

## A Green Light for Cancer Surgery

**F**or most women with uterine or cervical cancer, the prognosis is good, thanks to early detection: The majority of these women are postmenopausal, and the first symptom of uterine cancer is vaginal bleeding—a discovery that usually prompts a call to a gynecologist. Still, cancer cells can't be trusted, and nothing concerns a gynecologic oncology surgeon more, says **Edward Tanner**, than having a patient apparently at low risk for recurrence following hysterectomy and lymph node removal who still develops more disease later.

After diagnosis, the standard laparoscopic approach is to remove the uterus and, in many cases, lymph nodes in the pelvis. In the past few years, some surgeons have attempted to identify the lymph nodes at highest risk for disease by injected blue dye and/or radiocolloid into the cervix at the start of the procedure. This technique, called sentinel lymph node (SLN) mapping, is useful but has some drawbacks. The blue dye often stains normal tissue, says Tanner, making it difficult to identify troubling areas with precision.

Fortunately, he says, advanced robotic surgery with multispectral fluorescent imaging—typically favored in other specialties, like urology and colorectal surgery—is now available at The Johns Hopkins Hospital for gyn procedures. With its indocyanine green (ICG) dye, which can only be used with the new camera technology, he explains, suspicious nodes pop up like neon signs, “and that gives us more peace of mind.”

Tanner also cites the advantages of real-time lymphatic mapping and avoidance of



**Edward Tanner says the new minimally invasive robotic procedure lowers the risk of harm, provides more accuracy “and gets women back on their feet in record time.”**

radioactivity. With this novel approach, he says, surgeons can direct the pathologist to the lymph node most likely to contain disease that's spread beyond the uterus.

“I've seen some patients in which the only positive lymph node was a tiny metastasis in the SLN,” says Tanner. “We can't know whether this node would have been missed with a more conventional LN analysis, but I've also seen cases where patients have had a complete LN dissection that was all negative and the patient then had a recurrence in the area of the LNs. I suspect that we just didn't find it because we didn't know which of the 20 to 50 LNs to focus our efforts on.”

The hope, he adds, is that with greater visualization and experience with this technique, “we may one day be able to omit complete lymph node dissection, which can cause lymphedema in the legs.”

Over the course of the 150+ procedures Tanner has performed, he's rarely needed to convert to an open incision. In a recent

**“WE CONTINUALLY PUSHED THE BOUNDARIES OF WHAT KINDS OF SURGERIES COULD BE PERFORMED MINIMALLY INVASIVELY.”**

—EDWARD TANNER

patient with cervical cancer, Tanner tackled a radical hysterectomy and lymph node resection, which took about four hours. There were no complications, and the pleased patient went home the next day. “Pain levels are manageable,” he says. “Some women return to their jobs in just two weeks.”

Tanner, who completed his ob/gyn residency at Johns Hopkins and a fellowship at Memorial Sloan Kettering in gynecologic oncology, says his training for the new image-guided robotic procedures was intense. “We had a lot of very sick patients,” he says, “and continually pushed the boundaries of what kinds of surgeries could be performed minimally invasively instead of a large open incision.”

Another important benefit of the new approach, says Tanner, concerns the growing number of obese postmenopausal women with gynecologic cancers. More invasive surgery increases the risk of complications in these patients, especially in those with heart disease and diabetes.

Citing the ease of navigation through four small holes using tiny-wristed interactive robotic arms, Tanner can access harder-to-reach areas, particularly in heavy patients. As with any robotic surgery, there's no tactile sensation for the surgeon, “but with experience you learn to compensate,” says Tanner. “You can see just how much pressure is on a suture.”





Dear Colleague,

In our ongoing quest to discover new insights, techniques and treatments in gynecology, we at The Johns Hopkins Hospital are driven by the needs of our patients—women of all ages who turn to us for our expertise. From our most basic molecular and genetic studies to our translational research and clinical trials, we have one goal: to transform patient care.

