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PRESERVERS FOR THE SPIRIT (ANNIVERSARY UPDATE ON POST-KATRINA NEW ORLEANS)

By Robert J. Ascuitto, PhD, MD and Nancy T. Ross-Ascuitto, MD

Katrina: Pediatric Cardiologists' and Parents' Story by Drs. Robert J. Ascuitto and Nancy T. Ross-Ascuitto was published in the November 2005 edition of Congenital Cardiology Today. This is a follow-up article.

Katrina! On August 8, 2005, a small wave of turbulent air in western Africa headed out to sea. Within weeks, this innocuous disturbance intensified over warm ocean waters. Decreasing pressure at the system's center, organizing air currents at its periphery and updrafts of water vapor produced whirling winds and rain clouds. A hurricane was in the making; it would be named Katrina. This storm would not deviate eastward at the last moment to miss Greater New Orleans. She would follow in the footsteps of the legendary tempests, Betsy and Camille. On Sunday, August 28, 2005, The Times Picayune's headline read, "Katrina Takes Aim." One day later, our lives would change forever; New Orleans would finally lose its longstanding struggle against the sea.

The storm first made landfall in southeastern Louisiana near the mouth of the Mississippi River. She barreled in with shocking fury, wind gusts reaching 160 mph. Fortunately, all residents in the region had already been evacuated. Their communities were decimated; all livestock and wildlife perished. Katrina's evil plan was clear; destroy everything in its path. She had matured into one of the largest and most powerful storms to strike the Gulf South during the last 100 years; the storm carried more energy than

could be released by a large hydrogen bomb. Mercilessly, Katrina transformed the Big Easy into a modern-day Atlantis. Everyone suffered losses. For many, the losses were monumental. Rich and poor, black and white, residents perished. Even the dead lost homes, as the storm scoured New Orleans' peculiar aboveground cemeteries. The Big One crippled the Southeastern coastal economy.

New Orleanians experienced a horrifying natural disaster; Americans witnessed a humiliating national tragedy. The storm changed millions of lives and thousands of residents paid the ultimate price. Sadly, many people died in terrified solitude. Entire towns in Louisiana, Mississippi and Alabama no longer exist. Economists estimate Katrina's price tag will easily top 200 billion dollars, almost 5-times the cost of Hurricane Andrew in 1992. Indirect costs are incalculable. The hurricane irrevocably changed the Gulf Coast; its affect on the United States will be long lasting.

"Like the legend of the phoenix, the mythical old bird that was consumed by fire and rose anew from its ashes, New Orleans immolated by water will rise again to assume its rightful place among the culturally unique cities of the world."

Déjà Vu

It was a chilly February morning in the Crescent City. A north wind blew in from Lake Pontchartrain. This shallow inland

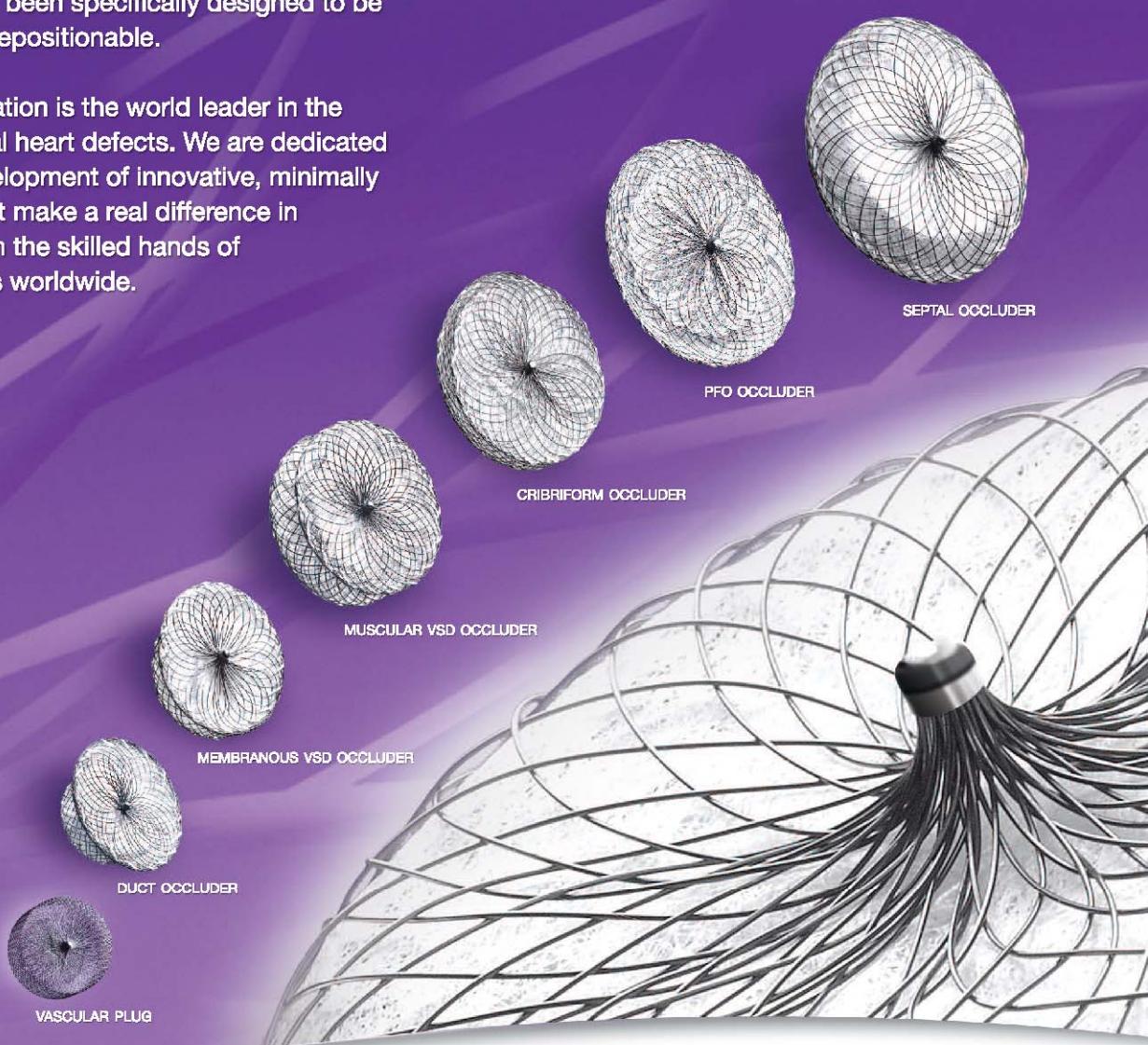
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sea, 50 miles long and 26 miles wide, engulfed at least 80% of New Orleans, leaving some areas of the city submerged in 20 feet of darkness. A group of physicians, nurses, ancillary health-care personnel and hospital administrators gathered on the roof of the Saratoga Parking Garage to celebrate the re-opening of the Tulane University Hospital and Clinic. The garage was the shelter where the remaining 400 thirsty, hungry and exhausted physicians, nurses, administrators, and their families, awaited evacuation from our besieged hospital in the wake of Hurricane Katrina. Many of the individuals attending the ceremony were standing in the same places they occupied five months earlier, prior to being shuttled by helicopters to safety.

The reunion had special poignancy, since the group shared the life-threatening experience of confronting the worst natural disaster in United States history. People hugged each other; some told their own unique story of how the hurricane redefined their lives. Others simply remained silent, perhaps re-enacting in their minds traumatic events encountered while trapped at the Tulane University Hospital and Clinic for nearly six days. At the time, most of us did not realize the magnitude of the crisis created by the storm. However, as the helicopters lifted us off to safety, we were horrified to see entire districts of New Orleans completely covered by millions of gallons of water. There was massive destruction; large areas of the city were unrecognizable.

