pharmacist, Vol. 31:05, 5/6/06, found online at http://www.uspharmacist.com/index.asp?show=article&page=8_1754.htm

⁴⁵ “Career Ladders Help Health Care Workers Move Up Faster,” ExploreHealthCareers.com, found online at <http://www.explorehealthcareers.org/en/Article.164.aspx>

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Resources

[Academy of Managed Care Pharmacy](#)

[American Association of Pharmacy Technicians](#)

[American Pharmacy Alliance](#)

[American Society of Consultant Pharmacists](#)

[American Society of Health-System Pharmacists](#)

[California Board of Pharmacy](#)

[California Pharmacists Association](#)

[California Society of Health-System Pharmacists](#)

[California State Board of Pharmacy](#)

[Centers for Medicare and Medicaid Services](#)

[Pharmacy Technician Certification Board](#)

[Pharmacy Technician Educators Council](#)

[National Association of Boards of Pharmacy](#)

[National Association of Chain Drug Stores](#)

[National Community Pharmacists Association](#)

[National Institutes of Health](#)

[Institute for Community Pharmacy](#)

[United Pharmacists Network Inc.](#)

Appendix A: How to Utilize this Report

This report is designed to provide current industry data to:

- Define potential strategic opportunities relative to an industry's emerging trends and workforce needs;
- Influence and inform local college program planning and resource development;
- Promote a future-oriented and market responsive way of thinking among stakeholders; and,
- Assist faculty, Economic Development and CTE administrators, and Community and Contract Education programs in connecting with industry partners.

The information in this report has been validated by employers and also includes a listing of what programs are already being offered by colleges to address those workforce needs. In some instances, the labor market information and industry validation will suggest that colleges might not want to begin or add programs, thereby avoiding needless replication and low enrollments.

About the Centers of Excellence

The Centers of Excellence (COE), in partnership with business and industry, deliver regional workforce research customized for community college decision making and resource development. This information has proven valuable to colleges in beginning, revising, or updating economic development and Career Technical Education (CTE) programs, strengthening grant applications, assisting in the accreditation process, and in supporting strategic planning efforts.

The Centers of Excellence Initiative is funded in part by the Chancellor's Office, California Community Colleges, Economic and Workforce Development Program. The total grant amount (grant number 08-305-016 for \$205,000) represents funding for multiple projects and written reports through the Center of Excellence. The Centers aspire to be the premier source of regional economic and workforce information and insight for California's community colleges.

More information about the Centers of Excellence is available at www.coecc.net.

Important Disclaimer

All representations included in this report have been produced from primary research and/or secondary review of publicly and/or privately available data and/or research reports. Efforts have been made to qualify and validate the accuracy of the data and the reported findings; however, neither the Centers of Excellence, COE host District, nor California Community Colleges Chancellor's Office are responsible for applications or decisions made by recipient community colleges or their representatives based upon components or recommendations contained in this study.

Appendix B: Employer Survey Questions



1. Please provide the following information:

Name/Title: _____
 Email Address: _____
 Phone Number: _____
 Number of employees in total? _____

2. How many people does your organization employ in each of the following positions?

Pharmacist _____ full time _____ part time _____ currently vacant positions
 Pharmacy Tech _____ full time _____ part time _____ currently vacant positions
 Pharmacy Aide, Clerk or Assistant (unlicensed) _____ full time _____ part time _____ currently vacant positions

3. How difficult is it to recruit qualified individuals for the following positions:

Occupation	Not Difficult	Somewhat Difficult	Difficult	Very Difficult	Not Applicable
Pharmacists	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Experienced Pharmacy Technicians	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pharmacy Technicians with no experience	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Pharmacy Aides/ Clerks/ Assistants	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4. What skills or job requirements do applicants often lack?

Pharmacists: _____

 Pharmacy Technicians: _____

 Pharmacy Aides/Clerks/Assistants: _____

5. In your organization is there a career ladder for Pharmacy Technicians? YES NO

If YES, please describe: _____

6. Is there a way for Pharmacy Technicians to move up in the organization without becoming Pharmacists? YES NO

If YES, please describe: _____

7. Do you have different levels or grades of Pharmacy Technicians in your organization? YES NO

If YES, please describe: _____

What special duties might they perform or be trained for? _____

8. Do you have LEAD Pharmacy Technicians who supervise other Technicians and Aides or Clerks? YES NO

If YES, how do their training, preparation and duties differ? _____

9. Do you employ "Tech-Check-Tech" Technicians who check the work of other Pharmacy Technicians? YES NO

If YES, what preparation, experience, or special circumstances do these employees have? _____

10. Where have most of your entry-level Pharmacy Technicians been trained?

- Community Colleges Proprietary and/or Trade Schools
 Other: _____

11. Do you believe that the community colleges in Los Angeles County should create new programs to train more Pharmacy Techs? YES NO

Why? _____

12. Do you have any other comments regarding the role of the community colleges in preparing students to work in pharmacy?

