The images in this report reflect some of the most dramatic transformations in the natural world. They awe and inspire us as we unfold the mysteries and possibilities of our approach to cancer in the 21st century.

Through breakthrough discoveries and day-to-day interactions with patients, Cedars-Sinai is transforming every aspect of cancer research and care.

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A butterfly will transform three times in its life: from egg to caterpillar to chrysalis to butterfly.
Letter From the Director

Dan Theodorescu, MD, PhD
PHASE ONE Foundation Distinguished Chair
Director, Samuel Oschin Comprehensive Cancer Institute
Director, Cedars-Sinai Cancer
Professor of Surgery, Pathology and Laboratory Medicine

This has been both an extraordinarily rewarding and difficult year, with Cedars-Sinai Cancer continuing to expand while delivering world-class care for our patients during the COVID-19 pandemic. The dedicated efforts of our cancer center family are reflected in part in the rise of our ranking in U.S. News & World Report’s “Best Hospitals 2020–21,” currently at #7 nationally and #1 in California.

Cedars-Sinai Cancer’s clinicians, nurses and healthcare workers have never stopped meeting the critical needs of our patients during the pandemic. Vital treatments and support have continued despite the added challenges required to maintain a safe hospital environment. Our patients throughout the Los Angeles region have been able to receive exceptional care, including diagnosis, surgery, radiation oncology, chemotherapy, survivorship services and rehabilitation.

During the past year, we have also cultivated groundbreaking and innovative research efforts, such as the Molecular Twin Precision Medicine Initiative (see page 4). This initiative will utilize next-generation genomic, proteomic, imaging and pathology techniques as well as other tools coupled with machine learning and artificial intelligence to identify personalized therapy and treatment planning for various diseases. These tools will also create a rich resource of data sets to explore and improve future diagnostics and treatment paradigms, creating a feedback loop between research and clinical practices. This will allow clinicians to better prescribe treatments today while our researchers expand our fundamental understanding of cancer biology to develop the treatments of tomorrow. Importantly, the initiative is part of our health-equity efforts and will be made available to all medically appropriate patients.
In addition to these accomplishments, the Cedars-Sinai Cancer faculty has experienced remarkable growth over the last year. We have recruited a large number of outstanding clinicians and scientists to leverage our existing strengths and take on new frontiers in translational medicine. We have also seen significant new construction, renovations and expansions of Cedars-Sinai Cancer’s clinical infrastructure at several sites, as described in this report.

Cedars-Sinai Cancer has been continuously working to improve health equity in our surrounding communities. We have been focusing on disparities in the two cancers (colon and lung) that are the leading cause of cancer deaths in the U.S. And our Cancer Research Center for Health Equity is engaged in a wide range of evidence-based programs to alleviate the disproportionate burden of cancer in high-risk minority and underserved populations.

As we anticipate the eventual end of the pandemic, Cedars-Sinai Cancer is ready to face a world that will be forever changed by these historic events. Through it all, we have never ceased to offer the highest level of care and services to our patients, while continuing to further our exceptional scientific research.

I feel very fortunate and grateful to be director of Cedars-Sinai Cancer, especially through these challenging times. I look toward to the future growth and evolution of our cancer center with great excitement. I truly believe that the best is yet to come for Cedars-Sinai Cancer and cancer care in Los Angeles and beyond.

Feel free to contact me at cancerdirector@cshs.org if you have questions. You can also reach Cedars-Sinai Cancer physicians and researchers at 310-423-8030.

My warmest wishes,

Dan Theodorescu, MD, PhD
The success stories in providing targeted, precision treatments for cancer are inspiring but are limited to only a few cancer types. At the same time, the research that leads to these lifesaving breakthroughs too often falls short in racial and ethnic diversity.

The Cedars-Sinai Cancer “Molecular Twin” initiative aims to provide patients with the most precise treatments available while expanding access to clinical trials and building a powerful platform for future discoveries.

Meet Your Molecular Twin

The body is made up of bone, muscle, organs, blood and tissues.

Break these down into their smallest cellular units, combine them with samples of bodily fluids, microbes, DNA, RNA and proteins, and meet the Molecular Twin—a scientific stunt double who is always in the lab, ready to test out new therapies and perhaps reveal important details of how a cancer is affecting the body.

Cedars-Sinai is partnering with academic and industry partners to deploy data-driven precision medicine infrastructure and software. This new platform for cancer diagnosis, treatment and scientific discovery has exceptional potential to overcome cancer disparities in vulnerable populations.

“The Molecular Twin is an innovative tool to help diagnose and precisely treat disease today through the convergence of multiple biologic, physical and computational technologies,” says Dan Theodorescu, MD, PhD, who conceptualized the idea. “Long term, combining these technologies in bespoke ways will also allow us to discover the circuitry used by cancer and other abnormal cells to drive the disease and develop new treatments with better efficacy.”

“The Molecular Twin approach fuses and integrates orthogonal information to help us completely understand an individual’s cancer.”

—Dan Theodorescu, MD, PhD
PHASE ONE Foundation Distinguished Chair
Director, Samuel Oschin Comprehensive Cancer Institute
Director, Cedars-Sinai Cancer
Sunflower seeds transform into tall and robust plants with large, colorful blooms.
A Complete Picture for Cancer Care

The causes of cancer are a combination of genetics, environmental exposures and chance. These causes manifest themselves in the landscape of a tumor—the changes that take place in cells as they progress from normal to cancerous, such as somatic mutations or epigenetic modifications that control which genes are active.

