Dana-Farber Cancer Institute

The Jimmy Fund

PROGRESS UPDATE

Recent Advances in the Center for Gynecologic Oncology

June 2020

BEST HOSPITALS U.S.News & WORLD REPORT NATIONAL CANCER 2019-20

BEST CHILDREN'S HOSPITALS U.S.News & WORLD REPORT CANCER 2019-20

Dana-Farber Cancer Institute has been the top ranked cancer hospital in New England by U.S. News and World Report for 19 consecutive years, and is ranked in the top 5 nationally for both adult and pediatric cancer programs.

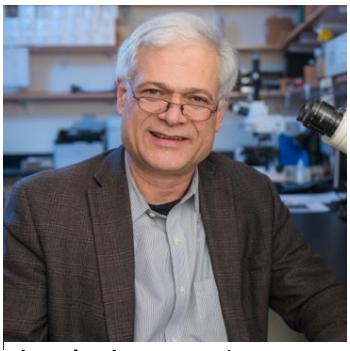
MAGNET RECOGNIZED AMERICAN NURSES CREDENTIALING CENTER

INTRODUCTION

Under the leadership of **Alan D'Andrea, MD,** who is joined by **Sara Tolaney, MD, MPH,** researchers at Dana-Farber Cancer Institute's Susan F. Smith Center for Women's Cancers have made major scientific strides. With **Ursula Matulonis, MD,** at the helm of the Center for Gynecologic Oncology within the Susan F. Smith Center, the team has grown its basic research, early clinical studies, and combination trials to improve outcomes for all patients with gynecologic cancers.

As part of this work, our investigators are exploring the cutting edge of cancer science, studying how to overcome drug resistance, designing a blood test to detect ovarian cancer at its earliest stages, investigating new ways of attacking disease subtypes through targeted treatments, and more. With Dana-Farber's unique position as a world leader in both cancer research and clinical care, your support is helping put these important scientific findings into action.

Ursula Matulonis, MD, Chief, Center for Gynecologic Oncology; Brock-Wilson Family Chair at Dana-Farber



Alan D'Andrea, MD, Director, Susan F. Smith Center for Women's Cancers; Director, Center for DNA Damage and Repair; Alvan T. and Viola D. Fuller American Cancer Society Professor of Radiation Oncology, Harvard Medical School

D'ANDREA LAB LEADS BIOBANK EFFORT

D'Andrea and his team are international leaders in developing ovarian cancer organoid models, which serve as important engines for basic science and discovery. With the expertise of **Joyce Liu, MD, MPH,** the new Clinical Co-Director of the Susan F. Smith Center Living Biobank, D'Andrea is leveraging patient tumor samples to create these three-dimensional models, which mimic the tumors from which they are derived and retain their original immune function. D'Andrea and his team continue to test combinations and new classes of drugs in these organoids, as well as study the effects of different dosing and scheduling regimens.

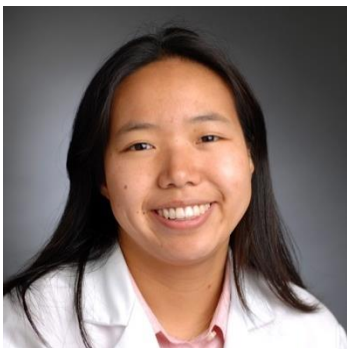
As part of their work, researchers in D'Andrea's lab have leveraged organoid models to identify a novel pathway of proteins that, when disrupted, result in sensitivity to drugs known as PARP inhibitors in patients with high-grade serous ovarian tumors. Six years ago, Dana-Farber researchers led by Matulonis discovered that PARP inhibitors,

Sara Tolaney, MD, MPH, Associate Director, Susan F. Smith Center for Women's Cancers; Director, Clinical Trials, Breast Oncology

which block an enzyme used by cancer cells to repair their DNA, can effectively treat several types of cancer, including some ovarian, breast, and endometrial cancers. However, most patients will eventually develop resistance to these drugs.

Using these organoid models, the team is now evaluating the effectiveness of various polymerase Q (POLQ) inhibitors, which were developed in the D'Andrea lab four years ago to treat a DNA repair deficiency associated with an inherited BRCA mutation in these tumors. Findings indicate that POLQ inhibitors have promise for treating patients who do not respond to PARP inhibitors.