A few of us at the ceremony dared to look over the city. In the distance, a light mist hovered over the Mississippi River, as it slowly meandered under the Crescent City Connection on its way to the Gulf of Mexico. To the east, a golden disk rose over the horizon. Collectively, we thought, "Did what we ex-

perienced on August 29, 2005 actually happen?" The tranquility in the city was in sharp contrast to the violent conditions that ushered in Katrina. Just months ago, the monstrous hurricane, with winds howling at 145 mph, ripped through historic New Orleans causing catastrophic damage. The streets below were inundated with four feet of water (to use a polite term), occupied by people pushing their families and belongings, and in some cases lifeless bodies, on makeshift rafts, crying for help. Over the next few days, stagnant floodwater around the oppressively-hot city distilled into a soup of gasoline, sewage and decaying bodies of fish, animals and humans. Scenes one expects to see in devastated Third-World Countries, were actually taking place in the United States of America.

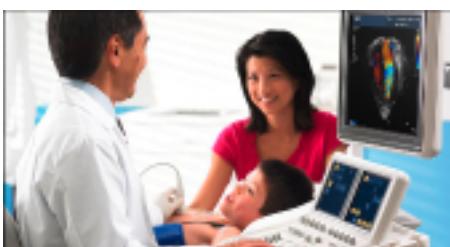
Thankfully, the streets are now dry and most of the debris in the central business district has been removed. The phalanx of reporters, camera crews and television personalities are gone, the ferocious gaze of public attention has waned. Once again, business people are skulking around the city, and many popular restaurants and hotels have reopened. Nevertheless, telltale signs of Katrina are everywhere. Brown tide-marks on buildings provide a vivid reminder to the height reached by the floodwater. Symbolic markings (macabre hieroglyphics) on structures indicate they were searched, and designate the number of people and/or animals found dead. Many windows on skyscrapers remain broken; traffic lights are frequently non-functional, street signs often point nowhere and city gardens take on an eerie appearance due to saltwater intrusion.

Cars and boats destroyed by the storm are scattered throughout the city, some resting in inconceivable places. More

than 100,000 cars were abandoned during the storm and 70,000 boats were lost. One can only imagine what happened to the millions of tons of debris and hazardous waste, and the unimaginable number of refrigerators, washing machines and dryers destroyed by the storm. Blighted businesses line both sides of a once bustling Canal Street; potholes are engulfing, traffic is meager and our newly constructed trolley system is barely operational. Animals are stranded around the city, separated from their owners. Katrina's unrelenting winds uprooted nearly 50% of New Orleans' historic trees and, in doing so the fallen giants damaged much of the underground pipe system in the city. As a consequence, 85 million gallons of water processed for drinking - 2/3 of the total amount pumped into pipes - is being lost into the ground every day. Even at this staggering rate of leakage, it would require seven years to match the flooding created by Katrina.

The storm also delivered a near-fatal blow to the healthcare system in Greater New Orleans. Baptist Memorial, Doctor's, Lakeland, Lindy Boggs, Methodist, Mercy Memorial, Saint Charles General, Saint Claude General and the Veterans Administration Hospitals are closed. Likewise, Charity Hospital, a colossus that provided 276 years of distinguished service for poor people and trauma victims, and University Hospital, the primary health care facility for indigent patients and the training site for countless numbers of medical and surgical residents, now have been boarded up, perhaps forever.

The closest thing to a Charity Hospital now is a makeshift urgent care center in a defunct downtown Lord & Taylor store. Luckily, Children's Hospital of New Orleans and Ochsner Medical Foundation, both located on relatively high ground in



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PHILIPS



Figure 1. Tulane Avenue flooded after Katrina. Ultimately, the street was submerged under four feet of water. The upper left portion of the picture shows the Tulane University Medical School; adjacent to the Medical School is Charity Hospital. Photo taken by Michael Ascuitto.

Uptown New Orleans, received minor damage. Consequently, they were operational within one month after the storm. Unfortunately, Tulane University and Louisiana State University Medical Centers fared less well, as both suffered severe damage. With the city's lower population and fewer medical facilities, these schools' residency programs have downsized incoming classes by at least 30%.

Suddenly, the unforgettable sound of rotating helicopter blades echoed in the distance. All the people on the roof of the Saratoga Parking Garage turned toward the escalating noise, as a lone helicopter painted red, white and blue emerged from the horizon and approached the Tulane University Hospital and Clinic. It was déjà vu (Figures. 1 and 2). Some people smiled, others wept openly. Everyone started waving and cheering as this magnificent flying machine, a symbol of our surviving the great flood of 2005, hovered over the roof of the parking garage. The wind blowing on our faces was exhilarating; we felt like liberated refugees returning home. An American flag was slowly

lowered and released from the chopper to assume its rightful place hanging from the Tulane University Hospital and Clinic (Figure 3); a re-enactment of five months ago when employees draped this same flag over the side of Tulane Hospital to signal advancing helicopters, and to inform our fellow Americans watching on television, that we were waiting below.

Bemused by the emotional events taking place, we had flashbacks: to the electrical power failure that paralyzed our hospital during the storm, to pediatric nurses clinging to extremely-sick babies, to children whimpering in the pungent darkness of their rooms, to parents wondering if their sick children would survive, to our thoughts of verdant regions beyond devastated New Orleans, to patients receiving life-sustaining treatment while lying on the crowded concrete floor of an unsanitary parking garage, to critically-ill hand-ventilated patients strapped on gurneys while being rushed to the rooftop of the parking garage to await helicopter rescue, to our horrified teenager, who required a heart transplant and was being kept alive by manually pumping a bi-ventricular assist device attached by tubes to his diseased heart, to a young man we followed with an aortic root replacement, who was evacuated by swamp boat with an open chest because of a sternum infection, to the rampant looting and destruction of property taking place in the streets of our city, to the thugs preying on the disposed and to the men in swamp boats and the pilots in helicopters brave enough to attempt to evacuate patients amid sniper fire. Who will ever forget the "Michaels," Brown, FEMA's poster child for incompetence and Chertoff, Homeland Security Department's apostle of indifference?

A recollection worth sharing involved

evacuation of some of our cardiac patients. After our backup electrical generators in the hospital failed, it became clear the post-operative babies needed immediate transfer to other institutions. In response, a pediatric cardiology colleague of ours, Dr. Albert Gutierrez, boarded an air-transport helicopter in



Figure 2. Christina Riviere, a pediatric intensive-care nurse, carries a child with end-stage kidney disease to safety. They were rescued by helicopter from the roof of the Saratoga Parking Garage at the Tulane University Hospital and Clinic. The child recently underwent successful kidney transplant at the Tulane Hospital for Children. Photo provided by HCA.

Lafayette, and headed for New Orleans. The trip was precarious, as residual storm cells were still active. He arrived in our blistering-hot NICU with a stethoscope around his neck, a large bag of food over one shoulder and a video recorder in his hand. It was as if Dr. Claus

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had arrived. In transit, he had recorded some of the earliest footage of the leaking levees and rising floodwaters around New Orleans. Dr. Claus showed us video recordings of a local sports stadium, one that recently had hosted U.S. Olympic trials. The stadium bowl was nearly completely filled with water; it looked like a giant swimming pool. Our response was, "Albert, we're in trouble." His was, "No, you're in deep trouble." As he left the NICU, he turned and smiled; he was hand-bagging one baby and holding another in his other arm!

