THE MAGAZINE OF **UC DAVIS COMPREHENSIVE CANCER CENTER** VOL 26 NO 1 / SUMMER 2023

SYNTHESIS

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Dear Reader,

UC Davis Comprehensive Cancer Center continues to grow as a world-class institution, with pioneering initiatives that are improving clinical outcomes, empowering innovative research and harnessing the latest breakthroughs.

In this issue of Synthesis, we invite you to travel the new cancer landscape as we drive the latest advances in cancer treatment — all while harnessing genomic, molecular, clinical and patient-centered data to help unlock the mystery of cancer.

Several articles in this issue examine not only genetics but epigenetics of cancer as a way to change outcomes. Based on our heritage, genetics can set us up for greater cancer risk, but how can we lessen that risk by understanding how cancer cells react to our environment? This is part of the science of epigenetics.

Learn about a prestigious National Cancer Institute (NCI) grant to advance immunotherapy in head and neck cancer. It is a first for our cancer center. You'll see why we are so proud to take the lead in creating what we hope will be a clinical trial that will revolutionize treatment for this difficult group of cancers.

A $15 million boost from the NCI will help us use artificial intelligence (AI) to make breast cancer screening more equitable and accurate. AI will never replace oncologists, but it gives us a high-tech tool for accessing medical data immediately, identifying patterns and recommending interventions.

We devote a special section of the magazine to ovarian cancer, also benefiting from AI. Brave women are facing down this disease and a new clinical trial may help head off a form of ovarian cancer that tends to run in families.

This issue also contains exciting news about the launch of our Women's Cancer Care and Research Program (or WeCARE), a new research and clinical care hub that will share scientific findings to help fight breast and gynecologic cancers.

Many stories in this issue report on an array of private and public sector grant funding now pouring into our cancer center. For instance, a new academic-industry partnership is investigating a unique approach to treating lethal pancreatic cancer.

Find out how we are prioritizing patient-partnered cancer research in the community. With a focus on underserved populations, we are dispatching free mobile screenings that also survey women to find ways to break barriers. We are hiring Spanish-speaking health educators known as "promotores," and community ambassadors known as "embajadoras" to advance breast cancer health equity.

Another section of our magazine focuses on the exciting progress we are making to understand and treat sarcoma, a relatively uncommon type of cancer that typically strikes young people but also can cause life to take a detour for adults. We are using 3D technology to guide precision surgical techniques that help get patients back on the road to normalcy.

Within this issue, glance at the various ways you can get involved with the cancer center, including a new program to bring peace of mind to pet-owning hospice patients.

Finally, preview the state-of-the-art California Tower under construction. It is rising up to meet the needs of our patients with a unit encompassing two floors solely dedicated to acute oncology care.

We hope you enjoy the summer issue of Synthesis. Thank you for reading about how we are leading a new era of cancer care. Your support is helping us save lives.

Primo "Lucky" Lara Jr., M.D.
DIRECTOR, UC DAVIS COMPREHENSIVE CANCER CENTER

BREAKING BARRIERS TO **BEAT CANCER**℠

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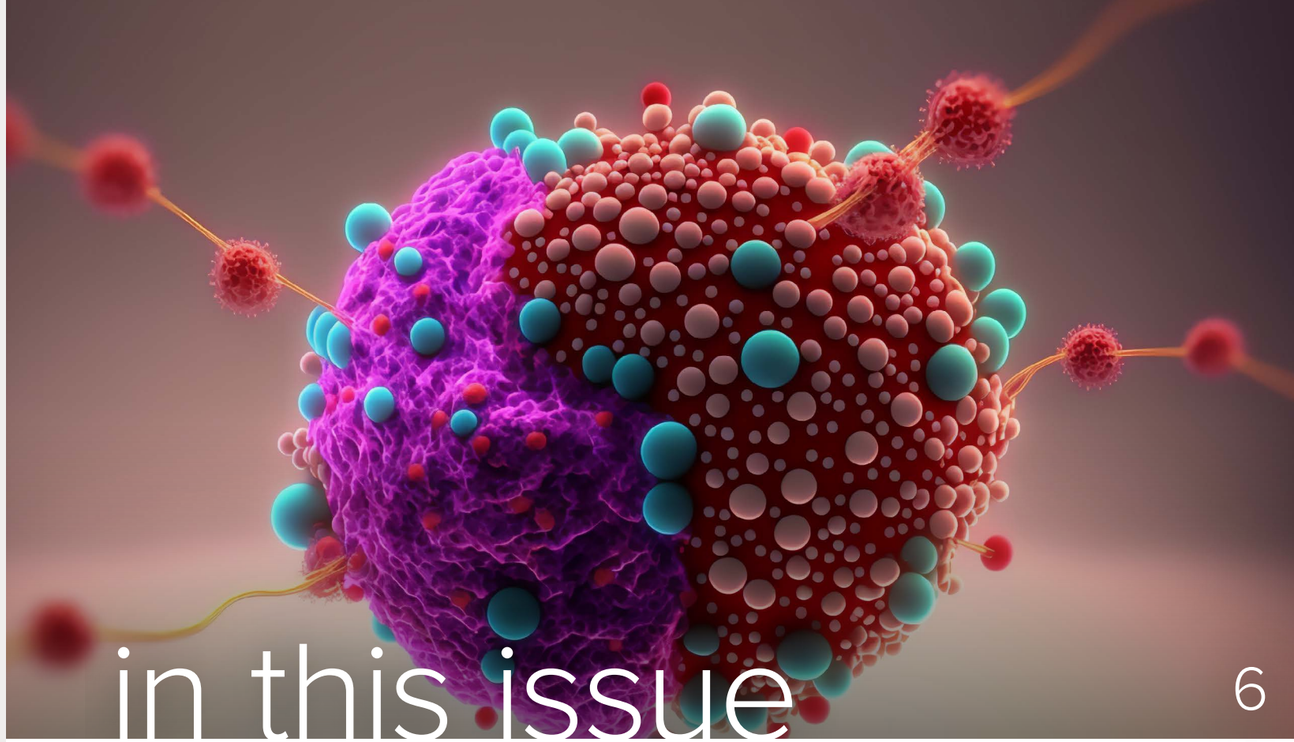

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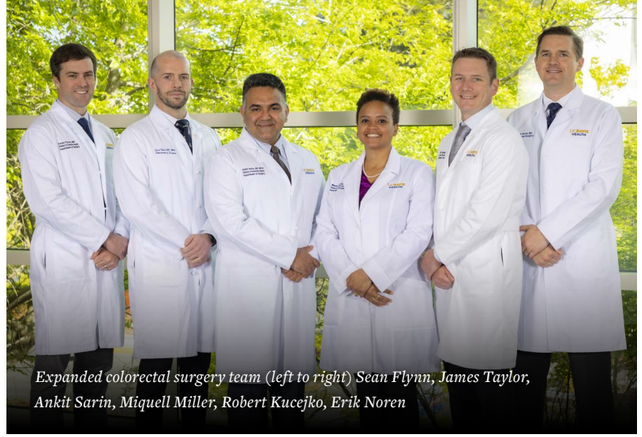
Expanded colorectal surgery team brings new expertise



Expanded colorectal surgery team (left to right) Sean Flynn, James Taylor, Ankit Sarin, Miquell Miller, Robert Kucejko, Erik Noren

An expanded colorectal surgery team within the Department of Surgery is bringing the newest in robotic-assisted surgical skills and other advanced expertise to treat colorectal cancer patients.

Ankit Sarin, the new chief of colorectal surgery, will lead the five-surgeon team. Sarin, formerly with UCSF Health, said he is excited about joining UC Davis Health.

"UC Davis is accredited by the National Accreditation Program for Rectal Cancer and is one of only two hospitals in Northern California with this designation," Sarin said. "Getting this designation requires substantial resources and effort and is the result of significant commitment to our patient population."

Newly hired colorectal surgeons include:

James Taylor, assistant professor

James Taylor completed his medical degree at the University of Cambridge School of Clinical Medicine in the United Kingdom. He did his residency in general surgery at Johns Hopkins University and a fellowship in colorectal surgery at Memorial Sloan Kettering Cancer Center and New York-Presbyterian Hospital. He attended the New York University School of Global Public Health, where he received his master of public health degree.

Miquell Miller, assistant professor

Miquell Miller received her medical degree and completed a general surgery residency at Stanford Medicine. She served a fellowship in colorectal surgery at Brigham and Women's Hospital.

Robert Kucejko, assistant professor

Robert Kucejko obtained his medical degree at UC Davis School of Medicine before completing the first three years of his residency in general surgery at Drexel University College of Medicine/ Hahnemann Hospital. During his residency, he trained as a research fellow in colon and rectal surgery at Drexel. He completed his residency at Thomas Jefferson University Hospital, and served a fellowship in colon and rectal surgery at Lahey Hospital and Medical Center.

Erik Noren, assistant professor

Erik Noren came from Keck School of Medicine of USC. He obtained his medical degree at Albany Medical College in New York. He completed a fellowship in anorectal physiology (functioning of the anal canal) and clinical research at Los Angeles County and USC Medical Center (LAC+USC Medical Center), where he also did his general surgery residency.

Sean Flynn, assistant professor

Sean Flynn obtained his medical degree at the University of Pittsburgh School of Medicine. He completed a general surgery residency at UC San Diego School of Medicine and a residency in colorectal surgery at the LAC+USC Medical Center.

Sophoclis Alexopoulos is the new chief of the Division of Transplant Surgery

Sophoclis Alexopoulos has been named chief of the Division of Transplant Surgery. He comes to UC Davis Health from Vanderbilt University where he was the chief of the Division of Hepatobiliary Surgery & Liver Transplant and a faculty member of the Vanderbilt-Ingram Cancer Center, specializing in complex liver cancer surgery.

Prior to Vanderbilt University, he was with Keck School of Medicine of USC. Alexopoulos completed his undergraduate education in physics at UC San Diego and received his medical degree from Columbia University. He completed his surgical residency at Beth Israel Deaconess Medical Center and completed his fellowship at Stanford University Medical Center.

Alexopoulos will assume the position held by Richard Perez who retired after 30 years at UC Davis.

Moon Chen, Jr. recognized for cancer control efforts benefiting Asian Americans and Pacific Islanders

Moon Chen, Jr. was awarded the 2022 Christopher N.H. Jenkins Cancer Control Award by the Asian American Research Center on Health. The endowed award is presented annually to recognize an individual who has made significant accomplishments in community-oriented activities to prevent and control cancer among Asian Americans and Pacific Islanders.

Chen is a nationally renowned expert in cancer health disparities, particularly as they affect Asian American populations. He is the senior advisor to the cancer center director for community outreach and population sciences.

New associate director for Office of Community Outreach and Engagement

Laura Fejerman has been appointed the new associate director of the cancer center's Office of Community Outreach and Engagement (COE).

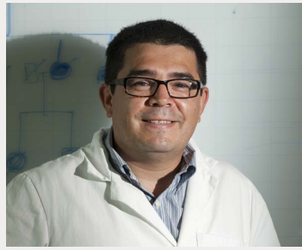
Fejerman succeeded Moon Chen, Jr. a pioneer in cultivating cancer health equity who helped launch the COE in 2018. Chen has a long history of leading National Cancer Institute programs focused on resolving cancer health disparities in various racial and ethnic populations.

Fejerman plans to focus on health equity in the diverse populations that UC Davis Health serves. Meanwhile, Chen assumed a new role as senior advisor to the cancer center director for community outreach and population sciences. He will lead the cancer center's innovative cancer screening initiatives with particular emphasis on the inclusion of racial and ethnic minorities and members of other population groups who don't have cancer symptoms but aren't regularly screened for undetected cancer. Chen will also retain his focus on health disparities that disproportionately affect Asian Americans.

Through community-engaged research, shared decision-making and mutual learning, the COE works with diverse stakeholders to address the cancer burden within diverse populations throughout inland Northern California. Fejerman will expand conversations with the community to give scientists an opportunity to receive feedback about their cancer research from diverse stakeholders.

Fejerman joined UC Davis Health in 2020, after expanding her skills as a breast cancer genetic epidemiologist and postdoctoral fellow at UC San Francisco. She earned her doctorate in biological anthropology and master's in human biology at the University of Oxford, England. She completed her undergraduate degree in social anthropology at the University of Buenos Aires, Argentina. Originally from Buenos Aires, Fejerman left Argentina in 1998 to study in England and arrived in the United States in 2003.

Office of Academic Diversity appointment for Luis Carvajal-Carmona



Luis Carvajal-Carmona has been appointed associate vice chancellor of the Office of Academic Diversity by the UC Davis Office for Diversity, Equity and Inclusion (DEI).

Carvajal-Carmona is a professor in the Department of Biochemistry and Molecular Medicine. He holds the Auburn Community Cancer Endowed Chair in Basic Science, and is the associate director for the Inclusivity, Diversity, Equity and Accessibility (IDEAL) office.

Carvajal-Carmona also is the founding director of the Latinos United for Cancer Health Advancement initiative and of the Center for Advancing Cancer Health Equity at UC Davis Comprehensive Cancer Center. Additionally, he co-directs the Community Engagement Program at the UC Davis Clinical and Translational Science Center.

The associate vice chancellor of the Office of Academic Diversity will play an influential role in the DEI office. The goal is to empower equity leaders and elevate the work of diverse faculty members as they solve global problems. Other priorities include supporting equitable ecosystems for student opportunity through the DEI's Hispanic-Serving Institution (HSI) initiative, and modeling equity and inclusion in higher education.

David Tom Cooke recognized for **care and compassion in medicine**

2022 Ethnic Physician Leadership Award given by Physicians for a Healthy California

Physicians for a Healthy California (PHC) has recognized David Tom Cooke, UC Davis oncology surgeon and chief of the Division of General Thoracic Surgery, with the 2022 Ethnic Physician Leadership Award.

PHC, formerly the California Medical Association Foundation, is dedicated to improving community health, growing a diverse workforce and promoting health equity. Its annual awards program celebrates the commitment, compassion and contributions of doctors who are improving community health and reducing health disparities in California.

"The Ethnic Physician Leadership Award recognizes an individual physician's contribution toward improving the health of ethnic communities," said PHC President and CEO Lupe Alonzo-Diaz. "Dr. Cooke earned the award by showing great success in helping eliminate health disparities, addressing access to care, and improving cultural competency and patient advocacy."

The purpose of the Ethnic Physician Leadership Award, Alonzo-Diaz said, is to honor an ethnic physician, inspire other physicians, and promote leadership, caring and compassion in medicine.

"I am humbled and honored to receive this important award presented by Physicians for a Healthy California," Cooke said. "Increasing access to health care for all is essential to ensuring that the progress we are making to prevent and cure diseases is available to everyone, no matter their ability to pay, their race or their cultural background."

Christopher Evans granted honorary membership in the European Association of Urology

Christopher Evans receiving the European Association of Urology award

Professor and Chair of the Department of Urologic Surgery Christopher Evans has received honorary membership in The European Association of Urology (EAU), which fosters the highest standards of urological care throughout Europe.

Evans is only the ninth American to receive this award, which reflects his contributions to the development of urology in Europe. His recognized accomplishments include training several European clinical and research fellows, as well as lecturing and performing demonstration surgeries at European universities.

The opening ceremony for the 38th Annual EAU Congress in Milan, Italy, this year provided an opportunity for the European Association of Urology to pay tribute to this year's distinguished award winners. At the meeting, Evans also taught a course on prostate cancer for the European School of Urology, along with delivering multiple lectures.

While president of the U.S. Society of Urologic Oncology from 2017 to 2019, Evans developed a scholar exchange program between the two societies and he also co-edited two textbooks now used in European medical schools.

MEGAN DALY HEADS UP CLINICAL RESEARCH FOR CANCER CENTER

Megan Daly has been appointed the new associate director for clinical research at UC Davis Comprehensive Cancer Center. For the past year, Daly has held the position on an interim basis.

Daly, a radiation oncologist and professor, joined the cancer center in 2011. Her research interests include the use of radiotherapy for the treatment of early-stage lung cancer, integrating radiation and immune checkpoint inhibitors in solid tumors, clinical implementation of new PET (positron emission tomography) tracers and reducing radiation-related toxicity.

She will focus on increasing the number of participants who complete clinical trials and expanding trial diversity through a multi-pronged approach. This will include a focus on investigator-initiated trials, pragmatic trials, and seeking involvement from a wider range of investigators across many cancer-related specialties in clinical trials.

Julie Sutcliffe receives distinguished scientist award

The Western Regional Society of Nuclear Medicine presented its 2022 Distinguished Scientist Award to Julie Sutcliffe, a professor of biomedical engineering and hematology/oncology. The award is given every year to an individual who has made significant contributions to the clinical science of nuclear medicine or molecular imaging.