Because ovarian organoids act as surrogate models for a patient's unique tumor, D'Andrea and his team are testing the drugs patients receive in a clinical trial on their genetically identical organoids to better inform treatment decisions. D'Andrea is also launching a collaboration with **Kai Wucherpfennig, MD, PhD,** to test new immunotherapy agents in these models, since organoids faithfully replicate the immune cell environments of the tumor from which they are derived.



Joyce Liu, MD, MPH, Clinical Co-Director, Susan F. Smith Center Living Biobank

Kai Wucherpfennig, MD, PhD, Chair, Cancer Immunology and Virology; Director, Center for Cancer Immunotherapy Research

ENDOMETRIAL CANCER

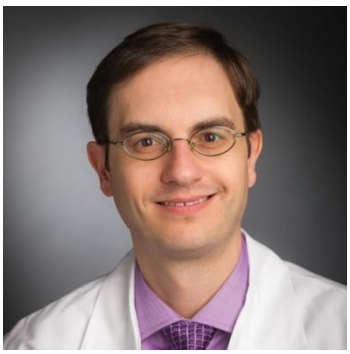
Endometrial cancer, often referred to as uterine cancer, is the most common gynecologic malignancy, affecting more than 60,000 patients annually in the United States. Due to limited treatment options for recurrent and metastatic forms of the disease, Dana-Farber researchers are focused on furthering our understanding of endometrial cancer to improve outcomes for patients.

A novel therapy for uterine cancers

Uterine serous carcinoma is an aggressive form of uterine cancer that—although making up only 10 percent of uterine cancer cases—accounts for up to 40 percent of deaths. Liu is testing the effectiveness of a new targeted treatment option for this disease subtype, a WEE-1 inhibitor called adavosertib that blocks a key regulatory checkpoint in the cell cycle, which is the process by which cells divide. In its first clinical trial in

patients with this hard-to-treat form of uterine cancer, adavosertib caused tumors to shrink in nearly one-third of patients. The trial involved 35 patients, all of whom had previously been treated with platinum-based chemotherapy. "Adavosertib demonstrated remarkable activity as a single agent in this group of patients," said Liu, adding that the results are especially encouraging given the limited effectiveness of current treatments for this subtype of uterine cancer.

Building on the trial's promising results, which were presented virtually at the April 2020 Society for Gynecologic Oncology annual meeting, Liu is expanding the study to include two more cohorts of patients. The first will enroll additional patients with uterine serous carcinoma and will include added translational components to confirm the drug's activity and identify potential biomarkers (see sidebar) that may predict treatment responses. The second added cohort will enroll patients with a rare and aggressive subtype of uterine cancer called uterine carcinosarcoma, which shares many molecular characteristics with uterine serous cancer. "Because patients with uterine carcinosarcoma typically do not respond to chemotherapy and are excluded from most clinical trials, there is a true unmet need here," explained Liu.



Panagiotis (Panos) Konstantinopoulos, MD, PhD, Director of Translational Research, Gynecologic Oncology

Biomarkers are substances found in the blood, other bodily fluids, or tissues that indicate a disease state or relay biological information. They can be used to detect the presence of cancer, identify disease recurrence, or predict treatment resistance.

Targeting the cell cycle and transcription

Panagiotis (Panos) Konstantinopoulos, MD, PhD, is leading a phase II clinical trial for patients with high-risk estrogen-positive endometrial cancer exploring the effectiveness of combining a targeted CDK4/6 inhibitor called abemaciclib with LY3023414, which targets a specific cancer cell enzyme, and the hormone therapy letrozole. By combining abemaciclib and LY3023414—which strike two parts of the same molecular pathway—to the hormone-blocking therapy, the investigators hope to overcome the problem of drug resistance.

