



HEALTH ESSENTIALS

CANCER SCREENING, PREVENTION & TREATMENT

Cancer diagnosis, management and treatment are more accurate and effective than ever thanks to medical advances including genetic testing, customized therapies and image-guided technology. Hospitals and specialized programs, including the groundbreaking ones featured in this section, are dedicated to the prevention and treatment of cancer and are working towards the day when cancer is history.

RADIATION THERAPY: A MORE ACCURATE AND LESS INVASIVE WAY TO TARGET CANCER

Radiation therapy is commonly used in nearly every type of cancer, from leukemia and lymphoma to solid tumors. “In just about every disease site, radiation therapy has a use,” noted Josh Yamada, M.D., a radiation oncologist at Memorial Sloan Kettering Cancer Center in Manhattan.

The difference between radiation treatment and chemotherapy is that radiation treatment has a biological effect in specifically targeted areas of the body and is considered a local treatment, while chemotherapy is a systemic therapy, meaning it goes through the bloodstream and affects the whole body. Radiation treatment is often complementary to systemic treatment.

“Radiation treatment is noninvasive — you don’t have to open a patient up, and radiation only affects the tissues around the tumor,” said Dr. Yamada. “You can minimize the chances of radiation complications, and you’ll have a better chance of curing that cancer. With prostate cancer, for example, we can give a very high

dose of radiation very safely to the tumor, accurately aiming multibeams of radiation at the prostate or putting radioactive sources right in the prostate to treat the tumor without giving radiation to the surrounding normal tissues.”

Radiation treatment has benefitted greatly from cutting-edge technology. One of the greatest technological advantages in cancer treatment has been the integration of the image-guided treatment approach, which helps physicians both identify what area of the body needs to receive treatment and to make sure the appropriate area is being targeted during treatment. “M.R.I. imaging is giving us a lot more information about where the tumor is and isn’t, as well as how aggressive the tumor is — or, within the tumor, which parts will be more difficult to treat,” said Yamada. “We have new tools to measure hypoxia, low-oxygen conditions, within the tumor, which are areas that are harder to treat. Or to see where within tumors there is a higher concentration of blood vessels. We’re able to peer inside of the tumor and adapt radiation treatment to match the biological character of the tumor to get an optimal response.”

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That's because every person's cancer is unique. At Memorial Sloan Kettering, we've developed a new genome sequencing test that can analyze a tumor to find its genetic weakness. This and other advancements in molecular oncology help us custom tailor care for our patients, changing how the world treats cancer, one person at a time. **Learn more at MSKCC.ORG/MORESCIENCE.**

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Greater Accuracy, Fewer Side Effects

Thanks to modern image technology, potent radiation is delivered to tumor sites more accurately and safely than ever before. “Imagine you have a wall and a big nail, and your job is to hammer the nail in the wall,” explained Yamada. “Before image technology, we would have to hit with a little hammer because we were afraid we weren’t accurate enough to hit that nail. Eventually, the nail gets in there, but it requires a lot more taps, which are smaller doses of radiation over time, because normal tissue tolerates small doses better. That was always the conundrum. It favored smaller doses, which meant longer treatment courses. Image-guided technology has allowed us to do what we’ve always known [would be beneficial], which is to safely give more biologically potent treatments by increasing the accuracy of radiation treatment. It’s like having the big sledgehammer but it’s laser-guided. It maybe takes one swing to get the nail in the wall, but there are no increased side effects because we don’t miss. We sculpt the radiation very tightly to the tumor.”

The advanced technology, such as stereotactic body radiation therapy, also accounts for patients as they breathe and in turn, move, assessing the tumor in real-time.

All of these advances, which have resulted in more potent radiation being delivered more

accurately, means doctors are now able to cure tumors in a way they weren’t able to before, noted Yamada. In addition, because so little radiation reaches the healthy tissues, there are fewer complications and side effects from the treatment.

