

# YEAR IN REVIEW

ANNUAL  
REPORT

2016-17

**UCDAVIS**  
CHILDREN'S HOSPITAL





Nationally recognized for leading-edge research and excellence in patient care.

# A year in review



Welcome! 2016-17 was a time of both historic firsts and enduring legacies at our nationally ranked pediatric academic hospital.

As we gathered last spring to break ground on an expanded new children's surgery center, we also commemorated our status as the first hospital on the West Coast – and just the fourth in the nation – to earn level I children's surgery verification from the American College of Surgeons.

These high points will help to amplify care across our more than 30 pediatric subspecialty areas, including our new fetal surgery program and our assortment of *U.S. News & World Report*-ranked specialties. They are also proud complements to existing distinctions such as our Magnet® recognition from the American Nurses Credentialing Center.

As 2018 begins, we are heartened to welcome a new chair of pediatrics to help guide our continued success. Dr. Satyan Lakshminrusimha joins us from the University of Buffalo, where he held leadership roles in neonatology and pediatrics and gained international recognition as a physician-scientist.

For families in our 33-county, 65,000-square-mile service area, we hope the above highlights and others in this report will continue to affirm the trust you place in us. For our regional and national partners in pediatric care, we are also delighted to offer new ideas here for discussion and collaboration.

As always, thank you for your support and partnership!

*Ann M Rice*

Ann Madden Rice  
Chief Executive Officer, UC Davis Medical Center



“He’s doing all the things a five-month-old baby is expected to do.”

– Estella Mendoza, whose baby Alexander Rojas became our first patient to undergo potentially life-changing open fetal surgery for spina bifida.



## SURGERY

### The West Coast’s first level I Children’s Surgery Center

In 2016 we became the first hospital on the West Coast and the fourth in the nation to earn verification as a level I Children’s Surgery Center from the American College of Surgeons (ACS), the world’s largest organization of surgeons. ACS granted us the highest-level designation after an extensive site visit by a survey team of children’s surgeons, anesthesiologists and nurses who reviewed our structure, processes and clinical outcomes data. Level I centers have specialty trained children’s surgeons in every discipline, with pediatric anesthesiologists and dedicated operating rooms for children available 24 hours a day. They also train future leaders in education and research and participate in community outreach.

### New pediatric surgery center taking shape

Our young surgery patients will benefit from new and improved children’s surgery center facilities starting in late 2018. Currently under construction after a spring 2017 groundbreaking, the new UC Davis Children’s Surgery Center will be a 33,000-square-foot facility with seven larger and more effectively designed operating rooms, a technologically advanced fleet of surgical equipment, and pre- and post-op bays. UC Davis performed more than 4,200 children’s surgeries this year, or an average of nearly a dozen per day.

### Fetal surgery part of new fetal treatment center

As part of our recent growth in pediatric subspecialty areas, we’ve launched inland Northern California’s first comprehensive multidisciplinary fetal diagnosis and therapy center, and performed the region’s first in-utero surgery. The UC Davis Fetal Care and Treatment Center offers advancements in fetal surgery and maternal-fetal medicine that allow multiple avenues of intervention, including in utero or in real time during the birthing process. We’re proud to be one of a limited number of U.S. hospitals to offer these services for our region’s families.

### Stem cells for spina bifida

The center is home to an extensive fetal care research program, including stem cell and tissue engineering for several fetal diseases. A spina bifida initiative led by Diana Farmer, our Children’s Hospital surgeon-in-chief, has demonstrated that prenatal surgery combined with stem cells helps canine patients with the disorder to walk without noticeable disability. Researchers are now moving the discovery to human clinical trials.



## TRAUMA AND EMERGENCY MEDICINE

### Insights on more effective – and less-invasive – testing in the peds emergency room

In 2001 UC Davis Department of Emergency Medicine and pediatrics professor Nathan Kuppermann helped to create the Pediatric Emergency Care Applied Research Network or PECARN, the nation's only federally-funded pediatric emergency care research network. Kuppermann and his colleagues have played key roles since in developing new guidance about a host of important clinical questions in pediatric emergency departments, such as CT scanning for children with minor head trauma.

