2006-2007 Academic Year Report

Yale University School of Medicine
Obstetrics, Gynecology & Reproductive Sciences
From the Chair...

It is with both pride and humility that I report to you our progress during this past academic year. It has been a very busy and challenging year and, as you will see on the following pages, we have accomplished much in the Department of Obstetrics, Gynecology & Reproductive Sciences. The Department has continued its growth and improvement agendas across all of our clinical, educational, and research programs. We’ve had excellent success in acquiring new research grants, in spite of the continued nadir of federal research funding. We have another stellar cohort of incoming residents who will benefit from the innovative educational tools and programs that we have introduced. And, we have won awards for patient satisfaction while substantially growing patient volume and clinical revenues.

“We will provide safe, consistent, evidence-based and cutting-edge clinical care.”

Charles J. Lockwood, M.D. - Chair

As is evident in this report, we have continued to Advance in all areas of clinical care. Our clinical subspecialty sections have grown impressively in volume, while expanding the scope of services through the introduction of new services and programs. Several examples of our advances in clinical care are our introduction of robotic surgery in Gynecologic Oncology, a comprehensive Diabetes in Pregnancy Management Program in Maternal-Fetal Medicine, and oocyte cryopreservation as part of a comprehensive Fertility Growth of the Clinical Enterprise...
Above: Dr. Azodi performs many of his laparoscopic gynecologic oncology procedures using the state-of-the-art da Vinci Surgical System, which helps him perform a more precise, less invasive procedure. For many patients, these minimally invasive procedures result in:

- Shorter hospital stays.
- Less pain and scarring.
- Less risk of infection.
- Less blood loss and fewer transfusions.
- Faster recovery.
- Quicker return to normal activities.

Preservation Program in Reproductive Endocrinology and Infertility.

We have also continued to expand clinical research activities, as is clear from the impressive number and breadth of publications and presentations at professional research meetings, and the significant growth in the number and type of ongoing clinical trials in the Department.

Through teamwork and dedication to a common goal of excellence, our clinical practices have continued to improve in customer service and quality of care. Our clinical programs are among the top-rated practices in the Yale Medical Group, with two of them having recently been recognized as among the top 10 in patient satisfaction. Five of our physicians were listed as “top docs” in their specialties in New York Magazine’s 2006 Best Doctors issue, while eight of them appeared in Connecticut Magazine’s “Top Docs in Specialties of Interest to Women” 2006 listing. The Department also claims the five top-rated patient care units at Yale-New Haven Hospital, as measured by the most recent Press-Ganey patient satisfaction scores. Our patients, as well as our referring physicians, recognize both our attention to service and the superior quality of medical care that we provide. Given the competing demands of research and training in a complex academic medical center environment, I am particularly proud of these accomplishments.
We made substantial progress this past year on our educational mission. Our Leadership in education is apparent from the quality of applicants seeking an opportunity to train in our Department. We have an outstanding and highly competitive Residency Program, with an average USMLE score of 232 for this year's entering class. Over half of our residents possess advanced degrees or are members of AOA. Two-thirds or more of our graduating chiefs enter the nation’s top fellowship training programs. We have equally competitive ABOG-approved fellowships in Maternal-Fetal Medicine, Gynecologic Oncology, and Reproductive Endocrinology and Infertility. We also expect to receive approval this year to begin a Urogynecology and Reconstructive Pelvic Surgery fellowship during the next academic year. Our fellows routinely present their research at their respective subspecialty societies’ annual meetings and at the Society for Gynecologic Investigation’s annual meeting, where they are

"We will recruit and train optimally the best residents and subspecialty fellows, and develop and maintain the best possible medical school clerkship."
Above: Dr. Scott Casper uses NOELLE as one of many simulation tools to teach medical students and residents how to cope with obstetrical emergencies in a safe, supportive environment. Our simulator is a full-sized articulating female mannequin with an articulating birthing baby and a full-sized intubatable and cyanotic newborn. NOELLE allows the students to care for the mother and fetus before delivery and the mother and neonate after delivery.

This year, we are proud to report that our Ob/Gyn Clerkship Director, Dr. Jessica Illuzzi, has won Yale School of Medicine's coveted Bohmfalk Teaching Prize for clinical science teaching. She is the first Ob/Gyn faculty member to achieve this leadership award for teaching excellence, and her selection for this award by the students is a testament to the tremendous effort she has expended to make the Ob/Gyn Clerkship one of Yale's top-rated clinical rotations.

Our Department is actively leading the paradigm shift to the use of simulation for training medical students and residents. Obstetrics teaching now includes the use of a birthing simulator, complete with an interactive neonate that changes color with positive pressure ventilation. Mock drills of obstetric emergencies complement the skills acquired in the simulation lab. In Gynecology, laparoscopic surgical training now begins with acquisition of a basic skill set through the use of a computerized simulation system in addition to the "box trainers."

We actively sponsor training programs for reproductive physician scientists as well. We support two NIH K-08 Scholars, a Research Scientist Development Program (RSDP) Scholar, a Clinical and Translational Science Award Scholar, and three Women’s Reproductive Health Research Scholars.
Discovering our Laboratories

In our Reproductive Sciences Division, we have continued to grow our research agenda despite severe declines in federal funding opportunities. Our overall grant portfolio has grown to $11.7 million in total sponsored research, and with our newly awarded NIH Program Project award grant, total NIH funding is now in excess of $7.2 million. This represents a 30% increase in sponsored grants and a doubling of our NIH funding over the past five years. In today’s extremely challenging federal research funding environment, this is an especially impressive achievement and a testament to both the diligence and talent of our reproductive scientists.

In our basic and translational science laboratories, our ongoing process of Discovery has yielded a number of exciting results. Here are just a few examples of the discoveries we have made this year:

**Cancer Biology:** Dr. Mor and his colleagues have dramatically improved the accuracy of their Ovarian Cancer Early Detection test. This new test...
Above: Drs. Seli (left) and Sakkas (right) insert samples into the new Molecular Biometrics Embryo Culture Media Profiler. The Yale Fertility Center’s IVF Laboratory is one of only several centers worldwide testing the initial prototype of this equipment.

Drs. Seli and Sakkas have been instrumental in developing this technology for use in predicting which in vitro fertilization embryos have greater potential to become babies. The equipment generates a rapid non-invasive spectral profile (see inset figure) of the embryo's culture media that is used to aid in selecting which embryos to transfer to the patient.

Reproductive Physiology: Dr. Taylor and colleagues have been awarded a Center Grant from the NIH to create the Yale Center for Endometrial Biology and Endometriosis. This new center coordinates research on the pathophysiology of endometriosis from four separate laboratories. In addition, work in the Taylor lab has uncovered an important role for bone marrow-derived stem cells in normal endometrial physiology.

Maternal-Fetal Sciences: The pathologic hallmark of preeclampsia is shallow endovascular trophoblast invasion in the first trimester, leading to incomplete development of the definitive uteroplacental circulation. Research in our labs suggests that this placental defect is associated with aberrant levels of angiogenic factors (VEGF, PI GF, and sFlt-1) in blood and urine, and that the ratio of these factors in the urine can be used to accurately identify women who are destined to develop preeclampsia several weeks before the disease manifests clinically.

As I mentioned earlier, we actively sponsor training programs for reproductive physician scientists so that we will continue the process of discovery well into the future with a new generation of well-trained physician-scientists and basic researchers.

It has been a busy and productive year, and we are all hard at work to ensure that this year will be equally productive.

is now based on six serum protein markers for early cancer.