The articles in this issue of *Innovations in Gynecology* highlight just a few of the ways that we continue to push the boundaries of gynecologic care: sentinel lymph node mapping for gynecologic cancers using imaging with advanced robotic surgery, developing a specialized clinic for high-risk pregnant obese women, and conducting groundbreaking research to confirm that ovarian cancer develops in the fallopian tube—not in the ovary.

And now, patients have the added advantage of receiving care in the comfort of our new, spacious and modern facility in the new clinical building.

We hope you enjoy this brief snapshot of our department's innovations. Please call on us to learn how we can contribute to your practice.

Harold E. Fox, M.D.  
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**“Our patients are weighing more, and so are their babies. It’s an unsettling trend,” says Janice Henderson, “and one we aim to turn around.”**

## Pregnant and Obese: Making the Best of It

It throws pregnant women off, at first, when obstetrician **Janice Henderson** says, *You know, you really don’t want to gain any weight at all during this pregnancy.*

But some 20 years of caring for obese and morbidly obese women through pregnancy and labor has shown her that even the Institute of Medicine’s recommended lower overall gestational weight gain—11 to 20 pounds for women with a BMI above 30—is still more than need be. “I reassure my patients that they’ll have ultrasound monitoring throughout their 9 months, that normal-size babies are the rule, and that they’ll end pregnancy pounds lighter than when they started, which makes us all happy.”

Henderson’s directive adds to advice that she and colleagues tailor for the population of high-risk obese women who come to Hopkins’ new Nutrition in Pregnancy Clinic. The cutoff for clinic entry is a BMI of 30, but she has patients well into the 50s and 60s. Many come to her with the hypertension, diabetes and cardiac disease that complicate pregnancy, “but even if there are none of those metabolic problems,” she says, “these women and their babies are still at high risk during pregnancy, labor and postpartum.”

“Obesity raises the risk of pretty much any congenital defect beyond 2 percent, the figure for a healthy pregnant patient,” she adds. Odds of neural tube defects, cleft lip or palate, heart abnormalities and hydrocephaly rise significantly—60 percent for some. And for the mothers, hazards read like the inventory at an unwellness superstore: gestational hypertension and diabetes—as well as problems keeping such preexisting conditions stable—and preeclampsia, preterm labor, stillbirth. Obese women in labor are more likely to have cesarian deliveries

and during them, increased blood loss, longer operative time and higher risk of a septic wound or uterus.

With this list in mind, against a background of patients carrying Oreo-and-chips-laden handbags, the need for the new clinic became obvious, Henderson says. “Though we’re looking after their diabetes or fetal problems, we’re not addressing our patients’ real problem, the weight gain itself.” So last fall, she and co-attending **Erika Werner**, with a nutritionist and a social worker, took steps to adjust patients’ lifestyles as well as manage their high-risk pregnancies.

They’ve focused first on younger women at high risk of metabolic disease, to try to reverse the trend. “We talk with them intently about nutrition, water intake and exercise, but we’re not hitting patients over the head,” Henderson explains. Plans are in place for a peer counselor who has faced similar problems and overcome them.

“We’d most like to see women during preconception, when screening has high benefits and better nutrition can help offset birth defects,” Henderson adds.

That may come with targeted outreach. Presently, reaching out involves teaming with area obstetricians, especially those not equipped to handle high-risk pregnancies and births, even vaginal deliveries.

Recently, Henderson delivered a baby whose 400 pound mother had had multiple abdominal surgeries, including gastric bypass. “We’re used to complex cases,” she says, “and we have the backup resources with blood-banking, ICUs and specialty anesthesia in-house, 24/7.” ■

**Info: 443-997-0400**

# The Skinny on Exercise During Pregnancy

It might seem counterintuitive, but regular, moderate exercise during pregnancy—and even vigorous exercise for some women—is not only safe, but beneficial to the mother and fetus. So says **Andrew Satin**, director of obstetrics and gynecology at Johns Hopkins Bayview Medical Center. The number of women entering pregnancy used to vigorous workouts is growing. Some are elite athletes. For these women, one-size-fits-all advice doesn't cut it. And some overweight pregnant women are trying to incorporate more exercise to improve their health and that of the fetus. All these women want detailed answers about the effects of their regimen on the baby, which as yet, says Satin, are scarce.