That work continued last year, when Kuppermann co-led a PECARN study that established a proof of principle for a promising, less-invasive method of determining when babies with fevers have bacterial infections. Published in an August 2016 issue of the *Journal of the American Medical Association (JAMA)*, the study focused on high-throughput RNA analysis, a diagnostic test that may someday help to reduce invasive exams, hospitalizations and antibiotic treatments.

### Level I trauma care for 65,000 square miles

Our trauma center is currently one of three in California with level I verification in both pediatric and adult trauma care from the American College of Surgeons. Level I centers have the full range of trauma specialists and

technology available onsite 24 hours a day, train the next generation of trauma specialists, and lead research and outreach to reduce injuries.

### Serving 33 counties

Our hospital and trauma center serve a 33-county, 65,000-square-mile area with the help of the most comprehensive children's critical-care transport team in Northern California. The program travels 24-7 by ambulance, helicopter or fixed-wing aircraft to carry in more than 900 children each year, some from hundreds of miles away. In all, we saw nearly 16,000 pediatric ER visits in FY16/17.

### Excellence in life support

UC Davis Children's Hospital and UC Davis Medical Center received the Gold Level ELSO Award for Excellence in Life Support last summer for our extracorporeal life support program, which provides lifesaving support for failing organ systems. The award from the Extracorporeal Life Support Organization recognizes centers that demonstrate exceptional commitment to evidence-based processes and quality measures, staff training, patient satisfaction and clinical care.

### Prevention component

Our Trauma Prevention and Outreach program was established in 1996 to help decrease preventable death and injuries through education, research and outreach. Recent focus areas include drowning prevention, car seat safety, fall prevention and, starting this year, teen distracted driving.

"We're very pleased with the care he received. The nurses are great and the doctors were very involved, and they kept us in the loop the whole way. Now he's a very active 4-year-old that keeps up with all the kids, and at home he doesn't stop talking."

– Sara Hunt, whose son Jonathan suffered a stroke at age 4.





“Many people at UC Davis hold a special place in our hearts. The team effort, expressed day in and day out by all involved in Isabella’s care, helped our family on some of the toughest days. They were all so professional, attentive and, most of all, supportive.”

— Robyn Lazzerini, mother of heart patient Isabella.

## CANCER

### Guiding age-specific recommendations for pediatric cancers

UC Davis Comprehensive Cancer Center epidemiologists led a novel analysis of more than 1 million U.S. cancer patients last year, and found that second cancers in children and in adolescents and young adults (AYA) are far deadlier than they are in older adults – and may partially account for the relatively poor outcomes of cancer patients ages 15-39 overall. Their study in *JAMA Oncology* also found that survival after almost all types of cancer is much higher when the cancer is a primary malignancy, and that survival differences are most pronounced in patients under age 40.

Our researchers hope the findings will help guide clinicians in providing age-specific recommendations on prevention, screening, treatment and survivorship – especially among the AYA population, whose survival rates have not improved to the same extent as for children and older adults.

## CARDIOLOGY AND HEART SURGERY

### Harnessing 3-D modeling of the pediatric heart

The UC Davis Pediatric Heart Center is inland Northern California's only full-service pediatric heart center, and provides some of Northern California's most sophisticated specialty and surgical expertise. Through a collaboration with UC Davis biomedical engineers, our team recently began using 3-D modeling to assist with more complex congenital heart patients. The models are based on CT scans and transthoracic echocardiograms, and allow our pediatric heart surgeons to visualize especially challenging procedures.

### New chief of pediatric cardiology

Late last year we secured the services of renowned pediatric interventional cardiologist Frank Ing as our chief of pediatric cardiology. Ing has pioneered new techniques in both pediatric interventional cardiology and fetal cardiac interventions.

“They weren’t just taking care of Jackson. They were taking care of us.”

– Tricia Manning, whose son Jackson spent 39 days at UC Davis Children’s Hospital for serious diabetes complications.



