



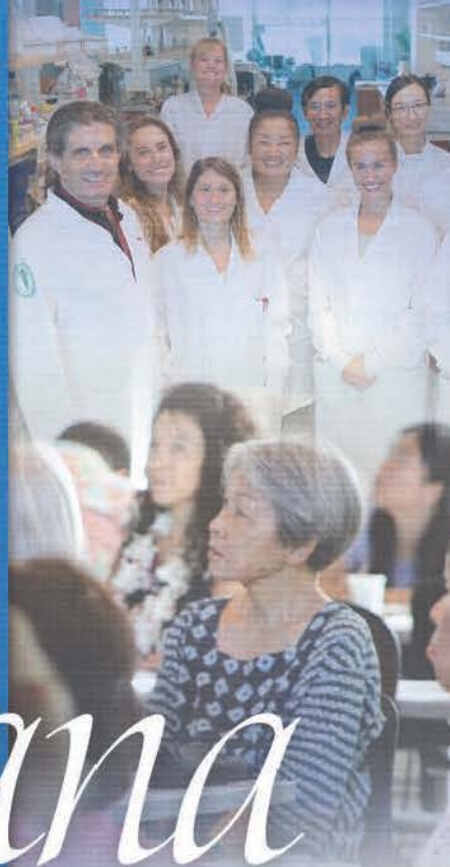
UNIVERSITY OF HAWAII
CANCER CENTER

Holo Manamana

DIVERSITY, HEALTH,
& KNOWLEDGE

50

YEARS OF PROGRESS
IN CANCER RESEARCH



2021 ANNUAL REPORT

NCI Cancer Center

A Cancer Center Designated by the
National Cancer Institute

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Ho'ōla Manamana

The University of Hawai'i Cancer Center fosters diversity, health, and knowledge through our mission to reduce the burden of cancer through research, education, patient care, and community outreach with an emphasis on the unique ethnic, cultural, and environmental characteristics of Hawai'i and the Pacific.

UNIVERSITY OF HAWAII CANCER CENTER

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DIRECTOR'S MESSAGE

2021 WAS BOTH AN EXCITING AND CHALLENGING YEAR AT THE UH CANCER CENTER.

This year we celebrated the 50th year of the National Cancer Act that launched an innovative new approach to cancer research establishing the network of National Cancer Institute (NCI)-Designated Cancer Centers and new funding for cancer research. Our UH Cancer Center staff and faculty also celebrated our 50th year serving our communities to reduce the burden of cancer in Hawai'i and the U.S.-Affiliated Pacific Islands and our 25th year of continuous funding as one of 71 elite NCI-Designated Cancer Centers across the U.S. We are the only NCI-Designated Cancer Center completely focused on cancer in the islands, and our faculty and staff continue to work hard every day to make a difference. We are making progress to end cancer as we know it, but there is still much work ahead. In these pages you will see a small sample of what the faculty and staff have accomplished over the last 50 years as well as current projects that carry us in new directions.

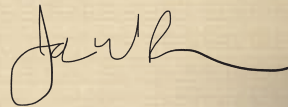
Along with the excitement of these landmarks, we continue to deal with the challenges of the COVID-19 pandemic, some of which will be felt well beyond its ending. We have found that in many rural areas of the state cancer screenings have declined during the pandemic. This may lead to some cancers being diagnosed at more advanced stages, when they may be harder to treat. You will learn how COVID-19 has affected our clinical trials work and how we are innovating to meet that challenge. This report also describes how our researchers are working to understand how genetics, race/ethnicity, and socioeconomic factors influence the risk of COVID-19 infection.

This year, Dr. Randall Holcombe left the UH Cancer Center, after having served as our Director for the last five years. We take a moment here to reflect on his many accomplishments at UH. We have also made several leadership changes. After years of outstanding leadership in our Population Sciences in the Pacific Program,

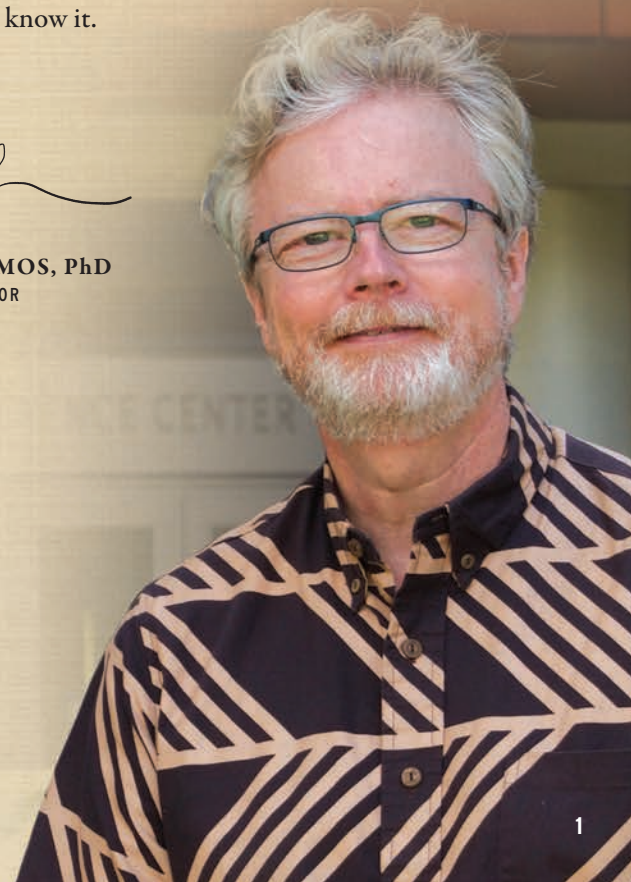
Drs. Thomas Wills and Herbert Yu stepped down to focus on their research. We are fortunate that Drs. Lani Park and Pallav Pokhrel have enthusiastically taken on leadership of the program to steer it into its next phase. We have recruited Dr. Xin Chen, an internationally renowned liver cancer expert, as the new co-leader of the Cancer Biology Program. Dr. Chen will bring her expertise to bear on the high incidence of liver cancer in Hawai'i. We welcomed as the new Medical Director of our Clinical Trials Office, Dr. Jonathan Cho, who has more than 30 years experience as an oncologist in Hawai'i. I also appointed Dr. John Shepherd as Interim Deputy Director to work with me to serve the UH Cancer Center during this transition. Finally, the search for the new Director is fully underway.

I am honored to serve this wonderful community of faculty and staff and all our partners across Hawai'i and the Pacific in support of our united mission to end cancer as we know it.

