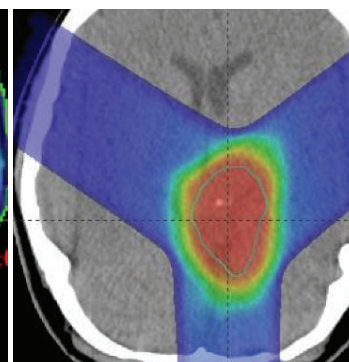
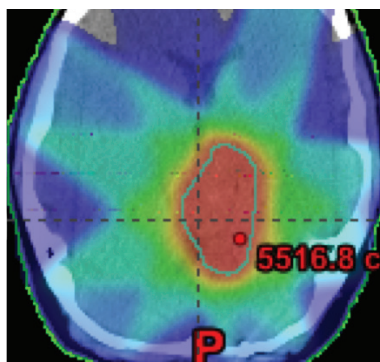


INNOVATIONS IN CANCER



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FROM THE DIRECTOR

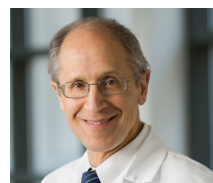
The term “game-changer” is often used too casually, connoting a “breakthrough” when “incremental improvement” is closer to the truth. However, there are times when the term is warranted. In this issue of *Innovations in Cancer*, we focus on two recent game-changers for the cancer community, both nationally and locally here at University Hospitals Seidman Cancer Center.

In our cover feature, we discuss President Obama’s bold ‘moonshot’ to cure cancer – and what it means for our nation’s efforts to reduce the burden of cancer. The emphasis is on collaboration, something we know well at UH Seidman Cancer Center as part of the Case Comprehensive Cancer Center at Case Western Reserve University. In our second feature, we highlight the imminent opening of our Proton Therapy Center, led by radiation oncologist **David Mansur, MD**, and set to begin seeing patients in July. We’re justifiably proud of the considerable investment we’ve made in this center, which will be the first in Ohio and the region.

While these exciting developments have garnered most of the attention, the day-to-day work continues to build on our successes at UH Seidman Cancer Center. This *Innovations* issue also features work by **Neal Meropol, MD**, to help cancer patients overcome the barriers they have to participating in clinical trials. His research, published in the *Journal of Clinical Oncology*, has shown definitively that tailored videos, available on the American Society of Clinical Oncology’s Cancer.net website, make the case more persuasively than simple text. Please visit the site and encourage your patients to use it.

On the health policy side, gastrointestinal cancer specialist **Gregory Cooper, MD**, has studied the impact of health care coverage through the Affordable Care Act on cancer screening. His population database study, published in the *Journal of the National Cancer Institute*, has shown that while the ACA has increased the number of women getting mammograms, it has not boosted the number of people getting screening colonoscopies, even when the procedure is available at no cost. This points to the need for more effective strategies to increase participation in colon cancer screening for patients over age 50.

Cancer remains our focus. We are committed to providing the best in screening and prevention, developing the best new treatments and discovering new approaches to manage and cure these difficult diseases. Join us by learning more about UH Seidman Cancer Center.



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Proof of Concept for PRE-ACT

Innovative video-based education more effective than text in encouraging cancer patients to consider clinical trials, new study shows

When it comes to encouraging cancer patients to enroll in clinical trials, a little information goes a long way and format matters, according to a new study published in the *Journal of Clinical Oncology*.

Neal J. Meropol, MD, Chief of Hematology & Oncology at University Hospitals Seidman Cancer Center, led a team of researchers from Case Western Reserve University School of Medicine and UH Case Medical Center, enrolling patients from five cancer centers nationwide. They gauged whether the video education program, Preparatory Education about Clinical Trials (PRE-ACT), developed by Dr. Meropol and collaborators, was more effective than information delivered as simple written text in persuading cancer patients to consider participating in a clinical trial. PRE-ACT first involves patients taking an online survey, which gauges each individual patient's knowledge and attitudes about clinical trials. Then, based on the patient's answers, it presents video clips to address their specific concerns.

"Unfortunately, although clinical trials are critical for advancing cancer treatment and ultimately serve as the basis for new standards of care, very few patients participate," Dr. Meropol says. "We want to close the patient knowledge gap and positively affect their attitudes toward clinical trials."