Reproductive Physiology: Dr. Taylor and colleagues have been awarded a Center Grant from the NIH to create the Yale Center for Endometrial Biology and Endometriosis. This new center coordinates research on the pathophysiology of endometriosis from four separate laboratories. In addition, work in the Taylor lab has uncovered an important role for bone marrow-derived stem cells in normal endometrial physiology.

Maternal-Fetal Sciences: The pathologic hallmark of preeclampsia is shallow endovascular trophoblast invasion in the first trimester, leading to incomplete development of the definitive uteroplacental circulation. Research in our labs suggests that this placental defect is associated with aberrant levels of angiogenic factors (VEGF, PI GF, and sFlt-1) in blood and urine, and that the ratio of these factors in the urine can be used to accurately identify women who are destined to develop preeclampsia several weeks before the disease manifests clinically.

As I mentioned earlier, we actively sponsor training programs for reproductive physician scientists so that we will continue the process of discovery well into the future with a new generation of well-trained physician-scientists and basic researchers.

It has been a busy and productive year, and we are all hard at work to ensure that this year will be equally productive.
Academic Year Report

Yale-New Haven Hospital Services

Obstetrics Service

LABOR FLOOR EXPANSION
The planned renovation of the triage area on Labor and Delivery has been completed, and we now have a modern, spacious, and well-functioning “Obstetric Emergency Department” with more than triple the original space. The new Obstetrical Triage Unit is equipped with state-of-the-art fetal monitoring and five private rooms, and meets the capacity and care quality needs of high-acuity referrals as well as the low-risk mother who is unsure if labor has commenced.

ENHANCED AMENITIES
In order to maximize the comfort of our patients and their families, the postpartum areas have been extensively refurbished, and the following additional services have been added:
- New furniture and décor
- Free wireless Internet access
- A “room service” approach to in-room dining, with food prepared to order from an extensive menu
- Massage therapy

DEPARTMENTAL QUALITY & SAFETY
The Obstetrics Service has rebuilt its safety and quality process from the ground up. Overall, patient safety has become the first priority of each physician, nurse, resident, and fellow. In order to effect a paradigm shift on the floor, the following initiatives have been introduced:

1. Mandatory Team Training for every obstetric provider, based on the airline “crew resource management model.” This four-hour curriculum teaches basic communication skills, delineates chain of command, and empowers all members of the care team, regardless of rank or seniority, to speak up when they are uncomfortable with a clinical scenario.
2. Mandatory Electronic Fetal Heart Rate Monitoring Certification, based on a nationally recognized nomenclature. This step has helped to establish clear communication among all members of the care team.
3. Inclusion of a full-time Patient Safety Nurse on the floor. This senior staff member reviews “near misses” and adverse outcomes, conducts root cause analyses and brief event reviews, and scrutinizes existing policy to ensure that routine care is evidence-based and reproducible.

Adverse Events by Month (Oct 2004-Feb 2007)

- 0.0%
- 0.5%
- 1.0%
- 1.5%
- 2.0%
- 2.5%
- 3.0%
- 3.5%
- 4.0%
- 4.5%
- 5.0%


- Adverse events (% del)
- Linear (Adverse events [% del])

p<0.02
4. Our Patient Safety Committee, comprised of University and Community Physicians, as well as midwives, residents, and nursing staff, continues its work of review of adverse event data and evaluation for trends.

5. The Obstetrical Service has embraced the value of drills and simulation. With the recent acquisition of the obstetric simulator, programs have been developed to drill all staff in the management of shoulder dystocia, obstetric hemorrhage, and emergency cesarean section.

Gynecology Service

INPATIENT GYNECOLOGIC CARE AT YALE-NEW HAVEN HOSPITAL

We are extremely proud to report that during the hospital’s most recent quarter, our patient satisfaction surveys ranked the Gynecology/Gynecologic Oncology inpatient unit at Yale-New Haven Hospital in the 99th percentile nationally. This ranking compares us with over 1500 hospitals in the Press-Ganey database. The areas within the report that are most heavily weighted are physician services, nursing staff, cleanliness, dietary services, and attention to personal issues.

Most recently, the hospital has greatly improved the food service on the inpatient Gynecologic Care Unit by converting to room service with expanded menu choices. The Gynecology Service has also refined and expanded its Patient Spa and Relaxation Project. We offer a Spa Cart and a Mind, Body, and Spirit class. Additionally, an art docent from the Yale University Art Gallery visits the Gynecology Service on a regular basis so that patients may view artwork from the gallery.

Every Monday, Wednesday, and Friday we hold “family rounds,” where the attending physicians, fellows, resident physicians, physician assistants, nurses, social worker, care coordinators, nutritionist, and chaplains meet and discuss all of the Gynecology/Gynecologic Oncology patients who are under our care in the Inpatient Service. In addition, we hold Discharge Planning Rounds every Tuesday and Thursday, led by the nurses, care coordinators, and social workers, to discuss discharge and emotional needs.

The resident physicians at Yale-New Haven Hospital continue to work actively on research projects related to gynecologic patient care. These projects include a review of deep vein thrombophlebitis, a review of surgery for small bowel obstructions, a review of management of ureteral obstruction using ureteral stents as well as surgical procedures, and a review of endometrial cancer in patients under 45 years of age. A project on postoperative delirium in our elderly patients has been completed and was presented this past year at the Society of Gynecologic Oncologists Annual Meeting.

Finally, the Gynecology Practice Council continues to develop new measurements aimed at improving the safety, quality, and efficacy of the services provided for women with gynecologic problems at Yale-New Haven Hospital.
Maternal-Fetal Medicine

Edmund Funai, MD, Director of Obstetrics, Section Co-Chief, Associate Professor
Interests: Long-term health consequences of preeclampsia, premature birth, perinatal patient safety

Charles J. Lockwood, MD, Anita O’Keefe Young Professor of Women’s Health and Chair
Interests: Prenature birth, thrombosis, pregnancy loss

Joshua Copel, MD, Vice Chair of Obstetrics, Professor
Interests: Prenatal diagnosis, fetal echocardiography, fetal therapy

Urania Magriples, MD, Associate Professor
Interests: HIV, models of prenatal care delivery

France Galemmeu, MD, Associate Professor
Interests: Prenatal diagnosis

Michael Paidas, MD, Associate Professor
Interests: Thrombosis and hemostasis in pregnancy, premature birth

Elrod Norvitz, MD, PhD, Fellowship Program Director, Section Co-Chief, Associate Professor
Interests: Premature birth, genomics of prematurity

Catalin Buhimschi, MD, Assistant Professor
Interests: Proteomic profiling of markers of prematurity and preeclampsia, myometrial physiology

Mert Bahliy, MD, Assistant Professor
Interests: Prenatal diagnosis, fetal echocardiography, fetal surgery, perinatal epidemiology

Anna Stokianakal, MD, Assistant Professor
Interests: Premature birth, the role of progesterone in treating symptomatic preterm labor, perinatal epidemiology

Stephen Thung, MD, Assistant Professor
Interests: Diabetes, decision support for clinical care

Heather Lipkind, MD, Assistant Professor
Interests: Prenatal diagnosis and maternal critical care

Christian Petter, MD, Assistant Professor
Interests: Prenatal diagnosis
Our Philosophy and Mission
The primary mission of the Section of Maternal-Fetal Medicine is to provide specialized care for women with high-risk pregnancies. In addition, the Section strongly emphasizes resident and fellow education, and promotes and supports innovative research with a goal to improve patient care.