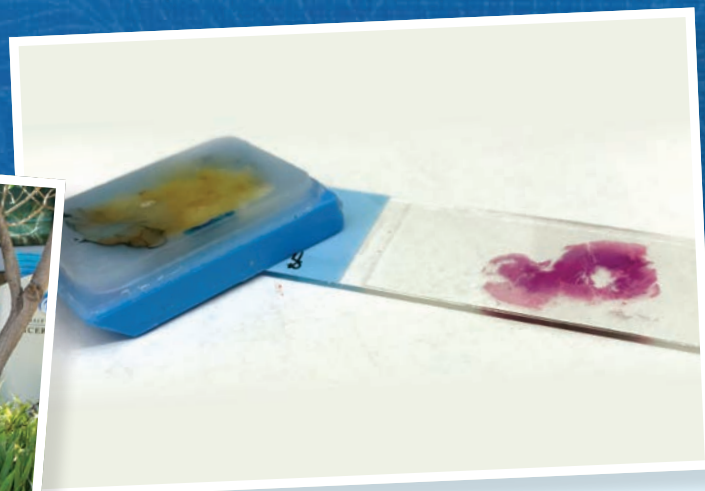
Mahalo,



JOE W. RAMOS, PhD
INTERIM DIRECTOR



HAWAI'I TUMOR REGISTRY: COLLECTING ESSENTIAL DATA



ABOVE: GLASS SLIDES WITH TUMOR TISSUE SECTIONS STAINED WITH HEMATOXYLIN AND EOSIN. LEFT: THE HAWAI'I TUMOR REGISTRY TEAM

As early as 1939, cancer was the leading cause of death in Hawai'i. However, it was not until 1960 that the Hawai'i Tumor Registry (HTR) was established by the Hawai'i Medical Association, Hawai'i State Department of Health, and the Hawai'i Pacific Division of the American Cancer Society. One of the earliest statewide cancer registries, HTR is responsible for cancer surveillance in the state.

The HTR has been operated by the University of Hawai'i Cancer Center since 1973, the year it became a funded registry of the National Cancer Institute (NCI) Surveillance, Epidemiology, and End Results (SEER) Program. The HTR is one of only 20 NCI SEER registries nationwide and collects confidential data on each cancer diagnosis made in Hawai'i, as well as treatments patients receive, and outcomes.

HTR cancer data are used to generate cancer incidence and mortality rates in order to track cancer trends in Hawai'i and nationally, essential for research at the Cancer Center and public health activities. Because of Hawai'i's unique multiethnic population, the HTR has played a key role in understanding how cancer affects different racial and ethnic minorities.

HTR's major achievements in the Cancer Center's past 50 years include:

- Being selected as a founding member of the NCI's SEER program;
- Consistent recognition as one of the top-performing central cancer registries in the U.S. and Canada, with GOLD standard awards from the North American Association of Central Cancer Registries;
- Being an integral component of groundbreaking research on ethnic disparities in cancer, including the Multiethnic Cohort Study and numerous other studies of cancer causes, development, and outcomes; and
- Establishment of a population-based tissue bank of clinically-analyzed and explained archival tumors which has contributed to multiple translational cancer studies.