New Hope for Cancer Patients

For patients who previously had radiation treatment and whose tumors have now regrown, image-guided technology plays an important part in treatment. “In the past, we would have said there’s not much we can do for you,” said Yamada, “but now with our ability to give more potent, focused radiation doses, we can now retreat a lot of areas that weren’t safe or possible before.”

The technology also offers hope for patients with metastatic (also known as Stage 4) cancer. Twenty years ago, if a patient had metastatic cancer, which is considered incurable, the typical approach was to do as little as possible, according to Yamada. “The general attitude was that there was nothing we could do about it,” he said. “But now we’re going through a whole paradigm shift and Stage 4 cancer is not considered a deadly disease. It’s becoming a chronic illness. Look at diabetes — it needs constant treatment and attention. It’s not curable, though. Cancer is becoming more and more that

way. We’re trying to make metastatic cancer — which is still incurable — treatable.”

Image-guided radiation has a special role to play in the treatment of patients with metastatic cancer, because it’s noninvasive and has minimal impact on quality of life. “In the past, a metastatic tumor might have been sent to surgery, but now we can give focused radiation treatment to blast it, and that patient can continue on systemic therapy,” explained Yamada. “A combination of the two therapies can keep these patients coming along. We’re hopeful we’ll be able to extend the lives of those with metastatic cancer but without affecting their quality of life. We have the technology to do that.”

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THE BEST POSSIBLE CARE FOR WOMEN WITH HIGH-RISK CANCERS

Stony Brook University Cancer Center recently launched a Women’s High-Risk Cancer Clinic, providing evaluation, disease management and cancer treatments.

The multidisciplinary program is the only one on Long Island and combines three disciplines — gynecologic oncology, breast health and genetic counseling — allowing women to receive comprehensive care in one location.

Patients also have access to a dedicated nurse navigator, who helps them navigate the medical system, manage multiple appointments, and receive education and support.

“It’s a multidisciplinary approach to dealing with women at high risk for cancer — primarily ovarian and breast cancer, but also endometrial cancer and [in some cases] colon cancer,” said Michael L. Pearl, M.D., professor and director of the division of gynecologic oncology and vice chair of research and faculty development, and director of Women’s Cancer Services at Stony Brook University Cancer Center in Stony Brook, N.Y.

