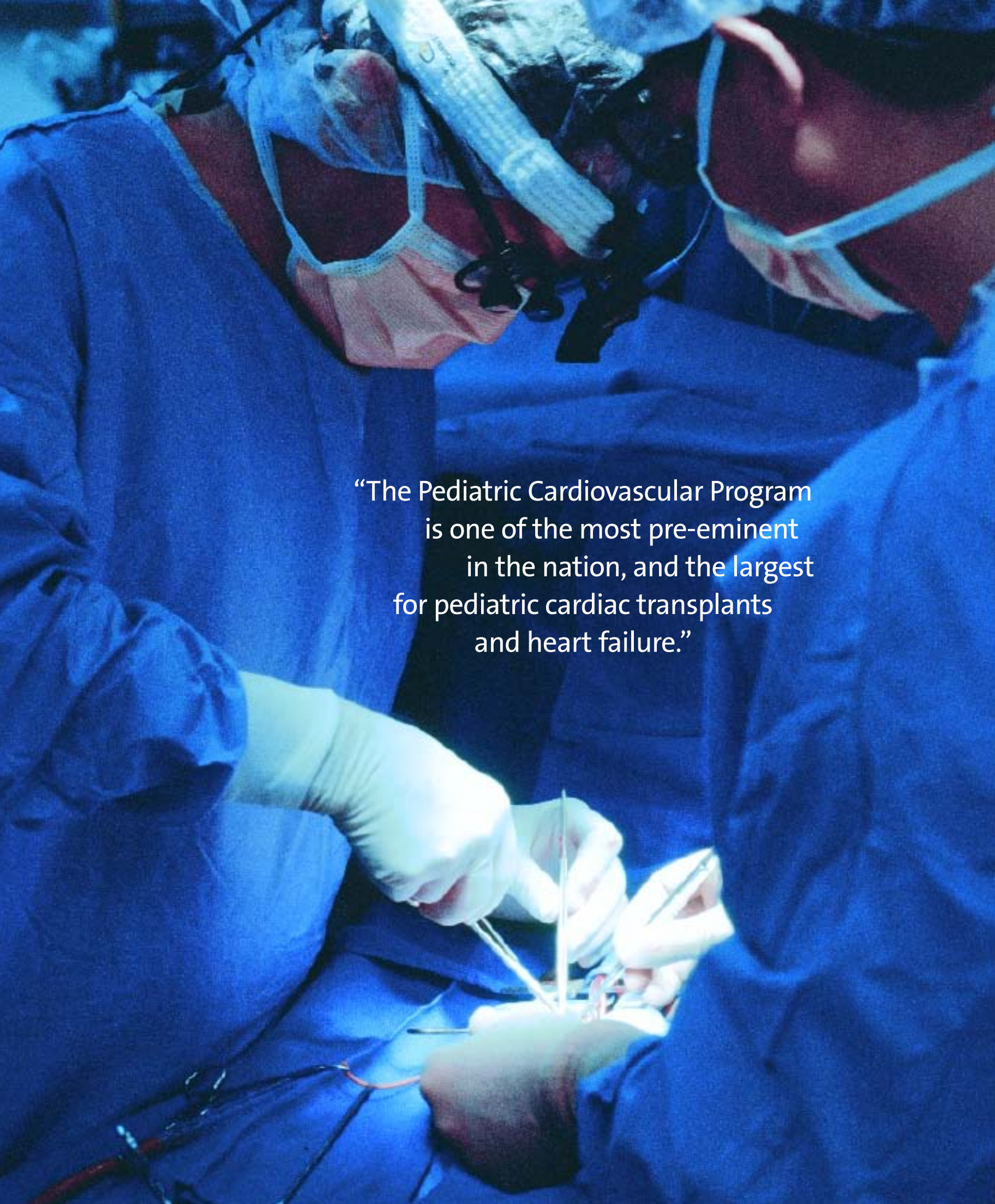
“The Pediatric Cardiovascular Program
is one of the most pre-eminent
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and heart failure.”

Specialized Centers And Clinical Programs

Overview: The Department of Surgery maintains over twenty specialized centers and clinical programs, offering a comprehensive, multidisciplinary approach to a wide variety of conditions described below.

■ The newly integrated **PEDIATRIC CARDIOVASCULAR PROGRAM** at Morgan Stanley Children's Hospital of NewYork-Presbyterian is one of the most pre-eminent in the nation, and the largest for pediatric cardiac transplants and heart failure.

"We have the only pediatric catheterization laboratories in the New York area dedicated to pulmonary hypertension and arrhythmia," says Welton Gersony, MD, Chief of Pediatric Cardiology. "The Center is known for its expertise in the ablation of cardiac arrhythmias and in balloon valvuloplasty. Each year our surgeons perform more than 550 pediatric cardiac procedures and over 650 cardiac catheterizations."

■ **THE PANCREAS CENTER** has achieved a mortality rate below one percent for the Whipple procedure, invented at Columbia, and is among the world's leading centers for the treatment of pancreatic cancer. Led by John Chabot, MD, Columbia surgeons perform over 100 pancreatic operations yearly, combining the Whipple procedure with distal and total pancreatectomy. They have improved the staging of the disease using endoscopic ultrasound, made improvements in anastomoses, and adopted techniques from liver transplantation to perform reconstructive surgery on the portal vein. Researchers are currently investigating a vaccine for advanced stage pancreatic cancer.

■ **THE ADRENAL CENTER**, now part of the Surgical Endocrine Program, assesses and treats patients with complex adrenal disorders, offering genetic counseling, screening, and both total and partial laparoscopic adrenalectomy.

■ **THE AORTIC SURGERY PROGRAM** offers a multidisciplinary team with expertise in the medical and surgical management of all types of acute and chronic aortic problems, including acute Type A and Type B dissection, ascending aortic and arch aneurysms, and aortic root reconstruction.

■ **THE SURGICAL ARRHYTHMIA PROGRAM** uses the latest technology to treat patients suffering from cardiac arrhythmias. Atrial fibrillation (AF) affects 5 to 10 percent of people over 65 and up to half of those undergoing cardiac surgery. Columbia surgeons are experts in the modified left atrial Maze procedure, in which pulmonary vein isolation (left) is performed using a variety of energy sources. Surgical atrial fibrillation ablation is also offered to all AF patients having a concurrent open-heart procedure, and rarely adds more than 20 minutes to the operation.

■ **THE CENTER FOR INNOVATIVE CANCER MANAGEMENT** is developing biologic therapies and vaccines for cancer patients. Under the direction of Howard Kaufman, MD, the Center is conducting clinical studies of new agents for various types of cancer, including malignant melanoma, colon, prostate and kidney cancer. It also maintains a specialized unit for the administration of Interleukin-2, a natural substance that promotes immune response. Led by Ziv Haskal, MD, a team of interventional radiologists is pursuing novel treatments for primary liver cancer and tumors that spread to the liver. The team also has extensive expertise in chemo-embolization and direct tumor ablations.

■ **THE MINIMAL ACCESS SURGERY CENTER** led by Dennis Fowler, MD, runs a nationally recognized training program in minimal access techniques and has pioneered minimally invasive approaches to a wide variety of conditions, including diseases of the heart, colon, gallbladder, spleen, adrenal glands, and biliary tract, as well as esophageal reflux and hernias.

■ **THE LE BUHN CENTER FOR LUNG FAILURE** is a state-of-the-art facility for pulmonary disease, caring for more than 5,000 patients annually. It is one of the premier referral centers in New York City for lung transplantation and a recognized leader in high-risk cases. Under the direction of Mark Ginsburg, MD, a multidisciplinary team assesses patients with end-stage pulmonary problems with the goal of treating them medically. Columbia surgeons also perform Lung Volume Reduction Surgery (LVRS) for selective patients with emphysema using new minimally invasive techniques.

■ **THE CENTER FOR ESOPHAGEAL DISEASES** draws together world-renowned experts in the diagnosis and treatment of benign and malignant esophageal diseases. It offers state of the art evaluation and minimally invasive endoscopic therapy to successfully treat pre-cancerous conditions, such as Barrett's esophagus. Significant gastroesophageal reflux disease (GERD) now affects an estimated 25 million Americans. This condition can often be treated medically or with endoscopic procedures. When surgery is needed, it can usually be performed without large incisions, allowing the patient a quicker recovery.

■ **THE PEDIATRIC CENTER FOR CRANIOFACIAL SURGERY**, under the direction of Jeffrey Ascherman, MD, was launched in late 2005 and provides comprehensive care for children with craniofacial defects. Its staff consists of plastic and reconstructive surgeons, neurosurgeons, oral surgeons, orthodontists, opthalmologists, geneticists, pediatricians, speech therapists, physical therapists and occupation therapists. Dedicated physicians and nurses have donated their time to create this service at the Morgan Stanley Children's Hospital of NewYork-Presbyterian.

■ **THE CENTER FOR LIVER DISEASE AND TRANSPLANTATION** cares for nearly a thousand patients per year, performing 80 transplants, one quarter of these in children. Guided by Robert Brown, Jr. MD, the Center is a leader in living donor and split liver transplants. Investigators are pursuing over 20 research projects on hepatitis antiviral therapies and regeneration biology.

■ **THE PEDIATRIC TRAUMA SERVICE** is one of three facilities in New York State to care for injured children on a 24/7 basis. A multidisciplinary team of more than 50 pediatric sub-specialists has developed special protocols to treat accident victims, including new guidelines for blunt injury of the liver and spleen.

■ **THE CENTER FOR OBESITY SURGERY** offers a wide range of bariatric procedures, long-term follow-up and patient support groups for patients suffering from morbid obesity. Director Marc Bessler, MD, is conducting new research to see if these procedures can help patients who are overweight but do not have grave health risks. The Center was among the first in the nation to perform laparoscopic gastric bypass and has studied the effectiveness of the LAP-BAND®, a band around the stomach that reduces food intake.

■ **THE CENTER FOR HYPERHIDROSIS**, directed by Lyall Gorenstein, MD, offers non-surgical methods to control hyperhidrosis or excessive sweating, and has also been instrumental in modifying the surgical techniques to minimize the side effects of this condition and improve the outcomes of surgery.

■ **THE PHRENIC NERVE PROGRAM** has developed and refined treatments for patients with paralyzed diaphragm, including phrenic nerve pacemakers, phrenic nerve grafts and diaphragmatic plication.

■ **THE COLORECTAL CARE CENTER** specializes in detection, diagnosis and treatment of all disorders affecting the lower GI tract, including cancer of the colon and rectum, and numerous benign conditions. Laparoscopic techniques developed by Richard Whelan, MD, can drastically reduce hospital say and time of recovery for patients undergoing resection. The Center is also conducting extensive research into inflammatory bowel disease and colon cancer also been instrumental in modifying the surgical techniques to minimize the side effects of this condition and improve the outcomes of surgery.

■ **THE CENTER FOR INTEGRATIVE MEDICINE** combines traditional Western medicine with complementary and alternative approaches, offering heart patients new tools to promote recovery, minimize pain and reduce stress. These include yoga, therapeutic massage, guided imagery, relaxation exercises, and nutritional counseling. Under the direction of Mehmet Oz, MD, researchers are investigating the use of magnets to reduce post-surgical pain, chelation therapy for reducing atherosclerosis and the effects of music, imagery and touch on the healing process.