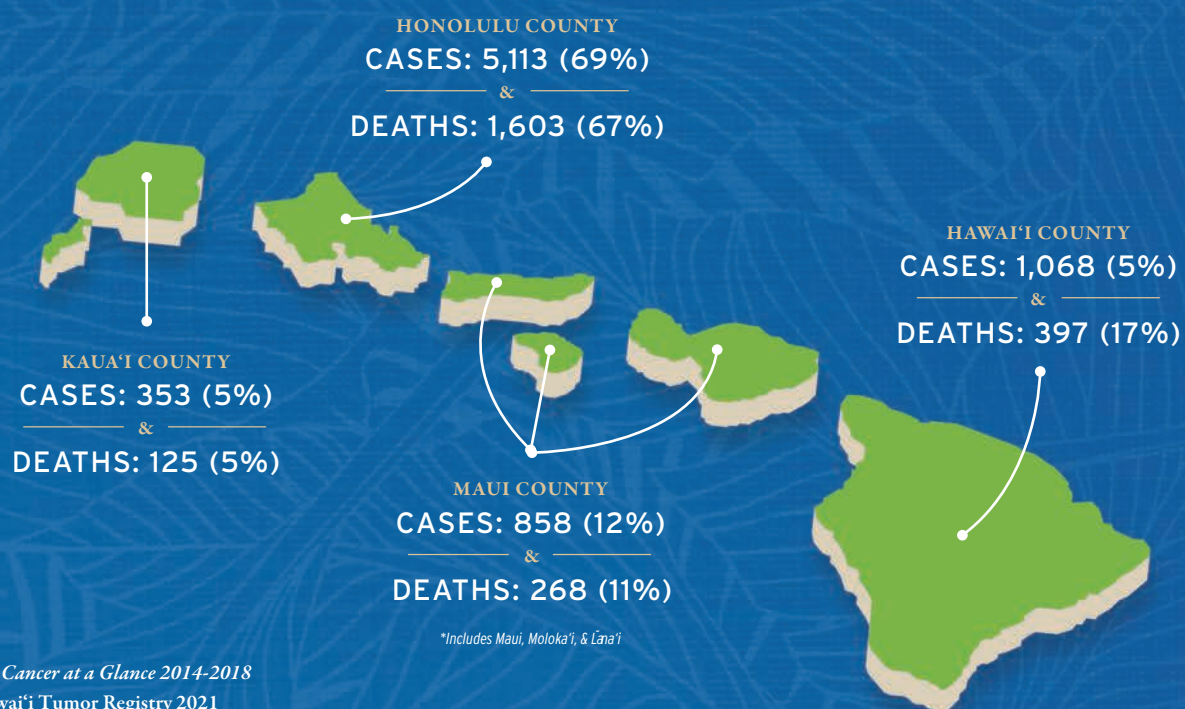
SNAPSHOT OF CANCER IN HAWAI'I

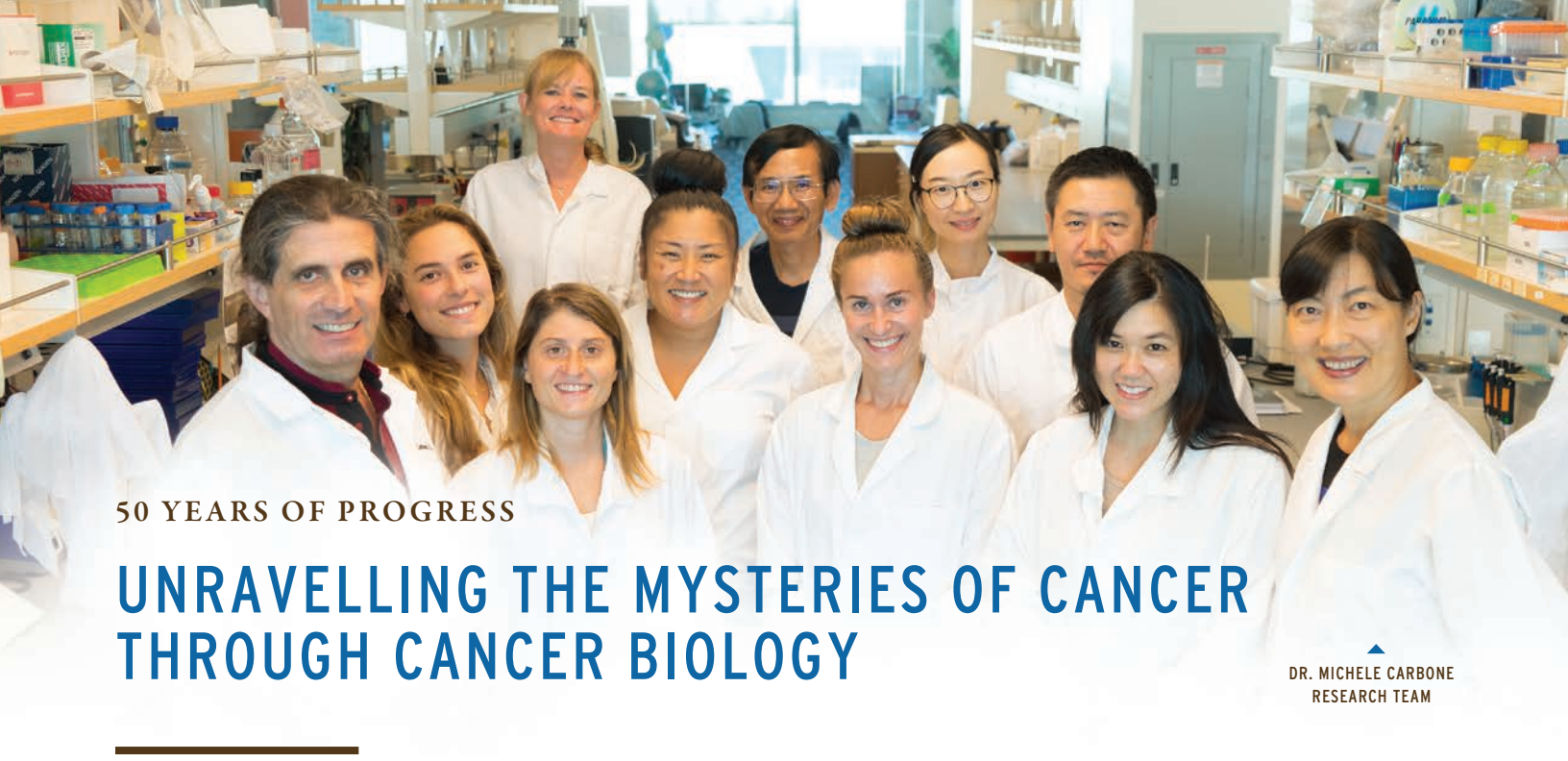
- Approximately **7,400** Hawai'i residents are diagnosed with cancer each year.
- In 2020, there were more than **67,000** Hawai'i residents living with cancer.
- More than **2,300** Hawai'i residents die of cancer each year.
- The average age of diagnosis is **67 years** for men and **64 years** for women.
- Cancer is the **second leading cause** of death (after heart disease) in Hawai'i.

HAWAI'I CANCER *at a* GLANCE

AVERAGE ANNUAL NUMBER OF CANCER CASES AND DEATHS, BY COUNTY, HAWAI'I, 2014-2018

(INCLUDES % OF TOTAL NUMBER OF CASES AND DEATHS)





50 YEARS OF PROGRESS

UNRAVELLING THE MYSTERIES OF CANCER THROUGH CANCER BIOLOGY

DR. MICHELE CARBONE
RESEARCH TEAM

Since the signing of the National Cancer Act in 1971, there has been a concerted attack on cancer, and although the battle seems endless, great strides have been made through collaborative research among cancer researchers spanning Hawai'i, the U.S., and the world. Because cancer is a complex disease comprised of over 200 different cancer types, uncovering better ways to detect cancer early and identify new treatments continues to challenge scientists worldwide.

The UH Cancer Center's Cancer Biology Program (CBP) has been making important discoveries in key areas that positively impact cancer incidence and decrease mortality. The CBP focuses on identifying biological causes of cancer, understanding how cancer progresses and moves to other parts of the body, and developing drugs and other therapies to stop disease progression and save lives.

Significant contributions and discoveries of the Cancer Biology Program (CBP) include:

- Understanding how gene and environment interactions cause cancers to form, some through damaging key genes. CBP researchers discovered the BAP1 cancer syndrome, a disease in which mutations in the BAP1 gene affect how cells respond to carcinogens in the environment. Affected individuals are at increased risk of developing mesothelioma, melanoma, renal cell carcinoma, and other malignancies. Another CBP team has identified new insights as to how patients with

Fanconi anemia, a hereditary condition that hinders DNA repair, are at increased risks of developing acute myeloid leukemia and some solid tumor cancers.

- CBP teams have also identified other genes involved in cancer and are actively working to understand them and stop cancers from developing and spreading. These include genes, such as RasGRP, which can drive the formation and growth of some skin cancers; HMGB1, a protein that plays a role in how prolonged inflammation can lead to cancers like mesothelioma; and RSK, a protein that is part of the driving force behind cancer metastasis, or spread, in highly invasive brain tumors and advanced melanomas.
- Our biologists are working to understand the processes that underlie sepsis, a life-threatening condition that increases the risk of death among Native Hawaiians with cancer.
- Hawai'i is home to many endemic species, and these may contain natural compounds that could become essential components of new cancer treatments. In the 1990s, cryptophycin, found in blue-green algae, was identified as active against cancer. More recently, hirsutinolide, a compound found in ironweed, consumed as an herbal tea, has been shown in cellular assays to have significant activity against some cancers. UH Cancer Center researchers have also investigated anti-cancer properties of well-known plants like noni and pohua berries.

POPULATION SCIENCES IN THE PACIFIC PROGRAM ADDRESSING CANCER DISPARITIES



CANCER EPIDEMIOLOGY

Established in 1993, the Multiethnic Cohort (MEC) Study is the most ethnically-diverse cohort study in the world. The MEC is a collaboration between the UH Cancer Center and the University of Southern California, and the cohort of 215,000 participants are primarily Native Hawaiians, Japanese, Whites, Latinos, and African Americans.

Findings from the MEC's numerous world-renown cancer studies have provided data relevant not only to Hawai'i but also other states and countries. The MEC study has examined the role of alcohol, diet quality, body fat distribution and physical activity in determining a person's risk for cancer.

The UH Cancer Center's epidemiology program was one of the first to focus on the role of diet in the causation of cancer, taking advantage of the variety of ethnic foods in Hawai'i. Its studies on Japanese immigrants to Hawai'i provided some of the most convincing data on the changing cancer rates among different generations of immigrants.

The MEC Study revealed that obesity has overtaken viral hepatitis as a major cause of chronic liver disease in Hawai'i's population, and the risk of lung cancer among Native Hawaiians matched that of African-Americans, indicating a 50% increase compared to Whites.

CANCER PREVENTION AND CONTROL

UH Cancer Center researchers were among the first to investigate the health effects of electronic cigarette use. Working with Hawai'i high schools, they uncovered a growing public health concern about the relationship between use of e-cigarettes by Hawai'i's youth to initiation of cigarette smoking and incidence of respiratory diseases, like asthma and chronic obstructive pulmonary disease (COPD).

