



UNIVERSITY  
OF  
CALIFORNIA

UC Health

# Health Innovations



**With health, there's hope.**

University of California Health delivers hope that tumors can be treated, diseases can be defeated and conditions can be cured.

With the power of its public mission and the skill to develop breakthroughs, UC Health takes innovation to the next level.



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## UC HEALTH

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### A Partner in Progress

California is a land of opportunity, unlimited possibilities and big dreams. These are the principles that UC Health exemplifies. It's inspiring first-generation college students to become doctors. It's pushing boundaries of science so patients can live better and longer lives. It's having the audacity to seek a cure to an incurable disease—and persevering until one is found.

UC Health's five medical centers and its 18 professional schools and programs serve the state and contribute to its well-being. The system has embraced health reform—establishing standards for patient safety. It has rallied resources—spearheading a statewide telehealth network that is expanding access to specialty care. It has achieved the seemingly impossible—helping paralyzed people walk again.

It's this type of innovation that makes UC Health an indispensable partner for California.





**A HEALTHIER YOU**

UC Health brings wellness programs to the community, from tai chi in San Francisco's Tenderloin district to yoga for kids by Santa Monica's beaches.



# Straight From the Heart

When you need the most complex of care, you can count on UC Health, which provides half of the state's transplant surgeries and a quarter of its extensive burn care.

At UC San Diego, surgeons saved the life of a young Oceanside mother whose diseased liver was removed, reconstructed and then reimplanted without any tumors. At UC Davis, surgeons restored a Modesto woman's voice with the world's second documented larynx transplant. Meanwhile, UCLA and UCSF took part in the world's longest kidney transplant chain.

This visionary thinking was true a half century ago when UCLA's Paul Terasaki developed the test that became the international standard method for tissue typing. And it's true now, when Rob Evans' new donor heart arrived at UCLA in a device that kept it warm and beating, an experiment that could expand the pool of donor hearts.

With expertise and compassion, UC Irvine's Regional Burn Center treats patients with Stevens-Johnson syndrome, a rare condition where an allergic reaction causes victims to lose nearly all their skin. Using advanced burn treatments, those patients not only heal and return to normal lives, they volunteer to aid other burn center patients.





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## PATIENT CARE

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# The Future of Surgery

UC Health is taking the stress out of surgery.

UC Irvine interventional radiologist Laura Findeiss and urologist Jaime Landman use advanced imaging technologies to precisely target tumors, which are destroyed by thin needles that are heated or cooled. Patients have little or no pain. They leave the same or next day and can return to work almost immediately. This is helping to revolutionize cancer care for early tumors.

At UC San Diego, Santiago Horgan is leading minimally invasive surgery in extraordinary directions. His team's U.S. firsts include removing an appendix through the mouth and a gallbladder through the belly button. More pioneering procedures are on the horizon. Horgan heads UC San Diego's new Center for the Future of Surgery, the nation's largest surgery training and research facility. The goal: Develop safe methods that will result in better outcomes, less pain and faster recoveries for every patient.



# Tools for Teaching

With the nation's largest health sciences educational system, UC fosters leadership, capitalizing on teamwork, technology and population trends.

All UC medical schools have student-run clinics, working in teams to care for the community's neediest populations. At UC Berkeley's School of Public Health, whose students run the popular Suitcase Clinic, the Center for Health Leadership is inspiring and preparing graduate students to be effective health leaders and professionals.

At UC Irvine, the iMedEd Initiative is changing how tomorrow's doctors are being trained—and the future of health care: Medical students use iPads and other high-tech tools to help keep the curriculum current with modern medicine. At the UC Davis Center for Virtual Care, patient simulation and advanced robotics technologies create a virtual hospital environment for health care learners. Meanwhile, UCSF's robotic pharmacy improves patient safety and offers a rich training ground for pharmacy students in medication distribution systems of the future.

