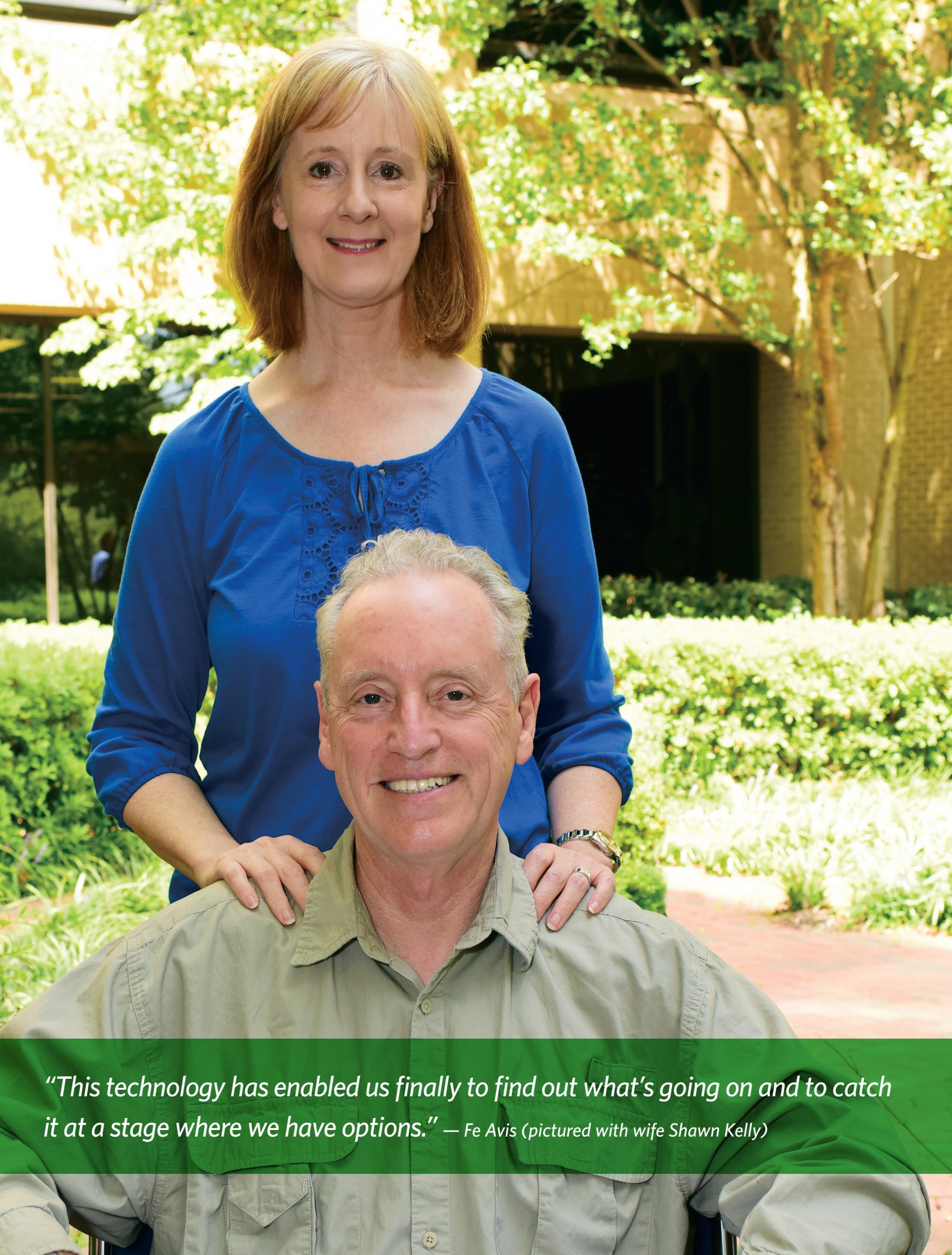


"This technology has enabled us finally to find out what's going on and to catch it at a stage where we have options." — *Fe Avis (pictured with wife Shawn Kelly)*

Pinpointing Prostate Cancer

Greenville Health System is the first in the state to offer the Artemis, a new technology that brings detailed, three-dimensional imaging to bear on a common cancer in men.