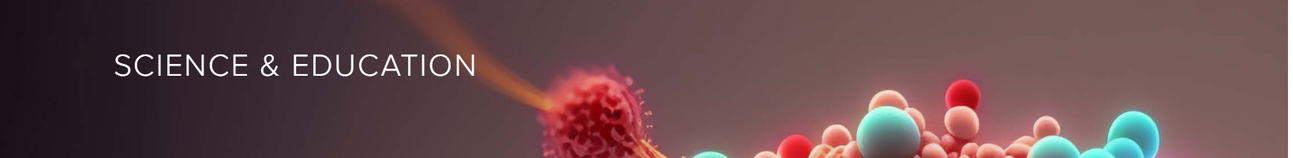
Sutcliffe is the leader of a multidisciplinary translational research team that is recognized nationally for its contributions to the field of molecular imaging. She is the principal investigator of four active clinical trials and leads the UC Davis unit participating in the National Institutes of Health U01 Pancreatic Cancer Detection Consortium. Sutcliffe also represents UC Davis on the Pancreatic Cancer Collective research team, a partnership of the Lustgarten Foundation and Stand Up To Cancer. Sutcliffe is a fellow of the Society of Nuclear Medicine and Molecular Imaging, a fellow and the immediate past president of the World Molecular Imaging Society, and a fellow of the American Institute for Medical and Biological Engineering.

American Joint Committee on Cancer names Candice Sauder to its executive and educational committees

The American Joint Committee on Cancer (AJCC) has appointed UC Davis breast cancer specialist Candice Sauder to its executive and educational committees. Sauder, an assistant professor in the Department of Surgery, is investigating ways to improve cancer staging standards and validate systems for the classification and management of cancer, including advanced prognostic tools and resources. Cancer staging is the process of determining the degree to which cancer has progressed in the body and where it is located.

The AJCC's cancer staging references are accepted and used by the medical profession to select the most effective treatment, determine prognosis and continue evaluating cancer control measures. Understanding the stage of cancer helps doctors develop a prognosis and design a treatment plan for individual patients. It also helps in identifying clinical trials that may be appropriate for particular patients.

Founded in 1959, the AJCC is administered by the Chicago-based American College of Surgeons.



Prestigious NCI grant to help *advance immunotherapy* in head and neck cancers

Internationally renowned researcher to lead first SPORE grant at UC Davis


Xiao-Jing Wang

A promising new research initiative at UC Davis Comprehensive Cancer Center could lead to a new and far more effective standard of care for head and neck cancers.

The research is being funded by the cancer center's first ever Specialized Programs of Research Excellence (SPORE) grant from the National Cancer Institute (NCI). The prestigious five-year $9.8 million federal grant is intended to translate cancer research into clinical intervention.

"We are so proud to take the lead in creating what we hope will be a clinical trial that will revolutionize treatment for head and neck cancers," said UC Davis Comprehensive Cancer Center Director Primo "Lucky" Lara, Jr. "Along with harnessing a breakthrough therapy to treat these difficult and debilitating cancers, we are also advancing interdisciplinary team science and that is exciting as well."

The grant comes with the recent appointment of the cancer center's new chief science officer Xiao-Jing Wang who came to UC Davis in 2022. Wang is building a team to investigate the potential application of immunotherapy to treat head and neck cancers. Immunotherapy uses a body's own immune system to fight cancer.

Along with her chief science officer role, Wang is associate director of basic science at the cancer center and a professor in the Department of Pathology and Laboratory Medicine.

She began her project under the SPORE program at the University of Colorado Anschutz Medical Campus with her co-principal investigator, Antonio Jimeno.

The researchers are using mouse models to study how cancer cells evade the body's immune system. The team wants to learn more about biomarkers through which immunotherapy can more effectively target head and neck cancers. The work will lead directly to a clinical trial to be initiated in the next year. It will test the efficacy of an immunotherapy drug in combination with radiation to treat patients with recurrent head and neck cancers.

"Each SPORE project requires a patient endpoint demonstrating impact to patients, in either prevention or treatment of disease, through at least one new investigator-initiated therapeutic trial," said Wang, who holds the Robert E. Stowell Endowed Chair in Experimental Pathology at UC Davis.

"Our trial will involve UC Davis and the University of Colorado jointly recruiting participants for therapeutic intervention," Wang said.

High incidence of head and neck cancer in Sacramento region

The trial holds particular importance for the Sacramento region where incidence of tobacco-related head and neck cancer is more prevalent than in many other areas of the nation.

"Consumption of smoking and chewing tobacco is high among farmworker populations in California's Central Valley. Members of rural underserved populations who develop head and neck cancers typically delay seeing a doctor until their disease is in advanced stages. Those populations tend to have recurrent therapeutic resistance, the worst prognosis," explained Wang, who works with clinical oncologists to design clinical trials.

Wang obtained her bachelor's, M.D. and Ph.D. degrees at Beijing Medical University. After postdoctoral training at the University of Texas M.D. Anderson Cancer Center in Houston, she joined the faculty of Baylor College of Medicine, also in Houston.

"At Baylor I was fortunate to have a great mentor who guided me in gaining the expertise to develop genetically engineered mouse models for studying skin cancer. But after the head and neck department at Oregon Health and Science University in Portland recruited me as a full professor in 2003, I realized that very few scientists or physician-scientists were involved in head and neck cancer research at the time, and no genetically engineered animal model existed for head and neck cancer."

That prompted her to seek and earn a grant in 2005 from the National Institutes of Health to create genetically engineered mouse models that could mimic head and neck cancer, enabling comparisons between mice and human cancer patients.

"That was my first grant, almost 20 years ago, and that started my head and neck cancer research career," Wang said.

The SPORE grant will serve as an "incubator," in Wang's view, to spur building successful teams of investigators, which harmonizes with her philosophical spirit.

"My two biggest passions are team science and mentoring, particularly for physician-scientists," Wang said. "At Colorado, I established the Head and Neck Cancer Research Program from scratch. I created a very successful succession plan that is sustainable without me. UC Davis has more basic scientists and physician-scientists studying head and neck cancer than when I started at the University of Colorado 14 years ago. Therefore, I can help create a great impact faster in team science and in mentorship here."

Reactivating the immune system

Wang's research project is important because radiation therapy — the current standard of care for head and neck cancer — not only kills tumors but also causes immune system suppression, thereby diminishing the body's ability to fight cancer naturally.

"Immunotherapy recognizes cancer cells as foreign and then utilizes your immune system to wipe them out. But that doesn't work for someone whose immune system isn't functioning optimally," Wang explained.

The major emphasis of her research is on how to make the immune system emerge from that immunosuppressive exhaustion stage and become reactivated, in combination with radiation. While she remains in the process of assembling her full team, research leading to the clinical trial is underway.

"We are determining which drug would hit the target and would be most likely to succeed," she said. "The first direct impact of this project will be opening a new clinical trial. And the second, if that works, will be to deliver a new therapeutic intervention at UC Davis Comprehensive Cancer Center."

Head and neck cancer

Head and neck cancers are those found in the mouth, lips, throat, tongue, tonsils, nasal cavity, throat, larynx (voice box) or salivary glands. They are often difficult to treat because the cancer is typically not detected until it has progressed to an advanced stage.

Treatment can change the way a patient looks, talks, eats or breathes, which is why quality of life is greatly impacted by head and neck cancers. Treatment options, such as surgery and radiation, must be carefully considered to preserve quality of life. Chemotherapy is used only for tumors that have metastasized and is often not effective.

Symptoms may include a lump in the neck or a sore in the mouth or the throat that doesn't seem to heal and may be painful. A persistent sore throat, difficulty in swallowing and changes in the voice, such as hoarseness, are other signs.

Major risk factors

- Alcohol
- Tobacco use (smoking and chew)
- Betel nut chewing or betel quid (popular in Southeast Asia)
- Human Papillomavirus
- Asian ancestry

$3 million national grant to fund pancreatic cancer study

Academic and industry partnership to investigate new approach to treating lethal pancreatic cancer


Gerardo Mackenzie


Edward Kim

UC Davis Comprehensive Cancer Center is partnering with TargaGenix and Northeastern University to study pancreatic ductal adenocarcinoma (PDAC). The often-lethal cancer has an average five-year survival rate of less than 11%. The academic-industry partnership will receive nearly $3 million over five years thanks to National Institutes of Health (NIH) funding through its R01 grant program. The NIH gives R01 grants only to mature research projects driven by strong preliminary data.

The team will develop a treatment based on the novel chemotherapy TGX-1214, in combination with cancer immunotherapy. The researchers expect that by the end of the study, this will become part of a new treatment option for PDAC patients.

PDAC accounts for more than 90% of pancreatic cancer cases. It is usually diagnosed at a late stage by which point disease has spread to other organs. Symptoms often are common and non-specific, such as weight loss and lack of appetite. By the time symptoms appear, the disease is at a late stage, making it inoperable and incurable.

Current challenges in treating pancreatic cancer

"Surgery, which offers the only realistic hope for a cure, is a viable option in only a limited number of patients, and current chemotherapy and radiation therapy offer limited or no benefit at all," UC Davis pancreatic cancer researcher Gerardo Mackenzie said.

Mackenzie is an associate professor in the Department of Nutrition. He and Edward J. Kim, oncologist and medical director of the cancer center's Office of Clinical Research, are the UC Davis principal investigators for the study.

"The current chemotherapy combinations used to treat PDAC have marginally improved survival outcomes. The average survival in advanced disease is still less than a year. The limited benefit of these therapies, unfortunately, comes at the cost of significant toxicities, including suppressed immune system, fatigue, nausea, diarrhea and nerve damage, limiting their use to patients with relatively preserved function," Kim said, "And most patients still ultimately relapse and progress."

In addition, studies show that new immuno-oncology agents, such as anti-PD-1 or anti-CTLA-4 are not effective in PDAC. This is partly because the drugs create a microenvironment that weakens the immune system and prevents cancer-fighting T-cells from entering the tumor mass.

"That's why there is a critical unmet need to develop better therapeutic options for aggressive and refractory PDAC," said Mansoor Amiji, distinguished professor of pharmaceutical sciences and chemical engineering at Northeastern University. Amiji is Northeastern's principal investigator for the study and the scientific advisor for TargaGenix.

"We are pleased to collaborate with colleagues at UC Davis and TargaGenix on this research," Amiji said. "Based on the high mortality associated with pancreatic cancer, the opportunity for us to develop TGX-1214 for this dreadful disease is especially exciting."

> "Surgery, which offers the only realistic hope for a cure, is a viable option in only a limited number of patients, and current chemotherapy and radiation therapy offer limited or no benefit at all."
>
> —GERARDO MACKENZIE, UC DAVIS PANCREATIC CANCER RESEARCHER

Promising TGX-1214 combination strategy for the treatment of advanced pancreatic cancer

The team will leverage the multidisciplinary expertise of scientists and clinicians to develop an effective treatment based on the combination of TGX-1214 and immune checkpoint inhibition, which block proteins called checkpoints. Immune checkpoint inhibitors are effective in helping T cells kill cancer cells.

Multiple animal studies have previously indicated that TGX-1214 is safe and effective. In preliminary studies, TGX-1214 strongly inhibited pancreatic cancer growth, with complete tumor regression in two pre-clinical models of pancreatic cancer.

The long-term goal of the research is to develop safe and effective treatment strategies for PDAC to test in clinical trials that will become available for patients.

RESEARCH LENS

"Effect of patient, characteristics, uptake, screening, using, mailed, human paillomavirus, self-sampling kit: A secondary analysis of a randomized clinical trial" was published in JAMA Network Open. Diana Miglioretti was the UC Davis co-author. The findings show that mailing HPV self-sampling kits significantly increased screenings in all subgroups including age, race, ethnicity, screening history as well as sociodemographic and health characteristics.

"Adapting investigational drug services during a pandemic: Recommendations for future preparedness from the Hematology/Oncology Pharmacy Association Investigational Drug Services Special Interest Group" was published in the American Journal of Health-System Pharmacy. Jennifer Murphy was the UC Davis co-author. This article found that research pharmacies transformed standard operating procedures during the outbreak of the COVID-19 pandemic to quickly meet the needs of research teams, study sponsors, and patients. By embracing technology, many services and audits were conducted in an electronic or virtual environment. This resulted in workflow efficiencies as well as potential cost savings.

"Case report: Treatment of metastatic dedifferentiated chondrosarcoma with pembrolizumab yields sustained complete response" was published in Frontiers in Oncology. UC Davis co-authors were Amisha Singh, Steven Thorpe, Morgan Dower, and Janai Carr-Ascher. The case found that the rapid and durable response seen with PD-L1 inhibition in the patient indicates that immunotherapy may indeed be a successful treatment option in a subset of dedifferentiated chondrosarcoma patients.

"Lymph node metastases in pediatric and young adult patients with non-rhabdomyosarcoma soft tissue sarcoma (NRSTS): Findings from Children's Oncology Group (COG) study ARST0332" was published in ScienceDirect.com. UC Davis co-author was Elysia Alvarez. The study concluded that lymph node metastases occur in about 4% of pediatric/young adult non-rhabdomyosarcoma soft tissue sarcoma, are limited to a few histologic subtypes, and are rare in patients who did not have clinical or imaging evidence of lymphadenopathy. This suggests that biopsies of non-enlarged lymph nodes are not necessary. Patients with isolated metastases have high 5-year overall survival (~85%) and should be treated with curative intent.

"Safety and efficacy of intravenous bisphosphonates for hypercalcemia of malignancy in patients with and without renal dysfunction" was published in the Journal of Hematology Oncology Pharmacology. UC Davis co-authors were Ryan Beechinor and Emily Hsu. The study compares the safety and efficacy of IV zoledronic acid and IV pamidronate in patients with hypercalcemia of malignancy with and without renal dysfunction.

"Time to completion of radiation treatment in locally advanced squamous cell carcinoma of the vulva and the impact on survival" was published in ScienceDirect.com. UC Davis co-authors were Nancy T. Nguyen, Xiao Zhao, Matthew Ponzini, Machelle Wilson, Gary Leiserowitz and Rebecca A. Brooks.

UC Davis researchers hope to unlock the complex ways body fat tricks the immune system and protects tumors

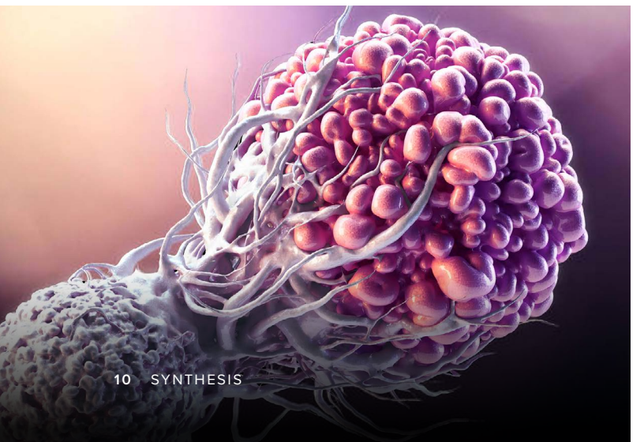
Obese patients are more resistant to radiotherapy and have higher rates of cancer recurrence than other patients. UC Davis Comprehensive Cancer Center radiation oncologist Arta Monjazeb is working to find out why that is. He was recently awarded a $2.7 million five-year grant from the National Cancer Institute for his research.


Arta Monjazeb


William Murphy

Obesity, which has reached alarming levels in the United States, may soon surpass smoking as the number one cause of preventable cancer. The U.S. Centers for Disease Control and Prevention links excessive weight with increased risk of developing 13 types of cancer. That's why understanding how to best treat obese cancer patients is essential.

Monjazeb is collaborating with a team of UC Davis researchers to unlock the role obesity and its related hormone leptin play in radiotherapy resistance. Their studies may have major clinical implications and could help advance personalized medicine.



Personalized care for obese cancer patients

Monjazeb's work focuses on understanding cancer holistically.

He says research has not paid enough attention to the patient's metabolic profile. Monjazeb and his team are looking at how obesity diminishes the radiotherapy response. They believe that what patients eat and the level of inflammation in their body may affect their cancer treatment.

"It is important to really know your patients and understand cancer in their specific context. Tailoring radiotherapy strategies to a patient's metabolic parameters can improve patient outcomes," Monjazeb said.

Radiotherapy resistance

For radiotherapy to work, it needs to directly kill cancer cells and trigger the immune system to clear out the damaged cells. The success is based on its ability to cause DNA damage and destroy the tumor cells as well as stimulate the immune system's response to that damage.

Radiotherapy resistance appears when patients have less tumor shrinkage and higher cancer recurrence rates after radiation.

"Our preclinical data show increased tumor resistance to radiotherapy in obese mouse cancer models. Clinical data also demonstrate that obese cancer patients are more resistant to radiotherapy and have higher rates of cancer recurrence," Monjazeb explained.