The following articles describe our most recent launches: The Pediatric Obesity Program, the Center for Intestinal Rehabilitation and Transplantation, the Endocrine Surgery Center, the Wound Healing Program, and the Center for Prenatal Pediatrics.

■ Obesity Surgery for Adolescents

What techniques work best for teens?

With obesity reaching epidemic proportions, Columbia physicians are devising new strategies to help younger patients. An ambitious Pediatric Obesity Program at the Morgan Stanley Children's Hospital of NewYork-Presbyterian is helping to set new standards of care in this evolving field.

Most young patients come to the Pediatric Obesity Program for treatment of diabetes, heart problems, bone loss or other complications associated with their weight. Like the adults who receive treatment in Columbia's adult obesity center, adolescent patients undergo rigorous education and benefit from a lengthy program of multidisciplinary, non-surgical therapies. Nevertheless, eighty-seven percent of adolescents with a body mass index (BMI) over 40 are unable to achieve or maintain adequate weight loss despite intensive medical regimens, according to Marc Bessler, MD, Director of The Center for Obesity Surgery. To help these patients, the program offers the LAP-BAND®, the safest and least aggressive surgical procedure. The LAP-BAND® is completely reversible, it does not reroute patients' digestive anatomy, and the operation is minimally invasive.

Researchers also focus on the special needs of this patient group. "There are important differences between adult and adolescent patients, such as the proportion of body fat, metabolic rates, and growing bones. We also consider any problems related to smoking or carrying around the extra weight," explains Jeffrey L. Zitsman, MD, Director of Minimal Access Surgery at Morgan Stanley Children's Hospital of NewYork-Presbyterian. "We still have much to learn about how to treat the younger patient."

The program will conduct a comprehensive, long-term study of the effects of bariatric surgery in the pediatric population. "We are one of leading centers in a multi-center trial sponsored by the American Pediatric Surgical Association, and part of a consortium of major children's hospitals conducting careful study of bariatric surgery in adolescents," adds Bessler.

The Department of Surgery's multidisciplinary program for adolescent weight management includes experts in pediatric gastroenterology, endocrinology, nutrition, psychiatry, diabetes, surgery, and other specialties.

■ One-Stop Care for Endocrine Problems

Goal is evaluation and diagnosis in a single day

The Endocrine Surgery Center, soon to be launched by William Inabnet, MD, will provide one-stop care for patients with diseases of the endocrine system, utilizing a multidisciplinary team to treat disorders of the adrenal, pancreas, parathyroid and thyroid glands. Its staff will offer a full range of tests and evalua-

Columbia surgeons perform a laparoscopic left adrenalectomy.

tive procedures and provide minimally invasive solutions to a wide range of problems.

"Our goal is to evaluate and diagnose the patient in a single day," says Inabnet.

"We will focus on early detection of these disorders and the most advanced surgical techniques available. Whenever possible, we will employ minimally invasive thyroid and parathyroid surgery, as well as laparoscopic adrenal and pancreatic surgery. This approach has the potential for minimal scarring and dramatically reduced recovery times, and allows people to return more quickly to their normal activities."

The program will bring together experts in the classification and treatment of endocrine disorders, including experienced endocrinologists, surgeons, surgical nurses, radiologists, pathologists and ophthalmologists. It will also sponsor an extensive program of clinical and basic research and provide ongoing physician education in this emerging field.

The Endocrine Surgery Center will be among the first in the nation to use pancreatic assays to address insulin-producing tumors to determine the amount of tissue surgeons need to remove during pancreatic resection.

Columbia surgeons have already introduced intraoperative hormone monitoring for the parathyroid. "We are now able to measure these levels during surgery to determine whether the patients have been cured before they leave the O.R.," notes Inabnet who, with his colleagues, performs over 200 parathyroid operations each year.

The team has also begun assembling long-term follow-up data on patients who undergo this surgery.

"Our goal is to compare the long-term cure rate of those who have had the minimally invasive approach with intraoperative PTH monitoring and those who had have the conventional bilateral, four-gland exploration," Inabnet says.

Intestinal graft

Whole liver and intestinal graft

Reduced liver and intestinal graft

Surgical procedures such as Serial Transverse Enteroplasty (STEP) can lengthen the bowel in some patients with short bowel syndrome. As a last resort, segments of small bowel may be transplanted as well (above).

Surgery for Struggling Newborns

Columbia surgeons are making considerable advances in a new area of transplantation involving the small intestine. Many patients in need of such intervention are children. These young patients can now receive state-of-the art care at Columbia's Center for Intestinal Rehabilitation and Transplantation.

Intestinal failure occurs when newborns lose a large segment of the intestine. Infants may be born without the full intestine, suffer from inflammatory conditions such as necrotizing enterocolitis, or develop a twist in the intestine (volvulus) leading to its loss.

"Some of these children are left with a critical reduction in small intestinal surface area and are therefore unable to absorb the nutrients and fluids necessary for growth," says Robert Cowles, MD, a pediatric surgeon who directs the Center with Dominique Jan, MD, an intestinal transplant surgeon, and Leslie Smith, MD a pediatric gastroenterologist. "We provide these children with intravenous nutrition and outpatient support and try to buy some time so their intestine can adapt. But some of them will require transplants."

Columbia provides the most comprehensive care available for these patients. The Center's multidisciplinary team also includes a neonatologist, infectious disease specialist and nutritionist, as well as nurses and social workers.

Researchers are currently studying the effectiveness of the STEP procedure (Serial Transverse EnteroPlasty) used to lengthen the intestine. "The intestine is cut in such a way that it folds up almost like an accordion," says Cowles. "It's like taking a straight race track and then turning it into a zigzag course. In the end, the aggregate distance is longer. We accomplish this with a surgical stapling device that is very easy to use. Earlier methods required the surgeon to almost split the bowel in half. You'd take one tube, divide it down the middle longitudinally, and in so doing, you'd run risk of damaging the blood supply to the intestine and losing it altogether. With this new method, we hope there will be fewer complications."

Cowles and his colleagues are also collaborating with basic scientists at Columbia to determine how well the intestine functions after the STEP procedure.

This multidisciplinary team also works closely with Columbia's renowned Center for Liver Disease and Transplantation to treat patients with decompensated liver function associated with long-term intestinal failure.

■ Help for Complex Pregnancies

A premier center for diagnosis and treatment

Parents-to-be who are worried about birth defects can now find out exactly what's happening to their babies in the weeks before delivery. Some are relieved to learn there's nothing wrong and they can proceed with a normal birth. Others will need help from a wide range of medical disciplines in the weeks ahead. The Center for Prenatal Pediatrics at Morgan Stanley Children's Hospital of NewYork-Presbyterian opened in January 2004 with the aid of a March of Dimes Community Grant and now offers a wide range of prenatal testing, specialty consultations, and pregnancy management. It also has a world-class team of pediatric and surgical experts who address major structural abnormalities at the time of birth.

"We are one of several centers in the country with the capacity to handle these difficult problems, taking care of both the mother and the baby," says Lynn Simpson, MD, Medical Director of the program who works closely with Charles Stolar, MD, Chief of the Division of Pediatric Surgery, as well as senior representatives from pediatric cardiology, neonatology, and genetics. The Center brings together leading specialists in a variety of departments to assure families the best possible outcome. "Our goal is to offer comprehensive evaluation in a single day," says Simpson, "and provide the finest follow-up care."

Today, one third to one half of all infants requiring surgery for congenital defects are diagnosed in the weeks before birth. This allows surgeons to prepare for rigorous procedures that can save a baby's life. "Twenty years ago we saw only diaphragmatic hernias. These are abnormal openings in the diaphragm that allow part of the abdominal organs to migrate into the chest cavity," says Stolar. "Now we can identify at least fifteen other conditions needing immediate surgical repair."

The most common problem is congenital heart disease, followed by abnormalities of the chest and abdomen.The Center combines in utero diagnosis, pediatric surgery, and pediatric subspecialties to treat a wide range of conditions, diagnosing some as early as the 13th week of pregnancy. These include abdominal wall defects, diaphragmatic hernia, gastroschisis, omphalocele, duodenal obstructions, lung masses, kidney abnormalities and tumors.

About 75 percent of all infants evaluated at the Center require surgery, according to Stolar. "This is a stressful time for prospective parents," he adds, "but these families have more confidence knowing they've come to an institution with the resources to manage these unusual challenges."

Morgan Stanley Children's Hospital has been designated by New York state as a Regional Perinatal Center with the ability to address high-risk cases. It has one of the most experienced obstetric teams in the nation, and the largest pediatric cardiac service in the New York area. It is also a pioneer in the use of Extracorporeal Membrane Oxygenation (ECMO), a "biomedical placenta" that reproduces the functions of the heart and lungs. (The baby's blood is oxygenated outside his body then the infant makes a gradual transition to breathing air.) This ECMO program was the third in the nation to successfully support a neonate and the first to use ECMO for bridge to transplant.

Charles Stolar, MD, amuses a young patient. The staff at the Center for Prenatal Pediatrics, offers highly personalized, integrated care for a wide range of conditions.

In a recent week, experts at the Center cared for two infants who had a great deal of difficulty coming into this world. Each child had a congenital diaphragmatic hernia as well as a heart defect. "Had these children been delivered at a local hospital, they wouldn't be alive today," Stolar says. "The obstetricians made a very accurate prenatal diagnosis. After delivery the infants were stabilized on a special heart-lung machine that oxygenates the baby's blood. We were able to address these complex conditions and now expect these infants to grow up to be teenagers and more."

"What makes us unique is our highly personalized and integrated approach," adds Simpson. "We have a case coordinator who helps families to prepare — medically and emotionally — for a high-risk delivery. Our physicians and surgeons also have a long history of collaborating on these difficult cases." In addition, the Center offers genetic testing and advises women and their families about their risks of having children with congenital abnormalities.

Harold Brem, MD, explains a new "smart card" that gives the history of a wound and charts its healing rate.

■ **Healing Stubborn Wounds** New program aids chronic sufferers

The tale of the Fisher King is about an aging monarch who suffers from a wound that will not heal. The king is finally cured when a wise knight arrives at court and asks about the nature of his injury.

This myth has a dramatic parallel today. In the United States, five million people suffer from untreated wounds, ranging from bedsores to diabetic and venous ulcers, with health care costs totaling $25 billion dollars.

"Many physicians have been taught that a percentage of these wounds will not respond to treatment," says Harold Brem, MD, Director of the Department of Surgery's new Wound Healing Program. "It's time to challenge that assumption."

Like the wise knight in the tale of the Fisher King, Brem and his team have been asking the right questions. Their work has produced new insights into the healing process and new standards in patient care. "In the last few years, we've made important inroads," says Brem. "We now know that with the proper care, nearly every wound will decrease in size, no matter what else is occurring with the patient."

Columbia has assembled a multidisciplinary group to explore the etiology of wounds. The Wound Healing Program is the only one of its kind in the nation, embracing 29 different specialties, including nutrition, emergency room medicine, diabetology, rehabilitation, geriatrics, pain management, anesthesia, vascular, general orthopedic and plastic surgery, dermatology, nursing and social work, as well as basic science. In the following interview, Brem describes their wide-ranging mission.