CLINICAL SERVICES
The Section of Maternal-Fetal Medicine consists of 13 attending physicians and eight fellows, each of us committed to providing the best possible care for our patients in an environment of respect, compassion, and understanding. We use an evidence-based approach to obstetric management to optimize pregnancy outcome for both the mother and the baby, while minimizing the number of required procedures. We make every effort to involve couples actively in management decisions, including ensuring that they are fully informed about all treatment options, are counseled in their language of choice, and have ample opportunity to meet and talk with members of the obstetric anesthesia and NICU teams. When our research offers a new treatment option, our patients are the first to benefit. Highlights of our clinical services include:

- Serving as a high-risk pregnancy referral center for over two-thirds of Connecticut, with approximately five high-risk pregnancy hospital transfers per week and numerous transfers to our outpatient high-risk practice.
- Comprehensive genetic counseling and testing.
- Amniocentesis, chorionic villus sampling (CVS), cordocentesis, and other fetal procedures.

EDUCATION AND TRAINING
An equally important mission of the Section is to educate and train Ob/Gyn residents and Maternal-Fetal Medicine Fellows. During their rotations, Ob/Gyn residents learn to evaluate and manage women with both low- and high-risk pregnancies and receive additional training in perinatal ultrasound. Residents participate actively in all obstetric surgical cases and outpatient services, and the Maternal-Fetal Medicine faculty are responsible for a comprehensive series of didactic sessions on pregnancy-related complications.

The Section of Maternal-Fetal Medicine is accredited by ABOG for the training of two Maternal-Fetal Medicine Fellows each year. The three-year Maternal-Fetal Medicine Fellowship is designed to train a select group of Ob/Gyn generalists in the management of high-risk pregnancies.
Maternal-Fetal Medicine

(continued)

with specific emphasis on perinatal consultation, genetics, advanced obstetric ultrasound, and fetal procedures. A significant amount of time (18 months) is set aside specifically for research with a view to training physician-scientists and future academic leaders in the field of Maternal-Fetal Medicine.

RESEARCH

The Section of Maternal-Fetal Medicine facilitates and coordinates basic science, clinical, epidemiologic, and translational research in the field of perinatal medicine. Specific emphasis is placed on encouraging and supporting intra- and interdepartmental research initiatives at Yale University School of Medicine. A further responsibility of the Section is to ensure a safe research environment for both researchers and patients.

Accomplishments 2006-2007

The Section of Maternal-Fetal Medicine enjoyed unprecedented academic and clinical growth during the past year. Among the highlights:

1. Despite the current shortage of Maternal-Fetal Medicine specialists around the country, the Section continues to attract talented applicants to join our faculty. In 2006-2007, we added two additional MFM faculty members.

2. Continued research excellence. The Section is actively involved in expanding our research contributions to our field. Original research from the MFM Section was presented at numerous national and international scientific conferences. Yale MFM was second among all U.S. medical schools in presentations at the 2007 Society for Maternal-Fetal Medicine Annual Scientific
Meeting in San Francisco. In total, the MFM Section had five oral presentations and 26 poster presentations. A similarly impressive performance was evident at the 2007 Society for Gynecologic Investigation meeting in Reno, NV (five oral presentations and 30 poster presentations).

3. Improved grant support for research initiatives. Seventy-five percent of MFM faculty received ongoing financial support for their research.

4. The MFM Clinical Service continues to grow robustly:
   a. Ultrasound volume increased 115% since 2002, with over 30,000 scans performed annually.
   b. The First Trimester Down Syndrome Screening Program continues to expand, with over 300 visits per month.
   c. MFM hospital discharges have increased by approximately 10% in the past year, and 70% since 2002.
   d. Total MFM clinical revenue has increased 147% over the past four years.

Goals 2007-2008
1. Continue to provide the highest quality of clinical care to our patients and to serve as the premier site for perinatal referrals in southern Connecticut.
2. Continue to lead national and international perinatal research, with continuing focus on prematurity and preeclampsia. Measures of success include NIH funding rank, volume and quality of national presentations, and number and impact factor of publications.
3. Continue to grow both clinical volume and revenue.

Selected Key Publications (OF 78 FOR THE ACADEMIC YEAR):

Meeting in San Francisco. In total, the MFM Section had five oral presentations and 26 poster presentations. A similarly impressive performance was evident at the 2007 Society for Gynecologic Investigation meeting in Reno, NV (five oral presentations and 30 poster presentations).

3. Improved grant support for research initiatives. Seventy-five percent of MFM faculty received ongoing financial support for their research.

4. The MFM Clinical Service continues to grow robustly:
   a. Ultrasound volume increased 115% since 2002, with over 30,000 scans performed annually.
   b. The First Trimester Down Syndrome Screening Program continues to expand, with over 300 visits per month.
   c. MFM hospital discharges have increased by approximately 10% in the past year, and 70% since 2002.
   d. Total MFM clinical revenue has increased 147% over the past four years.

Goals 2007-2008
1. Continue to provide the highest quality of clinical care to our patients and to serve as the premier site for perinatal referrals in southern Connecticut.
2. Continue to lead national and international perinatal research, with continuing focus on prematurity and preeclampsia. Measures of success include NIH funding rank, volume and quality of national presentations, and number and impact factor of publications.
3. Continue to grow both clinical volume and revenue.

Selected Key Publications (OF 78 FOR THE ACADEMIC YEAR):
Unique Maternal-Fetal Medicine Programs

As the obesity epidemic in the U.S. continues unabated, the prevalence of gestational diabetes in our pregnant population has increased. To address the need for expertise in managing diabetes in pregnancy, we have established the Diabetes in Pregnancy Program, and our experts are currently seeing patients at our offices both in Yale-New Haven Hospital and at our off-campus location. Stephen Thung, MD, is the Director of the Program. He oversees the care of all diabetic women referred to Yale Maternal-Fetal Medicine. Although the focus of our effort is concentrated on diabetes, consultation and management of other endocrinologic disorders are also available to referring physicians through this Program.

The Program will help initiate and manage hypoglycemic therapies to ensure optimally controlled glucose levels in pregnant patients with diabetes. We are particularly excited to now offer oral therapy, in the form of glyburide, to those gestational diabetic women who cannot optimally control their blood sugar with diet alone. Recent studies have demonstrated that glyburide is an effective, safe, and easily tolerated alternative to insulin.

The Program provides essential services for diabetic women before and after pregnancy. Although it is widely known that hyperglycemia at conception is teratogenic, preconception consultation and preconception glycemic control are often overlooked. The Diabetes in Pregnancy Program staff work with the patient's medical endocrinologist to optimize glycemic control before pregnancy and after delivery. For women with gestational diabetes, we arrange for postpartum diabetes testing and suggest further screening intervals.
This new Program, under the direction of Dr. Anna K. Sfakianaki, brings the most advanced techniques in gynecologic ultrasound to all of our patients. The Gynecologic Ultrasound Program has already partnered with the Yale Ovarian Cancer Early Detection Program, and has been imaging Gynecologic Oncology patients since July 2006. We are now offering appointments to our community on both a scheduled and urgent basis. The Program will strive to accommodate urgent requests for consultations on the same day, while guaranteeing an appointment within 24 hours of the call.

We offer detailed evaluation of the adnexa, uterus, endometrium, and cervix using modalities such as SonoCT, 3D/4D, and power Doppler. Additionally, 3D sonohysterograms are an exciting and less invasive alternative to hysterosalpingograms for the evaluation of both the uterine cavity and the external contours of the uterus.

