

V. UC SAN DIEGO CONTRIBUTIONS TO THE MEDICAL AND HEALTH SECTORS

MEDICAL TRAINING

UC San Diego plays a critical role in supporting the medical and health sector in San Diego County. As discussed in the previous chapter, numerous degree programs offered at the main campus relate to the health sciences. This chapter focuses on the School of Medicine and Skaggs School of Pharmacy and Pharmaceutical Sciences as UC San Diego graduate schools that train highly skilled professionals to enter the workforce as practitioners and scientists. During Fiscal Year 2006-07, the UC San Diego Medical Center had total revenues of \$659.5 million. The quantitative impacts of these schools are included in the discussion of the economic impacts of the campus as a whole in Chapters VI through VIII.

UC San Diego School of Medicine

UC San Diego plays a critical role in training the next generation of medical professionals to serve the health and medical needs of San Diego County as well as the nation as a whole. According to the U.S. News and World Report, the UC San Diego Medical School is rated 14th among all research medical schools in the nation. As one of the top research institutions, the UC San Diego School of Medicine attracts outstanding medical students and professionals to the region.

The Medical School was started in 1968 and has grown to over 900 faculty members, over 550 medical students including over 70 M.D. /Ph.D. students, 492 post-doctoral fellows, 300 graduate students and over 600 interns and residents. Entering class size is 134.

Of the nearly 3,700 total alumni who have graduated from the School of Medicine, accurate data on location is available for 3,670 alumni. Approximately 65.4 percent of these alumni currently reside in California. Of these, 19.3 percent reside in the City of San Diego and 8.8 percent reside in other parts of San Diego County. The primary fields of medicine practiced by UC San Diego School of Medicine alumni include general medicine (22.1 percent), pediatrics (12.9 percent), surgery (12.6 percent), and family medicine (11.8 percent).

Alumni are involved in patient care, research, and/or academia. Notable accomplishments by some UC San Diego School of Medicine alumni range from the creation of ground-breaking medical inventions to powerful positions in top hospitals. For example, John Dobak, M.D. is a UC San Diego alumni who founded the JAKK Group. The JAKK Group develops early stage medical technologies and is responsible for creating several successful start-up companies including Leptos Biomedical, Innercool Therapies, and CryoGen. Another example is Dr. Lisa Diller, who was recently named the chief medical officer at the largest pediatric cancer program in New England. An alumni of the School of Medicine, Dr. John Spinosa, was recently named Chief of Staff at Scripps Memorial Hospital in San Diego.

UC San Diego Skaggs School of Pharmacy and Pharmaceutical Sciences

The first class entered the Skaggs School of Pharmacy and Pharmaceutical Sciences (SPPS) in 2002. In FY 2006-07 SPPS graduated its second class, consisting of 23 students, with the third class of 32 students graduating in June 2008. Enrollment at SPPS has now reached steady state of 60 students per entering class.

All students at SPPS are enrolled in the full-time, four-year professional program leading to the doctor of Pharmacy Degree (Pharm. D.). A component of the training is the devotion of an entire year to practical clinical experience during which students apply their training in a patient care setting. Many of the students hold internships at the UC San Diego Medical Center serving the San Diego population.

MEDICAL RESEARCH

UC San Diego is known as a top research campus and the Health Sciences faculty account for a significant amount of the research activity, with the School of Medicine ranking 14th in the nation in funding from the National Institute of Health (NIH), and the School of Medicine faculty ranked 2nd in the nation in total research funding per faculty member.

Research Institutions and Centers

Major Health Sciences research centers include the region's only National Cancer Institute-designated Comprehensive Cancer Center (the Moores UCSD Cancer Center), the Stein Institute for Research on Aging, the AIDS Research Institute, a National Institute on Aging Alzheimer's Disease Research Center, an NIH Autism Center of Excellence, a Huntington's Disease Center of Excellence, and a major NIH Digestive Disease Research Center.