Why are some wounds so difficult to treat?
People with stubborn wounds are often elderly, disabled or diabetic. But little is known about how these conditions affect a patient's ability to heal. We don't understand for example, how glycemic control affects healing rates. Our goal has been to establish a scientific basis for all our treatment decisions and to understand the overall mechanism of the healing process.

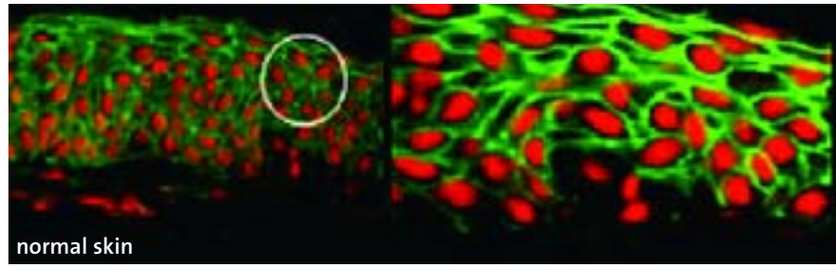
How did you begin?
My work started in the laboratory at Harvard working under the direction of Judah Folkman in the 1980s. Dr. Folkman is a genius and a compassionate man. I was studying blood vessel inhibitors, known as angiogenesis inhibitors, when he assigned me the task of determining if these inhibitors affected wound healing. I soon realized that this kind of healing was a beautiful biologic process.

What are your main projects now?
At Columbia we have launched a multidisciplinary study of wound healing with an emphasis on nutrition and glycemic control, pressure relief, and off-loading techniques such as orthotics. We are also leading a multi-center clinical trial that focuses on decreasing amputation rates and eliminating stage IV pressure ulcers. We routinely utilize tissue engineered products and recombinant growth factors approved by the Food and Drug Administration. Our goals are simple: to heal more wounds faster.

What is your program's greatest strength?
The Wound Healing Program is known for its treatment of diabetic foot ulcers, pressure ulcers, vein ulcers, and ischemic ulcers. In the past year, we have developed new statistical methods for assessing outcomes related to these wounds. Our greatest strength is our dedicated staff whose primary mission is to help those who are elderly, disabled, and suffering from diabetes.

We have found that nearly every person with a diabetic foot ulcer who has good blood supply can heal in less than a year. And we believe that every bedsore can be healed before it develops into a bone ulcer. Early detection halts progression.

Diabetics often face amputation of their feet and toes in order to remove their ulcers. What can be done to prevent this?
Everyone agrees that the rate of amputations is unacceptably high. A majority of these surgeries can be avoided simply by using available FDA approved therapies. We can address these patients with a stent, a growth factor, cell therapy and an antibiotic. But we've found that the key to success is to combine these treatments and give them simultaneously, not sequentially. Our patients receive the very latest of all these therapies upon presentation and then make significant progress. And all are fitted with special orthotics from the start.



Columbia has been extremely successful in treating venous ulcers, common in the elderly. How have you achieved such good results?
Venous ulcers don't result in limb amputation or death, but they do bring terrible pain and suffering. Up until a few years ago, we had no FDA approved treatment, though there are probably close to a million cases a year. Most medical professionals were trained to believe that there was nothing to be done for these patients.

This year, we presented a report at the 2005 Annual Symposium on Advanced

Wound Care in San Diego asserting that these wounds should heal if therapy is given early enough. We have found that using the current approved therapies (human cell therapy with keratinocytes and fibroblasts) 78 percent of these wounds will heal — even the very worst cases. This is an advance over the 19 percent cited in the current literature without this therapy. The bottom line is that nearly all venous ulcers can be eradicated in less than a year.

The passing of actor Christopher Reeve has shown us that even with the best of care, patients can still die from wound sepsis. What is your response to that?

This very public case called our attention to the need to treat wounds based on protocol. Until a wound heals completely, there is always a danger of infection or sepsis. Surgical debridement is needed to remove the locally contaminating bacteria and stimulate healing in most patients with a non-healing wound. At Columbia, we approach wound healing with the same rigor that is brought to open-heart surgery, combining insights from basic science with new surgical techniques. We have specialists who make every effort to keep our patients pain free, and we also employ the latest techniques to promote bone and skin healing.

At the Allen Pavilion, we have 17 people — surgeons, nurses, physician assistants, medical assistants, surgery residents and students who assist in the care of these patients 24/7.

You have also made advances in patient care by creating new information technology.

We developed an electronic medical record that shows all information pertaining to the progress of the wound and the patient's overall health. This is a "smart wound card" that gives physicians access to a patient's drug regimen and can decrease medication errors. We can also see results of x-rays, cultures, pathology reports, arterial inflow and venous reflux and can tell what bacteria is in the wound. We can view this data at a glance on a computer screen or a piece of paper. The program also gives us a picture of the wound and a graph that shows the healing rate.

The Wound Healing Program has an ambitious research portfolio. What are your main areas of interest?

We're investigating the first gene found in wound patients that stops wounds from healing. The gene was identified from some of our patients and isolated by our collaborator, microbiologist Marjana Tomic. If we can target that gene and start treatment before a massive ulcer develops, then many of the stubborn wounds we see today will be a thing of the past.

In addition, we are looking at proteins that are known to stimulate healing. The problem is that the particular proteins that can make a wound heal faster often get destroyed within the wound. We are currently designing a gene-and polymer-based therapy with a sustained-release delivery system that will hopefully keep the wound stimulated for days, or even weeks at a time. We are closely collaborating with Robert Langer at MIT and Savio Woo at Mount Sinai on these approaches.

We also have a strong interest in developing surgical aids to wound closure that are biodegradable. Instead of the artificial mesh used in hernia surgery, we'd like to use a collagen product that has the necessary strength and also contains a biological agent to promote wound healing internally.

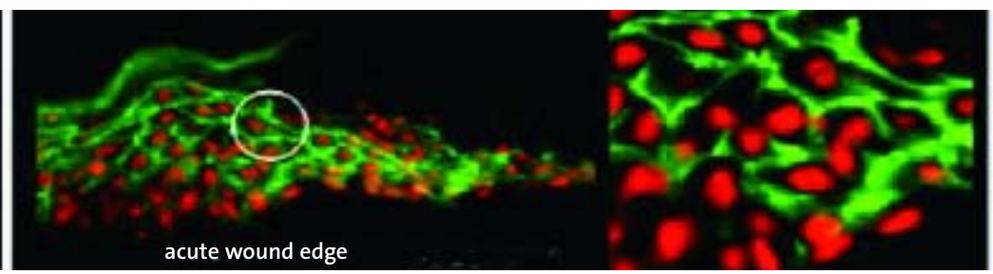
Another line of investigation involves cosmetics that can actually stimulate the healing of the skin. A recent article in the *New York Times* notes that in five to ten years, growth factors in wound healing will be applied to these products. We hope to contribute to this new approach.

We've also been pretty busy writing up our research projects. Since the Wound Healing Program was launched in 2004, we've completed over 11 peer-reviewed articles, with support from the National Institutes of Health and the American Diabetes Administration.

What is your vision of the future?

I'd like to build a hospital at Columbia that focuses on the needs of the elderly, the disabled and the diabetic. Our nation has no hospital of this kind, but we have begun to remedy that. In July 2005 Columbia launched the first dedicated in-patient unit providing comprehensive surgical wound care for this patient group.

Education is also extremely important. The more physicians we can train, the more we can improve the patients' quality of life. We have launched a CME program in wound healing offering seminars in seven different cities and offer a weekly preceptorship for nurses and surgeons and physicians. Through education, research and integrated clinical care, we hope to eliminate amputations, morbidity and mortality associated with non-healing wounds.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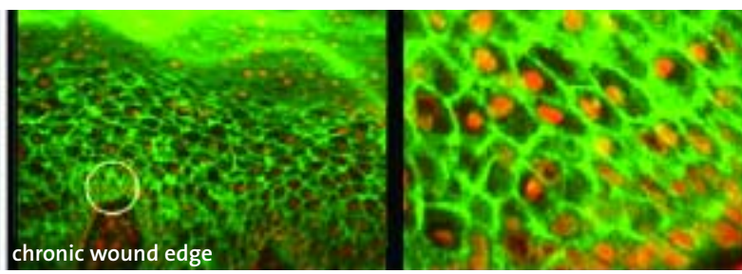
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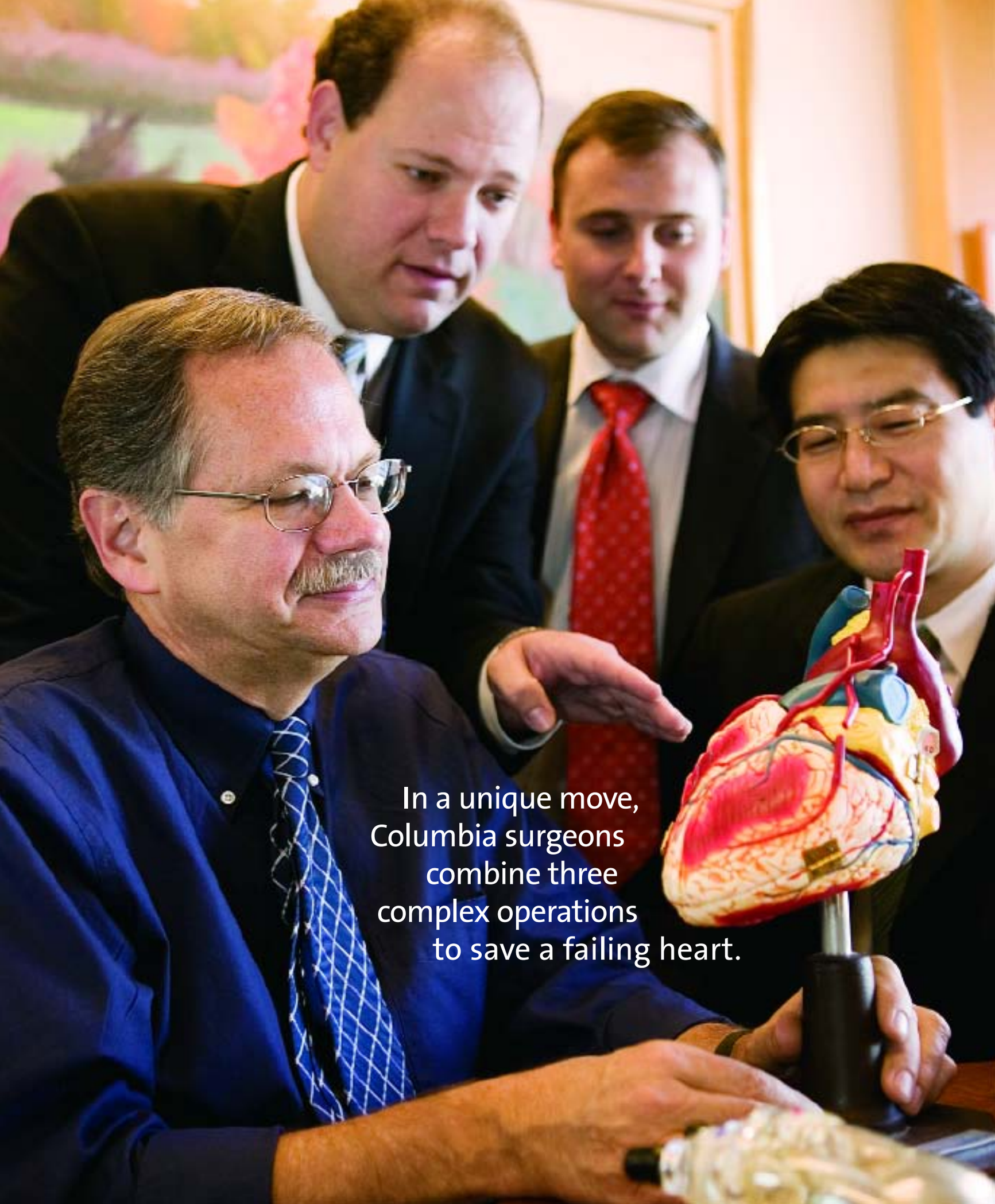

In a unique move,
Columbia surgeons
combine three
complex operations
to save a failing heart.

