Improving Fetal Therapy and Surgery
Technological Advancements in Obstetrics

Recent advances in technology have played a significant role in the implementation and refinement of medical and surgical procedures for treating a range of fetal disorders and syndromes. Lynn Simpson, MD, Director of the Division of Maternal Fetal Medicine at CUMC and Medical Director of the Carmen and John Thain Center for Prenatal Pediatrics, has been instrumental in integrating new and innovative approaches to fetal therapy and surgery to improve outcomes for both the fetus and the mother. Opened in 2011, the Center at NewYork-Presbyterian Morgan Visionary Surgery

Visionary Surgery
Ex Vivo Procedures for the Removal of Tumors

During a relatively new surgical treatment for large, complex abdominal tumors, there is a surreal moment, when the patient lies on the operating table with a completely hollow abdominal cavity. His organs—liver, intestines, pancreas, and/or stomach—lie in a bath of iced preservation fluid on a table nearby, and that’s where the action is. The tumor that has entangled these organs and their blood vessels is now fully accessible, and a small team of surgeons can extricate and completely remove it, then return the organs to their place, reattach the vessels, and close the abdomen. This innovative approach, called “ex vivo” surgery, is one of several novel surgical techniques surgeon Tomoaki Kato,
Technology has become so pervasive in the practice of medicine that doctors are now assisted in care in almost every task by technology in one form or another. In this issue of Connections we highlight some of the myriad ways in which technology has become integral to clinical care and research in Pediatrics and OB/GYN, and is fundamentally improving the care we provide. In the Conversation between the Chairs (page 4), Drs. D’Alton and Stanberry discuss the evolution and importance of electronic medical records, as well as the increasing impact of genomics. Our front page stories both cover advanced forms of surgery: by combining different transplant technologies, abdominal surgeon Dr. Tomoaki Kato is able to offer innovative and life-saving procedures to very ill patients, and maternal fetal medicine specialist Dr. Lynn Simpson uses techniques like fetoscopic laser surgery and fetal transfusions to correct problems in-utero. Both OB/GYN and Pediatrics are developing wide-reaching simulation programs so practitioners can work through new caregiving techniques and review key, but rarely used, ones (pages 5 and 12). Members of the OB/GYN data discovery committee have created a data repository to enable department researchers to easily access and analyze clinical data (page 11). And in “Innovations,” we cover several new technologies being deployed in both departments (page 5). Speaking recently, Dr. Stanberry said, “Institutions like CUMC and NewYork-Presbyterian are staffed by exceptionally bright people who have their pulse on developments in technology, and we are always going to be at the forefront of adopting new technologies to benefit our patients.” Read on to learn more about the ways that our faculty members are improving care through technology.

Michael Weiner, MD
Department of Pediatrics

Cande Ananth, PhD, MPH
Department of Obstetrics and Gynecology
Mourning a Loss

Sreedhar “Sree” Gaddipati, MD

The Department of Obstetrics and Gynecology mourns the unexpected and very untimely passing of our beloved colleague, Sreedhar “Sree” Gaddipati, MD on August 7, 2013. Dr. Gaddipati graduated from the State University of New York at Stony Brook’s School of Medicine and completed his residency in OB/GYN at Wayne State University, Hutzel Hospital/The Detroit Medical Center. He then completed a fellowship in Maternal-Fetal Medicine at the Mount Sinai School of Medicine, after which he remained on the faculty of that institution as an Assistant Professor of Obstetrics and Gynecology. While at Mt. Sinai, Sree developed extraordinary skill in the management of infectious disease problems in pregnancy with a subspecialty focus on HIV and AIDS. He joined CUMC in 2003 as a Clinical Assistant Professor in Maternal-Fetal Medicine and became the Director of Critical Care Obstetrics. He received numerous teaching awards and honors, including the Council on Resident Education in Obstetrics and Gynecology (CREOG) National Faculty Award for Excellent in Resident Education in 2000, 2003, and 2005. His talents were immeasurable, whether with his patients, medical students, residents, fellows, or fellow faculty members. “Dr. Sree Gaddipati was a wonderful human being,” said Dr. Lynn Simpson. “He was a devoted family man, compassionate and skilled physician, effective teacher, and loyal colleague and friend. Sree was loved and respected by all who met him— he made a real difference in the lives of so many people. He will be missed.” “I echo everything Dr. Simpson has said.” said Dr. Richard Berkowitz, his former Chairman and Division Chief at Mt. Sinai. “In addition to the attributes Lynn has mentioned I would add that Sree was unfailingly optimistic and upbeat, always willing to step up and help a colleague, and virtually never without a smile on his face, which truly reflected the cheer in his heart. He never stopped increasing his medical knowledge and using it to provide exemplary care to all of his patients, which, along with his compassion, made him a truly superb clinician. We have lost a marvelous teacher and role model, a great physician, and a very dear friend,” said Dr. Berkowitz. We extend our deepest sympathies to his family, friends, and well-wishers at Columbia University’s Department of Obstetrics and Gynecology.


Editor’s note

While I received many wonderful and touching photographs of Sree for this article, I felt something was missing from them. I wanted one that truly depicts Sree’s personality, and the attached photograph hit home. This picture captures his qualities: he was joyful, curious, attentive, caring, unassuming, fun-loving, astute, positive, jubilant, kind, compassionate, and supportive. I hadn’t come across a picture that justifies the age-old phrase, “A picture is worth a thousand words,” until I saw this. Sree was an incredible person who will be truly missed by all of his colleagues, friends, and well-wishers at Columbia University’s Department of Obstetrics and Gynecology.

Cande V. Ananth
Integrating Technology into Medicine: Promising New Tools

A Conversation Between
Mary D’Alton, MD
& Lawrence Stanberry, MD, PhD

Mary D’Alton, Chair of Obstetrics and Gynecology, and Lawrence Stanberry, Chair of Pediatrics, spoke recently about the range of technologies their departments are adopting, and how these new tools are improving care.

Dr. Stanberry: One technology that is currently used across the enterprise is the electronic medical record (EMR). I think we’re going to see much more real-time monitoring of the information through the EMR, especially on the inpatient side, and we’ll be able to link inpatient and outpatient information more and more. For example, if a child with asthma comes in through the emergency room, the ED physicians will soon be able to use our asthma pathway, which will recommend specific steps based upon best practices. If the child is hospitalized, the EMR captures all of their information, and at discharge patients go home with an asthma action plan, also in their EMR and available to our physicians in the community, who can ensure that the plan is followed. Another positive value of the electronic health record is through patient portals. Patients can readily access their own health information, and can make that available to other physicians in other settings, such as an emergency room thousands of miles away. It’s very portable. So this is going to empower patients to pay more attention to their own health. I’m very encouraged by this technology.

Dr. D’Alton: A couple of years ago we decided to allocate resources to IT because our doctors, nurses, residents and fellows were struggling with multiple systems and inputting data in a timely way. What really brought it home was that our nurses, residents and fellows were struggling to allocate resources to IT because our doctors, Dr. D’Alton: Another technology that will be more widely applied by specialists over the next decade is genomic medicine—the ability to sequence a patient’s DNA and extract information that’s important in both the treatment as well as in prevention and maintaining health. Our two departments have come together working with the Department of Pathology and others in the medical center to collaborate around personalized genomic medicine. Our particular interest is the Women and Children’s Genomic Center. The vast majority of pregnant women who come to us have one question: is my baby normal? In almost all cases we can reassure the mother, but in those cases where we can’t, we want to provide the most up-to-date level of diagnosis that can be had. And we’re very fortunate that we have three major leaders in the country here—in OB/GYN, Dr. Ron Wapner; in Pediatrics, Dr. Wendy Chung; and in Pathology, Dr. Brynn Levy. These three have really been at the forefront of developing new technology to give better information to families by integrating the highest level of genomic testing with phenotypic information from families. We hope to make this available to a much wider segment of our population through our IT and database infrastructure. To expand our current program we will need to rethink how we’re training medical students and residents about genomics, because it’s such an ever-changing world. And in my opinion, we don’t have enough people here to accommodate that need right now.

Dr. Stanberry: Right now genomic medicine is largely the province of geneticists, but increasingly there will be additional training by maternal fetal medicine physicians, gynecologic oncologists, pediatric cardiologists, pediatric critical care physicians, on and on, all subspecialties, to where they’ll be able to use this technology to address the problems of their specific patient population. When you think about where things will be in 5-10 years, we can’t train enough geneticists and we need to train other specialists so that they have a lot more expertise in genetics.

Dr. D’Alton: We have a bank of expertise in our departments that enables us to evaluate new technological tools, decide on their importance, and whether we need to adopt or change any of our systems. These will need constant re-evaluation and improvement. And that’s one of the things about building our own database and building our own notes in our EMR: it is more personalized to our situation.

Dr. Stanberry: In looking to the future of medicine, for inpatient pediatrics it’s going to be critically important that we capture detailed information about the history of the problem and the physical findings. We can then use sophisticated computer systems pre-loaded with algorithms that offer physicians a variety of potential diagnoses for each patient, as well as a number of treatment algorithms. This will allow physicians to become more sophisticated in their physical examinations and history-taking, and there will be less pressure on them to know every obscure disease that a patient may have. The merging of information from laboratories, imaging studies, and the patients themselves will help the system generate suggestions that the physician may or may not have thought of on their own, and that’s going to improve patient care.

Dr. D’Alton: Our goal through all of our efforts is to make it easier for our doctors and nurses and to enhance patient care. And I think we can do it. It’s exciting.
Simulation Models in OB/GYN Medical Education

Simulation models are becoming increasingly common in medical school and residency curricula. Ranging from simple anatomical models to high-fidelity mannequins equipped with computer controls for realistic responses, these technologies can provide valuable hands-on training for numerous medical procedures. While few programs systematically incorporate simulation as a learning assessment tool, Rini Ratan, MD, has created a unique simulation-based educational assessment in her role as the Director of both the OB/GYN residency program and clerkship rotation.

Dr. Ratan was instrumental in creating a simulation-based objective structured clinical examination for medical students. “It was our first at Columbia University College of Physicians and Surgeons for medical students and was very well received,” says Dr. Ratan. “Students felt that it was a very fair way of being tested and allowed them to show strengths that they couldn’t show on a standardized test.”

Drawing on the success of the exam, Dr. Ratan developed a similar program in 2008 for OB/GYN residents. Coined the Sloane Olympics, it has become an annual event consisting of individual stations with both low and high-fidelity simulation models. Led by the core faculty and division chiefs, each station has educational objectives that align with rotations in the curriculum. Residents are given the opportunity to practice procedures on simulation models while receiving valuable feedback from the faculty.

In addition to the Sloane Olympics simulation-based exam, monthly simulation sessions have been integrated into the curriculum for residents. Following a didactic lecture, faculty members lead residents in practicing procedures such as breech delivery, operative vaginal delivery, perineal laceration repair, laparoscopic and hysteroscopy skills, manual vacuum aspiration, and intrauterine device insertion on simulation models. When determining the best simulation model for teaching a procedure, numerous factors are considered. “Our most reliable model is an excellent hemipelvis that we use for just about everything. It allows you to show the outlet and is very versatile for a range of procedures,” Dr. Ratan explains. “For becoming comfortable with basic hand maneuvers and situations like shoulder dystocia and breech delivery, the low-fidelity simulators are suitable. The high-fidelity laparoscopic simulators are helpful because they can give you haptics (touch feedback). High-fidelity mannequins are able to simulate unstable vital signs for rare, high-stakes complications such as an eclamptic seizure.”