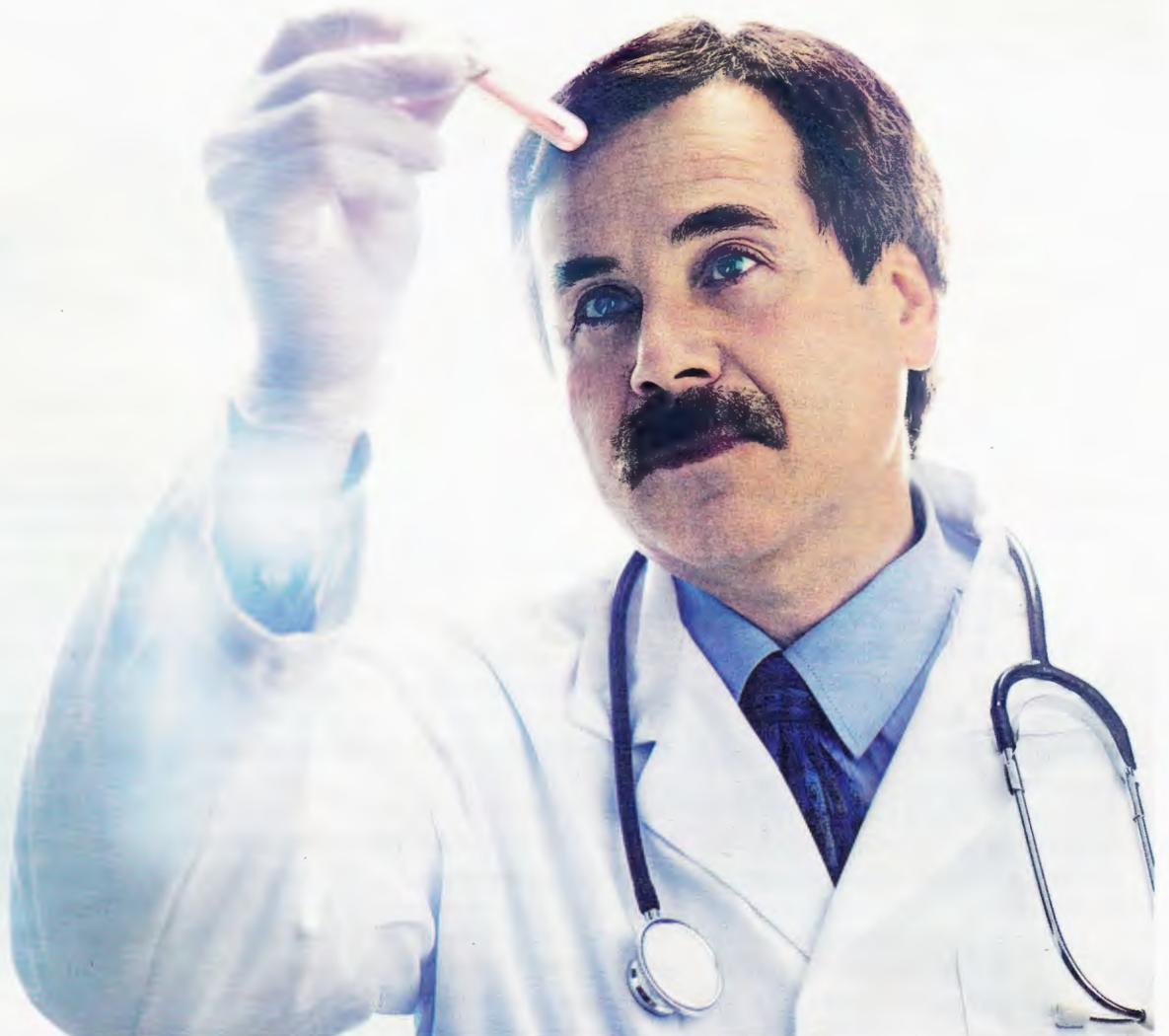
Know Your Personal and Family History

Women, and in some cases men, who are at high risk for these cancers typically fall into three categories: they carry a genetic predisposition, such as a mutation of one of the BRCA genes; they have a family history of cancer; or they have already been diagnosed with one type of cancer, which puts them at risk for that cancer to recur or for another type of cancer to develop.

“Because breast cancer is far more common than gynecological cancers, most patients come to the program because they’ve been diagnosed with a breast precancer, such as carcinoma in

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situ," said Pearl. "In other cases, women come in because they have a family history, such as their mother or aunt was diagnosed with breast cancer, genetic testing was done and they have a genetic mutation."

Added Pearl: "A fair number of people are coming in because they have a family history [of cancer] and have not been genetically tested. We work closely with our genetic counseling program and refer them. We feel very strongly that the geneticist plays an important role in counseling patients before and after their test."

The Importance of Genetic Counseling

Women who have a family and/or personal history of cancer, those who have or suspect a genetic predisposition to cancer and all women under 40 years old who have been diagnosed with breast cancer can greatly benefit from a conversation with a genetic counselor to help understand their risks.

Another important patient population for genetic testing: people who have Lynch syndrome, also known as hereditary nonpolyposis colorectal cancer. About three to five percent of the 140,000 cases of colorectal cancer and 50,000 cases of endometrial cancers diagnosed annually are caused by Lynch syndrome, and the disease affects men and women equally. Pearl recommends that all women with endometrial cancer should undergo molecular screening for Lynch syndrome.

"Those who truly have Lynch syndrome have an extraordinary risk of developing colon cancer; for some, it can be as high as 90 percent," noted Pearl. "It's also associated with developing endometrial cancer. And with many women, they may end up developing endometrial cancer first. If a woman comes in at 40 years old with no real risk factors for endometrial cancer and yet she has endometrial cancer, if she does have Lynch syndrome, there are ways to reduce the risk of then developing colon cancer and potentially dying of the disease."