13. May we contact you again if we have further questions? YES NO

~ Thank you ~

Appendix C: Model Curriculum for Pharmacy Technician Training

(See also: http://www.ashp.org/s_ashp/docs/files/RTP_TechUserGuide.pdf)

Major areas of job responsibility -

- Goal 1:** Assist the pharmacist in collecting, organizing, and evaluating information for direct patient care, medication use review, and departmental management.
- Goal 2:** Receive and screen prescription/medication orders for completeness and authenticity.
- Goal 3:** Prepare medications for distribution.
- Goal 4:** Verify the measurements, preparation, and/or packaging of medications produced by other technicians.
- Goal 5:** Distribute medications.
- Goal 6:** Assist the pharmacist in the administration of immunizations.
- Goal 7:** Assist the pharmacist in the identification of patients who desire/require counseling to optimize the use of medications, equipment, and devices.
- Goal 8:** Initiate, verify, assist in the adjudication of, and collect payment and/or initiate billing for pharmacy services and goods.
- Goal 9:** Purchase pharmaceuticals, devices, and supplies according to an established purchasing program.
- Goal 10:** Control the inventory of medications, equipment, and devices according to an established plan.
- Goal 11:** Assist the pharmacist in monitoring the practice site and/or service area for compliance with federal, state, and local laws; regulations; and professional standards.
- Goal 12:** Maintain pharmacy equipment and facilities.
- Goal 13:** Assist the pharmacist in preparing, storing, and distributing investigational medication products.
- Goal 14:** Assist the pharmacist in the monitoring of medication therapy.
- Goal 15:** Participate in the pharmacy department's process for preventing medication misadventures.

Foundation knowledge and skills -

- Goal 16:** Take personal responsibility for assisting the pharmacist in improving direct patient care.
- Goal 17:** Demonstrate ethical conduct in all job-related activities.
- Goal 18:** Maintain an image appropriate for the profession of pharmacy.
- Goal 19:** Resolve conflicts through negotiation.
- Goal 20:** Understand the principles for managing change.
- Goal 21:** Appreciate the need to adapt direct patient care to meet the needs of diversity.
- Goal 22:** Appreciate the benefits of active involvement in local, state, and national technician and other pharmacy organizations.
- Goal 23:** Appreciate the value of obtaining technician certification.
- Goal 24:** Understand the importance of and resources for staying current with changes in pharmacy practice.
- Goal 25:** Communicate clearly when speaking or writing.
- Goal 26:** Maximize work efficiency through the use of technology.

- Goal 27:** Efficiently solve problems commonly encountered in one's own work.
- Goal 28:** Display a caring attitude toward patients in all aspects of job responsibilities.
- Goal 29:** Maintain confidentiality of patient and proprietary business information.
- Goal 30:** Understand direct patient care delivery systems in multiple practice settings.
- Goal 31:** Efficiently manage one's work whether performed alone or as part of a team.
- Goal 32:** Function effectively as a member of the health care team.
- Goal 33:** Balance obligations to ones self, relationships, and work in a way that minimizes stress.
- Goal 34:** Understand the use and side effects of prescription and nonprescription medications used to treat common disease states.
- Goal 35:** Assist the pharmacist in assuring the quality of all pharmaceutical services.

Appendix D: Pre-Pharmacy and Pharmacy Transfer Programs

EL CAMINO COLLEGE

PHARMACY SCHOOL ADMISSION COUNSELING DIVISION

The following requirements for the major are subject to change without notice. To assure accuracy of the information on this sheet, you should consult with the Pharmacy School Admission counselor, or review articulation agreements via the Internet at WWW.ASSIST.ORG. You may also consult the Articulation Officer for specific articulation agreements.

CAREER OPPORTUNITIES: Pharmacists prepare, compound, and dispense medicines prescribed by doctors, veterinarians, and dentists. They advise doctors, veterinarians, and other prescribers on the proper selection and effect of the drugs.

ADMISSION: Admission to pharmacy schools is highly competitive. An appropriate major for the bachelor's degree should be selected that could lead to an alternate career if necessary. Pharmacists must graduate from a program accredited by the American Council of Pharmaceutical Education. Most schools require a pre-pharmacy curriculum emphasizing mathematics, chemistry, biology, and physics. Pharmacists must also be licensed, which requires graduation from a college of pharmacy. Licensed pharmacists must also complete written and practical examinations given by the board. Pharmacy schools accept applications submitted through the Pharmacy Centralized Application Service, PharmCAS. All of the schools in California and more than 60 schools across the country are participating in PharmCAS. To submit an application through PharmCAS, go to their website at <http://www.pharmcas.org>. Students may be required to submit supplemental application materials to each program. Students will need to check the individual program website for additional information.

UNIVERSITY OF SOUTHERN CALIFORNIA

www.usc.edu/schools/pharmacy

Students should have a minimum of 90 semester units. Recommended: three or four years of academic preparation; Bachelor's Degree is highly recommended. A minimum GPA 3.0 is required; The prerequisite courses (Physiology, Microbiology, Molecular Biology; and Organic Chemistry) must be repeated at a four year university if they are nine years or older at the time the application is submitted. The professional program requires four years and leads to a Pharmacy Degree (Doctor of Pharmacy). Students are encouraged to become familiar with the pharmacy profession, visit the campus, and meet the admission staff, faculty and students by attending one of the information sessions. To make a reservation, visit <http://www.usc.edu/schools/pharmacy/pharmd/admission/tour.html>.