The future of cancer treatment and healing will come from better understanding this vast landscape. The Molecular Twin initiative will classify every tumor using multiple technologies from thousands of Cedars-Sinai cancer patients. That information will be fused and further integrated with a patient’s unique clinical data, medical history and other health-influencing factors to assist in designing evidence-driven care plans, including assignment to clinical trials.

Data collected from our patients and analyzed by machine learning and artificial intelligence will guide investigators toward discovering new medications, treatments and biomarkers, and a better understanding of how cancers affect different populations.

Investigators will be able to create new subgroups within a disease. For example, they can look at patients who share not only a specific biomarker but also other clinical similarities in order to glean new insights.

The initiative will provide robust data to fuel answers to important research and clinical questions, such as:

✱ Are the most predictive biomarkers for cancer measurable in blood, urine or other bodily fluids?
✱ How do markers for cancer change over time and in response to treatment?
  Can they become guides for initial treatment or to detect the presence of cancer spread (metastases)?
✱ Can some new biomarkers replace the need for imaging and invasive diagnostic procedures?
✱ Do markers differ by race or ethnicity?
✱ What targets and markers can be discovered for cancers that do not yet have a precision treatment? And will they also be targets for novel therapies?
A Richly Diverse Platform for Current Treatments and Future Study

The Molecular Twin is a powerful tool for facilitating research on disparities in cancer diagnoses and outcomes.

Importantly, all patients with a certain cancer will have a chance to have a Molecular Twin, regardless of age, race or ethnicity. As the initiative is launched, Cedars-Sinai will start with select cancers based on disparities in the communities we serve.

Among the cancers that may be first in the initiative are:

- Breast cancer, which is skyrocketing in Asian women for reasons as yet unknown and that results in higher mortality in Black women
- HPV-related cancers, which disproportionately affect Latino populations
- Lung cancer, the No. 1 cancer killer overall and that disproportionately affects the Black community

A Bridge to Accessing Clinical Trials

Patients who consent to having their molecular and clinical profiles added to the database will be actively tracked and the success of their treatments and outcomes will be recorded. Their Molecular Twin will also be evaluated for eligibility in clinical trials.

Every patient will have an opportunity to have a Molecular Twin, helping to build a rich and biologically diverse data bank that will unlock access to emerging treatments even as they help scientists uncover new frontiers in treating and understanding cancer.

The difference between the Molecular Twin and the precision medicine tools we use today is like the difference between a 360° surround-view camera in your car and a simple backup camera.
Transforming Care for Women’s Cancers

Health disparities stemming from gender inequality remain a problem that permeates healthcare across disciplines and diagnoses. Cedars-Sinai has a longstanding commitment to women’s health, especially in detecting, diagnosing, treating and preventing cancers.

A Legacy of Leadership and Commitment

Cedars-Sinai has been home to some of the most important breakthroughs in gynecologic cancers: genetic markers for early detection of ovarian cancer, identification of 34 genes linked to ovarian cancer risk and research evaluating the success of the HPV vaccine in preventing cervical cancer. These are just some of the achievements that demonstrate our commitment to research that advances the field, treatments that tackle some of the most complex cases, and training for the next generation of physicians and scientists.

“Cedars-Sinai has been instrumental in shaping the field of gynecologic oncology since the very beginning as one of the original such programs in the U.S. Our fellowship training began the same year gynecologic oncology became a recognized, board-certified specialty nearly 50 years ago,” says Kenneth Kim, MD, MHPE, Cedars-Sinai Cancer’s new director of the Division of Gynecologic Oncology and the Board of Governors Chair in Gynecologic Oncology. “It’s our mission to improve the outcomes for women with these cancers by finding the best treatments, furthering our scientific understanding of these diseases, and providing the finest training for residents and fellows.”

34 genes linked to ovarian cancer risk have been identified by Cedars-Sinai scientists and our collaborators.
These plain white eggs will transform into blue macaws that develop magnificent, colorful feathers.
Investing in Research

The Women's Cancer Program was developed to facilitate basic science investigations and clinical trials across the Cedars-Sinai Cancer enterprise.

The program is entrusted with one of the nation’s largest BRCA databases and biobanks focused on breast and gynecologic cancers.

“We have a tremendous resource in our biobank,” says Reva Basho, MD, co-director of the Women’s Cancer Program. “We want to allow the bank to be curated in such a way that you can formulate your research question and easily pull all the relevant samples and associated clinical data.”

Understanding how ethnic differences affect cancer biology and outcomes, uncovering new targets for precision therapies and examining how wearable technologies can help patients are among the program’s research goals.

“This new program focused on women’s cancers provides a framework for us to look across different cancers—breast, ovarian, cervical, endometrial—to find trends and markers that could lead to earlier detection and better treatment.”

—Kate Lawrenson, PhD
Co-director, Women’s Cancer Program

“Because of our patient population, Cedars-Sinai is especially well-positioned to study those with BRCA mutations and apply that learning to other cancers,” says Kate Lawrenson, PhD, co-director of the program.