Delivering Innovation

ALLAN STEWART heads "The Dream Team"

The future was looking grim for Frank Stauffer, a dynamic, 55 year-old manager at Jet Blue, who suffered a sudden, massive heart attack on July 4, 2004. Stauffer was rushed to Weill Cornell Medical Center where he received CPR. The Cath Lab reported a totally occluded right coronary artery and a significant narrowing of the left. Cardiologist Jane Farr, MD, managed to resuscitate him then rushed him by ambulance to New-York Presbyterian Hospital where he was greeted by a team of specialists.

"When he came to us, Frank Stauffer was in pretty rough shape. He was on a massive amounts of medication, including high dose pressors to keep his blood pressure up and inotropic agents to support his heart," says Allan Stewart, MD, Director of the Aortic Surgery Program. "We knew he wouldn't survive with medical management alone."

To stabilize the patient, Stewart and Michael Argenziano, MD, immediately installed an ABIOMED BiVad, two separate devices about the size of a fist that would take over much of the pumping of the patient's struggling heart.

"Since Stauffer's left heart wasn't functioning at all and his right heart was working very poorly, we put in both an RVAD (right ventricular assist device) and an LVAD (left ventricular assist device)," Stewart adds. "The devices sit outside of the body, and are connected to the heart through cannulas inserted through the chest." This surgery took place on July 9, and was completed in four hours.

By July 15, blood had pooled around the patient's heart and Stewart had to operate again. "I realized immediately that it would be impossible to stop the bleeding with the LVAD still in place. Since the left side of the heart appeared to be much stronger I made the decision to explant the LVAD and leave the patient with only right ventricle support."

Alarmed by the internal bleeding, Stauffer's family were preparing for the worst. "It's going to be all right," Stewart reassured them just before going into the O.R. "He's young and he's in good condition, and we can deal with this."

The VAD is like per diem help, Stewart explained. "It takes all the blood out of the heart, so it can pump with less resistance and gradually recover. Then as time goes on, you slowly reduce the contribution of the VAD. If heart can do the work then you can get rid of the device."

The second surgery was successful and Stauffer continued to improve. But there was still the underlying problem of his severe coronary artery disease. On July 29, Stewart brought in Yoshifumi Naka, MD, PhD, Director of Cardiac Transplantation and Mechanical Circulatory Support Programs at NewYork-Presbyterian, to help with the next surgery. He also made a novel proposition. "I want to correct the coronary disease then see if the patient's own heart recovers. If it does, we may be able to take out the RVAD as well."

Stewart then added another interesting twist: Why not perform the coronary bypass with VAD support? That way they would avoid placing the patient on a heart-lung machine.

"The operation was highly unusual," says Stewart, "We called it a VAD-CAB (for VAD supported coronary artery bypass). The patient's VAD was in place and functioning well so that we could afford to use it in this way."

This third and final procedure took three hours and significantly improved blood flow to the patient's heart. Stewart and Naka were able to remove the RVAD and Frank Stauffer now relies completely on his native heart. He has gone back to work full-time, and regularly commutes to New York from his home in Brandywine Valley of Pennsylvania. The Stauffer family now refers to the Columbia surgeons as "The Dream Team" for their extraordinary accomplishment.

Stewart, who specializes in high-risk cases, says, "This is the kind of practice I've always wanted. High-risk patients can turn around very quickly and it's gratifying to see someone who's been on the edge regain his hope. A lot depends upon your creativity in the O.R."

After installing the ABIOMED BiVAD, the surgical team performed a VAD-CAB to improve blood flow to the patient's heart. In this photo, two retractors stabilize the beating heart that is now supported by the VAD. The surgeons performed an anastomosis of the left internal mammary artery to the left anterior descending artery then removed the VAD.

(Opposite) Frank Stauffer, seated at left, meets with Columbia's "Dream Team:" Michael Argenziano, MD, Allan Stewart, MD, and Yoshifumi Naka, MD, PhD.

JEFFREY ASCHERMAN'S mission to China

This is the story of a humanitarian mission to China that gave new hope to a facially deformed eight-year-old boy. Ren Wei was born with a congenital cleft that created a gaping hole in the center of his face. When he was three, his parents vanished during a flood and he was sent to an orphanage.

At age seven he went to school for the first time, wearing a bandage over the hole, and endured the teasing of his classmates. What Ren Wei wanted most was an easy comraderie with others and a sense that he belonged.

Jeffrey Ascherman, MD, Assistant Professor of Surgery at Columbia University College of Physicians and Surgeons, promised to make that dream come true when he met Ren Wei in China in April 2002. Since 1999 Ascherman, a specialist in plastic and craniofacial surgery, has traveled to remote towns in China, working with orphanage hospitals to reconstruct facial malformations and birth defects such as cleft lips and palates. He and his colleagues at Columbia donate ten days a year to an organization called The Children of China Pediatrics Foundation.

"We take everything with us, from anesthesia machines to sutures," says Ascherman. "We bring a full team of doctors, nurses, nurse practitioners, medical assistants, and bio-technicians. At least 15 to 20 of us volunteer for this mission every year."

When Ascherman and his team met Ren Wei, they were impressed by his resilient spirit and wanted to begin work immediately. The complexity of the facial reconstruction, however, required the kind of complex surgery and intensive post-op care not easily found in China. So the physicians launched a long and arduous campaign to bring the boy to the Morgan Stanley Children's Hospital of NewYork-Presbyterian and treat him free of charge.

Fifteen months later, Ren Wei safely arrived in New York City accompanied by two Chinese doctors —Wei Qi Li, a plastic surgeon, and Yong Yun Lian, an orthopedic surgeon — who wished to study the latest reconstructive techniques.

Ascherman planned to restructure key bones around Ren Wei's eyes and then manipulate tissue and cartilage to repair the cleft and create a nose. "Facial clefts are rare. Ren Wei had double the normal distance between his eyes, and he was missing the left side of his nose," Ascherman explains. "The reconstruction posed many potential risks, including blindness, brain injury, major blood loss and meningitis."

On July 28, 2003, Ren Wei underwent the first of three operations and remained in the O.R. for twelve hours. "I moved his left eye approximately two centimeters toward his midline. Then I had to replace the hole on the left side of his face with a nose. I constructed the inside of the nose with the mucosa already lining the hole. Next I used septal and ear cartilage to create the basic nasal structure. Finally, I brought a flap of tissue down from his forehead to provide the covering skin," says Ascherman. The surgery also involved cutting bone around Ren Wei's brain. Neil Feldstein, MD, a neurosurgeon, assisted during this portion of the surgery.

The remaining two operations took nearly two hours each and were performed as outpatient procedures. During the second surgery on August 18, Ascherman refined the shape of the nose and added more cartilage to its frame. The new nasal skin was still connected to Ren Wei's upper forehead, a temporary measure that kept the flap alive. The connection was severed in the second operation on September 8. By then, the nasal skin had developed its own blood supply.

Ascherman helps children with facial deformities and birth defects.

Ren Wei is now a very popular boy of eleven. His scars have faded, and an American family has offered to adopt him. Yet in the process of obtaining the proper clearance for the boy to emigrate, the Chinese government located Ren Wei's mother who survived the flood. Soon the two may be reunited.

"I was happy to give Ren Wei a better quality of life," Ascherman says. "My goal is to always push the limits of what we can safely achieve. In Ren Wei's case, we succeeded, thanks to his own bright spirit, and the help of many different people."

"Surgeons going abroad on humanitarian missions want do as many operations as possible," says Deborah Carson, RN, MPH, Nurse Coordinator of the Cranio-facial and Cleft Team at NewYork-Presbyterian Hospital. "In the limited time they have, they're always faced with the challenge, 'Do we help the patients or help build the infrastructure?' The surgeons in these countries are eager to learn, but there's only so much you can teach in a week's time. The beauty of this case is that the team achieved both goals. Drs. Li and Lian will now be able to change the lives of hundreds of Chinese children."

JONATHAN CHEN helps young heart patients in Cambodia

In February 2005 a group of American heart surgeons traveled to Phnom Penh, Cambodia, to perform pediatric cardiac surgery. This mission, the first of its kind from the U.S., was sponsored by the Surgeons of Hope Foundation, Inc. and its partner, Gift of Life International. Jonathan M. Chen, MD, Assistant Professor of Surgery at Columbia University College of Physicians and Surgeons, led a team of doctors and nurses from NewYork-Presbyterian Hospital.

After a grueling 30-hour trip, they arrived at the Phnom Penh Heart Center (PPHC), a four-year-old, cardiac hospital founded by the French foundation La Chaine de l'Espoir, the organization that started Surgeons of Hope. In addition to Chen, the team included William E. Hellenbrand, MD, a pediatric cardiac catheterization specialist, and Charles S. Kleinman, MD, a pediatric echocardiography specialist. The group took on 23 cases in five days, with Chen operating on nine children. The procedures were performed in The Children's Pavilion, the two-year-old pediatric unit of PPHC, which serves more than 240 Cambodian children a year at no cost to their families.

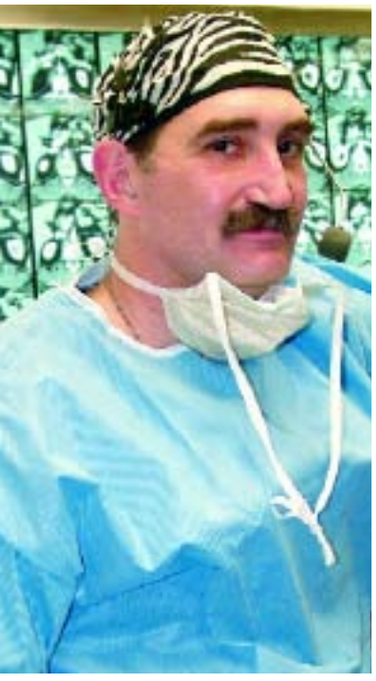
Surgeons of Hope estimates that 100,000 children in Cambodia suffer from heart disease, and one-tenth of those are in urgent need of critical cardiac surgery. Working on a very tight schedule, Chen and his colleagues immediately set about prioritizing cases. First, they identified those children who would benefit most from a single procedure. Next, they identified the cases they believed might become inoperable within several months—before an additional team of European physicians would arrive. Finally, they determined which operations had a low enough risk that proper follow-up care could be administered, and straightforward enough that they could be replicated by the Center's own surgeons.

