

# New Ways to Calculate the Risks of Surgery

By LAURA LANDRO

Facing abdominal surgery for colon and uterine cancer, Kathleen Rivard listened last Thursday as Stuart Bussell, her surgeon at Danbury Hospital in Connecticut, laid out the odds: a 1% risk of death, an 18% risk of a complication like an infection at the surgical incision site, and an 8% chance of a more serious complication like cardiac arrest.

It wasn't just an educated guess: Dr. Bussell used a new risk calculator that handicaps an individual patient's chances of surgical complications based on personal medical history and physical condition. It also helps doctors and patients make tough decisions about procedures.

For Ms. Rivard, who is 67 years old, factors including her age, blood pressure and weight lifted her risks—though the surgeon was able to reassure her that they weren't out of line, and that any complication would be manageable.

Risk calculators, used by heart surgeons for several years, are now being developed for other surgical specialties. The American College of Surgeons recently introduced calculators for surgery of the colon and pancreas, and is designing similar tools for 18 other procedures, including gastric bypass, hernia repair and prostate surgery. The calculators use data from more than one million patient records gathered as part of the group's National Surgical Quality Improvement Program, which works with hospitals to reduce surgical errors and complications.

More than 30 million operations are performed in the U.S. annually to remove deadly cancers, repair diseased organs and replace worn-out joints. Yet going under the knife can be risky, leading to serious infections, blood clots, heart attacks and pneumonia. Those risks increase with age and for patients who are obese, smoke, abuse alcohol or have medical conditions such as diabetes and hypertension.

The nonprofit Institute for Healthcare Improvement, which works with hospitals to improve the quality of care, estimates that 2.5 million to 3.5 million surgical patients each year experience unintended harm resulting from or contributed to by surgical care. While some complications are unavoidable, surgical teams often make mistakes, such as leaving a surgical sponge in a patient, or fail to take steps known to prevent complications, such as delivering antibiotics to a patient within one hour before beginning surgery, which can dramatically cut infection rates.

Complications are also costly. The Centers for Disease Control and Prevention estimates that there are more than 290,000 surgical-site infections each year, and the cost to treat them ranges from about \$12,000 to nearly \$35,000 per patient—or as much as \$10 billion annually.

The American College of Surgeons' quality-improvement program is one of several efforts to help reduce such risks. It was adapted from a program originally used by the Veterans Health Administration and shown to reduce deaths at VA hospitals

from surgery by 27% and complications by 45%.

Since its launch in non-VA hospitals in 2005, 250 hospitals have signed on. The program costs hospitals about \$35,000 annually to participate. But a study published last September in the *Annals of Surgery* found that it helped 118 hospitals prevent from 262 to 524 complications per year, saving each an average of \$3 million.

### *Preventing Complications*

"If these results were translated across all U.S. hospitals, we would have the potential to prevent millions of complications a year, save potentially billions of dollars a year and provide evidence to health-care reformers that higher-quality care can cost less," says Clifford Ko, a colorectal surgeon at the University of California, Los Angeles, and director of research and optimal patient care for the American College of Surgeons.

The calculators allow surgeons to enter a patient's risk variables and in a matter of minutes receive a customized report outlining the risk of death and specific complications. For example, using data from 28,863 patients who underwent colorectal surgery at 182 hospitals from 2006 to 2007, the colorectal risk calculator has 15 variables to help predict complications and death within 30 days of surgery, including age, body mass index, the extent of disease—whether it is cancer or a digestive disease—and how much of the colon must be removed.

David Bentrem, a surgeon at Northwestern University's cancer center who has used the colorectal surgery calculator, says it not only helps assess whether a patient is a good candidate for surgery, but also helps him make sure patients understand what they are getting into—the process known as "informed consent."

Patients often don't read or understand the documents they sign prior to surgery, studies show, and after meeting with a surgeon they may be anxious and confused, making it hard to process and remember information key to deciding whether to go ahead with surgery or not.

"The more information we can offer surgeons to give their patients that are specific to their own individual case, the better," says Dr. Ko. If the surgery isn't urgently needed, Dr. Ko says he may delay it until a patient loses weight or stops smoking to lessen the risks. Patients may also decide to delay surgery after learning of the risks.

Patients considering any kind of surgery should ask if their hospital participates in surgical-quality improvement programs, and whether risk calculators are available. For example, the Society of Thoracic Surgeons offers heart surgeons a calculator to predict the risk of death and complications from heart-bypass and other cardiac surgeries.

While generally surgical risk calculators are not designed for use by consumers, patients can visit [euroscore.org](http://euroscore.org) to calculate their risks for cardiac surgery, using a free program from the European System for Cardiac Operative Risk Evaluation, widely used in European hospitals.

Hospitals in the American College of Surgery quality-improvement program can also compare their performance against a national benchmark, and tell patients whether their complication rates are lower than the national average.

### *'An Easy Recovery'*

At Danbury Hospital, Dr. Bussell was also able to reassure Ms. Rivard that the facility has among the lowest infection rates among hospitals in the American College of Surgery's quality-improvement program, and because her results were comparable to the average low-risk patient, he expected her procedure to be "uneventful and dull" with "an easy recovery."

"Telling a patient there is a risk of dying from a cancer surgery is not an easy conversation to have," says Pierre Saldinger, a surgeon who oversees the quality-improvement program at Danbury Hospital and was also in the room when Ms. Rivard heard about her surgical risks. "The calculator is a tool you need to use in a judicious way, so as not to scare the patients, but to make them feel more comfortable that you are being honest and open with them."

Ms. Rivard says she had already determined that she needed the surgery before learning of the risks, but she and her two daughters, who accompanied her to the consultation, wanted to hear the doctor put the calculator data in perspective.

The last time she had surgery—on her hip, nine years ago—no one discussed risks with her. While hearing about the risks of complications and infections was "a little overwhelming," she says, "I want to know everything that might happen."