Exploring immunotherapy combinations

In an effort to treat endometrial cancer with immunotherapy, Konstantinopoulos launched a phase II clinical trial of the PD-L1 inhibitor avelumab, which has shown promise in other cancers. The trial is based

on an earlier study in which Konstantinopoulos and his colleagues found that avelumab was highly effective, with durable and long-term responses in 30 percent of patients with endometrial cancer whose tumors have a characteristic known as microsatellite instability (MSI). This earlier study also found that the drug was largely inactive in the more common microsatellite stable (MSS) mutant form of the disease (see sidebar). Now, Konstantinopoulos' phase II trial explores whether pairing avelumab with a PARP inhibitor is more effective in patients with MSS disease. By combining the two drugs, he hopes to make MSS tumors more susceptible to checkpoint inhibitors.

Smith Center investigators have also launched two other clinical trials for patients with recurrent or persistent MSS endometrial cancer. The first trial, led by Konstantinopoulos, combines the antiangiogenic agent axitinib with avelumab. Additionally, **Jennifer Veneris, MD, PhD,** recently launched a clinical trial for patients with MSS endometrial cancer whose tumors express folate receptor alpha on their surfaces. As part of the trial, patients receive a combination of pembrolizumab and an antibody-drug conjugate, called mirvetuximab soravtansine. This drug joins an antibody that recognizes folate receptor alpha to a chemotherapy molecule, delivering chemotherapy directly to cancer cells. Laboratory data suggests that antibody-drug conjugates can fire up the immune system, so by combining these two therapies, investigators aim to make these tumors more susceptible to immune-mediated attack.

Hormone-induced endometrial cancer

Dana-Farber researchers are studying tamoxifen, a selective estrogen receptor modulator (SERM) given to women for up to 10 years to help treat or prevent breast cancer. While the drug helps to prevent breast cancer recurrence, it can slightly increase the risk of endometrial cancer (though tamoxifen suppresses cell growth in the breast, it has the opposite effect in the uterus). **Rinath Jeselsohn, MD,** is spearheading efforts to understand how tamoxifen triggers cancerous growth in uterine cells. She is studying tumors from patients with tamoxifen-

Jennifer Veneris, MD, PhD

Rinath Jeselsohn, MD

Microsatellite instable tumors, found in 20 to 30 percent of endometrial cancers, are characterized by a defective DNA mismatch repair system, which when working properly ensures the copies of genes are correct. These tumors have very high mutation rates.

Microsatellite stable tumors are found in 75 percent of endometrial cancers and unlike microsatellite instable tumors, they have fewer mutations. They often exist in an environment that suppresses the immune system, and therefore do not respond to immunotherapy.

associated endometrial cancer to identify genomic signals that can distinguish the disease from other forms of endometrial cancer, which ultimately may help scientists develop therapies to protect the uterus from the off-target effects of tamoxifen.

Dipanjan Chowdhury, PhD

OVARIAN CANCER

Earlier detection

Ovarian cancer is often asymptomatic in its most treatable stages, so Dana-Farber experts are working to develop ways to catch this disease earlier in its development. **Dipanjan Chowdhury, PhD**, continues to make headway in the development of a novel blood test to detect ovarian cancer. Previously, Chowdhury identified 14 microRNAs, unique to ovarian cancer, whose presence can predispose women to the disease and which are readily measurable in a simple blood test.

In the past year, Chowdhury and his colleagues have analyzed more than 800 tissue and blood samples, with nearly half of the samples coming from patients with BRCA-deficient tumors. Given the international implications of this work, Chowdhury has leveraged his wide network to secure samples from across the globe. More than 100 samples analyzed this year were provided by collaborators in India, and he is actively working with the National Cancer Institute of Lithuania to access their extensive tissue bank that includes thousands of valuable patient samples. These preliminary studies are crucial for validating the accuracy of the microRNAs biomarker detection tool before analysis begins on 1,200 coveted samples from the National Cancer Institute (NCI) Prostate, Lung, Colorectal, and Ovarian (PLCO) database—the first step on the road to consideration for approval by the Food and Drug Administration (FDA).

Chowdhury is also exploring if his microRNAs biomarker detection tool can be used to screen for BRCA mutations. Today, genetic testing for BRCA mutations is costly and typically reserved for individuals with known family histories of BRCA-related cancers. An inexpensive blood

test that could identify BRCA defects has the potential to change the current standard of care.