For example, women with a BRCA2 mutation tend to have better outcomes in ovarian cancer compared to other ovarian cancer patients. Understanding why could potentially have therapeutic benefits across cancer types, Lawrenson says.
A Team That Listens

One of the most dangerous diagnoses a woman can hear is that her pain is imagined or a symptom of anxiety.

Skilled diagnostic teamwork at Cedars-Sinai ensures that patients never face such a diagnosis.

“Physician bias based on physical appearances, ethnicity and gender often delays diagnosis and treatment,” says B. J. Rimel, MD, a researcher and associate professor in the Division of Gynecologic Oncology. “These disparities in healthcare break my heart.”

Cancer symptoms are not always obvious, Rimel says. Indigestion, fatigue and changes in bowel movements are often-dismissed symptoms that could be related to cancer. In addition to the most advanced imaging tools available, listening carefully to patients and evaluating all of their symptoms seriously are important first-line diagnostic tools.

Bench Work

✱ **Increasing Access to Care**  A new study will examine how to overcome barriers to care in Korean Americans and other Asian populations, and among Latinas, specifically those most at risk of gynecologic cancers, by offering self-collection HPV tests. Data from the home tests will be compared to national screening guidelines to determine whether these tests could be an effective means to improve early diagnosis.

✱ **Role of BRCA Genes**  Cedars-Sinai investigators have established innovative research programs focused on understanding the role of BRCA1 and BRCA2 in breast and ovarian cancer pathogenesis. This research examines genetics, genomics and transcriptomics to model disease pathogenesis and identify novel biomarkers associated with early-stage neoplastic development and clinical outcomes. Some of the tools used in this research include induced pluripotent stem cell (iPSC)-derived organoids and organ-on-a-chip methods. Gene-editing technologies are being used to test the functional significance of specific mutations in these genes as well as in the BRCA-associated genes BRIP1, PALB2, RAD51C, RAD51D, CHEK2 and ATM.

✱ **Linking Genes to Ovarian Cancer Risk**  Cedars-Sinai scientists, in collaboration with colleagues from other leading cancer institutions, identified 34 genes associated with an increased risk for developing the earliest stages of ovarian cancer. The findings, published in the journal Nature Genetics, will help identify women at highest risk of developing ovarian cancer and pave the way for identifying new therapies that can target these specific genes.

✱ **New Breast Cancer Treatment**  Cedars-Sinai radiologist Peter J. Julien, MD, chief of Thoracic Imaging and Tumor Ablation, performed the first cryoablation procedure for breast cancer at Cedars-Sinai. The procedure—which uses extreme cold to destroy cancer cells and close off the blood vessels that feed them—is offered to women with small, low-risk breast tumors as an alternative to breast surgery.

✱ **Immunogenic Potential of Radiation Therapy**  Cedars-Sinai investigators are collaborating to assess the potential synergy of radiation therapy and immune therapy in the treatment of breast cancer. Stephen Shiao, MD, PhD, basic science director of Radiation Oncology, and Simon Knott, PhD, associate director of the Center for Bioinformatics and Functional Genomics, have obtained a U.S. Department of Defense grant to evaluate the immunogenic potential of combined radiation therapy and immune therapy using single-cell RNA sequencing. An ongoing associated clinical trial is evaluating this combination in patients who have breast cancer, with the goal of improving long-term cure rates.
Cedars-Sinai has a long history of treating blood cancers and hematologic malignancies with innovations driven by the unmet needs of our diverse patient population. We are building on this legacy of inclusion and discovery with the launch of a division dedicated to advancing cutting-edge hematology and cellular-therapy efforts.

Investing in CAR T-Cell Therapy

Chimeric antigen receptor (CAR) T-cell therapy is an exciting therapeutic option for patients with life-threatening, aggressive cancers, such as lymphoma and acute lymphoid leukemia. Cedars-Sinai is currently conducting clinical trials of this promising therapy and is building a robust infrastructure to manufacture these genetically engineered cells for use in research and treatments.

“Our goal is to expand cellular approaches to treatment that will be more precisely targeted,” says Ronald Paquette, MD, clinical director of the Blood & Marrow Transplant Program. “We believe that these treatments could provide attractive alternatives to allogenic stem cell transplantation. Innovative engineering of immune cells could yield outpatient treatments with curative intent that could supplant the more time-honored approaches.”

Scientists at Cedars-Sinai are exploring partnerships to develop renewable sources of genetically engineered cells that could provide off-the-shelf treatments for otherwise incurable cancers.

“Our goal is to expand cellular approaches to treatment that will be more precisely targeted.”

—Ronald Paquette, MD
Clinical Director, Blood & Marrow Transplant Program
Fully aquatic tadpoles transform into semi-aquatic frogs such as the red-eyed tree frog, native to the Seychelles.
Harnessing the Potential of Haploidentical Transplants

The rich ethnic diversity of Southern California means that many of our patients who do not have a tissue-type identical sibling to serve as a stem cell donor are unlikely to find a good match through the unrelated donor bone marrow donor registry.

“Most of our patients will likely also not have a family member who is a perfect match,” says John Chute, MD, division chief for Hematology and Cellular Therapy, and the Linda Ostrowski Chair in Hematology/Oncology in honor of Barry Rosenbloom, MD.