"Some researchers have hypothesized that this resistance is a matter of physics, as it's just harder to deliver radiation in larger patients, which may be true. But we think that there is a biological difference between cancers in obese patients and those in lean patients and the way that cancer responds to radiation," Monjazeb added.

> "Research has shown that the immune system plays a role in how tumors react to radiotherapy. Obesity can make cancer patients more resistant to radiation by causing immune dysfunction."
>
> —WILLIAM MURPHY, UC DAVIS IMMUNOLOGIST

How does obesity affect radiotherapy?

The team's previous studies showed that obesity could alter the growth, spread and survival of cancers. They showed that the obesity-linked adipokine leptin could influence cell death and post-survival pathways of cancer cells.

Adipokines are cell-signaling molecules produced by the body's fat tissue. They play a key role in regulating the body's energy and metabolic status, inflammation and obesity. Leptin, a recently discovered adipokine, is highly elevated in obese patients.

Research has shown that the immune system plays a role in how tumors react to radiotherapy. Obesity can make cancer patients more resistant to radiation by causing immune dysfunction. It may suppress the adaptive T cell response in the tumor microenvironment, impairing the immune response to cancer.

"The microenvironment surrounding the cancer cells provides nourishment for the tumor. Obesity can help feed this environment and protect the cancer cells," said immunologist William Murphy, a co-investigator on the study. "Obesity potentially helps tumors adapt and become resistant to radiation in a nutrient rich environment. It can also result in greater inflammatory responses, allowing the cancer to spread more as well as suppress immune attack."

Murphy is a distinguished professor and vice chair of dermatology with a joint appointment in the Department of Internal Medicine, Division of Malignant Hematology/Cellular Therapy and Transplantation.

Studying obesity's effect on radiotherapy

The team will study the links between obesity and radiotherapy using mouse models. They're using genetically identical mice with genetically identical tumors. The only difference is that some mice are on a high-fat diet, making them gain weight.

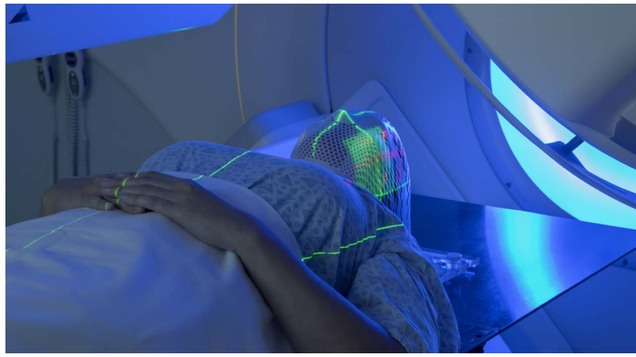
They will compare the efficacy of radiotherapy in the lean versus the obese mouse models.

They will also study radiotherapy in immunosuppressed mice to look at the direct effects of obesity on the tumor itself. The team will also evaluate how obesity and leptin signaling within cancer cells and the tumor microenvironment influence resistance to radiotherapy and immune responses.

Future directions

In the future, they hope to study different tumor models and explore avenues to reverse radiation resistance in obese patients.

"It is possible that certain strategies that we may come up with to try to make cancers more radiation responsive will work both in obese and lean patients. These strategies may just have a more profound effect on obese patients since these mechanisms are more in play," Monjazeb said.



> "We think that there is a biological difference between cancers in obese patients and those in lean patients and the way that cancer responds to radiation."
>
> —ARTA MONJAZEB, UC DAVIS RADIATION ONCOLOGIST

Monjazeb also received a supplemental diversity grant for $257,739 to support the work of doctoral graduate student Logan Vick. Diversity supplements provide funding to individuals from backgrounds that are generally less represented in the sciences. Vick is a researcher in Monjazeb's and Murphy's labs at UC Davis Medical Center.

Other collaborators on this project include radiation oncologist Jian-Jian Li, physicist Julian Perks and the Department of Radiation Oncology.

Study finds tough-to-treat tumor genes **contribute to gastric cancer disparities in Latinos**

Latino patients have higher rate of aggressive gastric cancers, according to new study

A study led by UC Davis Health researchers examines a striking health disparity: why Latinos in the United States are twice as likely to develop gastric (stomach) cancer and die from it than non-Latino whites. The research was published in Cancer Research Communications.

"There is a disparity in the incidence and mortality of gastric cancer in the United States. Latinos carry among the highest burden of gastric cancer, despite the low overall incidence rate of gastric cancer in the country," lead author and biochemistry and molecular medicine professor Luis G. Carvajal-Carmona said.

Carvajal-Carmona is associate vice chancellor for the UC Davis Office of Academic Diversity and chief diversity officer and associate director for the Inclusivity, Diversity, Equity and Accessibility (IDEAL) office at UC Davis Comprehensive Cancer Center. He is also the founding director of the cancer center's Center for Advancing Cancer Health Equity.

"Our research is focused on finding approaches to reducing disparities in care and outcomes. It also helps us better understand the development of gastric cancer, its diagnosis and potential personalized therapeutic approaches," Carvajal-Carmona said.

Gastric cancer, in which cancer cells form in the lining of the stomach, is linked to age, diet, stomach diseases such as gastritis and ulcers, and genetic risk factors.

Detecting a subtype with the worst prognosis

"The researchers took 115 tumor biopsies from 32 patients, the majority of whom were from Mexico, Colombia and California. Using tissue from the biopsies taken from different regions of the tumor, the researchers could identify mutations in hundreds of cancer genes and understand how these cancers evolved.

The study identified a molecular subtype — known as genomically stable — in gastric tumors detected in nearly half of the Latino study participants.

"We found molecular evidence that could partially explain why Latinos do so poorly when diagnosed with gastric cancer," Carvajal-Carmona said. "The molecular subtype we found in Latinos is the worst to have because it associates with the poorest prognosis."

Typically, cancer genes have mutations that can be targeted with medications to treat cancer cells. But tumors with genomically stable molecular subtypes do not respond well to treatment.

"This subtype does not have many targets or vulnerabilities that we can use with known drugs and tends to be resistant to commonly used chemotherapies," Carvajal-Carmona explained.

In addition, they are not genetically diverse enough to find other targets that can be treated with targeted therapies.

Risk factors for gastric cancer

According to the National Cancer Institute, the following factors can contribute to gastric cancer:

- Helicobacter pylori (H. pylori) infection of the stomach
- Chronic gastritis (inflammation of the stomach)
- Pernicious anemia (caused by inability of the body to absorb vitamin B12)
- Gastric polyps
- Eating a diet high in salted, smoked foods, and low in fruits and vegetables
- Being older or male
- Smoking cigarettes
- Having a mother, father, sister or brother who has had gastric cancer

Symptoms of gastric cancer in the early stages may include indigestion and stomach discomfort, feeling bloated after eating, mild nausea, loss of appetite and heartburn. At later stages, symptoms may become more severe and include trouble swallowing, vomiting, blood in the stool, stomach pain, jaundice, unexplained weight loss and ascites (buildup of fluid in the stomach).

Gastric cancer risk widely varies by geographical region. Eastern Asia exhibits the highest rates, and North America has the lowest incidence globally.

"Unlike in other countries where overall gastric cancer incidence is high and where there are preventive programs that identify gastric cancer early, we do not have gastric cancer screening programs in this country," Carvajal-Carmona said.

The need for more regular gastric cancer screening

Without regular screening protocols in place, gastric cancer is difficult to detect. When it is detected, it is typically at an advanced stage.

That's why researchers are focusing on studying a patient's genetic makeup, the tumor's DNA profile and the unique interaction between the two with the patient's environment, diet and lifestyle. The goal is to develop ways to detect gastric cancer earlier, understand its weaknesses and develop better therapies.

"On the prevention side, in our ongoing studies of gastric cancer predisposition, we hope this data will help to develop ways of preventing or catching gastric cancer earlier," Carvajal-Carmona explained. "Early detection is key to improving patient outcomes as treatments are more effective. Using genetics, we are trying to understand why some people get gastric cancer and others don't. It is our hope that our studies of gastric tumors will find their vulnerabilities and the combinations of mutations that can be targeted with effective therapies, which can be moved to clinical trials."

UC Davis coauthors included Ted Toal, Ana Estrada-Florez, Guadalupe Polanco-Echeverry, Ruta Sahasrabudhe, Paul Lott, Sienna Rocha, Alexa Morales-Arana, Shiro Urayama, Amanda Kirane and Dongguang Wei.

This research was supported by universities and funding agencies in Colombia, Mexico and the U.S., including the HEAL-HER Program and the National Institutes of Health.

Health equity cancer researchers win grant for global health initiative in Latin America

The National Cancer Institute's (NCI) Center for Global Health is funding a training program for clinical, population and basic scientists in Colombia and Peru.

It's called the UC Davis Multi-Disciplinary Cancer Research Training Program to Advance Precision Cancer Prevention and Care in Latin America. The program was developed by UC Davis Comprehensive Cancer Center leaders Luis Carvajal-Carmona and Laura Fejerman and has an annual budget of $250,000. The goal is to train at least four scientists from Latin American countries per year.

Carvajal-Carmona is associate vice chancellor for the UC Davis Office of Academic Diversity and chief diversity officer and associate director for the Inclusivity, Diversity, Equity and Accessibility (IDEAL) office at UC Davis Comprehensive Cancer Center. He is also the founding director of the cancer center's Center for Advancing Cancer Health Equity. Fejerman is associate director for the cancer center's Office of Community Outreach and Engagement.

They are working with doctors and researchers in the two Latin America countries to train them in precision medicine and cancer epidemiology.

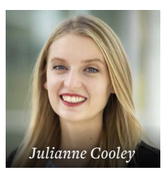
"Of the seven training grants funded by the NCI Center for Global Health Initiative, this was the only one funded for Latin America," Fejerman said.

Collaborators in the region include the national cancer institutes of Colombia and Peru, two local universities and the largest private health system in Colombia.

"We are very excited about this program," Carvajal-Carmona said. "It will contribute to education and training and our own diversity, equity and exclusion initiatives, as well as foster global cancer health collaborations."

Study finds increase in women 65 and older dying of cervical cancer

Findings prompt researchers to question screening guidelines for older women


Julianne Cooley

A new study conducted by UC Davis Comprehensive Cancer Center researchers shows that an alarming number of California women age 65 and older are facing late-stage cervical cancer diagnoses and dying from the disease. This is because federal guidelines recommend most women stop screening for cervical cancer at this age.

"Our findings highlight the need to better understand how current screening guidelines might be failing women 65 and over," the study's lead author, UC Davis senior statistician Julianne Cooley, said. "We need to focus on determining the screening history of older women as well as lapses in follow-up care. We must utilize non-invasive testing approaches for women nearing age 65 or those who need to catch up on their cervical cancer screenings."

The findings from the study, published in Cancer Epidemiology, Biomarkers & Prevention on January 9, 2023, showed that nearly one in five new cervical cancers diagnosed from 2009 to 2018 were in women 65 and older. More of these women (71%) presented with late-stage disease than did younger women (48%), with the number of late-stage diagnoses increasing up to age 79. Late-stage five-year relative survival was lower for women 65 and over (23.2%—36.8%) compared to patients under 65 (41.5%—51.5%). Women 80 years and older had the lowest survival of all age groups.

"Our study found worsening five-year relative survival from cervical cancer with each increasing age category for both early- and late-stage diagnoses," said co-author Theresa Keegan, a professor in the UC Davis Department of Internal Medicine's Division of Hematology and Oncology.

California Cancer Registry provided crucial data

The study utilized a large set of population-based data from the California Cancer Registry. This state-mandated cancer surveillance system has collected cancer incidence and patient demographic, diagnostic and treatment information since 1988. The data was used to identify all women 21 years and older who were diagnosed with a first primary cervical cancer in California between 2009 and 2018, the 10 most recent years for which complete data was available.

> "Our findings highlight the need to better understand how current screening guidelines might be failing women 65 and over."
>
> —JULIANNE COOLEY, UC DAVIS SENIOR STATISTICIAN

In the 65-plus group, late-stage disease was most prevalent among those of advanced age and those who had comorbidities.

"Interestingly, prior studies of younger women have found increased late-stage cervical cancer diagnoses among young Hispanic/Latina and Black women," Cooley said. "Our study did not observe these associations and instead found that older Hispanic/Latina women were less likely than non-Hispanic white women to be diagnosed late-stage."

Current screening guidelines

Following the introduction and widespread adoption of the Papanicolaou (Pap) smear test in the 1940s, cervical cancer incidence and mortality have fallen significantly. However, incidence rates have plateaued since 2012, and rates of invasive cervical cancer have actually increased in recent decades.

Through adequate screening and follow-up, cervical cancer can be prevented or detected at an early stage, which leads to excellent survival prognoses. However, current guidelines recommend discontinuing screening for women 65 or older who have had a history of normal Pap and/or human papillomavirus (HPV) tests, potentially leaving this age group vulnerable.

Lack of adherence to screening

Previous studies have shown that 23.2% of women in the U.S. over age 18 are not up to date on recommended cervical cancer screening. Disadvantaged women, such as those who are uninsured or poor, are the least likely to report being up to date with cervical cancer screening.

"Scheduled screenings may also decrease as women approach 65, increasing the likelihood that women have not been adequately screened prior to the upper age cutoff," co-author and senior epidemiologist Frances Maguire said.

Failure of older women to receive adequate screening also may be attributable to additional factors:

- Specific type of hysterectomy. Women who have undergone a supracervical hysterectomy, which leaves the cervix intact, may not realize they need to continue screening for cervical cancer.
- Discomfort. Women may tire of Pap smears due to embarrassment and the intrusiveness of a speculum-based exam.
- Diminished Pap test detection of adenocarcinoma. The screening may not be as accurate in post-menopausal women in detecting adenocarcinoma, which has been increasing in incidence (as compared to squamous cell carcinoma).
- Deficiency in testing for HPV. Women in the older age group may not have received HPV testing, now the gold standard of cervical cancer screening, which wasn't widely available until 2003. The Centers for Disease Control reports that almost all cases of cervical cancer are HPV-related.

ACKNOWLEDGMENTS

Other authors of the study include Cyllene R. Morris, Arti Parikh-Patel, Renata Abrahão and Hui A. Chen.

Cancer survivor celebrates 100th clinical trial dose

After nearly a decade on the novel treatment, Lymphoma survivor is living life to its fullest

The only issue slowing down 74-year-old Cheryl Joordens recently was recovery from rotator cuff surgery to keep her on top of her game.

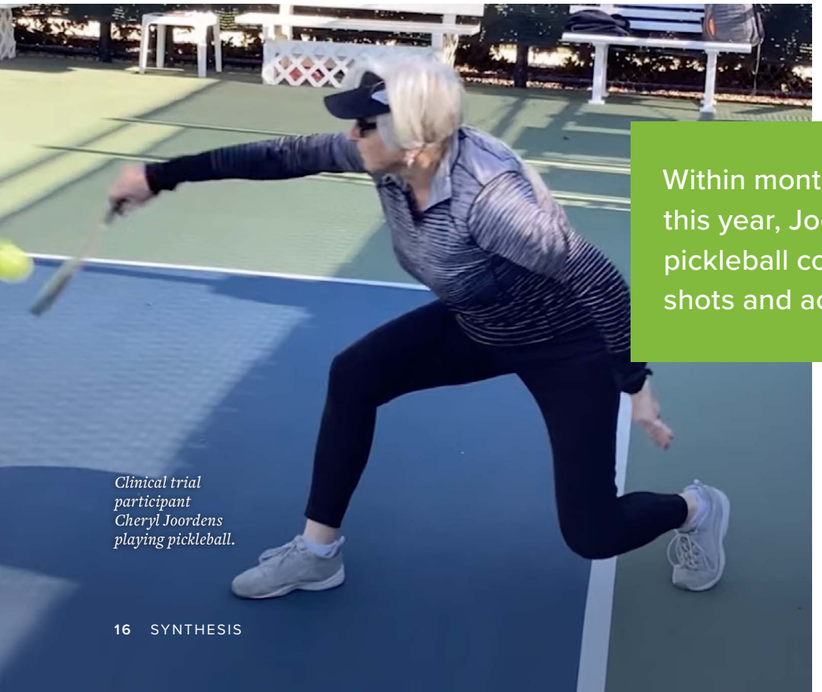
"I'm addicted to pickleball," said the Sacramento retiree who also enjoys indoor water volleyball and golf.

Within months of her surgery earlier this year, Joordens was back on the pickleball court — slamming volley shots and acing her serves.

And this month she celebrated her biggest win — the 100th dose of a clinical trial therapy at UC Davis Comprehensive Cancer Center.

Joordens, now cancer free, was diagnosed in 2014 with follicular lymphoma, which is a slow-growing type of non-Hodgkin lymphoma. It develops when the body makes abnormal B lymphocytes — a type of white blood cell that normally helps us fight infections. The lymphocytes develop a genetic mutation that causes them to rapidly multiply and become diseased.