The obstetrician-gynecologists comprising this Program strive to provide superior guidance in both diagnosis and management, as opposed to merely a description of the relevant anatomy. Patients will benefit from our sensitive and compassionate care. We emphasize prompt and thorough communication with our referring physicians.
Reproductive Endocrinology and Infertility

Hugh Taylor, MD, Section Chief, Professor
Interests: Infertility, reproductive surgery, congenital anomalies, DES exposure, implantation/endometrial receptivity, endometriosis, IVF, recurrent pregnancy loss (first trimester), menopause.

Pasquale Patrizio, MD, Director of the Yale Fertility Center, Professor
Interests: Infertility (female and male), assisted reproductive techniques (IVF, ICSI, PESA, TESE), reproductive surgery, genetics of infertility, PGD, egg donation and surrogacy, reproductive options for women and men with cancer, oocyte cryopreservation

Aydin Arici, MD, Professor
Interests: Infertility, egg donation, recurrent pregnancy loss (first trimester), congenital anomalies, endometriosis

Beth Racob, MD, Assistant Professor
Interests: Pediatric and adolescent gynecology, polycystic ovary syndrome, pelvic pain, endometriosis, infertility, fibroids, reproductive surgery

Emre Sel, MD, Assistant Professor
Interests: Infertility, oocyte donation and surrogacy, reproductive surgery, polycystic ovarian syndrome, reproductive options for women with cancer, endometriosis, IVF

Gabor Huszar, MD, Director, Male Fertility and Sperm Physiology Laboratory, Senior Research Scientist
Interests: Sperm function tests, sperm structure, donor insemination, sperm cryopreservation (freezing) prior to vasectomy, IVF, oncological treatment

Denny Sakkas, PhD, Director, IVF Lab, Associate Professor
Interests: IVF laboratory, PGD, IVF, ICSI, embryo and blastocyst cryopreservation (freezing)

Dorothy Greenfeld, LCSW, Professor
Interests: Patient education, emotional counseling and support

Lubna Pel, MD, Assistant Professor
Interests: Reproductive endocrinopathies including PCOS, central reproductive disturbances attributable to hypothalamic and pituitary disorders, obesity related dysfunction and low bone density
Our Philosophy and Mission
The mission of the Section of Reproductive Endocrinology and Infertility is to provide specialized care for women and men with a variety of reproductive endocrine disorders and infertility, to accomplish cutting-edge research in reproductive biology, and to educate future physicians and specialists. Our Section is committed to improving patient care through conducting innovative clinical and translational research, and by educating future reproductive endocrinologists.

CLINICAL SERVICES
Our caregivers select treatments with the highest long-term cure rate and the lowest associated morbidity based on evidence-based therapeutics and in an environment of respect, compassion, and sympathetic concern.

EDUCATION AND TRAINING
Our Section provides a well-rounded program of teaching and clinical activities to enable residents to become well versed in the basic clinical aspects of Reproductive Medicine. During their six-week rotation, residents are taught how to evaluate women with reproductive problems, and to implement appropriate non-surgical and surgical treatments. Residents participate in the Section’s surgical cases, postoperative care, and didactic sessions. Residents serve as first assistant in all of the Section’s surgical cases. We believe that the knowledge and surgical skills gained from these activities will allow our residents to evaluate and manage routine reproductive endocrinology and infertility cases.

The Yale Fellowship Program in Reproductive Endocrinology and Infertility is a three-year, American Board of Obstetrics and Gynecology approved educational program designed to provide advanced training to obstetrician-gynecologists. The three-year fellowship consists of both research and clinical components. The first year is devoted to office-based practice and surgical training. The fellow gains experience in the full range of clinical reproductive endocrine and infertility disorders. The second-year curriculum provides an opportunity for mentored research; the fellows conduct laboratory and/or clinical research and enhance their understanding of the latest scientific principles of reproductive biology. This training provides comprehensive research opportunities as well as extensive interaction with other scientists. The third year is spent learning the full spectrum of assisted reproductive technologies. Upon completion of the Fellowship Program, our physicians are expected to become independent leaders in the practice and advancement of the specialty.

RESEARCH
The world-class investigators in our Section have advanced our understanding of cellular and molecular aspects of reproduction and have formulated new or improved diagnostic methods and treatments through their research. At present, the focus of the Section’s research includes gamete biology (sperm, oocyte, and embryo physiology), uterine biology (endometrial and myometrial physiology and pathology), ovarian dysfunction, stem cells, and menopause. Together with the...
Reproductive Physiology and Gamete Biology Groups, our Section has initiated multiple translational research projects with direct clinical implications. These projects are expected to improve oocyte cryopreservation techniques, advance our understanding of sperm and oocyte function, increase IVF pregnancy rates, and clarify the adverse effect of adenomyosis on fertility. We are currently studying novel treatments such as aromatase inhibitors for ovulation induction, low-dose hormone therapy for menopause, several new treatments for endometriosis, new methods of embryo evaluation and selection, and ovary and oocyte freezing.

Accomplishments 2006-2007
1. We have sustained competitive IVF cycle success rates, with a donor oocyte cycle live birth rate of over 55%.
2. We experienced a growth of 20% in in vitro fertilization, egg donation and gestational surrogacy cycles.
3. We grew our Male Fertility Program by 25%.
4. We expanded our screening list of single gene disorders in our Preimplantation Genetic Diagnosis Program.
5. We achieved a pregnancy after egg freezing in the Oocyte Cryopreservation Program established last year (under IRB approval).
6. We recruited a new faculty member who will develop the Pediatric and Adolescent Gynecology Program, as well as direct resident training in laparoscopic and hysteroscopic surgery.
7. We were awarded a multimillion-dollar National Institutes of Health grant establishing the Yale Center for Endometrial Biology and Endometriosis. With this award Yale receives the prestigious NIH designation as a Specialized Cooperative Center in Infertility and Reproduction Research (SCCPIR program).
8. Yale REI is now a member of the NIH Reproductive Medicine Network (RMN), in collaboration with the School of Public Health. The RMN is the largest organization conducting clinical trials in our field.
9. Our clinical revenue grew by 11%.
10. We developed the novel HA-binding assay for sperm and now offer the Andrology Clinical Service to aid in the diagnosis and treatment of male infertility.

Goals 2007-2008
1. Increase the number of IVF cycles, egg donations and gestational surrogacy cycles by 10%.
2. Grow the Egg Freezing Program by 40%.
3. Create a new Egg Donor Bank Service.
4. Recruit a new faculty member to direct the Clinical Trials Program and subsequently expand the number of clinical trials conducted in the Division.
5. Expand the newly established Ovarian Tissue Cryopreservation Program for oncology patients. This new addition will complete the range of services available to any cancer patient wishing to preserve future fertility.
6. Continue to increase male infertility visits and surgeries.
7. Expand the clinical practice by opening an office in Fairfield County.

**Selected Key Publications (OF 16 FOR THE ACADEMIC YEAR):**


3. Matalliotakis IM, Cakmak H, Mahutte N, Fragouli Y, Arici A and Sakkas D. Women with advanced-stage endometriosis and previous surgery respond less well to gonadotropin stimulation, but have similar IVF implantation and delivery rates compared with women with tubal factor infertility. Fertil Steril. 2007 Mar 10; epub.


This series of photos shows our IVF Lab Director, Dr. Sakkas, performing an embryo biopsy preparatory to Preimplantation Genetic Diagnosis to rule out transferring embryos that contain a single gene disorder.

Pictured far left: Dr. Sakkas isolates the embryo under the microscope.

Pictured center: A single cell is removed from the embryo, taking care to avoid any damage to the embryo.