Required courses: Biology 101-102-1C, Chemistry 1A-1B and 7A-7B, Microbiology 33, Physiology 31, Math 150 and 190, English 1A and 1B or 1C, Psychology 5 or Sociology 101, Speech 12, Econ 1 or 2, Physics 2A-2B or 1A-1C or 3A-3B

Recommended courses:

Computer Science; Biochemistry course required by USC, however, El Camino does not have an equivalent course.

*Humanities- six semester units from: Literature, Classics, Philosophy, Religion, Ethics, History, Foreign Language, and Fine Arts; *Social & Behavioral Sciences- six semester units from: Anthropology, Geography, Behavioral Biology, Psychobiology, Sociology, Political Science or International Relations

* Note: Students who have earned a Bachelor's Degree in the U.S. before beginning the Doctoral Program will have met the requirements for Humanities and Social & Behavioral Sciences.

UNIVERSITY OF CALIFORNIA, SAN FRANCISCO (UCSF)

<http://pharmacy.ucsf.edu>

To be eligible for admission, satisfactory completion of a minimum of 62 semester units must have been completed at another college. The curriculum requires two years of pre-professional courses followed by four years of professional study at UCSF leading to a Doctor of Pharmacy (Pharmacy. D.) Degree. A minimum GPA of 2.80 is required to meet admissions eligibility.

Required courses: Biology 1A-1B or (101-102 articulation is pending review); Chemistry 1A-1B and 7A-7B; Physiology 31; English 1A and 1B or 1C; Math 190 and 191 or 160 and 161; Physics 1A-1B-1C or 2A-2B or 3A-3B; 18 semester units of Humanities and Social Sciences which must include the following courses: Economics 1 or 2 or 5; Psychology 5 or Sociology 101 or Anthropology 2; Speech 1 or 4

Note: Entering students are required to have home internet connection, email, and a computer that meets the software and hardware requirements. Students are expected to have computer literacy upon entering the program in Excel, Word, Equation Editor, and Power Point. Apply by November 1 for admission the following year in September.

Pharmacy School Admission Carteron, Gaines, Key- May 2008 Pharmacy School Admission Carteron, Gaines, Key- May 2008

UNIVERSITY OF THE PACIFIC

www.uop.edu

Doctor of Pharmacy Degree: 64 transferable units required.

Required courses: Biology 101-102, Chemistry 1A-1B and 7A-7B, Economics 1 or 5, English 1A and 1B or 1C, Math 190 or 160, Microbiology 33, Psychology 5, Speech 1 or 4, Physics 1A or 2A or 3A *Students with a bachelor's degree are exempt from the GE requirement: General Education: 28 additional units from humanities, social, and behavioral sciences - including the English, Speech, Economics, and Psychology. No more than 2 units of P.E. will count.

SANTA MONICA CITY COLLEGE

PRE-PHARMACY

Pharmacists prepare, compound, and dispense medicines prescribed by doctors, veterinarians, and dentists. They advise doctors, veterinarians, and other prescribers on the proper selection and effect of drugs. Additionally, pharmacists learn to recognize and classify hundreds of medicines. Pharmacists must graduate from a program accredited by the American Council of Pharmaceutical Education. Most schools require a pre-pharmacy curriculum emphasizing mathematics and basic sciences, such as chemistry, biology, and physics. Pharmacists must also be licensed, which requires graduation from a college of pharmacy. The curriculum must contain at least 3200 hours of course work and 1000 hours of practical experience. Licensed pharmacists must also satisfactorily complete written and practical examinations given by the Board.

PhamCAS is a central online application center. The website provides useful information including a directory of all United States pharmacy schools, with links to information: www.pharmcas.org.

PRE-PHARMACY REQUIREMENTS

Although not required for application to pharmacy school, very few applicants are accepted who do not have a Bachelor's degree. It is becoming increasingly crucial for successful pharmacy school applicants to have direct work or volunteer experience in pharmacy. Excellent written and verbal communication skills are essential.

TRANSFER

Students planning to transfer to a four-year college should complete the lower-division major requirements and the general education pattern for the appropriate transfer institution. Santa Monica College has articulation agreements for this major with the following UC, CSU, and private institutions. Exact major requirements for these and other UC and CSU campuses can be found online www.assist.org. Articulation agreements with private institutions can be found online at www.smc.edu/articulation.

PHARMACY SCHOOLS IN CALIFORNIA INCLUDE

UNIVERSITY OF CALIFORNIA, SAN DIEGO

Prerequisite coursework for admission to the Doctor of Pharmacy Program:

It is highly recommended that students have four years of undergraduate study and complete the requirements for the bachelor's degree (B.S. or B.A.) prior to entering the UCSD School of Pharmacy and Pharmaceutical Sciences. The absolute, minimum requirements are 90 quarter units or 60 semester units taken at an accredited college or university in the United States and completion of the prerequisite coursework listed below.

