Final countdown to opening of new hospital begins...

By Sara Reeve

Nearly 15 years after the 1994 Northridge earthquake rocked Southern California and left Los Angeles County+USC Medical Center damaged beyond repair, the new replacement hospital is almost ready for business.

The outpatient clinic tower opened on Sept. 15 and the move into the inpatient tower and diagnostic and treatment center, including emergency room, is scheduled to begin Oct. 17.

The 1.5 million-square-foot facility boasts state-of-the-art equipment and design features, and is home to one of the largest emergency rooms in the country with 109 beds.

The replacement of Los Angeles County’s largest provider of trauma services hit its share of road bumps.

The unrelated closure of several public health care clinics underscored the County’s need for a reliable hospital. This realization led elected officials to approve the new hospital, which is the largest hospital construction project west of the Mississippi River.

The scope of the project is unprecedented in Los Angeles County, with a cost of nearly $1 billion for construction and equipment. Because the old County Hospital was damaged in the Northridge earthquake, the Federal Emergency Management Agency funded $500 million towards the cost of the new hospital. At $431 per square foot, the replacement facility is a relative bargain compared to recent hospital construction projects. The construction costs at the Kaiser Permanente Medical Center in Downey ran $612 per square foot, and at the UCLA Ronald Reagan Hospital, costs ran to $921 per square foot.

What do Los Angeles County residents get for $1 billion?

The hospital features a seven-story outpatient tower hosting numerous specialty clinics, including psychiatry, ophthalmology, dentistry and orthopedics. The eight-story inpatient tower houses the hospital’s acute care and intensive care units. And at the heart of the new hospital is the five-story diagnostic and treatment building, which contains several departments including the expanded emergency room, operating rooms and pharmacy.

The new emergency room is three times the physical size of the old one and the new design has streamlined care and treatment for emergency patients. The new helipad is now located on the roof of the diagnostic center, which allows for direct access to the emergency room for the most critical cases.
LAC+USC emergency room aids Metrolink crash victims

By Sara Reeve

The Sept. 12 crash of a Metrolink commuter train and a Union Pacific freight train cost the lives of at least 25 people and injured more than 100. When the tragedy struck the Los Angeles community, the emergency medicine physicians and staff of LAC+USC Medical Center jumped into action, caring for five critical patients injured in the accident.

“The hospital response was excellent and we had additional staff ready to respond if necessary,” said Edward Newton, chair of emergency medicine at the Keck School of Medicine. According to Christian McClung, Keck School of Medicine clinical instructor of emergency medicine, who was on duty on Friday evening, the LAC+USC emergency room immediately responded to requests for assistance. “Our HERT Team [Hospital Emergency Response Team]—a special response team of an ER doctor, two surgeons and two nurses trained to extricate patients from debris—was flown out to the scene of the crash,” said McClung. “Their services were not required, but we were prepared in the event that they were.”

When the announcement came about the incident, LAC+USC responded that the medical center could treat up to 50 victims. “We first received notice that there was a mass casualty incident at approximately 4:25 p.m.,” said Stephanie Hall, chief medical officer of LAC-USC Medical Center. “Our staff really stepped up to the plate. Nurses stayed; residents stayed. Surgeons came in from home. We worked like a well-oiled machine.”

Administrative staff, nurses and physicians worked together to clear the emergency room by moving patients to other areas.

“The hospital’s response was very well coordinated thanks to the surge capacity plan that we have in place,” said McClung. “The surge capacity plan has enabled huge improvements in our ability to respond to disasters like this.” LAC+USC’s surge capacity plan compensates for an increased demand on emergency room services by increasing resources from throughout the hospital.

“We received approximately five critical patients from the rail crash, and they came in one after another,” McClung said. “We also received additional critical patients at the same time: a man suffering from a head attack, another with a gunshot wound. So at the same time we were taking the crash victims, we received four to five critical patients that were unrelated to the crash.”

In comparison to the LAC+USC Medical Center’s response to previous disasters, Hall felt that the entire hospital responded with better efficiency and coordination.