Pictured left: The biopsied cell is transferred to a culture dish for further analysis.
Our Philosophy and Mission
The Section of Gynecologic Oncology provides specialized care for women with gynecologic malignancies. Our mission is to provide education, conduct basic and translational research, increase awareness, and expand treatment options for women with gynecologic cancers. We employ a multidisciplinary approach to comprehensive management of gynecologic malignancies and offer clinical trials participation as members of the Gynecologic Oncology Group for national cooperative study group trials.

EDUCATION AND TRAINING
An important mission of our Section is to teach residents to evaluate and counsel women and their families regarding malignancies, including treatment options, complications and success of treatment. Residents participate in the operating room and manage pre- and postoperative care. Our Fellowship Program teaches the diverse treatment options for, and complications of, gynecologic cancers. This training requires one research year that leads to a study designed by the fellow.
CLINICAL/RESEARCH SERVICES

We endeavor to provide the best possible care for our patients and their families in an environment of respect, compassion, and sympathetic concern. The patient is informed about all treatment options, including their advantages and disadvantages.

The Section focuses on clinical care and translational research in the areas of endometrial, cervical, and ovarian cancer. We are searching for specific early markers of endometrial cancer, we continue investigating the molecular pathways responsible for chemoresistance in ovarian cancer, and we continue to develop new markers to predict chemoresponsiveness.

We have continued to develop the Yale Ovarian Cancer Early Detection Program, and it now utilizes ultrasonography, serum blood markers, physical examination, and genetic counseling to determine a composite risk score.

Accomplishments 2006-2007

1. Clinical volume increased 17% over the prior year. We currently have outreach programs in 10 hospitals.

2. We have active protocols for cervical, vulvar, vaginal, endometrial, ovarian, fallopian tube and peritoneal cancers. Our Section has applied and expanded the use of robotic surgery. We are continuing to develop our bone density screening program for women treated with pelvic radiation or chemotherapy, or for those patients who are placed in surgically induced menopause.

Goals 2007-2008

1. Recruit new faculty to develop new research thrusts that are compatible with our current programs, Support expansion of our outreach services.

Selected Key Publications

(OF 12 FOR THE ACADEMIC YEAR):


Our Philosophy and Mission
We endeavor to provide the best possible care for our patients in an environment of respect, compassion, and concern. Best care in our Section means choosing a treatment with the highest long-term cure rate and low associated morbidity, but also that the patient is accurately informed about all of her treatment options.

Furthermore, our Section strongly emphasizes resident education, community outreach, and innovative research to improve the care of those patients with Pelvic Floor Disorders (PFDs).

CLINICAL SERVICES
Our faculty have advanced training in managing disorders of the female pelvic floor and offer evidence-based treatment options for women afflicted with pelvic organ prolapse, urinary and fecal incontinence, interstitial cystitis and pelvic floor fistulae.

Our facility provides state-of-the-art diagnostic equipment and evidence-based treatment options for women afflicted with problems of PFD, including single and multi-channel urodynamic testing, office cystoscopy, anal manometry, pelvic floor muscle and neurodiagnostic.
evaluations, advanced vaginal and abdominal reconstructive pelvic surgeries, minimally invasive surgical options, transurethral and paraurethral collagen injections, pelvic floor rehabilitation with biofeedback and electrical stimulation, and myofascial release technique for dyspareunia.

**EDUCATION AND TRAINING**

During their rotation with our Section, residents learn to evaluate women with urinary and fecal incontinence, uterovaginal prolapse, and other PFDs. They also are introduced to appropriate non-surgical and surgical treatment modalities. Several residents are actively involved in clinical and basic research projects. Gynecologic surgeons visit regularly to observe our recently developed surgical techniques.

**RESEARCH**

The Division has been chosen as one of 20 sites in the U.S. to trial a new device for the treatment of urinary incontinence. NIH-funded research includes investigation of the molecular and cellular mechanisms of pelvic organ prolapse, and the role of vaginal smooth muscle function in pelvic organ prolapse.

**Accomplishments 2006-2007**

1. Identified as one of the top five practices in the Yale Medical Group for patient satisfaction for the year.
2. 35% increase in new patient visits and 20% increase in major surgical repairs.
3. Increase in clinical revenue of 15%, despite declining reimbursements.

4. New treatment modalities have been added, including Percutaneous Nerve Stimulation for the treatment of urinary incontinence.

**Goals 2007-2008**

1. Continue research into genetic and molecular causes of pelvic floor disorders.
2. Increase NIH funding by successful application for continued funding.
3. Accept first fellow for specialized training.

**Selected Key Publications:**


Family Planning

Our Philosophy and Mission
The Section of Family Planning provides specialized care for women with reproductive planning needs. In addition, our Section strongly emphasizes resident education and innovative research to improve patient care in all aspects of family planning services.

We endeavor to provide the best possible care for our patients in an environment of respect, compassion, and sympathetic concern. Best care also means that the patient is accurately informed about all of her treatment options, including their advantages and disadvantages.

An important mission of our Section is to educate residents about our subspecialty. The second-year residents have a seven-week Family Planning rotation, during which they learn to evaluate and counsel women regarding the complete spectrum of contraceptive and sterilization options, and to provide appropriate non-surgical and surgical treatments for undesired or abnormal pregnancy. Residents participate in the Section’s surgical cases, pre- and postoperative care, ambulatory procedures in the Yale-New Haven Hospital Women’s Center, and in didactic sessions. Residents serve as first assistant in all of the Section’s surgical cases. We believe that the knowledge and surgical skills gained from these activities will allow our residents to evaluate and manage a wide range of office gynecologic issues, such as threatened or incomplete miscarriage, menorrhagia, and dysfunctional uterine bleeding.

Another mission of our Section is to increase our understanding of women’s reproductive health issues, and to formulate new or improve existing treatments. At present, the focus of the Section’s research includes the development of new contraceptive methods and the study of pathophysiologic mechanisms of currently available modalities such as the IUD and long-term progestin-only approaches. Residents are encouraged to participate in the Section’s ongoing research projects.
Accomplishments 2006-2007
The Section of Family Planning continued its academic and programmatic growth during FY 06-07 as demonstrated by the following:
1. Renewal of Kenneth J. Ryan Grant in Abortion & Family Planning.
2. Continuation of collaborative clinical rotation for PGY2 residents at the New Haven Planned Parenthood site.
3. Improved and expanded lecture series in family planning/abortion services.
4. Continued growth of Yale Family Planning as a referral practice for genetic/structural terminations, contraception services, and vulvodynia.
5. Participation as a clinical site for a Phase III clinical trial of the Quinacrine Sterilization Procedure.
6. Collaborative investigation of the safety and tolerability of a novel non-hormonal vaginal contraceptive ring.

Goals 2007-2008
1. Recruit additional faculty to Section.
2. Continue growth of clinical practice.
3. Open additional clinical research protocols, with eventual entry into the NICHD Contraceptive Clinical Network.

Selected Key Publications:
The Gamete Biology Research Group is comprised of seven internationally recognized researchers whose laboratory projects span translational research with direct clinical implications to basic molecular investigations into gene expression in embryos and gametes. Research emphases fall into the following categories:

**Female Reproduction:**
1. DNA repair in the mammalian oocyte;
2. The role of FSH receptor variants in infertility;
3. Translational control of gene expression in the mammalian oocyte; and
4. mRNA gene expression in cumulus cells and in human oocytes at different maturational stages.

**Male Reproduction:**
1. Sperm quality in the aging man;
2. Paternal effects on reproductive outcome;
3. Mammalian sperm DNA and the infertile male; and
4. Apoptosis during spermatogenesis and in mature spermatozoa.