In collaboration with researchers from the University of Guam, UH Cancer Center researchers also developed the first cessation program for areca (betel) nut use, demonstrating the program's effectiveness in a clinical trial. Worldwide, about 600 million people use betel nut for cultural and recreational purposes, and use is particularly widespread throughout Southeast Asia and the Pacific, including Guam. Research has shown the devastating effects of its use, which include cancers of the oral cavity.

Prevention and control researchers have studied the effect of hula on the physical fitness and psychosocial well-being of breast cancer survivors. They have explored culturally sensitive approaches to increase colorectal cancer screening rates among Native Hawaiian men with the aim of reducing the disproportionately high rate of cancer deaths in this group.



ADVANCING CLINICAL TRIALS THROUGHOUT THE PACIFIC

2021 was an exciting year for the Pacific in terms of clinical trials, which play a significant role in decreasing cancer mortality through the development of new effective cancer treatments. Since the establishment of the UH Cancer Center in 1971, over 16,000 individuals have been enrolled onto cancer clinical trials facilitated by Cancer Center scientists. In our mission to reduce the burden of cancer through research and patient care, the UH Cancer Center continues to prioritize the expansion of access to clinical trials in Hawai'i to patients who live outside of O'ahu, as well as throughout the greater Pacific.

A partner organization in Guam, FHP Health Center, has begun enrolling cancer patients onto clinical trials. In April of 2021, UH Cancer Center staff provided intensive training for FHP's sole clinical research nurse about adhering to protocols and monitoring patients on clinical trials. As one of Micronesia's leading medical clinics, FHP's ability to provide the highest quality of care for its cancer patients will have a profound impact on cancer mortality in Guam.



UH CANCER CENTER STAFF JOIN CLINICAL TRIALS
STAFF AT FHP HEALTH CENTER IN GUAM

In order to improve cancer care in local communities, UH Cancer Center researchers have recently developed five investigator-initiated clinical studies tailored to the needs of the state's population. Through these studies, researchers seek to better understand and reduce cancer disparities that are unique to Hawai'i and the Pacific.

Lastly, we are steps closer to beginning construction on Hawai'i's first Early Phase Clinical Research Center. Since 2019, the UH Cancer Center has been securing state, federal, and philanthropic funds and preparing designs for the state's first research center focused on early phase clinical trials. The design and bidding phases of the project neared completion in 2021, and construction is scheduled to begin in 2022.

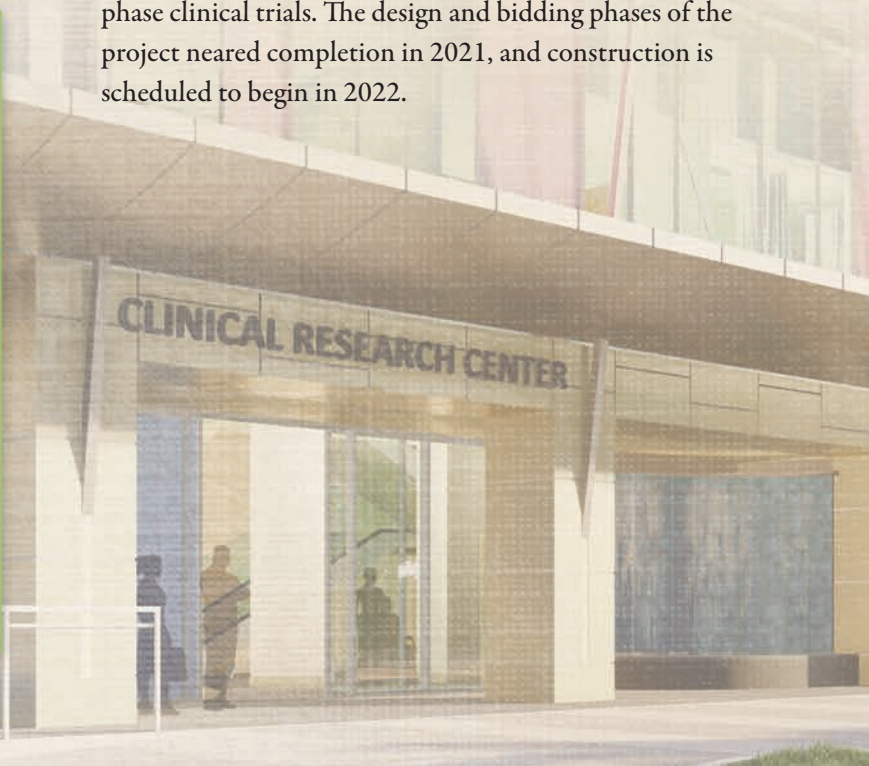
Due to the COVID-19 pandemic,
we have been seeing a decrease in
patient enrollment to clinical trials.