“Resources came together so much more quickly than they have in past incidents,” she said. “People did just what they were supposed to do. All of the planning that our staff, nurses and physicians have done paid off.”

Collaboration featuring USC researchers suggests ways to detect, treat glioblastoma

The Cancer Genome Atlas (TCGA) Research Network, a collaborative effort funded by the National Cancer Institute and the National Human Genome Research Institute of the National Institutes of Health (NIH), recently reported the first results of its large-scale, comprehensive study of the most common form of brain cancer, glioblastoma.

In a paper published Sept. 4 in the advanced online edition of the journal Nature, the TCGA team describes the discovery of new genetic mutations and other types of DNA alterations with potential implications for the diagnosis and treatment of glioblastoma.

Among the findings are the identification of many gene mutations involved in glioblastoma, including three previously unrecognized mutations that occur with significant frequency; and the delineation of core pathways disrupted in this type of brain cancer.

Among the most exciting results is an unexpected observation that points to a potential mechanism of resistance to a common chemotherapy drug used for brain cancer.

Epigenetic (DNA methylation) analyses were performed collaboratively by the USC Epigenome Center and Johns Hopkins University, said Peter W. Laird, associate professor of surgery, biochemistry and molecular biology at the Keck School of Medicine and director of the USC Epigenome Center.

“We are excited to be part of this large-scale collaboration aimed at understanding the genetic and epigenetic characteristics underlying this deadly disease,” Laird said. “An important new insight from this study is that tumors with an epigenetic defect at the MGMT gene, which should initially respond well to standard chemotherapy, may be more likely to recur as rapidly mutating aggressive tumors, in part as a consequence of the treatment. This suggests that novel approaches to combination therapy targeting both the MGMT defect and the hypermutator phenotype should be considered for development.”

NIH Director Elias A. Zerhouni said, “These impressive results from TCGA provide the most comprehensive view to date of the complicated genomic landscape of this deadly cancer. The more we learn about the molecular basis of glioblastoma, the more swiftly we can develop better ways of helping patients with this terrible disease. Clearly, it is time to move ahead and apply the power of large-scale, genomic research to many other types of cancer.”

The TCGA network analyzed the complete sets of DNA, or genomes, of tumor samples donated by 206 patients with glioblastoma.

The work complements and expands upon a parallel study by Johns Hopkins researchers of 22 glioblastoma tumors, which was also published in the journal Science.

EPA names USC public health expert chair

EPA officials have announced the appointment of Jonathan Samet, an expert on the effects of air pollutants on human health, as chair of the Clean Air Scientific Advisory Committee (CASAC).

EPA Administrator Stephen L. Johnson said, “Dr. Samet brings tremendous expertise and insight to the Clean Air Scientific Advisory Committee. As a respected scientist, having studied internal medicine and the factors that affect the health and illness of populations for nearly 40 years, Jonathan will be a great asset to the agency.”

Samet is currently professor and chair of the Department of Epidemiology at the Bloomberg School of Public Health, Johns Hopkins University in Baltimore. On Nov. 1, he will transfer to the Keck School of Medicine of USC and become professor and chair of the Department of Preventive Medicine, as well as director, Institute for Global Health.

Johnson also thanked Rogene Henderson, senior scientist emeritus at Lovelace Respiratory Research Institute, for her public service in the past four years as chair of CASAC.

The CASAC is an independently chartered federal advisory committee composed of independent, external scientists that provides independent advice to the EPA administrator on the technical bases for EPA’s standards for criteria air pollutants.
patients. Radiology and surgery also are located in the building, easily accessed by swift new elevators.

With the reduction in licensed beds from 612 at the old hospital to 600 in the new—plus the loss of 212 beds at Women's and Children's Hospital—the size of the replacement facility has been a sensitive issue and a concern for doctors, staff and community leaders. However, plans for more streamlined processing and treating of patients are in place, and officials expect that these efficiencies, along with 50 overflow beds at Rancho Los Amigos Medical Center in Downey, will allow the hospital to operate successfully.