Although at the time it seemed New Orleans was descending into anarchy, every one of the pediatric patients survived. Through round-the-clock efforts, an additional 300 patients, 500 employees and 1500 family members were successfully evacuated from the Tulane University Hospital and Clinic and Tulane University Medical School. Unfortunately, other health care facilities fared less well. Seventy patients were rescued from Memorial Medical Center by Acadian Ambulance helicopters – the Cajun Air Force; inexplicably, many of the elderly and handicapped were left behind. On September 6th, 2005, rescue workers searching the area found 45 decomposed bodies remaining in the hospital; a horrifying discovery. Why were these patients not evacuated? How did they die? At St. Rita's Nursing Home, another heart-wrenching story unfolded. The owners of the facility had decided not to evacuate residents as the hurricane roared toward New Orleans; a fatal mistake. Soon after Katrina struck, the home was consumed by 12 feet of water. In the end, 35 elderly people ended their lives helplessly gasping for air, as their lungs filled with fetid floodwater. No one deserves to die that way. One can only hope many of the victims were already unconscious as they took their last breaths.

Charity and University Hospitals, as state-run facilities, had their own problems. As floodwaters entered the hospitals, backup electrical power generators shut down. Conditions quickly became intolerable. Critically ill patients on mechanical ventilators required hand bagging to remain alive; medications, food and water became scarce. The biblical Jacob's ladder would have been a welcomed sight during their eternal wait for evacuation. Unfortunately, no government agency came forward to organize relief efforts. As state institutions, they had no source of money available to hire private helicopters to evacuate patients. It is incredulous that during a domestic crisis of such magnitude, money would need to change hands to save American lives. Quite simply, "Government had forsaken them during the critical days following the storm."

In the midst of the storm's madness, a mini-miracle was in the



Figure 3. Old Glory hangs from the roof of Tulane University Hospital, as it did during those horrifying days following Katrina. The flag came to symbolize the successful evacuation of the Tulane University Hospital and Clinic and Tulane University Medical School, and to provide hope for the downtown medical community. Photo taken by Jeff Tully: VP-Marketing/Patients Relations, HCA.

making at University Hospital's NICU. Of course, the hospital was without electrical power and the heat was stifling. The staff was restricted to one bottle of water every 12 hours. Nurses took 12 hour shifts to care for 20 babies. At night, work was guided by a dimming flash light. Through NICU windows, several nurses actually saw their homes washed away by the storm. Somehow, they maintained composure, and continued working. The staff endured the ordeal by participating in prayer twice a day. Late one evening, an obstetrical patient went into labor and precipitously delivered a 24 week fetus. In the darkness, the micro-premie was resuscitated; umbilical lines were inserted for access. The baby was hand ventilated; oxygen was delivered by "rigging up" an old generator to an O₂ tank. Ultimately, the premature infant was evacuated by helicopter to Baton Rouge, being hand-bagged during the entire trip. In the end, the baby did remarkably well; there was no evidence for an intra-ventricular hemorrhage. It was a miracle indeed.

Nearly a year after Katrina devastated New Orleans, shocking news from the Medical Examiner's Office suggested pa-

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tients left behind at local area hospitals during the flood may have received unethical medical treatment. A doctor and two nurses were accused of (and booked with) second-degree murder. Forensic evidence suggested four patients at Memorial Medical Center died from lethal doses of morphine and midazolam. State Attorney General Charles Foti Jr. announced in Baton Rouge, "These were not mercy killings. This was homicide; it was not euthanasia." As health care providers, we recognize relieving pain with drugs in seriously ill patients carries a risk of hastening death. To some extent, it's part of medical practice. However, some ethicists would contend consciously ending a patient's misery through death, amounts to murder. As physicians, we would hope the drugs, if used, were administered to alleviate patient suffering during a time of severe crisis. The judicial process will need to carefully consider the evidence in this, and other such cases.

The tragedies at Memorial Hospital and St. Rita's Nursing Home made national headlines. However, for hundreds of thousands of Gulf South residents, their heart-breaking stories went untold. We follow a six year-old girl with a myocardial tumor and ventricular tachycardia. She and her mother struggled to stay above rising flood waters, after their home was washed away by the hurricane. Fortunately, a man with a small boat rescued them. As they were pulled into the boat, the girl's mother noticed the lifeless body of an elderly woman tied to the boat. It was the man's dead mother. The mother, father and brother of a Tulane nurse-colleague of ours chose not to evacuate Chalmette as the hurricane approached. Soon after the storm struck, the front door of their house blew off. They were facing a menacing wall of water. Within minutes, the entire house flooded over. The brother was washed out the door and the parents were suddenly within inches of the ceiling struggling to remain upright in the water and gasping for air. The father managed to punch through the ceiling to the attic, his head and hands bleeding. He could hear his wife crying for help. Her last words were, "Please see about our son". Battered and bruised, the father and son survived. Unfortunately, the mother's remains were discovered three weeks later; her body damaged beyond recognition. The list of personal tragedies seems endless; the hurt goes on.

The neonates who had undergone surgery at the Tulane Hospital for Children for their congenital heart disease prior to Katrina recovered at their accepting hospitals, and are currently well. Miraculously, the teenage boy with the cardiomyopathy survived the ordeal, and had a successful heart transplant at Texas Heart Institute. He recently was seen in the Tulane Pediatric Cardiology Clinic and is doing beautifully. The young man with the open sternum underwent closure of his chest at a Baton Rouge Hospital. He presently is asymptomatic, and has returned to work. The stories are a testimony to the training, dedication and skill of health care providers in this country. Sadly, an older girl, someone we were very fond of and had followed from birth, with a Total Cavopulmonary Connection for Single Ventricle Complex and protein losing enteropathy, ultimately died of sepsis.

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All we could say was "Thank God" (Figure 4). Thank God for everyone's safe evacuation and congratulations to the Tulane University Hospital and Clinic, the only full-service medical facility now available in downtown New Orleans. HCA's evacuation plan, "Leave No One Behind," never wavered. At the ribbon-cutting ceremony, a jubilant Mayor Ray Nagin – of *Chocolate City* fame - acknowledged to heartfelt cheering, "The opening of the Tulane University Hospital and Clinic provides the downtown community with something it desperately needs, an essential vitamin for the spirit." The Tulane University Hospital and Clinic and the Tulane Hospital for Children joined our overworked sister institutions Touro Infirmary, Ochsner Medical Foundation and Children's Hospital of New Orleans as the primary healthcare providers in the region.

Revelers Defy the Wrath of Katrina

The period of heroic rescues, elation over being united with family and friends, exposure to terror that riveted a nation and widespread media attention had passed. As the New Year approached in New Orleans, people began to seriously reflect upon their situation. They pondered the deadly failures of the city's hurricane protection system and the likelihood of being able to safely reside in the New Orleans area. Residents came to the stark realization that inadequate engineering construction standards and years of neglected maintenance were largely responsible for the levee breaches that nearly decimated our city. Everyone's fear was, and continues to be, the ability of partially restored levees to adequately protect the city for the 2006 hurricane season, and for the future.

USA Today reported, "Holes in levees have been plugged, but the New Orleans system won't survive a major storm." The public's concern about the safety of the city heightened when civil engineers discovered eight out of 11 of the repaired major water pumping stations tested well below even pre-Katrina capacity. At the same time, Ivor Van Heerden, Director of the Louisiana State University Hurricane Center, announced that Katrina wasn't even the mythical Big One. A frightening thought for a vulnerable city entering a new hurricane season. Perhaps, the Army Corps of Engineers was hoping lightning won't strike twice in the same place. Residents were more realistic; they counted on protection through divine intervention.