But he and his colleague **Linda Szymanski**, a maternal-fetal medicine physician with a Ph.D. in exercise physiology, are doing their part to change that. Recently they published two articles on their research to evaluate fetal responses to strenuous exercise in 45 physically active and inactive women during their third trimester. The results showed that even inactive healthy women can exercise moderately, and athletes may continue vigorous exercise safely. All the mothers delivered without complications.

Now she and Satin are enrolling pregnant women, including those with chronic hypertension, in a clinical trial. The studies require the women to undergo peak and moderate exercise tests on a treadmill, while Szymanski measures how different intensity levels affect the fetus. Ultrasound exams immediately follow the women's exercise. "The difference between our studies and existing studies," says Szymanski, "is that we are differentiating between fit women and women who do not exercise. We're also looking at fetal response to exercise in a practical way—that is, walking on a treadmill at the intensity and duration currently recommended by public health experts."

It's generally agreed that absent known contraindications, exercise reduces common discomforts and helps prevent gestational diabetes and possibly preeclampsia. The Department of Health and Human Services, for example, recommends two and a half hours of moderate aerobic exercise per week. Common sense should also prevail: Pregnancy isn't the time to take up activities like kickboxing or skiing, where the abdomen can get hit. Still, says Szymanski, guidelines are vague, and few studies have evaluated the fetal response to exercise.



**Andrew Satin and Linda Szymanski offer individualized regimens in which they calculate safe levels for heart rate, blood pressure and exertion. "Pregnancy is a great time for behavior modification," says Satin. "Mothers want the best for their babies."**

Although the pair's initial results boost the case for workouts, Satin says, "we still advise women to talk first with their physicians to make sure obstetric conditions won't compromise their health or that of the fetus." ■

**Info: [hopkinsmedicine.org/obgyn](http://hopkinsmedicine.org/obgyn)**

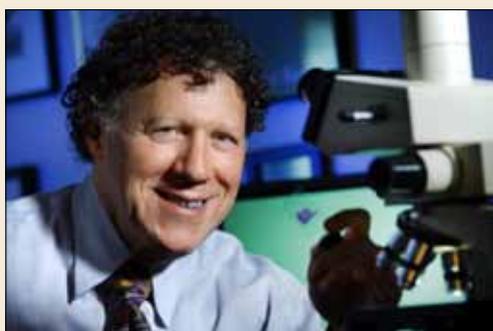
## New Thinking on Ovarian Cancer's Source

Johns Hopkins researchers are leading a new North American study of ovarian cancer that they hope will encourage better prevention strategies.

With a five-year, \$12 million grant from the Department of Defense, scientists from Hopkins and three other institutions have formed a consortium to identify potential sites where ovarian cancer originates. They also hope to confirm a new theory that most of these cancers develop not in the ovary itself, but in the fallopian tube immediately adjacent to the ovary.

Ovarian cancer is the most lethal cancer of the female reproductive organs, explains principal investigator **Robert Kurman**, director of Hopkins' Division of Gynecologic Pathology. By the time most women are diagnosed, he says, the disease has already spread beyond the ovary.

"Despite numerous clinical trials aimed at early detection, the overall



**Robert Kurman and his colleagues are trying to prove that most ovarian cancers begin in the fallopian tubes.**

mortality from this disease has remained essentially unchanged for decades," he says. "We want to better characterize where ovarian cancers begin to draw more insight on how to manage the disease."