In particular, the Women's High-Risk Cancer Clinic hopes to reach out to women who haven't been diagnosed with cancer but have a personal history of genetic mutation or a family history of genetic mutation. "We hope to guide them through a multidisciplinary approach, dealing with their risk and reducing their risk," said Pearl. "There are a variety of opportunities for women to reduce their risk once they're diagnosed with either a genetic mutation or if they have family history."

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A NEW CANCER HOSPITAL THAT PROVIDES PRECISE, STATE-OF-THE-ART CARE

In an effort to revolutionize cancer prevention and care, The Ohio State University Comprehensive Cancer Center (O.S.U.C.C.C.) will open the new James Cancer Hospital and Solove Research Institute in December 2014.

The new hospital will meet an increasing patient demand. "We've had a flood of patients who want what it is we do—innovative, cutting-edge therapies for cancer," said Michael Caligiuri, M.D., the director of The Ohio State University's Comprehensive Cancer Center and the chief executive officer of the James Cancer Hospital and Solove Research Institute in Columbus, Ohio. "About five years ago, we were at maximum capacity. We've ended up quadrupling our size to 1.1 million square feet."

The James Cancer Hospital, which will be the third-largest cancer hospital in the nation, will integrate cutting-edge cancer research and clinical care. Each floor of the 21-level hospital will be dedicated to a specific cancer and staffed with nearly 200 nationally and internationally renowned O.S.U.C.C.C.-James specialized cancer physicians.

"Every single doctor here does one cancer—21 floors, 21 specialties," said Dr. Caligiuri. "They teach medical students about that one cancer, and they lecture and research that one cancer. They've seen every side effect."

With patient advocates designing the space, each and every hospital room is private with family space. The hospital is structured with physicians and nurses in mind: Every room on each floor is the same, allowing doctors and nurses to seamlessly navigate and care for patients on any floor, if need be.

Breakthrough Treatments

To ensure that every patient benefits from the bench-to bedside approach and to provide patients with early access to new treatments and tools, translational research labs and education spaces will be located on every inpatient floor. Rather than broad-based therapies, there will be a focus on molecular- and genetic-based prevention strategies, as well as targeted treatments for each patient's unique cancer.

"We also have our own intensive care unit," said Caligiuri. "At that critical time when a patient might need a respirator or a special heart monitor, you don't transfer them to a new doctor or staff or new hospital; we have a cancer-specific intensive care unit that is focused on the care of the cancer patient."

The James Cancer Hospital will also have the largest cancer surgical floor in the country with



14 operating rooms. The O.R.s will be outfitted with advanced technology, such as minimally invasive robotic surgery. Intra-operative radiation and intra-operative M.R.I. technologies will also be available for patients in the operating room.

Thanks to a government grant, the James will have an above-ground (rather than basement level) radiation oncology department—one of only four in the world. "Because of the radiation, you [typically] use the basement," pointed out Caligiuri. "But in this instance, we used very special brick from South Africa, which repels any radiation, and built it on the second floor so there are windows."

Using the latest technology to deliver radiation therapy, the James's radiation oncology department will have seven Varian TruBeam linear accelerators, as well as a brachytherapy unit.

The James Cancer Hospital, one of the most advanced precision cancer medicine clinics in the nation, will also boast the first fully integrated cancer emergency department, which will open in March 2015. •

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The world's most advanced cancer hospital opens soon.



There are no routine cancers. This is no routine cancer hospital.

After ten years of planning and construction, we are humbled and proud to announce that the new James Cancer Hospital and Solove Research Institute is about to open. This is the most advanced cancer treatment and research hospital the world has ever known, staffed by some of the most prominent cancer doctors and researchers ever assembled.

Over the last 7 years, hundreds of renowned cancer researchers and physicians from our country's most well-known cancer centers have joined The James. These experts left M.D. Anderson, Memorial Sloan Kettering, Johns Hopkins, Harvard, Duke, Vanderbilt and Stanford to join our team. Today, more than 200 oncologists and 300 cancer researchers are united, here, at the world's most advanced cancer center.

New
The James

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