Haploidentical transplants use stem cells from a donor who is partially immune-matched to the patient. Children are haploidentical matches for their parents and are more readily available than unrelated donors. As a result, performing haploidentical transplants can eliminate the long waiting period to find a suitable donor. At Cedars-Sinai, haploidentical transplants have outcomes that are as good as transplants performed using fully tissue-matched, unrelated donors and have the potential to substantially increase the number of patients who can receive this potentially lifesaving therapy.

“Haploidentical transplants will be a focus for ongoing innovation at Cedars-Sinai through clinical trials that push the field forward.”

—John Chute, MD
Division Chief, Hematology and Cellular Therapy
Expertise in Amyloidosis

Cedars-Sinai is one of the top centers for treating amyloidosis in the U.S. Our expertise in treating cancer and similar malignancies is paired with the nation’s top heart transplant program, at the Smidt Heart Institute, uniquely positioning us to treat this condition.

Amyloidosis occurs when an abnormal protein builds up in the organs and interferes with their function, and can often lead to heart failure. Though a rare disease, 4% of African Americans are likely to have a variation of the gene that puts them at high risk of amyloidosis.

“It’s an under-recognized disease causing a lot more harm in the population than people realize,” says Robert Vescio, MD, medical director of the Multiple Myeloma and Amyloidosis Program. “We hope more physicians will take the possibility of amyloidosis into consideration because we have excellent options for treating the disease if it’s diagnosed early.”

Bench Work

✱ **Testing New Combination Treatments** Cedars-Sinai is a leader in using a new immunotherapy drug in combination with revlimid maintenance treatment. The aim of the project is to determine whether this new drug combination will improve survival in patients with multiple myeloma.

✱ **Changing Premedication Regimens** Cedars-Sinai physicians have been working on more efficient ways of delivering daratumumab treatments to multiple myeloma patients. An ongoing study is looking at changing the premedication regimens for the IV and subcutaneous injection forms of the drug, potentially resulting in a shorter treatment time and with fewer side effects from the antihistamines or steroids often taken in preparation.

✱ **No Blood, No Problem** In 2002, Cedars-Sinai pioneered a “bloodless” bone marrow transplant procedure for Jehovah’s Witnesses, whose faith doesn’t allow for blood transfusions. In 2020, a study published in Bone Marrow Transplantation reported that the bloodless procedure, when offered with appropriate supportive measures, is as safe and effective in Jehovah’s Witness patients as standard bone marrow transplantation is for patients who accept transfusions.

More than 95% of patients who need a stem cell transplant will have at least one haploidentical related donor available (parent, child or sibling); in contrast, as few as 18% of African American and Latino patients will have an HLA-matched unrelated donor.
Lung cancer and colon cancer are leading causes of cancer deaths in the United States. Serving the diverse population of Los Angeles offers a powerful opportunity to study how these diseases affect different groups, uncover better understanding of the biology of these diseases, develop new prevention strategies and screening methods to detect cancers early, and create more effective, targeted treatments to benefit cancer patients of all races and backgrounds.

Crossroads for Lung Cancer

Statistics from 2016–2017 show the largest-ever single-year drop in the U.S. cancer death rate—a decline attributed to fewer people dying of lung cancer. Prevention efforts, access to screening and advancements in treating lung cancer all contributed to this result.

Cedars-Sinai is committed to ensuring that all populations benefit from these advances.

We are expanding our research efforts into exploring new targeted treatments for lung cancer and ways to bring precision lung cancer therapies to a diverse patient population. Combined with our pioneering expertise in minimally invasive surgical options, our lung cancer program is powerfully positioned to address the challenges posed by what remains the leading cause of cancer death. We are striving for equal outcomes in diverse communities.

California’s rank nationally for screening those at highest risk of lung cancer. In California, only 0.9% of people at high risk of lung cancer are screened.
There are 200–300 cells in a human blastocyst five days after fertilization. An adult human body is made up of 300 trillion cells.
Expanding Screening Access

Experts from Cedars-Sinai Cancer and the Cancer Research Center for Health Equity are collaborating on a lung cancer screening program that aims to increase access to low-dose CT scans while uncovering why screening rates are so low and ways to improve them.

The program is working with groups disproportionately affected by lung cancer, including Black, Korean, Latino and LGBTQ+ communities, to better understand obstacles to screening and how to increase access.

New Screening Tools

Investigators are partnering with manufacturers to develop and validate lung cancer screening technologies that would facilitate reaching underserved communities who may not have the means or cannot afford to take time away from work to travel to Cedars-Sinai.

Lung cancer screening has largely been anchored in place by 2.2-ton CT-scanning machines. Recent advances allow for mobile, low-dose CT-scanning units capable of providing lung cancer screening and we plan to bring this technology on board. Cedars-Sinai investigators are also studying the efficacy of another potentially cost-effective, accurate and portable option—low-field MRI, a new system that uses a lower magnetic-field strength but still offers high-quality images of the lungs.

“Mobile blood draws and blood pressure checks have been important tools for improving community health,” says Robert Haile, DRPh, MPH, director of the Cancer Research Center for Health Equity and the Cedars-Sinai Chair in Cancer Population Health Sciences. “Having these same mobile capabilities available for lung cancer would be a powerful step toward detecting the disease earlier in high-risk, underserved communities when it is most treatable.”
Colorectal Cancer in the Latino Population

Barriers to screening for and treating colorectal cancer are complex. Our team of clinicians and researchers engages with community leaders—including policymakers and faith-based leaders—to understand the lifestyle choices, socioeconomic conditions and genetic factors that contribute to colorectal cancer.