## DIABETES AND ENDOCRINOLOGY

### New national guidelines for childhood obesity

Dennis Styne, our Yocha Dehe Endowed Chair in Pediatric Endocrinology, chaired an international Endocrine Society task force that issued new evidence-based clinical practice guidelines on preventing, evaluating and treating childhood obesity. The guidelines, for health care providers for children and adolescents, appeared in the March 2017 issue of the *Journal of Clinical Endocrinology and Metabolism* and were co-sponsored by the European Society of Endocrinology and the Pediatric Endocrine Society.

### Nationally ranked

The UC Davis Children’s Hospital pediatric diabetes and endocrinology program ranked 41st nationally in 2017-18 *U.S. News & World Report* rankings.

## GASTROENTEROLOGY AND GI SURGERY

### Expanded peds GI team joins national research network

Following a recent surge of faculty growth and program development in this rare specialty, in 2016 we joined the ImproveCareNow network. The nationwide organization of care centers unites clinicians, researchers and families to help care for kids with Crohn’s disease and ulcerative colitis. Participating centers collect standardized data during clinic visits, monitor performance, compare outcomes, and share best evidence and tools.

### East meets West to ease GI pain

UC Davis Children’s Hospital is home to one of just a handful of pediatric gastroenterologists across the globe trained in medical acupuncture. Arthur de Lorimier studied at the Helms Medical Institute, and practices the ancient Chinese medicine art form in his care of patients with conditions such as chronic abdominal pain, chronic nausea and related anxiety.



“Our twins fought hard. The medical interventions they received allowed them to survive. The love and minute-by-minute support they received from the NICU nurses allowed them to thrive.”

– The Williams family, whose twins, Matthew and Morgan, were born at 26 weeks and spent months in neonatal intensive care at UC Davis Children's Hospital.

## NEONATOLOGY

### A new collaboration on a leading threat to preemies

UC Davis Children's Hospital played an instrumental role last year in launching a nationwide effort to better address one of the most pressing concerns in the care of neonates, necrotizing enterocolitis or NEC. The nonprofit NEC Society's first-of-its-kind Multi-NICU Probiotic Quality Improvement Project will examine routine administration of probiotics to very low birthweight infants at risk for the relatively common intestinal disease, which has case-fatality rates of 20 to 30 percent. Despite probiotics' promising protective qualities for preemies, many NICUs aren't utilizing this potentially lifesaving intervention.

### First national NEC conference

The project emerged from the first national conference dedicated to the condition, presented in spring 2017 by the society and the UC Davis Department of Pediatrics. Mark Underwood, chief of neonatology at UC Davis Children's Hospital, is a member of the NEC's scientific advisory committee.

### Nationally ranked

Our pediatric neonatology program placed 16th in the nation in 2017-18 *U.S. News & World Report* rankings.

## NEPHROLOGY AND KIDNEY TRANSPLANT SURGERY

### Finding new avenues for kidney transplantation

UC Davis Children's Hospital is home to the Sacramento region's only pediatric nephrology and renal transplant program, where we use research and early adoption of emerging techniques to help influence volume and outcomes locally and nationally. The center was one of the early programs to accept and use *en bloc* organs from very young deceased donors (median age 1 year) for transplant into pediatric patients. In 2016 we followed with a comprehensive analysis of national transplant registry data, published in the *Journal of Pediatrics*, suggesting that the organs have similar outcomes as those from standard deceased donors. The findings could have an important impact on clinical care, as opening up a new source of donor kidneys could shorten wait times and reduce reliance on dialysis.

### Unique dialysis service

To better serve children waiting for a kidney transplant, in 2016 our program added the region's only outpatient peritoneal dialysis service for patients under 10 years of age.

### Nationally ranked

Our pediatric nephrology program placed 23rd in 2017-18 *U.S. News & World Report* rankings. The overall UC Davis kidney transplant program regularly ranks among the top U.S. centers by volume.