UC's systemwide PRIME program addresses a looming doctor shortage, training students to practice in the state's underserved communities. PRIME is projected to enroll 375 students by 2014. UC plans to open its sixth medical school at UC Riverside in 2013. UC Merced also is developing plans that could lead to a future medical school.





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## RESEARCH

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# Impatience is a Virtue

With its breadth and brainpower, UC battles health's most difficult diseases in innovative ways. This pursuit of the greater good is typified by UC's efforts to treat cancer.

UCSF surgeon Laura Esserman spearheads the Athena Breast Health Network. The initiative, which serves more than 150,000 women receiving breast care at all five UC medical centers, aims to accelerate advancements in breast cancer prevention, screening and treatment with Silicon Valley-style collaboration, innovation and speed.

For 12 years, UCLA professor Dennis Slamon and colleagues conducted the research that led to developing the breast cancer drug Herceptin. The drug has saved the lives of hundreds of thousands of women and expedited research into therapies customized for each patient.

At UC Davis, medical and veterinary researchers work together to fight cancer in animals and humans, applying what they learn to develop better treatments for pets and people.

UC also administers the California Breast Cancer Research Program, which has awarded \$225 million in 920 grants, funding bold, life-saving research that other agencies might be reluctant to support.



# Stepping Up for Society

UC is a research powerhouse, receiving \$2 billion a year from the National Institutes of Health, along with funding from other agencies, foundations and institutes. From Alzheimer's to autism to obesity, UC is advancing science to address health's most pressing problems.

Alzheimer's affects more than 5 million Americans. By 2050, that number could triple. The debilitating disease not only causes memory loss but also is one of the leading causes of death. UC San Diego scientist Steven Wagner seeks to ease that suffering. He has received NIH funding to fast-track development of a promising Alzheimer's disease therapy.

Meanwhile, UC Davis' MIND Institute is helping unlock the mysteries of autism, with three studies named among the year's Top 10 Research Achievements by the world's largest autism science and advocacy organization—insights that are changing the lives of people with autism.