As the simulation program continues to grow, new modules in topics like urogynecology have been added to provide additional instruction to the residents. While didactic learning remains an essential component of the curricula, the simulation program complements and enhances the learning goals and outcomes for medical students and residents alike.

— Elizabeth Gough-Gordon
Advances in Prenatal Screening and Diagnosis

Screening and diagnosis of prenatal conditions and disorders have made significant strides in the past two decades due to the development of new methods of detection for chromosomal disorders and structural abnormalities. Mary D’Alton, chair of obstetrics and gynecology at CUMC/NYP sees many of these positive changes as the results of large-scale collaborative research, non-invasive early screening with individualized risk assessment, and changes in standards of care that have benefitted patients and physicians alike.

According to Dr. D’Alton, the translation of research into standardized patient care has been a turning point in prenatal screening and diagnosis. The results of the First Trimester Maternal Serum Biochemistry and Fetal Nuchal Translucency Screening (BUN) study and the First-and-Second-Trimester Evaluation of Risk (FASTER) trial, published in 2003 and 2005 respectively, showed the effectiveness of first-trimester screening using measurements of nuchal translucency and serum screening. These screenings for trisomy 21, a common indicator of Down’s syndrome, provide a numeric risk for the fetus to be diagnosed (greater than 1 in 150 for first-trimester screening and greater than 1 in 300 for second-trimester are considered positive test results). The studies led to the American Congress of Obstetricians and Gynecologists (ACOG) to revise their recommendations and encouraged physicians to offer all pregnant women the option of first-trimester screening, regardless of maternal age or other risk factors. “The field advanced far enough that it was able to give a numeric risk to the patient, which made it much easier for patients to understand their individual risk. For obstetric practices, the ability to give individualized numbers to patients about their risk for certain common chromosomal abnormalities was a huge landmark. It has really become woven into the fabric of obstetrical care,” Dr. D’Alton says.

In conjunction with serum markers, improvements in ultrasound imaging have also been a vital advancement in prenatal screening for the detection of structural abnormalities in the fetus. In addition to 3D images, 4D imaging now allows the fetus to be seen in real time with movement. While these types of imaging are becoming more commonly used to help patients understand structural abnormalities, there are limitations in screening and diagnosis. “There is a significant training that’s required to become an expert in getting appropriate 3D and 4D imaging necessary to diagnose unusual fetal structural abnormalities,” states Dr. D’Alton. As well, the diagnosis of congenital heart disease via ultrasound remains difficult and there is a growing demand for trained individuals who can accurately diagnose this disease. “We’re fortunate here (at CUMC/NYP) to have an expertise in the maternal fetal medicine and pediatric cardiology divisions for collaboration. This partnership gives CUMC/NYP patients an advantage with the detection of most fetal cardiac defects prior to birth, with a plan for treatment in place after delivery.

Dr. D’Alton believes that the future of prenatal screening and diagnosis will be in expanding the current non-invasive tests to detect all chromosomes and microarray abnormalities. In addition, the use of MRI with ultrasound imaging will expand for improved screening and diagnosis of fetal abnormalities. “MRI has been very helpful in being an adjunct to ultrasound imaging, especially for brain abnormalities of the fetus,” says Dr. D’Alton. As the technology continues to evolve, new methods provide patients and doctors with more precise, informative, and reliable means of prenatal screening and diagnosis. — Elizabeth Gough-Gordon
Finding New Paths to a Difficult Diagnosis

Appendicitis has the reputation of being easy to diagnose because of its well-known pain pattern—pain that begins around the umbilicus and migrates to the right lower quadrant. But this classic pattern is very rare in children, and even children who have this pattern can’t always articulate what they are feeling, “so in kids appendicitis is actually a very difficult clinical diagnosis,” says pediatric radiologist Carrie Ruzal-Shapiro, MD.

At the same time, “appendicitis is relatively common—it’s the most common of the surgical entities after trauma to come through any pediatric ED,” she says, “yet it’s seen in only one of every 10,000 patients, so few practitioners will have seen a large number of cases. It’s a difficult diagnostic dilemma, and radiologists across time immemorial have been trying to work on it.” In the 1990s radiologists began to use ultrasound to diagnose appendicitis. The imaging test is useful in thin patients, but it’s much less successful in the obese patient, according to Dr. Ruzal-Shapiro, because sound waves are unable to penetrate a thick layer of abdominal fat. The radiologist has to compress the normal bowel out of the way with the ultrasound probe, so the procedure is also painful. In addition, performing the test successfully requires a lot of experience, she adds. “Unless you’ve had a lot of experience you would have trouble doing this even in a thin kid, and with an obese child it’s just technically impossible. So it’s a difficult exam on many levels.” In approximately 2000, radiologists began using CAT scans to diagnose appendicitis. “This was a really good test with high sensitivity and specificity, and it replaced abdominal sonograms,” she says. But in 2004 Columbia University Professor David Brenner, MD, published data on the potential cancerous effect of ionizing radiation, even with doses as low as those in a CT scan, she says. (Brenner DJ, Elliot CD. Estimated radiation risks potentially associated with full-body CT screening. Radiology. 2004 Sep;232(3):735-8.) “So we went back to using ultrasound followed by CT when the ultrasound was not diagnostic.” Most children’s hospitals continue to follow this diagnostic pattern now. “But at CUMC we’ve decided to do something a little different,” Dr. Ruzal-Shapiro says. “We knew MRI could be used to look for appendicitis in kids, because there was a history of using it to detect appendicitis in pregnant women. In the past two years, in every pediatric patient where we suspect appendicitis we start with an ultrasound, and if we can, we make a diagnosis of either normal or acute appendicitis. But in about 40 percent of patients we can’t see the appendix to comment on it. If the child is able to lie still, we do an MRI next.” MRI has the same sensitivity and specificity as CT (accuracy around 98%), according to Dr. Ruzal-Shapiro. “We’ve shortened our MRI protocol, making it easier for kids to tolerate.” For children too young to lie in the MR machine without sedation the group does do a CT scan. Dr. Ruzal-Shapiro and her colleagues have analyzed and submitted their data for publication from the first year of this new approach, during which they used MRI to diagnose 60 patients. “That’s 60 patients who did not have to receive radiation from CT in the year,” she says.

— Beth Hanson

### Technological Innovations

**Robotic Surgery is Advantageous for Children with Some Urologic Conditions**

Pasquale Casale, MD, Chief of Pediatric Urology, is an authority on robotic surgery for pediatric urologic problems, and has developed many of the robotic procedures currently performed on children with these conditions. With the surgical robot Dr. Casale treats obstructed kidneys, non-functioning bladders, and disorders of sexual development, undertaking complex surgeries such as bladder neck reconstruction, bladder augmentation, and the creation of catheterizable channels, “procedures that a lot of surgeons wouldn’t think of doing robotically,” he says.

Dr. Casale recently operated on a two-year-old who was incontinent due to an open bladder neck with bilateral renal duplication: bilateral ureterocele and bilateral reflux. He and his team reconstructed the ureters, the continent mechanism of the bladder neck, and the rest of the bladder. The girl returned home two days after surgery without any catheters, if surgery is done on their blabber, patients have fewer bladder spasms following robotic surgery compared to open surgery. “They really return to their normal activities quite early,” he adds.

Comparing open, laparoscopic, and robotic approaches, Dr. Casale details the advantages of the latter: The surgeon has as many degrees of freedom as during open surgery, but a digital magnification up to 12 times normal compared to 3.5 times normal with open surgery, in which surgeons view the field through surgical loupes. Robotic surgery is ergonomically different from open and laparoscopic surgery, he says. “You’re sitting down, you’re relaxed and comfortable, and you have degrees freedom in arm and hand movement equivalent to open surgery. You get all the benefits of minimally invasive surgery, and the ergonomic comfort that you don’t get in either of the other types of surgery.” It relieves fatigue typically associated with laparoscopic and open surgery, which translates to better outcomes, in his opinion. With the option of a robotic surgical approach, patients, their families, and surgeons, too, have more choices and greater benefits, he concludes.

— Beth Hanson
In any single tumor, distinguishing the genetic mutations that promote cancer from mutations that have no adverse effect has been a longstanding problem for researchers. A team that includes CUMC researchers has identified 18 new genes responsible for driving glioblastoma multiforme, the most common, and most aggressive, form of brain cancer in adults.

The study, published in Nature Genetics, examined nearly 140 brain tumors and sequenced the DNA and RNA of every gene in the tumors to identify all the mutations in each tumor. A statistical algorithm was then used to identify the mutations most likely to be driver mutations, plus considering how often and in what manner the gene is mutated in different tumors. The analysis identified 15 driver genes that had been previously identified in other studies, confirming the accuracy of the technique, and 18 new driver genes that had never been implicated in glioblastoma. Significantly, some of the most important candidates among the 18 new genes, such as LZTR1 and delta catenin, were confirmed to be driver genes in laboratory studies involving cancer stem cells taken from human tumors and examined in culture, as well as after they had been implanted into mice. “Personalized treatment could be a reality soon for about 15 percent of glioblastoma patients,” said Anna Lasorella, MD, an Associate Professor in Pediatrics and one of the study’s authors. “Our study, in conjunction with our previous work from last year, shows that about 15 percent of glioblastomas are driven by genes that could be targeted with currently available FDA-approved drugs,” she said. “There is no reason why these patients couldn’t receive these drugs now in clinical trials.”

Growing up in nearby Mount Vernon, NY, Kobina Ghartey, MD, was drawn to medicine at an early age. His path to becoming a physician has taken him from an interest in pediatrics during medical school to a residency in OB/GYN and a fellowship in maternal fetal medicine (MFM).

He has recently joined the CUMC faculty as an assistant professor in MFM, where he will continue to apply skills learned and developed during his fellowship and impart these to future medical students, residents, and fellows.

As a child, Dr. Ghartey’s positive interactions and experiences with his pediatrician shaped his perception of medicine and inspired him to choose this profession as a career. When he began medical school at New York Medical College, pediatrics was still his desired specialization until he began his third year clerkships. “Once I did my pediatrics rotations, I realized that it wasn’t going to be for me. I didn’t have the patience as is required for that,” Dr. Ghartey said. It was during his OB/GYN rotations that he found the field of medicine that was challenging, flexible, and unpredictable. He explains, “Especially when you’re on a labor floor, the work feels like it is constantly changing. Whatever happens that day is what you are going to take care of, and that really intrigued me.” He completed his residency in OB/GYN, also at New York Medical College, and was named Executive Chief Resident in his final year.