Average length of stay for inpatients has been reduced from an average of 6.6 days in 2003 to 5.2 in 2008. Median boarding time in the emergency room—defined as the time between a patient's admission to being placed in an inpatient bed—decreased from seven hours to four, and clinic cycle time was also improved from seven hours to only two.

“The County and USC have had to work closely together to reduce the average length of stay of patients in order to maintain our current number of discharges while operating a reduced number of beds,” said Edward D. Crandall, chair of the Department of Medicine, Hastings Professor and Norris Chair of Medicine at the Keck School of Medicine. “The new hospital will allow USC physicians to manage inpatient length of stay and improve patient flow even more efficiently.”

The new medical center includes multiple design and technological upgrades that speed patient care, increase efficiency and ensure patient, physician and staff safety.

Wall-mounted ultrasound imaging equipment in the emergency room allows physicians to immediately get an in-depth look inside their most critical patients without having to transport them to the radiology department.

Physicians will also have easy access to specialized equipment and facilities. The replacement hospital will feature four computed tomography (CT) scanners, three magnetic resonance imaging (MRI) scanners, three linear accelerators, two cardiac catheterization laboratories, one lithotripter, and a combination positron emission tomography (PET)/CT scanner.

Intra-hospital communication has been simplified with a pneumatic tube system and a state-of-the-art automated, guided vehicle system that will transport certain items between floors, saving staff time and effort.

The new medical center has also incorporated elements of “evidence-based design.” This concept states, in part, that the right physical environment can reduce the spread of hospital-acquired infection. Most rooms in the hospital are designed for a single patient, a big change from the multi-patient wards of the old County Hospital. The addition of several special rooms equipped with negative airflow pressure, as well as ubiquitous hand-washing sinks and alcohol hand-sanitizing dispensers, will help protect patients, physicians and staff from infection.

Because earthquake damage resulted in the need to build the new hospital, earthquake safety was a major consideration in its design and construction.

According to hospital officials, major portions of the new facility are designed to withstand earthquakes with a magnitude of up to 8.0. The hospital also is intended to be completely self-sustaining for up to 72 hours in the event of a major earthquake or other disaster.

“This new facility provides an opportunity for the LAC+USC Medical Center to have a new shining image for the entire County of Los Angeles,” said Christi N. Heck, director, USC Comprehensive Epilepsy Program. “It means we can assure patients of all backgrounds complete, efficient and state-of-the-art care.”

With all the new technology and gleaming facilities, USC faculty physicians, residents and medical students will continue their tradition of medical service to the community that began in 1885. That was seven years after the original County Hospital opened with 100 beds and six staff members.

The prospect of training at LAC+USC Medical Center is often cited as a key attraction for students at the Keck School of Medicine. Learning at a large public hospital in a metropolitan environment provides a variety of opportunities not often found in medical school.

“The opportunity to train at County was a huge draw to me when I decided to come to the Keck School.”

—Fourth-year medical student Erin Jones

Photos, from top: the helipad atop the LAC+USC Replacement Facility offers views of downtown Los Angeles; hospital features include state-of-the-art intensive care rooms (left) as well as four computed tomography scanners and two cardiac catheterization laboratories.

“The opportunity to train at County was a huge draw to me when I decided to come to the Keck School.”

—Fourth-year medical student Erin Jones

The faculty, residents and students all have very special regard for “Big County” or “Mother County,” as the old hospital has been called for over 75 years. It will be sad to leave the old building, but everyone is looking forward to working in a state-of-the-art facility with considerably improved patient amenities.

—I believe it is a true honor to advocate and care for the patients of the LAC+USC Medical Center because these are the patients and families who need us the most. The new hospital provides an opportunity for the doctors, nurses and staff to perform our jobs optimally, saving lives and money by getting studies performed on time and safely. It gives us all an opportunity to showcase our work and provide a sense of pride to the community for doing it.