For years, women in their early 40s with a family history of ovarian cancer had been encouraged to have their ovaries removed to reduce their risk, Kurman says. Pathologists who evaluated the ovaries and tubes

that had been prophylactically removed observed that many women had no cancers or precancerous changes in their ovaries. Rather, they had small, occult cancers in their fallopian tubes. The new thinking is that these small tumors shed malignant cells that implant on the ovaries, he says. True, the prophylactic removal of the fallopian tubes and ovaries in these women at high risk reduces the risk of develop-

ing ovarian cancer. But studies have shown that women whose ovaries are removed prior to menopause have a higher overall mortality and are at a higher risk for coronary heart disease compared with women who undergo a natural menopause, presumably because of premature loss of female sex steroid hormones.

If Kurman and colleagues can prove that most ovarian cancers start in the fallopian tubes, women at high

risk could have their tubes or the part of their tubes where the precancerous lesions develop surgically removed. That would reduce their risk of developing "ovarian" cancer while preserving their fertility and maintaining their source of disease-preventing hormones.

Studies to begin next spring will focus on high-grade serous carcinoma, the subtype accounting for 75 percent of all ovarian cancers and 90 percent of all ovarian cancer deaths. Four projects will characterize precancerous lesions by clinical, pathologic and molecular genetic analyses. A fifth will evaluate whether these lesions can be modified by oral contraceptives or anti-inflammatory drugs.

"Ovarian cancer is much more complex than we realized," Kurman says. "We believe that shifting from early detection to prevention of precursor lesions in the fallopian tube will significantly reduce the burden of this disease." ■

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SINGLE-ACCESS PROCEDURES

## One-Port Hysterectomy Wins Favor



**“My favorite story,” says gynecologic surgeon Stacey Scheib, “is my patient who lifted the edge of her shirt in an airport, daring the woman passenger she’d just met to find her scar.”**

While back, when Stacey Scheib—then a gynecologic surgery fellow—overheard discussions about single-incision laparoscopic hysterectomy, she was a nonbeliever. “Just the idea made me say that’s crazy,” says Scheib recounts. Already expert in laparoscopy, she’d counter, “I use conventional noninvasive approaches and my patients do so well. What’s the benefit here? With only one port, you lose triangulation.”

Scheib stayed reluctant until her first single-incision laparoscopy—performed on a woman with a grapefruit-size ovarian cyst. “It took no longer than usual,” she says, “and when my patient told me three days later that she’d gone running without trouble, I knew there was something to this!” Since then, she’s performed some 500 of the single-incision procedures and is readying a training program in the technique for Johns Hopkins surgical fellows.

After its first appearance in 1989, the new laparoscopy failed to take off, Scheib explains, because of a lack of useful technology. It’s only in the last three or so years that companies have sold the specialized ports that give surgeons single access points for multiple laparoscopic tools as well as instruments that bring the triangulation necessary for surgery. The laparoscope that Scheib now uses is itself a model of form and function, with a flexible, articulated tip that clearly opens up the abdominal

field. “We get views that go beyond even traditional laparoscopy.”

Patients reap the benefits. There’s the cosmetic bonus of having the single 2-centimeter incision within the umbilicus, leaving no obvious scar. The chief advantage, however, is in whittling the risk of complications that can come with trocar use. “Each new incision in the fascia weakens it, increasing chances of hernia, bowel injury, infection or bleeding,” says Scheib. So a single opening not only reduces that risk, it also lessens patient pain and need for narcotics while preserving greater abdominal wall integrity.

Scheib’s research shows no increase in surgery time or blood loss. Time away from work is shorter: Life typically returns to normal within two weeks. And beyond hysterectomy, Scheib uses the technique for ovary or ovarian cyst removal, select myomectomies and treatment of endometriosis. Her recent studies support its use during pregnancy or for ovarian masses, when done “by the right hands.”

Single incision laparoscopy isn’t common for myomectomies or other situations that call for a lot of uterine suturing—a challenge from one port. “Fortunately,” she says, “there’s no problem if, in the midst of surgery, I find the single opening isn’t enough to do things safely: I can add another port and I’m back to the way I started.” Being comfortable with the full spectrum of surgery allows tailored care. ■