By Robin Halcomb

The Artemis: 3D Imaging and Navigation (photo used courtesy of Eigen)

It is probably not surprising to learn that the most common cancer affecting men (after skin cancer) is prostate cancer, and that about one man in seven will be affected in his lifetime.

What is news—and very good news for upstate men and those who love them—is GHS' Artemis, a new imaging and navigation system that detects prostate cancer. The system fuses an MRI with a real-time ultrasound to create a three-dimensional (3-D) image, providing GHS physicians with a much more detailed picture of the prostate.

3-D image fusion, similar to that used in animation and video gaming, combines the relevant data of three dimensions in two or more images into a single 3-D image, which is more informative than either of the images separately. GHS is the only facility in the state and one of few in the region offering the technology.

"Artemis allows us to more accurately biopsy the prostate and find cancers that are more aggressive or clinically relevant and which need to be treated on a more consistent basis," said Erik Busby, MD, urologic oncologist with GHS Regional Urology. "It can eliminate repeat biopsies because the catch rate is more accurate. The system can go as high as 70 percent to 75 percent in detecting cancer in initial biopsies and also reduce false negatives by about 50 percent."

One of the first to benefit from the technology is Fe (pronounced Fay) Avis, now a resident of Asheville, N.C. Avis

had a long history of abnormal levels of prostate-specific antigens (PSA), a possible indication of prostate cancer. While living in Texas in 2006, his levels started rising and he was diagnosed with chronic prostatitis, an inflammation of the prostate gland. When his PSA levels fell after being treated with an antibiotic, it further confirmed the diagnosis. In 2012, when antibiotics failed to lower his levels, he underwent his first prostate biopsy, which came back negative.

After moving to South Carolina in 2013, Avis' PSA levels again spiked, a second biopsy was conducted which also was negative, and he was placed under active surveillance through 2014. A biopsy in June of this year with GHS' new Artemis imaging system located a tumor on the anterior, or front, side of his prostate. Because tumors on the anterior side are rare, they are almost never routinely biopsied.

"I had been dealing with this for several years," remarked Avis. "To live with this anxiety and then finally be able to understand why it's been so difficult to locate it—and get a clear answer early enough to deal with it—has really been helpful to me."

"Fortunately, for this patient and many others, this use of MRI has found tumors we typically would not be able to identify or access by two-dimensional technology that is standard in the U.S.," said Patrick Springhart, MD, division chief of GHS Urology. "The technology that GHS has brought to the Upstate precisely locates and precisely biopsies those suspicious areas that are likely to be significant prostate cancer."

Understanding Prostate Cancer

The prostate is a small, walnut-sized gland located in the male urinary tract that undergoes two periods of growth. The first occurs early in puberty, followed by a second growth period at around age 24 that continues for life. While more than half of men in their 60s and even more in their 70s and 80s have some symptoms related to benign prostatic hyperplasia (BPH), a non-cancerous enlargement of the prostate, the American Cancer Society says over 220,000 new cases of prostate cancer are diagnosed each year.

It is rare for men to have symptoms of prostate cancer. In those limited cases, symptoms may include a need to urinate frequently, especially at night, difficulty starting or stopping urination, a weak or interrupted flow of urine, painful or burning urination, difficulty in having an erection, painful ejaculation, blood in urine or semen, and frequent pain or stiffness in the lower back, hips, or upper thighs.

(l-r) GHS urologic oncologists Erik Busby, MD; Patrick Springhart, MD; and William Flanagan, MD; believe that the new Artemis technology is helping save lives in the Upstate and beyond.