Genetic Research and Better Screening

Despite being the largest ethnic minority group in the United States, Latinos are underrepresented in colorectal cancer research. Through the Hispanic Colorectal Cancer Study, the largest of its kind in the U.S. with more than 2,000 patients, we are examining genetic susceptibility to colorectal cancer as well as gene/environment interactions and other risk factors in this population. One recent focus of the study is development of ethnically specific models of risk to allow better tailoring of colon cancer screening.

Community Partnerships

We don’t only study the diseases affecting our communities: Community members are vital partners in our research. Their voices and experiences help shape our research enterprise through community advisory boards.

For example, cancer screening rates are lower in the LGBTQ+ community. Our LGBTQ+ advisory board suggested that screening guidelines are not specific enough for diverse genders. In response, Cedars-Sinai scientists, health behavior specialists, epidemiologists, researchers and other experts collaborated to address the question and develop a new communication tool.

“We will be testing screening-communication tools that use an organ inventory rather than gender to help people figure out what screenings they need,” says Zul Surani, director of Community Outreach and Engagement at the Cancer Research Center for Health Equity. “It’s innovative and empowering.”

The LGBTQ+ advisory board also assisted us in designing a campaign to increase awareness about HPV and the role that vaccination can play in cancer prevention.

More than 1,000 survey respondents shaped our cancer needs assessment for Filipinos in the Los Angeles area, illuminating the need for more research and outreach in the areas of breast, thyroid and prostate cancer. Prostate cancer screening rates are lower among Filipinos, and we are working with focus groups to uncover why.

“Health equity is a serious priority for Cedars-Sinai and healthcare providers everywhere,” Surani says. “Having the communities most affected at the table helps us better serve them and better formulate important research questions.”
Transforming Results

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  Transforming Cancer Through Research
  Faculty Awards and Recognition
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  Recruitments and Appointments
  High-Impact Research Publications

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An acorn weighing less than 10 grams will transform over 100 to 300 years into an oak tree weighing as much as 8 tons.
### Clinical Volume*

**INPATIENT VOLUME**

- **Surgences** ........................................... 2,095
- **Bone Marrow Transplant Discharges** ........ 118
- **Discharges/Consults** .......................... 7,006
- **TOTAL** ............................................... 9,219

**OUTPATIENT VOLUME**

- **Surgences** ........................................... 3,869
- **Chemo/Infusion** ................................. 57,642
- **Radiation Oncology** ......................... 26,072
- **Imaging** ........................................... 25,172
- **Clinic** ............................................. 134,009
- **Other Ancillary Visits** ...................... 78,887
- **TOTAL** ............................................... 325,651

**GRAND TOTAL ........... 334,870**

*Volumes are based on encounters, not volume of accounts.

### Clinical Trials

- **Investigational-Initiated Trials Opened to Accrual (Interventional and Non-Interventional)** .......................... 53
- **Investigational-Initiated Trials Opened to Accrual (Interventional Only)** ........................................ 26
- **Investigational-Initiated Trials in Which Cedars-Sinai/PI Holds the IND** ........................................ 4
- **Open to Accrual Phase I Trials** .......................... 30
- **Active Phase I Trials Accruals** ...................... 118
- **Interventional Treatment Trial Accruals** ............ 340
- **Interventional (Nontreatment) Trial Accruals** ........ 204
Top Cancers Treated by Anatomic Site

TOTAL NEWLY DIAGNOSED PATIENTS 5,201

- Breast
- Prostate
- Lung/Bronchous Nonsmall-Cell
- Colon
- Pancreas
- Hemeretic
- Non-Hodgkin Lymphoma
- Kidney and Renal Pelvis
- Melanoma of Skin
- Bladder

Publications

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<tr>
<th>Fiscal Year</th>
<th>Intra-Programmatic</th>
<th>Collaborative*</th>
<th>High-Impact**</th>
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<td>FY20</td>
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*Collaborative metrics capture collaborations between Cedars-Sinai Cancer members.
**High-impact publications are publications in journals with impact factors greater than 15.
Grant Funding*

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<tr>
<th>Year</th>
<th>Cancer Biology Program</th>
<th>Cancer Prevention and Control Program</th>
<th>Translational Oncology Program</th>
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*Includes training grants

Research Program Membership

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<td>Translational Oncology Program</td>
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Patents and Disclosures

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<td>United States</td>
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<td>Assessments</td>
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<td>Israel</td>
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<td>Japan</td>
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<td>Licensed (Nonexclusive)</td>
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<td>Mexico</td>
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<td>Marketing</td>
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## Community Outreach and Engagement