All along, Katrina's mounting death toll provided residents with a gruesome reminder that remains of flood victims, possibly unaccounted for loved ones, may still be buried beneath the debris of collapsed buildings in Lakeview, the Lower 9th Ward, New Orleans East and other devastated parts of the city. Nevertheless, many people ventured to return to their storm-ravaged homes, living precariously from day-to-day, clinging to belongings and uncertain about their future. Making matters worse, an overwhelming number of families' home insurance claims remained unsettled and restoration efforts were being severely hampered by lack of comprehensive flood-protection guidelines by the State. Obtaining FEMA trailers was a painfully slow, and often impossible, task. We never

did get ours. Government aid became mired in red tape. People's moods and emotions changed, now colored by disillusionment and feelings of abandonment. The Big Easy was in dire need of spiritual resuscitation. Enter Mardi Gras 2006; a truly monumental event in Carnival history.

New Orleans played host to the largest free party on earth, six months after Katrina made landfall, and in the midst of an unfinished recovery in South Louisiana. In Louisiana, the celebration of Mardi Gras can be traced to the early 1700's. The festivities begin on Twelfth Night (twelve days after Christmas), the Feast of the Epiphany, and run through Fat Tuesday (Mardi Gras), the day prior to Ash Wednesday - the beginning of a period of religious penance. Critics argued, "Why have Mardi Gras? Can't the money be spent better?" City officials responded with, "Carnival will serve as a catalyst for economic recovery." After all Katrina destroyed in New Orleans, she could not extinguish the indomitable spirit of its people. The general feeling was, if we give up our traditions, there would be little left returning to New Orleanians pleaded, "Laissez les bons temps roulez"- let the good times roll. Headlines in the Times Picayune read, "Rolling with the punches, battered and bruised, New Orleans puts on a show for the world."

"We have resided in New Orleans and have been associated with Tulane University Medical School for nearly twenty years. This update on post-Katrina New Orleans is based primarily on our personnel experiences during and following the great storm of 2005, and through information gleaned from colleagues, local newspapers and radio and television accounts of events as they unfolded. We have traveled the road for ourselves and experienced its hardships and pleasures directly, not second hand."

A lot of krewe members (riders on floats) lost their homes and many were still displaced around the country. Yet they put personal problems aside and worked hard to make the legendary Mardi Gras parades happen. And happen they did! Superkrewe Bacchus (Grand Marshal Actor Michael Keaton) and Endymion (Grand Marshals Actor Dan Aykroyd and Blues Brother Jim Belushi) rolled back-to-back for the first time, along with 60 other parades across the state, to welcome in Fat Tuesday. During the customary toast of Rex (King of Carnival) at Gallier Hall on Mardi Gras, Mayor Nagin called this year's Carnival, "A party with a purpose."

Parades normally are dedicated to themes as varied as the imagination allows. This year, however, one theme domi-



Figure 4. Colleagues played a vital role in the successful evacuation of patients in the Hospital, and of employees of the Hospital and Tulane University Medical School, and their families. Many other physicians, nurses and administrators contributed to these rescue effort. Unfortunately, no picture shows all these courageous individuals. (Bottom row from left to right: Rob Heifner, VP Operations; Danita Sullivan, Chief Nursing Officer; Kim Ryan, Chief Operating Officer; Kim Graham, Director of Pediatric and Neonatal Services; Jim Montgomery, Chief Executive Officer; Dr. Michael Kiernan, Pediatric Pulmonology; Dr. Lee Hamm, Chairman of the Department of Medicine. Middle row from left to right: Mel Lagarde, President & CEO of the Delta Division of HCA; Styles Clarke, Program Director Life Net Alabama; Sharif Omar, Associate Vice President Operations; Jeff Tully, VP Marketing/Patient Relations. Top row: John Holland, Regional Aviation Director, Air Methods Corporation). Photo provided by HCA.

nated, and, of course, it was Katrina. In designing floats, krewes raised carnival satire to new heights. They portrayed "insurance maladjusters," advertised opportunities for "careers in looting" and, depicted our Mayor and Governor "engaged in boxing matches". Float signs read, "Bridge Over Troubled Water," "Drove My Chevy To The Levee But The Levee Wasn't Dry," "Ain't Got No Home," "Come Hell Or High Water," "Sham-On-Us-O' FEMA", "Washington's response to Katrina was Bush League, ..." The resiliency of one's sense of humor is amazing.

It became immediately obvious how hungry people were for Carnival. As soon as floats turned onto St. Charles Avenue and hit Fat Harry's famed watering hole, crowd noise became deafening. The city rocked! Krewe members later reported, "It

wasn't just the enormity of the crowds, it was their animated faces, their body language, their desperate pleas for throws." Everywhere people were holding cell phones in the air so someone on the other end, perhaps a loved one far away, could hear familiar festival music, the excitement of the crowd or simply recognize a Cajun accent. It was wonderful therapy for the spirit. Just what the doctor ordered. Carnival history was being re-written, and we were part of it.

Revelers partied well into the night. They were serenaded by marching bands, greeted by masked horsemen in elaborate costumes, entertained by flambeaux carriers (torch-bearers) and of course treated to magnificently decorated floats. (Figure 5) Crowds were rewarded with an unprecedented outpouring of colorful beads, stuffed animals, a variety of dubbloons and souvenir cups. Prized hand-decorated Zulu coconuts were in abundance. For those who couldn't attend the big party, many took their Fat Tuesday traditions with them, to Chicago, Houston, Long Island, Louisville, St. Louis and San Diego, perhaps providing seeds for a future national tradition. As the festivities drew to a close, Mayor Nagin proudly proclaimed, "Mardi Gras was a smoke signal to the rest of the world that New Orleans is on its way back." The world got the message. Bring on Jazz Fest 2006.

The Show Must Go On

The New Orleans Jazz & Heritage Festival 2006 proved to be a smashing success. For the 37th consecutive year, New Orleans played host to perhaps the greatest collection of musical talent in America. The Fair Grounds, the traditional site of Jazz Fest, sat under at least five feet of water for nearly three weeks. Nevertheless, with the generous support of Shell Corporation, and with the help of performers and fans, this year's event went on, and was truly remarkable.

Superstars of blues, bluegrass, Cajun, folk, gospel, jazz, Latin, reggae, rock and zydeco gave stellar performances. Legendary artists Jimmy Buffett, the Dave Matthews Band, Bob Dylan, Pete Fountain, Etta James, Dr. John, Ellis Marsalis, Charmaine Neville, Lionel Ritchie, Bruce Springsteen, Paul Simon, Irma Thomas, Allan Toussaint, Dr. Michael White and many others graced our stages to show their love and support for the city that gave birth to jazz and helped spawn gospel, R&B, rap and zydeco. No one at the Acura Stage will ever forget Bruce Springsteen's emotional performance, as he dedicated a revitalized song "My City of Ruins" to a battered New Orleans. His delivery, accompanied by the Seeger Sessions Band, brought many in the massive crowd to tears. Irma Thomas' and Paul Simon's rendition of "Bridge Over Troubled

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"Water" paralyzed their audience during its inspirational finale. As the final evening descended on the Fair Grounds, Lionel Ritchie brought Jazz Fest 2006 to a triumphant close with one of the most electrifying shows of the festival.