One of the operations Chen performed was a complete repair of a congenital heart condition called tetralogy of Fallot. Babies with this condition are born with a hole between the left and right side of the heart and an obstruction of blood flow to the lungs, impairing the ability of the heart to deliver oxygenated blood to the body. Open-heart surgery is required to seal the hole. Chen also operated upon a child with a subaortic membrane, an area of fibrous tissue below the aortic valve that obstructs the flow of blood. The surgical repair for this condition requires stopping the heart, opening the aorta and removing the tissue.

In addition to heart surgery, the team performed several cardiac catheterization procedures. According to Chen, "The local medical staff had never seen this done. It's a whole new era. Today we can do a lot with catheterization that spares kids from open-heart surgery."

The pediatric patients, ranging in age from one to 16, came from all over Cambodia; some were referred from smaller satellite clinics where earlier diagnoses had been made. Chen reports that the working conditions were quite good, and the 50-bed facility was well designed and well equipped. The team plans to return to Phnom Penh next year for another week of patient care and physician training.

Chen was the first to demonstrate cardiac catheterizations for Cambodian physicians.



LLOYD RATNER pioneers the two-way kidney swap

On April 21, 2005, a team of Columbia surgeons completed a two-way kidney swap, enabling two patients with incompatible donors to receive routine transplants and say goodbye to troublesome dialysis. Rosalind Dorlen, a clinical psychologist from New Jersey, gave her kidney to Thomas Packard, a senior vice president at a Manhattan brokerage firm. Packard's partner, Ann Heavner, a former financial research packager who read about the kidney exchange in the *Wall Street Journal*, gave her kidney to Dorlen's husband Dave, a retired businessman.

The exchange was so successful that the couples plan to start a support group for kidney donors. "We want to get the message out to donors that the swap is safe and easy," says Rosalind Dorlen, who treats critically ill patients in her psychology practice and is writing a book about resilience during a health crisis.

"Columbia is one of the few places in the nation with the resources to field four operations at a time," says Lloyd Ratner, MD, Surgical Director of the Renal Transplant Program at NewYork-Presbyterian/Columbia. Ratner pioneered the two-way kidney swap while he was at Johns Hopkins. He then brought the capacity for paired-exchange to Columbia and has performed multiple exchanges in 2005. "The beauty of this approach is that by simply working out the logistics, we can give people straightforward transplants, with excellent results," he adds.

Without a system of matching donors, these two men had only one other alternative: plasmapheresis, a blood purification process, to remove harmful antibodies that create incompatibilities between donors and recipients. "While successful, the plasmapheresis protocol requires more anti-rejection medications," Ratner reports, "and it has a higher risk of complications."

Both Tom Packard and Dave Dorlen had been through tiring sessions of dialysis and were relieved when Columbia's Renal Transplant Coordinator Joan Kelly called to say, "We've got a match."

At 8 AM, the donors were wheeled into surgery, and by noon, Marc Bessler, MD, had removed Rosalind Dorlen's kidney. It took Ratner a bit longer to free Ann Heavner's because it had a second artery attached. "About fifteen percent of our patients have two arteries," says Ratner. "Her portion of the transplant was still routine, it just took a little more time." There was just time enough for the O.R. team to move from a hip-hop CD through "The Three Tenors." Heavner was in recovery by 1:45 PM.

In two adjacent operating rooms, Mark Hardy, MD, and Roman Nowygrod, MD, prepared the recipients. As soon as the donor kidneys arrived, the surgeons began to connect the blood vessels. John Birkhoff, MD, the transplant urologist, hooked up the new kidneys with the bladder, and by 4 PM, the transplants were complete.

The Monday after surgery, the two couples met for the first time. It was an emotionally powerful moment. Tom put his arm around Roz and said, "Thank you for the gift of life." A grateful Roz invited Tom and Ann to her house for Thanksgiving. And in the weeks ahead, the two couples began to talk about a support network for people participating in live donor exchange.

There is an urgent need for donors, according to Kelly. "We hear from 50 people a month who need transplants. Often family members do not realize they can be donors. The procedure is now minimally invasive. Most donors are discharged in two days and are able to resume normal activities within two weeks."

"The operation is a miracle," says Ann. "It's taking the men a bit longer to recuperate, but it has given them a new lease on life."

Soon after his surgery, Tom Packard was joking with his colleagues, "You have to understand, I'm brighter now. The woman who gave me her kidney has a PhD."

Packard has raised significant funds for Columbia University in the past and is currently dedicating his energy to the swap program to support a donor bank, patient education, and expansion of the facilities at Columbia University Medical Center.

"Columbia is one of the few places in the nation with the resources for the two-way kidney swap."

Expanding transplant criteria to save lives

In 2002 Columbia expanded its donor pool in an effort to help hundreds of people in the New York area who are waiting for heart, liver, lung and kidney transplants.

HEART: Roughly 200 patients in the New York area are now on the waiting list for a heart transplant, and about 20 percent will die before they find a donor. "Many more will die before they make it to the list," adds Yoshifumi Naka, MD, PhD, Director of the Cardiac Transplantation Program. "Now more of these patients will have an opportunity for a transplant."

The expanded donor policy will significantly benefit people over 65, says Naka, as well as individuals with significant medical conditions that preclude them from joining the regular transplant waiting list.

"To help our older patients, we no longer need to look for the perfect heart," Naka says. " Instead we might use a nineteen-year-old heart that was damaged at the time of the donor's death but will recover once it has been transplanted. We refer to this as an alternative risk transplant."

After one year, regular transplant patients have a 90 percent survival rate, while those with alternative risk transplants have a 75 percent to 80 percent survival rate. "Individuals with end-stage heart disease or heart failure have a one-year survival rate of less than 25 per cent," says Naka. "The alternative risk transplant gives them a much better chance."

Outcomes are even better for those receiving livers and lungs from expanded donors. In fact, patients in this category fare as well as those receiving standard transplants. And there are even more individuals in these categories who are anxiously awaiting organs.

LIVER: In the New York Area, there are about seven people on the waiting list for every available liver. In 2005, 2,127 individuals needed transplants but there were only 320 available organs, according John F. Renz, MD, Assistant Professor of Surgery Columbia University College of Physicians and Surgeons. "We have one of the longest wait lists in the country," says Renz. "Half the people will die while waiting for a transplant unless we can find new ways of increasing the donor pool. The expanded donor approach is an important step forward."

Standard liver donors must be under 65, with no history of diabetes, renal failure, Hepatitis B or C or past narcotic use. They must also be tumor-free. With the expanded donor criteria, a selected patient might receive a liver from an 80 year-old man, or from a 40-year-old who was treated for Hepatitis C.

The good news is there is no difference in the one-year survival for standard and expanded donor transplants. The one-year survival rate for patients receiving standard livers is 84 percent; for expanded donors it is 83 percent. At the three-year mark, survival rates are 76 percent for both groups.

"In general, our expanded donor recipients are healthier," says Renz. "While there may be a slightly higher incidence of problems with the organ, we usually chose patients for this program who have good physiological reserves." The median length of stay for patients with expanded donor livers is eleven days. For those with standard donors, it is fifteen days.

LUNG: Individuals awaiting lung transplants can also benefit from this new approach. These patients are placed on a national waiting list, says Joshua R. Sonett, MD, Director of the Lung Transplant Program at NewYork-Presbyterian Hospital/Columbia University Medical Center. There are approximately 1,000 lung transplants performed each year, with over 3,000 patients on the list.

"At Columbia, we've been aggressively trying to expand the donor pool. Between 2001 and 2003, 53 percent of the lungs we transplanted were from extended donors," says Sonett. "There is no difference in outcomes for these individuals. All our transplant patients have a 90 percent survival rate after one year." That's significantly higher than the national average of 78 percent.

Expanded donor lung transplants may come from patients diagnosed with a minor lung infection, those with a minor smoking history, and those whose lungs were healthy, but did not have optimal oxygenation. "Over 90 percent of our patients who receive these organs say their quality of life is excellent," reports Sonett.

KIDNEYS: End-stage kidney disease has been steadily increasing and is expected to affect nearly 700,000 Americans in the next five years. "We have an urgent need to increase the number of donor organs," says Lloyd E. Ratner, MD, Surgical Director of the Renal Transplant Program. "Columbia is making significant progress in this direction. We now have a highly successful program that allows virtually all medically suitable individuals to donate kidneys," Ratner adds.

Previously it was impossible for a patient to receive a kidney from a donor with an incompatible blood type. "We are one of a handful of institutions in the world with protocols to remove anti-donor antibodies," says Ratner. "We are also researching the immunologic mechanisms that produce anti-donor antibodies."

The Columbia team employs a combination of approaches—plasmapheresis, immunosuppressant drugs and steroids, to abrogate positive cross-matches and blood group incompatibilities. This advance enables them to perform an increasing number of live donor transplants.

Long-term survival rates for patients receiving ABO (blood group) incompatible transplants are exactly the same as the survival rates for those receiving ABO compatible transplants, Ratner says. In addition, the two-way kidney swap allows surgeons to increase the donor pool by matching ABO compatible donors and recipients.

(Above) Yoshimumi Naka, MD, PhD and Mark Eisenberg, MD review a heart transplant case.

RESIDENT COREY MAGNELL helps reduce medical errors

For a two-year independent research program, resident Corey Magnell chose to focus on patient safety. Working with three departments at the College of Physicians and Surgeons, she contributed to the design of a Medical Error Reporting System that encourages voluntary reporting of near miss and patient-harm events in an effort to find any underlying patterns.

"The idea was not only to report high-profile adverse events," says Magnell, "but to make people aware they should be focusing on near misses so we can strengthen our safety net."

The tracking technology was created by Harold Kaplan, MD, Director of Transfusion Medicine at NewYork-Presbyterian Hospital/Columbia University Medical Center, and the International Center for Health Outcomes and Innovation Research (InCHOIR). The project was funded by a $9 million grant from the Agency for Healthcare Research and Quality.

"Our grant was twofold," says Magnell. "The clinical portion enabled us to look at the safety issues for the hospital. The research arm allowed us to perform meaningful statistical analysis of these events, to look at cost impact and epidemiology."

"Patient safety has recently come on the radar screen in medicine," says Annetine Gelijns, PhD, Co-director of InCHOIR with Alan Moskowitz, MD. "Our unique data base offers Columbia residents exciting opportunities in this emerging field. Residents now have a living laboratory to track the quality of care, and the opportunity to make immediate therapeutic improvements."

"MERS-TH (Medical Event Reporting System-Total Hospital) is an on-line, web-based reporting system that replaces the manual reporting system used by the hospital for state mandated reporting as well as the various individual departmental data collection efforts that have been in place for years," says Moskowitz.

> "The idea was to focus on near-misses and strengthen our safety net."

This medical event reporting system was introduced at NewYork-Presbyterian hospital over the past several months, starting in late August 2004. Since then, roughly 7000 near misses and actual patient-harm events have been reported.