**Preimplantation Embryo Development:**
1. Improving in vitro fertilization outcome by identifying the most viable embryo;
2. Preimplantation Genetic Diagnosis and investigation of novel techniques of screening for aneuploidy in single blastomeres;
3. Characterizing the gene expression profiles of human embryos and gametes; and

**Gonadal Development:**
1. Gonad development in the fetus; and
2. Developmental establishment of stem cell "niches," or compartments, that support the developing and adult ovary.

**SELECTED KEY PUBLICATIONS (OF 28 FOR THE ACADEMIC YEAR):**


Maternal-Fetal Sciences Group

The Maternal-Fetal Sciences Group seeks to develop therapeutic interventions for major complications of pregnancy through an integration of clinical, translational, and basic science research approaches. Studies focus on preterm delivery (PTD), preeclampsia (PE), intrauterine growth restriction (IUGR), and recurrent pregnancy loss, leading causes of maternal, fetal, and neonatal morbidity and mortality. Research on preterm delivery specifically seeks to dissect the mechanism through which progesterone supplementation can prevent preterm birth in high-risk parturients and, in particular, to characterize the role of the progesterone receptor in spontaneous preterm labor. Inherited thrombophilias are also implicated in these complications of pregnancy, prompting a systematic analysis as to whether heparin anticoagulation is the best prevention option in these patients.

Proteomic methodologies are being developed to identify novel markers of PTD and PE, which will facilitate the development of new diagnostic and therapeutic strategies. Studies aimed at understanding the role of extracellular matrix remodeling in the placenta and myometrium will enable implementation of procedures that limit fibrosis at the uterine-placental interface that is associated with IUGR and is also a deleterious consequence of iatrogenic delivery by cesarean section. A major research focus of this group is the analysis of the interaction of uterine, placental and immune cells in the etiology and
pathophysiology of PTD, PE and IUGR. Studies include the evaluation of separate and interactive effects of ovarian steroids and pro-inflammatory cytokines including thrombin, a specialized hemostatic, pro-inflammatory molecule, on the expression of members of the IL-6 family of cytokines.

The role of Toll-like receptors, mediators of the innate immune response, in first trimester trophoblast-macrophage interactions is also being explored using co-culture and molecular methodologies. Studies using gene array analysis have established patterns of decidual chemokine response to inflammatory stimuli, prompting investigation of the role of dendritic cells, specialized antigen-presenting immune cells, in the etiology and pathophysiology of PE. The differential roles of placental and renal synthesis of the angiogenic factors VEGF and PLGF, and their antagonist sFlt-1, in pregnancy-induced hypertension and proteinuria are under study using animal models and placental and kidney cell cultures. The specific role of plasminogen activator inhibitors, major regulators of fibrinolysis and cell invasion, in the pathophysiology of IUGR and PE is under investigation using primary cultures of human placenta and a dual perfusion model. In addition, the role of tissue factor and other hemostatic regulators in abnormal uterine bleeding and endometriosis, major causes of infertility and of consultations for women, is also actively investigated by this group, using animal models and human cells and tissues.

Charles J. Lockwood, MD, The Anita O’Keefe Young Professor of Women’s Health and Chair
viki.abrahams@yale.edu

Catalin Buhimschi, MD, Assistant Professor
catalin.buhimschi@yale.edu

Irina Buhimschi, MD, Assistant Professor
irina.buhimschi@yale.edu

Seth Guller, PhD, Associate Professor
seth.guller@yale.edu

Se-Ta Joseph Huang, MD, PhD, Associate Research Scientist
joseph.huang@yale.edu

Graciela Krikun, PhD, Research Scientist
graciela.krikun@yale.edu

Pictured right: Dr. Huang and her visiting scientist from China have developed a novel method for tethering siRNAs to the folate molecule. Since cancer cells express the folate receptor, while most normal cells do not, this method represents a potentially powerful new technique for inducing siRNA-mediated gene silencing in cancer cells only.

Pictured far right: Immunofluorescence staining of folate receptor-expressing cancer cells. The red punctate staining indicates cell membrane-associated folate receptors, while the blue depicts cell nuclei.

SELECTED KEY PUBLICATIONS
(OF 47 FOR THE ACADEMIC YEAR):


Cancer Biology Group

The Cancer Biology Group is concerned with various aspects of cell signaling that cause or support carcinogenesis. In addition to basic studies of inter- and intracellular communication through membrane and nuclear receptors, these well-funded laboratories are using the knowledge gained from these basic studies to devise novel methods for cancer diagnosis and therapy. In the field of nuclear receptors, the Hochberg lab is designing and synthesizing analogs of steroid hormones for diagnostic and therapeutic purposes and for investigations of hormone action. His laboratory has synthesized estrogens, labeled with $^{123}$I for SPECT imaging of breast cancer, and androgens labeled with $^{18}$F for PET imaging of ovarian and prostate cancer. These radiolabeled compounds allow the detection and localization of cancers by hormone receptor-mediated uptake. In addition, they have synthesized locally active estrogens for the treatment of dyspareunia in women for whom estrogen therapy is contraindicated (e.g., breast cancer), as well as SERMs for the treatment of menopausal symptoms. There are a number of groups that are focused on communication through cell membrane receptors. Studies in the Mor laboratory on the communication between cancer cells and immune cells are focused on the control of apoptosis to develop new therapeutic approaches that may reverse chemoresistance in cancer cells. A new test from this lab for early detection of ovarian cancer is based on serum proteins associated with cancer biology. In addition, they have identified a sub-group of ovarian cancer patients, based on the expression of MyD88, who are resistant to paclitaxel. These cancer cells express high levels of cytokines and chemokines and educate immune cells to promote tumor growth, angiogenesis and metastasis. Similarly, Y Huang is developing a novel method for the targeted delivery of therapeutic nucleic acids including small interfering RNAs (siRNAs) to chemoresistant ovarian cancer cells through receptor-mediated endocytosis. Using this method, the lab is specifically down-regulating genes involved in the inhibition of apoptosis to restore chemo-sensitivity to the cancer cells. The long-term goal is to identify effective siRNAs that can be used to treat cancers in animal models.
Research Laboratories (continued)

Two laboratories are studying oncogenic development transmitted through communication initiated by the epidermal growth factor receptor (EGFR) system. Oncogenic signaling pathways that arise as a result of mutations in the EGFR receptor are being investigated in the Maihle laboratory. It appears that two pathways, ligand-dependent and ligand-independent signaling (i.e., cell survival signaling and oncogenic signaling), may be interrelated. These alternate transcripts of EGFR arise from several ErbB/EGFR genes that appear to have potent regulatory activity with respect to receptor-mediated processes such as cell survival. These novel gene products circulate at fairly high levels and their concentrations are altered in response to certain pathologic states such as cancer. They are being studied as potential serum biomarkers in both breast and ovarian cancer patients. Additionally, increasing numbers of ErbB/EGFR directed drugs are in clinical trials and these markers are also being examined as potential surrogates for monitoring responsiveness to novel therapeutics during clinical trials. Also, the EGFR system is being investigated in the Reiter laboratory to gain a better understanding of the mechanisms that regulate the normal developmental processes and how these mechanisms are overcome during tumorigenesis. Important questions being studied are the genetic mechanisms that expand the biologic roles of the EGFR gene family, and how the molecular mechanisms by which these recently discovered human EGFR splice variants regulate EGFR signaling pathways in normal and malignant cells.