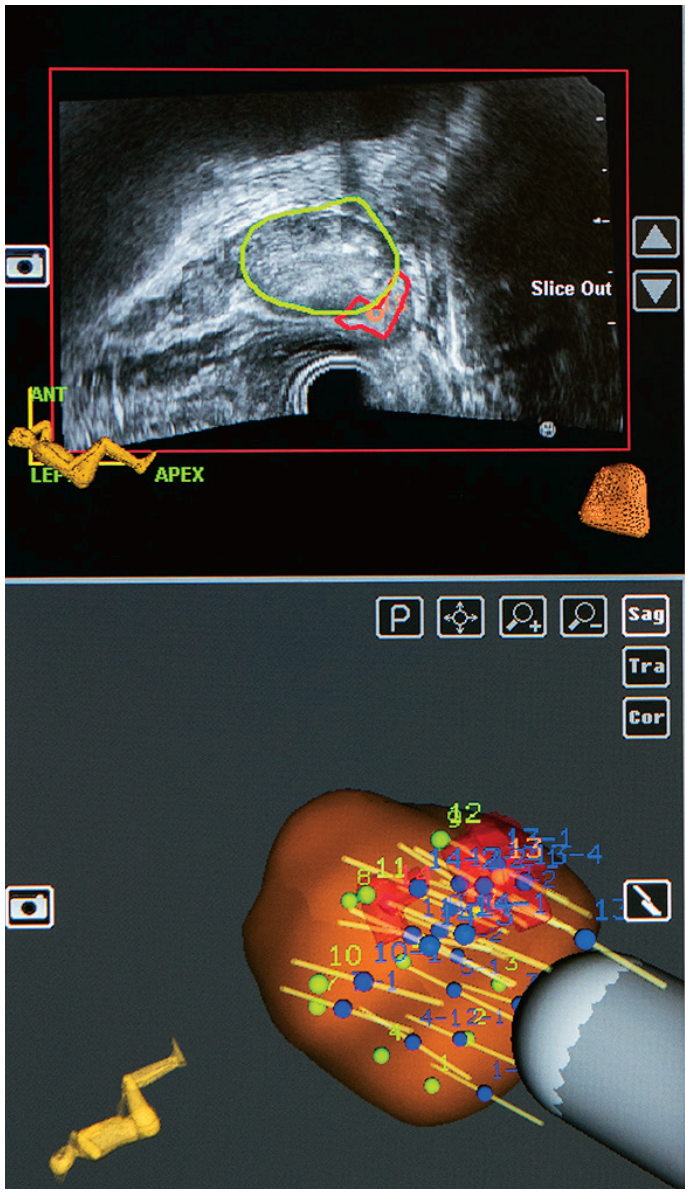
Because prostate cancer may have either no symptoms or symptoms that don't show up for months or years, screening (which typically begins at age 50) is the only reliable way to detect abnormal prostate growth. By the time urinary symptoms develop, a tumor may be quite advanced. Screening usually starts with a digital rectal exam along with tests for increased PSA levels. Patients with an abnormal digital exam or those with recurring elevated PSA levels typically have then undergone ultrasound-guided biopsies—sometimes multiple ones.

"People tend to have two misconceptions about prostate cancer: Number one, that it will kill you in all scenarios, and number two, that it will not kill you and doesn't need to be treated," Dr. Busby noted. "Still, over 30,000 men die yearly from the disease. While it's true that some men have cancer that does not need to be treated, we need to figure out their particular risk. We don't exclude anyone from screening, but do screen those who are younger with higher risk, African Americans and those with a family history."

Precision Targeting

The Artemis system helps decrease random biopsies and provides a way to find higher-grade tumors and more thoroughly biopsy them. This benefit allows physicians to not only know there is cancer, but also where it is and precisely modify surgery or radiation therapy to minimize damage to the surrounding area while maximizing the chance of removing all of the cancer. The system represents the state of the art in contemporary prostate cancer detection and is another example of GHS' constant search for new technologies that make real contributions to the medical care of patients.

"GHS embraces things in a novel way, whether it's new technology or new approaches, and sets the standard in the Upstate," Dr. Busby observed. "We understand that it's important to not just jump in without scrutinizing it. You don't want to use something just because you have it—you need to use the most effective treatment for each particular patient."



Upper photo shows ultrasound image of the prostate including the area of concern (outlined in red). Lower photo demonstrates the 3-D result of the MRI and ultrasound fusion. Also shown are the biopsy locations that include the "red" area of concern.

For Fe Avis and other patients like him, the technology represents a significant step forward in removing doubt from diagnosis.

"Without this technology, I could have been going through standard procedures and getting negative results while the cancer was growing in different locations of the prostate and potentially metastasizing to other parts of my body," said Avis. "This technology has enabled us finally to find out what's going on and to catch it at a stage where we have options. That innovative spirit and willingness to move forward with new technology is something to be commended."

For more information on prostate cancer, please visit ghs.org/prostate.