## NEUROLOGY AND NEUROSURGERY

### Major collaborations on sweeping neuroscience challenges

The UC Davis MIND Institute remains an international leader in research on causes, treatments and potential cures for autism, ADHD, Down syndrome and other neurodevelopmental disorders. Select research highlights from 2016-17 include helping to launch SPARK, the largest U.S. autism study ever undertaken; joining ECHO, a large-scale effort to identify environmental influences on child health; launching a major project to track impulsivity in teens and young adults; and generating new insights in areas such as biomarkers, maternal influence, drug treatment and cognitive testing.

### Level 4 Epilepsy Center

We're also proud to offer remarkable care for epilepsy, the nation's most common childhood brain disorder. The National Association of Epilepsy Centers has designated UC Davis as a Level 4 Comprehensive Epilepsy Program – the highest rating awarded – and our inpatient epilepsy monitoring unit includes pediatric beds and capabilities for high-resolution MRI, single photon emission computed tomography (SPECT) and PET. A strong basic-science research program aims to develop new drugs that will aid epilepsy treatment.

## ORTHOPAEDICS

### Treating trauma and complex sports injuries

UC Davis pediatric orthopaedic surgeons perform a high volume of trauma surgery and play an important role in our American College of Surgeons-verified level I pediatric trauma center. We also provide a significant amount of care for sports injuries and complex hip disorders, via a team that includes faculty members double-boarded in pediatric orthopaedics and sports medicine. Pediatric sports injuries and brachial plexus birth palsy are recent research focus areas.

### Nationally ranked

*U.S. News & World Report* ranked our pediatric orthopaedics program 18th in the nation in 2017-18, in collaboration with Shriners Hospital for Children – Northern California, our longstanding partner in caring for children with orthopaedic disorders and spinal injuries. UC Davis and Shriners combine to provide comprehensive musculoskeletal care for children, including trauma, limb deficiencies and prosthetics, hand and upper extremity surgery, spine surgery, neuromuscular conditions and spinal cord injury rehabilitation.



“Los milagros existen (miracles exist).”

– Alma Portugal on son Jorge, whose seventh birthday celebrations also marked his recovery from lifesaving surgery to remove cancer from his leg.



“Dr. Kurzrock has been our guiding light in our daughter’s health – with his endless knowledge and expertise, he’s been the biggest blessing to our family. We have so much gratitude to him and the wonderful team at UC Davis.”

– Tami Ames, on daughter Zoey’s care.

#### PULMONOLOGY

### Expansions in sleep medicine, cystic fibrosis and neuromuscular disease

We significantly expanded our sleep medicine program in the past year, completing more than 250 infant and pediatric studies at a new laboratory. We also started a new CPAP clinic and a combined airway/sleep clinic with our pediatric otolaryngology unit.

### Accredited Cystic Fibrosis Center

We invested significantly in our Cystic Fibrosis Foundation-accredited Cystic Fibrosis Care Center, increasing efforts around quality improvement, social services and dietitian support. New state-of-the-art sweat chloride testing devices now assist in confirmation of diagnosis.

### Early evaluation initiative

A new collaboration with our pediatric physical medicine and rehabilitation service targets early evaluation of neuromuscular disease-related respiratory issues. The program helps to standardize evaluation and early care, and provides opportunities for preventive, protective and promotive services.

#### UROLOGY

### Regenerative investigations for urological disorders

Our pediatric urology program is a national leader in research that studies stem cells and tissue engineering to improve treatments for children with urological disorders. In addition to serving a very busy surgical practice, our clinicians are also evaluating quality-of-life issues, outcomes data and topics in minimally-invasive surgery.

### Nationally ranked

*U.S. News & World Report* consistently ranks the pediatric urology program at UC Davis Children’s Hospital among the nation’s best, including a rating of 26th in 2017-18. We collaborate with Shriners Hospital for Children – Northern California, our longstanding partner in caring for children with urological issues.



## NURSING

### Recognized for nursing excellence and education

UC Davis Children's Hospital has long been identified as a U.S. center of nursing excellence devoted to optimal, collaborative and evidence-based care. We are privileged to have been granted Magnet® recognition status by the American Nurses Credentialing Center – the nation's highest form of recognition for nursing excellence – and recently marked our 20th year using the primary nursing model to enhance care and comfort for our pediatric patients.