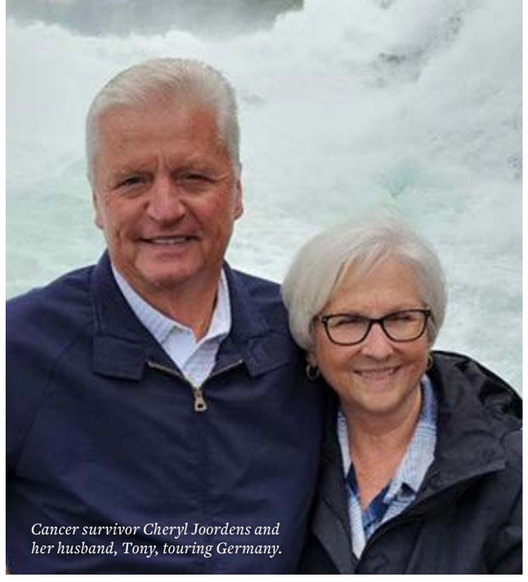
Two of Joordens' cousins have died from similar lymphomas.



Clinical trial participant Cheryl Joordens playing pickleball.

Within months of her surgery earlier this year, Joordens was back on the pickleball court — slamming volley shots and acing her serves.

"I was already close to stage IV, with the cancer in my bones and my organs, including my liver," Joordens said. "We looked at all the possibilities and really the only thing to do was to do a clinical trial."



Cancer survivor Cheryl Joordens and her husband, Tony, touring Germany.

That was eight years ago. The mother of two, grandmother of five and great-grandmother of four said her husband and her brother researched the best place to get treatment when she found out she had cancer.

"UC Davis Comprehensive Cancer Center won hands down," Joordens said.

She came to the right place. "Our cancer center was the first in the world to launch a clinical trial that combined two drugs: lenalidomide and rituximab, both immunotherapies," said UC Davis oncologist Joseph Tuscano, who specializes in cancers of the blood.

How it works

One of the drugs stimulates the immune system. The other binds to the cancerous cells, recruiting the "now-stimulated" immune system to the site of the cancer, enhancing the targeted killing of the cancer cells.

"It is an ideal combination because it has low toxicity but leads to long-term remission," said Tuscano, who wants to improve upon the drug combination to make it work even better in new trials now open at the cancer center.

UC Davis Comprehensive Cancer Center's Office of Clinical Research, led by Clinical Research Coordinator Teri Nguyen, supports what is formally called the "Phase II Study of Lenalidomide and Rituximab in Subjects with Previously Untreated Indolent Non-Hodgkin's Lymphoma." The team pulled out all the stops when Joordens received her 100th cycle of the therapy, serving cupcakes and a big show of support.

"Eight years later Cheryl remains in complete remission, which is remarkable," Tuscano said. "No one would ever think that was possible."

"I have a great quality of life. I feel fabulous and love to travel with my husband who I've been married to for 54 years," said Joordens, who toured Europe with husband, Tony, this past summer.

Time to celebrate

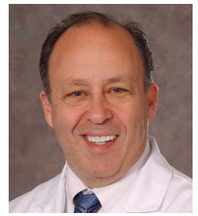
Joordens' husband would have been on hand for the celebration of her 100th dose, but he was recovering from his own rotator cuff surgery (perhaps undertaken to keep up with his wife on the pickleball court).

Tuscano was there to witness Joordens' 100th dose of oral medication, which she swallowed before sharing refreshments with the cancer center staff.

"It is so special to be in this position and be given this gift," Joordens said.

"Participants in these clinical trials not only help themselves, but so many others down the road," Tuscano said. "Without patients willing to enroll in clinical trials and help us test therapies, we will be unable to find a cure for cancer."

"The 100th dose is a big deal and I plan to celebrate the 200th dose, too, when we get there!" said Joordens, who will continue on the clinical trial.



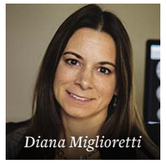
"Without patients willing to enroll in clinical trials and help us test therapies, we will be unable to find a cure for cancer."

—JOSEPH TUSCANO, UC DAVIS ONCOLOGIST

The cancer center conducts hundreds of clinical trials to test the safety and efficacy of newly developed therapies. To learn more about participation in cancer clinical trials at UC Davis Comprehensive Cancer Center, visit the clinical trials website or call **916-734-0565**.

UC Davis gets $15 million to develop **and assess AI for breast cancer detection, risk model**

Study aims to reduce health disparities by improving breast cancer screening and risk prediction


Diana Miglioretti

How can we improve the early detection of breast cancer and better identify women who have higher risk for an advanced or second breast cancer and who need additional screening?

This is the mission of a national research team co-led by UC Davis Professor and Division Chief of Biostatistics Diana Miglioretti. Thanks to a $15 million, five-year grant renewal from the National Cancer Institute (NCI), the team will use artificial intelligence (AI) to make breast cancer screening and surveillance more accurate and equitable.

Screening to catch breast cancer early

Despite great strides in diagnosing and treating breast cancer, the disease remains the second leading cause of cancer death for women in the United States. The disease burden varies, with racial and ethnic disparities in breast cancer diagnosis, rates of second breast cancers and even death rates.

Mammogram screening is intended to diagnose breast cancer early — when it's more treatable. Yet, even with regular screening, some women are diagnosed with advanced cancer. Those women might have benefitted from more intensive or accurate screening.

"The U.S. Preventive Services Task Force recommends screening every two years, which is sufficient for most women. But some women could benefit from screening every year or with supplemental imaging," Miglioretti said. "Still, we need to be very careful about the impact of additional screening on women."

Screening comes with the potential harms of false-positive results and overdiagnosis, which occur more frequently with annual versus biennial screening and screening with supplemental imaging, like ultrasound and MRI. The new grant will allow Miglioretti's research program to assess if improvements in breast imaging quality and regularly scheduled screening can lead to more equitable health outcomes for women.

"Screening will be most effective and equitable when all women have access to high-quality risk assessment and breast imaging, and when the strategies are targeted to clinically meaningful outcomes," program co-leader Anna Tosteson said. Tosteson is a professor of community and family medicine and the James J. Carroll professor of oncology in the Geisel School of Medicine at Dartmouth College in New Hampshire.

Artificial intelligence to make more equitable breast cancer risk models

Miglioretti and her team started studying and promoting safer and more personalized breast cancer screening in 2011. Their program has advanced the science of risk-based screening and surveillance in many ways.

The team has already optimized its models based on patient factors, such as age and breast density. Now, the researchers are looking to integrate imaging features (including calcifications) and AI algorithms to improve predicting whether a woman is at risk of breast cancer.

"We're at a point where we've developed risk models for women with or without breast cancer, and we now want to be able to use those models to better select those who need to undergo more intense screening or surveillance," Miglioretti said. "What's exciting about this grant renewal is incorporating artificial intelligence into these models to identify women at high risk of advanced cancer despite regular screening or at risk of second cancer missed by annual mammography."

The grant will fund three new projects.

Project 1: More equitable breast cancer risk models

The first project will use AI to predict which women with no history of breast cancer are at high risk of being diagnosed with advanced cancer. The team will develop advanced breast cancer risk models that include imaging features and will evaluate FDA-approved AI scores from five vendors. They will compare the benefits and harms of mammogram screening frequency with respect to breast cancer mortality, based on varying degrees of cancer risk.

Project 2: Using AI to identify factors contributing to breast cancer screening inequities

The second project seeks to identify factors that drive inequities in breast cancer screening. It will explore whether the use of AI detection scores and other facility-level interventions (such as mobile mammography programs) can improve outcomes, with special attention to health equity.

"We are looking at whether AI algorithms can improve cancer detection, especially for women from marginalized communities who may not have access to highly experienced breast imaging specialists. In fact, a lot of mammograms for women from underserved communities are read by general radiologists," Miglioretti explained.

The team will evaluate whether using AI algorithms can improve breast cancer detection and reduce disparities.

"We anticipate that this program will help show how AI can improve breast cancer detection and risk prediction of advanced breast cancer," said Karla Kerlikowske, professor of medicine, epidemiology and biostatistics at UC San Francisco and program co-leader. "This, in turn, will allow for the development of new, more equitable screening strategies that maximize benefit while minimizing harms."

Project 3: Reducing surveillance failures

In the third project women who get breast cancer treatment and receive an all-clear are put under surveillance. They are asked to receive a yearly mammogram to help screen for a cancer recurrence or a new cancer. Some of these women are diagnosed with a second breast cancer due to symptoms occurring between the two screens. Such diagnosis of cancer recurrence before their scheduled next screening is considered surveillance failure.

Project 3 seeks to develop a risk-based approach to identify women at higher risk of having such a surveillance failure. It will examine multiple factors that might be linked to these failures and possible ways to prevent them.

"So, for this project, we ask: Based on the women's initial cancer stage and characteristics, and on their personal factors such as age and breast density, what's their chance of their second breast cancer being missed by mammography? Answering this will help us identify those who might benefit from more intense screening with supplemental MRI," Miglioretti said.

What is the Breast Cancer Surveillance Consortium?

This research program leverages the Breast Cancer Surveillance Consortium (BCSC).

BCSC is a nationwide research network with robust, community-based data collection from geographically and socio-demographically diverse settings. It has a long history of evaluating the benefits and harms of different screening approaches.

The research team will use the BCSC database to help improve screening and surveillance. Their findings might contribute to public health activities to promote more balanced risk-based screening and reduce breast cancer disparities.

"We will use the powerful BCSC database to inform population-level simulations in collaboration with CISNET," Tosteson said. "These simulations will project the long-term impact of incorporating risk-based screening into clinical care on mortality."

CISNET is a consortium of NCI-sponsored investigators. They use simulation modeling to understand cancer interventions and their effect on prevention, screening and treatment.

Ovarian cancer treatment is making strides but early diagnosis still key

Ovarian cancer patients are living longer because they have more treatment options, but the cancer still frustrates doctors and their patients because it often goes undetected until it has spread. The problem is that the symptoms are nonspecific and can often be discounted as gas, bloating or attributed to other causes.

UC Davis gynecologic oncologist Rebecca Brooks said, “Women need to know what to watch for, trust their instincts, and see a doctor in order to give themselves the best chance of identifying and beating this tough cancer.”

Brooks and colleague Nancy Nguyen specialize in cancers of the female reproductive system.

“Treatment advancements are helping save lives, but we still need to improve the odds of finding the cancer earlier when treatment has the best chance of being successful,” Nguyen said.

Nguyen and Brooks are teaming up to help women advocate for themselves.

“Ovarian cancer awareness is gaining momentum but has been slower to gain attention because it is less common and also less publicized than the breast cancer movement,” Brooks said. “We want to make sure that cancers of the reproductive organs, such as ovarian cancer, are getting the attention they deserve.”

Few warning signs

Unlike mammograms that spot most breast cancer, no uniformly effective screening is available for ovarian cancer, and the symptoms are often silent in the early stages. As the cancer progresses, the following symptoms may emerge:

- Bloating or abdominal swelling
- Decreased appetite, getting full quickly, weight loss
- Pelvic pain
- Changes to bowel or bladder habits

“Women need to push for evaluation if they have symptoms that are suspicious,” Brooks said. “Ovarian cancer often lingers for months before diagnosis, if not years, which can be a big disadvantage for our patients.”

Ways to reduce the risk of ovarian cancer

The risk of ovarian cancer increases with age. Ovarian cancer is rare in women of childbearing age. The typical patient is in her 60s and past menopause. Women who have been pregnant and have breastfed their babies as well as women who have taken birth control are less at risk of ovarian cancer.

Risks of getting ovarian cancer include:

- Family history of breast or ovarian cancer
- Having children later in life or never having a full-term pregnancy
- Older age

Genetic factors

Ovarian cancer can run in families. In fact, the American Cancer Society reports that up to 25% of ovarian cancers are part of what are called family cancer syndromes resulting from inherited changes in certain genes.

Mutations in the BRCA1 or BRCA2 genes are responsible for most inherited ovarian cancers and are about 10 times more common in Ashkenazi Jewish people. A number of other genes may increase risk as well.

“If you do have a genetic mutation such as BRCA1 and BRCA2, you will be at higher risk and could get ovarian cancer at a much younger age,” Brooks said. “That’s why obtaining an accurate family history and screening appropriate candidates are crucial for identifying patients who can be saved from this disease.”

Clinical trial is enrolling ovarian cancer patients

Ovarian cancer occurs in the layer of cells covering the ovary and many are thought to begin in a projection at the far end of the fallopian tubes called the fimbria, which sits adjacent to ovaries.

“We now know that the most common type of ovarian cancers likely develop from the ends of the fallopian tubes,” Nguyen said.

UC Davis Comprehensive Cancer Center has opened a clinical trial for women who have a BRCA1 mutation and want to reduce their chances of getting ovarian cancer later in life. It is called the SOROCk clinical trial and it is being led by UC Davis clinical scientist Hui Amy Chen .

“We want to see if removing the fallopian tubes and waiting to remove ovaries until a later time is effective at reducing the risk of younger women getting ovarian cancer later in life,” Chen said. “The standard approach of removing the ovaries first sends women into a surgically induced menopause, which is difficult for a lot of women.”

The clinical trial is open to women with the BRCA1 mutation between the ages of 35 and 50. The study also surveys women before, during and after their treatment to gauge their overall quality of life.

Ways to potentially decrease risk of ovarian cancer include:

- Use birth control pills, typically for at least five years.
- Consider removal of fallopian tubes and ovaries in patients with high-risk genetic mutations, such as patients with BRCA1 or BRCA2 mutations.
- For those already planning a sterilization procedure, consider removing the entire fallopian tubes instead of a tubal ligation.
- For those already planning a hysterectomy (removal of uterus), consider removing the fallopian tubes at the same time. This could potentially decrease lifetime risk of developing ovarian cancer.

Targeted therapy

“Every tumor has its own genetic makeup,” Nguyen said. “When tumor cells are developing there are different mechanisms that can turn on and off genetic mutations, so we are using the genetics of the cancer itself to guide treatment.”

While chemotherapy is still a standard approach to treating ovarian cancer, targeted therapy is playing a larger role in the treatment of UC Davis ovarian cancer patients. This type of cancer treatment uses drugs to attack cancer cells.

Nguyen said PARP inhibitors are tremendously helpful with BRCA1 and BRCA2 mutations. PARP stands for poly adenosine diphosphate-ribose polymerase, which is a type of enzyme that repairs DNA in cells. PARP inhibitors work in ovarian cancer patients by blocking cancer cells from repairing or replicating, specifically capitalizing on what’s genetically broken in cancer cells of patients with a BRCA mutation.

Treating the whole person

Whether it is chemotherapy, clinical trials, targeted therapy or surgery, UC Davis uses an individualized and interdisciplinary approach to treating ovarian cancer patients. This is always accompanied by supportive services addressing their psychosocial needs.

“We are so honored to take care of these women during a time when they are vulnerable and facing a difficult situation,” Nguyen said.

Brooks added that treating the whole person is important. This is one area in which oncology nurse navigators and social workers play such an important role on the care team.

Gynecologic oncologists (left to right) Nancy Nguyen, Rebecca Brooks and Hui Amy Chen

“We want our patients and their caregivers to know that we are there for them, whether it is to provide emotional, nutritional or even financial support,” Brooks said.

Both Brooks and Nguyen said that the Supportive Oncology and Survivorship Program at UC Davis Comprehensive Cancer Center provides valuable resources that help their patients get through what can be a long and complex cancer journey.

CA 125

Sometimes ovarian cancer can cause high levels of the protein CA 125 and there is a blood test available to check for its presence. Women who are worried about the potential of having ovarian cancer often ask their doctor for a CA 125 test.

“It is important to know that CA 125 is not an effective screening because the cancer antigen level isn’t always elevated in ovarian cancer patients, especially if the cancer is limited to the ovary or hasn’t spread yet,” Brooks said. “It is an important tool, though, to monitor patients who have completed treatment to make sure it isn’t coming back.”

Brooks emphasized that CA 125 is not totally specific. An elevated CA 125 level in the blood also can indicate a wide range of other non-life-threatening conditions, such as ovarian cysts, fibroids, endometriosis, infection, ascites, or anything that causes inflammation of the lining of the abdominal cavity.

“A positive CA 125 can cause a lot of anxiety and unnecessary procedures for women,” Nguyen added. “The test is not something we feel can be solely relied on as a diagnostic tool.”

In my *own* words

Health care communications consultant specializing in oncology became stage IV ovarian cancer patient after symptoms were dismissed by a non-UC Davis physician

Marie Kennedy urges women to own their health.
Sharing the news of health care breakthroughs, advocating on behalf of patients and delving into the science of saving lives have been the cornerstones of my career. Medicine has been my livelihood in my career as a health care communications strategist, and now it is my life raft.