Students who have attended a foreign school must have completed at least one year of study at a four-year college or university in the United States prior to application. Entrance examinations such as the P.C.A.T. or G.R.E. are not required. Students with international transcripts should e-mail the School of Pharmaceutical Sciences at pharmacy@ucsd.edu providing your first and last name, an e-mail address, and the full name of the school (or schools) you attended outside the United States.

A solid understanding of the fundamental sciences is essential for the study of the pharmaceutical and biomedical sciences, and applications are required to have successfully completed with a grade of C (2.0) or higher the following prerequisite coursework.

Applications may have an undergraduate major in any area of interest, as long as the prerequisite coursework have been completed. Proficiency in a foreign language, such as Spanish, is considered highly desirable.

Students who have completed only the minimum prerequisite coursework and who do not intend to obtain a Bachelor of Arts degree may be at a competitive disadvantage in the application process compared to students who have earned their degree.

Suggested Santa Monica College courses: Biology 21, 22, 23; Chemistry 11 **and** 12; Chemistry 21, 22, **and** 24; Physics 21 (formerly 1) **and** 22 (formerly 3) **or** 6 **and** 7 **or** 8 **and** 9; Math 7 **and** 8; English 1 **and** 2; Economics 1 **or** 2; Speech 1 For more information on UCSD's new PharmD program contact: pharmacy@ucsd.edu, or <http://pharmacy.ucsd.edu>

UNIVERSITY OF CALIFORNIA, SAN FRANCISCO

Admission requirements include:

Completion of a minimum of two years of pre-pharmacy prerequisites (62 semester units) to include the following courses:

Biology 21, 22 **and** 23; Physiology 3; English 1 **and** (2 **or** 31); Chemistry 11, 12, 21, 22 **and** 24; Math 7, 8; Physics 21 (formerly 1) **or** 6 **or** 8; Physics 22 (formerly 3) **or** 7 **or** 9; Speech 1, Economics 1 **or** 2; choose 1 from: Anthropology 2; Psychology 1; Sociology 1

18 semester units of Humanities/Social Sciences to include the following three courses:

Speech 1; Economics 1 **or** 2; select one course from: Anthropology 2; Psychology 1; Sociology 1

Santa Monica College has articulation agreements for this major (see www.smc.edu/articulation for exact major requirements) with the following private and out-of-state institutions:

LOMA LINDA UNIVERSITY

Loma Linda University will require that applicants complete a minimum of 60 semester units of undergraduate work prior to applying. Since specific admissions requirements have not been developed at this time, Loma Linda University advises applicants to follow a course of study common to admission to other schools of pharmacy (1 year each of general chemistry, organic chemistry, physics, biology, calculus, and English and 1 course each of public speaking, economics, and social sciences). Applicants can provide their mailing address to Loma Linda University, School of Pharmacy and they will mail an information packet and application when they are ready.

Contact the LLC School of Pharmacy at: gradschool@univ.llu.edu or call (800) 422-2558.

**UNIVERSITY OF THE PACIFIC -
THE THOMAS J. LONG SCHOOL OF PHARMACY & HEALTH SCIENCES PHARM D PROGRAM**

Admission requirements include:

Chemistry 11, 12, 21, 22, 24; Economics 2; Math 7 **or** 23; Microbiology 1; Physics 21 (formerly 1) **or** 6 **or** 8; Psychology 1 **or** 14; Speech 1; select two courses from: Biology 21, 22, 23; select two courses from: English 1, 2, 31

GENERAL EDUCATION CATEGORIES

Students who have not completed a U.S. Bachelor of Arts degree must complete the following general education categories: (A minimum of one 3 semester or 4 quarter unit course in each area is required)

IC: INTERNATIONAL OR INTERCULTURAL STUDIES

Select one course from: Anthropology 2, 3, 14, 20; English 50; Geography 2; History 3, 4, 5, 6, 19, 21-39; Political Science 2, 7, 8, 11, 14; Speech 7

IIB: FUNDAMENTAL HUMAN CONCERNS

Select one course from: English 51, 52; History 1, 2, 55; Philosophy 1, 2, 3, 4, 5, 6, 10, 22, 23, 24, 51, 52; Political Science 51, 52; Religious Studies 51, 52

IIC: PRACTICE AND PERSPECTIVE IN ARTS

Select one course from: Art 1-73; Cinema 1-10; Dance 5, 7; English 15, 55; Music 1, 30-37; Theatre Arts 2, 5, 7
Please see www.pacific.edu/pharmd for more information.

UNIVERSITY OF SOUTHERN CALIFORNIA (USC)

A minimum of 90 semester or 135 quarter units with a minimum grade of C (2.0) in each course and a cumulative grade point average of 3.0. Grades of "pass/no-pass" will not be accepted (unless a course is offered only on a "pass/no-pass" basis). Candidates who have received or will receive a Bachelor of Arts degree or who have completed units in excess of the minimum required will be considered more favorably than applicants who have fulfilled only minimum requirements.

"Pre-pharmacy requirements in the following areas must be repeated if they are 9 years or older at the time the application is submitted: mammalian physiology, microbiology, molecular biology, biochemistry and organic chemistry (full year). These courses must be repeated at a four year college/university."