Health Sciences faculty collaborate with colleagues throughout the UC San Diego campus, as well as with the affiliated Veterans Affairs San Diego Medical Center and Rady Children's Hospital, which includes an alliance with St. Jude's Children's Research Center to bring promising clinical trials to children in San Diego and research collaborations with the nation's largest pediatric research center.

The Center for Community Health. The Center for Community Health is a sponsored research center focusing on improving the health needs of the community through integration of the work done at UC San Diego and the interests and needs of the community. The Center incorporates the various medical disciplines and provides services such as prenatal care and family planning, medical science education, and psychiatric advice for counselors, case workers and home visitors associated with public assistance programs. Some of the specific research services are detailed below with select public health programs detailed in the final section of this chapter.

- Huntington's Disease Research Clinical Research Program (HDCRP): The HDCRP's objective is to provide care, services, and education to HD patients, their families, and to professionals in the community. The HDCRP also strives to increase awareness and conducts research on treatments and future cures.
- Comprehensive Research Center of Excellence in Minority Health and Health Disparities (CRCHD): The Comprehensive Research Center of Excellence in Minority Health and Health Disparities was developed after UC San Diego, San Diego State University, the San Diego Council of Community Clinics, and the San Diego County Health and Human Service Agency received a five-year grant of over \$6.000 million in 2002 to start a center. Since then CRCHD has strived to achieve the Federal Department of Health and Human Services Healthy People 2010 goals for the nation in HIV, cardiovascular disease, and other diseases that disproportionately affect various communities.

Shiley-Marcos Alzheimer's Disease Research Center (ADRC). ADRC was established as one of the first National Institute on Aging-designated centers in 1984 to investigate Alzheimer's and its effects. The Center conducts numerous clinical studies with hundreds of volunteers in an effort to further understand the disease. Since its inception the Center has helped the scientific community with its advancement of treatments.

AIDS Research Institute (ARI). The ARI was established by UC San Diego to coordinate the efforts of the other research centers on campus focusing on AIDS/HIV related issues. The Institute also serves as a community resource offering patient care and educating the general population. The Center for AIDS Research (CFAR) is the primary component of ARI. CFAR strives to develop vaccines and therapies for HIV infection.

Rebecca and John Moores Cancer Center. The Rebecca and John Moores Cancer Center is one of only 39 National Cancer Institute-designated centers that combines patient care, research and education to provide leading edge care and clinical trials to prevent, diagnose, and treat cancer. The center draws from UC San Diego's vast resources of intellectual capital. In addition to the scientific breakthroughs and clinical trials that are part of the Center's commitment to improving treatment, the Cancer Center has an active outreach program to bring education and services to patients and the community. The Rebecca and John Moores Cancer Center offers free public seminars focusing on cancer awareness, prevention, and screening.

Medical Innovations and Discoveries

Students and faculty of the School of Medicine and Skaggs School of Pharmacy dedicate much of their time to basic, translational and clinical research to improve patient care. Innovations from medical researchers at UC San Diego provide a significant benefit to the region and beyond. Some of the key innovations are as follows.

Interstitial Cystitis Drug, Elmiron. Dr. Lowell Parsons, a faculty member in the surgery/urology department at UC San Diego, specializes in Interstitial Cystitis (IC), which is an inflammatory medical condition of the bladder resulting in pain in the bladder. Dr. Parsons' efforts over the past 25 years in treating people with this condition and researching possible therapies produced novel treatments that eventually led to the discovery of the drug Elmiron. Nearly 61.0 percent of patients experience improvement of symptoms in three months.⁴²

New Anti-Cancer Drug, Somocystinamide A (ScA). An innovative new anti-cancer drug was identified through collaboration between the UC San Diego School of Medicine, SPPS, Moores UCSD Cancer Center, and the Scripps Institution of Oceanography. ScA was found in a toxic algae gathered off the coast of Fiji by researchers from the Scripps Institution of Oceanography. The drug is still in the early stages of development, but the researchers envision that it will be useful in non-toxic treatment of cancerous tumors.