The right combination

The FDA has approved four PARP inhibitors to treat patients with breast or ovarian cancer, transforming the management of ovarian cancer, particularly BRCA-mutated ovarian cancer. Investigators are now exploring the effectiveness of combining PARP inhibitors with other drugs to prevent resistance and extend their benefits to more patients. In the October 2019 *Gynecologic Oncology,* Matulonis, Veneris, Liu, and Konstantinopoulos published an article outlining the need for further investigation and development of new PARP inhibitor combinations to be used alongside other drugs.

TOPACIO study

In 2017, Konstantinopoulos led a national study called TOPACIO, which found that the combination of the PARP inhibitor niraparib alongside the immunotherapy pembrolizumab showed anti-tumor activity in women with recurrent ovarian carcinoma. Konstantinopoulos' later results, published in the June 2019 *JAMA Oncology*, showed higher-than-expected response rates to the treatments—a total of 18 percent of participants responded to the combination, with three women showing complete responses—and demonstrated the feasibility of using the combination in patients who are resistant to platinum chemotherapy. Furthermore, in a follow-up study published in the March 2020 *Nature Communications*, Konstantinopoulos identified biomarkers that can predict response to the combination of niraparib and pembrolizumab.

The TOPACIO trial, supported by Stand Up To Cancer, reinforces Dana-Farber research suggesting a synergistic relationship between PARP inhibitors and immunotherapy in treating ovarian cancer. These findings led to follow-up phase II clinical trial called the Moonstone Study, which is evaluating the safety and efficacy of the combination of niraparib and the PD-1 inhibitor TSR-042 in women with platinum-resistant ovarian cancer.

Epithelial ovarian cancer

Each year, approximately 20,000 women in the United States are diagnosed with epithelial ovarian cancer, the most common type of the disease. Despite aggressive surgical and chemotherapeutic approaches, the majority of patients with epithelial ovarian cancer eventually relapse. To improve outcomes for these women, Konstantinopoulos is leading a clinical trial combining the PARP inhibitor olaparib with a drug known as AT13387. The trial is also investigating the combination's safety and efficacy in treating less common tumors with similar clinical courses and behavior, including cancer of the fallopian tube, peritoneal cancer, and recurrent triple-negative breast cancer.

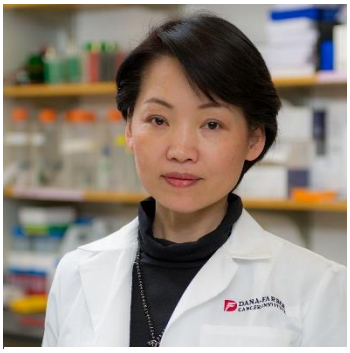
High-grade serous carcinoma

At the September 2019 meeting of the European Society for Medical Oncology (ESMO), Konstantinopoulos presented results from a phase II randomized study of women with a subtype of epithelial ovarian carcinoma called high-grade serous ovarian carcinoma (HGSOC). This cancer is resistant to treatment and has poor survival rates.

Konstantinopoulos found that combining a drug called M6620 with the chemotherapy gemcitabine was successful in treating many of the women with this cancer. "It was a positive randomized trial for this hard-to-treat subtype of ovarian cancer," says Matulonis. This study has been accepted for publication in the *Lancet Oncology*. Konstantinopoulos and his colleagues are now studying this combination further in patients with HGSOC.

In partnership with researchers in Dana-Farber's Robert and Renée Belfer Center for Applied Cancer Science, Konstantinopoulos led a multicenter phase I study that found the PARP inhibitor olaparib combined with the PI3K inhibitor alpelisib outperforms olaparib alone in patients with chemotherapy-resistant ovarian cancer. In the trial, which was published in the March 2019 *Lancet Oncology*, 10 percent of participants had measurable shrinkage of their tumors and 50 percent saw their disease stabilize. That compares with 4 percent of patients who, according to

previous research, would likely respond to a PARP inhibitor alone. The trial grew out of research at Dana-Farber indicating that a PI3K inhibitor could sensitize cancer cells to the effects of a PARP inhibitor, which limits tumors cells' ability to repair damage to their DNA.