Holders of international degrees are required to complete the following courses in the USA at an accredited **four year** degree granting college or university: mammalian physiology, molecular biology, biochemistry and microbiology. English and interpersonal communication must also be completed in the USA, but may be completed at a two year college along with any other required humanities, social or behavioral sciences.

Please Note: English and Communication courses taken in a foreign country will be accepted only from countries whose native language is English (e.g., Great Britain, English-speaking Canada, Australia, New Zealand and the British West Indies). Students from any other foreign country must take English and Communication courses in the United States.

It is recommended that as many of these courses as possible be completed prior to transfer.

CALCULUS

1 semester/2 quarters: Math 7

GENERAL CHEMISTRY

One year course with lecture and lab: Chemistry 11 **and** 12

ORGANIC CHEMISTRY

One year course with lecture and lab: Chemistry 14 **and** 16 **or** Chemistry 21 (formerly 1), 22 (formerly 3), **and** 24

GENERAL BIOLOGY

One year course with lecture and lab (usually cellular and organismic biology): Biology 21 (6A) **and** 23 (7)

BIOCHEMISTRY

One course: Chemistry 31

MICROBIOLOGY

One course: Microbiology 1

MOLECULAR BIOLOGY

One course: Biology 22

PHYSICS

One year: Physics 6 **and** 7 **or** 8 **and** 9 **or** 21 (formerly 1) **and** 22 (formerly 3) **and** 23 (formerly 2)

PHYSIOLOGY

One course: Physiology 3

STATISTICS

One course: Math 52

ENGLISH COMPOSITION

One course: English 1, 2 **or** 31

COMMUNICATIONS

One course: Speech 5 **or** Psychology 5

GENERAL PSYCHOLOGY OR SOCIOLOGY

One course: Psychology 1 **or** Sociology 1

MICRO OR MACROECONOMICS

One course: Economics 1 **or** 2

SOCIAL AND BEHAVIORAL SCIENCES

Students who have earned or will earn a baccalaureate degree in the U.S. before beginning the PharmD. program and meet the prerequisites described above (including introduction to psychology or introduction to sociology and micro- or macro-economics) will have fulfilled the

requirements for social and behavioral sciences. Students who will not have earned a baccalaureate degree before beginning the PharmD. program must complete an additional 2 semesters/3 quarters of courses in the social and behavioral sciences. Recommended areas include: anthropology, psychology, psychobiology, economics, geography, and sociology.

HUMANITIES

Students who have earned or will earn a baccalaureate degree in the U.S. before beginning the PharmD. program and meet the prerequisites above will have fulfilled the requirements for humanities. Students who will not earn a Bachelor of Arts degree before beginning the PharmD. program must complete 2 semesters/3 quarters of courses in literature, philosophy, history, ethics, foreign language, art history, or music history. Studio or performance classes in art and music are not acceptable.

WESTERN UNIVERSITY OF HEALTH SCIENCES

Anatomy 1 or 2; Chemistry 11, 12, 21, 22, 24, 31; Math 7; English 1, 2; Microbiology 1; Physiology 3; Speech 1; one semester course in two of the following three areas: Public Speaking/Debate; Social Sciences; Economics. **Pharmacy College Admissions Test (PCAT):** Not required

PHARMACY SCHOOLS OUTSIDE OF CALIFORNIA INCLUDE

TOURO UNIVERSITY

Candidates who have obtained a Bachelor of Arts degree (or will obtain a Bachelor of Arts degree prior to the start of classes) are eligible for admission to the College of Pharmacy provided they meet the following prerequisite requirements and coursework. **Pharmacy College Admissions Test (PCAT):** Not required.

- 8 semester/12 quarter units of Inorganic Chemistry with lab
- 8 semester/12 quarter units of Organic Chemistry with lab (4 semester units of Biochemistry may be substituted for the second semester of Organic Chemistry)
- 4 semester/6 quarter units of Human Anatomy/Physiology (combined course) with lab or one course each of Human Anatomy and Human Physiology with labs
- 4 semester/6 quarter units of Microbiology with lab
- 3 semester units of Calculus
- All prerequisite coursework completed with a grade of C (2.0) or higher
- Minimum cumulative and science grade point average of 2.5 (candidates who qualify for secondary applications typically have GPA's substantially higher than 2.5)

CANDIDATES WITHOUT A BACHELOR'S DEGREE

Though it is strongly recommended that candidates for the Doctor of Pharmacy Degree program obtain a Bachelor of Arts degree prior to the start of classes, candidates without a Bachelor of Arts degree who have completed more than 60 college semester units may be accepted to the program provided they meet all of the prerequisite requirements and coursework listed above as well as the following additional coursework:

- 3 semester units of College English
- 3 semester units of English Composition
- 3 semester units of Speech/Communication
- 3 semester units of Economics

CERRITOS COLLEGE

PRE-PHARMACY CAREER PATHWAY

The following curriculum does not lead to an Associate in Arts Pre-Pharmacy Degree. However, students could fulfill requirements for a Natural Sciences Degree by completing 18 units of science and math coursework to include a minimum of 2 Biological Sciences, 2 Physical Sciences and a math course beyond Intermediate Algebra.