Soon thereafter, he was accepted to the MFM fellowship program at CUMC/NYP. For Dr. Ghartey, the fellowship helped him see MFM as a field of both specializations and a broad knowledge base. “The fellowship has exposed me to a wide array of physicians within the field with different specialties, whether it is in the fetal or maternal areas. It’s also opened my eyes to the possibilities of remaining a well-rounded MFM—you don’t necessarily have to find a niche, but if you so choose, that’s also an option for you.” In addition to learning the scope of MFM, the instruction he received from faculty has been invaluable. “The best part of the fellowship for me has been the teaching that I’ve received. One of the biggest purposes as an academic is to pass on what you’ve learned in your training and your experiences,” he stated. While Dr. Ghartey says he had many great teachers, Sreedhar Gaddipati, MD was a particularly positive influence on his work. “I think in working with him, he definitely taught me compassion, hard work ethic, and above all else, humility,” said Dr. Ghartey. “This was a man who had an extensive knowledge base, had an amazing bedside manner and way with patients, and was never too busy. Essentially, I felt like he was a person that whenever you were working with him, you always knew you could tackle anything.” These traits have had a profound impact on his approach to MFM, he stated, and he has adopted these traits in his own care of patients and work with colleagues.

Dr. Ghartey’s fellowship research has focused on neonatal outcomes in regards to respiratory and nonrespiratory morbidity, along with abdominal circumference. In a study published in the American Journal of Obstetrics & Gynecology, he and other CUMC faculty evaluated the risks of respiratory and nonrespiratory morbidity among neonates delivered between 37–39 weeks. This time frame is considered to be early term period and there was a two-fold increased risk of respiratory morbidity among neonates delivered in the early term period, compared with those delivered at 39 weeks. For his thesis, his work examined neonatal outcomes in regards to abdominal circumference. When measuring the weight of the newborn, the biparietal diameter, head circumference, abdominal circumference, and femur length are all evaluated. While there is debate over what significance each of those parameters have in regards to their impact on the overall growth of the fetus, there is concern when the overall weight of the fetus falls below the 10th percentile of clinical growth charts. This may be suggestive of a placental insufficiency, resulting in the fetus being malnourished. Dr. Ghartey explained, “Even if the overall weight itself is still above the 10th percentile, an abdominal circumference below the 10th percentile may be suggestive of an impending intrauterine growth restriction.” His research findings suggest that morbidity is higher among neonates with intrauterine growth restriction, compared to those with only a small abdominal circumference. Dr. Ghartey is currently collecting data from additional hospitals to further explore neonatal outcomes of fetuses with normal growth and those with small abdominal circumferences.

In addition to continuing his research, Dr. Ghartey has several goals in his transition from fellow to assistant professor at CUMC. He hopes to continue to enhance his MFM skills in areas such as ultrasound and labor floor duties, as well as teaching. “I was fortunate to have received terrific teaching during my fellowship here at CUMC. I want to try to continue that process in my own teaching for medical students, residents, and fellows.” — Elizabeth Gough-Gordon
Rachel Miller, MD, brings a unique perspective to her role as Chief of the Division of Allergy and Immunology (AI). Dr. Miller’s training is in medicine, pulmonology, and critical care, and her relationship with Pediatrics began when she was named director of the AI Division’s fellowship program in 2004, the only fellowship that cross-trains in pediatrics and adult medicine.

Then, a few years ago she gained a more formal appointment in Pediatrics as part of the department’s initiative to build up its translational immunology efforts.

Dr. Miller has spent her post-medical school career at Columbia, and is a member of three different departments in two schools. "When I took on the role as division chief, I had an interesting outlook, both as an insider and an outsider," she says. The strength of the AI Division, with four full-time clinicians, several voluntary positions, and two fellows, is clinical excellence, she says. Since her appointment last summer she has begun to implement her plan to fulfill the mission she conceived for AI: to be an outstanding division in New York and nationally.

To work toward this goal, Dr. Miller is building two targeted clinical and research areas. Over time immunology had taken a back seat to allergy in the division, she says. "Immunology is part of the division’s name, but it was not on the sign outside our area, and I want to bring it back.” Immunologists treat a constellation of disorders, and there is often a many-year delay between the manifestation of symptoms and diagnosis—delays that can sometimes cause serious disability. Early diagnosis leads to early treatment, “so we are now offering state-of-the-art diagnosis.” To that end, she recently recruited Yesim Demirdag, MD, a clinician with expertise in primary immunodeficiencies, allergies, and asthma.

Once a child is diagnosed with an immunodeficiency, treatment may require a stem or bone marrow transplant, so Division members are collaborating with Andrew Kung, MD, Director, Division of Pediatric Hematology/Oncology/ Stem Cell Transplantation, to treat children born with life-threatening immunodeficiencies who will benefit from a transplant.

A second new area of focus is the diagnosis and treatment of food allergies, which are increasingly prevalent worldwide. "Our clinicians have always been strong in this area, but there is room for an expanded program," Dr. Miller says. She brought in new faculty member, Joyce Yu, MD. Dr. Yu, a food allergy expert, brings enthusiasm and a personalized and multidisciplinary approach to care, Dr. Miller says.

She is also on a path to better integrate AI into pediatrics and engage division members in departmental activities, through conferences, for example. "Most of the interactions AI members have with patients are through outpatient visits, so we were not as integrated into the department as we could be." The division was ripe to be more integrated, she adds.

In addition to her leadership role Dr. Miller conducts her own research, and is co-deputy director of the Columbia Center for Children’s Environmental Health (CCCEH). Exposure to environmental allergens and pollutants are factors in the onset of allergies, asthma, and immune responses, and Dr. Miller’s research aims to determine their importance and to identify the mechanisms for the onset of asthma.

She and her colleagues are building a program in environmental epigenetics, the study of whether and how exposure to allergens and pollutants changes DNA structure and therefore gene expression. Specifically they are looking at DNA methylation, the addition of a methyl group to the DNA nucleotide cytosine, which affects how DNA is packaged and ultimately how well genes are expressed. “DNA methylation is a relatively new field in asthma. We are looking at short-term and long-term changes in methylation and what they might mean,” says Dr. Miller.

Along with other CCCEH researchers she is following a birth cohort begun in 1998 in northern Manhattan, to determine the role of exposure to air pollution and allergens in the development of asthma. “These kids are now adolescents,” says Dr. Miller, “and a lot of changes take place in adolescence regarding asthma. And children who continue to have asthma through adolescence are more likely to have it as adults. This is an important time of life.” In one study, Dr. Miller and her colleagues are tracking the exposure of one group of adolescents to air pollution—specifically black carbon soot, much of which is a byproduct of the burning of heating oil and traffic emissions—then monitoring the kids for DNA methylation changes in asthma genes. The kids’ exposure is tracked by a device they wear 24 hours a day on several different days.

Dr. Miller summarizes some of the big takeaway messages from her work: air pollution is bad, smoking is bad, exposure to widespread chemicals like phthalates and bisphenal A (BPA) are asthma risks, and prenatal exposures—especially to smoking—are important to developing asthma later in life. “And in some cases these exposures interact,” she adds.

With its focus on the relationship between prenatal exposure and health later in life, “AI is a fascinating area,” says Dr. Miller. “Asthma, allergies, and immunodeficiencies are on the increase worldwide, and we have to figure out why, and deliver the best care for these. This is the public health mission for our division.”

— Beth Hanson
Research Profile

OB/GYN Leads Data Analytics Sharing Project

For the last two years, a team of researchers, department administrators, and medical informatics programmers have been building a data repository to allow for easy, efficient, and accurate clinical data collection and analysis. Led by the department of Obstetrics and Gynecology’s vice chair of research, Dr. Ronald Wapner, the Department of OB/GYN, along with assistance from New York Presbyterian Hospital (NYPH), has made a major investment of resources and the time of its committee members to fill this need. Through collaboration with NYPH’s IT department, two projects that demonstrate the capability of gathering and integrating data from multiple sources are nearing completion: an OB Dashboard that delivers summary data for clinicians providing inpatient care and an electronic version of the delivery log.

“Timely, accurate clinical documentation is essential in providing quality care and—as a consequence—we have amassed vast amounts of electronic data,” Dr. Wapner says. “Unfortunately, access to and analysis of this data has proven to be difficult and has not kept pace with the rate of data acquisition. This was the problem we set out to solve two years ago. What we want to do is create a completely integrated data system for operational efficiency, quality assurance, and medical research.”

While Dr. Wapner oversees the overall direction of the group, the OB/GYN Director of Medical Informatics, Alexander Sicular, handles the technical aspects of the project. He draws examples and inspiration for the data sharing system from today’s leaders in technology. “We can take our cue from companies like Google, Yahoo, Facebook, Twitter, Amazon, and others. They have all contributed to the fields of data informatics and analytics and have created open source products that we should actively be employing as part of any data analytics platform. Some of our peers are already taking advantage of this and are giving their clinicians, researchers, and administrators access to a complete replica of their clinical data for ongoing unfettered analysis.”

For the team, getting this type of data had proven to be challenging.

“For one, there are a lot of difficulties with the different data systems,” Mr. Sicular says. “Just as we have multiple clinical documentation systems, we require multiple analytics systems. No one system can service every type of analytics request. The medical center’s enterprise platform is not intended to perform analytics, but rather to document care and then provide appropriate data to analytic applications, which allows the end-users to execute task specific queries.”

Project Manager Cynthia Masson has been adding her expertise in clinical system workflow and design to the team. She says, “Our clinicians have a multitude of clinical systems in which to enter data, none of which were designed by clinicians for clinicians. Our team believes that clinician input is crucial. In the past year, our team has successfully completed physician inpatient notes and order set alignments between the Children’s Hospital and the Allen Hospital. We are currently sharing our success and expertise with the east and downtown campuses. We are now working to optimize content within antepartum and plan to continue to collaborate with the NYPH family.” Similarly, assistant clinical professor Dr. Karin Fuchs is providing physician input for this group and streamlining the process of how physicians enter data. Dr. Fuchs says “Ultimately, the quality of the data we get out of our records is limited by the quality of the data we as clinicians enter into charts. While discrete data elements are needed to be able to extract specific variables, we are trying to incorporate these fields into our electronic record systems while still maintaining user-friendliness and a readable clinical record.”

Even after finding a way to link the different data systems at different campuses, which include Eclipsys, CROWN, Observer, and Eagle, challenges remained. These challenges have included both technical and operational issues. However, the team views overcoming these challenges as valuable learning experiences. “The challenges will not be unique to our project, but the overall experience gained in overcoming them will give others experience on how the process can be improved,” Dr. Wapner says. “We are dedicated to sharing our experience and improving the process. The goal of this project is to provide all departments at our institution a template for how they can incorporate their own data management systems.”

The project continues to be a work in progress. An accessible, integrated, and real-time data system remains their end point. “Presently, accomplishing even the most rudimentary data request takes an inordinate amount of time frustrating administrators, managers, and researchers,” Dr. Wapner says. “Overtly, near real-time data is necessary to perform day-to-day operations. A robust intellectual environment such as Columbia and NYPH requires a system in which data is understood to be a creative tool.”

Dr. Wapner says. “The value here is the ability of machine learning to identify previously unsuspected relationships. An approach which is impossible when only structured pre-specified data is available.”

The solution that the committee proposes is to develop such systems that will allow for the collection of data by having trusted users of local systems, implementing robust and transparent security, and auditing core toolsets.