I'm a stage IV ovarian cancer survivor. It took a full year from the time my symptoms appeared until my diagnosis. That was a difficult journey, full of angst and obstacles. My hope is that, by sharing my story, women will stop questioning whether "it's all in their heads" and start taking action before this sneaky, deadly disease takes them.

Symptoms that shouldn't have been ignored

I knew something was wrong. It was fall of 2020 early in the COVID-19 pandemic. I noticed spotting, which is not normal for a postmenopausal woman. After all the cancer stories I read or wrote about, my instincts immediately told me that it could be cancer.

My primary care physician, not affiliated with UC Davis Health, ordered a pelvic ultrasound, which didn't show any cancer. As I reflect, I remember the results indicated that one of my ovaries had been obscured. By what? I never asked more questions. Could it have been a tumor?

I've specialized in educating patients and the public on the proactive approach we should all take to managing our own health. My gut told me I should get to the bottom of it all.

I was accessing health care during the pandemic, which created greater complexity for me and other patients in navigating the system. Still trying to be proactive, I returned to my doctor in January who ordered an endometrial biopsy. The results were normal. After a biopsy, some bleeding is typical. The spotting continued.

Life started getting in the way

Ongoing concerns about my health were overshadowed by a new and demanding job. I didn't drive for more answers. I had a new puppy. He needed training. I ignored the fatigue. I brushed aside the bloating. Like many women in middle age, I chalked it up to not exercising enough, not eating the right food. I did not put the symptoms all together nor did my physician.

In early September 2021, I took a nine-day river rafting trip down the Colorado River. It was extremely hot in the canyon and the water was muddy, as it often is. When I returned from the trip, I was bone tired and assumed that it was from hiking in the heat and sleeping on the hard floor of the Grand Canyon. I tried to rest more.

Sometimes, even pets know when something is wrong

My Labrador retriever, Bowie, kept burrowing his nose into my belly. Being from a long line of hunting dogs, his nose was always at work, so I didn't think too much about it. But then, I discovered that my belly button was oozing — yes, oozing!

Back to the doctor I went. Antibiotics were prescribed for a possible infection (due to the muddy conditions during the rafting trip). I was to make a return visit if there was not an immediate change, which there was not, and now I had a swollen gland in my groin area. I was sent for a scan of my stomach and pelvis. It was now late September 2021. Still no sign of cancer was detected.

The mystery continues until a dog walking accident (so glad I got that energetic puppy)

On Monday, October 4, 2021, I set out to walk Bowie. He was full of energy per usual and I was not. Before I knew it, I had fallen flat on the sidewalk. Back to the doctor I went. In enormous pain from the fall, I had chest X-rays taken, and I braced for what I thought would be the news of broken bones.

The three scans showed metastatic carcinoma, which was found in my ovaries, my omentum (fold in the lining of my abdomen) and my lungs. After a full year of trying to determine a diagnosis, a dog walk gone awry is what, ultimately, caught my cancer. By the way, what my Lab had sniffed out was a Sister Mary Joseph nodule, an umbilical mass resulting from the metastasis of malignant tumors in the pelvic or abdominal cavity.

A bone scan looking for metastases found a fractured sternum (breastbone) and ribs, which caused so much pain that in the beginning that was my focus. The stage IV metastatic ovarian cancer diagnosis took longer to sink in. As I faced advanced ovarian cancer that had spread, I was mad that I had not continued to navigate and push to find out what was wrong with me.

No time to waste

Within weeks, I was sitting in an infusion room receiving a potent chemotherapy combination of carboplatin and paclitaxel, which is the standard first line of offense for my type of cancer. It involved infusions of the chemo cocktail every three weeks to shrink the cancer before undergoing surgery. I had high-grade serous ovarian cancer, which is known to respond well to chemotherapy. After my third infusion, my pre-surgery scans showed a complete response. Such good news!

> "Women are courageous, so be courageous. And don't stop until you get the answers."
>
> —MARIE KENNEDY

Seeking specialty care at UC Davis Comprehensive Cancer Center

When it came to my surgery, my background kicked in, again. I did my research. I knew I could obtain specialty surgical cancer care from UC Davis Comprehensive Cancer Center while I was getting cancer care elsewhere. I had written about rural community hospital patients who were getting such care locally while seeking specialized cancer treatment from UC Davis.

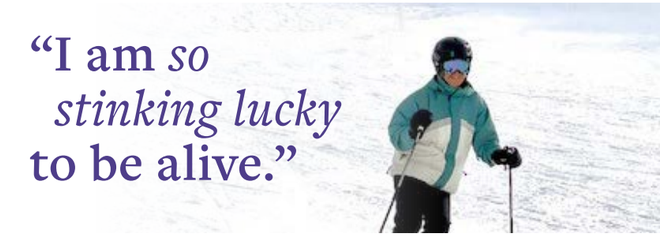
My doctor was completely comfortable with the partnership, and we went forward with UC Davis gynecologic oncologist Rebecca Brooks performing what, in the end, was a highly successful surgery in early 2022.

I really appreciated Dr. Brooks' well-rounded experience in ovarian cancer, her background, and how honest and comforting she was about the surgery. Dr. Brooks is so well-known that a gynecologic surgical oncologist at a different health care system told me if she needed the same surgery, she would go to Dr. Brooks.

Ongoing treatment

Three more infusions followed the surgery, with my last in April 2022.

I am on the PARP inhibitor Lynparza for two years to prevent a recurrence. I have to be careful with what I eat and stay hydrated. I sometimes get winded, which is annoying when I'm hiking and skiing.



The importance of genetic testing

After learning that the BRCA1/BRCA2 genes can increase the risk of ovarian cancer, I pushed for quickly doing genetic testing. I tested positive for the BRCA2 gene, which is an indicator for not just ovarian, but also breast, melanoma, prostate, colon, and possibly pancreatic cancers. This is when I became angry. Why was I never tested? Both my mother and my brother had cancer. None of us were tested.

In my opinion, this is a flaw in preventive health care, and I intend to advocate on behalf of patients like me. Genetic testing should be part of women's health guidelines and be as easy to get as a mammogram or a Pap test. And insurance providers should cover biomarker testing for any patient who requests one.

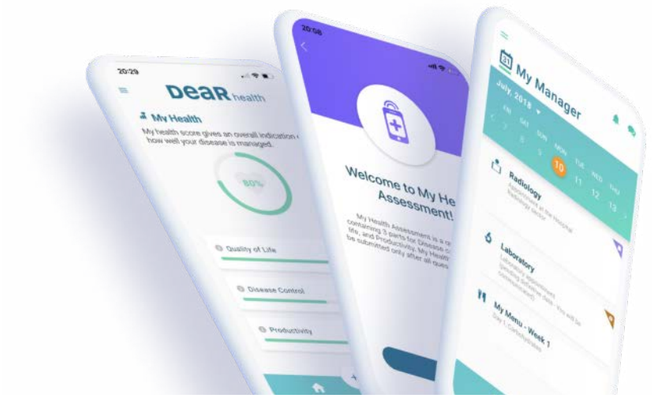
Lessons learned

If your body is telling you something, don't ignore it. Keep navigating the health care system until you have an answer. I feel like I let my foot off the gas pedal and did not take time to follow up on what the next steps might be. I also assumed that what are now the obvious symptoms were just common female complaints. I was wrong and it almost cost me my life.

I am fortunate that, because of my career, I know more than the average person about health care. But yet, that hard-to-diagnose ovarian cancer nearly got the best of me. The nurses and doctors are there to help you, but they cannot do it all for you. There are no stupid questions.

Women are courageous, so be courageous. And don't stop until you get the answers.

VIRGO Project to test AI as a way to improve care for ovarian cancer patients



Can artificial intelligence, or AI, improve treatment experiences, care and outcomes for ovarian cancer patients? Patients at UC Davis Health will have the opportunity to take part in a new multi-campus study that seeks to answer those questions. The project is part of the University of California Cancer Consortium.

The idea is to see if the patient app can help to minimize medication side effects and improve quality of life. Participants will be asked to use an interactive mobile platform to report symptoms and problems, such as nausea, pain or fatigue, as well as their sleep habits and how they are feeling overall.

"The software makes evidence-based treatment recommendations to the patient's doctor," UC Davis gynecologic oncologist Rebecca Brooks said. "It isn't that we think a computer can do a better job than doctors. We want to explore augmenting the care provided by an oncologist by generating AI tailored for that specific patient, available at their fingertips. This helps them get the support they need when they need it and helps to keep track of the details."

Brooks is one of the co-principal investigators for what is being called the VIRGO Project or Value-Based Integrated Recommendation Software Guiding Ovarian treatment. The VIRGO software is integrated into the electronic medical record of patients enrolled in the study and securely delivered to their doctors.

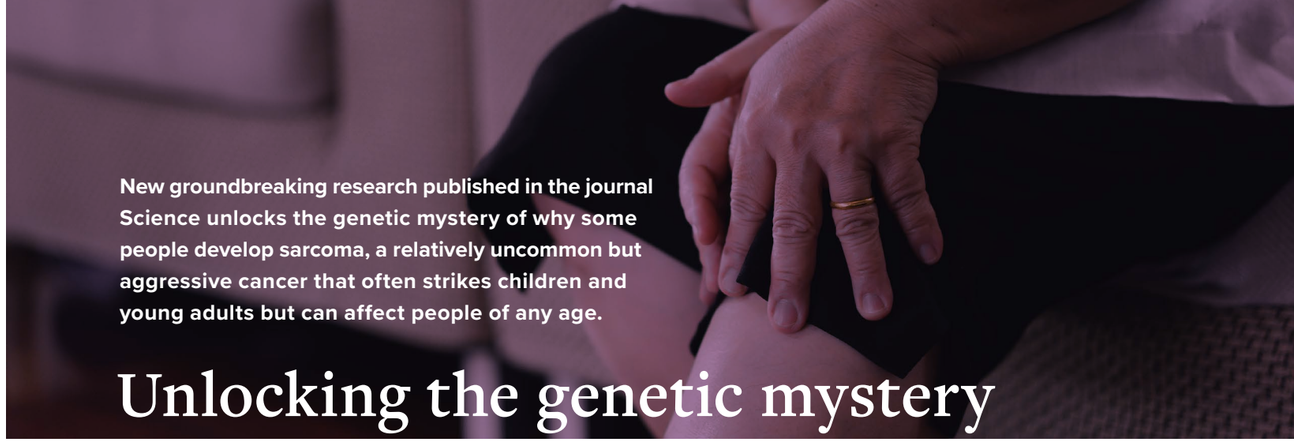
To conduct the study, the researchers are recruiting 200 women who have been diagnosed with ovarian, fallopian tube or primary peritoneal cancer. Each participant will be followed for one year. Half will use the app for their surveys, while the other half will receive standard care with surveys done less frequently and manually.

"Many ovarian cancer patients will not be cured, and the side effects from the ongoing medications they take to control their disease can be hard to get used to," Brooks said. "The app is available in real time and that can make a real difference in addressing things like nausea and pain as quickly as possible so that the patient will feel motivated to stay on the medication and feel supported."

The patient app also gives real time information regarding nutritional intake, visits, lab results, education and caregiver support. Patients will receive customized information that will help them take charge of their care and make decisions, such as whether to have surgery or chemotherapy first.

The responsiveness provided by the app platform may show which maintenance medications are more tolerable and have fewer side effects — and that might lead to treatments allowing patients to get more enjoyment from life.

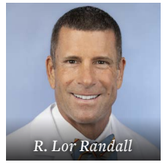
The study is being funded by a grant from GlaxoSmithKline. Along with UC Davis Health, patients are being enrolled from UCLA Health, UC San Diego, UC Irvine Health and UC San Francisco Health.



New groundbreaking research published in the journal Science unlocks the genetic mystery of why some people develop sarcoma, a relatively uncommon but aggressive cancer that often strikes children and young adults but can affect people of any age.

Unlocking the genetic mystery of why some people develop sarcoma

The findings of this first-of-its-kind research study involved investigators from around the world at major sarcoma research and treatment centers, including UC Davis Comprehensive Cancer Center.


R. Lor Randall

A co-author of the study was professor and chair of the UC Davis Department of Orthopaedic Surgery, R. Lor Randall, who is also The David Linn Chair in Orthopaedic Surgery.

Randall, who has expertise on the molecular makeup of sarcoma tumors, contributed critical genetic material from his sarcoma patients for the research analysis.

"This potentially paradigm-setting work reflects a concerted global effort on the part of sarcoma thought leaders to understand the mechanistic underpinnings for a possible heritable contribution to this devasting disease," Randall said. "I am humbled and very grateful to have been asked to participate. Furthermore, I want to recognize and thank UC Davis for the tremendous commitment to our sarcoma program as we make impactful discoveries and deliver world-class care."

The findings have wide implications for people living with sarcoma — allowing detection of the cancer earlier and potentially improving survival for patients.

To date, little research has been done on the genetic basis of sarcomas. The global study led by Omico, the Garvan Institute of Medical Research and UNSW Sydney has generated the first comprehensive genetic map of sarcomas, identifying several new important genes that, when inherited, can cause the deadly cancer.

The Australian-led research revealed that one in 14 individuals diagnosed with sarcoma carries a clinically important gene that explains why the cancer arose. In addition, the research team identified a previously unrecognized genetic pathway specific to sarcomas, which may lead to increased understanding of cancer biology that will improve health outcomes.

Sarcoma facts

Sarcoma is a cancer found in bone and soft tissue, including fat, muscle, nerves and blood vessels. It is rare. Sarcomas make up only about 1% of all adult cancers in the U.S. but about 15% of all cancers diagnosed in children.

Symptoms include:

- A lump that may or may not be painful
- Unexpected broken bone
- Abdominal pain
- Weight loss

Bone and soft tissue sarcomas make up a group of connective tissue malignancies that are difficult to treat. Successful outcomes require a collaborative, multidisciplinary approach, which may include surgery, chemotherapy or radiation therapy.

Lead author of the study was Professor David Thomas, CEO of Omico, head of the Genomic Cancer Medicine Laboratory at the Garvan Institute of Medical Research and conjoint professor at the UNSW Medicine & Health.

Thomas summarized why the research is so important: "Cancer is fundamentally a genetic disease and genomics is the key to unlocking its secrets. This international collaboration has developed new methods for mapping the genetic basis for cancer and identified new heritable pathways that increase cancer risk. The findings fill important gaps in the missing heritability of cancer."

The research used data collected from more than 3,500 families recruited from 23 cancer centers in seven countries.

Michigan boy's life and limb saved

A pulled muscle, growing pains, a sprain. These are what most parents think of when their child complains of a painful leg. But for Karen and Baron Colbert, hearing their son Darren say he was in pain was unusual.

A joyous Darren, his leg still intact.

As the fourth of their nine children — all with names that rhyme with their parents' names — Darren was an active kid who loved sports, swimming and going to the gym. It was just not like him to complain, but he told his parents his left thigh really hurt.

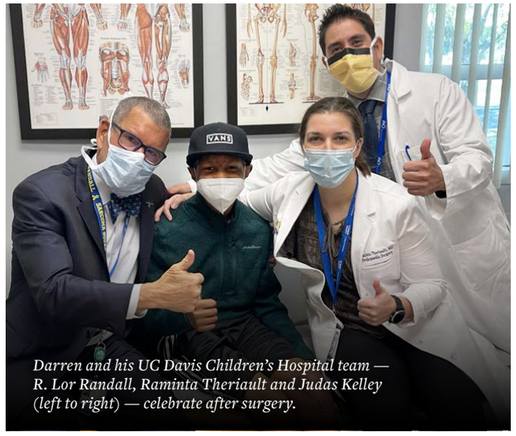
Karen took her son to a clinic in Michigan, where they live. It was late February 2022.

During the exam, the doctor touched Darren's leg here and there, asking if it hurt. His mom vividly recalls that when the doctor squeezed a part of Darren's leg that caused him obvious pain, the doctor spun around and asked her, "Are you in a hurry?"

X-rays revealed a growth in Darren's leg.

Preparing for the worst: Osteosarcoma

Further tests revealed that Darren had osteosarcoma, a type of sarcoma, or cancer, that begins in the cells that form bones. Most osteosarcomas occur in children, teens and young adults. Darren was 11 years old.



Darren and his UC Davis Children's Hospital team — R. Lor Randall, Raminta Theriault and Judas Kelley (left to right) — celebrate after surgery.

With chemotherapy and a bone replacement surgery, Darren could survive and thrive, the care team told them. The Colberts were thrilled. They had caught it in time. It was going to be like it never happened, they told themselves. He's going to grow up, grow tall.

When Darren started chemotherapy, the family breathed a sigh of relief. But two rounds of treatment later, Darren's tumor began to hemorrhage, or bleed. He was taken to an emergency room near their home and stabilized.

Comparing medical opinions: Amputation, or was there another option?