PATIENTS ENROLLED ON CLINICAL TRIALS 2021

Interventional Therapeutic: **58**

Non-Interventional Epidemiology,
Observational, & Outcome Studies: **504**

Total Patients Enrolled on Trials: **562**

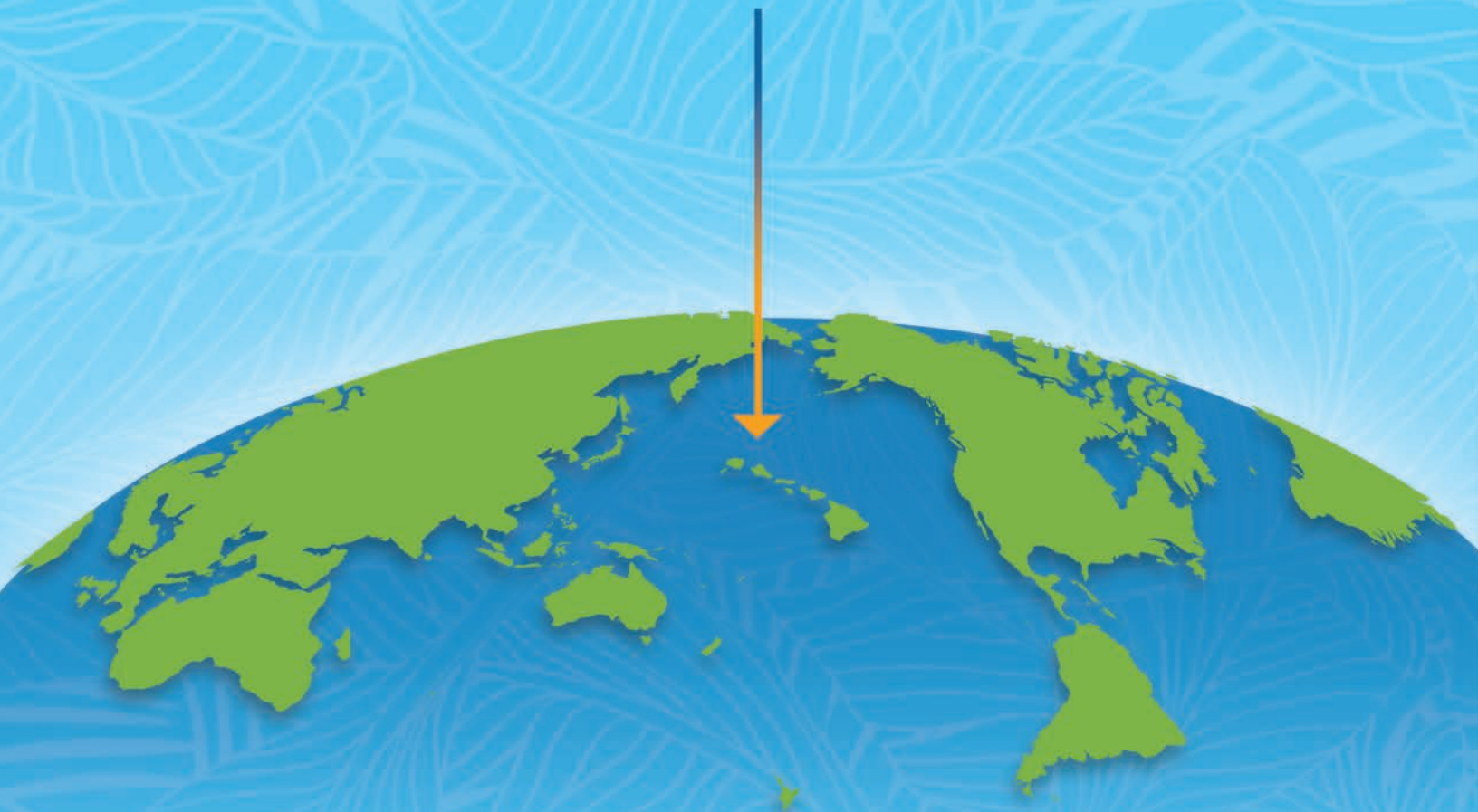


2021 GLOBAL *Collaborations*

10 Countries

27 U.S. States & Territories

78 Universities & Institutions



NEW LEADERSHIP

WELCOME, DR. JONATHAN CHO!

We would like to welcome Jonathan Cho, MD, who joined the UH Cancer Center in April as the new Medical Director of the Clinical Trials Office. Cho is responsible for exploring ways to increase clinical trial access and enrollment throughout Hawai'i. His mission is to reduce obstacles to clinical trial participation, especially with regard to minority and underserved populations.

A faculty member since 1991, Cho previously served as the Principal Investigator of the UH Cancer Center's NCI-funded Hawai'i Minority-Based Community Clinical Oncology Program. During this time, he expanded the infrastructure of clinical trial activities at the Cancer Center, allowing for the conduct of both investigator-initiated translational research and pharmaceutical-sponsored trials.

Prior to being named Medical Director here at the UH Cancer Center, Cho was a community medical oncologist/hematologist for nearly 30 years, and was one of six physicians treating cancer and blood disorders at Hawai'i Cancer Care.

"Cancer patients, their caregivers, and care providers should feel optimistic that advances in the prevention, diagnosis, and treatment of cancer will continue. Research brings hope," says Cho.

**"OVER THE PAST 20 YEARS, WE HAVE
WITNESSED SIGNIFICANT ADVANCES
IN CANCER CARE. THESE ADVANCES
ARE THE RESULT OF RELENTLESS
EFFORTS BY THE CANCER
RESEARCH COMMUNITY."**

JONATHAN CHO, MD

Cho is a graduate of the University of Hawai'i's John A. Burns School of Medicine. He completed his internship and residency in Internal Medicine at the University of California at Irvine, a fellowship in Medical Oncology at the City of Hope National Medical Center in Duarte, California, and a combined Medical Oncology/Hematology Fellowship at the University of California, Irvine.

JONATHAN CHO, MD



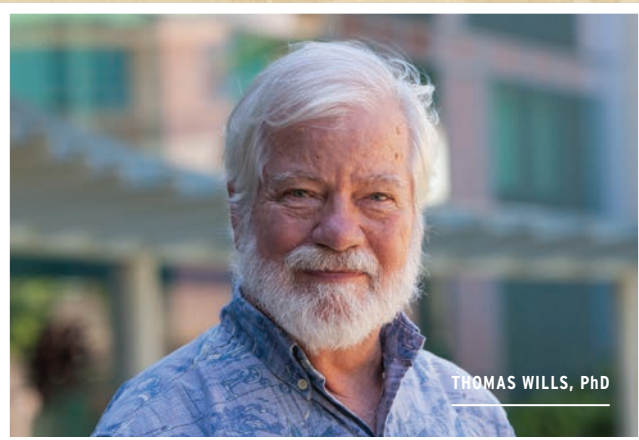
NEW LEADERSHIP

POPULATION SCIENCES IN THE PACIFIC PROGRAM WELCOMES NEW CO-LEADERS

Following thorough reviews with senior leadership and extensive discussion among program faculty, Sung-shim (Lani) Park, PhD, MPH, was appointed as the new co-leader of the UH Cancer Center's Population Sciences in the Pacific Program (Cancer Epidemiology). Park has over 10 years of experience working with the Multiethnic Cohort Study and has ongoing collaborations with large consortia such as the Population Architecture using Genomics and Epidemiology (PAGE) and Transdisciplinary Research in Cancer of the Lung (TRICL). Her research focuses on identifying genetic, health, behavioral, and environmental factors that contribute to racial-ethnic differences in cancer risk.

At the conclusion of a nationwide search, Pallav Pokhrel, PhD, MPH, was selected as the new co-leader of the UH Cancer Center's Population Sciences in the Pacific Program (Cancer Prevention in the Pacific). Pokhrel joined the UH Cancer Center faculty in 2009. His research focuses on reducing tobacco-related cancer disparities and preventing the abuse of emerging tobacco products. He is currently investigating the effects of e-cigarette marketing on young adults, the effects of e-cigarette use on tobacco use behavior, psychosocial predictors of racial-ethnic disparities in tobacco use, and application of self-regulation theories on tobacco use prevention and cessation interventions.

Mahalo to Thomas Wills, PhD, and Herbert Yu, MD, PhD, MSc, for leading the Population Sciences in the Pacific Program for the last 10 years. We appreciate their dedication and guidance in moving the program forward. Both have stepped down to focus on their research.



PROVIDING EDUCATION

QUEST STARLIGHT LECTURES INFORM THE PUBLIC OF LATEST RESEARCH

In 2021, Quest for a Cure celebrated its 11th anniversary. Before COVID-19, this public event was held annually, in person, on a Saturday morning, consisting of presentations and panel discussions by UH Cancer Center and community experts, as well as vendor exhibits where guests could receive a quick skin cancer screening or information about subjects like genetic counseling.

This year, due to the pandemic, the half-day event pivoted to a webinar format with an hour-long lecture series every month from April through July, and the name was changed to the Quest Starlight Lecture series. Topics include: Diet, Body Composition and Cancer, Brain Cancer, Cancer and Diabetes, and Pancreatic Cancer, with speakers from the UH Cancer Center as well as clinician partners from our oncology community. The overwhelming popularity of the event spurred an additional event in October 2021 focused on Breast Cancer.