“What we want to do is have the computing capabilities and empowerment to answer questions we have today and be able to answer questions we don’t know we’ll have in the future.” Dr. Wapner says. “At an institutional level, our efforts should be consistent with a vision to develop an analyzable data repository accessible to trusted end-users to inform quality, operations, and research. By building a sound foundation of transparent policy and investing in core technology building blocks, we believe this vision can be made a reality.”

— Matt Talucci
Do you get certified on new planes and spacecraft, pilots and crews man the controls for days or weeks, encountering routine situations, emergencies, and rare events—and these hours are logged in the cockpit of a flight simulator. With as much at stake in medicine as in flight, teaching hospitals are increasingly using simulation to expose young doctors and staff members to the range of events that can unfold in a healthcare setting. New, sophisticated technologies such as virtual operating rooms and lifelike mannequins, as well as restricted working hours for residents, have motivated hospitals to adopt simulation as a training tool, and are transforming medical education in the process, says Katherine Biagas, MD, Associate Director of the Division of Pediatric Critical Care Medicine and Associate Medical Director of NewYork-Presbyterian Hospital’s Simulation Program.

“Simulation enables trainees and staff to get experience with a variety of situations and procedures—including rare events that a young doctor might see just once in a three-year fellowship—and can help teams of caregivers learn to work smoothly as a group in both everyday and unusual situations,” Dr. Biagas says. “In the past we all learned by practicing on patients. But if you don’t have to do something for the first time on a patient why should you?”

Both the Pediatrics and OB/GYN departments now use simulation exercises regularly throughout the year. In the neonatal ICU residents practice caring for premature and term newborn infants on a mannequin that looks and acts very much like a newly born baby. In the pediatric emergency room residents, paramedics, and the entire ER team regularly take part in simulations of severe traumas and of children presenting with heart disease, for example. On patient floors nursing staffs perform mock codes both alongside residents and separately, working through challenges such as locating specific medications during an emergency. Following the model of an annual East Coast simulation “boot camp” program for critical care practitioners, Pediatrics now offers its own one-day boot camp for incoming interns as part of their orientation and another for fellows. The camps, held this past June, focused on professionalism and on refreshing resuscitation skills.

One tool that can make a simulated situation feel very real is a lifelike, “high-fidelity” mannequin that can breathe, has a pulse, generates a blood pressure, cries, talks, and undergoes a seizure. Participants in a simulation exercise work through the procedures to put the “patient” on a ventilator and hook him up to a monitor, which they then configure as they would in the ICU or on the floor. “Within a few seconds you can get very engaged as the mannequin starts to have problems,” Dr. Biagas says.

More doll-like, “lower fidelity” mannequins can be very helpful in situations such as teaching parents how to care for a child’s tracheostomy, Dr. Biagas says. Task trainers—torsos, arms, and other body parts that are anatomically correct and look and feel real—help trainees learn and practice key skills such as placing tubes, needles, and catheters.

Pediatrics has also begun using simulation to help physicians and staff work through some common social encounters. Through interactions with “standardized patients”—actors specially trained to play patients with specific symptoms—trainees can get experience making diagnoses. And with actors in the roles of caregivers, trainees practice obtaining informed consents or encountering angry parents. “Appropriately trained actors can give direct feedback—describe how they felt and what their reactions were to certain words,” says Dr. Biagas. “This is the kind of feedback that you would never get from an actual parent.”

Simulation is most fruitful when well-trained debriefers work with trainees and staff to both process their emotions and highlight the medical points—“because both the learning and the processing take place during debriefing,” Dr. Biagas says. “Some people are upset after a simulation. Through a group discussion the debriefer gets the group to explore and process their emotional responses to the situation they’ve been through together.”

The simulation program also holds group discussions about the use of social media in medicine, covering issues like professionalism and communication, and what’s appropriate and not appropriate in this setting. “We know that these questions will come up, and we want to explore them with the trainees at the start of their experience,” says Dr. Biagas.

Dr. Biagas and her group are looking forward to the completion of the new medical school building, which will have dedicated space for standardized patient programs, simulated operating rooms, and scenario simulations, she says. In the meantime, “we are creating many ‘in situ’ simulations to give trainees practice for the real thing.” — Beth Hanson
When Rajasekhar Ramakrishnan, PhD, Director of the Biomathematics/Biostatistics Division in the Department of Pediatrics, completed his degree and began working at CUMC in 1973, biostatisticians’ workhorse for analyzing clinical trial data was the room-sized mainframe computer. Four decades later, things have changed. Physician-researchers can now crunch data on their laptop computers; however, a few fundamental aspects of clinical research remain unchanged: the importance of framing a cogent research question before embarking on a study and analyzing the resulting data properly. To provide new doctors an understanding of these skills, Dr. Ramakrishnan teaches a biomathematics rotation to residents. In addition, in conjunction with his colleague Steve Holleran, the other member of the division, they also collaborate with more senior physician-scientists on the design and analysis of complex studies requiring their biostatistical expertise.

A few years ago, the Department of Pediatrics began offering residents the option of a biomathematics rotation, and with a renewed emphasis on research, the Department now requires incoming residents to devise a research project and identify a mentor by the end of their first year. “If residents plan on a clinical research project, they are strongly encouraged to do this rotation,” Dr. Ramakrishnan says. During the two-week rotation, residents learn about clinical research design and how to analyze and manipulate data. At the completion of the course, “they are well-equipped for their project,” he adds. The main focus of the rotation is helping residents determine whether their research projects make sense statistically. “Sometimes they come up with a question, and their mentor says, okay, here are some data. But answering the question definitively might require a much bigger database, or much larger study; thus we analyze this critically up front, giving residents the chance to say, ‘there’s no point in my spending three months on this, because this question cannot be answered with the data I have.’” At the end of the rotation residents write up their proposals and present them to their colleagues and mentors. This past summer, 19 of 24 second-year residents participated in the elective rotation.

Dr. Ramakrishnan and Mr. Holleran are also available to advise established investigators in the Department of Pediatrics how to do basic statistical analysis on their own, and may be called in to work on more complicated studies. The pair frequently collaborate with Melissa Stockwell, MD, MPH, in the Division of Child and Adolescent Health who is very interested in using new technologies to improve patient care, says Dr. Ramakrishnan. Recently, Dr. Ramakrishnan and Mr. Holleran worked with Dr. Stockwell to design a complex randomized crossover trial based in four clinics in the community during two periods in the fall and two in the spring, to discern any seasonal or month-to-month trends in vaccinations. “Melissa is very creative and is constantly looking to bring newer approaches to health care delivery,” says Dr. Ramakrishnan.

Other collaborators in pediatrics include diabetes researcher Michael Rosenbaum, MD, whose project “ROAD” examined the effects of supervised exercise and education on Type II diabetes and obesity risk factors among middle age children. In addition, they have worked with neonatologist Sudha Kashyap, MD, to design clinical studies in newborns, and with Peter Dayan, MD, who is currently participating in a multicenter emergency medicine study to determine which aspects of seizures are predictive of abnormalities in a scan.

Dr. Ramakrishnan says, “It’s very easy to do a trial where you don’t design the study properly, and then you can end up with results that are not interpretable. You do need to design these studies with some care so that you can get the effect that you’re looking for without it being confounding by other factors.” — Beth Hanson
Providing Support for Gynecological Cancer Patients

Psychosocial support during cancer treatment can be highly beneficial to many patients, but programs specifically addressing the needs of gynecological cancer patients are scarce. Woman to Woman is a unique program that connects newly diagnosed gynecological cancer patients with survivors who have been previously diagnosed with the same form of cancer and have been in remission for at least two years. This program is focused on building one-on-one relationships between the patient and survivor volunteer and offering advice, guidance, and hope.

Gynecological oncologist Sharyn Lewin, MD, came to CUMC/NYP in 2009 and identified a need for a program to provide psychosocial support for gynecological cancer patients. After learning about the Woman to Woman program, Dr. Lewin felt that it would be an excellent resource for patients here and could provide a valuable service. At the same time, the Ovarian Cancer Research Fund was seeking to expand Woman to Woman from its location at Mount Sinai Hospital, NY to a second center as a pilot expansion site. While many hospitals were interested in adopting the Woman to Woman program, CUMC/NYP was selected and the program was implemented in November of 2012.

In addition to the one-on-one support, what differentiates Woman to Woman from other cancer support programs is the flexibility in tailoring to the patients and their particular diagnosis. Connecting a patient with a survivor volunteer that has experienced the same type of gynecological cancer can be a meaningful experience that they may not encounter in a support group. “Cancer support groups can be tricky for making connections,” says Woman to Woman Program Coordinator Ellen Kapito, RN, OCN. “Even if you have the same type of cancer, there are different stages, cell types, treatments, and ages present at the groups. When it’s one-on-one and there’s a connection, it’s very meaningful.” Dr. Lewin adds, “Many gynecological cancer surgeries are much more in-depth than other types of cancer surgeries because they involve the abdomen and pelvis, which often have longer recovery times. These types of cancers are very unique to treat in and of themselves, let alone the psychosocial support the patients may need.”

All patients being treated for gynecological cancers at CUMC/NYP are offered the program at no cost, starting from the day of diagnosis. Because surgery often occurs quickly after diagnosis, many choose to wait until after their surgery to inquire about the program prior to starting chemotherapy. Some women also request to speak with a volunteer pre-operatively to learn about the surgery itself, what to expect, and advice for recovery. The volunteers encourage the patients to become advocates for their treatment and speak up with questions and concerns, though some feel more comfortable discussing certain issues with their volunteer first. “When a patient is having questions about whether or not to ask their doctor, the volunteers are great about emphasizing ‘yes, you need to ask the doctor,’” says Ms. Kapito. “Likewise, patients may not feel comfortable talking about taboo topics like dating and sex with doctors, but may feel comfortable talking to their volunteer.” To prepare the survivors for discussions such as these, they undergo volunteer training sessions that include role-playing as patients to prepare them for possible questions. The volunteers also attend monthly meetings where they can discuss issues or concerns with the staff, fellow survivors, and a psychologist.

Participating patients in the program also receive an information and resource guide that covers a range of topics such as treatment options, side effects, insurance, and fertility. “It’s such a life-changing event,” states Dr. Lewin. “We can be so focused on the surgical and medical aspects, but it’s important to bring in the psychosocial to treatment as well. This is for not only supporting the patients, but their families and caregivers as well.” Included in the guide is a section for caregivers of women with gynecological cancers, with advice on providing support to their loved one during and after treatment.

In the time that Woman to Woman has been offered at CUMC/NYP, it has already shown to provide a significant service to patients, as well as a benefit to survivors in sharing their knowledge and experiences to help others. In the next phase of the program, Dr. Lewin and Ms. Kapito will incorporate a range of integrative therapies, complementary medicine, and nutritional information to aid in stress and anxiety management and coping with the treatment side effects.

Based on the success of the pilot expansion program, the Ovarian Cancer Research Fund has expanded Woman to Woman to an additional 15 sites at hospitals and centers across the country. “We are really proud that we were the first pilot site, and our success propelled them to open up more sites,” says Dr. Lewin. “This program really is the model for cancer support because so many women don’t feel comfortable talking in a group setting. It provides so much hope through example.”