—Christi N. Heck, director, USC Comprehensive Epilepsy Program

This is a very modern, state-of-the-art facility, which is bringing many technological advances to our patients. For example, we’ll have the CT scanner in the emergency room, which means we won’t have to transport unstable patients to the scanner. The equipment and technology is just much superior to what we have now.

—Edward D. Crandall, chair, Department of Medicine, Hastings Professor and Norris Chair of Medicine

We anticipate that patients will feel that the new hospital will be modern, cleaner and state-of-the-art. Every patient, no matter what their source of payment, deserves to be treated with dignity, and they deserve all of the same amenities that patients at a private hospital can expect.

—Lawrence Opas, chief, Department of Pediatrics, LAC+USC Medical Center

Our students feel strongly about LAC+USC being a facility that treats all patients that need care, regardless of ability to pay. As we move into the new building, we will continue to provide the best of care to all, and in the new, state-of-the-art setting, we will continue our tradition of excellence in medical education.

—Erin Quinn, associate dean for Admissions and Educational Affairs
Replacement Facility Facts and Figures

**THE PROJECT/SCOPE**
- Replacement of Four Existing Hospital Facilities
- Approximately 1.5 million Square Feet Total
- Inpatient Tower
- Diagnostic & Treatment Facility
- Clinic Tower (Outpatient Clinic Building)
- Central Energy Plant
- Common Systems
- Final Site

**INPATIENT TOWER**
- 8-Story Structure, 618,000 Square Feet
- 600 Patient Beds
- 130 Adult Medical/Surgical Intensive Care
- 319 Medical/Surgical Acute Care
- 25 Pediatric Acute Care/10 Pediatric Intensive Care
- 10 Burn Acute Care/10 Burn Intensive Care
- 32 Obstetrics/40 Neonatal Intensive Care
- 24-Bed Jail Unit
- Pharmacy
- General Administration
- Food Service Facility and Central Services

**DIAGNOSTIC & TREATMENT FACILITY**
- 5-Story Structure, 430,000 Square Feet
- Base-Isolated Structure
- Diagnostic Imaging
- Radiology
- Surgery
- Emergency Services
- Core Laboratory
- Central Sterile Supply
- Trauma Helipad

**OUTPATIENT CLINIC BUILDING (CLINIC TOWER)**
- 7-Story Structure, 334,000 Square Feet
- Radiation Oncology
- Outpatient Pharmacy
- Psychiatrics
- Pediatrics
- Women’s Services
- Dental
- Orthopedics
- Ophthalmology

**CENTRAL ENERGY PLANT**
- 1-Story, 60,000 Square Feet
- Underground Facility
- Utility Tunnel to D&T Building
- HVAC Systems
- Electrical Systems
- Fire/Life Safety Systems
- Emergency Generator
- Communication Systems
- Dept. of Water and Power Vault

---

**LAC+USC Medical Center chronology**

1933—Los Angeles County opens a new modern county hospital on State Street

1942—Capacity of the County Hospital is expanded to nearly 3,800 beds to accommodate injured military personnel returning from World War II

1953—The Los Angeles County Board of Supervisors approves a contract to compensate the USC School of Medicine for its services at the County Hospital which had heretofore been provided free of charge

1968—The Los Angeles County Board of Supervisors votes to change the name of the County Hospital to the Los Angeles County+University of Southern California Medical Center

1994—Northridge earthquake damages facility, necessitating the LAC+USC Replacement Facility

1998—Master plan for Replacement Facility completed

2003—Construction on LAC+USC Replacement Facility starts

2008—LAC+USC Replacement Facility completed

**LAC+USC Medical Center in popular culture**

Visible from downtown Los Angeles and many surrounding neighborhoods, the looming, Beaux-Arts style exterior of the Los Angeles County+USC Medical Center is a familiar sight for most Angelenos. Thanks to the magic of Hollywood, it may also be recognizable to many across the country.

