Like all residency programs in the US, the Yale program has to meet certain basic requirements outlined by the Accreditation Council for Graduate Medical Education (ACGME). Those structured requirements call for residents to go through various rotations, take part in a set of didactic sessions, and keep a log of every case they handle. But for residents to become true leaders in women’s health, a training program must do much more.

Among the resources that the residents draw on at Yale are the three DaVinci robotic surgery units that we have on campus, including one machine that has dual controls and one dedicated exclusively to surgical training of residents. The dual console machine is one of the few surgical robots in the US that allows the senior surgeon and the student to sit at separate consoles. Normally, when teaching residents on a single console model, the instructor operates the controls from the console while the resident stands at the operating table to help manipulate the surgical equipment. In our dual console model, the surgeon can hand over complete control of the procedure to the resident. It’s a little bit like a dual control car when you are learning to drive.

The medical school also has an ongoing relationship with the manufacturer of the DaVinci robot, which means residents can obtain more in-depth training in robotic surgery by spending time at the company’s Hackensack, NJ headquarters.

The residents also have access to several other simulation programs and in-service teaching programs to train them in laparoscopy, deliveries, labor and delivery emergency management, and a variety of basic (CONTINUED ON PAGE 6)
Greetings from Charles J. Lockwood, MD, The Anita O’Keeffe Young Professor of Women’s Health and Chair of Obstetrics & Gynecology

Welcome to another edition of Yale Advancing Ob/Gyn. This issue highlights our Department’s teaching activities. Our residency program, in particular, prides itself on combining cutting-edge technology with world-class mentorship, which is no doubt one of the reasons so many of our residents go on to become leaders in the field. (See our website for former residents who are now medical school chairs.)

Part of the secret to our success is the high-quality basic, translational and clinical research that our residents are exposed to on a daily basis. But equally important are the innovative clinical practices—from laser therapy for twin-to-twin transfusion syndrome to radical robotic surgery for advanced ovarian cancer.

In this issue you will see how Dr. Joshua Copel, one of the world’s top obstetrical imagers, teaches ultrasound. Similarly, Drs. Beth Rackow and Julia Shaw describe the growing role of simulation in residency Ob/Gyn training and discuss their empowering teaching methods.

Our top-notch residency program by no means overshadows our other educational jewel: medical student education. We are justifiably proud of the work done by Dr. Jessica Illuzzi to completely revamp our medical student clerkship. She has introduced a dizzying array of innovative pedagogic offerings. It is no surprise that students rate our clerkship very highly. Jessica has won multiple prizes for her teaching, mentorship, and professionalism over the past several years, and you can get a sense of why after reading her article.

Whether one looks at the medical school’s innovative teaching initiatives or the outstanding scholarship that residents are exposed to, it’s easy to see why Yale produces so many leaders in women’s health care!

Message from the Chair

Charles J. Lockwood, MD

Yale Advancing Ob/Gyn, Developments from Yale Obstetrics, Gynecology & Reproductive Sciences
Executive Editor: Paul Cerrato
An integrated medical school curriculum builds strong clinical skills

An exceptional faculty, professional standardized patients, and state-of-the-art simulators prepare the next generation of physicians to care for their female patients.

At Yale, our Department’s goal is to train future physicians to provide excellent care for women across the reproductive lifespan. Physicians of all specialties will care for female patients who present with reproductive health issues, whether it is a young athlete with amenorrhea, a pregnant woman with an autoimmune disease, a patient with type II diabetes and abnormal uterine bleeding, or a post-menopausal woman with breast cancer and symptoms of hypoestrogenemia. We have designed an innovative, longitudinal curriculum in reproductive health that spans all 4 years of medical school, building upon itself and complementing the students’ advancing clinical skills.

Dr. France Galerneau oversees an outstanding 1st and 2nd year curriculum that begins with the physiology of reproduction and progresses to more advanced topics, such as the pathophysiology of PCOS and preeclampsia. These topics are taught both in lecture and small groups by dedicated departmental faculty including Drs. Lubna Pal, Pinar Kodaman, Stephen Thung, Jessica Illuzzi, and Beth Rackow. This strong foundation prepares students for their clinical experience during the 3rd year clerkship in Ob/Gyn.