In a city where people "live to eat," local restaurants embraced the Festival Spirit by providing a curious mélange of classic New Orleans' dishes like Andouille Gumbo, Oyster Artichoke Soup, Blackened Red Fish, Crawfish Monica, Crawfish Etoufee, Jambalaya, Oyster Rockefeller, Char-broiled Oysters, Pecan Catfish Meunier, Catfish Lafitte, Boudin Sausage, Jumbo Gulf Shrimp, Red Beans and Rice, Softshell Crabs, Po-Boys of all types, Beignets, Bread Pudding, Pecan Pie.... Only in New Orleans can this degree of creativity be translated into food. With music in the background and tantalizing aromas in the air, Jazz Fest provided a feast for the Gods. The festival permitted tourists to experience a full-bodied immersion into Louisiana music, culture and cuisine. Once again, the New Orleans Jazz and Heritage Festival proved to be a musical metaphor for what our city means to America.

Katrina's Shadow Won't Go Away

People of Louisiana labored for 300 years to build a great city in a largely hostile environment along the banks of the Mississippi River. Ultimately, this city, New Orleans, rose to command the shipping lanes into the heartland of America, and became a worldwide magnet for tourism. Yet on August 29, 2005, in less than half a day, Hurricane Katrina, with sustained winds of at least 145 mph and accompanied by waves reaching 40 feet, roared in from the Caribbean and devastated 100 thousand square miles of the heavily populated Gulf Coast. The eye of the storm passed only 40 miles southeast of New Orleans. The near miss was of little consolation. Her whirling disk was 400 miles wide; punishing counterclockwise winds and a massive storm surge set Greater New Orleans up for a deluge that lead to near destruction of this historic city. When the hurricane finally left New Orleans, the city lay in ruins; its music gone. On September 7, 2005, Mayor Nagin ordered the city completely emptied; the first total evacuation of a major American city in modern times. The Army Corps of Engineers would assume the arduous task of draining the region of the floodwater. What remained was a shell of a great American city.

Katrina was different from any other previous natural catastrophe to strike the United States; she consisted of successive tragedies that shook America at its very foundation. She evolved into a meteorological monster of unprecedented pro-

portions. She spawned an epic flood, one that submerged a half million homes and displaced more than one million people. She exposed profound social injustice ingrained in our society. She uncovered government mismanagement – at the local, state and national level – that led to untold human suffering.

How could a disaster of this magnitude have occurred? What went wrong? New Orleans is surrounded by a 350-mile system of levees – massive barriers constructed from earth, concrete and steel - to hold back the waters of the Mississippi River and Lake Pontchartrain. The Army Corps of Engineers - the nation's engineering brain trust – have always claimed its levees could protect the city only from storm surges produced by relatively weak hurricanes. Thank you. Researchers now acknowledge that as many as 30 breaches in the levee system may have occurred, which accounted for most of the metro area flooding. What started as an inconvenience to residents soon escalated into a deadly tragedy. The water level in New Orleans rose to approach that of a surging Lake Pontchartrain, effectively making the city part of the lake.

Stated more precisely, Katrina had left the levee system in ruins. Almost a half-century of work was undone in a matter of hours. Floodgates were ripped apart, steel support structures were distorted beyond recognition. The massive earthen levees, some thirty feet high, were gone! Neighborhoods near the lake and its drainage canals, with their restaurants, marinas, schools and homes, were doomed. The New Orleans communities: Lakeview, the Lower 9th Ward, New Orleans East, Gentilly and Lakeland were inundated by 10 - to - 20 feet of raging water. Apparently, there was no way to repair the levees quickly or get the city's pumping stations working. Thus, Greater New Orleans was exposed as never before. Unexpectedly, in some regions, the levees actually acted like a massive one-way valve. Once the New Orleans bowl was filled, the levees prevented floodwaters from receding into the lake, river and the Gulf.

South of New Orleans, Katrina's powerful winds forced the Mississippi River to reverse its direction (flow northeast) causing it to backup, unearth its boundaries and flood heavily populated regions, like Chalmette and Mereaux. These cities were washed away by a wall of water and further were poisoned by a million gallon crude-oil spill from a damaged local refinery; a deadly combination. Shortly thereafter, St. Bernard Parish disappeared under 15 feet of an unrelenting Mississippi River, hundreds drowned. Next, Plaquemines Parish was lost; its massive marshlands-protectors of New


HEART FAILURE
IN CHILDREN AND YOUNG ADULTS


Orleans-were reclaimed by the sea. On the north shore of Lake Pontchartrain, its waters rose to cover major portions of Lacombe and Slidell. The flooding soon assumed biblical proportions. The destruction to Greater New Orleans went beyond comprehension.

Since these horrifying events, people have been coping with loss of loved ones, separated families, finding places to live, obtaining new jobs, rebuilding homes, simply trying to survive. Collectively, these stresses took an enormous emotional toll on the population. Many residents reached their psychological saturation point. Healthcare providers have been recording increasing rates of alcohol and drug use, domestic violence and an alarming number of suicides, in part due to a shortage of support groups during this time of medical under staffing. The Tulane University and Louisiana State University Medical Schools released at least 50% of their faculty; tenure provided little protection. The children in Greater New Orleans have not been spared mental anguish associated with the storm. The National Mental Health Association estimates a half million children will struggle emotionally from loss of family members, homes and schools.

Can you imagine, an estimated 1.2 million people have been displaced across America, wondering where they would live, where they would work, where their children would go to school and if they would ever return home? Thankfully, these people were greeted with open arms, and fellow Americans made them feel welcome. For instance, our son, Michael, started high school and our daughter, Suzy, entered kindergarten at the Morris Center School located near the end of Long Island. Although initially traumatized by events they experienced during the hurricane, both flourished in their new academic environment. Hopefully, other families had a similarly gratifying experience.

Openings of familiar services like shopping centers, banks and hospitals has helped restore some degree of confidence in New Orleans' infrastructure, and has provided a sense of normalcy to communities. Ultimately, however, the city's recovery rests heavily on the Bush Administration and the American Congress. Most residents cannot be expected to rebuild their homes without the financial support promised by the Federal Government. Nearly one year after Katrina entered our lives, money has not been forthcoming for reconstruction.

The plight of people residing in public housing prior to Katrina is even more tragic. Many of these families were already of limited means, dependent on state aid to make ends meet. Now they are both, "poor and homeless." Thousands remain displaced after being forced to flee New Orleans' floodwaters. There still is no definite plan by the city to restore storm-damaged housing projects, or provide new places for these people to live. Former residents have banded together and threatened to take over hurricane-shattered complexes if action is not taken to make suitable housing available. For many of New Orleans' lower socioeconomic group, housing projects are their only hope of again residing in the city.



Figure 5. Mardi Gras 2006 float with masked krewe members preparing to throw beads to an excited crowd. Photo taken by Nancy Ross-Ascuitto.

Private industry has been reluctant to return to the storm-ravaged city, since the pumping stations, water gates and levees comprising the flood protection system were not fully repaired for the 2006 Hurricane Season. Many residents and business people are downright angry about the delay. Perhaps the Army Corps of Engineers was banking on low risk of a major storm developing early in the season. Typically, the peak of the hurricane season occurs in late August and September, as the shallow waters of the Caribbean warm. Most of the major storms striking the Gulf Coast - Betsy, Camille, Gilbert, Andrew and Katrina - developed during this time period. However, Mother Nature is not obliged to adhere to this, or any other, schedule. Audrey, a Category 4 hurricane, pounded southwestern Louisiana in June of 1957, killing 390 residents. A scary thought, considering the levees were described as being repaired to withstand a Category 3 storm at best.