<table>
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<tr>
<th>Population at Risk</th>
<th>Science-based cancer information dissemination</th>
<th>Number of participants in interventions</th>
<th>Number of events</th>
<th>Number of participants in cancer screening events</th>
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<tbody>
<tr>
<td>Korean American Adults in Greater LA</td>
<td>745</td>
<td>320</td>
<td>15</td>
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</tr>
<tr>
<td>Latino</td>
<td>1,802</td>
<td>352</td>
<td>29</td>
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<tr>
<td>African American</td>
<td>151</td>
<td>38</td>
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<td>Total</td>
<td><strong>2,698</strong></td>
<td><strong>710</strong></td>
<td><strong>49</strong></td>
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<th>Population at Risk</th>
<th>Number of Filipino Cancer Healthcare in Los Angeles Survey respondents who also received cancer information</th>
<th>Number of events</th>
<th>Number of people participated in interventions</th>
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<tr>
<td>Filipino</td>
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<th>Population at Risk</th>
<th>Intervention</th>
<th>Total LGBTQ+ community members counseled</th>
<th>Total referred to gender-affirming clinics</th>
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<tbody>
<tr>
<td>LGBTQ+</td>
<td>Use of counseling, small media and referral to local gender-affirming healthcare providers to obtain vaccinations and anal cancer screenings</td>
<td>608</td>
<td>136</td>
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</tbody>
</table>
At any given time, approximately 140 cancer clinical trials are available through Cedars-Sinai Cancer.

In 2020, Cedars-Sinai ranked #7 in the nation and #1 in California for cancer care by U.S. News & World Report.

Our oncology experts treat over 60 types of cancer at more than 10 locations throughout Greater Los Angeles.
Notable Developments

Transforming Cancer Care in More Locations

Our expert team of oncologists, hematologists, surgeons, nurses and staff is committed to making the path to treatment easier for all patients closer to where they live.

**A Cancer Space Like No Other**  The Samuel Oschin Cancer Center, part of Cedars-Sinai Cancer, opened its doors in June 2020. The new facility offers 45,000 square feet designed to provide a healing environment and the highest-quality care for patients and their families as they go through their cancer journey. With a light-filled space and panoramic views of Los Angeles, the center helps bring serenity and calm to patients going through a frightening experience. The space boasts two newly designed infusion areas that can accommodate 53 patients and their guests, an on-site pharmacy and an expanded blood-draw station. To support hematology and cellular therapy programs, we offer a private waiting area for immunocompromised patients. Patients treated in the new facility can also participate in a wide array of clinical trials and research opportunities.

**Cancer Care in the San Fernando Valley**  Our 40,000-square-foot Tarzana location offers extensive cancer care, including radiation oncology, medical oncology, an infusion center, surgical oncology and diagnostic imaging. “We’re the first to provide the Valley area with a full range of cancer services from an academic medical center,” says Dan Theodorescu, MD, PhD, director of Cedars-Sinai Cancer and PHASE ONE Foundation Distinguished Chair. “We believe it’s important to make life less complicated for our cancer patients. By offering comprehensive care in a convenient location, we hope to accomplish that.”

**Renovated Breast Health Services Location**  The Breast Health Services Building, part of Cedars-Sinai Cancer and the Samuel Oschin Comprehensive Cancer Institute, underwent a transformative renovation. Every detail of the 39,000-square-foot facility was designed with the patient in mind, offering a safe and secure space for care where state-of-the-art imaging is used to create individualized patient treatment plans. Light, bright and spacious, it provides a calm, inviting environment where we treat the patient’s mind, body and spirit. The renovated space also allows for greater capacity and improved patient flow.

**Expanded Services in West L.A.**  The Angeles Clinic and Research Institute, a Cedars-Sinai affiliate that develops new therapies and provides personalized care for many cancer types, completed a 38,000-square-foot expansion and renovation in West Los Angeles. The project included expansion of the infusion and research centers and the addition of a surgical oncology suite as well as a CT/SPECT and interventional radiology suite.

**Major Cancer Center Opened in South Bay**  The Donald and Priscilla Hunt Cancer Center opened at Torrance Memorial Medical Center, a Cedars-Sinai affiliate. The center offers specialized care for more than 60 types of common, rare and complex cancers as well as access to clinical trials. It opens the door for greater collaboration as Cedars-Sinai and Torrance Memorial share cancer expertise, innovations and resources to achieve the best possible outcomes for patients.
Transforming Cancer Through Research

Our research program is instrumental in shaping and transforming cancer medicine. When wide-ranging and leading-edge research discoveries are being translated to clinical practice, they are poised to have a major impact on the health and well-being of patients everywhere.

**Ovarian Cancer** A multisite study led by Cedars-Sinai investigators has identified 34 genes related to increased risk of the disease. Their findings may help warn women in jeopardy of ovarian cancer and also pave the way for targeted therapies. The team’s work builds on previous research by the Ovarian Cancer Association Consortium comparing the genetic profiles of nearly 25,000 ovarian cancer patients to 45,000 healthy women, and finding that more than 30 regions in the genome are associated with the disease.

**Liver Cancer** Cedars-Sinai was awarded a $9.1 million grant from the National Cancer Institute to study how fat may promote cancer’s spread to the liver. The study will focus on the interplay between dietary fat and fatty liver disease, which is commonly associated with obesity, and the mechanisms that allow cancer to spread to the liver. Working collectively on four separate projects, researchers will study how signaling, or “crosstalk” between the liver and cancer in a distant organ, alters the liver environment to allow cancer to spread and thrive there.

**Breast Cancer** A team performed the first cryoablation procedure for breast cancer at Cedars-Sinai. The procedure—which uses extreme cold to destroy cancer cells and close off the blood vessels that feed them—is offered to women with small, low-risk breast tumors as an alternative to breast surgery. Clinical trials are being planned to further study the procedure.