— Elizabeth Gough-Gordon
Children’s Board Offers New Strategic Tools

New York City is the place for business, entertainment, cuisine, and culture. Everything about the City is superlative, and that includes the care sick children receive here. To secure Columbia University Medical Center’s (CUMC) position as the local and world leader in pediatric care, many constituencies and partners at CUMC are collaborating with each other and with advocates and advisors from the community.

The Children’s Board at Columbia, the culmination of this collective effort, is modeled after the Medical Center’s Board of Advisors, whose members help the Medical Center fulfill its strategic plans. The new Children’s Board will provide assistance, support, and advice to Lawrence R. Stanberry, MD, PhD, Chair of the Department of Pediatrics, and his leadership team.

The Children’s Board, which launched this year, has assembled an outstanding group of prominent New Yorkers dedicated to maintaining and enhancing excellence in patient care, research, and education at CUMC. The Board will enable us to be the best children’s enterprise in the metropolitan region and also one of the foremost Pediatrics programs in the country.

Karen A. Kennedy, MD, a retired pediatrician and distinguished alumna of the Columbia College of Physicians and Surgeons, is leading the Board as its first chair. She collaborates closely with Dr. Stanberry and Michael Weiner, MD, Vice Chair for External Relations. “The work taking place at Columbia in the area of children’s health is incredibly exciting,” says Dr. Kennedy, who also serves as a member of the Medical Center’s Board of Advisors. “I am honored to lead this initiative and look forward to expanding on the success that has already made CUMC a leader in the field.”

The Board will play a strategic role in identifying initiatives that advance progress toward new treatments and cures for diseases affecting children and adolescents. It will also help mobilize resources and cultivate new partnerships to implement these initiatives. Nearly 50 volunteers have joined the Board so far, bringing diverse expertise from a range of fields, including finance, real estate, law, the arts, media, and marketing. Board members will stay abreast of the latest medical developments at Columbia, and provide strategic counsel to assure that children and adolescents continue to receive state-of-the-art, family-centered care.

“We have had terrific success recruiting a talented group of Board members,” says Dr. Kennedy. “We hope to make the Board aspirational and recognizable as a formidable presence and voice for the children of New York and beyond.” The Board will draw on its diverse expertise to help raise awareness of the major issues in pediatric healthcare, working with CUMC faculty to identify and meet both the short-term and long-term needs of the children’s programs at Columbia.

“We have an amazing faculty, world-class facilities, and more than a century’s worth of experience in medical research and education dedicated to children,” says Dr. Kennedy. CUMC has more than 30 children’s specialties, 19 of which are in the Department of Pediatrics. A key component of the Board’s mission is to foster productive collaborations across departments and with our partners at NewYork-Presbyterian Morgan Stanley Children’s Hospital.

Drs. Stanberry and Weiner agree that the Children’s Board will be a game-changer for the Department of Pediatrics and all of the children’s specialties across the Medical Center. Dr. Kennedy adds, “We see Columbia as the leading pediatric health provider in the greater New York City region, and a global destination for children with complex illnesses.”

— John Uhl
A “Hybrid” Approach to Mending the Heart

In years past, many pediatric heart surgeries were done through a large incision in the child’s chest so that surgeons could gain access to the heart to repair congenital disorders. As refinements in pediatric heart care grew, interventional cardiologists devised ways to mend heart defects through narrow tubes, called catheters, threaded through blood vessels leading into the heart. These early “transcatheter” procedures allowed interventional cardiologists to open tight valves in the heart or close unwanted blood vessels without surgery, sparing the child from a lengthy hospitalization and recovery.
At NewYork-Presbyterian Morgan Stanley Children’s Hospital, pediatric heart specialists are integrating surgical and catheter-based approaches to treat young patients in the hospital’s “hybrid operating room (OR),” which are particularly effective for treating heart defects that cannot be repaired with surgery or cardiac catheterization alone.

Hybrid heart surgery refers to procedures that use both conventional surgical methods and minimally invasive catheter-based approaches. These less invasive techniques require a smaller incision through the breast bone or right side of the child’s chest. They often avoid the need for cardiopulmonary bypass (heart-lung support by a machine) and offer the advantages of less pain and a faster return to the child’s normal activities.

While the hybrid approach has become routine for some adult heart surgeries, Morgan Stanley Children’s Hospital is one of only a handful of centers with a hybrid OR for pediatric heart patients. At the hospital’s Congenital Heart Center, each patient is first evaluated by the hybrid team to see if less invasive treatment options are possible.

“We try to make the surgery less invasive by doing less with traditional surgery and more with interventional cardiology techniques,” explains Emile A. Bacha, MD, Chief of Congenital and Pediatric Cardiac Surgery at NewYork-Presbyterian, who has pioneered several hybrid approaches to heart surgery in children. He noted that about 5 percent of the surgeries he performs can be accomplished using the hybrid approach.

The hybrid OR is a traditional operating room with catheterization equipment mounted on the wall. The catheterization tools can be moved into place during hybrid OR procedures, and left against the wall during conventional surgery. Catherization procedures are guided by specialized x-ray imaging equipment and a special table, which facilitate the work of the pediatric heart surgeon and the interventional cardiologist performing hybrid procedures.

“When the surgeon is working through a smaller chest incision to perform a minimally invasive surgery, this specialized imaging equipment allows the heart team to see the blood vessels and heart structures they are treating more clearly,” says Julie A. Vincent, MD, Chief of Pediatric Cardiology and Director of Pediatric/Congenital Interventional Cardiology at Morgan Stanley Children’s Hospital. “We can also assess the results of these procedures immediately after surgery, while the patient is still in the hybrid OR.”

In some cases, a hybrid approach may enable the team to treat a condition with a single procedure rather than a series of surgeries, or to treat conditions that would otherwise be inoperable. Examples of procedures that can be accomplished using the hybrid approach include:

- **Hypoplastic left heart syndrome (HLHS),** in which the left side of the heart does not form correctly. To survive, babies born with this anomaly must undergo surgery in the first week of life. Until recently, the only treatment available was a series of three difficult standard open operations, with the first stage of surgery (termed the “Norwood procedure”) performed within the first days of life and requiring cardiopulmonary bypass. Doctors can use a hybrid approach as the first surgery for some newborns, which helps to protect them at this vulnerable age and enables them to become stronger. At six months of age, when the baby is better able to handle major open surgery, surgeons correct the remainder of the problem using conventional methods.

- **Ventricular septal defect repairs (VSDs),** in which doctors close a hole in the wall separating the right and left ventricles of the heart. Certain holes are difficult to get to using open heart procedures, or there may be multiple holes that cannot be closed in a single operation. Interventional cardiologists are able to close these types of holes using catheter-based procedures in many of these patients; however, babies and small children do not always tolerate the larger catheters needed to position transcatheter closure devices. The hybrid technique allows doctors to go through a small chest incision and deploy a device to close the holes more safely in these smaller patients, without conventional open heart surgery or bypass and often preventing the need for multiple procedures. Morgan Stanley Children’s Hospital heart specialists have developed special instruments that allow them to make these repairs using much smaller incisions than previously possible.

- **Percutaneous valve replacement therapy,** which enables interventional cardiologists to employ a less invasive, non-surgical option for repairing and replacing inadequate heart valves by threading a catheter inserted into the groin up to the heart. “This new technology has allowed us to decrease the number of open heart surgeries that many of our patients would otherwise require,” said Dr. Vincent. Many of the more common congenital heart defects require patients to undergo multiple valve replacements throughout their lifetimes. Up until the past five years, this could only be done using conventional surgery. “Our ability to perform catheter-based valve replacements has allowed us to prolong the function of surgically placed valves and to significantly decrease the number of surgeries many children with congenital heart disease will need over their lifetimes—which, in turn, improves their quality of life,” she added.

“Sometimes there are heart problems that can’t be treated fully just with surgery or just with interventional cardiology,” concluded Dr. Bacha. “By combining both, we can explore new avenues for treating these particularly challenging defects.”— Rosie Foster

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**We try to make the surgery less invasive by doing less with traditional surgery and more with interventional cardiology techniques**
In the News

THE NEW YORK TIMES

Delayed Umbilical Cord Clamping Not Suitable for All, Says Dr. Gyamfi-Bannerman

The umbilical cord is typically clamped less than 1 minute after birth to minimize the risk of maternal hemorrhaging, but a study in the Cochrane Database of Systematic Reviews found benefits to delaying the clamping and severing of the umbilical cord in newborns. Infants whose umbilical cords were not clamped until at least 1 minute after birth had higher hemoglobin levels and improved iron stores compared to those with early cord clamping, without any increased risk to the mother. Maternal fetal medicine specialist Dr. Cynthia Gyamfi-Bannerman was quoted in the New York Times, warning that delayed clamping could increase the risk of postpartum hemorrhage in Caesarean deliveries. “We don’t have enough information on the effects of delayed cord clamping for someone undergoing a Caesarean delivery in terms of postpartum hemorrhage,” Dr. Gyamfi-Bannerman said. “It’s not something we’ve really looked at.” In some scenarios, Dr. Gyamfi-Bannerman adds, there is an increased risk of postpartum hemorrhage.


HUFFINGTON POST

Dr. Sauer Responds to Veto of California Bill Allowing Women to Sell Eggs for Research

California Governor Jerry Brown recently vetoed legislation that would have allowed women to sell their eggs for medical research. While women in the state are allowed to sell their eggs to fertility clinics, California is one of only three states that ban women from selling their eggs for medical research. Some critics of the bill were concerned that it would take advantage of low-income women in need of money, but reproductive endocrinologist Mark Sauer, MD called it an “absolutely myth and a misrepresentation of the reality. It sadly demonstrates the lack of understanding such individuals possess about how egg donation is performed in this country.” Since 2009, over a third of participants in Dr. Sauer’s egg donation research program have been Caucasian and two-thirds have earned a college or graduate degree. “They do undergo a lot of risk but it’s an acceptable risk. This is a 35-year-old medical procedure, and the safety track record is well-defined.”

http://www.huffingtonpost.com/2013/08/14/california-women-sell-eggs-research_n_3756776.html

WASHINGTON POST

Dr. Wapner Supports New Prenatal Genetic Testing

A new form of prenatal genetic testing has been shown to be just as effective as standard prenatal methods for detecting chromosomal disorders, but questions regarding its widespread application are currently being debated. The Washington Post recently reported on this issue, including an article published in the New England Journal of Medicine by CUMC/NYP reproductive geneticist Ronald Wapner, MD. Chromosomal microarray analysis was shown by Wapner and collaborators to be as effective as the standard method of amniocentesis analysis (karyotyping) in analyzing the number of chromosomes in the fetal genes. In addition, the test found DNA abnormalities not detected in karyotyping. In just the past two to three years, Dr. Wapner says, “the genetic testing that’s available for pregnancies has become phenomenally more advanced.” Although some experts argue that microarray testing may show genetic abnormalities that are not problematic or are linked to known disorders, Dr. Wapner asserts that this is not a case of too much information. “Why not get as much information as you can?” he asked. This information, he explained, can assist patients in making informed decisions regarding their options and prenatal therapies.

http://www.washingtonpost.com/national/health-science/new-prenatal-tests-provide-more-information-but-link-to-problems-aren’t-clear/2013/08/26/7dd85dfb-e7eb-11e2-a301-ead5a8116d2f_story.html
In the News

**REUTERS HEALTH**

Many early preemies face developmental delays, Dr. Noble says

While substantial numbers of extremely preterm infants later develop moderate to severe neurodevelopmental impairment, the results of a recent study “are not completely bleak,” Kimberly Noble, MD, a pediatrician who studies child brain development, told Reuters Health. Dr. Noble was commenting on research published recently in JAMA Pediatrics that pooled the results of nine studies in which close to nine hundred 4-8 year-old European children born between 22 and 25 weeks’ gestation were assessed. The research overall showed that, “babies born at 25 weeks’ gestation or earlier and survive early life have a ‘substantial likelihood’ of having a very low IQ or other neurodevelopmental problems in childhood. But over half of the children studied did not go on to develop moderate to severe impairment,” Dr. Noble noted. She concluded that it’s unclear whether rates of impairment would be similar for US babies born very early.