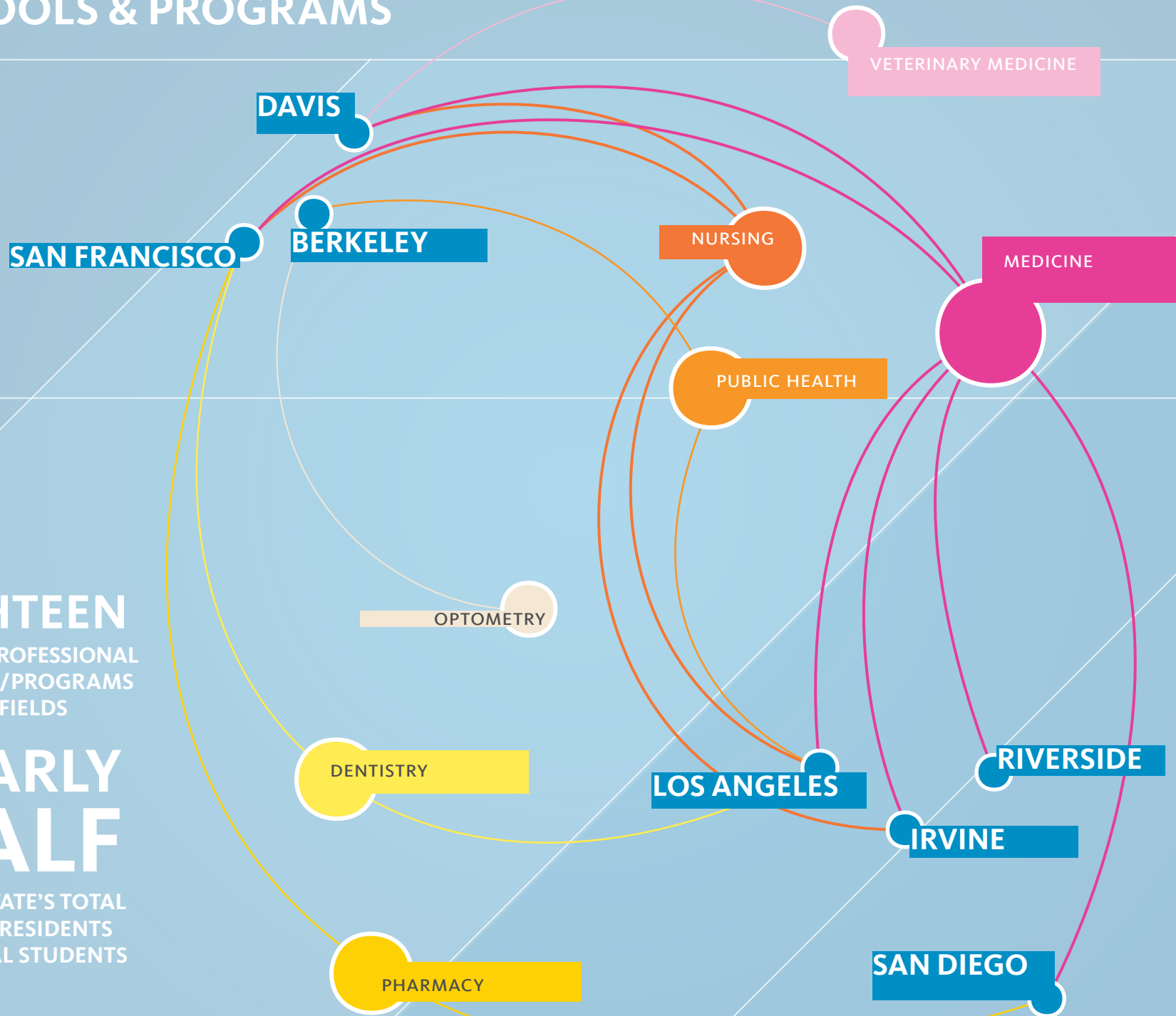
UCLA School of Public Health professor Antronette Yancey is studying ways to prevent obesity. She has developed 10-minute routines of fun, simple, low-impact movements to promote healthy living.



“The public health approach is not how to get a few people to do a lot; it’s how you get a lot of people to do a little.”

ANTRONETTE YANCEY, UCLA PROFESSOR

# UC HEALTH PROFESSIONAL SCHOOLS & PROGRAMS



**EIGHTEEN**  
HEALTH PROFESSIONAL  
SCHOOLS/PROGRAMS  
IN SEVEN FIELDS

**NEARLY  
HALF**  
OF THE STATE'S TOTAL  
MEDICAL RESIDENTS  
& MEDICAL STUDENTS



# INNOVATIONS

UC Health is changing  
the course of medicine  
one discovery at a time.

invented first device to treat acute ischemic stroke

synthesized human pituitary growth hormone

invented device to remove vascular birthmarks

developed artificial lung surfactant to treat premature newborns

discovered proto-oncogenes

developed durable artificial hip

first hand transplant in western U.S.

**WORLD'S SECOND DOCUMENTED LARYNX TRANSPLANT**

developed therapy for interstitial cystitis

developed mouthwash that may wipe out tooth decay

developed ViroChip to help identify viruses

developed CAPRA prostate cancer risk assessment test

**NATION'S FIRST REMOVAL OF GALLBLADDER THROUGH THE BELLY BUTTON**

developed liposomes

world's first domino liver transplant surgery

discovered vitamins E and K

discovered prions

West Coast's first non-surgical removal of kidney stones with lithotripter

laid groundwork, developed techniques for nerve transplantation

first to provide clinical PET scan services

developed prenatal tests for sickle-cell anemia

nation's first combined unrelated living liver and domino transplant

**LAI D GROUNDWORK FOR CAT AND MRI NONINVASIVE IMAGING TECHNOLOGIES**

developed a hepatitis B vaccine

first small bowel/liver transplant in western U.S.