Going forward, Starlight Lectures will be held quarterly, starting in February 2022. If you would like to be added to our Quest mailing list, please send an email to quest@cc.hawaii.edu. If you missed any of the past lectures, please visit our website at uhcancercenter.org/quest to access the archives.



2021 DATA:



5

VIRTUAL EVENTS



431

TOTAL ATTENDANCE



106

PEOPLE ATTENDED
MORE THAN ONE EVENT



117

QUESTIONS ASKED

PROVIDING EDUCATION

"CREATE" STRENGTHENS CANCER CENTER'S ROLE AS CANCER RESEARCH EDUCATION HUB

The Cancer Research Education, Advancement, Training and Empowerment (CREATE) program at the UH Cancer Center offers training experiences in Cancer Biology and Population Sciences in the Pacific for undergraduate sophomores and juniors, and for first-year graduate students. A collaboration between the University of Hawai'i and the University of Guam, the program trains the next generation of researchers from our multiethnic population to address cancer health disparities affecting their communities.

This year, four first-year graduate students entered the program in the spring, and another enrolled in the fall.

The summer program welcomed 16 undergraduate students. All participants were from Hawai'i or Guam and were paired with UH Cancer Center faculty to work on research projects in the Cancer Center's two programs. The trainees participated in seminars, contributed to manuscript preparation and journal clubs, developed and presented posters, and received training in the responsible conduct of research, laboratory safety, and protection of human subjects in research.

The CREATE program demonstrates the UH Cancer Center's commitment to providing innovative training, education, and mentorship experiences to students interested in cancer research.



2021 CREATE SUMMER PROGRAM UNDERGRADUATE STUDENTS AND PROGRAM STAFF

ADVOCATING FOR ADVANCED PRACTICE PROVIDERS IN CLINICAL RESEARCH

Successful treatments for cancer have resulted from clinical trials, enabling people to live longer and enjoy fulfilling lives. Ideally, all eligible individuals should be offered the option to participate in clinical trials. However, studies have shown that during the COVID-19 pandemic, patient enrollment on clinical trials has been significantly negatively impacted because of factors like delayed in-person healthcare visits and delayed cancer screenings, resulting in possibly late diagnoses of more advanced cancers. Expanding the ranks of advanced practice providers (APPs) in clinical research may be a viable way to improve clinical trials participation in the presence of COVID-19.

As an APP, associate researcher, and oncology nurse practitioner at the UH Cancer Center, Christa Braun-Inglis, DNP, MS, APRN-Rx, FNP-BC, AOCNP, holds a hybrid position as a researcher and part-time clinician working with breast cancer patients at the Kapi‘olani Medical Center for Women and Children. She is also on a mission to recruit more APPs to be involved in clinical research.

APPs are nurse practitioners, physician assistants, clinical nurse specialists, and other licensed, nonphysician providers who are involved in the overall care of patients. As cancer treatments have become more complex and cancer patients are surviving longer, the need has grown for the specialized skills and knowledge of licensed nonphysician health practitioners such as APPs to be utilized outside the scope of cancer treatment.

APPs can have a significant impact in clinical research as they offer valuable perspectives that can enhance clinical trials, from increasing accrual to educating participants, developing and improving protocols, and providing feasibility analyses and scientific review. They can identify potential study participants, follow them on trials, and even enroll them as their own patients on studies related to symptom management and quality of life.



CHRISTA BRAUN-INGLIS WITH PATIENT

Braun-Inglis continues to embrace her mission to recruit even more oncology APPs who want to participate in clinical research as she inspires, mentors, educates, and helps train, and have them registered with the National Cancer Institute (NCI). Since 2018, she has successfully recruited 10 oncology APPs in Hawai‘i who can now enroll patients onto clinical trials.

“To become more involved in research, APPs must have a clear sense of purpose and understand the extent of their authority. They should be made aware of trials that may match their patients’ needs and provided with the flexibility and freedom to work to their full potential,” Braun-Inglis said.

PROVIDING EDUCATION

EDUCATING FUTURE CLINICIANS ABOUT CLINICAL TRIALS



LEFT: CLINICAL TRIALS SHADOWING PROGRAM'S 2020 AND 2021 STUDENT COHORTS. ABOVE: TREVOR TORIGOE

The UH Cancer Center's Clinical Trials Program for first-year medical students of the John A. Burns School of Medicine (JABSOM) continues to grow and evolve. This fall, 77 students were introduced to clinical trials, and the Clinical Trials Shadowing Program welcomed our 7th cohort to the Cancer Center.

Since 2003, the UH Cancer Center has been providing clinical trials education to JABSOM medical students. Students work on problem-based learning scenarios featuring clinical trials, using the National Cancer Institute's Clinical Trials Education Series—Cancer Clinical Trials: The In-Depth Program. To date, more than 1,000 future doctors—some of whom are now practicing physicians—have been introduced to the value of clinical research and clinical trials for the care of their patients.

The UH Cancer Center's Clinical Trials Shadowing Program, an option for JABSOM students participating in the Community Health and Services program, is a nine-month opportunity for students to get a glimpse into what clinical trials research entails. They work alongside oncologists at the Tripler Army Medical Center, The Queen's Medical Center, Hawai'i Pacific Health, and Kuakini Medical Center.

Trevor Torigoe, a 2020 cohort Shadowing Program student and MD/PhD candidate said, "The UH Cancer Center's Community Health program was an amazing experience and classmates Chloe, Rachel, and I are truly grateful for all of the time and care that was invested in our learning and development. We were extremely fortunate to be able to work with and learn from amazing physicians, who opened up their practices to us including Drs. Jeffrey Berenberg, Jami Fukui, Jared Acoba, and Clifton Layman."

ENGAGING COMMUNITIES

PROMOTING SUN PROTECTION EDUCATION



The UH Cancer Center, the Hawai'i State Department of Health, and the American Cancer Society founded the Hawai'i Skin Cancer Coalition (HSCC) in 1995. The HSCC's mission is to provide clear, concise messaging on skin cancer prevention and detection for both the public and health professionals. Since its establishment in 1995, the HSCC has promoted sun protection education in Hawai'i in a manner that is mindful of the rich cultural diversity of the state.

Skin cancer is the most common type of cancer in the U.S., with at least one in every five adults developing the disease within their lifespan. Hawai'i's close proximity to the equator puts residents at a higher risk than those residing in areas that are farther from the equator. To reduce skin cancer incidence among those most susceptible to the disease, the HSCC is creating sun protection initiatives for Hawai'i's high school athletes, developing educational videos about skin cancer for the public, and presenting information at community groups about skin cancer prevention and early detection. The Hawai'i Skin Cancer Coalition is an invaluable asset in the state's fight against skin cancer.