Advanced education and training continue to be hallmarks of our all-R.N. pediatric nursing staff. Overall, nearly 85 percent of UC Davis registered nurses hold a bachelor's of nursing or higher, and 14 percent an advanced degree. UC Davis nurses established the area's chapter of the Society of Pediatric Nurses, and regularly provide scholarly experiences for counterparts from our region and beyond.



The nationally ranked Betty Irene Moore School of Nursing at UC Davis further enhances our ability to conduct research and participate in education, outreach and quality improvement.



“Telemedicine technology is fantastic. It did wonders for us. If it saves one person, especially a baby, it’s worth it. I know that Eric and I will be always grateful.”

– Kim Griffiths, whose daughter Avery’s cardiac crisis was stabilized at a rural Sierra Nevada hospital by local physicians and UC Davis specialists collaborating via telemedicine.



## SERVING CALIFORNIA COMMUNITIES

### Reaching underserved rural areas through telehealth

The UC Davis Pediatric Telemedicine Program was the first of its kind in the U.S., and today is part of one of the nation’s largest telehealth services. Our clinicians conduct an average of 2,800 inpatient and outpatient telemedicine consultations each year, across nearly two-dozen pediatric specialties.

### Increasing emergency medical access

We remain an international leader in evaluating telehealth effectiveness and other policy implications. In 2016-17 we continued with more than five large federally funded grants, including evaluations of pediatric tele-emergency, tele-NICU and newborn nursery, tele-audiology, and tele-pediatric psychiatry programs. All are designed to increase access to pediatric subspecialty services in rural, territorial, insular and/or tribal communities.

### Quantified benefits of telemedicine

James Marcin, our pediatric telemedicine director and chief of pediatric critical care medicine, published a landmark study demonstrating the enormous environmental benefits of telemedicine. He found that over 18 years, our telemedicine patients avoided more than 5 million miles of travel, nine years of travel time, \$3 million in related costs and the release of nearly 2,000 metric tons of carbon dioxide.

### Helping vulnerable populations closer to home

Partnerships focused on economically underserved populations also help us to advance health and health care closer to home. UC Davis physicians provide services for pediatric patients at the Sacramento Native American Health Center, and also manage a pediatric clinic at the Sacramento County Primary Care Center that includes many patients on Medi-Cal, California’s Medicaid program. Last year we established a new affiliation agreement with Elica Health Centers that will provide high-quality, affordable care to thousands of people in the Sacramento area. Elica is a Federally Qualified Health Center (FQHC), a federally funded nonprofit clinic that specializes in serving Medicare and Medicaid recipients.



## PATIENT-CENTERED CARE

### Minimizing the trauma and anxiety of hospitalization

Our Child Life and Creative Arts Therapy Department and compassionate staff work hard to minimize trauma and anxiety for our patients and allow them to continue typical growth and development. This year we continued to offer a wide variety of support services and activities, including some new initiatives.

### MRI movies

Fewer patients are now requiring general anesthesia for their MRI exams, following the addition of a dedicated child life specialist in radiology and special goggles that play DVDs during the procedure. As of last summer some 80 percent of our MRIs were being performed without anesthesia among patients ages 6 to 11, and 63 percent among kids ages 0 to 5.



### Staying connected

Off-site families can now see their infants 24 hours a day in our neonatal intensive care unit, thanks to a program developed by our staff. Webcams mounted on isolettes, warmers or

cribs allow parents to pay "virtual visits" from a computer or tablet – an option that's especially helpful during long hospitalizations.

### Promoting safe sleep

Every year, 3,400 infants die of sleep-related causes – including one every other week in Sacramento County. In response we're working with the Child Abuse Prevention Center to promote safe sleep practices. We've trained our providers and have begun providing sleep sacks for all of our infant patients, who also receive a free sack when discharged thanks to a Children's Miracle Network grant.