developed the rectilinear scintillation scanner

**DEVELOPING AN ARTIFICIAL KIDNEY**

isolated the gene for insulin

played a key role in developing cancer drug Yervoy

first total shoulder replacement

West Coast's first total artificial heart transplant

co-discovered recombinant DNA techniques

co-discovered telomerase

**DEVELOPED WORLD'S FIRST EMBRYONIC STEM CELL TREATMENT TESTED IN HUMANS**

developed semisynthetic version of antimalarial drug artemisinin

**NATION'S FIRST REMOVAL OF APPENDIX THROUGH THE MOUTH**

helped develop flu vaccine

discovered beta-endorphin, a natural painkiller

crystallized tobacco mosaic virus

developed a treatment for brain aneurysms

**DEVELOPED TEST FOR TISSUE TYPING**

**DEVELOPED CELL PHONE MICROSCOPE**

nation's first sleeve gastrectomy

developed first techniques for fetal monitoring

co-discovered HIV

first discovered role of LDL and HDL in heart disease

**DEVELOPING AN ARTIFICIAL RETINA**

**INVENTED THE COCHLEAR IMPLANT**

cloned the gene for human growth hormone

first open-heart surgery in western U.S.

discovered first cancer-causing gene, or oncogene, in a virus

developed test to identify chemicals that damage DNA

West Coast's first robot-assisted spinal surgery

established first outpatient AIDS clinic, inpatient ward in U.S.

crystallized virus for polio

world's first fetal surgery

**INVENTED THE NICOTINE PATCH**

**HELPED DEVELOP BREAST CANCER DRUG HERCEPTIN**

developed world's first gene therapy for Alzheimer's disease

isolated the first human antibiotic peptides



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## RESEARCH

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### Stemming Diseases

UC is at the forefront of stem cell science, which has raised hopes of cures for a host of diseases and illnesses. UC and its affiliates have received more than half of the \$1.3 billion in grants awarded so far by California's stem cell agency.

All 10 UC campuses conduct stem cell research. A therapy developed at UC Irvine by Hans Keirstead that made paralyzed rats walk again became the world's first embryonic stem cell treatment to be tested in humans. UCLA has two clinical trials using stem cells to treat degenerative eye diseases, while UC San Diego is moving toward a trial to treat Lou Gehrig's disease and UC Davis is advancing a stem cell therapy to treat Huntington's disease.

Behind the clinical progress is a commitment that can be deeply personal. UCSF Provost Jeffrey Bluestone's parents both had diabetes. When complications caused his father to need a kidney transplant, Bluestone donated his kidney. But he wanted to do even more. He now leads a team that is seeking a cure for type 1 diabetes.





“I realized at that moment that we need to do something about (diabetes). My aspiration from the very beginning was that we would put together a team that would be among the world leaders in trying to pull this off, and I think we have.”

**JEFFREY BLUESTONE, UCSF PROVOST**



# Biotech Booster

Innovation is in UC's DNA. The modern biotech industry was born from discoveries by UCSF and UC Berkeley scientists who co-founded pioneering firms Genentech, Cetus and Chiron, and nurtured by the vital role UC San Diego has played in its growth. That entrepreneurial spirit is alive at UC, which holds more U.S. patents than any university.

UC's BRAID program brings together expertise from the UC Office of the President and the five UC medical school campuses to catalyze change and reduce barriers to biomedical research. Its UC ReX consortium is developing the first-ever, cross-campus searchable database of patient-level study data from all UC medical centers.

The California Institutes for Science and Innovation—a partnership between industry, the state and UC—is a launching pad for new ideas and companies in health and other fields. For example, one of the four institutes, QB3, has helped launch 65 firms that have raised over \$230 million in capital. At the federal level, all five UC medical school campuses have received NIH funding to accelerate the translation of research into cures. Also, UC campuses have signed industry alliances with companies such as Bayer, Pfizer and Sanofi-Aventis to speed up development of drugs to treat cancer, diabetes and other diseases.