Admission to schools of pharmacy is highly competitive. Schools of Pharmacy offering the Doctor of Pharmacy generally require the completion of a minimum of 60 semester units of pre-pharmacy coursework. Applicants who have received a baccalaureate degree will be considered more favorably than applicants who have fulfilled only minimum requirements. A solid understanding of the fundamental sciences is essential for the study of the pharmaceutical and biochemical sciences. A discipline in the natural sciences is often the popular major selected.

COMMON COURSE REQUIREMENTS FOR MOST PHARMACY SCHOOLS

UNITS

BIOL	200	Principles of Biology	5
BIOL	201	Principles of Biology	5
CHEM	111	General Chemistry	5
CHEM	112	General Chemistry	5
CHEM	211	Organic Chemistry	5
CHEM	212	Organic Chemistry	5
ENGL	100	Freshman Composition	4
ENGL	102	Freshman Composition & Literature	3
MATH	170	Analytic Geometry and Calculus I	4

ADDITIONAL REQUIREMENTS FOR SPECIFIC CALIFORNIA PHARMACY SCHOOLS

LOMA LINDA UNIVERSITY – SCHOOL OF PHARMACY

www.llu.edu/llu/sps

Preferably, applicants will have successfully completed a baccalaureate degree in chemistry, biology, physics, or a related scientific field. The minimum requirement for acceptance without a BS degree is completion of the 72 semester units of a pre-pharmacy program of study. An introductory computer class (e.g., proficiency in a word processing program, spreadsheet, and Power Point; ability to send and receive emails with attachments and ability to search and retrieve information from the World Wide Web) and a speech communication class are required along with the following general education:

A & P	200	Human Anatomy (as of entry 2006)	5
CIS	101	Introduction to Computer Information Systems	3
PHYS	101	General Physics	4
PHYS	102	General Physics	4
SPCH	100	Fundamentals of Oral Communication	3

Humanities

12 units

Fine Arts, literature, philosophy, religion, ethics, foreign language, preferably Spanish, cultural diversity, performing arts, visual arts history or civilization

Social Sciences/Behavioral Sciences

12 units

Include one semester of economics and one semester of psychology. The remaining units can be from sociology, anthropology, political science, geography or cultural diversity.

UNIVERSITY OF CALIFORNIA, SAN DIEGO – SCHOOL OF PHARMACY

www.pharmacy.ucsd.edu

It is strongly recommended that students complete the requirements for a bachelor's degree. The absolute, minimum requirement is 63 semester units taken at an accredited college or university in the United States and completion of the prerequisites for this school. Students who have only completed the minimum coursework and who do not obtain a bachelor's degree may be at a competitive disadvantage in the application process. Applicants who have not earned a bachelor's degree prior to the start of classes in the Fall, will only be considered if they have exceptional academic performance and evidence of outstanding leadership potential. The Admissions Committee selects applicants for matriculation who have demonstrated the personal qualities of intelligence, maturity, integrity, dedication to the ideal of service to society, and who are best suited for meeting the educational goals of the School. The ability to express oneself clearly in both oral and written English is essential. In addition to intellectual and academic competence, the Admissions Committee considers communication skills, demonstrated leadership ability, community service and health care related experience. There were 1,058 applications received. Number of applicants invited to interview was 229 of which 100% had a bachelor's degree. Sixty students were admitted to the graduating class of 2009. The average overall G.P.A. of the students admitted was 3.67.

ECON	201	Principles of Macroeconomics	3
or ECON	202	Principles of Microeconomics	(3)
		HUMANITIES AND FINE ARTS: any two additional courses	3-3
MATH	190	Analytic Geometry and Calculus II	4
PHYS	101	General Physics	4
PHYS	102	General Physics	4
PSYC	101	General Introductory Psychology	3
or SOC	101	Introductory Sociology Principles	(3)
or ANTH	100	Cultural Anthropology	(3)
SPCH	130	Fundamentals of Public Speaking	3
		SOCIAL SCIENCES: Any two additional courses	3-3

Proficiency in a foreign language such as Spanish is considered highly desirable. It is also strongly recommended that students take upper division courses in biochemistry, physiology and cellular and molecular biology. These courses will better prepare the first year UCSD Pharmacy student.

UNIVERSITY OF CALIFORNIA, SAN FRANCISCO – SCHOOL OF PHARMACY

<http://pharmacy.ucsf.edu>

The minimum requirement is 62 semester units. Although this is the absolute minimum requirement, about 96% of the students accepted to U.C.S.F. PharmD program have completed a bachelor's degree – usually in biology, biochemistry, or chemistry. The average grade point average of all accepted students is about 3.50. Each year, less than about 1.6% of admitted students enter directly from a California Community College. Last year U.C.S.F. PharmD program accepted 122 students from 1,200 applicants.