Richard Hochberg, PhD, Professor
richard.hochberg@yale.edu

Yingqun Huang, MD, PhD, Assistant Professor
yingqun.huang@yale.edu

Nita Maihle, PhD, Professor
nita.maihle@yale.edu

Gil Mor, MD, PhD, Associate Professor
gil.mor@yale.edu

Jill Reiter, PhD, Assistant Professor
jill.reiter@yale.edu

SELECTED KEY PUBLICATIONS
(OF 17 FOR THE ACADEMIC YEAR):


Reproductive Physiology Group

Faculty in the Reproductive Physiology Group investigate the physiological processes that regulate reproductive tract function. These studies range from the cellular and molecular level to clinical and translational research. The Group strives to better understand the etiology and regulation of diseases of the reproductive tract with the objective of developing novel treatments and interventions. Interests include elucidation of aberrant signaling pathways in polycystic ovarian syndrome, the etiology and regulation of endometriosis, biochemical regulation of ovarian and corpus luteum function, the mechanism of embryo implantation, the development of the urogenital tract, uterine stem cells and the endocrine regulation of reproductive tract gene expression. In particular we investigate the regulatory control of sex hormones in male and female reproduction, with special emphasis on the reproductive tract during the estrous/menstrual cycle and pregnancy.

Another area of active investigation focuses on the adverse effects of environmental contaminants in a variety of human and animal models. Basic questions regarding the underlying regulation of gonadal function, such as steroidogenesis, cell proliferation and apoptosis, are also under investigation. Working with whole animals as well as at the cell and molecular level, studies utilize human and rodent tissues to elucidate how hormones interact with receptors and how these interactions affect differentiation, growth, and cell-cell communication in the reproductive tract. The etiology of endometriosis, adenomyosis, leiomyomata, pelvic organ prolapse, implantation failure and pregnancy loss are all studied at the molecular, cellular, and clinical level. Novel treatments including gene therapy and stem cell therapy are currently studied. Clinical trials in the area of menopause and pregnancy loss are currently in progress. The research conducted within this group is supported by the NIH through several RO1s, a K award, and an R03 grant. Additionally, the Group was recently awarded a multimillion-dollar U54 center grant to study endometrial physiology and endometriosis.

Aydin Arici, MD, Professor
aydin.arici@yale.edu
Harold Behrman, PhD, Professor
harold.behrman@yale.edu
Kathleen Connell, MD, Assistant Professor
kathleen.connell@yale.edu
Umit Kayisli, PhD, Associate Research Scientist
umit.kayisli@yale.edu
Carlos Stocco, PhD, Assistant Professor
carlos.stocco@yale.edu
Hugh S. Taylor, MD, Professor, Chief of Reproductive Endocrinology & Infertility
hugh.taylor@yale.edu
SELECTED KEY PUBLICATIONS
(OF 26 FOR THE ACADEMIC YEAR):

Reproductive Neurosciences Group
The Reproductive Neurosciences Group is involved with research that aims to understand the mechanisms of action of peripheral hormones, including gonadal steroids and metabolic and stress hormones, on the activity of the brain. Several projects focus on a better understanding of how gonadal steroids affect cellular functions in the hypothalamus and hippocampus. Studies are also conducted to reveal brain signaling modalities of metabolic hormones, including thyroid hormones, the adipose hormone leptin and the gut hormone ghrelin. Particular emphasis is given to determining the interaction between gonadal and metabolic hormones with the goal of better understanding malfunctions of the hypothalamus that lead to reproductive failure, obesity and type 2 diabetes. Efforts also are underway to illuminate the role of these peripheral signals in the regulation of higher brain functions and neurodegeneration.

Last year, our Group published our research in several high-impact journals, including various Nature and Cell family journals. Our research was frequently featured in national and international media.

Tamás Horváth, PhD, DVM, Professor and Director, Reproductive Neurosciences, Chair, Section of Comparative Medicine
tamás.horvath@yale.edu
Sabrina Diano, PhD, Associate Professor
sabrina.diano@yale.edu
Qian Gao, MD, PhD, Assistant Professor  
qian.gao@yale.edu

Xiao-Bing Gao, PhD, Assistant Professor  
xiao-bing.gao@yale.edu

Tibor Hajszan, PhD, Associate Research Scientist  
tibor.hajszan@yale.edu

Csaba Leranth, MD, PhD, Professor  
csaba.leranth@yale.edu

SELECTED KEY PUBLICATIONS  
(OF 18 FOR THE ACADEMIC YEAR):


(8) Hajszan T, Leranth C, Roth RH. Subchronic phencyclidine treatment decreases the number of dendritic spine synapses in the rat prefrontal cortex. Biol Psychiatry. 2006 Sep 15;60(6):639-44.


Pictured far left: The Department has its own dedicated electron microscopy suite. The Reproductive Neurosciences Group uses this resource extensively to study differences in brain morphology associated with various hormone milieux.

Pictured left: An electron photomicrograph of a section of an ovariecimized monkey brain. This image of an estrogen-treated monkey shows increased density of axo-spine synapses in the stratum radiatum.
Education Division

MISSION STATEMENT
We strive to train future physicians to possess a keen sense of women’s health issues.

STUDENT TEACHING
The Department teaches Obstetrics, Gynecology, and Women’s Health to over 390 students from Yale School of Medicine and Yale’s Physician Associate Program each year. Our goal is to provide a strong and stimulating foundation in women’s health for all students, so that these future physicians will enter their areas of specialization with a keen interest in and accurate sense of the issues that their female patients will present to them.

The first-year curriculum focuses on normal reproductive physiology including embryology, puberty, the menstrual cycle, human sexual response, and maternal-fetal physiology. In the second year, students are introduced to pathophysiology and disease processes across the life span, starting from birth and progressing through puberty and the reproductive years, followed by menopause and aging. The pre-clinical curriculum has been dramatically revised and updated during the past year, and student feedback on the quality of the presentations has been very positive.

In the third year, students enter the clinical setting during a six-week core rotation in Obstetrics and Gynecology. In the outpatient setting, they participate in the care of women seeking routine gynecologic screening and prenatal care, contraceptive counseling, and evaluation for common gynecologic problems. In the hospital, students participate in the care of women requiring gynecologic surgery or hospitalization for non-surgical care. They also assist in the care of women in labor and participate in vaginal births and cesarean sections, as well as in the care of antepartum and postpartum patients. In addition, each week we offer a series of well-received didactic, interactive lectures and case-based sessions.

In the fourth year, we provide subspecialty electives for students interested in more focused and in-depth experiences. These include four-week rotations in Maternal-Fetal Medicine, Reproductive Endocrinology and Infertility, Gynecologic Oncology, Ambulatory Obstetrics and Gynecology, and an off-site elective at a health services clinic on an American Indian reservation in Gallup, New Mexico.

Jessica Illuzzi, MD, MS Ob/Gyn Clerkship Director

France Galemmeau, MD, Ob/Gyn Reproductive Module Director
We host an annual Medical Student and Faculty Ob/Gyn Research Hour to introduce students to the broad range of research topics and opportunities in reproductive sciences. In addition, we organize an ACOG-sponsored Ob/Gyn Student Interest Group to which we invite obstetrician-gynecologists in the community to discuss practice and lifestyle issues. We guide all students expressing interest in applying to Ob/Gyn residencies and provide comprehensive mentoring regarding career development. During the past year, all of our students desiring a residency in Obstetrics and Gynecology matched at their first-choice programs.

We are proud that Dr. Illuzzi’s significant efforts at improving the clerkship program have been recognized by the students who awarded her the Bohmfalk Teaching Prize.