**CBS/NY & DES MOINES REGISTER**

Dr. Rosenbaum on study showing “weight-shaming” leads to weight gain

Weight discrimination is common at work, in dating, and even in the media. But does shaming people help people lose weight? In a segment on CBS NY, pediatrician and obesity researcher Michael Rosenbaum, MD, commented on a recent study in PLoS ONE (Sutin AR, Terracciano A (2013) Perceived Weight Discrimination and Obesity. PLoS ONE 8(7): e70048). “The theory is if you make them feel ashamed, that then they will be more likely to engage in behavior to address the problem,” said Dr. Rosenbaum, but the study showed that shaming has the opposite effect. Middle-aged adults who have been subjected to weight discrimination were much less likely to lose weight, and even gained weight as a result of their perceived fat-shaming. Dr. Rosenbaum also commented on this study in the Des Moines Register. Weight problems become much harder to resolve as a child ages, he said, and changes in the brain during adolescence may make it harder for a heavy teen to return to a healthy weight. “So the best time to intervene to prevent adult obesity is in the years before puberty.”

http://newyork.cbslocal.com/2013/07/31/study-fat-shaming-doesnt-work
In the News

THE ATLANTIC
It’s important to treat gut problems in autism, Dr. Margolis says

As many as 70 percent of kids with autistic spectrum disorder have gastrointestinal (GI) abnormalities at some point during childhood or adolescence, and they are 3.5 times more likely to have constipation or chronic diarrhea than children who are not autistic—and kids may become aggressive and frustrated because they have no other way of saying that their stomachs hurt. Autistic children who act often do so simply because they’re constipated, which can also mean they stop sleeping and eating well, pediatric gastroenterologist Kara Margolis, MD, told The Atlantic. Once their GI problems are treated, “their whole lives turn around,” Dr. Margolis said. “They’re not miracles. They seem like miracles, but really all it takes is a recognition that GI things happen in these kids and they manifest in very different ways than in kids who are not autistic.” She added, “Many doctors don’t recognize that the aggressive behavior is not part of autism. This is really a new field.”


NEWSTRACK INDIA
Dr. Romo says teen girls who exercise are less likely to be violent

Regular bouts of physical exercise may help decrease violent behavior among adolescent girls, according to Noe D. Romo, MD, primary care research fellow in community health, and lead author of an analysis of a survey of 1,312 inner-city high school students. Dr. Romo presented the results of the survey at the Pediatric Academic Societies (PAS) annual meeting in Washington, DC, and spoke about the study to Newstrack India. The survey was designed to determine if there is an association between regular exercise and violence-related behaviors, and showed that females who reported exercising regularly had decreased odds of gang involvement, carrying a weapon, or being in a fight. “Violence in neighborhoods spans the entire length of this country and disproportionately affects the poor and racial and ethnic minorities. It results in significant losses to victims, perpetrators, families and communities and costs our country billions of dollars,” Dr. Romo said. “This study is only a start,” he added. “Further studies are needed to confirm this association and to evaluate whether exercise interventions in inner-city neighborhoods can decrease youths’ involvement in violence-related behavior.”

http://www.newstrackindia.com/newsdetails/2013/05/06/166-Teen-girls-who-exercise-less-likely-to-be-violent.html
Each year, members of the Departments of Obstetrics and Gynecology and Pediatrics publish several hundred research articles in medical journals. Below are highlights from those publications.

**Pediatrics**


**OB/GYN**


Linda Addonizio, MD, (Cardiology) will be the site principal investigator for the research study, “Pediatric Heart Transplantation: Transitioning to Adult Care [TRANSITION],” a recently funded initiative of the National Heart, Lung, and Blood Institute. The pilot trial aims to develop and test an intervention to improve outcomes for emerging adults who have undergone heart transplantation as children.

Staci Arnold, MD, MBA (Hematology, Oncology, and Stem Cell Transplantation) has been chosen to receive a four-year Robert Wood Johnson Foundation Harold Amos Faculty Development Award. This prestigious and highly competitive national award supports up to nine scholars a year.

David Bank, MD, (Vice Chair, Clinical Operations) and Lynne Quittell, MD, (Pulmonology) are newly elected ColumbiaDoctors Board of Governance members for the 2013-2016 term.

David Bell, MD, (Child and Adolescent Health) has been invited to speak about the impact of fathers’ involvement on pregnancy, birth outcomes and the health and development of children during the first year of life by the Eunice Kennedy Shriver National Institute of Child Health and Human Development (NICHD) in collaboration with the Administration for Children and Families (ACF), the Maternal & Child Health Bureau, Health Resources and Services Administration (HRSA), and the NIH Office of Behavioral and Social Sciences Research (OBSSR).

Gina Coscia, MD, (Pulmonology) received the Thrasher Research Fund Early Career Award for her project entitled, “Novel microbial detection techniques in pediatric patients with Cystic Fibrosis: The role of viral infection.”

Mary E. D’Alton, MD, (Obstetrics and Gynecology, has been appointed Chair of the Pregnancy Foundation Board, the non-profit foundation of the Society for Maternal-Fetal Medicine.

Annika Hofstetter, MD, and Susan Rosenthal, PhD (Child and Adolescent Health) received a Pfizer Medical Education Fund Early Career Award for their project entitled, “A multilevel approach to understanding and reducing missed opportunities for vaccination among adolescents with chronic medical conditions.”

Lauren Chernick, MD, and Daniel Tsze, MD (Emergency Medicine), and Annika Hofstetter, MD, (Child and Adolescent Health) are recipients of 2013 Irving Institute/Clinical Trials Office (CTO) Pilot Awards by The Irving Institute for Clinical and Translational Research. Dr. Chernick’s research will focus on text messaging from the pediatric intensive care unit to increase contraception initiation amongst adolescent females at high pregnancy risk; Dr. Tsze’s study looks at optimal administration of intranasal midazolam; and Dr. Hofstetter’s research focuses on optimizing influenza and pneumococcal vaccination of children with chronic medical conditions.

Jessica Fanzo, MD, (GI, Hepatology & Nutrition) received a grant from the Global Alliance for Improved Nutrition to fund research on improving nutrition outcomes for northern Kenya pastoralists. Dr. Fanzo was also invited to give a keynote talk at the First International Conference on Global Food Security in the Netherlands.

Nancy Green, MD, (Hematology, Oncology, and Stem Cell Transplantation) received an NIH R21 grant for her project, “Hydroxyurea Adherence for ‘Personal Best’ in Sickle Cell Treat- ment: HABIT.” Dr. Susan Rosenthal is a co-investigator on this project.

Neera Gupta, MD, (GI, Hepatology and Nutrition) was selected as Chair of the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN) Research Committee and participated. She and her team presented the NASPGHAN Research Agenda to the NIAID, NIDDK, and the NICHD, and met with representatives on Capitol Hill to present the NASPGHAN 2013 Policy Priorities.

Thomas Hooven, MD, (Neonatology) was chosen as this year’s recipient of the Pediatric Scientist Development Program. This is the third consecutive year that a Columbia fellow has won this award.

Steve Kernie, MD, (Critical Care) was awarded a two-year NIH grant for his project, “Therapeutic enhancement of neurogenesis following traumatic brain injury.” In addition, Dr. Kernie and Gary Brittenham, MD, (Hematology, Oncology, and Stem Cell Transplantation) are co-investigators in a recently awarded NIH R01 grant entitled “Harmful effects of red cell transfusions are medi- ated by iron.”

David Kessler, MD, (Emergency Medicine) has been invited to serve on the advisory council for the Rutgers School of Health Related Professions Inter-professional Center of Excellence, which is dedicated to studying inter-professional education and practice in the health professions.

Sivan Kinberg, MD, (Gastroenterology) has been awarded a National Library of Medicine post-doctoral training grant in bioinfor- matics. The grant will fully fund her stipend and tuition toward her Master’s degree in informatics.

Mays Koenig-Dzialowski (student mentor-Phil LaRussa, MD,) was awarded the David E. Rodgers Fellowship from the NY Academy of Medicine, which will fund her study, “Filling the gap: A Needs Assessment of Adolescents in Kampala Uganda.”

Andrew Kung, MD, PhD, Jennifer Levine, MD, Julia Glade Bender, MD, and Jennifer Oberg, MD, (all members of Hematology, Oncology, and Stem Cell Transplantation), received a two-year CAMPR award for their work entitled, “Overcoming Challenges to Meaningful Informed Consent for Whole Genome Sequencing in Pediatric Oncology.”

Christine Lauren, MD, (Dermatology) was selected by the Society for Pediatric Dermatology’s (SPD) Awards & Goals Committee as one of three 2013 Pilot Project Award recipients based on her submission, “Development of a topical antibiogram for staphylo- coccus aureus and other cutaneous isolates in pediatric patients with atopic dermatitis.”

Kara Gross Margolis, MD, (GI, Hepatology and Nutrition) received funding from The Autism Research Institute/ The Jane Botsford Johnson Foundation for her research evaluating the role of serotonin as a chemical mes- senger in the gastrointestinal tracts of children with autism. Dr. Margolis was elected as a council member for the North American Society for Pediatric Gastroenterology, Hepatology and Nutrition (NASPGHAN), and was selected by the American Gastroenterological Association to give a “Rising Star” research talk in Berlin at the European Gastroenterology Meeting.

Philip LaRussa, MD, and collabora- tors Drs. Anthony Mborie and Esther Buregyeya from the Department of Pediatrics, Makerere University, Kampala, Uganda received a three-year, USAID-funded grant to assess the ef- fect of strengthening the referral of sick children by village health teams and its impact on child survival in Uganda.