In this study, half of the patients received PRE-ACT, while the other half received general, written information about clinical trials, not tailored to their responses on the initial survey. The findings showed that among 1,255 cancer patients taking part in an educational program, 21 percent of patients chose to enroll in cancer clinical trials – a significant boost from typical participation. The American Cancer Society estimates that fewer than 5 percent of cancer patients typically choose to participate in clinical trials. What's more, the PRE-ACT videos were shown to be more effective than text at improving knowledge and decreasing negative attitudes that can be barriers to patients taking part in clinical trials.

"Although both the PRE-ACT videos and the written materials improved participants' knowledge, reduced attitude-related barriers, and improved their preparation to consider clinical trials as a treatment option, we found that PRE-ACT was better than the written information in reducing barriers," Dr. Meropol says.

In addition, participants rated the Web-based video educational program significantly higher than the text-based education material in satisfaction with the amount of information presented, the way the information was presented, and the feeling of being more prepared for them to consider clinical trials for cancer treatment.

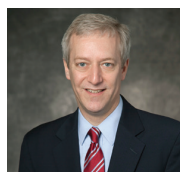
"By identifying knowledge gaps and negative attitudes and addressing those before patients meet their doctors to discuss cancer treatment, the patient will be better prepared to make a good decision about whether a clinical trial will be an appropriate option for them," says Dr. Meropol. "We hope PRE-ACT will result in increased participation in clinical trials by cancer patients through improving knowledge and attitudes and facilitating treatment decision-making."

Dr. Meropol has partnered with the American Society of Clinical Oncology to make PRE-ACT widely available to cancer patients worldwide at www.cancer.net/PREACT. The development of this Web-based program was supported by the National Cancer Institute (NCI).

"I encourage you to review the site and discuss it with your patients," Dr. Meropol says.

This research was funded by a grant from the National Institutes of Health to Case Western Reserve University School of Medicine.

For more information about using PRE-ACT to help boost recruitment in your clinical trials, contact Dr. Meropol at Neal.Meropol@UHhospitals.org.



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CLEVELAND AND UH SEIDMAN CANCER CENTER:

The Epicenter for the Nation's Moonshot Effort Against Cancer

UH Seidman Cancer Center's role in the Case Comprehensive Cancer Center models the collaboration at the heart of President Obama's 'moonshot' initiative

The cancer community has long advocated for increased federal funding and a more collaborative approach to fighting the disease. There's been some progress, but it's been arguably incremental. So when President Obama announced the 'moonshot' effort to cure cancer in his January 2016 State of the Union address, **Stan Gerson, MD**, was taken a bit by surprise.

"I was astounded," says Dr. Gerson, Director of University Hospitals Seidman Cancer Center. "In December 2015, Vice President Biden worked with Congress to give the National Institutes of Health the strongest resources that they've had in over a decade. Now, having President Obama move cancer research to the front burner is astonishing, and it really could be a game-changer."

If Dr. Gerson has a small quibble, it's with the moonshot analogy.

"The moonshot is a good analogy in that it took thousands upon thousands of bright minds to come together to put

a man on the moon – engineers and scientists and people who are very creative. It will be the same with this fight against cancer. But curing cancer is a lot more complicated than any moonshot or space mission is going to be."

In a memo to the directors of the nation's 46 National Cancer Institute-designated Comprehensive Cancer Centers, NCI chief Douglas Lowy, MD, wrote that an important part of the moonshot effort will be "identifying current barriers to progress and developing specific ways to better coordinate federal efforts to support cancer research and care, partnerships with stakeholders, and implementation of findings."

Already, this effort toward greater collaboration is under way at the Case Comprehensive Cancer Center at Case Western Reserve University, also led by Dr. Gerson. The unique NCI-designated center includes UH Seidman Cancer Center, the Cleveland Clinic Taussig Cancer Center and Case Western Reserve University.

"One of the things I'm very proud of under the Case Comprehensive Cancer Center is networking patient information and researchers across the two hospitals and the university," Dr. Gerson says. "It gives us a much bigger platform to work from than almost any other city in the country. While protecting our patients' identities, our goal is to share information across our entire community so that when one patient responds in one setting with one genetic background, it might help another patient. We regularly prove that institutional affiliation and disciplinary specialization need not represent barriers to progress, but rather can be sources of illumination that produce good results. Cleveland serves as a national example. It is not always easy to remove barriers to cures, but we work hard every day to collaborate for the common good."

Dr. Gerson, currently Vice President of the Association of American of Cancer Institutes (AACI), plans to continue focusing on these issues when he assumes the group's two-year presidency in 2017. He says he will continue AACI's mission and tradition of breaking down silos and facilitating cooperation by supporting cancer centers' ability to work together. This approach dovetails nicely with the moonshot's goal of revolutionizing the sharing of medical and research data.