A unique partnership between industry and academia has led to human clinical trials of a new drug for a rare class of blood diseases called myeloproliferative disorders (MPD), which can evolve into leukemia. In just one year, collaborative discoveries by stem cell researchers from UC San Diego, Dana-Farber Cancer Institute, the Mayo Clinic and a San Diego pharmaceutical company moved from identification of the most promising drug candidate to clinical trials for a new drug to fight this degenerative blood disorder, which affects more than 100,000

⁴² www.orthoelmiron.com/aboutelmiron.html

Americans. A study headed by Catriona H.M. Jamieson, M.D./Ph.D., assistant professor of medicine and Director for Stem Cell Research at Moores UCSD Cancer Center, found an inhibitor that can stop the over-proliferation of blood cells that results in problems with blood clotting, heart attacks and, in some cases, leukemia. With collaborators at Stanford University and the Mayo Clinic, the findings led to development of the inhibitor by TargeGen, based in San Diego. That drug is currently being tested in human clinical trials.

In March 2008, surgeons at UC San Diego Medical Center were the first in the country to remove an inflamed appendix through a patient's vagina. Removal of diseased organs through the body's natural openings offers patients a rapid recovery, minimal pain, and no scarring. Key to these surgical clinical trials is collaboration with medical device companies to develop new minimally-invasive tools. The procedure, called Natural Orifice Translumenal Endoscopic Surgery (NOTES), involves passing surgical instruments through a natural orifice, such as the mouth or vagina, to remove a diseased organ such as an appendix or gall bladder. Only one incision is made through the belly button for the purpose of inserting a two millimeter camera into the abdominal cavity so that surgeons can safely access the surgical site.

ASF/SF2 Protein. In research funded by the National Institutes of Health (NIH), researchers at the UC San Diego School of Medicine identified a molecular sequence in mice that could grow a juvenile heart into an adult heart through a process called alternative splicing. According to Xiang-Dong Fu, Ph.D., the report author and a UC San Diego professor of Cellular and Molecular Medicine, the discovery is "directly relevant to understanding heart physiology during development, and may provide insights into mechanisms that directly contribute to heart attacks in humans."⁴³

HEALTHCARE NETWORK

UC San Diego Medical Center⁴⁴

The UC San Diego Medical Center is San Diego's only academic medical center. The UC San Diego Medical Center operates two hospitals in the region: UC San Diego Medical Center in Hillcrest and the John M. and Sally B. Thornton Hospital in La Jolla. Together the hospitals have 540 beds, with approximately 21,000 discharges annually. There are an additional 476,000 outpatient visits annually. The daily census has increased by 36.0 percent over the past 10 years. The Medical Center leads the nation in several specialties ranked in the annual U.S. News and World Report "Best Hospitals" and "Best Graduate Schools" issues, including Respiratory Care, Rheumatology, Kidney Disease, Gynecology, Cancer, Endocrinology, Urology, AIDS, and Drug and Alcohol Abuse. The UC San Diego Medical Center operates a regional Trauma and Burn Center, Stroke Center, high risk pregnancy program and neonatal intensive care unit, and other specialized clinical programs serving San Diego and Imperial counties and beyond.

The Medical Center operates a positive bottom line with revenue totaling approximately \$650.0 to \$750.0 million annually, which covers the hospital operating expenses and investment in construction and other costs. The economic impacts of these expenditures, including payroll,

⁴³ http://www.innovations-report.com/html/reports/life_sciences/report-38839.html

⁴⁴ Figures are provided by the UC San Diego Medical Center website "Facts and Figures," at www.health.ucsd.edu.

purchasing and construction, generated by the Medical Center are included in the overall analysis in Chapters VI through VIII.

The UC San Diego Medical Center has partnerships with other local hospitals and clinics including Sharp Hospital, which is co-director of the joint Bone Marrow Transplant Program.