Washington must assume an important role in re-establishing health care delivery in Greater New Orleans. Since Charity Hospital and University Hospital are closed, an ever-increasing number of indigent patients are seeking medical attention at private hospitals that are open. Hospitals south of Lake Pontchartrain are losing millions of dollars a month caring for uninsured people, who otherwise would have gone to Charity Hospital or University Hospital. For instance, patients without medical coverage, i.e. so-called self-pay, are inundating the Tulane Hospital and Clinic, in part related to its downtown location. Tulane in partnership with Hospital Corporation of American (HCA-Healthcare) is at risk of losing 5-6 million dollars a month caring for uninsured patients. Nevertheless, the organization's commitment to help rebuild New Orleans and to patient care motivates administrators to keep the Tulane Hospital and Clinic doors open to all patients, especially during

this time of an unparalleled domestic crisis. The State of Louisiana and the Federal Government must grant financial assistance to healthcare facilities providing uncompensated service. We have all focused on fixing the levees; let's not forget our healthcare system.

Another major concern is that Louisiana has been forced to relocate its subspecialty medical services for indigent patients throughout the statewide Charity Hospital System. Patients with ophthalmological problems now must travel to Baton Rouge or Houma for the treatment, orthopedic surgery to Lafayette and heart-bypass surgery to the most northern part of the State in Shreveport. Likewise, Charity's busy Cancer-Treatment Center has been moved to Independence, Louisiana. These cities are considerable distances from New Orleans, and from each other. Since the State of Louisiana cannot afford to provide transportation for medical care, many patients are not receiving treatment they require.

Scars from Katrina are many and run deep. Yet progress has been made toward recovery. Mardi Gras in February and Jazz Fest in April surpassed organizers' expectations. New Orleans' renowned Aquarium of the Americas, an attraction that lost 4000 animals due to the storm, reopened in May and, in June, the Ernest N. Morial Convention Center hosted its first major conference since the storm. In September, a renovated Superdome opened, as the Saints and rival Falcons helped kick off the 2006 NFL Season. New Orleans will also be the site for the 2007 Sugar Bowl and the NCAA Basketball Tournament, the 2008 BCS Title Football Game and the NBA All-Star Game. Now, the major challenge facing the city is resurrecting its 10 billion dollar hospitality industry.

Tourism is New Orleans' biggest business, and Katrina's damage cost Louisiana billions in lost revenue. Fortunately, the part of the city tourists would visit is now in good shape, something they surely would enjoy. Not unexpectedly, nightlife in the French Quarter hadn't lost a step. Downtown Harrah's Casino has reopened and is ready for action. So, where ya'at; come on down already !

Awards continue to roll in and provide a vote of confidence in city officials. A sweeping plan has recently been unveiled to revitalize storm-ravaged downtown New Orleans. Strategic Hotels and Resorts, the Chicago based owner of the Hyatt Regency Hotel in New Orleans, in conjunction with a coalition of business people and musicians, wish to create a 715 million dollar, 20-acre National Jazz Center. The six-block complex would include a 20,000 square-foot jazz performance arena, a 70,000 square-foot amphitheatre and a 60,000 square-foot educational center. The complex would become an international home for jazz, and other musical art forms. Streetcars would connect the Jazz Park with sports' facilities, the French Quarter and the Convention Center. All this is exciting news.

To combat post-Katrina housing shortage, developers are proposing to construct high-rise residential complexes near the Central Business District. About 2,200 new apartment and condominium units are in the planning phase. In some cases, old buildings will be remodeled; other projects call for entirely new construction. Likewise, Donald Trump and associates are moving forward with building a massive new tower, 70 stories and 400 condominiums, located amidst the French Quarter, Convention Center and Superdome. It appears that vertical living will become part of the revitalized New Orleans skyline.

The loss of Charity, University and the Veterans Administration Hospitals has put southeastern Louisiana in dire need of a medical facility for training medical students and residents. In response to this void, Louisiana State University officials in conjunction with the United States Department of Veterans Affairs have proposed the construction of a 1.3 billion dollar academic medical complex for downtown New Orleans. Such a facility would permit New Orleans to remain a nationally recognized center for medical education.

All this is fine. However, for a truly successful recovery of New Orleans, the blue print for the city must include going beyond Mardi Gras, Jazz Fest, tourism and sporting events. The plan needs to include provisions for businesses to prosper and for families to flourish. In the 1960's, the population of New Orleans was comparable to that of Atlanta and Houston. New Orleans was one of the richest cities in America; now, on a per capita basis, she is one of the poorest. New Orleans grew poor as residents fled to suburbs to better opportunities; its population steadily declined. Although hotels and convention centers boomed, the remaining economy faltered badly. Quite correctly, the national news media has vociferously taken the city to task on crime, political corruption, fiscal mismanagement, lack of foresight and an embarrassingly poor educational system. Here is a major American city that cannot run its own public schools.

More than 200,000 Louisiana students made their way to 49 states in the immediate aftermath of the storm. Katrina dismantled New Orleans' public school system, acknowledged by educators to be one of the country's worst. Many displaced children were thrown into radically different cultural and racial environ-



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ments. Nevertheless, in an overwhelming number of cases, they prospered in their new academic settings. Newfound successes were linked to improved classroom conditions, absence of chaos and violence, and community support for education – conditions largely absent back home. Displaced children and their families discovered educational opportunities they never imagined; an embarrassing upside to the hurricane.

Crime remains a problem and has increased as the city repopulates. Prior to Katrina, New Orleans was riddled with crime. The city had the yearly distinction of having one of the highest homicide rates in the country. Citizens have compared New Orleans' underworld activity to that of Chicago in the 1920s, with its drive-by shootings, drug trafficking and gangland-type murders. In the first months after Katrina, residents returning to New Orleans were treated to an essentially crime-free environment. Unfortunately, as the ravaged city lumbers through its recovery, the criminal element has returned to the Big Easy, and in full force. Mayor Nagin, however, is fighting back, and big time, "This city is not returning to its pre-Katrina state; no way, that's history." He has gone as far as obtaining help from the State Police and Louisiana National Guard Forces to squelch crime. Felony arrests have increased and killings decreased, each by 50%, since these forces began helping the New Orleans Police Department.

Prior to entering politics, Nagin was a successful telecommunications executive. When elected in 2002, he was a political neophyte. During the tumultuous aftermath following Katrina, he cut his political teeth. He's still charming and witty, but now has become a no-nonsense guy. He was infuriated by Washington's sanitized and inverted view of events in New Orleans shortly

after the storm. On CNN, during the critical days, Nagin delivered a moving ultimatum to the country, "I've talked to everybody under the sun, including the President. We need reinforcements, troops, and busses, man." On WWL radio, Nagin was asked by newsman Garland Robinette to comment about the initial lack of help by the Federal Government. His response was cutting, "The President and the Governor need to get their asses on a plane, sit down and figure this out. This is a national disaster." Later, Nagin met with President Bush and Governor Blanco aboard Air Force One. He nearly lost composure as he admonished them to work out a chain of command to obtain military assistance in the city. His actions finally led to the evacuation of flood victims.

Katrina cannot solely be blamed for the disaster that unfolded in New Orleans. What she did was to expose glaring inadequacies in the way Louisiana traditionally has operated, much like her storm surges opened breaches in New Orleans' poorly managed levee system. In addition to destroying homes, businesses, buildings and lives, Katrina shattered America's self-esteem. Shamefully, 8/29 turned into an ugly version of 9/11; New Orleans' ground zero became a wormhole back to the tumultuous 1960s. An international audience witnessed the consequences of being poor in the Deep South; a poverty that largely can be traced to social and racial injustice.