A&P	201	Human Physiology	5
ECON	201	Principles of Macroeconomics	3
or ECON	202	Principles of Microeconomics	(3)
MATH	190	Analytic Geometry and Calculus II	4
PHYS	201	Engineering Physics	4
or PHYS	101	General Physics	(4)
PHYS	202	Engineering Physics	4
or PHYS	102	General Physics	(4)
PSYC	101	General Introductory Psychology	3
or SOC	101	Introductory Sociology Principles	(3)
or SOC	101	Introductory Sociology Principles	(3)

or ANTH	100	Cultural Anthropology	(3)
SPCH	130	Fundamentals of Public Speaking	3
or SPCH	235	Fundamentals of Argumentation & Persuasion	(3)

UNIVERSITY OF PACIFIC

www.pacific.edu/pharmacy

Although a bachelor's degree is not required, a degree can make an applicant more competitive, in recent years a strong majority of the successful applicants have had degrees. There is no absolute G.P.A. cutoff. Admission is competitive and is based on a number of factors in addition to G.P.A. including science grades, recommendations, essay, interview results, and demonstration of your ability to succeed in 17 units or more per semester. Competition can vary from year to year depending upon the size and strength of the applicant pool. The average G.P.A. over the past four years has ranged from a 3.1 to 3.5. Check UOP PharmD website for specifically listed general education coursework. Recommended electives include anatomy, genetics, physiology, microbiology, biochemistry, analytical chemistry and physical chemistry.

ECON	201	Principles of Macroeconomics	3
or ECON	101	U.S. & Global Economy	(3)
MATH	116	Calculus for Managerial and Biological Sciences	4
or MATH	170	Analytical Geometry and Calculus	(4)
MICR	200	Principles & Applications of Microbiology	5
PHYS	101	General Physics	4
or PHYS	100	Elementary Physics	(4)
PSYC	101	General Introductory Psychology	3
or PSYC	271	Abnormal Psychology	(3)
SPCH	130	Fundamentals of Speaking	3

UNIVERSITY OF SOUTHERN CALIFORNIA

www.usc.edu/schools/pharmacy/pharmd/

A minimum of 90 semester or 135 quarter units must be completed prior to entrance, with a minimum 3.0 cumulative G.P.A. and 2.75 Math and Science G.P.A. Sometimes a lower cumulative G.P.A. might be considered if grades in mathematics and science are stronger. It is highly recommended that Math and Science courses be completed during the regular academic year and not during a summer term. Pre-pharmacy requirements in the following areas must be repeated if they are 9 years or older at the time the application is submitted: mammalian physiology, microbiology, molecular biology, biochemistry and organic chemistry (full year). These courses must be repeated at a four-year college/university. Priority is given to those who have completed the Math and Science requirements at the time of the application and to those applicants who have completed more than the minimum amount of coursework. Candidates who have received or will receive a Baccalaureate degree or who have completed units in excess of the minimum required would be considered more favorably than applicants who have fulfilled only minimum requirements. The School of Pharmacy Office of Admissions uses an interview process to make determinations on admissions. The interview consists of two parts: an oral interview and a writing test. The purpose of the interview is to assess your oral communication skills, writing skills, leadership ability, and your motivation or potential to be a pharmacist.

BIOL	202	Molecular Biology/Genetics	4
ECON	201	Principles of Macroeconomics	3
		HUMANITIES/FINE ARTS: Two courses	3-3
MATH	112	Elementary Statistics	4
MICR	200	Principles & Applications of Microbiology	5
PHYS	201	Engineering Physics	4
PHYS	202	Engineering Physics	4
PSYC	101	General Introductory Psychology	3
or SOC	101	Introductory Sociology Principles	(3)
		SOCIAL/BEHAVIORAL SCIENCE: Two Additional courses	3-3
SPCH	120	Interpersonal Communication	3

The following **required** upper division courses are not offered at Cerritos College, but must be taken at another college or university: Biochemistry, Molecular Biology and Mammalian Physiology.

RECOMMENDED COURSE: Any Computer Science class

WESTERN UNIVERSITY OF HEALTH SCIENCES, COLLEGE OF PHARMACY

Formerly known as College of Osteopathic Medicine of the Pacific

www.westernu.edu/pharmacy/pharmd_about.xml

Minimum of 60 semester units is required. Candidates who have received a baccalaureate degree will be considered more favorably than applicants who have fulfilled only minimum requirements. Complete prerequisites with a "C" or better. All prerequisite coursework in progress must be completed no later than the spring semester or quarter immediately preceding matriculation. Summer session courses taken immediately prior to matriculation at Western University of Health Sciences are not accepted. Students must have a minimum cumulative and science grade point average of 2.5 in order to apply.

For the academic year Fall 2005/Spring 2006, 120 students were admitted from an applicant pool of 1,200 students. The average cumulative grade point average was 3.40 and the average science grade point average was 3.25. Applicants must submit an application by March 1 of the year prior to admission and participate in an admission interview and assessment of written and verbal communication skills.

A&P	200	Human Anatomy	5
A&P	201	Human Physiology	5
MICR	200	Principles & Applications Microbiology	5
SPCH	100	Fundamentals of Oral Communication	3

Besides the required courses listed the student must have at least 20 additional units from natural sciences, humanities/fine arts, and behavioral and social sciences. Electives must be met from at least two of the three following areas: Public Speaking/Debate, Social Sciences, to include Economics.

The following **required** coursework is not offered at Cerritos College, but must be taken at another college or university: Biochemistry (2 semesters) or Biochemistry (1 semester) and Molecular Biology (1 semester).

Advanced Placement, Transfer of Credit, CLEP or Credit for Experiential learning is not recognized by the program.