"AACI cancer centers are a primary source for the generation, collection and use of molecular, clinical and outcomes data," Dr. Gerson says. "However, the ability to network and engage these huge datasets, and do it efficiently with all the privacy concerns handled, is a huge challenge. It requires almost equal investments in



Dr. Gerson says he has no problem with expecting cancer centers to be accountable for increased collaboration, even to the point of tying increased funding to increased collaboration. "It's a reasonable expectation," he says. That said, however, he also has expectations that the administration and Congress will help the moonshot succeed by engaging on some of the thorny political issues. Two that immediately come to mind are insurance coverage of genomic testing and revision of HIPAA.

"The Vice President should use his leadership to spur Medicare and private insurers to pay for gene sequencing, a sea change in cancer research and treatment that enables targeted anti-cancer therapy, replacing the one-size-fits-all approach of the past," Dr. Gerson wrote in a Cleveland Plain Dealer op-ed. "In addition, federal patient privacy laws such as HIPAA need to be adjusted to allow for more sharing of anonymous patient data to enable the kind of big-data analysis that can pinpoint which treatments work best for specific types of patients."

the scientist with the test tube, the person sitting at the computer and the physician caring for the patient. Those three elements need to come together if this is going to work. But this initiative gives us the best shot in years.

"It's a cost-effective strategy," he continues. "We're now at a place where dollars can be incredibly well-spent. The return on investment will be longer lives for patients, many more cures and certainly a better lifestyle for patients, with more people coming out of a cancer treatment and going back to work and going back to their communities and families. If we can nip away and make cancer part of life and live beyond it, I think that's the strategy."

As the moonshot gets off the ground, UH Seidman Cancer Center is poised to play a leading role, Dr. Gerson says.

"Our biorepository capabilities, patient populations, bioinformatics, electronic medical record and the wealth of expertise on the research side allow us to put all the pieces together," he says. "We're excited to get to work. Our focus on innovation and clinical trials provides patients with unique opportunities to prevent cancer and treat it when it occurs."

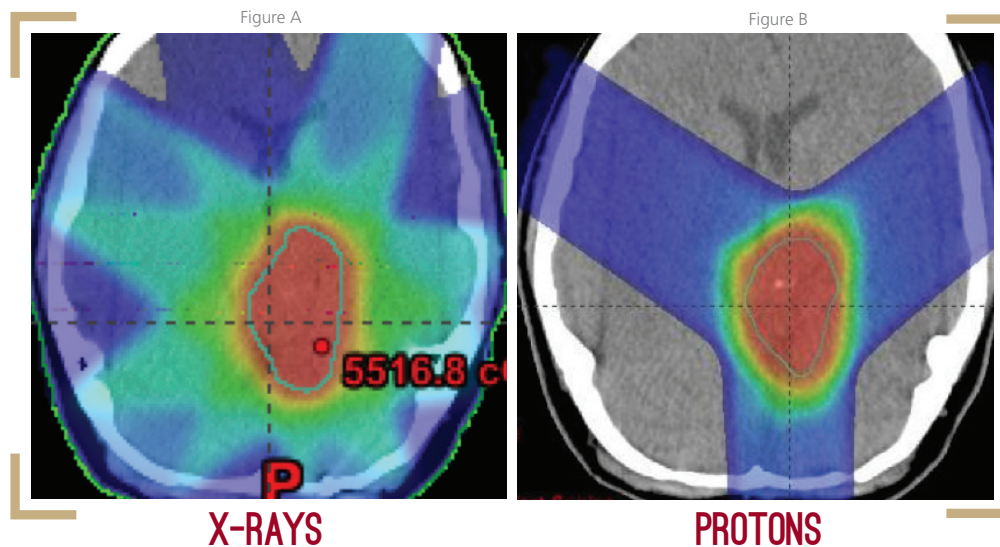


DAVID MANSUR, MD

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COMPACT AND CONNECTED

New Proton Therapy Center at UH Seidman Cancer Center
will be first in Ohio and region



Figures A and B show treatment plans for an unresectable low-grade glioma. Figure A shows a five-field intensity-modulated radiation therapy plan, while Figure B shows a three-field passively scattered proton plan. The conformity of the prescription dose, shown in orange/red, is quite good for both plans. However, the proton plan shows a large reduction in low- and intermediate-dose levels to uninvolved, normal brain, shown in blue and green.