**USE OF SIMULATION TO IMPROVE OBSTETRICAL PATIENT SAFETY**

To better prepare personnel and teams for the high-risk, low-occurrence events that are possible during labor, we have begun using drills and simulations. On-site simulation of obstetric emergencies allows for improvement in team functioning and decision-making without exposing real patients to risk. On-site simulation also provides a controlled experience for all staff and promotes team-work within a patient care unit. High-fidelity simulation has become the training tool of choice because it can simulate real critical-care events. We have begun using the NOELLE Birth Simulator for these purposes.

NOELLE is a full-sized articulating female mannequin with an articulating birthing baby. NOELLE has a dilating cervix and a birthing mechanism that allow demonstration of fetal palpation, vaginal delivery, shoulder dystocia, cesarean section deliveries, cord prolapse, placenta previa and vacuum delivery. In addition, NOELLE allows for the generation of realistic electronic fetal monitor tracings and displays maternal and neonatal vital signs that can be adjusted by the simulation leader in response to the team's actions.

We are committed to the use of medical simulation as an integral component of training in obstetrics. The NOELLE Birth Simulator represents our initial investment in this new model of team training for patient safety.
MISSION STATEMENT
The primary goal of the Obstetrics & Gynecology Residency Program at Yale University School of Medicine is to train future leaders in women's health.

OB/GYN RESIDENCY PROGRAM
The Department offers a four-year ACGME-accredited postgraduate residency training program based at Yale-New Haven Hospital. There are six categorical resident positions per year and a one-year preliminary PGY-1 position. The Program remains extremely competitive, and the number of applications as well as the strength of the applicants has been increasing year by year. During the 2007 residency recruitment season, we received over 350 applications and interviewed approximately 80 candidates, all of whom had a track record for academic excellence, public service, and a passion for women's health care. We continue to attract and recruit some of the top students from medical schools around the country. In 2007, the Department filled its incoming class with candidates ranked no lower than 11 on our match list.

CLINICAL AND DIDACTIC TEACHING
The Ob/Gyn Residency Program is based primarily at Yale-New Haven Hospital, with additional rotations at the nearby ambulatory sites, Yale-New Haven Temple Women's Surgical Center and Planned Parenthood of Connecticut. A dedicated team of full-time university and community faculty lead the Gynecology and Obstetrics Morning Report each day. Faculty review patient cases and assist the resident staff in devising clear and rational plans of management, using the principles of evidence-based medicine. A state-of-the-art interactive computer system allows the team to review radiologic imaging studies, laboratory data, and fetal heart rate tracings in real time during Morning Report.
Thursday afternoons are reserved for didactics, during which all Ob/Gyn residents are excused from clinical responsibilities. A comprehensive Resident Lecture Series has been developed that includes lectures by full-time Ob/Gyn faculty covering all relevant topics (including obstetrics, gynecology, reproductive endocrinology, urogynecology, gynecologic oncology, pathology, and ambulatory and primary care), with a particular emphasis on evidence-based management. One hour per week is also set aside for CREOG reviews, journal club, professionalism seminars, and for micro-seminars to familiarize the residents with issues relating to medical malpractice insurance, litigation, risk management, and effective patient communication.

RESIDENT RESEARCH

In addition to promoting clinical and academic excellence, the Ob/Gyn Residency Program requires an original research thesis for graduation. The Department has a large number of outstanding laboratories covering the entire spectrum of basic, clinical, translational, and epidemiologic research in women’s reproductive health, and residents are encouraged to take advantage of these opportunities. To introduce our residents to research, the Department sends the entire PGY-1 resident class each year to the Annual Scientific Meeting of the Society for Gynecologic Investigation. Moreover, an eight-week research elective is set aside in the PGY-3 year to allow residents to complete their research projects in time to present them at our annual Resident Research Day.

These initiatives have been enormously successful, and a number of residents were invited to present their research at national and international Ob/Gyn scientific meetings. A number of residents also had their research accepted for publication in highly respected peer-reviewed journals.

ACCOMPLISHMENTS 2006-2007

The Ob/Gyn Residency Program has enjoyed unprecedented academic, clinical, and organizational growth during the past year. Among the highlights:

1. Introduction of a comprehensive two-week PGY-1 orientation at the beginning of the intern year, which includes hands-on training in basic obstetric and gynecologic ultrasound.
2. Organization of a cadaver laboratory to teach basic surgical techniques.
3. Introduction of a biweekly interactive Debate Club alternating with a review of ACOG Practice Bulletins and quarterly ABOG Life-Long Learning (LLL) Modules in which the residents select a topic, critically review and critique relevant articles, and discuss patient management under the supervision of a faculty moderator.
4. Introduction of a hands-on laparoscopic simulator model and a “virtual reality” computer simulated trainer (LapSim®), both designed to teach laparoscopic surgical techniques.
5. Introduction of an obstetric training module using a birthing simulator to improve management decisions and communication skills in the setting of routine obstetric care as well as obstetric emergencies.

7. Improvements in the Ob/Gyn Resident Library, including the addition of new textbooks, electronic resources, and a Residency Website with links to additional on-line resources, reading lists, and program announcements.


9. Introduction of a Continuity Team Clinic Practice model for providing basic obstetric and primary care in the Women's Center. Patient satisfaction scores have significantly increased in response to this innovative continuity clinic practice model.

SELECTED KEY PUBLICATIONS


(3) Matalliotakis IM, Cakmak H, Mahutte N, Fragouli Y, Arici A, Sakkas D. Women with advanced-stage endometriosis and previous surgery respond less well to gonadotropin stimulation, but have similar IVF implantation and delivery rates compared with women with tubal factor infertility. Fertil Steril 2007; in press.


Service to Our Community and to the Needy

Our faculty contribute their skills beyond traditional medical school teaching and clinical care activities to further local educational causes and to offer care for the medically underserved in developing countries around the world.

For the past four years, the Discovery to Cure High School Internship Program has fostered the love of science and research among area high school students. The Program pairs students with Yale Ob/Gyn researchers for the summer. These researchers from different labs, supervise the students as they learn a variety of modern molecular biology research techniques, such as PCR. For two years in a row, students who participated in the Internship Program were selected as semifinalists for the Siemens Westinghouse national competition.

Yale Ob/Gyn international humanitarian efforts include providing annual clinical care for patients in Jamaica, West Indies. Drs. Lockwood and Rutherford visit the island yearly as part of a medical relief mission to volunteer their expertise in providing Ob/Gyn surgical care to the needy. While the nurses, pediatricians and internists see between 250 and 300 patients per session for a wide range of medical conditions, Rutherford and Lockwood perform surgeries up to 18 hours a day for disorders including fibroids and ovarian tumors.

Additional sites of outreach and care by Yale’s Ob/Gyn physicians have included Haiti and several Central and South American countries.

Yale Obstetrical and Gynecological Society

The Yale Obstetrical and Gynecological Society (YOGS) is comprised of current and former students, residents, and clinical fellows who completed their training at Yale, as well as past and current faculty members. Although we continue to update our eligible membership list that dates back to approximately 1945, we currently have identified 494 colleagues who are eligible for membership, of which 141 are paid members.

One of the primary purposes of the Society is dissemination of information regarding new developments within the Department. Toward this end, during this academic year, YOGS held its first formal meeting at the annual ACOG conference in San Diego and disseminated its first periodic newsletter. Additional meetings have been planned, and the first issue of an annual YOGS Journal will be distributed this coming year. In addition to dissemination of information regarding new developments, noteworthy achievements by our graduates, highlights from presentations such as Grand Rounds and symposia, and original articles from active, former, and visiting faculty will be featured.

Yale Obstetrical and Gynecological Society

YOGS