**Prostate Cancer** Cedars-Sinai investigators identified a driver of aggressive prostate cancer in animal models and found a molecule that could potentially attack it. Analyzing patient genetic and molecular data, the team found elevated activity of the molecule ONECUT2 in tumors of patients with hormone-therapy-resistant prostate cancers.

**Pancreatic Cancer** A scientific team led by Cedars-Sinai investigators was awarded $10 million from the U.S. Department of Defense to study risk factors and behaviors that contribute to pancreatic diseases and then devise potential treatments and lifestyle recommendations to prevent them. The project could reveal how pancreatitis develops in patients due to lifestyle factors such as alcohol abuse and smoking.

**Impact of COVID-19 on Minorities** Cedars-Sinai has been awarded a five-year, $8.3 million grant from the National Cancer Institute to study the diversity and determinants of the immune-inflammatory response to SARS-CoV-2, the virus that causes COVID-19. Using comprehensive, longitudinal data collection and analyses, the research will focus on the ethnically and racially diverse population served by Cedars-Sinai.

**Enhanced Supportive Services**

Cancer doesn’t stop. So when the coronavirus pandemic reached Los Angeles in March 2020, we never stopped treating cancer patients. Our many clinics pivoted to virtual care in a matter of days. Remote supportive services have been made available through the Cedars-Sinai Patient and Family Support Program. Services include psychiatric care, nutritional support, social services, and wellness, resilience and survivorship programs. For families struggling with cancer and staying safe during COVID-19, these services are more important than ever.
Faculty Awards and Recognition

✱ Joshua Breunig, PhD, a 2020 American Association for Cancer Research (AACR) NextGen Stars recipient, presented at a Plenary Session during the AACR Virtual Meeting II to discuss his research into developing a novel model system for glioblastoma.

✱ Mitchell Kamrava, MD, was elected to the American Brachytherapy Society.

✱ Jayoung Kim, PhD, was awarded leadership of a new mentoring and education program for Korean and Korean American female STEM students and professionals, supported by a grant through the Center for Women in Science, Engineering, and Technology.

✱ Dan Theodorescu, MD, PhD, was elected by the American Association for the Advancement of Science (AAAS) to the rank of AAAS fellow.

Funding Highlights

✱ Increased cancer research funding by 23%

✱ Increased National Institutes of Health peer-reviewed funding, including from the National Cancer Institute, by 15%

✱ Received six new cancer-focused awards from the U.S. Department of Defense

✱ Provided seed funding totaling $2 million to support new multi-PI/team/investigator-initiated trials/Community Outreach and Engagement development projects

Select Grants

✱ A scientific team of investigators from Cedars-Sinai (Jane Figueiredo, PhD, of Cedars-Sinai Cancer and Susan Cheng, MD, MMSc, MPH, of the Smidt Heart Institute) and the University of California, San Diego (Michael Karin, PhD), received a $12 million U54 grant from the National Cancer Institute to study the diversity and determinants of the immune-inflammatory response to SARS-CoV-2.

✱ The National Cancer Institute awarded a five-year, multi-PI, R01 grant to J. Manuel Perez, PhD, and John Yu, MD, to develop a magnetofluorescent nanoprobe for image-guided delivery of drugs across the blood-brain barrier into glioblastoma multiforme tumors.

✱ The National Institute of Biomedical Imaging and Bioengineering awarded a four-year, multi-PI grant to Zhaoyang Fan, PhD (Cedars-Sinai) and Wensha Yang, PhD (University of Southern California) to improve magnetic resonance (MR) acquisition and multi-organ auto-segmentation for use of MR simulation in abdominal radiation treatments.

✱ A Mentored Clinical Scientist Research Career Development Award (K08) from the National Cancer Institute will provide Christopher Almario, MD, MSHPM, with support and protected time for an intensive mentored research experience to improve colorectal cancer screening uptake by developing and validating the Automated Colorectal Cancer Educational Support System.
Recruitments and Appointments

EXECUTIVE LEADERSHIP

John Chute, MD
Director, Division of Hematology and Cellular Therapy
Director, Center for Myelodysplastic Diseases Research
Associate Director, Board of Governors Regenerative Medicine Institute
Linda Ostrowski Chair in Hematology/Oncology in honor of Barry Rosenbloom, MD

Stephen J. Freedland, MD
Associate Director, Education and Training
Warschaw, Robertson, Law Families Chair in Prostate Cancer

Kenneth Kim, MD, MHPE
Division Director, Gynecologic Oncology
Chair, Committee for Oversight of Training and Education
Board of Governors Chair in Gynecologic Oncology

Karen L. Reckamp, MD
Director, Division of Medical Oncology
Associate Director, Clinical Research

James Turkson, MD
Associate Director, Strategic Partnerships

Denene Williams, MBA, MLA, BSN, RN
Executive Director, Samuel Oschin Cancer Center

NEW RECRUITMENTS AND APPOINTMENTS

Katelyn Atkins, MD, PhD
Staff Physician, Breast Center and Radiation Oncology

Alexander Boiko, PhD
Research Scientist, Melanoma

Vinicius Calsavara, PhD
Research Scientist, Biostatistics Core

Philip Chang, DO
Staff Physician, Oncology Rehabilitation

Vi K. Chiu, MD, PhD
Director, Medical Oncology, Gastrointestinal Oncology and Molecular Precision Oncology Programs, The Angeles Clinic and Research Institute