"They told us the bleeding meant Darren was no longer a candidate for a bone replacement because the hemorrhage had contaminated his leg," Baron said. "That's when the long-term prognosis changed, and they started talking about amputation."

Darren's doctors said the tumor was in an area that would require the entire left leg to be removed at the hip.

"There were so many options to begin with and then everything was taken off the table," Karen said. "We didn't want to believe that amputation was the only answer, and that was all they were offering. We wanted a second opinion."

Darren's parents sought a second opinion but got the same answer. That's when they turned to 2nd.MD, a service that connects families with board-certified, leading doctors across the country for an expert second opinion via video or phone. Through 2nd.MD, the Colbert family was introduced to R. Lor Randall at UC Davis Children's Hospital.

Caring: More than just statistics and treatment

Randall is professor and chair of the UC Davis Health Department of Orthopaedic Surgery and is The David Linn Chair in Orthopaedic Surgery. He also specializes in pediatric oncology, the perfect combination of expertise for Darren's illness. Not only did Randall's training fit the bill, so did his compassion.

"Dr. Randall read Darren's records and recognized what a psychological blow it would be to our 11-year-old son if he lost his leg. It was the opposite of what I expected to hear," Baron said.

"In listening and learning from Darren's parents, we started the conversation acknowledging the horror of their journey thus far and their fears for Darren's life," Randall said. "We then talked about how best to remove the cancer surgically, weighing the risk of limb salvage with amputation."

Karen added, "He was the first person who put Darren first. He didn't talk to us about stats," she said. "Dr. Randall brought the humanity back to what a family battling cancer looks like. To me, that was the most important part."

Daring to save life — and limb

Now that Randall had suggested surgery was possible, the family had renewed hope. Perhaps Darren could have surgery and still keep his leg, an outcome the Colberts desperately wanted. Randall passed his notes on to Darren's care team in Michigan.

As their son's chemotherapy continued and the MRIs began to show that the tumor was shrinking, the Colberts kept in touch with Randall. Although Randall felt confident that Darren's leg could be saved, Darren's Grand Rapids care team remained convinced that amputation was the best option. They were not comfortable doing anything else.

The family flew to Sacramento for a consultation. Randall and the UC Davis Children's Hospital team discussed the risks with Karen, Baron and Darren, and explained that the surgical team would not know whether they could save Darren's leg until they were in the operating room.

"It was the longest day of our lives," said Baron of September 14, 2022, when Darren finally had surgery at UC Davis Children's Surgery Center. "It was a delicate operation with huge risks, including the fact that the tumor was starting to close in on his femoral artery."

The femoral artery is the main blood vessel supplying blood to the lower body. It starts in the upper thigh near the groin and runs down to the back of the knee. The mass in Darren's leg was within two millimeters of the femoral artery.

The surgery took 11 hours.

Declaring victory: California care team delivers

When the moment of truth arrived, Darren's parents — far away from home and their other eight children who were back in Michigan — held their collective breath.

"Dr. Randall came out and told us the surgery had gone well. Nothing was damaged and the margins were good. And then the moment of truth: he was able to save Darren's leg. It was everything we had hoped for," Baron said.

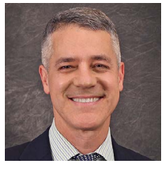
Karen added, "To any family who starts a cancer journey like this, it can be scary to feel like you need a second opinion. But you need to feel supported and have someone who will put you and your family first."

> "To any family who starts a cancer journey like this, it can be scary to feel like you need a second opinion. But you need to feel supported and have someone who will put you and your family first."
>
> —KAREN, DARREN'S MOTHER

Darren and his mom, Karen

Tumor microbiome linked to immunotherapy success in sarcoma patients

New UC Davis study finds relationship between tumor microbiome and immune system in patients with soft tissue sarcoma



Robert Canter

In a significant new study, UC Davis Comprehensive Cancer Center researchers have uncovered a link between patients' microbiome — all of the microbes within their bodies — and their immune system that can potentially be used to improve the treatment of soft tissue sarcoma. This type of cancer is found in connective tissues like muscle, fat and nerves.

Findings from the study were published in the Journal for ImmunoTherapy of Cancer.

"The study's data show new lines of research in the paradigm-shifting concept that the microbiome of a patient and their immune system can interact and shape one another, as well as be potentially engineered to improve patient outcomes," said Robert Canter, the lead author of the study and chief of the Division of Surgical Oncology.

The gut microbiome is made of microorganisms in the digestive tract that include bacteria, fungi and viruses. Microbial communities also have been found in other parts of the body, including the mouth, lungs and skin. And now the study shows they are also found in tumor cells.

"We found that soft tissue sarcomas harbor a quantifiable amount of microbiome within the tumor environment. Most importantly, we found that the amount of microbiome at diagnosis may be linked with the patient's prognosis," Canter added.

Although the levels of microbes are low, the study findings are significant because many tumors, especially sarcomas, were believed to be sterile.

Viruses within the microbiome may attract cancer-fighting cells

The UC Davis researchers also uncovered how the microbiome within a sarcoma tumor plays a role in attracting specific types of immune cells like cancer-fighting natural killer cells. Canter said that's important because the higher the rate of natural killer cell infiltration in a tumor, the greater the chance that the sarcoma won't spread to other parts of the body. Natural killer cells have strong potential for improving the effectiveness of immunotherapy.

The team found that viruses within the microbiome of a tumor appear to influence the amount of natural killer cells found in sarcomas and, for that reason, affect survival rates. Specifically, the study found a strong positive correlation between the presence of Respirovirus, a genre of viruses known for causing respiratory illnesses, and the presence of natural killer cells in the tumor. Canter and his colleagues are now considering ways to create viruses to attract more cancer-killing immune cells.

"It has become clear that the microbiome in the gut and other parts of the body has a major impact on human health and disease. Amazingly, it shapes the immune system throughout the body and, because of its interaction with the immune system, we now know it also has a big role in how the body responds to cancer and cancer treatments like immunotherapy," Canter said.

Cross-campus collaboration

The authors obtained tumor and stool samples from 15 adult patients with non-metastatic soft tissue sarcoma, which was studied for a median of 24 months.

ACKNOWLEDGMENTS

UC Davis co-authors on the study are Lauren Perry, Sylvia Cruz, Kara Kleber, Sean Judge, Morgan Darrow, Louis Jones, Ugur Basmaci, Nikhil Joshi, Matthew Settles, Blythe Durbin-Johnson, Alicia Gingrich, Arta Monjazeb, Janai Carr-Ascher, Steven Thorpe, William Murphy and Jonathan Eisen.

This work was supported by the UC Davis Comprehensive Cancer Center and the UC Davis Flow Cytometry Shared Resource Laboratory, with funding from the National Cancer Institute.

Specimens were provided by the UC Davis Pathology Biorepository, funded by UC Davis Comprehensive Cancer Center and the UC Davis Department of Pathology and Laboratory Medicine. The sequencing was carried out at the DNA Technologies and Expression Analysis Core at the UC Davis Genome Center, supported by the National Institutes of Health (NIH) Shared Instrumentation Grant.

Chemo care "hugabox" available through UC Davis Comprehensive Cancer Center collection

Cancer center gets its own 'hugabox collection' to help raise money for sarcoma research

Hugabox is in the business of spreading kindness and joy while raising money for sarcoma, a type of cancer that mostly affects young people. And now Washington state-based hugabox has created a collection of gift boxes with UC Davis Comprehensive Cancer Center in mind. For every gift box ordered through the cancer center collection, $10 will go toward the Kelsey Hastings Golitz Sarcoma Research Fund at UC Davis.

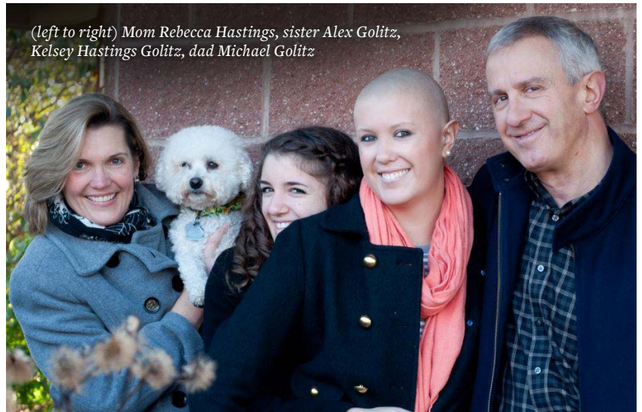
The fund was started by Rebecca Hastings and Michael Golitz in memory of their daughter Kelsey Hastings Golitz, who was diagnosed with Ewing sarcoma in 2010 and died of the disease four years later.

Golitz had just graduated from college and was starting a career in Boston when she began feeling ill.

"She thought she had the flu and had been fighting pelvic pain she assumed was a sports injury," Hastings said. "We just thought this was going to go away. Six months went by. One day, she told me on the phone, 'Mom, I'm in excruciating pain.'"

A sports rehabilitation doctor suspected it was not an injury. He referred Golitz to the Dana-Farber Cancer Institute in Boston. The family was stunned when Golitz was diagnosed there with Ewing's sarcoma, a cancer that attacks soft tissue and bone and mostly hits young people.

"Our daughter seemed perfectly healthy. She was a strong athlete," Hastings said. "We couldn't make sense of it."



(left to right) Mom Rebecca Hastings, sister Alex Golitz, Kelsey Hastings Golitz, dad Michael Golitz

Hugabox began when Kelsey's cancer was closing in

In early 2014, Kelsey's doctor called her parents to say they could not stop the cancer. Kelsey loved her job and enjoyed living in Boston, but she was getting weaker.

"I'll never forget the call," Rebecca Hastings said. "The doctor asked, 'Where do you want her to be for her last breath?'"

"I knew, after the call from her doctor, that Kelsey would be coming back home, but she was 26 years old and didn't want to. Because she had been working in e-commerce, I began a dialogue about starting a care package business. I thought it would give us something to do when she made the difficult decision to move back home. We never got the chance. She died too soon," Hastings said.

When you lose a child to cancer, you want people to remember them and so we continued with the care package business, which is now called 'hugabox' to honor our daughter and help the next generation," Hastings said.

Giving to the next generation of sarcoma patients

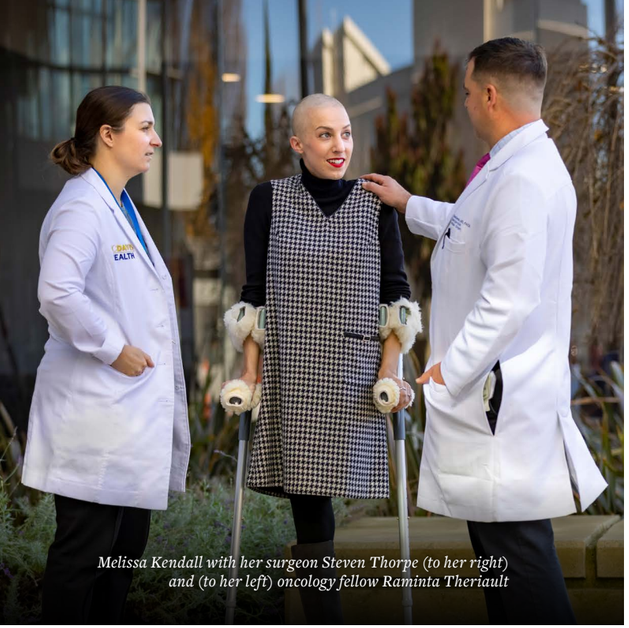
"I looked into all 52 sarcoma centers in the U.S.," Hastings said. "UC Davis became one of the six I selected to help fund because of the level of sarcoma research underway and because the staff were very professional and welcoming."

Since launching in 2015, hugabox's Sarcoma Charity Research fund has donated more than $100,000 to the six cancer centers, including $15,000 to UC Davis Comprehensive Cancer Center with a pledge to donate a total of $35,000 with the new cancer center collection.

Hugabox ships care packages to college students, cancer patients or anyone needing a holiday hug-in-a-box, with 90% of the proceeds going to sarcoma cancer research.

"We all grieve in our own way," Hastings added. "Doing this has helped me process Kelsey's cancer. I know I'm still grieving and will for a long time, but it feels like Kelsey's optimism and spirit lives on through what we're doing."

When a sarcoma patient's limb can't be saved, **3D technology can help them resume an active life**



Melissa Kendall with her surgeon Steven Thorpe (to her right) and (to her left) oncology fellow Raminta Theriault

In December 2021, Melissa Kendall, a dental hygienist living and working in the Sierra foothills, started having pain when she walked. By January the pain had progressed to a limp.

An active, healthy then 36-year-old, Kendall knew something was wrong. She went to her local primary care doctor who sent her to physical therapy. Bone cancer was not suspected due to her age because sarcoma usually strikes children or young adults in their early 20s.

"PT didn't help alleviate the pain, but I had a wedding to focus on," Kendall said. "My busy life took priority."

Minor mishap reveals major diagnosis

In February 2022, Kendall and her husband, Jim, were married and soon a rescue puppy named Loki joined the family.

In May, their world turned upside down.

"My pelvis became so weak that it fractured one day with a simple twisting motion when my dog's leash was caught in the wheel of our golf cart, and I was pulled suddenly in one direction," Kendall described.

The injury during the outing with Loki is what led to a cancer diagnosis.

Scans were performed to determine why her pelvis shattered so easily. That's when a mass was detected. A needle core biopsy followed to identify the type of tumor, which would help determine the best course of treatment.

"I was diagnosed with a cancer known as undifferentiated pleomorphic sarcoma of the bone," Kendall said, with the tone of someone who had educated herself thoroughly about the disease.

She explained that the word "undifferentiated" is used because the cancer cells do not resemble other types of sarcomas. The term "pleomorphic" refers to the cells growing in different sizes and shapes. It was a rare and aggressive sarcoma.

'Avengers' team assembled

The cancer center's sarcoma services group was brought in immediately to review Kendall's complex case. The team included radiation oncology, medical oncology, and other surgeons who focus and specialize in the treatment of sarcoma.

UC Davis Health surgeon Steven Thorpe, an associate professor with the Department of Orthopaedic Surgery, was assigned to lead a team that Kendall later named her "Avengers."

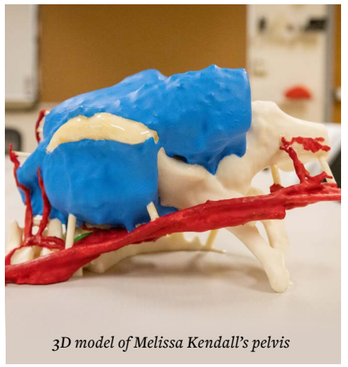
"Chemotherapy was started right away, to decrease the risk of metastasis and hopefully to shrink the tumor, but this cancer is notoriously resistant to treatment, and it grew. The tumor invaded not only the pelvis but also part of Melissa's sacrum," Thorpe said. "I let her know what was at stake and I recommended an external hemipelvectomy and partial sacrectomy, which meant removing her pelvis along with partial removal of the sacrum and her leg."

It was a life-changing moment.

"Dr. Thorpe gave me all the information to make the decision," Kendall said. "I relied on my faith and prayed about what I should do. It was a big decision but ultimately, with the support of my family, I decided to proceed with the surgery, which I knew would leave me with only one leg."

Thorpe pulled together the team that would see Kendall through the day-long surgery. It included experts in urology, orthopaedic spine surgery, general surgery and plastic surgery.

One of the team members was Osama Raslan, an assistant professor in the Department of Radiology. He specializes in using advanced 3D radiographic imaging technologies like 3D printing and augmented reality. His goal is to help surgeons plan and safely execute complex surgical procedures such as hemipelvectomies while sparing as much healthy tissue as possible.



3D model of Melissa Kendall's pelvis

3D model of her pelvis helped prep for surgery

Raslan and his biomedical engineering partner Steven Lucero used Kendall's CT and MRI images to create a real-life 3D printed replica of her pelvic region. It was complete with the tumor, major arteries, veins and nerves running along the tumor. Both Raslan and Lucero work in the UC Davis 3D Printing and Visualization Lab.

Using specialized software and a CT scan of Kendall's pelvis, Raslan meticulously defined the boundaries of the normal bone, the tumor, and the surrounding critical structures. The computer then generated a digital 3D replica of these structures, which the team reviewed and authenticated before the replica of her pelvic region was created.

Raslan said the size and location of Kendall's tumor were unique. It was very closely connected to the major arteries, veins and nerves that supply the pelvis and left leg.

The model not only helped surgeons prepare for her complex surgery, it was also used to help Kendall's family visualize what she was undergoing while they waited for her to come out of surgery.

Due to her positive attitude, faith and family support, Melissa was able to go home from the hospital earlier than expected.

Looking ahead to an exciting future

"Dr. Thorpe encouraged me every step of the way, which helped keep up my spirit. His fist bumps and high fives really meant a lot to me. And even though we all wore masks, Dr. Thorpe's eyes tell you he is in it wholeheartedly," Kendall said.