By far, most of the people unable to leave the city as Katrina approached were old, poor and African-American. Conditions at the ill-fated Superdome (25,000 people stranded) were horrific and the mayhem that erupted at the Convention Center (20,000 people stranded) was shameful. Instead of places for respite from the storm, these

facilities became islands of despair, public health disasters. Hundreds of people lost their medications in the flood and were suffering from breathing problems, dehydration, heart failure, seizures, etc. It seems sacrilegious that the Superdome, site of Pope John Paul II's monumental religious sermon to people of all faiths in 1987, should become a cathedral for human misery during the great flood of 2005.

Who will forget the overwhelming number of African-Americans (our fellow countrymen) seen on television screens, stranded on rooftops, wandering in filthy water, pleading for help, desperately looking for family members, trying to escape the horror of the storm. Reverend Jesse Jackson compared the plight of people trapped on the I-10 causeway to, "Africans in the hull of a slave ship." The comparison may have been overstated, insomuch as the crowds at the Superdome, Convention Center and I-10 largely reflected the racial makeup of the poor in New Orleans. Nevertheless, this in no way exonerates anyone from the way these people were treated. No explanation by the City of New Orleans, the State of Louisiana or the Federal Government can vindicate the devastation these people encountered during, and after the storm.

It seems apropos to paraphrase from Dr. Martin Luther King, Jr.'s speech about impoverished African Americans. At the great march on Washington, exactly 42 years prior to Katrina striking the Gulf Coast, Dr King pleaded to a massive audience,..." THEY are still languished in the corners of American society and find themselves in exile in their own land." Political leaders need to take what happened in New Orleans as a wakeup call, and address once and for all the social and racial injustice that has become part of the very fabric of this old city.

There are lessons to be learned from this



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hurricane. What went wrong in New Orleans could happen in San Francisco or Long Island, with a large earthquake or a major storm. As was the case in New Orleans, it isn't a matter of if, it's a matter of when these regions will be struck by a catastrophic event. Will they be prepared? Katrina was a natural disaster that evolved into a national tragedy. The devastating flooding should never have occurred. It demonstrated the woefully poor hurricane protection system surrounding New Orleans. The United States has prided itself on being a world-leader in technology. In the Netherlands, at least a quarter of its land is well-below sea level. Without proper safeguards against flooding, the sea would quickly swallow up 65% of the country. In response, Dutch engineers designed a remarkable complex of dikes, dams and pumps that put to shame what Louisiana had in place to protect New Orleans against Katrina's monstrous storm surges.

What the Netherlands accomplished should be taken as a challenge to the United States. Cost should be no obstacle when the life of a great city and the safety of its people are at stake. However, there likely will be no quick fix to New Orleans' levee problem. The Dutch protection system was developed in response to a catastrophic flood in 1953; more than 2000 people perished. Despite billions of Dutch guilders being invested in the project, the final product took nearly 20 years to complete. In the Netherlands, flood protection amounts to a national problem. In the United States, it is a local issue for states to work out; in essence, flood protection becomes a political football. In the end, New Orleans can no longer be held hostage by nature; its residents cannot live in fear of the water around them.

In Mayor Nagin's re-election speech, he reported that, "Billions of American dollars will flow through the city to fuel its rebirth".

He vowed qualified, honest and competent people will manage these funds - a legitimate requirement when it comes to Louisiana politicians. Notwithstanding the challenges ahead, Governor Kathleen Blanco and Mayor Ray Nagin now seem intent on working together to right the ship that will carry us to a better New Orleans. Like the phoenix, these political leaders can facilitate the successful birth of a NEW Orleans. However, we cannot have a recurrence of 2005. If another hurricane strikes New Orleans without a proper protection system in place - even a Category 2 storm could overflow the levees if it strikes on a high tide - this grand old city will vanish into the sea, along with its unique cuisine, creativity, culture and music. Its residents' remarkable accomplishments will become part of American folklore.

"Come on rise up, come on rise up, come on rise up, ... our city is in ruins." Let us not forget.

Post Script

We have resided in New Orleans and have been associated with Tulane University Medical School for nearly twenty years. This update on post-Katrina New Orleans is based primarily on our personnel experiences during and following the great storm of 2005, and through information gleaned from colleagues, local newspapers and radio and television accounts of events as they unfolded. We have traveled the road for ourselves and experienced its hardships and pleasures directly, not second hand.

We wish to acknowledge the remarkable job done by the Associated Press and USA Today, and ABC, CNN, Fox and NBC News Channels, to make the American Public aware of the tragic events that took place in New Orleans during and after Katrina. Locally, the Times Picayune, along with WWL- radio

and television, provided residents of Greater New Orleans with a dramatic day-by-day account of the Katrina story.

The Great Deluge, by Douglas Brinkley, professor of history at Tulane University, depicts in graphic detail inside story of the Great Flood of 2005. Path of Destruction, by John McQuaid and Mark Schlestein, provides the reader with a concise history of hurricane alley, the Army Corps of Engineers and, of course, Hurricane Katrina. Breach of Faith, by Jed Horne, a resident of New Orleans and Pulitzer Prize editor of the Times Picayune, masterfully takes us through an analysis of the worst disaster of our time. Leave No One Behind, by Bill Casey, tells the story of the rescue of Tulane Hospital. Lastly, Time Magazine's *Hurricane Katrina: The Storm That Changed America* is a "must read" for all Americans.

~CCT~

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HIGHLIGHTS FROM SPECIALTY REVIEW IN PEDIATRIC CARDIOLOGY 2006 BOARD REVIEW/CME COURSE - CHICAGO

By Maria Serrato, MD

On June 26-29, Chicago was the venue of the 15th "Specialty Review in Pediatric Cardiology" sponsored by the University of Illinois College of Medicine and directed by Maria Serrato, MD, course founder.

The attendees were physicians seeking Board certification and re-certification or established specialists interested in updating their knowledge in this specialty.

The course proved to be a resounding success as indicated by the number of participants coming from throughout the United States and several foreign countries.



Dr. P Kratunkov receiving a gift certificate from Dr. Serrato.

The curriculum was structured to meet the requirements for Board certification as well as to provide an updating in this dynamic specialty offering CME accreditation. To this end, sessions were held with structured lectures, board-simulations, hands-on workshops and informal discussions with the faculty.



Dr. Steve Pophal presenting his lecture on the "Management of the Post-Heart Transplant Patient."



Dr. W. J. Franklin interacting with the attendees

Although the course was addressed exclusively to physicians, an exception was made for one participant, Tomas Kuprys who, as a pre-medical student, was not qualified to attend the course. He, nonetheless, was admitted thanks to a learned and gracious letter he wrote, displaying an unusual knowledge of medicine and refreshing enthusiasm. He was presented with a gift of a stethoscope, emblem of our profession, as a good-luck-charm for his future professional career.

The farthest-traveling attendee was Dr. Pencho Kratunkov, hailing from Bulgaria, who overcame passport and visa difficulties to reach these shores. As a parting gift he received Mullins' book on cardiac catheterization.

The participants at the end of each hard-working day enjoyed the numerous cultural, entertainment and shopping opportunities Chicago offers.

From the post-course evaluations we were gratified to learn that our efforts provided a satisfying and significant educational experience, with 98% of the attendees satisfied with the faculty, content and organization of the course.