GLENDALE COMMUNITY COLLEGE

PRE-PHARMACY

The pre-pharmacy track consists of a group of courses that are required for admission to a Doctor of Pharmacy program. Students cannot transfer as pre-pharmacy majors, but they can major in any program and attend any other accredited university and still be taking courses towards fulfilling those requirements. Many students choose to follow a science major because the prerequisites are usually part of the science major, however, this is not required. The requirements listed below are for those universities that offer the Pharmacy program in California.

UC SAN FRANCISCO

ENGL 101, 102 or 104
CHEM 101, 102
CHEM 105, 106
MATH 103, 104
PHYS 101, 102 or 105, 106
BIOL 101, 102, 121

18 semester units of Humanities/Social Science must include the following three courses:

SPCH 101 or 102 or 104
ECON 101 or 102

A course in one of the following areas:

ANTHRO 102
PSYCH 101
SOC 101

UC SAN DIEGO

<http://pharmacy.ucsd.edu/admissions.shtml#PreReg>

The UCSD School of Pharmacy and Pharmaceutical Sciences has the same pre-requisite course requirements as the UCSF School of Pharmacy except we do not require a course in Mammalian Physiology.

WESTERN UNIVERSITY OF HEALTH SCIENCE

http://www.westernu.edu/admissions/pharmd_requirements.xml

Communications:

College English (1 semester)
English Composition (1 semester)
Speech Communication (1 semester)

Biological Sciences:

Human Anatomy with Lab (1 semester)
Human Physiology with Lab (1 semester)
Microbiology with Lab
medical Microbiology is preferred (1 semester)

Chemistry:

General Chemistry with Lab (2 semesters)
Organic Chemistry with Lab (2 semesters)
Biochemistry (2 semesters)

Mathematics:

Calculus (1 semester)

Electives:

Electives must be met from a 1 semester course from two (2) of three (3) of the following areas:

- Public Speaking/Debate
- Social Sciences
- Economics

Listing of approved prerequisites

Anatomy - BIOL 120

Biochemistry - BIOL 103
Calculus - MATH 103, 104, 105
English - ENGL 101, 102, 104
General Chemistry - CHEM 101 and 102
Microbiology - BIOL 112
Organic Chemistry - CHEM 105 & 106
Physiology - BIOL 121
Speech - SPEECH 101

UNIVERSITY OF SOUTHERN CALIFORNIA

http://www.usc.edu/assets/pharmacy/equiv/Glendale_College.html

MATH 103, 136
CHEM 101 and 102
CHEM 105* and 106*
BIOL 101** and 102**, 103, 112, 121
ENGL 101 and 102 or 104
SPCH 100
PSYCH 101 or SOC 101
ECON 101 or 102
PHYS 105 and 106 or 101 and 102

Social and Behavioral Sciences

Students who have earned or will earn a baccalaureate degree in the U.S. before beginning the Pharm.D. program and meet the prerequisites described above (including introduction to psychology or introduction to sociology and micro- or macro-economics) will have fulfilled the requirements for social and behavioral sciences.

Students who will not have earned a baccalaureate degree before beginning the Pharm.D. program must complete an additional 2 semesters/3 quarters of courses in the social and behavioral sciences. Recommended areas include anthropology, psychology, psychobiology, economics, geography, and sociology.

Humanities

Students who have earned or will earn a baccalaureate degree in the U.S. before beginning the Pharm.D. program and meet the prerequisites above will have fulfilled the requirements for humanities. Students who will not earn a baccalaureate degree before beginning the Pharm.D. program must complete 2 semesters/3 quarters of courses in literature, philosophy, history, ethics, foreign language, art history, or music history. Studio or performance classes in art and music are not acceptable.

* For science majors only.

** These courses fulfill pre-requisites for the USC School of Pharmacy. They may not, however, earn equivalence to USC's BISC-110 and/or BISC-112. Please review the appropriate articulation agreement if you seek these equivalences for other programs.

UNIVERSITY OF THE PACIFIC

<http://www.pacific.edu/admission/PharmD/Articulations/Articulation%20Glendale%20Community%20College.asp>

MATH 103 or 112
PHYS 101 or 105
CHEM 101 and 102
CHEM 105 and 106
BIOL 101, 102, 112
ENGL 101 and 102 or 104
SPCH 101 or 102
ECON 102
PSYCH 101 or 115

General Education requirements: Students who have not completed a Bachelor's degree must complete these categories IC International or Intercultural Studies (one course)

ANTH 102, 102H, 104, 105; ARMEN 125-127; ENGL 111; ETHN 101; FREN 121-126; GEOG 102, 105, 106; GERM 125, 126; HIST 103-109, 113, 119-121, 131, 132; HUM 101, 102, 106, 111, 115, 117; MUS 127; PHIL 113, 114, 122; POLSC 102, 103, 103H, 110, 111; SOCS 124; SPAN 124-128

IIB Fundamental Human Concerns (one course)

ENGL 109, 110, 128; HIST 101, 102, 133, 136; HUM 105, 105H, 110, 125, 135; PHIL 101, 112, 116, 118-121; SOCS 136

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