Jean Zhao, PhD

Provoking an immune response

Given the hard-to-detect, aggressive nature of ovarian tumors, Konstantinopoulos is leading efforts to develop an ovarian cancer neoantigen vaccine, which trains the immune system to destroy tumor cells. His six-year, phase I clinical trial, which launched in January 2020, evaluates the safety and efficacy of the vaccine in combination with the PD-1 inhibitor nivolumab, which is already used to treat lung, colon, and other cancers.

Konstantinopoulos is examining whether nivolumab enhances T-cell response, as well as the safety and efficacy of the vaccine at different timepoints. The latter will be assessed by looking at blood cells obtained from patient tumor biopsies for signs that the vaccine induced a tumor-fighting immune response. Because making the neoantigen vaccine takes time, patients will receive standard immunotherapy or chemotherapy during this interval, which will also help determine if using chemotherapy prior to vaccination and subsequently introducing the PD-1 inhibitor impacts the vaccine's success. The vaccine contains protein fragments, or peptides, based on the mutations unique to each patient's specific tumor, as well as an investigational drug that activates the immune system.

Genetically engineered mouse models

Preclinical models are a vital step in the treatment discovery process. **Jean Zhao, PhD,** is developing genetically engineered mouse models (GEMMs) for gynecological cancer that contain the same mutations and driver genes that fuel cancer in humans. Critically, these models share cellular and biological similarities to their human counterparts while also remaining immunologically intact, which enables researchers to carefully analyze the complex interplay between tumors and the immune system.

Zhao's work, published in the December 2018 *Cell Reports*, showed that PARP inhibition activates the body's innate immune response. While studying the effect that PARP inhibitors have on the immune system in homologous recombination (HR)-deficient cancer, Zhao demonstrated that her GEMMs capture the immune microenvironment response to treatment better than models with compromised immune systems. Her work suggests that PARP inhibitors increase expression of PD-L1 and that PD-1 blockade can enhance the anti-tumor effect of PARP inhibition. Additionally, the researchers showed that PARP inhibitors impact the immune system by activating stimulator of interferon genes (STING), a pathway that helps instruct the immune system to destroy foreign cells.


Elizabeth Stover, MD, PhD

Highlighting the impact of PARP inhibitors on the immune system will provide researchers with insight into how to design immunotherapy combination approaches for HR-deficient and other forms of ovarian cancers.

Overcoming drug resistance

Cancer cells use a variety of mechanisms to evade treatment, and ovarian cancer is no exception. Susan F. Smith Center investigators are studying ways to design successful therapeutic strategies to overcome drug resistance.

Liu is leading a clinical trial testing a combination of the PD-1 inhibitor nivolumab with bevacizumab, which blocks blood vessel growth, in women with recurrent ovarian cancer who have previously received platinum chemotherapy. Liu presented early data at the 2018 ESMO annual meeting showing that the combination generates responses. These promising results warrant further evaluation of anti-angiogenic and immune checkpoint blockade combinations to treat ovarian cancer.

While neoadjuvant chemotherapy—drugs given prior to surgery to shrink a tumor—can result in improved outcomes, cancer cells sometimes resist treatment. **Elizabeth Stover, MD, PhD,** and Liu are leading a clinical trial that studies patient samples taken before and after therapy to pinpoint differences that might enable cancer cells to evade chemotherapy. In

addition to providing insight into the use of neoadjuvant therapy, the study will indicate whether preserved or newly obtained biopsies are the most useful for conducting detailed sequencing-based analyses. The clinical trial has enrolled 60 patients and will enroll more based on the study's preliminary success. The new cohort will demonstrate whether there is greater value in collecting biopsy specimens during surgery and allow collection of more substantial and diverse samples to enable additional studies of chemotherapy resistance.

Stover is also analyzing treatment resistance using patient-derived xenograft (PDX; see sidebar) models, which she and Liu treated with chemotherapy to identify the differences between initial treatment and recurrence, and whether recurrent tumors are more resistant than untreated tumors. Leading the genomic analysis in collaboration with the Broad Institute of MIT and Harvard, the duo successfully observed differences in the signaling pathways in the PDX tumor models after treatment and hope to begin refining potential pathways of interest.