The Auburn resident is in physical therapy and is hoping to return to many of the outdoor activities she loves, thanks to a prosthetic leg and a lot of rehabilitation. That includes skiing at nearby Tahoe resorts.

Through social media, Kendall has connected with other hemipelvectomy patients, including one woman who after her surgery was able to become pregnant and have two sons.

"That's one of my goals — to be a mother," Kendall said. "I feel so supported at UC Davis Health as I pursue starting my own family. My 'Avengers' saved my life, and I will be forever grateful."

3D printing technology guides sarcoma surgeries

3D-printed surgical technology is helping guide UC Davis surgeons in the operating room where a millimeter means the distance between success and failure.

UC Davis Health orthopaedic surgical oncology surgeon Steven Thorpe uses custom 3D-printed surgical guides for bone cancer resections and reconstruction.

"These cutting guides come from scans done before the surgery. They show us where to make cuts around the tumor with excellent margins, so we can preserve as much good bone or normal tissue as possible," Thorpe said. "The guides are like a template, but specific to each patient and planned in three dimensions. We can narrow what we take out, which cuts down on recovery time and we can make more complex cuts with confidence."

The custom plastic guides are currently made by a company specializing in commercial 3D-printing applications. Magnetic resonance imaging (MRI) and computed tomography (CT) scans of the patient are used to create the 3D-printed custom guides and 3D planning of custom metal implants.

The widths and geometry of the guides vary depending on the individual tumor. Each guide is about a half centimeter thick — or two-tenths of an inch. After moving aside the soft tissue, the guides are then placed against the bone, any necessary saw cuts are made, and then the tumor is removed.

The lab is where it all begins

Osama Raslan is the co-founder and co-director of the 3D Print and Visualization Lab (3D PrintViz Lab) and an assistant professor of clinical radiology.

"Our team's 3D printing brings tumors to life, so to speak," Raslan said. "This allows surgeons to intuitively know the size and extent of the tumor, or, for example, how much of the pelvic bone needs to be removed. It also gives an intimate understanding of the relationship between the tumor and the major arteries, veins and nerves.

Thorpe and Raslan said life-size 3D models of regions that contain tumors are becoming essential to better surgical outcomes for patients.

Surgeons refer to the model during the surgery. For example, if a patient's operative position must change, such as moving from lying on the back or belly, the model can enhance the surgeon's visual reorientation.

WeCARE fuels innovative research
to bring equity to detection and treatment of breast and gynecologic cancers

UC Davis Comprehensive Cancer Center has created a new hub to share scientific findings with the public as well as among researchers and clinicians to drive innovative, multi-disciplinary advancements in the prevention and treatment of breast cancer and gynecologic cancers.

The Women's Cancer Care and Research Program (WeCARE) is committed to community-informed science that will foster dialogue and promote health equity and diversity. The goal is to fuel clinical research and trial development to benefit people with breast and gynecologic cancers (ovarian, cervical, uterine, vaginal and vulvar).

"We want to enhance our portfolio of team-based, community-engaged and multidisciplinary research in breast and gynecologic cancers at UC Davis," said Laura Fejerman, one of the directors of WeCARE and associate director of the cancer center's Office of Community Outreach and Engagement.

Two clinical scientists, Alexander Borowsky, Department of Pathology and Laboratory Medicine professor and director of molecular diagnostics, and Gary Leiserowitz, chair of the UC Davis Department of Obstetrics and Gynecology, serve as WeCARE co-directors.

WeCARE program priorities

- Prevention and early detection
- Care innovation
- Research

WeCARE will facilitate and support the development of prevention and early detection programs, care innovation and research for breast and gynecologic cancers. The program will leverage innovative and multidisciplinary approaches to reduce the cancer burden and achieve health equity.

"We appreciate the backing of the cancer center to provide $50,000 in seed funding that will grow innovative multidisciplinary science to advance breast and gynecologic cancer equity," Fejerman said.

Cancer center and partners hold free mobile mammography event for uninsured women

In collaboration with community partners, UC Davis Comprehensive Cancer Center hosted an all-day mobile screening mammography event in North Highlands in March.

Most of the patients were screened at no charge in a "mammovan" that pulled into the parking lot of the Elica Health Center. Uninsured women aged 40 and older who did not have current symptoms were registered ahead of time for the free event.

"I'm so grateful to have these programs that help poor and indigent people. They make women care about themselves because others care about them," screening participant Juanita Wilson said.

To encourage women to be screened, the cancer center provided $10 gas cards to participants.

"Early detection saves lives," Julie Dang, executive director for the cancer center's Office of Community Outreach and Engagement (COE), explained. "We want to reduce barriers to mammography by bringing breast cancer screening services to the community."

Other collaborators of the event included Elica Health Center, La Familia Counseling Center and UC Davis student-run clinics: Imani Clinic and VN CARES.

"This mobile mammography event is so important, because it screens women for breast cancer who otherwise would not have the opportunity because they don't have health insurance or they cannot afford their insurance co-pay," said Laura Fejerman, co-leader of the Women's Cancer Care and Research Program (WeCARE) and associate director of the COE.

> "Early detection saves lives. We want to reduce barriers to mammography by bringing breast cancer screening services to the community."
>
> —JULIE DANG, EXECUTIVE DIRECTOR OF UC DAVIS COMPREHENSIVE CANCER CENTER

The free mammograms were offered for eligible, uninsured patients through California's Every Woman Counts program, which provides clinical breast exams, mammograms, pelvic exams and Pap tests to California's underserved populations.

Screening participant Juanita Wilson answers survey questions.

Advancing health equity in breast cancer

Breast cancer rates in Latinas are lower overall than in non-Hispanic white women, but Latinas are often diagnosed at later stages and are about 30% more likely to die from the disease. Latinas also are less likely to seek genetic counseling for breast cancer as compared to non-Hispanic white women and their rate of mammography screening is far lower.

With the help of a $750,000 grant from biopharmaceutical company Gilead Sciences, UC Davis Comprehensive Cancer Center is helping launch a new program to increase breast cancer screening rates in Latinas. The goal is advancing health equity.

"We need to close the gap in breast cancer care," said Laura Fejerman, associate director of the cancer center's Office of Community Outreach and Engagement (COE).

Fejerman also co-leads the cancer center's Women's Cancer Care and Research program (WeCARE). The program is teaming up with The Latino Cancer Institute and its founder Ysabel Duron to launch a new breast cancer outreach program at two Federally Qualified Health Centers (FQHC) in California, WellSpace in Sacramento and San Ysidro Health in San Diego.

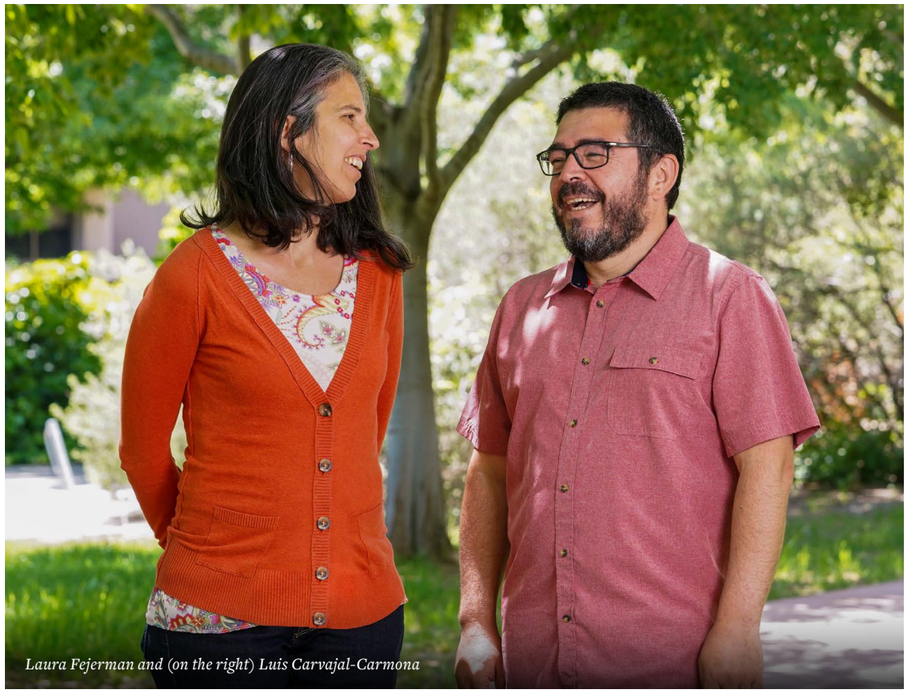
Duron has been working for many years to effect policy changes around barriers to cancer prevention and care in Latinas. She is co-principal investigator of the grant program along with Fejerman. Julie Dang, COE executive director, is co-investigator and Alyssa Reed will serve as the UC Davis program manager.

"Low-income Latinas are getting left behind because they are not aware of the role genes play in breast cancer," Fejerman said. "The answer is to integrate health educators, who speak Spanish and are community members, to educate Latinas and help them navigate breast cancer screening and care, if cancer is diagnosed."

These lay health workers, empowered and trusted to connect community members with information and resources, are called promotores de salud. They are part of the cancer center's new program called Tu Historia Cuenta (your story matters). The new funding from Gilead will expand the program by hiring promotoras as staff at the FQHC nonprofit clinics that care for medically underserved.

"What's exciting is that this community-clinic-academic partnership will lay the groundwork for a model to scale up across the state," Fejerman said.

The goal is to increase the number of Spanish-speaking patients screened for breast cancer, ultimately reducing the rate of advanced diagnoses among Latinas and improving survival.



Laura Fejerman and (on the right) Luis Carvajal-Carmona

Center for Advancing Cancer Health Equity 'embajadoras' project

Building human capital and networks for breast cancer health equity

Bilingual and bicultural promotoras de salud (health educators) trained to be "embajadoras" or community ambassadors have improved cancer outcomes for women living in marginalized Latino communities.

"The COVID-19 pandemic uncovered the effects of multiple structural barriers and inequities to delivering health care in Latino communities. An important lesson has been that trusted community health workers have the language, knowledge and trust of their communities," said Luis Carvajal-Carmona, associate vice chancellor for the UC Davis Office of Academic Diversity and chief diversity officer and associate director for the Inclusivity, Diversity, Equity and Accessibility (IDEAL) office at UC Davis Comprehensive Cancer Center. He is also the founding director of the cancer center's Center for Advancing Cancer Health Equity (CACHE).

CACHE, established in the spring of 2022, aims to achieve cancer health equity for all regardless of race, ethnicity or socioeconomic background. Thanks to a $750,000 grant from Gilead Sciences, it is leading a new project to train bilingual and bicultural promotores from underserved and marginalized Latino communities through what it's calling the "embajadoras project." Promotores trained through the pilot program will become Spanish-speaking health outreach ambassadors in the 19 counties that the cancer center serves, enabling community members to better access cancer education, prevention and care.

The embajadoras project is a partnership between CACHE and the Health Education Council (HEC), a Sacramento non-profit organization founded in 1991 that works to improve health outcomes in underserved neighborhoods.

With the cancer center's support, the project will develop its first accredited bilingual and bicultural promotores curriculum. The course will bridge an important educational gap and will encompass job skills training. HEC will further train promotores who have completed their accredited promotores training.

UC Davis promotora Maria Gozalez

Working with CACHE, HEC will supply infrastructure, knowledge and logistical support for the embajadoras project, training promotores so they can develop support systems for Latinas living with breast cancer in their communities.

Existing HEC health outreach programs Ventanilla de Salud, Mente Sana, Vida Sana and Peers helping Peers will also be leveraged by the embajadoras project. Together, they'll serve as an outreach hub to help Latinas navigate and overcome the challenges of living with breast cancer.

Calling all citizen scientists!

To assess cancer risks, new study recruiting households that get water from wells

Can contaminants in the water we drink, such as particulate matter from wildfire smoke, increase our chances of getting cancer? A first-of-its-kind study, funded by UC Davis Comprehensive Cancer Center, will seek answers with the help of households that depend on private wells for water.

The Well Water Quality Awareness Campaign aims to study potential impacts of wildfire smoke on surface water and groundwater supplies, especially in fire-affected regions. The campaign will provide a $20 gift card and a free well report to study participants. Groundwater well users in northern and central California counties are eligible.

Department of Public Health Sciences Professor Shehnaz Hussain, a molecular epidemiologist, is partnering with Jasqueline Peña, a professor with the UC Davis Civil and Environmental Engineering Department, to conduct the study. They began recruiting participants in April.

"A lot of people in our region rely on well water, which is not monitored," Hussain said, noting that particulates from wildfire smoke can penetrate the soil and seep into groundwater. "There's no law in California to monitor the composition of heavy metals and other things in well water."

To rectify this, the campaign will build a groundwater quality database.

"Through a citizen science approach, we want people to give us samples from their wells so we can develop a baseline database," Hussain added.

The goal is to study wildfire events that happen near or upstream of participants in the study so that any changes in water quality can be studied.

"The intention is to deploy a rapid-response study that enables us to investigate post-fire impacts to water quality and to collect ash and burned soil samples," Peña said.

People using wells for drinking water are urged to sign up for the study through the cancer center website. Participants will be asked to collect and send in samples of their water and take a short survey about their household and their well.

Lungapalooza

First outreach event of its kind held at Esther's Park in Sacramento

Sacramento Lung Health Coalition hosts Lungapalooza

The Love Your Lungs: Sacramento Lung Health Coalition hosted its first Lungapalooza, an outdoor festival to promote lung health, in October at Esther's Park on Third Avenue near 34th Street in Sacramento.

Lungapalooza featured informational booths mixed with fun activities. Free barbecue box lunches, games and raffle prizes, as well as music and fitness sessions added to the festival.

"This first-ever Love Your Lungs in-person event for Sacramento was organized to educate our community about lung health, including the importance of lung cancer screenings as well as the dangers of tobacco use and vaping," event coordinator Alexandra Gori said. Gori is a coordinator for UC Davis Comprehensive Cancer Center's Office of Community Outreach and Engagement, a sponsor of the event.

The festival brought health experts and community members together to also shine a light on the racial disparities seen in lung cancer.

Lung cancer affects Black Americans, particularly Black men, with greater intensity than it does their white counterparts. Statistics show that Black men are 11% more likely than white men to be diagnosed with lung cancer, and 9.8% more Black men die from the disease, according to the Lung Cancer Research Foundation.

> "This first-ever Love Your Lungs in-person event for Sacramento was organized to educate our community about lung health, including the importance of lung cancer screenings as well as the dangers of tobacco use and vaping."
>
> —ALEXANDRA GORI, COMMUNITY OUTREACH AND ENGAGEMENT COORDINATOR

Nearly half of the deaths from **12 cancers are due to tobacco — higher than previously reported**

UC Davis study shows that tobacco use has increased among Californians diagnosed with cancer


Frances Maguire


Theresa Keegan

Despite California's success in reducing tobacco use, a new study published in JAMA Network Open demonstrates the continued and significant burden tobacco inflicts on people with cancer.

The study was conducted by researchers at UC Davis Comprehensive Cancer Center who used data collected from the California Cancer Registry, a state-mandated population-based cancer surveillance system managed by UC Davis. The study looked at people diagnosed with one of 12 tobacco-related cancers from 2014 to 2019 in California. The analyses showed that nearly half of the cancer deaths over two years, between 2017 and 2019 (totaling 93,764 Californians), were associated with tobacco use.

"This is almost double what was previously estimated in a study that looked at 2014 data," said Frances Maguire, a California Cancer Registry researcher who is the lead author of the study. "However, we believe this is a more accurate representation since tobacco use data came directly from individual patients with cancer rather than estimates based on general population surveys. This study is also specific to the 12 tobacco-related cancers."

Tobacco status data used in the study included use of cigarettes, other smoked tobacco products (such as cigars and pipes) and smokeless tobacco products (such as chewing tobacco and snuff). Data on the use of vaping products is not yet collected by the registry.

The study results showed that among the nearly 400,000 patients diagnosed with a tobacco-related cancer from 2014 to 2019, most (72.3%) were over 60 years old. The majority (57.7%) were non-Hispanic white, were men (58%) and nearly half (46.6%) had lung or colorectal cancers.