When you say the words “proton therapy,” what comes to mind for many physicians is a large, football-field-sized facility that may occupy a city block. The space is necessary to accommodate three or four vaults, but it makes integrating the technology into an existing medical center impractical.

“Typical proton facilities are too large to be well-integrated into most existing urban cancer centers, where space is at a premium,” says **David Mansur, MD**, Director of Pediatric and Hematologic Radiation Oncology at University Hospitals Seidman Cancer Center.

However, proton therapy technology has advanced to the point that creating a smaller superconducting synchrocyclotron is now possible. This novel proton accelerator is gantry-mounted and allows for constructing a single-room, compact facility, deep in the heart of a thriving medical center.

Such a facility is opening this summer at University Hospitals in Cleveland. The new Proton Therapy Center is housed in the space that once held the UH Case Medical Center emergency room, located between UH Seidman Cancer Center and UH Rainbow Babies & Children's Hospital.

This is not by accident.

"Most proton centers are isolated from the nearest children's hospital, to some extent," says Dr. Mansur, who is leading the new Proton Therapy Center. "The goal was to have it physically connected to Rainbow, through a corridor, rather than several miles away or even across the street. Even facilities across the street must rely on ambulance transfer if a child requires emergency transport back to the PICU. Our Proton Therapy Center will be located on the same campus as a nationally ranked children's hospital – one of the only places in the country to achieve that distinction."

As the first in Ohio and regionally, the Proton Therapy Center will accommodate patients from a multistate region. Adult patients can and will benefit. But the children, teens and young adults treated at the Angie Fowler Adolescent & Young Adult Cancer Institute at UH Rainbow Babies & Children's Hospital stand to benefit most.

"Proton therapy is uniquely suited for treating pediatric and young adult populations," Dr. Mansur says. "These patients are at greatest risk for long-term effects from radiation treatment, such as cognitive problems and second cancers."

The science of proton therapy

To truly understand the benefits of proton therapy requires a quick review of medical physics. Traditional radiation therapy uses X-ray beams. They pass into the patient, to the tumor, then out again through the patient's body. The photons' lack of charge and mass means most of their energy is deposited in normal tissues near the body's surface, as well as areas of the body beyond the site of the cancer.

With proton therapy, heavy, charged particles penetrate the tumor. But then they stop. Because protons are energized to specific velocities, the radiation oncologist can determine how deeply in the body they will deposit their maximum energy. Their depth-dose relationship is characterized by the Bragg peak, beyond which no dose is deposited.

The elimination of the exit dose for passively scattered proton beams results in greatly reduced low and intermediate doses to distant, uninvolved normal tissues, but little or no difference in conformality of higher prescription doses immediately surrounding the targeted tissue.

"With the X-ray beam, you get very conformal high dose, but the cost of that is all the lower dose from the exit of all the beams," Dr. Mansur explains. "You can greatly reduce that by using proton therapy. It hugs the targeted area as well as X-rays. It's actually no more precise in the high-dose region. But you can lessen the lower doses, which is significant."

Indications and outcomes

Proton therapy can provide advantages for treatment of certain tumors, Dr. Mansur says, such as those in the brain, spine, base of skull and in the head and neck. Proton therapy also is effective in treating sarcomas, such as Ewing's sarcoma and rhabdomyosarcoma. For adults, proton therapy can be a good option for patients with lung cancer and breast cancer. It helps protect delicate lung tissue from damage and helps reduce the radiation dose to the heart among left-sided breast cancer patients.

Numerous studies have compared the dosimetric advantages of proton beam therapy compared with other advanced X-ray treatments. "These studies have demonstrated significantly reduced doses to uninvolved tissues in children with pediatric tumors and adult patients with cancers of the breast, lung, and head and neck," Dr. Mansur says.

Outcomes for pediatric brain tumor patients treated with proton beam therapy have recently been reported with encouraging results. "Long-term follow-up is needed to determine if adverse effects are reduced compared with photon treatments," Dr. Mansur says. "Subtle differences don't immediately translate into a clinical endpoint you can measure. Second cancer risk, for example, takes decades to manifest. However a recent modeling report estimates the risk of a radiation-induced second cancer can be reduced with proton beam therapy, compared with conventional photon radiation therapy."