The value of this program was clearly demonstrated in the hospital's pediatric service. On five occasions over several months, intravenous pumps had delivered the wrong amount of fluid and medications. Without the reporting system, these would have been treated as isolated events. Looking at the cluster of events, flagged by MERS-TH, administrators were able to identify the root of the problem and rapidly correct it. The hospital had been renting additional pumps, which should have been restricted to deliver milliliters per hour. However, these pumps could also be set to deliver milliliters per minute and on certain occasions, medical personnel were delivering infusions at 60 times the intended rate.

In the coming months, the Columbia team will assemble data from New York, Florida and California to analyze error codes on a statewide basis. "We want to see what patient groups are more vulnerable to these adverse events," says Magnell."For example, do they break down by age, race, gender or insurance coverage?"

The Columbia team is also introducing the MERS-TH system in the Netherlands, and to ensure widespread use, they are developing a business strategy to support the system.

What's next for Corey Magnell? "A fellowship in minimally invasive surgery, then I'm going to practice as a general surgeon," she says. "I'd like to incorporate these skills into my work, using real data, rather than anecdotes, to deal with perioperative complications."

SPENCER AMORY repairs a ruptured aneurysm

On a cold February morning, a college student named Melissa Ductan was headed to the gym when her heart started racing. Seconds later, she passed out. Melissa's father, who was driving her to the workout, rushed her to the Emergency Room at Allen Pavilion of NewYork-Presbyterian Hospital on Broadway and 220th Street.

By the time Melissa was admitted, she had regained consciousness and was complaining of abdominal pain and some distention, according to Spencer Amory, MD, Chief of the General Surgery Group. "In a nineteen year-old, it looked like we might be dealing with a ruptured ectopic pregnancy so we decided to explore her."

While Melissa was being prepped for surgery, she arrested in the holding area and CPR was initiated immediately. "Two second-year residents got central access, the nurses started chest compression, the anesthesiologist intubated her, and they got her back," says chief resident Catherine Boulay, MD.

Once Melissa was revived, the gynecologist took her into the operating room. It turned out that Melissa's fallopian tubes were normal but she was now bleeding profusely. Boulay and Juliette Park, MD, packed her abdomen, applying pressure to staunch the flow of blood. "Their prompt response made a difference," says Amory, who then stepped in and took charge of the case.

"Since the patient's tubes were normal, I thought the most likely diagnosis would be a ruptured splenic artery aneurysm," he explains. "The pool of blood obscured my vision, but I palpated and squeezed that artery and the bleeding stopped." The surgical team gave Melissa more blood and cleaned up her abdomen. After her blood pressure improved, they ligated the splenic artery.

There was still cause for concern, however. At this point Melissa's temperature was only 91 degrees and her blood wasn't clotting. "I didn't know if Melissa would recover her neurological function," Amory recalls. "I was also worried about infection and additional bleeding. But I was pleasantly surprised by her postoperative course."

In the recovery room, Melissa was concerned about a quiz she'd missed and wanted to know if she could do a make-up test. From that moment on she had a rapid recovery without any significant complications. Says Amory, "She's now back to being a healthy 19-year-old and is very glad to be alive."

At the weekly conference, several of the younger surgeons asked Amory, "What made you think this was a splenic artery aneurysm?"

"General surgeons are trained to think broadly," he replied, "so we combine the perspectives of gynecologists, colorectal surgeons, vascular surgeons and many other specialists. When a patient presents with an abdomen full of blood, we ask, 'Is the bleeding likely to be coming from the gastrointestinal tract, from a ruptured aneurysm or ectopic pregnancy or a liver hemangioma?'"

In saving Melissa, collaboration was important too. "Everyone pulled together to try to save this young woman," Amory notes. "When I walked into the operating room, about 15 people were working on her and others were running back and forth with blood for transfusions."

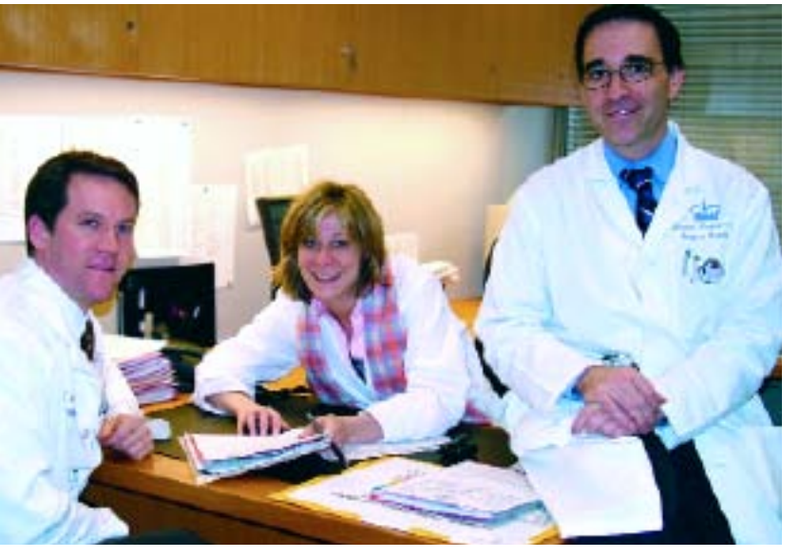
Melissa's mother, a clinical nurse at the Allen Pavilion, also played a key role. She knew something was terribly wrong and helped the E.R. staff expedite Melissa's transfer to the operating room.

"You train for this kind of emergency, then suddenly you are in it and the situation is changing every second," Boulay reflects. "Melissa had no vital signs that we could document for 15 minutes. We also had trouble controlling her blood pressure, and postoperative infections are common in situations like these. Yet she made the most miraculous recovery I have ever seen thanks to her youth and to the quick response of our O.R. team."

"Melissa had no vital signs for 15 minutes yet she made the most miraculous recovery I have ever seen thanks to her youth and to the quick response of our O.R. team."

GAIL DERAFFELE leads patients through clinical trials

"Cancer patients who have failed the standard therapies come to us looking for more options," says Gail DeRaffele, RN, Clinical Research Coordinator of the Tumor Immunotherapy Program at NewYork-Presbyterian Hospital/Columbia. "Most of them want to know if the treatment we are studying will interfere with their quality of life or allow them to stay active for a longer time."



Bret Taback, MD, Gail DeRaffele, RN and Howard Kaufman, MD.

"Patients want to know if the treatments under study will allow them to stay active longer."

"The good news is that our experimental cancer vaccines are well tolerated and have few side effects," DeRaffele adds.

The Tumor Immunotherapy Program is currently conducting 13 studies that focus on cancers of the skin, kidney, pancreas, colon and prostate. Patients learn about these trials from their physicians or through the National Cancer Institute.

DeRaffele interviews prospective participants to determine whether they meet the study requirements. If they do, she assembles the necessary documents, then coordinates preliminary testing and evaluation. "My job is to give patients a clear understanding of the rationale behind a particular clinical trial and help them make an informed decision about their treatment," she says.

"In general, we require that patients who enroll in our studies be in good health," DeRaffele adds. "Many of our melanoma patients have never been sick before and so they're scared and anxious about what lies ahead. We believe their participation will benefit others and that our research will lead to improved response rates."

Once the study begins, DeRaffele monitors their progress and plays an increasingly important role. "I'm here to support these individuals," she says. "That can mean holding a hand through several rounds of therapy or helping a family to secure the proper end-of-life support."

With one of several melanoma vaccines currently under study, Columbia investigators have been able to stabilize patients and ward off the progression of the disease. "The average lifespan for melanoma patients, without treatment, is six to nine months. We are still monitoring individuals who received the vaccine, three to six years later," DeRaffele reports.

In one case, investigators injected the vaccine into a patient's tumor and it disappeared completely. "During the vaccine portion of this treatment, this man remained stable and was able to travel and tend to his business," says DeRaffele. "Many of our melanoma patients continue to lead full lives."

In December 2004, DeRaffele began enrolling patients in a trial of a new vaccine for kidney cancer. "This is an important trial because chemotherapy hasn't proven very effective for this type of cancer," she says. "When I describe this study, I explain our two-pronged therapy."

Participants receive a combination of an experimental vaccine and Interleukin-2 (IL-2), a standard treatment for kidney cancer and melanoma. "The vaccine contains a protein called 5T4 that is found only on kidney tumor cells," DeRaffele notes. "We hope it will alert the immune system to respond and target those cells. IL-2 works more generally, boosting the white blood cell count, and may improve patients' overall response rates."

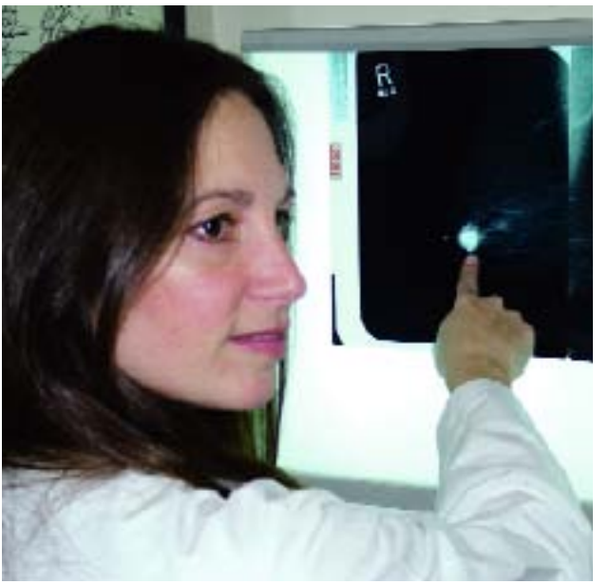
Response rates to IL-2 are low — in the range of 20 percent — but patients who stabilize or experience shrinkage of the tumor often reap the benefits 5 to 15 years after treatment.

DeRaffele recalls the case of a 34-year-old man who underwent emergency surgery to relieve an obstruction of the bowel. "He was diagnosed with metastatic melanoma and was so sick I didn't think he'd make it. We gave him IL-2 and he's disease-free today. Though he wasn't enrolled in a study, I use his case to illustrate how dramatic the IL-2 portion of our treatment can be."

Patients receive IL-2 treatments on the oncology floor at NewYork-Presbyterian/Columbia. Specially trained nurses administer this therapy in a relaxed setting, not in the Intensive Care Unit as is the custom at other institutions. Friends and family can visit during the cycle of treatment to provide support. "This treatment can be tough, but we do the best we can to make our patients comfortable," DeRaffele says.

DeRaffele currently monitors patients many of whom are participating in trials of new cancer vaccines and immunotherapies. "I love the science and enjoy writing protocols," she says, "but the most rewarding thing about translational research is helping patients every day."

LAURA KLEIN gives breast cancer patients a new cosmetic option



Thanks to a new discipline called oncoplastic surgery, breast cancer patients now have the option of lumpectomy with immediate local reconstruction. Oncoplastic surgery uses several techniques to obtain wide margins and also conserve the breast.

A key element in this approach is the local advancement flap, long used for breast reduction. With this technique the surgeon removes the cancer, then rotates the remaining tissue to reconstruct the breast. "This gives the woman an optimal appearance and leaves no indentations or defects," says Laura Klein, MD, Instructor in Clinical Surgery at Columbia University College of Physicians and Surgeons.