Cancers most related to tobacco use

The greatest number of deaths attributable to tobacco consumption, for both men and women, were from cancers of the lung and bladder. The greatest proportions of tobacco-related cancer leading to deaths were found in the:

- lung (90.2%)
- larynx (85.6%)
- esophagus (58%)
- oral cavity/pharynx (55.5%)
- bladder (52.7%)

Men mostly had higher proportions of tobacco-related cancers compared with women, with the largest differences seen in:

- liver cancer (33.9% men, 11.1% women)
- stomach cancer (25.9% men, 6.5% women)
- kidney cancer (23.8% men, 6.8% women)
- acute myeloid leukemia (20.8% men, 3.0% women)

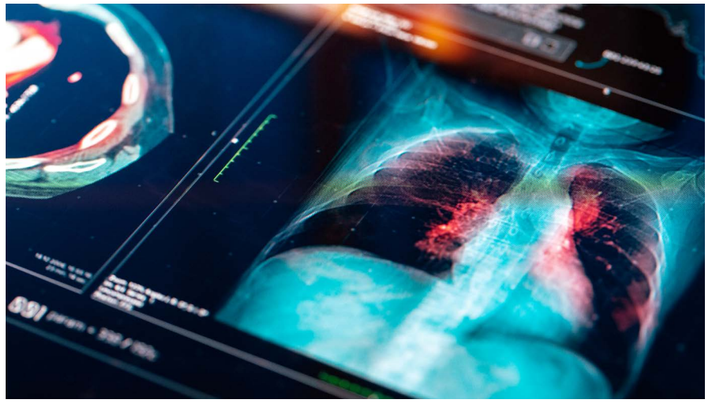
UC Davis researcher Theresa Keegan, the study's co-author and co-principal investigator with the California Cancer Registry, said, "Smoking remains the largest preventable cause of death from cancer and other diseases. This study shows that tobacco continues to kill Californians with cancer at an alarming rate. Cancer registries can play an important role in monitoring progress for this priority population."

Tobacco use trends

"What is important to note in the study findings is the number of Californians diagnosed with these 12 types of cancers who still use tobacco: about 1 in 5 men (19.6%) and 1 in 7 women (14.5%). Some people with lung cancer or laryngeal cancer had even higher use rates at 30—37%," said senior author Elisa Tong, a UC Davis Health internist and cancer center tobacco researcher. "It's important to remember that it's never too late to quit smoking even after a cancer diagnosis, because quitting can improve cancer treatment outcomes and significantly reduce mortality."

Other authors of the study included cancer center affiliates Ani S. Movsisyan, Cyllene R. Morris and Arti Parikh-Patel.

Researchers launch **new lung cancer screening study**



Even though lung cancer is the No. 1 cause of cancer death, relatively few people participate in screening tests. UC Davis researchers want to find out why that is.

The cancer center's Office of Community Outreach and Engagement (COE) has launched a study to investigate why so many eligible patients refrain from lung cancer screening.

Moon Chen, Jr., the cancer center's senior advisor for community outreach and population sciences, said, "The purpose of the study is to interview UC Davis patients, doctors and nurses to discover what is holding eligible patients back from being screened for lung cancer. We also want to learn how we, as a health system, can be more successful in getting our screening rates up."

An estimated 80—90% of all lung cancers are caused by tobacco use. New lung cancer screening guidelines from the U.S. Preventive Services Task Force were rolled out in 2021 to enable smokers and former smokers to qualify more easily for screening. But lung cancer screening rates remain abysmally low. Only about 1% of those eligible for lung cancer screening are getting screened in California.

"It is easier than ever to qualify for low-dose lung cancer CT scans," Chen said. "That's why we need to understand why we are not seeing the rates for lung cancer screening increase."

Treatment breakthroughs, including a new robotic procedure at UC Davis that offers diagnosis and removal of lung cancer during a single surgery, make lung cancer less stressful and treatments more successful. That's why UC Davis researchers want to ask questions, such as: Why are more eligible patients not being screened? What is the best way to reach out to smokers and former smokers to encourage them to be screened?

The Enhancing Lung Cancer Screening for Eligible Patients Through Human-centered Intervention or ELFE study participants must be between the ages of 50 and 80 and eligible for lung cancer screening. Under new guidelines, anyone in that age group who has smoked at least 20 "pack-years" and either still smokes or quit within the past 15 years is eligible for screening. A "pack-year" means smoking a pack of cigarettes a day for a year or an equivalent amount.

The study will take no more than an hour of time, and a gift card will be given as a thank you. Funding for the study came from the Victory Over Cancer Foundation.

ELFE
ENHANCING LUNG CANCER SCREENING FOR ELIGIBLE PATIENTS THROUGH HUMAN-CENTERED INTERVENTION

St. Baldrick's 'Brave the Shave' brings wave of donations and bald heads

Bald is beautiful when it means you are raising money to conquer cancer in kids, and a lot of bald heads resulted from this year's St. Baldrick's Brave the Shave event at Mulvaney's B&L restaurant in Sacramento in March.

More than 90 "shavees" stepped up to have their hair shaved off after raising money for pediatric cancer research underway at UC Davis Comprehensive Cancer Center. Participants included members of the Sacramento Republic FC soccer team as well as UC Davis Health staff.

According to St. Baldrick's Foundation, every two minutes in this country, a family is given the devasting news that their child has cancer. One in 263 children in the U.S. are diagnosed with cancer before they turn 20 years old.

Keaton's Child Cancer Alliance teams up with Supercuts and UC Davis Comprehensive Cancer Center each year to organize the local St. Baldrick's event.

Cancer care close to home

Keaton's Child Cancer Alliance is a nonprofit organization, based in Roseville, that provides financial, emotional and educational assistance to families and children battling cancer, while building awareness and funding toward a cure.

This year, the organization presented a check to UC Davis Comprehensive Cancer Center for more than $113,000, which was raised from last year's Brave the Shave. Since it was created more than 20 years ago, Keaton's Child Cancer Alliance has donated nearly $2.5 million to the pediatric oncology program at the cancer center.

"This event is an example of UC Davis working with the community to improve the quality of care for children with cancer so that they don't have to leave the Sacramento region and their loved ones to seek treatment somewhere else," said UC Davis Pediatric Hematology-Oncology Chief Marcio Malogolowkin. He accepted the check from Jessica Alonso, executive director of Keaton's Child Cancer Alliance.

Malogolowkin said the generous contribution helps the cancer center offer National Cancer Institute-supported clinical trials, which enables UC Davis to find new ways to treat pediatric cancer patients.

"The money is also helping us launch a new bone marrow transplant program for kids at UC Davis Comprehensive Cancer Center later this year," Malogolowkin added.

"It is so important that we make sure that we are funding cancer research close to home, which is why we are pleased to contribute in a significant way to the incredible research work underway at UC Davis Comprehensive Cancer Center," Alonso said. "St. Baldrick's is just one of the events we hold every year to generate funding to find a cure for childhood cancer."

Marcio Malogolowkin receives check from Keaton's Childhood Alliance at St. Baldrick's event

"This event is an example of UC Davis working with the community to improve the quality of care for children with cancer so that they don't have to leave the Sacramento region and their loved ones to seek treatment somewhere else."

—MARCIO MALOGOLOWKIN, CHIEF OF UC DAVIS PEDIATRIC HEMATOLOGY-ONCOLOGY

Keaton's legacy lives on

In memory of their son Keaton who died from neuroblastoma, a type of cancer that starts in early nerve cells, Robyn and Kyle Raphael created the Keaton Raphael Memorial in 1998. It is now known as Keaton's Child Cancer Alliance, and Keaton's legacy lives on as the organization continues to provide resources to young cancer patients and their families while fueling research projects to win the larger war.

"Childhood cancer impacts the whole family — in fact, one in four families lose more than 40% of their annual household income as a result of childhood cancer treatment-related work disruption," Alonso said. "One in three families face other work disruptions, such as having to quit work or change jobs."

Patients and siblings of children with cancer are also at risk for emotional and behavioral difficulties, such as anxiety, depression and post-traumatic-stress disorder, Alonso added.

St. Baldrick's FOUNDATION
Conquer Kids' Cancer

UC Davis Hospice provides **peace of mind for pet-owning patients**

It's not uncommon for a UC Davis Hospice patient to own a pet. But what happens to the pet when a patient comes to hospice care, and what happens after the patient passes away?

Thanks to a new partnership with Pet Peace of Mind, UC Davis Hospice can now assist with caring for the pets of patients who are in their the final days, including finding new homes for the pets afterward.

Pet Peace of Mind is a national registered 501(c)(3) nonprofit organization that serves more than 3,500 patients and 4,000 pets annually. The team prepares hospices to support patients' pet care needs in practical ways by deploying trained local volunteers. Through the program, patients nearing the end of their life are alleviated from worrying about their pets' future needs.

"Pet Peace of Mind is one way we can make it easier for cancer patients who have pets," said volunteer coordinator Erin Bjork, a UC Davis hospice physical therapist. "We welcome volunteers who want to get involved, as well as people who would like to support this new program."

UC Davis Hospice staff members and volunteers feed pets, take them for walks and offer transportation when the patients are getting treatment. They also assist with finding new homes for pets when needed.

More Information

To learn more about ways to support and give back to UC Davis Hospice, please call the volunteer coordinator **916-731-6873**.

If you would like to donate to the UC Davis Hospice Program, contact Reese Scherber, the cancer center's director of development, at **916-291-5775**. To donate online to the hospice program, please visit **give.ucdavis.edu/go/hospice** or scan the accompanying QR code.

Supporters provide a special touch of love for patients and families who are served.

Bergelectric fundraising **gives pediatric cancer research a $31,000 boost**

Cornhole tournament raised money for children with blood cancers and other disorders

Bergelectric is in the business of energizing large commercial building projects — and it's also dedicated to energizing childhood cancer research at UC Davis Comprehensive Cancer Center.

Recently, the electrical contracting firm presented the cancer center with a $31,000 check to empower pediatric cancer research, specifically blood cancers such as childhood acute lymphoblastic leukemia.

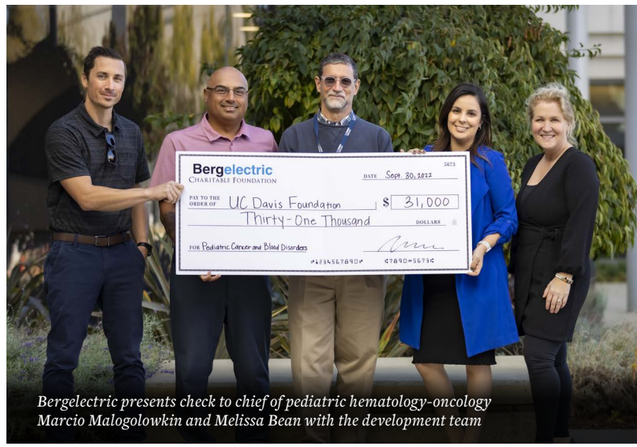
> "We have so much fun at our annual cornhole tournament, and every year we look for a way to use the money raised at the event to give back locally to the community."
>
> —GRIZELDA ROMO PAZ

The money was raised during Bergelectric's annual fall cornhole tournament at Mather Sports Complex. Cornhole is similar to the game of horseshoes except bags of corn or beanbags are thrown into wooden platforms with holes. Nearly 150 Bergelectric employees and others in the community participated in the fundraiser.

"We have so much fun at our annual cornhole tournament, and every year we look for a way to use the money raised at the event to give back locally to the community," Bergelectric project coordinator Grizelda Romo Paz said. This year, employees decided on the cancer center.

Paz said she encourages others to consider donating to the Pediatric Cancer and Blood Disorders General Support Fund because cancer is still the number one cause of death by disease in children.

In addition to the financial donation, Bergelectric also donated 366 toys to the UC Davis Children's Hospital annual holiday toy drive.



Bergelectric presents check to chief of pediatric hematology-oncology Marcio Malogolowkin and Melissa Bean with the development team

Balcomb Greene painting graces cancer center lobby

Carla Andrews, wife of the late UC Davis oncologist Neil Andrews, next to the painting she bequeathed to the cancer center.

"Fog, Ocean and Wind" gifted by the wife of esteemed UC Davis oncologist and early advocate of the cancer center

For many years, the large and inspiring piece of art titled "Fog, Ocean and Wind" greeted guests entering the Davis home of an early pioneer in oncology. Now, the painting, created in 1956 by renowned abstract artist Balcomb Greene, welcomes cancer patients coming for treatment at UC Davis Comprehensive Cancer Center.

"It is thrilling to see the painting he loved in a place he loved. My husband was an early advocate of the cancer center," said Carla F. Andrews, wife of the late UC Davis oncologist Neil C. Andrews, who died just shy of the age of 100 in 2015. "It's an amazing building and the 'comprehensive' status the cancer center has received from the National Cancer Institute is equally impressive," she added.

The painting was to go to UC Davis upon Carla Andrews' passing but, still healthy, she decided to make sure it was settled in its new home while she was here to see it.

Cancer center Director Primo "Lucky" Lara, Jr. expressed gratitude for the generous bequest, "The exquisite painting adds a great deal to our growing art collection at the cancer center, much of it donated by people such as Neil and Carla Andrews who wanted to share art that they knew would bring beauty to the cancer center while giving patients hope and strength to face their cancer."

In 1966, Neil Andrews was in Denmark attending a global meeting of the American College of Chest Physicians when, his wife recalled, he spotted the painting during a visit to the U.S. Embassy in Copenhagen. She said he fell in love with the contemporary artwork.

At the time, the 40-by-50-inch painting of waves crashing on a rugged shoreline was on loan from the Saidenberg Gallery in New York City as part of a worldwide tour to exhibit the work of American artists.

"Mr. Greene set up a studio in a village at the east end of the Long Island peninsula near the 1796 Montauk Point Lighthouse. We think the strong Atlantic surf inspired this painting and many of his other works," Carla Andrews said.

Her husband, who was practicing in Columbus, Ohio, at the time, tracked the painting to the New York City gallery in 1968 and quickly purchased it. Not long after, he brought the painting to California after he joined the faculty of the then-new UC Davis School of Medicine in 1970.

A year later, Ronald Reagan, governor of California at the time, appointed him to the Governor's Cancer Advisory Council. Neil Andrews' leadership positions also included serving as chair of the UC Davis Division of Community and Post-Graduate Medicine, and as a founding member of both the Society of Thoracic Surgeons and the American Society of Clinical Oncology.

You can find "Fog, Ocean and Wind" in the lobby of the second floor of the cancer center's south building.

Rising to the needs of patients

Expansion of the UC Davis Health Sacramento campus to meet regional health care needs for the next 50 years is underway. The California Tower, located between the medical center and the cancer center, will add nearly 1 million square feet of surgical and acute care space containing about 400 more inpatient beds — about 62% more than the existing 646-bed capacity.

An acute oncology care unit will encompass two floors of the state-of-the-art California Tower. A key highlight will be single-patient rooms designed to enhance recovery and healing, rather than the traditional two-bed design.

A specialized suite of rooms will be dedicated to bone marrow transplant patients designed with positive pressure technology that protects patients by preventing circulation of viruses and bacteria. A satellite oncology pharmacy will make discharge easier for patients, and many areas will be inviting for patients and their loved ones, with walkways to stroll and sitting areas featuring inspirational art.

UCDAVIS HEALTH | COMPREHENSIVE CANCER CENTER

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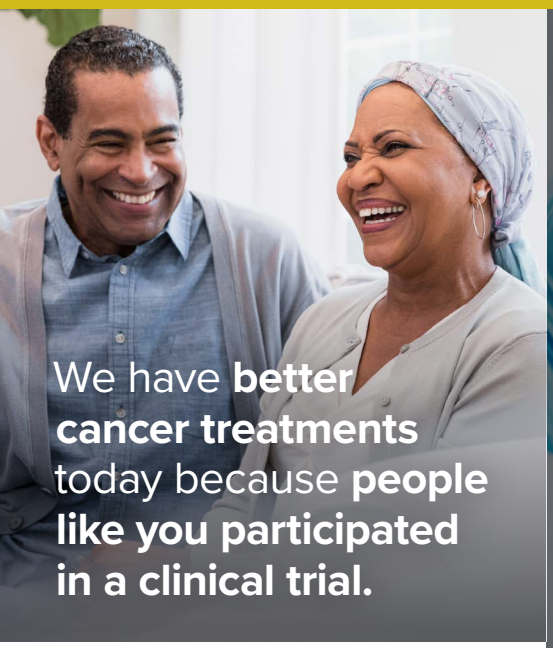

We have **better cancer treatments** today because **people like you participated in a clinical trial.**

If you're interested in exploring new treatment options, a clinical trial may be right for you. **Ask your doctor today about clinical trials.**

Breaking Barriers to Beat Cancer

UCDAVIS HEALTH | COMPREHENSIVE CANCER CENTER

NCI Comprehensive Cancer Center
A Cancer Center Designated by the National Cancer Institute

Synthesis — the art of bringing distinct elements together to form a cohesive whole — is the name of our magazine and our strategy as the Central Valley's only National Cancer Institute-designated comprehensive cancer center. Leveraging UC Davis strengths in innovative cancer models and technologies, precision therapeutics, transformative imaging and mitigation of cancer risks and disparities, we aim to reduce the cancer burden in our region and beyond. Uniting physicians, scientists and public health experts, we are committed to making cancer discoveries and delivering them quickly to patients so they have the best possible outcomes.

***Synthesis* — linking the best in cancer science to improve patients' lives — is our promise.**