A close-up photograph of a hand holding a black microscope lens. The background is dark, with a blurred white microscope body and a vertical purple light source. A white diagonal line runs from the top left to the bottom right, separating the text area from the image.

“To bring science to practice is a key thing. Since we’re a UC facility, that’s what we have that’s unique to offer.”

MERRITT SCHREIBER, UC IRVINE ASSOCIATE PROFESSOR

## INVENTIONS

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### Transforming Tomorrow

UC inventions are improving lives, from the nicotine patch that helps smokers quit to cochlear implants that can improve hearing. UC research laid the groundwork for the noninvasive imaging technologies known as computerized axial tomography (CAT) and magnetic resonance imaging (MRI), advancing the diagnosis of medical conditions. The tradition lives on, with UC producing an average of more than four inventions a day.

UCSF bioengineer Shuvo Roy is developing an artificial kidney, which one day could eliminate the need for dialysis. Livermore Lab scientists are developing an artificial retina, which could restore vision to millions suffering from eye diseases. A groundbreaking imaging technology developed by UCLA engineering professor Aydogan Ozcan can turn a simple cell phone into a powerful microscope with just \$10 in parts.

UC ideas also are helping heal communities. UC Irvine associate professor Merritt Schreiber has developed “PsySTART,” a rapid mental health triage and incident management system for use after disasters, and the “Listen, Protect and Connect” psychological first-aid guide for children after emergencies.