"Our goal is not only to remove the cancer but to keep the woman whole while she's moving toward her cure."

Klein is among a select group trained in the emerging field of oncoplastic surgery. "From the oncologic point of view, we need to take out as much tissue as possible to be sure we've solved the problem," she explains. "From the cosmetic point of view, we want take out as little tissue as possible in order to conserve the breast. Both aims can be achieved with this new approach."

Many women with B-sized breasts or smaller choose mastectomy over lumpectomy as breast cancer treatment because they feel this is their best cosmetic option. Reconstruction is achieved by a prosthetic breast implant or a TRAM-flap that uses a portion of the patient's own abdominal fat and muscle to create a new breast. Oncoplastic surgeons use a variety of creative incisions, along with the local advancement flap, to achieve similar cosmetic results.

With recent advances, patients requiring extensive surgery to remove their cancer may have immediate reconstruction. This cosmetic repair is usually performed by plastic surgeons at NewYork-Presbyterian.

Today Klein is able to offer women requiring more moderate surgery immediate cosmetic repair.

Help for women with DCIS

Those with DCIS (ductal carcinoma in situ), a non-invasive cancer, can also benefit from this new technique. Ductal carcinoma in situ (DCIS) is the most rapidly growing breast cancer diagnosis affecting nearly 60,000 women each year. Between 25 to 30 percent of carcinomas detected by mammography are in this category. DCIS patients have nearly a hundred percent survival rate after their cancer is surgically removed.

DCIS is often hard to excise, however, because it is distributed throughout the ductal system — a network that radiates outward from the nipple like spokes in a wheel. The surgeon's goal is to obtain a wide enough margin surrounding the malignant tissue to prevent recurrence. That may require the removal of a substantial amount of breast tissue, and the patient may end up with a mastectomy (removal of her entire breast).

Klein recently treated a woman who had DCIS with microinvasion, meaning that the cancer had begun to spread beyond the breast ducts. Her problem was in the 7 o'clock position in the left breast. "If I had made a curvilinear incision (cutting in an arc as most breast surgeons do), her nipple would turn down toward her toes," she says. "Instead I made a radial incision (cutting in a straight line radiating out from the nipple) and local advancement flap, giving her a slight lift."

(Left) A woman with DCIS at the 7'clock position. (Right) The patient after surgery.

The problem with removing tissue from this area of the breast is that the patient is often left with an indentation or deformity in the breast. After removing the cancer, Klein rotated the patient's own breast tissue to fill in the gaps caused by the incision. "It takes about fifteen minutes longer to suture the underlying layers of tissue together but the end result is worth it," she says. "In the long-run, there is no fluid accumulation and no defect. And the patient doesn't have to wait several months to see what her breast is going to look like."

At the same time the woman is undergoing this procedure, a plastic surgeon can reshape her other breast to give her a more balanced appearance.

Klein has been performing this innovative surgery since 2003 with the elegant stitches of a Paris couturier. "My aunt was a good seamstress and this skill runs in my family," she says.

Increasingly, women with invasive breast cancer have begun to ask their doctors about breast conservation. Oncoplastic techniques are a welcome addition to the surgeon's arsenal. "This is an evolving trend," says Klein. "Our goal is not only to remove the cancer but to keep the woman whole while she's moving toward her cure."

Jurisprudence training for Columbia residents

Twelve residents delivered a close verdict in a mock medical malpractice trial, exonerating a surgeon accused of causing ureteral injury to a patient. The young woman required multiple re-operations and was suing for pain and suffering in the amount of $250,000.

"This was not a true story, but it was inspired by the kind of cases that do make headlines," says Benjamin Samstein, MD, the chief surgical resident who designed the trial in collaboration with litigator Samuel Davis. Warren Widmann, MD, Associate Program Director of the General Surgery Residency, played the defendant, while Davis represented the plaintiff. The trial was staged on a courtroom set in the New Jersey Law offices of Davis, Saperstein & Salomon, P.C. with jurist Anthony Sciuto, Ret., an expert in medical malpractice cases, presiding.

"We wanted to address the anxiety that many residents feel about lawsuits," Samstein explains. "At that stage of your medical career, you work under the protection of other surgeons. You hear about lawsuits and you wonder what triggers them, and what the consequences are of being sued. Many of the residents said this training made them feel much more at ease taking care of patients on a daily basis."

"This is the first course that I know of that teaches practical, hands-on interaction with legal issues. Let's face it, physicians will sooner or later have to deal with the nexus of law and medicine," says Davis who teaches the seminar.

Davis told the class, "You will be sued, and this course is designed to give you an insider's look at medical malpractice from the lawyer's point of view. By understanding how the legal system works and how lawyers think, I hope to give you a perspective that will increase your comfort level as a possible litigation target."

"Our first seminar covers the general topic of medical malpractice, what lawyers look for to build a case, how the legal system works, and how to give a deposition," says Samstein. "Our second seminar consists of the mock trial with a court reporter, judge, defense and plaintiff attorneys and a jury. In the third session, residents learn how to present themselves effectively in court, when acting as an expert witness for the plaintiff or testifying as a defendant."

The Jurisprudence Program is part of a lecture series Samstein created to address topics of growing importance to residents that are not covered in traditional medical training. Among these subjects are contract and job negotiations, interviewing, teaching in an academic medical center, and financial management. The Jurisprudence Program is funded by the Department of Surgery, the NewYork-Presbyterian/Columbia Office of Graduate Medical Education, and the Arnold P. Gold Foundation for Humanism in Medicine.

Mock trials reduced the anxiety many residents felt about lawsuits and gave them an insider's look at the court system.

FOR DIANE AMATO, patient satisfaction comes first

As Administrator of Columbia's Division of Cardiothoracic Surgery, Diane Amato plays a dual role: She uses her business acumen to keep the office running smoothly, streamlining billing procedures, and managing a staff of 22 health care professionals. In addition, she serves as an outreach coordinator for Craig Smith, MD, Chief of the division, providing medical information, practical support and a good old-fashioned dose of TLC for all those in his care.

Why such an unusual mix of responsibilities? After fourteen years as a practice manager at Columbia, Amato was promoted. She agreed to oversee the budgets with the proviso that she still be able to counsel patients. "This is a passion, not a job," she says. "People are my number one priority."

Columbia's heart surgeons have a reputation for innovation and are among the best in the nation. "We also treat our patients like family members," Amato adds. "We're here to help, 24 hours a day, and to guide them through one of the most challenging moments of their lives."

Amato and her staff serve as ombudsmen, overseeing pre-op tests and medical orientation for patients two weeks before surgery, and checking up on them throughout their recovery. As a rule, the team has lunch at their desks, and keeps on working after hours, taking calls from patients with specific medical concerns and helping those who simply need a reassuring word.

On orientation day, Amato presents patients with a tote bag and a navy warm-up suit to be worn on the morning of their surgery. "When they arrive in their warm-up suits, they are immediately welcomed and made to feel at ease. The suits are also an incentive for our patients to start exercising once they're in recovery. It's a nice way for us to say, Thank you for coming to Columbia." Patients receive an information packet, with a DVD explaining their procedure. (Soon they will also be able to link to a streaming video on the Columbia website.) Amato then spends a good part of her day telling patients and their families what to expect before and after surgery.

"Diane meets you in a plush, wood-paneled office that's like a corporate conference room. You don't feel like you're in a hospital so it's more relaxing," says Ed Devlin, a former New York City policeman who now works as security manager for the Metropolitan Museum of Art. When Devlin was referred to Columbia for a bypass operation, Devlin joked, "What's your conviction rate?"

"It's pretty good," Amato replied. "Our track record for your procedure is 95 percent, plus you may have the opportunity to be among the first patients to receive a bypass without being placed on a heart-lung machine."

"Diane was honest and direct," Devlin recalls. "And she explained all the technical details to my daughter who's a nurse."

Providing emotional support

"When you're facing open heart surgery, you feel amazingly vulnerable," admits Judy Blau, a 60 year-old toy inventor who needed an operation to repair a congenital defect in a valve leading to her heart. "I knew, for years, that I'd have to take care of this, and the worst part was the waiting. Diane and my surgeon, Craig Smith, were both extremely kind. No matter what procedure they were discussing, they took time to reach out and comfort me."

Cynthia Agerup was recovering from a hysterectomy when she found out that her husband, Dennis, needed surgery for an aortic aneurysm. "Dennis was only 55 and had no symptoms, so we were in a state of shock," she says. "Dr. Smith calmly explained our options then introduced us to Diane, who saw that I was teary. She put her arms around me and from that moment, I knew I had a friend.

"This is a passion, not a job. People are my number one priority."

Things got a lot easier for Dennis because he no longer had to worry about me."

Amato also refers patients like the Agerups to the Heart-of-Hearts support group run by Columbia health educator Lisa Mainieri, MPH, MSW. "Support groups provide a place where people can share their experiences throughout their recovery," Mainieri says. "We talk about the psychological effects of heart surgery, as well as nutrition, exercise, and other activities post-op." Mainieri serves as cardiac outreach coordinator for five physicians in the division and also counsels patients one-on-one. Amato's assistant, Caroline O'Sullivan, found Mrs. Agerup a room in Columbia's small hotel above the hospital, so she wouldn't have to commute from New Jersey on the day of her husband's surgery. "We're here to help with logistics of every kind," Amato says.

Cynthia was concerned about her husband's response to a blood thinning medication. "You can call me anytime," said Joseph Costa, PA, "and I'll meet you here, even at 3 AM."

A few days after Dennis Agerup was discharged, Cynthia was concerned about her husband's response to a blood-thinning medication. Amato immediately set up an appointment with Columbia Physician Assistant, Joseph Costa. "You can stay here for monitoring, or go home and call me if you feel worse," Costa told the Agerups, "I'll meet you here any time, even if you call at 3 AM."

"This gave us tremendous peace of mind," Cynthia says. "In the last five years I'd dealt with a lot of hospitals and whenever I needed help, I got stuck with a telephone recording. I knew that Diane and the physicians at Columbia would be there for us at a moment's notice."

Physician Assistant Joseph Costa addresses patients' concerns during the recovery process.

On the one-year anniversary of Dennis Agerup's bypass, Cynthia had this to say: "Diane and all the doctors at Columbia gave us something money can't buy. At every turn, they offered us their hearts."

When a patient's personal responsibilities are overwhelming, Amato also extends a helping hand. One woman was admitted for emergency heart surgery shortly after her husband and sister-in-law had open-heart procedures at Columbia. While she was in recovery, her son was dying of cancer in another section of the hospital. Amato helped find a notary to transcribe his will. A week later she attended the son's funeral to support the family. "The most important part of my job is instilling trust," says Amato. "Our surgeons are unusually responsive to the needs of their patients. We try to extend that sensitivity to every aspect of patient care."

Amato's special rapport with people stems, in part, from her own upbringing. "My mother was widowed during World War II and had to work at the same time she raised my older sister. I know how hard it is for the parents of our younger heart patients," Amato says, "I try to make sure they have enough back-up to address their children's needs." Amato's older sister was also deaf and had special needs. "I learned to sign before I learned to write," Amato recalls. "This experience also taught me how to listen at a deeper level," she says, "and how to identify what people need to feel secure."