Getting ready for patients

Dr. Mansur estimates that the new Proton Therapy Center at UH will treat about 20 to 25 patients a day, when fully operational in July. Patient selection and risk management will be paramount. "Proton therapy is a more unforgiving treatment," he says. "With proton therapy, changes in density and tumor motion have a greater potential to introduce uncertainty in the radiation dose than in photon beam cases. We will be exercising caution in proper selection of patients who will benefit the most."

The center has been undergoing a rigorous installation and quality assurance process for the past year or so. The journey began back in June 2011, when the decision to build the facility was announced. Builders broke ground in September 2013, the vault was completed in June 2014 and the proton accelerator arrived on scene in June 2015.

It's been a long road, but Dr. Mansur says he's looking forward to the enhanced treatment that proton therapy will offer his pediatric patients, as well as the convenient way they'll be able to access this innovative care.

"Proton therapy is the best treatment for some cancer patients, but it is not intended to replace traditional radiation therapy for all patients. It provides us with another tool in the arsenal," Dr. Mansur says. "The benefits of proton therapy are most significant in younger patients who have curable cancers and decades of life expectancy ahead of them. In addition, it will limit the late effects of treatment, so it's worth it."

You can learn more about the Proton Therapy Center at UH from Dr. Mansur's article, "Incorporating a Compact Proton Therapy Unit Into an Existing National Cancer Institute-Designated Comprehensive Cancer Center." It appeared in the journal *Expert Reviews in Anti-Cancer Therapies* in September 2014. Visit <http://www.ncbi.nlm.nih.gov/pubmed/25109233>. For more information, contact Dr. Mansur at Peds.Innovations@UHhospitals.org.

Part of a



STYMIED SCREENING?

Barriers to colonoscopy persist despite no-cost coverage under Affordable Care Act, study finds

Making colonoscopy available at no cost to eligible Medicare beneficiaries under the Affordable Care Act (ACA) did not increase the number of people in this target population who regularly undergo the procedure, according to a new large-scale national study from University Hospitals Seidman Cancer Center and Case Western Reserve University. Interestingly, the same analysis found that rates of routine mammography significantly increased following the ACA's mandate for low- or no-cost screenings for Medicare recipients.

"It was long assumed that cost was a major prohibitive factor for why people didn't get screened. So the Affordable Care Act made an effort to reduce or remove costs for several highly successful screening and recommended procedures, including mammography and colonoscopy," says study lead author **Gregory Cooper, MD**, Co-Program Leader for Cancer Prevention and Control at UH Seidman Cancer Center and the Case Comprehensive Cancer Center. "This data shows that doing so still doesn't necessarily guarantee the patients who should be screened will be. Other factors clearly play a role and need to be addressed as well."

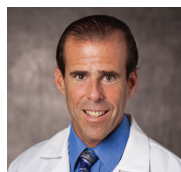
The research team analyzed data from a 5 percent random national sample of Medicare claims from 2009 through 2012 in people ages 70 years or older. The data set captured two years of claims prior to the ACA, when authors estimate only one-third of beneficiaries could obtain screenings with little or no out-of-pocket cost, and two years of claims post-ACA implementation, when all beneficiaries were able to receive these services with no out-of-pocket cost. For mammography, the sample included 862,267 women. For colonoscopy, the sample comprised 326,503 individuals, all with one or more increased risk factors for colorectal cancer.

The study, which will appear in the May 2016 (e-published December 6) edition of the Journal of the National Cancer Institute, found a greater uptake in colonoscopy for patients who participated in a yearly wellness visit with their primary care physician. The authors hypothesize this could be because these preventive visits include a required written screening schedule for five to 10 years, and may be effectively facilitating referrals for these tests.

"This study reinforces that we need to do more than simply issue national guidelines for colorectal cancer screenings and make them affordable for everyone in the target population, especially African-Americans," Dr. Cooper says. "It is imperative we find a way to increase participation in these important cancer screenings for at-risk populations. For example, if more people had yearly preventive visits, primary care physicians would have additional opportunities to emphasize the importance of procedures such as colonoscopy at detecting and treating cancer early."

For more information, contact Dr. Cooper at Gregory.Cooper@UHhospitals.org. You can view the study abstract online at <http://www.ncbi.nlm.nih.gov/pubmed/26640244>.

This research was supported, in part, by funding from the National Institutes of Health to Case Western Reserve University School of Medicine.



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University Hospitals Case Medical Center and Case Western Reserve University School of Medicine are consistently recognized as two of the premiere institutions in the nation, according to U.S. News & World Report.

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