The building served as the inspiration for the hospital featured in the popular soap opera, “General Hospital,” which was also the original name of the medical center. When the series began in 1963, establishing shots and the opening sequence were filmed at the entrance that faces State Street at 1200 North. Exterior shots were filmed at the entrance on Zonal Avenue and State Street.

According to the International Movie Database, the LAC+USC Medical Center has also been featured in the television show “Murder, She Wrote,” the made-for-TV movie “The Case of the Hillside Stranglers,” and movies such as “Vital Signs” with Diane Lane (1990) and “City of Angels” with Nicholas Cage and Meg Ryan (1998).

The hospital is also responsible for the birth of at least one Hollywood legend. Marilyn Monroe was born in the charity ward on June 1, 1926.
Virtual reality brings real pain relief to kids at Childrens Hospital Los Angeles

By Sara Reeve

“When your kids are playing video games, the kitchen could blow up, and they wouldn’t notice,” said Jeffrey I. Gold, assistant professor of anesthesiology and pediatrics. “Why is that? That’s what we are investigating.”

Gold, a member of the interdisciplinary Comfort, Pain Management and Palliative Care Program in the department of anesthesiology critical care medicine at Childrens Hospital Los Angeles, is studying the power of virtual reality (VR) to provide pain relief for children.

His 2006 study of the use of VR during pediatric venipuncture demonstrated that it can be effective in reducing or eliminating pain. Children in the study were separated into two groups: those who played a VR game, Street Luge, and those who had a topical anesthetic.

Children who did not play the game reported a four-fold increase in pain intensity from the procedure, while those immersed in the VR environment reported no change in pain intensity.

Children in the VR group were calm, less anxious and more cooperative during the intervention, indicating a reduction in overall pain and distress.

VR environments do seem to provide a distraction for patients, which may help reduce their capacity for pain, but they could also be doing much more.

“The initial assumption of many people is that VR works because we all have a limited capacity for attention, and if you can distract someone with VR, then it reduces their capacity for pain. But I am trying to better understand the function of the brain and how VR may change the brain’s response to pain,” said Gold.

“We are looking at fMRIs and other measures to see if VR actually creates analgesia, rather than just providing a distraction from the pain.”

Gold’s most recent work suggests that a full 360-degree VR environment may inhibit the brain’s ability to perceive and process pain by acting through the anterior cingulated cortex.

The use of VR treatment holds many benefits for patients, including a potential reduction in the need for sedatives, opioids and other pharmacological treatments. “Research has shown that the use of VR can calm and relax patients to make treatments and processes easier, and require less medications,” said Gold.

So what does the future hold for virtual reality?

The technology associated with the treatments, including the head-mounted display units, is becoming more affordable, and so use of VR is beginning to spread in hospitals across the country.

But Gold is anxious to push the technology even further, in order to provide more specialized treatment for patients.

“One thing that is holding us back is a lack of VR environments. True VR environments are hard to come by. I’d love to be able to manipulate the environments to tweak for age or gender,” he stated. “For example, if you have a 12-year-old girl and a 16-year-old boy undergoing painful treatments, they probably have different needs and desires for a VR experience.”

Gold is convinced that the future of virtual reality is wide open, with the potential for application in patients suffering from chronic pain and anxiety.

“VR is an area of research that is moving forward, and there is so much possibility, and opportunity for growth,” he said. “This area of study is really in its infancy.”

LAC+USC study highlights benefits of epilepsy surgery for uninsured patients

By Sara Reeve

Surgery is a fairly common treatment for patients with epilepsy whose seizures cannot be controlled by standard medications.

At least, it’s common in private hospitals for patients with insurance. But uninsured and underinsured patients are rarely offered this treatment.

“There are very few large metropolitan hospitals in the U.S. that consider this therapy worthwhile or worth the time and tax dollars for the offering,” said Christianne Heck, director of the USC Comprehensive Epilepsy Program.

Uninsured and underinsured patients “are not offered epilepsy surgery in most centers, and this is an important standard of care for this group of patients,” she said.