A presentation by Dodi Meyer, MD, and Anne Armstrong-Coben, MD, (Child and Adolescent Health) collaborating with faculty from Family and Internal Medicine, entitled “Attracting Medical Students to Primary Care: A Collaboration Between Family Medicine, Internal Medicine, And Pedi- atrics,” was accepted for presentation at the STFM (Society for Teachers of Family Medicine) Conference on Medical Student Education. In addition, Dr. Armstrong-Coben’s program was spotlighted by Healthy Tomorrow’s Partnership for Children in America’s Guide to Family Services in its August newsletter. http://www2.aap.org/ commpeds/Spotlights/Spotlight-Arm- strong-Coben.pdf

Rachel Miller, MD, Director of Pediatric Allergy and Immunology, received a three-year NIH grant, part of a Research Supplement to Promote Diversity in Health-Related Research. The grant will support the work of Dr. Miller and of Stephanie Lovinsky-Desir, MD, (Pul- monology) on air pollution exposure, epigenetic regulation, and asthma.

Kimberly Noble, MD, PhD (Child and Adolescent Health) was invited to join the Early Childhood Interventions Network, an interdisciplinary global network of scholars in the field of hu- man capital and economic opportunity. Dr. Noble was also named co-investi- gator on a “Nurture Science Program” grant by the Einhorn Family Charitable Trust, and is the recipient of the GH Sergievsky Pilot Award. In addition, Dr. Noble spoke on “Socioeconomic Disparities in Neurocognitive Develop- ment: A Global Perspective” at the Columbia Population Research Center, and at the Society for Research in Child Development in Seattle, on, “Ges- tational length and neurodevelopment among healthy children with a stable neonatal course” and “Socioeconomic Disparities in Brain Structure Across the Life-Span.”

Steve Paik, MD, (Child and Adoles- cent Health) won the Faculty Teacher of the Year award.

Alice Prince, MD, (Infectious Disease) received a RO1 grant award from NIH for her project, “MRSA Activation of Human Keratinocyte Signaling.”

Boyd Richards, PhD (Child and Adolescent Health) has been invited to serve as a Review Board Member of Teaching and Learning in Medicine: An International Journal.

Marc Richmond, MD, (Cardi- ology) is the principal investigator at NewYork-Presbyterian/Morgan Stanley Children’s Hospital of the NIH/NHLBI Pediatric Circulatory Support Program, which is funding the development of five novel circulatory support devices for infants and young children. During the current phase of the project (PumpKIN: Pumps for Kids, Infants and Neonates) researchers will complete the studies needed to gain FDA approval to begin clinical testing of the devices.

Noe Romo, MD, (Child and Adoles- cent Health) was invited to speak at the University of Austin at a conference on young, disadvantaged Latino youth, and was also asked to run a workshop at the Young People’s Peace and Jus- tice Conference in New York City.

Susan Rosenthal, PhD, Director of Child and Adolescent Health and Vice Chair of Faculty Development, was ap- pointed to the Association of American Medical Colleges’ (AAMC) new Council of Faculty and Academic Societies. The Council represents faculty’s voice within the AAMC leadership structure, and replaces the current Council of Academic Societies.

Wei Shen, MD, (GI, Hepatology and Nutrition) has received a two-year RO1 NIH grant for her research on, “Contribution of Organ Size to Adaptive Thermogenesis during Caloric Restriction.”
Aviva Sopher, MD, (Endocrinology) was awarded the TRANSFORM K12 Award from the CTSA/Irvine Institute to support her research, “Effect of metformin on insulin resistance, non-alcoholic fatty liver disease and body composition in nonobese adolescents with polycystic ovary syndrome.”

Melissa Stockwell, MD, MPH (Child and Adolescent Health/Population and Family Health) has been selected as an “Irving Scholar,” and will hold the title “Florence Irving Assistant Professor of Pediatrics and Population and Family Health” for a three-year term. The award will fund her research project, “Comparative Effectiveness of Interactive, Health Literacy Promoting Text Messages on HPV Vaccine Completion in Minority Adolescents.” Dr. Stockwell and collaborators Sekhar Ramakrishnan, PhD and David Vawdrey, PhD from the Department of Biomedical Informatics also received a grant from the Agency for Healthcare Research and Quality for their study, “DEVISE: Data Exchange of Vaccine Information between an IIS and EHR.” Dr. Stockwell and Philip LaRussa, MD, (Infectious Diseases) are co-PIs on a two-year grant from the CDC’s Clinical Immunization Safety Assessment network for their project, “Assessing the Feasibility of Monitoring Vaccine Safety in Pregnant Women Using Text Messaging.”

Anu Subramony, MD, (Child and Adolescent Health) recently completed the Clinical Quality Fellowship Program sponsored by the Greater New York Hospital Association and the United Health Fund. Her quality improvement project was chosen as one of the four top projects and she was chosen to present at the culminating dinner. Dr. Subramony was also invited to speak at the Society of Hospital Medicine’s Annual Meeting on, “Strategies to improve communication between patients/families and medical teams.”

Shiu-Lin Tsai, MD, (Emergency Medicine) was awarded a grant from the Virginia Agar Academy for her project, “Assessment of an Innovative Educational Workshop on Acupuncture for Children.”

Daniel Tsze, MD, (Pediatric Emergency Medicine) was the recipient of the 2013 American Academy of Pediatrics Ken Graff Young Investigator Award for his proposal, “Determination of optimal volumes of administration for intranasal midazolam in children.” The award supports a research project addressing the care of acutely ill or injured children.

Aviva Sopher, MD, MS, Assistant Professor of Pediatrics, Division of Pediatric Endocrinology. Dr. Sopher will receive funding to support her proposal, “Effect of Metformin on Insulin Resistance, Non-Alcoholic Fatty Liver Disease and Body Composition in Non-Obese Adolescents with Polycystic Ovary Syndrome.” Her mentors on this project will be Dr. Michael Gershon, Professor of Pathology and Cell Biology, and Dr. Tim Wang, Professor of Medicine and Chef of the Division of Digestive and Liver Diseases. Dr. Rao received her BA from Washington University in St. Louis, Missouri, and her MD and PhD from John Hopkins University School of Medicine. She completed both her residency and fellowship at Boston Children’s Hospital/Harvard Medical School.

Amy Xu (student, mentor Paul Planet, MD, PhD) won second prize in the INTEL ISEF Science competition for her project entitled, “Evolutionary and Ligand-binding Dynamics of ClfB and IsdA in Staphylococcal Species,” and placed fifth in the American Society of Microbiology Competition at the same event.

Darrell Yamashiro, MD, PhD (Hematology, Oncology and Stem Cell Transplantation) received a two-year Alex’s Lemonade Stand award for his work, “Identification of TFAP4 (transcription factor AP-4/activating enhancer binding protein) as a potential master regulator/synthetic lethal gene of MYCN amplified neuroblastoma.”

Three Physician-Scientists Receive Driscoll Awards

The John M. Driscoll, Jr., MD, Children’s Fund, created in the Department of Pediatrics in 2005, supports junior physician-scientists at the beginning of their careers. The endowed fund, made possible by the many friends, faculty, and families who responded to Dr. Driscoll’s appeal for support, provides select junior faculty members stipends for up to two years. This year’s scholars include:

Meenakshi (Meena) Rao, MD, PhD, Assistant Professor of Pediatrics, Division of Pediatric GI, Hepatology and Nutrition. Dr. Rao will receive funding to support her proposal, “The Role of Gliarial Cells in the Enteric Nervous System.” Her mentors on this project will be Dr. Michael Gershon, Professor of Pathology and Cell Biology, and Dr. Tim Wang, Professor of Medicine and Chef of the Division of Digestive and Liver Diseases. Dr. Rao received her BA from Washington University in St. Louis, Missouri, and her MD and PhD from John Hopkins University School of Medicine. She completed both her residency and fellowship at Boston Children’s Hospital/Harvard Medical School.

Teresa M. Lee, MD, Assistant Professor of Pediatrics at CUMC, will receive funding to support her proposal, “Identification of Novel Causes of Infantile Cardiomyopathy.” Her mentor on this project is Dr. Wendy K. Chung, Associate Professor of Pediatrics, Divisions of Pediatric Clinical and Molecular Genetics, CUMC. Dr. Lee received her BS at the University of California, Los Angeles and her MD at Albert Einstein College of Medicine. She did her pediatric internship at Harbor-UCLA Medical Center and completed both her pediatric residency and clinical genetics residency at NYP/Morgan Stanley Children’s Hospital/CUMC. She completed her cardiology fellowship in June, 2013 at NYP/Morgan Stanley Children’s Hospital/CUMC.
Pediatric Fellowship Program

The mission of the Department is to produce young physician scientists who will become leaders in their particular areas of practice.

To this end the Department offers a Pediatric Fellowship Program, which this academic year includes 78 Fellows in 14 Pediatric subspecialties. Most Fellowships are three years long and offer training in the clinical arena of the specific subspecialty as well as research experience. Throughout their Fellowship, young pediatricians acquire skills and experience and receive guidance from experienced faculty and research mentors. They, in turn, bring fresh minds, new questions, and the energy that is vital for collaborative research ventures.

The Pediatric Fellows are integrated into all aspects of the department and are important role models and advisors to their junior resident and medical student colleagues. Each year one Fellow is nominated “Fellow of the Year” by the residents. Dr. John Babineau, from the Division of Pediatric Emergency Medicine, was given this notable honor by the graduating resident class of 2013.

This past May the Department hosted its 15th Pediatric Fellows Poster Day in the Wintergarden of Morgan Stanley Children’s Hospital of New York. This annual event showcases the Fellows’ research projects, and a committee nominates the top posters in basic science, translational, and clinical research. The Department of Pediatrics was delighted to honor Dr. Sharon Oberfield, who initiated this successful venture, by naming the prizes for her. This year the recipients of the Oberfield Prize in basic science was Dr. David Sparling, a PGY5 Fellow in Pediatric Endocrinology; the winner for translational research was Dr. Gina Coscia, a PGY5 Fellow in Pediatric Pulmonary Medicine; and the clinical research prize winner was Dr. Brett Anderson from the Division of Pediatric Cardiology.

For more information about Pediatric Fellowships at Morgan Stanley Children’s Hospital and CUMC, as well as information on the extensive academic accomplishments of the Pediatric Fellows in the past year, click here to see the 2013 Pediatric Fellowship Annual Report:

http://www.cumc.columbia.edu/pediatrics/education-training/fellowship

Residents & Fellows News

Danis Copenhaver, MD,
Third-year pediatric resident Danis Copenhaver, MD, is working with Melissa Stockwell, MD, MPH, to collect data from post-partum mothers regarding their use of technology-based medical applications, including personal electronic health records (PHR). Previous studies have demonstrated the effects of PHR use among adults in improving chronic disease control, but little is known about parental interest in, and potential facilitators and barriers to, access of PHR. Through this survey, Drs. Copenhaver and Stockwell hope to better understand how this patient population accesses medical information, and their preferences for receiving future updates and reminders about health for themselves and their families. Dr. Copenhaver, who is planning to pursue a career in outpatient general pediatrics, graduated from the University of Arkansas with a degree in biochemistry, then spent a year with her husband in Belize collaborating with community partners and the University of Arkansas to set up a study abroad opportunity, which is now in its seventh year of operation. She completed her medical education at Weill Cornell Medical College, where she devoted much of her extracurricular time as director and then senior counselor for Camp Phoenix, a year-round camp for burn survivors and their siblings, which is associated with New York Presbyterian’s William Randolph Burn Center and FDNY firefighters.