Amato has been called the quarterback of her division because she successfully fields every type of problem, from the scheduling of clinical evaluations to solving transportation needs, as well as making sure patients receive social and emotional support. Under her aegis, Cardiothoracic Surgery routinely receives high marks for customer satisfaction. "We routinely do patient surveys and more than ninety-five percent of our patients have a positive experience," she says.

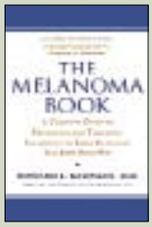
In addition, Amato fills the much-needed role of caregiver or "mom" for all her co-workers. "Our modern high tech society is too often lacking in interpersonal skills," says Mehmet Oz, MD, Director of the Cardiovascular Institute at NewYork-Presbyterian/Columbia. "Our division works well because Diane always has her ear to the ground and can sense when her staff is not getting along, when someone feels left out, or a particular issue needs tending to. Her passion for us as individuals and her desire to make us better members of the healing community are invaluable. She loves us and it shows."

Resources for Patients and Clinicians

■ Books and publications for patients

THE MELANOMA BOOK: A Complete Guide to Prevention and Treatment, Including the Early-Detection Self-Exam Body Map

By Howard L. Kaufman, MD

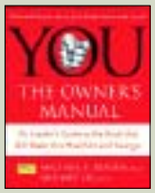


The fastest rising form of cancer worldwide, melanoma can strike at any age. Although cure rates have improved, experts often disagree about the best course of treatment and patients face a bewildering array of options—often with precious little time to choose among them. Drawing on his years as one of the nation's foremost researchers and specialists in the field of melanoma treatment, Howard L. Kaufman, MD, shares his easy-to-follow plan for detecting melanoma early, making informed decisions after a diagnosis, and taking an active role in treatment. This book contains "everything you need to know to prevent—and survive—a diagnosis of melanoma."

YOU: THE OWNER'S MANUAL
An Insider's Guide to the Body That Will Make You Healthier and Younger

By Michael Roizen, MD and Mehmet Oz, MD

Most patients know very little about their miraculous anatomy. The authors show how an understanding of the basic systems of the body can contribute to longevity and quality of life. This unique book is part fitness motivator and part home medical reference and it contains a myriad of how-to instructions for keeping any body in prime condition for a longer time.



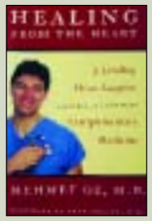
THE COLUMBIA PRESBYTERIAN GUIDE TO SURGERY

By Eric A. Rose, MD

The Surgeon-in-Chief of NewYork-Presbyterian Hospital addresses patients who are candidates for surgery and describes an array of options and alternatives that will help them to participate fully in this major health decision. *The Columbia Presbyterian Guide to Surgery* depicts 45 of the most common surgical procedures and also discusses various diagnostic tests, important questions to ask the doctor, reasons for having specific operations, and what to expect in the recovery process.

HEALING FROM THE HEART

By Mehmet C. Oz, MD



This helpful guide to combining state-of-the-art Western medicine with complementary methods of healing received the Best Wellness Book Award from Books for a Better America. Oz outlines a holistic approach that draws on the patient's own self-healing powers, and includes hypnosis, reflexology, visual imagery, music, yoga, massage, aromatherapy, as well as improved diet and vitamins.

THE GRATEFUL HEART, DIARY OF A HEART TRANSPLANT

By Candace Moose

In 2001, Candace Moose received recommended immunizations in preparation for a humanitarian trip to Malawi, Africa. Seven weeks later she was placed on the emergency transplant list at NewYork-Presbyterian/Columbia. The immunizations had triggered giant cell myocarditis, a typically fatal autoimmune disease. Moose survived after receiving the heart of a 17-year-old donor. She describes the people who came together to save her life, including Yoshifumi Naka, MD, her transplant surgeon. Moose's children have contributed chapters about caring for their mother during this challenging time.

THE THYROID GUIDE

By Paul LoGerfo, MD, and Beth Ann Ditkoff, MD

In this definitive guide for more than 20 million Americans suffering from chronic thyroid problems or thyroid cancer, the authors help patients understand their diagnoses and provide them with the information they need to manage their medications and symptoms.

QUARTERLY NEWSLETTER—healthpoints

The Office of External Affairs also publishes *healthpoints*, an award-winning newsletter for patients that explores all aspects of surgery from diagnosis to post-operative care. Issued quarterly, *healthpoints* is posted on the Department of Surgery's website at www.columbiasurgery.org

■ For Clinicians

MINIMALLY INVASIVE CARDIAC SURGERY

Edited by Mehmet C. Oz, MD and Daniel J. Goldstein, MD

The first definitive text on this topic contains 18 timely articles by leading practitioners. Cardiac surgeons from the United States and Europe describe specific surgical procedures, and consider quality of life issues for patients undergoing minimal access surgery. The book won the Best Health Science Book Award from Doody's rating service in 2000.

CARDIAC TRANSPLANTATION: THE COLUMBIA UNIVERSITY MEDICAL CENTER/NEWYORK-PRESBYTERIAN HOSPITAL MANUAL

Edited by Niloo M. Edwards, MD, Jonathan M. Chen, MD, and Pamela A. Mazzeo

This is a valuable hands-on guide to the clinical management of transplant donors and recipients. Unprecedented advances in immunosuppression and surgical techniques have made cardiac transplantation the gold-standard for treating end-stage heart disease and have also challenged practitioners to keep thoroughly up-to-date. The editors summarize the day-to-day management of transplant donors and recipients at NewYork-Presbyterian Hospital/Columbia University Medical Center.

COMPLEMENTARY AND ALTERNATIVE CARDIOVASCULAR MEDICINE

Edited by Richard A. Stein, MD and Mehmet C. Oz, MD

In this valuable compendium, clinicians, scientists, and well-known practitioners of alternative approaches summarize the literature on complementary cardiovascular medicine. The authors explain the background for each important alternative therapy, its rationale and the evidence supporting its use. They describe potential interactions with standard medicines, and, where possible, cite data on safety and efficacy.

The therapies for treating coronary heart disease (CHD) range from the more commonly encountered ones—herbs, vitamins, supplements, and dietary fats and oils—to less familiar techniques such as acupuncture, homeopathy, massage, chelation therapy, meditation, energy and aroma therapies and prayer. Also included is a CD-ROM that that can be viewed either on a personal computer or synchronized to a PDA.

LAPAROSCOPIC BARIATRIC SURGERY

By William B. Inabnet, MD, Eric J. DeMaria, MD, and Sayeed Ikramuddin, MD

This is a complete guide to the three major types of laparoscopic surgery for severe obesity—restrictive, restrictive/malabsorptive and revisional procedures. The book features more than 160 illustrations — over 90 in full color. It offers guidelines on patient selection and counseling, addresses the psychological ramifications of this surgery, and provides step-by-step instructions on patient positioning and surgical technique. The authors discuss the pitfalls and potential complications of each operation in detail and offer advice on how to avoid them. An accompanying DVD demonstrates key steps in each procedure.

LUNG VOLUME REDUCTION SURGERY

Edited by Michael Argenziano, MD and Mark E. Ginsburg, MD

In the first comprehensive work on this topic, the authors make a compelling argument for the benefits of LVRS as a treatment for emphysema. Contributors include leading radiologists, cardiothoracic surgeons, pulmonologists, anesthesiologists, nurses, and topics range from open surgical and video-assisted thoracoscopic approaches to LVRS to anesthetic management and nursing care.

Experts also discuss eligibility criteria for LVRS, clinical trials, and the effects of LVRS on survival rates. There is ample background material on the clinical and basic science aspects of emphysema, including its pathogenesis, cardiovascular effects, medical management, and evaluation with exercise testing. This book is intended to help thoracic surgery departments implement their own LVRS programs.

CARDIAC ASSIST DEVICES

Edited by Daniel J. Goldstein, MD, and Mehmet C. Oz, MD

This compilation of articles and research reports by cardiothoracic surgeons and research fellows, internists, nurses, physical therapists and immunologists includes contributions from pioneers of CAD and heart transplantation, Michael E. DeBakey, MD and Robert K. Jarvik, MD. The authors provide an historical perspective on cardiac assist devices and the evolution of this technology. They describe available devices and discuss specific medical treatments and their outcomes, quality of life issues, and the next wave of CAD development.

This comprehensive manual (444 pages with illustrations) is an indispensable reference for practitioners, hospital administrators, health care policy makers and legislators. In a brief foreword, Bill Frist, MD, a heart surgeon and U.S. Senator, outlines the importance of CADs in the fight against the "pandemic" of congestive heart failure.

A PROUD HERITAGE: AN INFORMAL HISTORY OF SURGERY AT COLUMBIA

Edibed by Frederic P. Herter, MD, Alfred Jaretzki III, MD, and Kenneth A. Forde, MD

This book captures the intellectual excitement and personal dedication of Columbia's innovators, from the pioneers of vascular surgery in the early 1800s, to the expert using a left ventricular assist device (LVAD) to extend the life of heart failure patients today. The editors provide an insightful and often humorous account of generations of Surgeons-in-Chief at Columbia, and give the reader an insider's look at a surgeon's life.



Websites

Department of Surgery
www.columbiasurgery.org
General information for patients, clinicians and researchers. News and events, alumni relations, a listing of surgical specialties and physician directory.

Atrial Fibrillation
www.afibsurgery.org

The Center for Hyperhidrosis
www.hyperhidrosiscumc.com

The Center for Liver Disease and Transplantation
www.livermd.org

The Center for Obesity Surgery
www.obesitymd.org

The Center for Prenatal Pediatrics
www.prenatalpediatrics.org

The Comprehensive Breast Center
www.breastmd.org

Cardiac Surgery
www.columbiaheart.org

Clinical Research
www.columbiasurgery.org/pat/research/index.html

Colorectal Surgery
www.columbiasurgery.org/divisions/colorectal/index.html

Continuing Medical Education
www.columbiasurgerycme.org

The Endocrine Surgery Center
www.columbiasurgery.org/pat/endo/index.html

General Surgery
www.columbiageneralsurgery.org

Heart Transplant
www.hearttransplant.com

The Integrative Medicine Program
www.columbiaintegrativemedicine.org

Interventional Bronchoscopy and Endobronchial Therapy
www.columbiabronchoscopy.org

Kidney Transplant Program
www.columbiakidneytransplant.org

The Lung Transplant Program
www.columbialungtransplant.org

The Melanoma Center
www.columbiamelanomacenter.org

The Melanoma Consortium
www.nycmelanomaconsortium.org

Minimally Invasive & Robotic Cardiac Surgery Program
www.heartrobot.org

The Pancreas Center
www.pancreasmd.org

Pediatric Surgery
www.babysurg.org

Pediatric Cardiac Surgery
www.pedsheartmd.org

Plastic Surgery
www.columbiaplastics.org

Press Releases
www.columbiasurgeryPR.org

Speaker's Bureau
www.columbiasurgerylectures.org

Surgical Innovations Report
www.columbiasurgery.org/innovations/index.html

Tumor Vaccines
www.tumorvaccines.com

Thoracic Surgery
www.columbiathoracic.org

The Wound Healing Program
www.columbiawoundhealing.org



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