But a recent review of epilepsy surgeries performed at Los Angeles County+USC Medical Center shows that patients at a large metropolitan hospital can have excellent outcomes, despite obstacles.

A retrospective chart review of 19 patients who underwent surgery from June 2004 through January 2008 was conducted. Prior to surgery, the average number of anti-epileptic drugs taken was 2.47. After surgery, that number went down to 1.76.

Thirteen of the 17 patients who had surgery and completed follow-up were seizure-free, three had rare seizures (due to non-compliance with medications), and one patient had rare seizures until his medication was changed.

Overall, the percentage of patients who became seizure-free or had only rare seizures after surgery was 100 percent.

“Most retrospective studies of surgical outcomes suggest a wide range of possible seizure free rates from 60 to 90 percent. Our particular study provides an even better outcome, and in a population that is quite skeptical of such invasive treatments,” noted Heck.

The LAC-USC epilepsy clinic sees 32–40 patients a week with intractable epilepsy that does not respond to standard medications.

According to Heck, a high percentage of these patients are candidates for surgery, but many are reluctant to have the operation.

“The patients of the clinic are particularly interested in that they are predominantly of Hispanic descent and this culture or population is traditionally not particularly accepting of brain surgery,” said Heck. “It thus takes a great deal of time and effort to establish trust with them to the point of accepting more invasive treatments and research protocols.”

Despite obstacles to care common in large metropolitan public hospitals, including bureaucratic delays, lack of surgical options and cultural bias, Heck feels that this study proves epilepsy surgery can make sense in that setting.

“It’s very unusual to be able to offer epilepsy surgery in a public hospital because the whole process is very labor- and time-intensive. It’s a big commitment on the part of the team and patient,” she said.

“Heck said they work with the USC Marshall School of Business to provide estimates of the impact these surgeries could have on the economy, including patients earning potential as they return to the workforce.

“This is where the impact will be most greatly felt, and hopefully ultimately accepted beyond our hospital system,” she said.

Heck plans to present the results of her study at the American Epilepsy Society’s Annual Meeting in early December.
A Sept. 14 Los Angeles Times article reported that two dozen outpatient clinics will open at the new Los Angeles County-USC Medical Center, part of a decades-long effort to replace one of nation’s largest public hospitals.

ON Sept. 12, Time Warner Cable interviewed cardiologist Leslie Saxton and a patient at USC University Hospital about body computing, the use of implantable devices or networked systems that enable physicians and patients to monitor their health status in real time.

A Sept. 8 Chronicle of Higher Education article noted that USC held a groundbreaking ceremony for the Eli and Edythe Broad Center for Regenerative Medicine and Stem Cell Research at USC.

A Sept. 5 Press-Enterprise article quoted environmental expert Jim Gauderman about the health effects of air pollution.

**REMEMBERING RONALD ROSS**—Family, friends, staff and faculty gathered to honor the late Ronald K. Ross on Sept. 8 as he was inducted to the Faculty Wall of Fame. Ross was remembered as a respected pioneer in research on the relationship between hormones and cancer and as chair of the Department of Preventive Medicine. As chair—and as deputy director of the USC Norris Comprehensive Cancer Center—Ross led USC to the top in the country in funding for preventive medicine research, despite an affinity for writing his grant applications in long hand on a yellow pad. The Wall of Fame started under the deanship of Brian E. Henderson as a way to recognize and honor distinguished Keck School faculty members. Above, Ross' wife Karen speaks about his enthusiastic love of family, medicine, research and USC football.

**SAVE THE DATE**
Support the USC Norris Comprehensive Cancer Center Lee Breast Center at “Cure in the Canyons” on Oct. 5 from 11 a.m. - 4 p.m. The event will be held at the California Health and Longevity Institute at the Four Seasons Hotel in Westlake Village. Participants will enjoy spa and beauty treatments, a yoga mini-mat class, five-star gourmet delights, and gift bags. Advance tickets are available for $55 at www.cureinthecanyons.com along with additional information.