Patient-derived xenografts (PDXs) refer to surgical grafts of human tumor tissues into mice. Once established, PDXs faithfully recapitulate the genetic complexity of human cancers and offer an elegant platform in which to test new therapeutic agents.

Detecting cell-free DNA

Stover is studying resistance using a technology developed in partnership with the Broad Institute and Dana-Farber colleagues that detects circulating DNA in the bloodstream, known as cell-free DNA. The technology facilitates the analysis of changes that occur in ovarian cancer cells without relying on the use of traditional tissue biopsies, which are more invasive. This year, she and her team showed they could detect genetic mutations in cell-free DNA isolated from patient blood samples that match the mutations found in the ovarian tumors of these patients. The team confirmed the validity of the technology using 60 blood samples collected from patients treated with neoadjuvant chemotherapy. She hopes to one day to establish a distinctive set of mutations, or a "fingerprint," that can be used to monitor cancer through blood samples over time, which may provide insights into patients' responses to drugs in a dynamic fashion.

Stover is also testing whether an implantable microdevice, inserted into ovarian tumors in animal models, can identify effective drugs or drug combinations to treat ovarian cancer. Developed in the lab of **Oliver Jonas, PhD**, the microdevice—smaller than a grain of rice—contains several minuscule reservoirs, each filled with a different drug. The microdevice is inserted into ovarian cancer models, where drugs are then released into the tumor, and the device is removed along with surrounding tissue so that each region of the tumor can be examined for evidence of drug response. These studies might reveal features of individual tumors that render them more or less responsive to particular drugs. It is hoped that the microdevice may move into human clinical trials in the coming years.

Geoffrey Shapiro, MD, PhD, Director, Early Drug Development Center; Clinical Director, Center for DNA Damage and Repair

A new drug for BRCA-positive cancer

The Early Drug Development Center (EDDC) at Dana-Farber plays an important leadership role in conducting phase I clinical trials—the first step in bringing new drugs to market—and increasing treatment options for patients with cancer. EDDC trials have successfully laid the groundwork for later FDA approvals of numerous targeted therapies to treat different types of cancer. These trials also offer patients access to the latest experimental developments when there are no other treatment options available.

Under the direction of **Geoffrey Shapiro, MD, PhD,** the EDDC is increasing options for BRCA-associated ovarian cancer, in which mutations prevent DNA damage from being properly repaired. The center was recently involved in a phase I/II study demonstrating that the PARP inhibitor rucaparib shows antitumor activity in patients with solid tumors, including BRCA1- and BRCA2-mutated high-grade serous ovarian cancer.

In the August 2017 *Clinical Cancer Research* and the January 2019 *Clinical Pharmacology in Drug Development*, Shapiro published research on behalf of a team of scientists investigating the anti-tumor activity of rucaparib in patients with inherited BRCA1- or BRCA2-mutated ovarian cancer who had received multiple prior therapies. The results of these

studies, the first to fully evaluate rucaparib's effectiveness as a single agent treatment, revealed robust activity in patients with platinum-sensitive ovarian cancer with a germline BRCA1 or BRCA2 mutation. The overall response rate for patients was nearly 60 percent. These findings supported the April 2018 FDA approval of rucaparib for BRCA-associated ovarian cancer, as well as fallopian tube and primary retroperitoneal cancer.

Early prevention strategies

While removing the fallopian tubes and ovaries together is the current surgical prevention strategy for patients with ovarian cancer, evidence suggests that the fallopian tubes could be removed first, followed by the ovaries at a later date, allowing women to complete family planning and delaying premature menopause. Dana-Farber is part of the Women Choosing Surgical Prevention (WISP) clinical trial, taking place at seven locations nationwide, which has enrolled more than 100 patients to investigate this approach in patients with a known cancer risk gene.

Cloud Paweletz, PhD, Head of Research, Belfer Center for Applied Cancer Science

Since access to testing for inherited mutations is not universal, a patient-friendly web platform, called MAking GENetic Testing Accessible (MAGENTA), delivers education and connects patients to genetic testing for ovarian cancer. MAGENTA has accrued 2,500 of an expected 3,000 participants and will help evaluate those enrolled for 19 mutations in breast and ovarian cancer risk genes.