Geetanjali Toby Datta, PhD
Research Scientist, Cancer Research Center for Health Equity

Leigh Ellis, PhD
Research Scientist, Prostate Cancer Pathology

Gillian Gresham, PhD
Research Scientist, Cancer Research Center for Health Equity

Sergei Grivennikov, PhD
Research Scientist, Molecular and Cell Biology

Ekaterina Koltsova, MD, PhD
Research Scientist, Molecular and Cell Biology

John Lewis, PhD
Radiation Oncology Physicist, Division of Medical Physics

Xue (Sean) Li, PhD
Research Scientist, Bladder Cancer and Gender Disparity

Michael Manuel, MD
Staff Physician, Gynecologic Oncology, Cedars-Sinai Valley Oncology Medical Group

Inderjit Mehmi, MD
Medical Oncology Specialist, Immuno Oncology and Translational Research Program, The Angeles Clinic and Research Institute

Arsen Osipov, MD
Staff Physician, GI Medical Oncology

Joshua Sasine, MD, PhD
Staff Physician, CAR-T, BMT and Hematology

Stephen Shiao, MD, PhD
Program Co-Leader, Translational Oncology

Alexandra (Alix) Sleight, PhD, MPH, OTD
Clinical Scientist, Center for Integrated Research on Cancer and Lifestyle

Jennifer Steers, PhD
Radiation Oncology Physicist, Division of Medical Physics

Patricia Thompson-Carino, PhD
Research Scientist and Program Co-Leader, Cancer Prevention and Control

Sungyong You, PhD
Director, Bioinformatics Core

Roja Zakariaee, PhD
Radiation Oncology Physicist, Division of Medical Physics
High-Impact Research Publications

Note: Publications included have an impact factor greater than 10 and have Cedars-Sinai Cancer Core members as primary authors.


INDEX: Names in bold purple are Cancer Biology; names in bold green are Cancer Prevention and Control; names in bold blue are Translational Oncology.
Cedars-Sinai Cancer Care Locations

If you have a patient you would like to refer to one of our programs, please contact us at 310-423-8030 or visit cedars-sinai.org/cancer. Our physicians will work with you to understand the unique needs of your patient and develop the best treatment plan—and will be available for additional consultations and procedures as needed.

Our care teams are committed to making the path to treatment easier for all patients. We provide locations throughout the greater Los Angeles area, including some that are open 24 hours a day.

<table>
<thead>
<tr>
<th>Location</th>
<th>Address Details</th>
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<tbody>
<tr>
<td>Beverly Hills</td>
<td>200 N. Robertson Blvd. Beverly Hills, CA 90211</td>
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<tr>
<td></td>
<td>Tower Hematology Oncology Medical Group</td>
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<tr>
<td></td>
<td>9090 Wilshire Blvd. Beverly Hills, CA 90211</td>
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<tr>
<td>Los Angeles</td>
<td>Samuel Oschin Comprehensive Cancer Institute</td>
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<tr>
<td></td>
<td>8700 Beverly Blvd. Los Angeles, CA 90048</td>
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<td>Samuel Oschin Cancer Center</td>
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<tr>
<td></td>
<td>127 S. San Vicente, 7th Floor Los Angeles, CA 90048</td>
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<td></td>
<td>The Angeles Clinic and Research Institute</td>
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<tr>
<td></td>
<td>11800 Wilshire Blvd. Los Angeles, CA 90025</td>
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<td>Radiation Oncology</td>
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<td>8700 Beverly Blvd. Los Angeles, CA 90048</td>
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<td></td>
<td>Marina del Rey</td>
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<tr>
<td></td>
<td>Cedars-Sinai Marina del Rey Hospital</td>
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<tr>
<td></td>
<td>4650 Lincoln Blvd. Marina del Rey, CA 90292</td>
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<td>Santa Monica</td>
<td>The Angeles Clinic and Research Institute</td>
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<tr>
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<td>1919 Santa Monica Blvd. Santa Monica, CA 90404</td>
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<tr>
<td>Tarzana</td>
<td>Valley Oncology Medical Group and Cedars-Sinai Radiation Oncology</td>
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<td>18133 Ventura Blvd. Tarzana, CA 91356</td>
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<td>Torrance</td>
<td>Torrance Memorial</td>
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<tr>
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<td>Hunt Cancer Institute and Center</td>
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<tr>
<td></td>
<td>3330 Lomita Blvd. Torrance, CA 90505</td>
</tr>
<tr>
<td>West Hollywood</td>
<td>Breast Health Services</td>
</tr>
<tr>
<td></td>
<td>310 N. San Vicente Blvd. West Hollywood, CA 90048</td>
</tr>
</tbody>
</table>

We are continually expanding. Call us at 1-800-CEDARS-1 or visit cedars-sinai.org for our most up-to-date locations. To find a doctor at Torrance Memorial, call 310-891-6717 or visit torrancememorial.org.
Named one of the 10 best hospitals for Cancer in the U.S.

At Cedars-Sinai, the dedication of our doctors and staff has made us one of the most recognized hospitals in the nation. We're proud to have earned a place on U.S. News & World Report's Best Hospitals Honor Roll. This recognition belongs to our entire team who shows up day after day, night after night, to care for patients from around the world.

Learn more about our cancer care: cedars-sinai.org/cancer