### Dedicated child life staff

Child life specialists, along with music and art therapists, continue to use creativity and compassion to provide bedside medical play and preparations for procedures; familiarization with age-appropriate coping strategies; accompaniment during medical interventions; continued education to families and staff; and general play opportunities. A full-time teacher provides educational services for children during extended stays. Our young patients also enjoy regular visits from local athletes, their favorite superheroes, and other fun friends.

### Home away from home

The Kiwanis Family House and Ronald McDonald House use charitable support to offer inexpensive, referral-based accommodations on the UC Davis Children's Hospital grounds for families who have traveled significant distances to seek treatment for a child here.

## COMMUNITY SUPPORT

### Supporting community wellness

We're partners with several wellness-related community organizations and events, including the Sacramento Running Association's California International Marathon (CIM) and the popular Sacramento Republic FC professional soccer club.

### Popular players

The health system is a founding and ongoing season-presenting partner of the Republic FC, and serves as the official medical provider for the club's players. UC Davis Health's kit (jersey) sponsorship of the team helps to emphasize, model and normalize health and outdoor activity for area youth. The partnership also creates opportunities for players to interact with patients during special visits to our children's hospital.

### A life saved

We are the race sponsor and chief beneficiary of the CIM, a major qualifier for the Boston Marathon. More than 10,000 runners and teams participated in the main race at the 34th annual event in 2016, and an additional 2,000 children participated in a 2.62-mile fun run/walk. Meanwhile more than 100 faculty, staff and students reported for volunteer duty on the course and the finish-line medical tent, which included acute care and musculoskeletal teams.

One of the runners they served at the 2016 event was a seemingly healthy 28-year-old – who surprisingly collapsed and went into cardiac arrest. Thanks to the life-saving work of our medical volunteers and a successful cardiac surgery later at UC Davis, she was able to return and run in the CIM's relay marathon in 2017.

### Children's Miracle Network Hospitals and philanthropic support

Philanthropy plays a crucial role in the kind of advanced care and research highlighted in this report, and we are incredibly thankful to have the support of many partners.

UC Davis Children's Hospital is a proud member of the Children's Miracle Network Hospitals, an international nonprofit dedicated to raising funds for, and awareness of, children's hospitals. Donations create miracles by funding medical care, research, equipment and education that saves and improves the lives of our children.

Network staff are glad to help community members get to know our hospital and the variety of ways they can get involved.

**To learn more or give a gift, please visit us at [give.ucdavis.edu/CHLD](http://give.ucdavis.edu/CHLD) or contact: Jacquelyn Mills, Senior Director of Development, at 916-734-9192 or [jrkaymills@ucdavis.edu](mailto:jrkaymills@ucdavis.edu)**





# UC Davis Children's Hospital by the Numbers

**level I** The Central Valley's only level I pediatric trauma center, with more than 127,000 clinic visits, 8,000 hospital admissions and 15,900 emergency department visits per year.

The first **level I children's surgery center on the West Coast\*** verified by the American College of Surgeons, with more than 4,260 children's surgeries this year.



- Designated children's hospital beds**
- Neonatal Intensive Care Unit (NICU) – **49**
  - Pediatric and Cardiac Intensive Care Unit (PICU) – **24**
  - General Pediatrics – **48**
  - Pediatric Emergency Department – **11**
  - Children's Surgery Center – **4** operating rooms, **1** procedure room, **4** pre-op/post-op beds

Provides **care** for children in **33 counties, covering 65,000 square miles**, with 1,835 transfers accepted from referring institutions.



**120** Physicians across more than 30 subspecialties, (the region's greatest diversity of pediatric subspecialties).



- 850** Members of our all-R.N. nursing staff trained to care for children.
- Granted Magnet® recognition status by the American Nurses Credentialing Center
  - 85% of UC Davis nurses hold a B.S.N. degree or higher
  - 14% hold advanced degrees
  - 49% of UC Davis nurses have obtained a specialty certification through the American Nurses Credentialing Center



\*As of December 2017

# UC DAVIS

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## CHILDREN'S HOSPITAL

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