Erin Paul, MD,
Third-year pediatrics resident Erin Paul, MD, has focused her research on attitudes among doctors and nurses toward management of newborns with hypoplastic left heart syndrome (HLHS) and the changes in those attitudes over time. Under the mentorship of Kristina Orfali, PhD she presented a literature review of HLHS management trends at the American Society for Bioethics and Humanities annual conference in 2011. In collaboration with Thomas Starc, MD, MPH, she recently conducted a survey of CUMC doctors and nurses on their opinions of treatment options for newborns with HLHS. When they compared the results to a similar survey conducted in 1995 they found a growing preference for surgical intervention in 2012. These results were presented at Eastern Society for Pediatric Research earlier this year. Dr. Paul will be staying at CUMC as a pediatric cardiology fellow beginning in July 2014. She studied neurobiology as an undergraduate at Harvard College and completed her medical education at Columbia University College of Physicians and Surgeons.
Improving Fetal Therapy

Stanley Children’s Hospital provides care for pregnant women and their families when a birth defect or genetic syndrome is suspected or diagnosed. With a multidisciplinary approach and a state of the art facility that includes the Carmen and John Thain Labor and Delivery Unit and the Maternal Fetal Medicine Division, the Center has been designated by the State of New York as a Regional Perinatal Center for difficult and high-risk cases—the highest hospital classification.

When evaluating whether intervention should be performed before (prenatally) or after (postnatally) birth, fetal interventionists Russell Miller, MD, Chia-Ling Nhan-Chang, MD, and Dr. Simpson weigh all potential outcomes with treatment plans. Dr. Simpson asserts that, “fetal surgery must have significantly better outcomes for the fetus, compared to neonatal surgery, for it to be performed. This includes risk evaluation in regard to the mother’s health and surgical outcomes.” The most common invasive fetal interventions and surgeries performed at the Center include fetoscopic laser photocoagulation, radiofrequency ablation, placement of fetal shunts, and fetal transfusions.

While the majority of interventions and surgeries are still best treated during the postnatal period, prenatal medical therapy and surgical interventions are optimal for certain conditions. For example, fetal arrhythmia has been successfully treated prenatally at the Center. “Fetal arrhythmia responds well to prenatal treatment with anti-arrhythmic medication taken by the mother. The medication crosses the placenta to correct the arrhythmia,” says Dr. Simpson. “There are also conditions that cause a fetus to need a blood transfusion, like erythroblastosis fetalis (Rh disease), where a mother with Rh negative blood is carrying a fetus with Rh positive blood. We know that we can prevent that disease by giving the mom anti-Rh antibodies, but for those women that do get exposed to the Rh positive blood and fetal anemia is diagnosed, you can actually do a fetal blood transfusion through cordocentesis or percutaneous blood transfusion. When performed under ultrasound guidance, it can be a life-saving procedure for a fetus that has severe anemia due to the Rh disease.”

While not suitable for all fetal disorders, advances in fetal surgery have enabled significant progress with treatment for disorders like twin-to-twin transfusion syndrome (TTTS). TTTS occurs in approximately 10 to 15 percent of identical twin pregnancies where the fetuses are mono-chorionic diamniotic (sharing a placenta), characterized by an unequal sharing of blood between the blood vessels connecting the twins. A procedure such as amnioreduction, in which excess amniotic fluid from the fetal recipient’s sac is removed, temporarily stabilize the fetuses but doesn’t directly address the underlying pathology behind this disorder.

Prior to the development of fetoscopic laser photocoagulation surgery to correct this imbalance, survival rates for the fetuses were low; 10 to 30 percent of one or more of fetuses typically survived. The Center received training in 2008 for fetoscopic laser photocoagulation and began to offer the procedure in 2009. It is currently the only medical center in Manhattan to offer this procedure, which comprises the largest number of prenatal surgeries performed at the Center. “Lasers have revolutionized the treatment of this condition because it really targets the underlying problem,” Dr. Simpson states. “With the new technology, our scopes have become smaller and smaller. Rather than opening up the maternal abdomen and performing a laparotomy, we can do it all percutaneously and it really targets the problem.” Smaller instruments also decrease risks for complications, including pre-term labor and premature rupture of the membranes. With fetoscopic laser photocoagulation, 50 percent of pregnancies with TTTS will result in the birth of two live babies and 80 percent of pregnancies will end up with the birth of at least one live baby—a significant improvement over pre-laser procedure outcomes. To date, the Center has performed over 30 fetoscopic laser photocoagulation surgeries.

Advancements in technology are some of the contributing factors to the success of fetal therapy and surgery at the Center, but Dr. Simpson also attributes the research and multidisciplinary approach to maternal fetal medicine at CUMC. “Ron Wapner, MD, and Cande Ananth, PhD, have built a very strong research team, so when questions about the evaluation of treatment outcomes emerge from the Center we have their expertise readily available to design a study. I think the type of research structure that we have here is one of the strongest in the nation and perhaps sets us apart from some other fetal therapy centers,” emphasizes Dr. Simpson. The multidisciplinary approach to maternal fetal medicine at the Center also provides comprehensive care to the fetus and mother in all stages of the process, from diagnosis to neonatal care for the baby and support for the family. “We have weekly meetings which truly are multidisciplinary in regards to managing the patient and their baby. We have geneticists, immunologists, obstetricians, maternal fetal medical specialists, and surgeons and everyone has an opportunity to speak and discuss the care of the patient. It truly is a team approach to patient care.” This care also extends to providing families the emotional and psychosocial support they may need during the pregnancy and postpartum.

“I’d like to think we’re a little bit more comprehensive towards the mom and baby regarding how this condition will affect both of them including aspects of bringing the baby home,” Dr. Simpson adds.

In looking to the future of fetal therapy and surgery, Dr. Simpson notes the importance of making equipment and instruments smaller and more user-friendly, so that surgeons have the ability to treat almost all problems percutaneously rather than with open surgery. “I think moving in a direction where we never have to open a mother to correct these fetal problems is going to truly make a difference for maternal health, and hopefully continue to improve our fetal approaches,” Dr. Simpson explains. These types of advancements can also reduce the potential risk to both the fetus and the mother due to the enhanced precision, as is the case with laser photocoagulation treatment for twin-to-twin transfusion syndrome. “Laser photocoagulation was initially performed as open surgery and going through the uterus directly. We’ve really learned that we don’t have to do things that way, and can do it in a much safer way with less risk.” Structural diseases that were previously attributed to abnormalities in fetal development are also now being explored for possible genetic causes and treatments. “We used to never even investigate genetic aspects of a birth defect such as an isolated club foot, but now we know from studies we’ve been conducting that some isolated club feet are associated with abnormalities on chromosome 17 in the DNA of the fetus. I think that as that knowledge expands and as we learn to use stem cells and other genetic treatments, it’s going to change our approach to fetal therapy and surgery in the future.”

—Elizabeth Gough-Gordon
Visionary Surgery

CONTINUED FROM PAGE 1

MD, Professor of Surgical Oncology and Chief, Division of Abdominal Organ Transplantation at Columbia University Medical Center, is using and refining.

Dr. Kato employs ex vivo surgery mainly to treat very large sarcomas, but also cancers of the bile duct or pancreas or of a blood vessel supplying one of the major organs. Because of their size and location, the only way to remove these tumors, he explains, is to take the organ out along with the tumor, separate the organ from the tumor, and put the organ back. “Ex vivo surgery is an application of existing technology, from straightforward organ transplantation, into a new field,” Dr. Kato says. “The organ preservation approach, for example, is borrowed from transplant technology and is well established.”

Because of the pancreas’s location in the middle of the body abdominal tumors often involve the pancreas, along with the liver or intestines, he says, as well as the blood vessels that supply the major organs. In some cases he can remove part of the pancreas, leaving the other half in the body. But if the pancreas is too involved with the tumor, “we have to sacrifice entire pancreas as well as the stomach, and return just the liver and intestine to the body,” he says. “People can live without a stomach easily. The bigger problem is when patients lose the pancreas—they become diabetic as a result, and that’s more of an issue.”

Ex vivo surgeries are not usually emergencies, “and planning is really, really important, and we have to go through many, many different things during the planning phase,” says Dr. Kato. “The first question is, is this really technically possible? And that depends in large part on which vessels are involved, because often have to reconstruct a vessel with synthetic material. So the extent of vessel involvement is a big question.”

Children tend to tolerate and recover better from this type of surgery than adults, says Dr. Kato, who has performed this surgery on three children to date.

Dr. Kato has also adopted and refined a novel surgical treatment for patients with acute liver failure, which children and adults can develop as a result of viruses, autoimmune diseases, exposure to high levels of certain medications and substances, and other problems. When the liver stops functioning, toxins accumulate in the bloodstream and can cause brain damage, and death. If the liver fails all of the toxins it normally filters accumulate in the body and affect the brain, Dr. Kato says, and emergency surgery is needed. But in most cases treatment for acute liver failure is a total liver transplant, which leaves organ recipients on immunosuppressive drugs for the rest of their lives.

To help patients avoid this lifelong dependence on immunosuppressants, Dr. Kato performs a surgery called auxiliary partial orthotopic liver transplantation (APOLT). In APOLT Dr. Kato removes a portion of the failing liver, and transplants a partial liver from a donor, leaving the rest of the failing liver in place. The donor liver takes on the work of the failing organ, and over time—in most cases—the patient’s own liver recovers. Once that happens the patient can be taken off immunosuppressants.

“The most fascinating part of this surgery is that, when we stop the immunosuppression, the body starts to reject the transplant liver, and the donor liver practically disappears,” he explains. “This is an ideal approach because in acute liver failure there’s a chance the child’s own liver can recover over time, but if you completely change the liver you lose that opportunity for recovery right from the beginning.”

APOLT was developed in the early 1990s in Germany, but initially patients’ outcomes weren’t good, both because the surgery is technically difficult, and in most cases the livers of the patients who did survive did not recover. But very recently surgical techniques plus the experience of the surgical and postoperative management teams have improved greatly, says Dr. Kato. And as more surgeons attempted the procedure, it became clear that APOLT was more likely to be successful in children.

Dr. Kato has developed a rough guideline: he performs APOLT only in children younger than 10 years old, because the shapes of their bodies and livers are very different from those of an adult, and, “at less than 10 their liver regeneration rate is so great,” he adds. The optimal approach is transplantation of the smaller left lobe of the liver. “Given the size and shape of the adult liver, this is not easy to do, so it was better just to focus on young children.”

Acute liver failure is a rare problem. Over the past 20 years Dr. Kato has performed about a dozen cases, he says. But among these patients the survival outcome is great—100% survival so far. And in almost all of these patients, their own liver has regenerated, and they are off immunosuppression. “The one or two cases per year at most in children less than 10 in acute liver failure arise very suddenly, and you just have to be ready to do it;” he adds.

The individual techniques that make up both ex vivo surgery and APOLT are ones that Dr. Kato and his team perform frequently in other types of organ transplantation. “These are complicated surgeries,” he says, “but each component in these procedures is something that we do many, many times in other surgeries.”

— Beth Hanson