CERVICAL CANCER

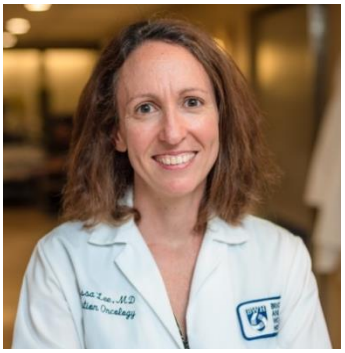
Cervical cancer is the second most common women's cancer worldwide. For many women with cervical cancer, treatment with surgery or the combination of chemotherapy together with radiation can be curative. However, some of these women are still at risk of their disease recurring. Smith Center investigators are developing new ways to monitor and treat cervical cancer using cutting-edge technology and therapies.

Blood test tracks treatment response

Together with the Belfer Center's **Cloud Paweletz, PhD,** Liu is working on a blood test to detect human papilloma virus (HPV); Paweletz and Liu hope that tracking the HPV levels detectable in the blood may provide valuable information about how well the cancer is responding to therapy and which women may be at highest risk of their cancer recurring.

Immunotherapy

The FDA recently approved the use of pembrolizumab for cervical cancer—the first immunotherapy to be widely used against this disease. Building upon successes like these, **Larissa Lee, MD,** is leading a new clinical trial combining the PD-1 inhibitor durvalumab with tremelimumab, also an immune checkpoint inhibitor, together with radiation. This study is open and enrolling patients with recurrent gynecologic malignancies.



Larissa Lee, MD, Director, Gynecologic Radiation Oncology

Radiation therapy

Dana-Farber researchers are using more precise targeted radiation therapy to treat cancer with pinpoint accuracy down to the millimeter. Lee is leading a trial to track the placement of highly-focused, image-guided catheters that are inserted directly inside a patient's tumor, along with all radioactive sources, in a procedure known as brachytherapy. The trial, which aims to more accurately treat cervical and advanced endometrial cancers, will replace the need for multiple MRIs with a real-time MRI-guided procedure, which will allow clinicians to immediately evaluate radiation doses so that they can adjust the radiation catheters accordingly.

Alexi Wright, MD, MPH, Director, Gynecologic Oncology Outcomes Research

OUTCOMES-BASED RESEARCH

The Smith Center continues to lead innovative research focused on monitoring, evaluating, and improving the patient treatment experience. These efforts are vital for ensuring the quality of care offered at Dana-Farber continues to set the standard.

HOPE

A pilot study by **Alexi Wright, MD, MPH,** called Helping Our Patients Excel (HOPE), uses a smartphone app to help patients with gynecologic cancer and their care teams become more proactive about managing symptoms and side effects between visits. In collaboration with area institutions, Wright is assessing the effectiveness of wearable accelerometers that

track physical activity, as well as an established research platform called Beiwe that collects smartphone sensor and usage data to capture a "digital phenotype" of a person's day-to-day life.

Early results, which were published in the June 2018 *JCO Clinical Care Informatics*, confirmed the ability of the platforms to track patient responses, stratify patients by risk, provide tailored symptom management, and notify patients and clinicians of high-risk symptoms. The initial pilot, which enrolled patients receiving palliative chemotherapy, warrants a larger clinical trial to study the HOPE intervention.

BOLSTER

Another study by Wright aims to support patients with ovarian cancer and their caregivers as they transition home after hospitalization. Building Out Lifelines for Safety, Trust, Empowerment and Renewal (BOLSTER) is a pilot study that provides education and skills training, symptom management, and support across care settings—including how best to manage symptoms and new procedures with tubes, lines, and drains. In phase I and II of the study, patients and their caregivers are receiving nursing support, symptom management, medical education, skills training, and more. This initiative, which utilizes telehealth, seeks to help patients with complex care needs feel more empowered and self-sufficient during their course of treatment.

THE POWER OF PHILANTHROPY

As you have read, investigators in the Center for Gynecologic Oncology at the Susan F. Smith Center are at the forefront of the most important gynecologic cancer discoveries in the world. Your generosity is paramount to this cutting-edge research, from the lab to clinical trials to FDA approval. We cannot thank you enough for supporting this work.

Report written by Anna Fiorentino.