REDUCING CANCER INCIDENCE THROUGH SUBSTANCE USE PREVENTION

Studies have shown that adolescents in Guam have higher rates of tobacco product and areca (betel) nut use compared to the general U.S. population. Scientists have long established that those who use these substances have a greater risk of developing cancer. To prevent tobacco use and ultimately decrease cancer incidence in the Pacific, UH Cancer Center researcher Pallav Pokhrel, PhD, MPH, and collaborators from the University of Guam are conducting a study that seeks to develop and test the use of a tobacco, e-cigarette, and areca (betel) nut prevention program that could be implemented and evaluated at public middle schools across Guam.

The study is funded by the Pacific Health Partnership for Cancer Health Equity (U54CA143727-11), and is one of many projects at the UH Cancer Center working to reduce the burden of cancer in Hawai'i and the greater Pacific through prevention and education.



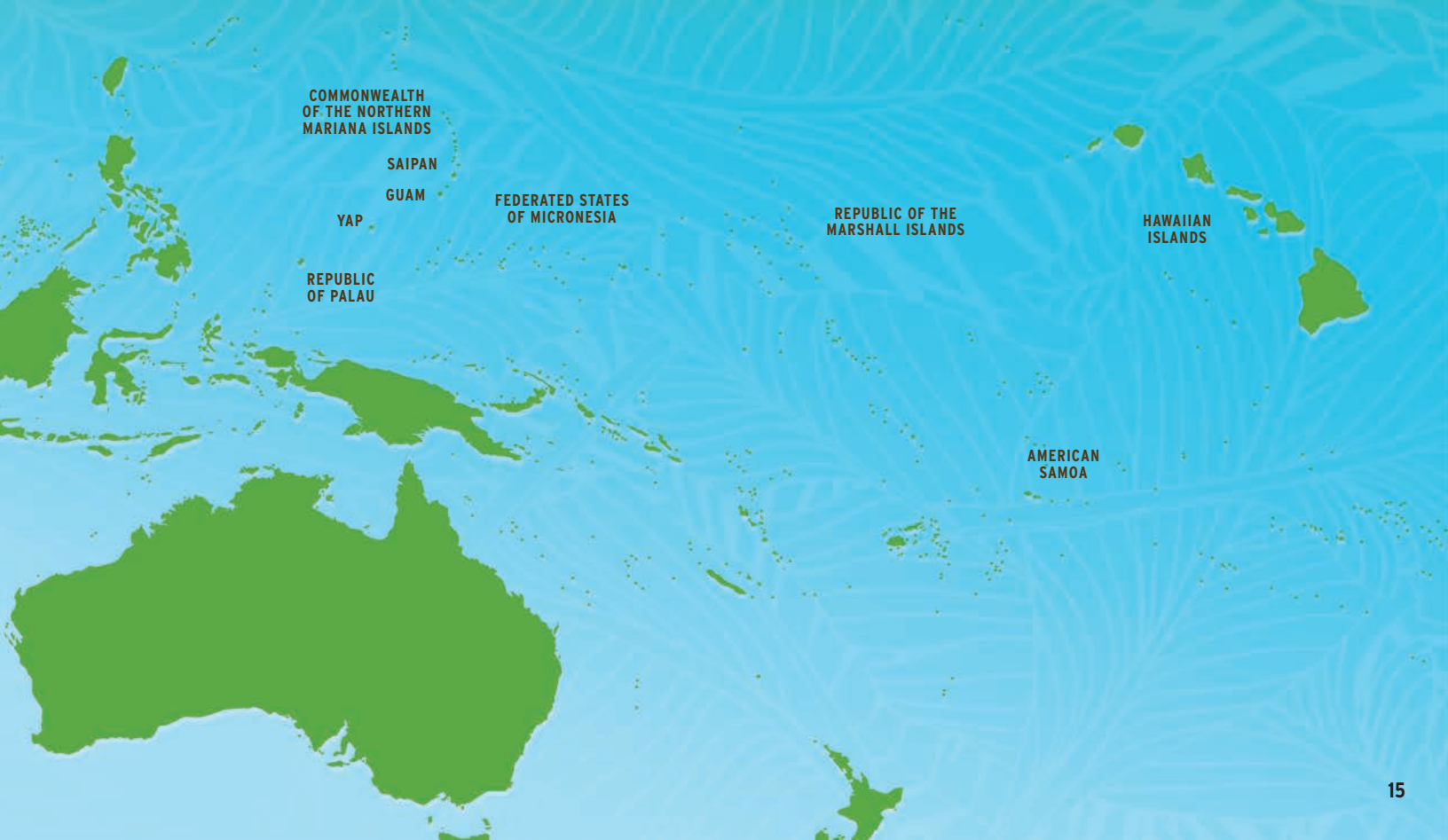
ARECA (BETEL NUT) PALM

PACIFIC ISLANDS AT A GLANCE

SNAPSHOT OF CANCER IN THE USAPI

TOP 13 CANCER FOR ALL USAPI	CASES	%	RANK
LUNG & BRONCHUS	922	15%	1
BREAST	921	15%	2
PROSTATE	587	9%	3
COLON & RECTUM	585	9%	4
UTERUS	416	7%	5
LIVER	357	6%	6
CERVICAL CANCER, INVASIVE	339	5%	7
TOBACCO-RELATED ORAL CAVITY & PHARYNX	299	5%	8
LEUKEMIA	197	3%	9
THYROID	189	3%	10
STOMACH	173	3%	11
NASOPHARYNX	135	2%	12
ILL-DEFINED & UNSPECIFIED (UNKNOWN + MISC)	130	2%	13

Proportional Distribution of Top 13 Incident (New) Cancers all USAPI 2007-2018, except Republic of the Marshall Islands (RMI) 2018 cases.