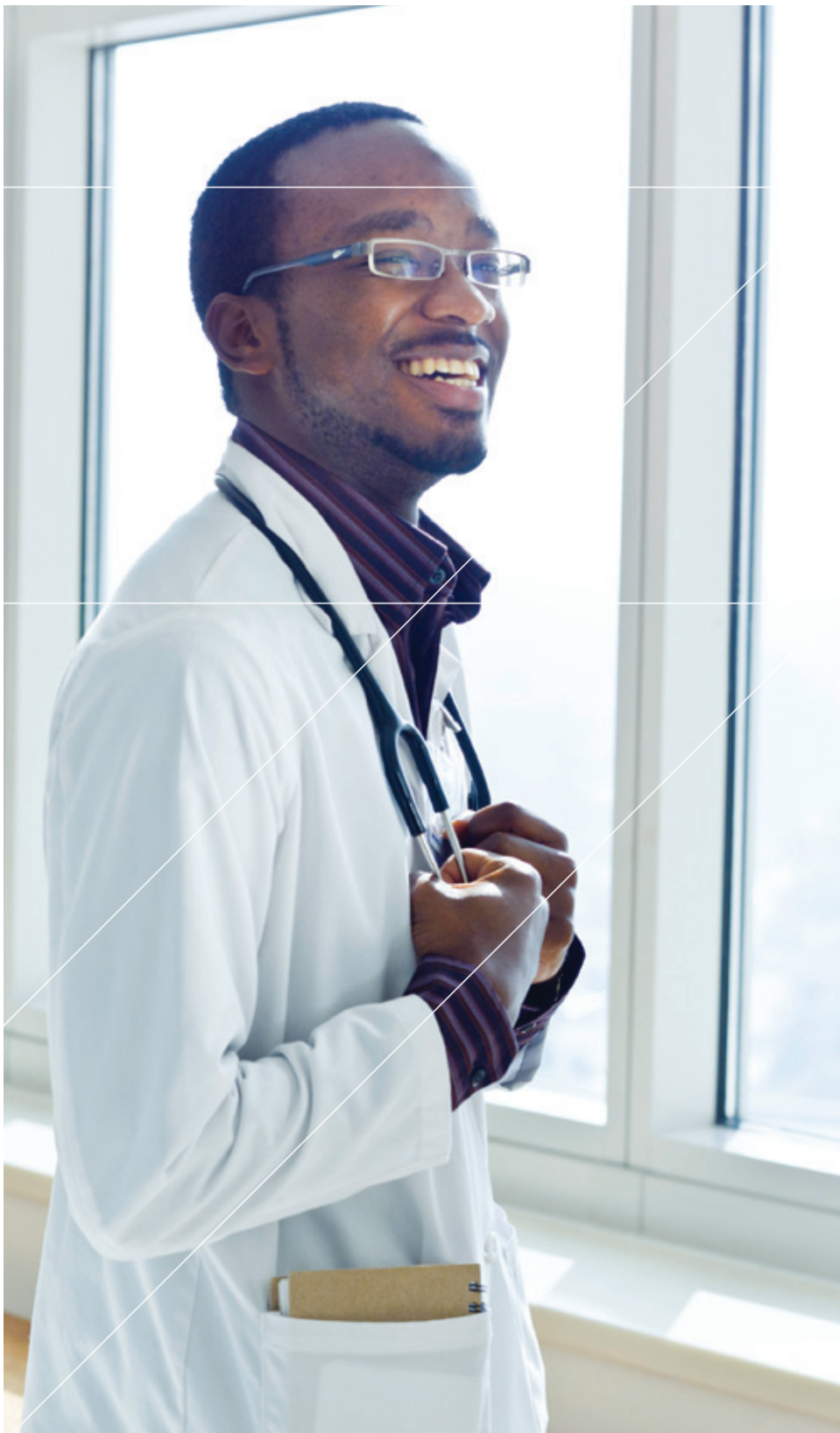
# Giant Steps

Austin Whitney and Rob Summers share a common bond. Both were paralyzed in car accidents. Both were told they would never walk again. Thanks to UC researchers and their capacity to work across disciplines to solve problems, both have done the seemingly impossible: They have taken steps on their own.

Whitney stood up from his wheelchair at UC Berkeley's commencement ceremony, and the graduating senior walked across the stage aided by an exoskeleton created by UC Berkeley engineers. Summers went from playing college baseball to not moving a toe for four years. Now he can stand and take steps on a treadmill, aided by an experimental treatment developed at UCLA. The electrical therapy that stimulates spinal nerves received Popular Mechanics' Breakthrough Award, honoring innovators whose work will transform the world in years to come.

That's UC transforming lives one step at a time.





## PARTNERSHIPS

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### Answering the Call

When Martin Luther King Jr. Hospital closed in 2007, it left a hole in Los Angeles' safety net. California's governor and county officials approached UC to discuss reopening the hospital. UC Regents agreed to help, entering an agreement with Los Angeles County under which UC provides physician services for a revamped 120-bed hospital.

UC launched the Center for Health Quality and Innovation in 2010 to improve quality, access and value in delivering health care. The center has funded projects to stop blood clots, reduce hospital readmissions, decrease falls in hospitals and limit patient exposure to radiation. Also, UC participates in the Delivery System Reform Incentive Program, a federal pay-for-performance initiative to further enhance quality, increase access to care, improve population health and contain costs.

When the state needed help forming the California Telehealth Network, UC Davis and the UC Office of the President led the effort. The network will connect more than 800 facilities in underserved areas to UC and other specialists. Throughout the state, UC Berkeley optometrists and community clinics have teamed to provide telemedicine screenings to low-income diabetic patients, helping prevent vision loss. UC also administers statewide helplines for poison control (UCSF), healthy pregnancies (UC San Diego) and quitting smoking (UC San Diego).



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## Crucial to California

UC Health doesn't just provide care, it advances health. UC Health trains tomorrow's leaders, strengthens the safety net and tackles health's toughest challenges.

The benefits are tangible: UC Health supports about 117,000 jobs in California and generates \$16.7 billion in economic activity.

Beyond those numbers is a promise to serve, to seek solutions and work for a healthier California.