Sample comments are here listed: "Excellent. Very oriented to Board...." "Outstanding". "Great." "Excellent Board review." "Nicely organized course..."

The course was video-taped by the ESI Company based in Florida, a CME accredited institution. The resulting CD/DVD, providing Category One AMA Credits, will be available for purchase from the company.

See you in Chicago in two years!

-CCT-

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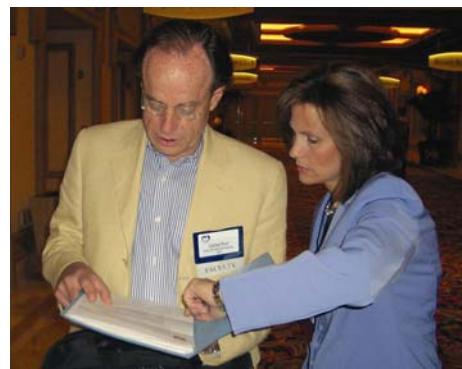
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MEDICAL NEWS, PRODUCTS AND INFORMATION

Closing In on Lethal Heart Rhythm in Young Athletes

Johns Hopkins experts on the genetics of a potentially lethal heart rhythm defect that runs in families and targets young athletes report they have greatly narrowed the hunt for the specific genetic mutations that contribute to the problem.

Their new findings, described in the July issue of the American Journal of Human Genetics, should increase the accuracy of tests to identify those at risk for arrhythmogenic right ventricular dysplasia (ARVD), which is among the top causes of sudden cardiac death in the young and fit.

In February, the same team linked one-third of ARVD cases in their large database of patients to a dozen abnormal changes in a gene called plakophilin-2 (PKP2), which makes proteins involved in heart cell stickiness.

In the new study, confirming experiments elsewhere, the Hopkins team found four mutations in another sticky protein gene, Desmoglein-2 (DSG2), in five of 33 patients tested.

"This gene is highly expressed in the heart, where muscle tissue expands and contracts with the heartbeat," says senior study author and cardiac geneticist Daniel P. Judge, MD. "Our results confirm that altered genes in the desmosomal cellular complex are responsible for ARVD. And now that we know the genetic roots of this disease, we can also create better blood tests for their proteins to predict who is at risk for developing this condition."

Judge, an assistant professor at The Johns Hopkins University School of Medicine and its Heart Institute, says DSG2 mutations appear to account for at least 10 percent and possibly more of the estimated 25,000 deaths each year from ARVD.

"We expect a test for DSG2 mutations to be available to those with a family history of the condition before the end of the year," he says. The same Hopkins team developed a blood test to screen for PKP2 mutations. That test became available in May and is currently the only one available for detecting those at greater risk of the disease.

More than 400 people have been screened at Hopkins so far and of these, two-thirds have had serious enough forms of the condition to warrant implantation of a defibrillator, an electrical device that corrects any disturbances in the heart's rhythm.

The Hopkins researchers identified the DSG2 mutation through genetic analysis of blood taken from 60 men and women already diagnosed with ARVD. All were part of a patient database created at Hopkins in 1998. The researchers focused on cell-adhesion proteins because they had already been linked to Naxos syndrome, which produced symptoms in the right ventricle similar to those documented in ARVD.

When scientists excluded their ARVD patients with PKP2 mutations, they were left with 33 who had no known genetic explanation for their condition. Additional testing revealed the four mutations in DSG2.

"We knew right away that we had found something very significant," says lead author Mark Awad, BA, a medical and predoctoral sciences student at Hopkins. "The mutations were confined to a highly functional part of the gene and were highly conserved, meaning that evolution had not drastically changed the genetic sequence over time - the gene was kept the way it was because it was important to the heart's normal function."

According to Awad, not everyone with a genetic mutation develops ARVD. He adds that further analysis of the condition's genetic roots will help researchers

to calculate the precise increased risk from each mutation for developing symptoms and dying. Previous research by the Hopkins team showed that familial ARVD generally strikes after puberty and its symptoms - dizziness, fatigue and fainting after exercise - may appear up to 15 years before diagnosis.

Funding for this study was provided by the Bogle Foundation, the Campanella family, the Wilmerding Endowments, the National Institutes of Health, the Donald W. Reynolds Foundation and the W.W. Smith Charitable Trust.

For more information www.arvd.com.

Heart Tissue Repair System in Animal Models: Penn Researchers Enlist Proteins to "Switch On"

Researchers at the University of Pennsylvania School of Medicine are utilizing a protein to "switch on" the ability to repair damaged heart tissue. By triggering the cell-cycle signal, researchers can manipulate cells in animal models to regenerate damaged heart tissue. If this research is someday successfully translated to humans, it could change the approach to treating heart disease, the nation's leading killer.

"This is a different concept in terms of how to address heart disease. The classic thinking is to replace a valve, or place a bypass graft. Traditionally, when the heart gets injured, there's dead tissue, and we work our way around it surgically, even replacing the heart with a transplant," explains principal investigator Joseph Woo, MD, Director of the Minimally Invasive and Robotic Cardiac Surgery Program at Penn and Assistant Professor of Surgery. "So we asked, 'What would be the most ideal, natural way of fixing any sort of problem like this?' If you look at nature, the best way is to sim-

ply re-grow the tissue. We know that if we take out a piece of the liver, our body has programming to grow it back to how it was."

However, unless the body receives some sort of "jump start," it does not heal dead tissue in the heart. This can have devastating effects. When tissue dies in the heart (for example, due to a heart attack), it is not able to contract and function as effectively to pump oxygenated blood throughout the body, which could ultimately lead to heart failure and death.

Working to better understand how to reverse this damage in humans, Woo first identified the signals in the rat heart that currently prevent the ability to re-grow damaged heart tissue. The researchers then manipulated those signals so the heart could work to regenerate itself.

Specifically, Woo's team investigated myocardial regeneration by initiating heart cell division and replication. They did this by expressing the cell-cycle regulator, a protein called cyclin A2. It is unique in its control at two major transitions of the cell cycle and is the only cyclin that is completely silenced after birth in mice, rats and humans. This approach -- using cyclin A2 expression via gene transfer -- yielded improved myocardial function.

The results of this study ("Therapeutic Delivery of Cyclin A2 Induces Myocardial Regeneration and Enhances Cardiac Function in Ischemic Heart Failure") are posted on-line in Circulation, the journal of the American Heart Association (<http://circ.ahajournals.org/>).

This study was funded in part by the National Institutes of Health.

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A 4 ½-day comprehensive international meeting on pediatric heart failure, featuring a distinguished faculty of internationally recognized leaders, well-known for their clinical expertise and teaching abilities. Meeting includes a clinically focused, cutting-edge program; lectures, panels, case discussions, Q&A, and extended informal faculty interactions, and special evening dinner events.

CME hours: Accredited by The Center for Bio-Medical Communications, Inc.

Topics include:

- * A 1-day symposium on Pediatric Cardiac Transplantation
- * A 2-part mini-symposium: *State-of-the-Art: Acute and Chronic Mechanical Support in Children*
- * A 1-day nursing symposium: Nursing Aspects of Heart Failure in Children
- * Adult clinical trials in heart failure
- * Updates on new drugs
- * Adults with CHD and heart failure
- * Right heart failure and cardiomyopathies
- * Innovations in surgical management of heart failure
- * Cardiac synchronization therapy (CRT) and indications
- * Non-Invasive methodology of heart failure assessment
- * Case discussions on challenging patients
- * Scientific abstract session with oral and poster presentations with all abstracts to be published following the conference
- * And more...

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