The Ob/Gyn clerkship immerses students in the clinical setting with a fantastic cadre of residents, midwives, nurses, and physicians. The clerkship starts with a series of simulation experiences and basic instruction. Every student has a session with a Gyn Teaching Associate who helps the student learn and practice breast and pelvic examination and guides each student on how to help a woman through these exams by verbal and non-verbal communication. This program is directed by Dr. Shefali Pathy and Nancy Kellet, RN. Obstetric simulations follow with the NOELLE birth simulator, expertly led by Dr. Scott Casper and Cheryl Raab, RN. Students rave about this training because it prepares them to participate in the care of laboring women during their birth experiences. Later in the clerkship, Dr. Ozan Bahtiyar uses a different set of simulators to teach students how to perform ultrasound to visualize both normal and abnormal anatomy.

One of our newest and most exciting initiatives on the Ob/Gyn clerkship is the Options Counseling Curriculum, led by Dr. Eric Hodgson. Options counseling is the communication that occurs between a provider and a patient when important medical decisions need to be made. We have developed a series of realistic clinical scenarios, including a broad range of topics related to unplanned pregnancy, postmenopausal hormone therapy, contraceptive counseling, amniocentesis, and conservative vs. radical treatment for gyn malignancies. Professional actors have been trained in these scenarios to serve as standardized patients so medical students can learn and practice options counseling. Every session is observed, and faculty preceptors and peers provide immediate feedback to students. This initiative is supported by the Cavanagh Endowment, a recent gift to the Yale School of Medicine.

Later in the clerkship, students have a unique session with ovarian cancer patients, led by Ms. Joanne Bilyard, called Survivors Teaching Students. In this forum, women share their personal experiences about being diagnosed and treated for ovarian cancer. Students ask questions and talk with these women about what types of patient-doctor interactions were helpful and which ones were not.

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Here at Yale, we have two laparoscopic simulators that residents have access to 24/7. The LapSim System is a remarkable teaching tool that provides residents with a wide variety of modules that simulate various laparoscopic maneuvers. These modules help our residents develop hand-eye coordination and master tasks that require both right hand and left hand dexterity. In some of the scenarios, the computer will control movement of the camera while the student operates with both hands; in others the student is expected to control the camera, which adds another layer of complexity. The exercises range from basic camera and instrument navigation to vessel clipping and cautery to advanced suturing.

One of the apparent disadvantages of the system is the fact that it doesn’t offer “haptic” feedback (i.e., active touch perception), so residents don’t get the tactile cues that are present when interacting with live tissue. In one sense that’s an advantage because some of the robotic surgery training devices we use (see article by Shaw) don’t let you physically feel the tissue either; you have to rely on visual cues to perform the procedure. And while lack of tactile feedback may have some drawbacks, we do have other simulators here at Yale that provide such feedback. Box trainers are set up with real laparoscopic cameras and video systems. With these systems, the residents can use the same instruments they use in the operating room and practice tasks such as cutting, suturing, and knot tying on physical objects that do provide haptic feedback.

Of course, there is no substitute for training in the OR. When I spend time with residents in that setting, my approach is to make sure they learn not only the “how” but the “why.” We want them to be the experts in the room so that when their surgical nursing team does not understand the equipment or the procedure, they can explain it. With that in mind, I’ve developed a series of lectures on both laparoscopy and hysteroscopy, which discuss the techniques in detail, explaining how the instruments function, and providing details on energy sources and ways to minimize complications.

One of the more challenging pieces of equipment that we use in gynecology is the operative hysteroscope. There are multiple pieces to this equipment, including a very complex tubing system. The typical office hysteroscope may have only one operative channel, but the hysteroscope we use in the OR for a major operative case has the ability to cut and cauterize, has multiple attachments and a very complicated inflow-outflow system. Many of the residents do not know how to assemble and disassemble this equipment. One of my goals when training residents in the OR is to get them to the point where they can independently do so.

Our surgical training program really excels, not only because of the simulators and OR training, but because residents are exposed to so many experts in each subspecialty (i.e., as of July 1st, seven infertility surgeons, four urogynecologists, and six gyn oncologists) performing over 2,000 major surgeries per year and an equal number of minor cases. Our community-based physicians add nearly equivalent surgical volume. The residents get exposure to some very complicated and unusual surgeries as well as the routine procedures. And because they see so many experienced surgeons performing so many gynecologic procedures, they are exposed to a wide range of surgical techniques that they wouldn’t be exposed to in most other programs; they get to see the same procedure accomplished several different ways, which helps them begin to establish their own preferred surgical techniques.
World-class ultrasound training, “fireside chats” with a full professor, and exposure to the top talent in the field all help train the next generation of leaders in Ob/Gyn and women’s health.