Medical Center Outreach and Public Health Programs

UC San Diego Health Sciences is a major contributor to the health of the community through outreach programs operated by faculty, staff, medical students, and pharmacy students. The education, research, and services affiliated with UC San Diego provide the community with direct healthcare benefits. A few of these programs include:

UC San Diego Center for Community Health. As mentioned above, the UC San Diego Center for Community Health focuses on improving the health needs of the community through integration of the work done at UC San Diego and the interests and needs of the community. Partnered with various government and community organizations, the UC San Diego Center for Community Health provides numerous public health programs and services devoted to bettering the health of the community. Some of the programs and services include:

- Southern California Border HIV/AIDS Project: This program was created for high-risk Latino's working or residing in the U.S./Mexico border region to help progress the methods of HIV outreach, testing, and services.
- Community Pediatrics Center for Community Health. Through numerous outreach programs, the Community Pediatrics Center for Community Health targets at-risk and underserved populations in San Diego. The services offered range from providing employers culturally appropriate family health insurance information to examination of school programs and their effect on student health. The San Diego Kids Health Assurance Network (SD-KHAN) offers care for families living below the poverty line in San Diego County.

Border Health Education Network. This network is a partnership between UC San Diego, the Universidad Autónoma de Baja California (UABC), and the Border Health Initiative of Project Concern International. The mission of the network is to develop cross-border connections between healthcare professionals, to share information and resources, and to improve skills and capabilities. Working off the basic concept that disease does not recognize geographical boundaries, the Border Health Education Network addresses diseases such as AIDS, measles, hepatitis A and B, and tuberculosis.⁴⁵

The UC San Diego Student-Run Free Clinic Project. This community partnered clinic offers easily accessible, quality healthcare, education, and access to social services. It is operated by medical students, pharmacy students, and undergraduates under the supervision of UC San Diego faculty physicians and community volunteers. This project is also a way for students, staff, patients, health professionals, and community members to gain knowledge and connections. Types of services offered through the UC San Diego Student-Run Free Clinic Project include:

⁴⁵ <http://meded.ucsd.edu/hetc/index.html>.

- Health counseling and education on subjects such as drug and alcohol addiction, nutrition, first aid, hepatitis, diabetes management, and eye disease;
- Social and community service referrals to help those who cannot afford health insurance and do not qualify for county or government programs to access other resources;
- Limited medical outpatient care and prevention services comprising neurology, diabetes, psychiatry, ophthalmology, podiatry, dermatology, cardiology, and hepatitis;
- Education and training for medical and pharmacy students; and
- Affiliated acupuncture and dental clinics where students partner with local professionals and provide their services.

The UC San Diego Student-Run Free Clinic is a non-profit organization funded by individuals, organizations, and local businesses through in-kind donations and grants. There are three site locations as well as occasional specialty clinics ⁴⁶

Lifesharing Community Organ and Tissue Donation. Lifesharing is a designated Organ Procurement Organization (OPO) dedicated to providing organ and tissue to support transplant programs in San Diego and beyond. Operated by the UC San Diego Medical Center, Lifesharing has afforded approximately 3.000 million people in San Diego and Imperial counties organ recovery, donor family support, and educational services. 26 donor hospitals and four local transplant centers are supplied with transplantable organs through Lifesharing tissue and organ procurement, helping the continuously growing waiting list of 1,600 San Diego patients.⁴⁷

Teratogen (Pregnancy Risk) Information Services. Primarily funded by California's Department of Education, this program is based out of the UC San Diego School of Medicine and has been in service for about 27 years. The Teratogen Pregnancy Risk Information Line offers free information over the telephone to the general public about medications, chemicals, infectious diseases, and other factors that can be harmful to an unborn baby. The objective is to avoid preventable birth defects and support healthy pregnancies through education and research. The public can access the information over the phone, the Internet, or through e-mail.

⁴⁶ <http://meded.ucsd.edu/freeclinic/>.

⁴⁷ <http://lifesharing.org/>.