As a professor at Yale School of Medicine, I have the most contact with medical students when they are in their 3rd year clerkship, at which point they are assigned to either Yale-New Haven or Bridgeport Hospital. While the students attend a wide range of formal didactic lectures, some of the more unique experiences they participate in are my “fireside chats.”

Several years ago I started to invite all the 3rd year clerks to my house for pizza and beer one night in each rotation for a lecture on operative obstetrics. We discuss operative vaginal deliveries, which they don’t get to see very often these days. But it is also an opportunity to discuss whatever else is on their minds and to address topics that they want to learn more about, including careers in Ob/Gyn, future directions in fetal imaging, and the many clinical uses of ultrasound. It’s a much more relaxed environment than a lecture hall, and for that reason it helps break down some barriers and lets them see faculty members in a less formal way.

Ultrasound (U/S) training

Needless to say, as past president of the American Institute for Ultrasound in Medicine (AIUM) and the current president of the Society for Maternal-Fetal Medicine (SMFM), ultrasound training of medical students, residents, and MFM fellows is one of my top priorities. Ultrasound has become such an integral part of Ob/Gyn care; we have ultrasound machines in our main Long Wharf faculty practice, various community hospital satellite offices, our low- and high-risk clinics, on the labor floor, and on the postpartum floors. And while I spend a good deal of time teaching the basics in these settings, I firmly believe that the best teachers of ultrasound are the outstanding sonographers we have here at Yale. So I encourage residents to initially go into an ultrasound room with sonographers and watch them scan; they’re the professionals at Ob/Gyn imaging.

I also tell residents training in U/S that they have to learn to develop a third eye, the one that they just grew on the end of their arm. Essentially they have to rewire their brains to use a hand instead of an eye. Normally, if you want to look to the right, you turn your head a little bit and certain muscles in your eyes relax or contract and allow your orbit to veer a little bit to the right. There are corresponding hand movements in U/S scanning that allow you to look to the right too. So basically students have to learn how to move the hand controlling the transducer to make the picture change.

On a broader scale, our educational efforts in U/S have led to the development of a national curriculum on this topic. One of my initiatives as president of AIUM was to develop 31 lectures that will eventually be offered to every Ob/Gyn residency program in the country. I spearheaded this project because we recognized that there is so much to cover in this area; without a well-structured curriculum, residents can easily be shortchanged. The series covers everything in Ob and Gyn starting with the physics of U/S; basic gynecology; first, second and third trimester obstetrics, even the ergonomics of how to scan without hurting oneself. The curriculum tapped experts from all over the country to develop PowerPoint presentations on each of the major topics, and it will be implemented very shortly here at Yale and then around the country.

Rock stars and rewards

Some of the world-class leaders who contributed to this national curriculum were “born” in Yale’s training program. The new president of AIUM, Alfred Abuhamad, MD, did an ultrasound fellowship here before moving down to Eastern Virginia Medical School, where he is now the Chair of the Department of Ob/Gyn and the Dean for Clinical Affairs. Ray Bahado-Singh, MD, another

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skills, including suture technique, IUD placement, circumcision, and insertion of injectable contraceptives.

**Clinical training and patient safety**

Of course, simulation training can only go so far in creating a well-qualified clinician. There’s really no substitute for patient contact. To help develop clinical skills, all residents participate in the Gynecologic Teaching Associate Program. We were one of the first in the country to take this approach, which teams up professional clinical instructor “patients” and first year Ob/Gyn residents. First, the resident receives an hour-long didactic session on pelvic and breast examination, and then he or she actually gets to do exams on professional patients. The instructors guide residents along to ensure that they learn to palpate correctly and also help residents with technique and communication skills to optimize the comfort of the patient.

Another important part of the residents’ training here revolves around patient safety. One of the goals of the program is to develop better lines of communication between all members of the medical team. We have put in place a standardized protocol to accomplish this goal. For instance, all residents are required to pass a special national certification exam to demonstrate their competence in fetal monitoring. That’s another unique part of our program.

**Embracing challenges and rewards**

Another novel aspect of the Yale residency program is its focus on developing high-quality research expertise. All residents are asked to do at least one research project during their four years of training and to present the results during their 4th year at our Resident Research Day. Many

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Perhaps one of the most highly praised aspects of our clerkship is the 6-week didactic curriculum that we run every Thursday. This series of small group seminars and interactive sessions, covering contraception to menopause, is one of the most popular at the medical school. We also engage in a weekly discussion of ethics, professionalism, and challenging situations in the clinical setting, providing an open forum for discussion about students’ experiences as they transition into the medical setting, often unfamiliar territory with shifting rules and boundaries. We discuss topics such as how to care for patients who do not speak English, pelvic exams under anesthesia and informed consent, and professionalism in the surgical suite. Throughout the 6-week clerkship, students also meet regularly for Clinical Reasoning Workshops led by our extraordinary cadre of community faculty members, including Drs. Joel Silidker, Natalie Achong, Ann Ross, Maria Asis, Ronald Cwik, Sean Flaherty, Howard Simon, and Emily Fine. These workshops ensure that all students have an opportunity to consider some of the most common Ob/Gyn scenarios, such as pelvic pain and abnormal bleeding, even if they do not encounter a patient with these symptoms during their clerkship.

Lastly, we strive to motivate students to explore the quality of the evidence regarding the many controversial topics in our field: when to honor a maternal request for Cesarean delivery; when to perform vaginal delivery after Cesarean section; how many embryos should be placed during in vitro fertilization; whether to recommend post-menopausal hormone therapy or cord blood banking, and so on. We have designed a forum in which students engage in formal debates centered on such common controversies. The debate-style approach motivates them to find the highest-quality evidence to support their assigned stance on each controversial topic and also forces them to scrutinize the literature on both sides to identify limitations. This leads to an engaging and often entertaining debate in which all students participate and ultimately learn about the topics. This forum teaches students to think critically and practice self-directed learning, which prepares them for the ever-changing literature and the decisions they and their patients will face.

Obstetrics and Gynecology present a unique set of clinical experiences and challenges for all students, ultimately helping them to reach their full potential as compassionate and knowledgeable physicians able to provide optimal care for patients in all specialties.
Training Ob/Gyn residents to excel  
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carry out multiple projects, resulting in multiple peer reviewed publications.

When interns enter the program, they are assigned a career mentor and they subsequently identify a research mentor by the 2nd year. With over $16.3 million in departmental research funding including $9.7 million in annual NIH grant support and another $6.6 million in foundation, Pharma, state and other federal support, there is a surfeit of well-funded research mentors to choose from. Our goal is for each resident to develop at least one research project that is of sufficient clinical value to warrant presentation at a national meeting and publication in the professional literature. If they do get their work accepted at a national meeting, we then fund their attendance to present their work. In fact, two of our residents recently presented at the Society for Gynecologic Investigation. Over the past five years, multiple residents have had more than four projects presented nationally.

Looking at our track record, it’s clear that our residency program has produced clinicians with leadership skills. During the last several years, six out of six of our residents have gone on to do subspecialty or research fellowships.

World-class medical student training doesn’t have to be impersonal  
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Yale ultrasound fellow, has a prominent post at Wayne State University. Dr. Giancarlo Mari, MD, the Acting Chair of Ob/Gyn at the University of Tennessee, was both a resident and a fellow at Yale. While he was here, his research helped deepen our understanding of fetal blood flow in anemic fetuses.

So clearly, there are a lot of exciting things happening here at Yale, and our residents get to be right in the middle of all this creative energy and scholarship. One of the reasons the program is so innovative is the fact that residents have the opportunity to work directly with international leaders in every subspecialty. We’ve got the stars in all the subspecialties. In Maternal-Fetal Medicine, there are Charly Lockwood, Ed Funai and myself; in Gyn Oncology, there are Peter Schwartz, Tom Rutherford and Mazoud Azodi; in Reproductive Endocrinology & Infertility, we have Pasquale Patrizio and Hugh Taylor, and in Urogynecology, Richard Bercik. Who can ask for a better group of teachers? And behind these senior faculty are a bevy of future stars.