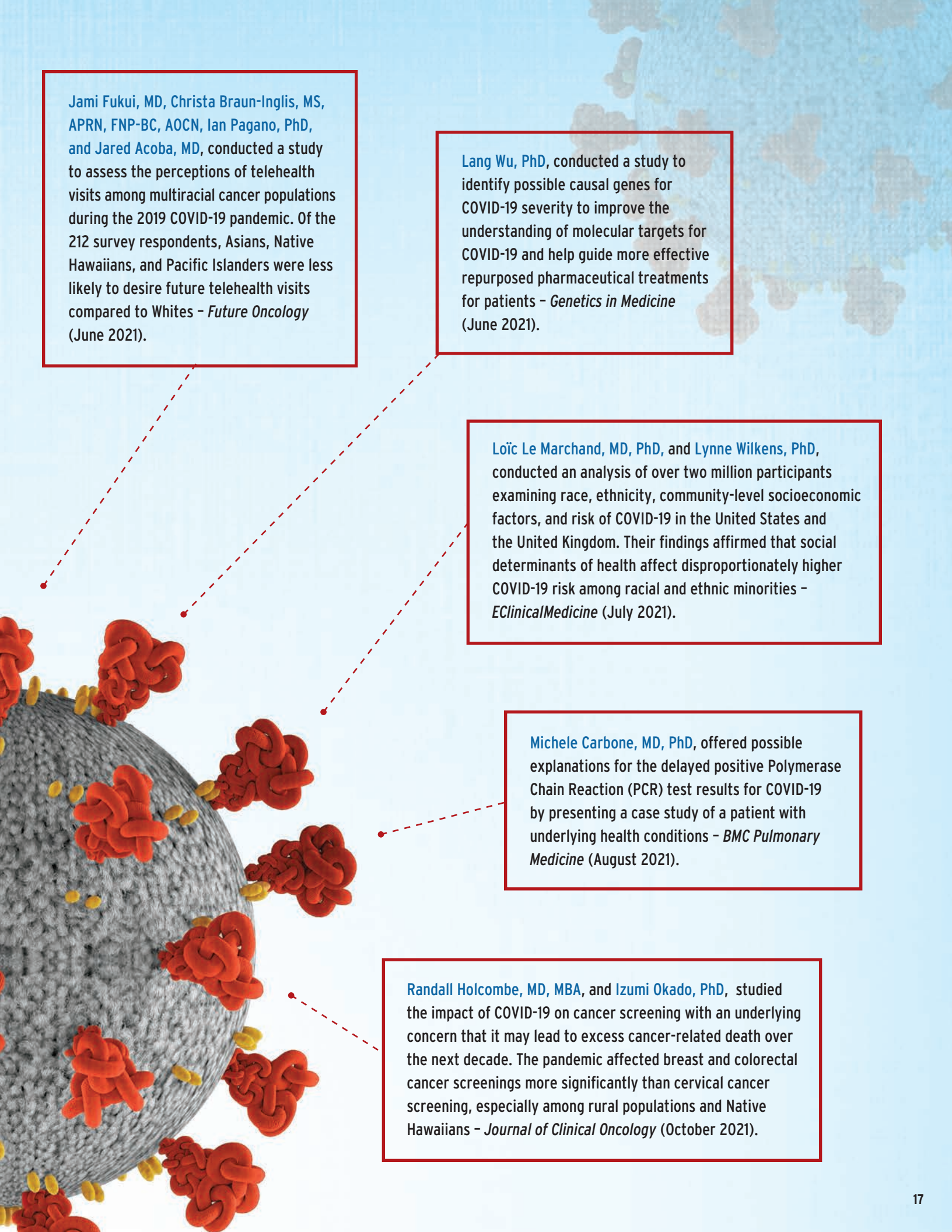
COVID-19 HIGHLIGHTS

COVID-19 IS AN INFECTIOUS DISEASE CAUSED BY THE SARS-COV-2 VIRUS THAT EMERGED IN DECEMBER 2019. THE DISEASE WAS RECOGNIZED AS A PANDEMIC IN MARCH 2020. UH CANCER CENTER RESEARCHERS, IN COLLABORATION WITH NATIONAL AND INTERNATIONAL COLLEAGUES, HAVE BEEN ENGAGED IN ADDRESSING THE MAJOR BURDEN OF THIS INFECTIOUS DISEASE.

Patients with cancer may be at higher risk of adverse outcomes from severe acute respiratory syndrome. [Jared Acoba, MD](#), and the COVID-19 and Cancer Consortium examined data from almost 5,000 patients with cancer and COVID-19 to identify prognostic clinical factors, including laboratory measurements and anticancer therapies – *Annals of Oncology* (June 2021).

Mental health impacts of the pandemic continue to be widespread. [Ian Pagano, PhD](#), explored the use of a mobile app, COVID Coach, to provide tools and resources to address COVID-19-related stress – *Journal of Medical Internet Research* (March 2021).

A comprehensive review of COVID-19, co-authored by [Michele Carbone, MD, PhD](#), discussed topics such as origins of the disease, its detection, death rates, susceptibility, transmission and vaccines. The article provides a reliable scientific source of information regarding facts about COVID-19 – *Journal of Thoracic Oncology* (January 2021).



Jami Fukui, MD, Christa Braun-Inglis, MS, APRN, FNP-BC, AOCN, Ian Pagano, PhD, and Jared Acoba, MD, conducted a study to assess the perceptions of telehealth visits among multiracial cancer populations during the 2019 COVID-19 pandemic. Of the 212 survey respondents, Asians, Native Hawaiians, and Pacific Islanders were less likely to desire future telehealth visits compared to Whites – *Future Oncology* (June 2021).

Lang Wu, PhD, conducted a study to identify possible causal genes for COVID-19 severity to improve the understanding of molecular targets for COVID-19 and help guide more effective repurposed pharmaceutical treatments for patients – *Genetics in Medicine* (June 2021).

Loïc Le Marchand, MD, PhD, and Lynne Wilkens, PhD, conducted an analysis of over two million participants examining race, ethnicity, community-level socioeconomic factors, and risk of COVID-19 in the United States and the United Kingdom. Their findings affirmed that social determinants of health affect disproportionately higher COVID-19 risk among racial and ethnic minorities – *EClinicalMedicine* (July 2021).

Michele Carbone, MD, PhD, offered possible explanations for the delayed positive Polymerase Chain Reaction (PCR) test results for COVID-19 by presenting a case study of a patient with underlying health conditions – *BMC Pulmonary Medicine* (August 2021).

Randall Holcombe, MD, MBA, and Izumi Okado, PhD, studied the impact of COVID-19 on cancer screening with an underlying concern that it may lead to excess cancer-related death over the next decade. The pandemic affected breast and colorectal cancer screenings more significantly than cervical cancer screening, especially among rural populations and Native Hawaiians – *Journal of Clinical Oncology* (October 2021).

IMPROVING OUTCOMES FOR LIVER CANCER PATIENTS THROUGH CLINICAL TRIALS

In September of 2018, Byron Rodrigues was diagnosed with hepatocellular carcinoma, the most common form of liver cancer. Upon diagnosis, Rodrigues immediately received surgery to remove the cancer. He did well until the cancer returned the following year in December.

Rodrigues' oncologist, UH Cancer Center researcher Jared Acoba, MD, suggested he participate in the Phase II Study of TSR-022 in combination with TSR-042, a clinical trial for the treatment of advanced hepatocellular carcinoma. He agreed and began immunotherapy in January 2020, and he will remain on this treatment until early 2022. So far, he says he is doing well, even though managing side effects from the treatment was sometimes difficult. "After some time of adjustment, I realized that all of this is worthwhile," said Rodrigues.

Although the process has been stressful, Rodrigues feels his experience has largely been positive. Dr. Acoba is not only his oncologist, but also his 30-year-long

friend from 'Iolani High School. "I don't think we ever thought we could be helpful to each other's lives in this unique way," Rodrigues stated. "If you have cancer and have an opportunity to be in a clinical trial, do not hesitate to participate! You can be an integral part of helping people around the world, while making a difference in medical advancement."

Clinical trials are research studies designed to test the safety and effectiveness of new treatments for cancer. "The UH Cancer Center develops studies to specifically address the health needs of the people of Hawai'i. The study in which Byron is participating focuses on the treatment of liver cancer, a cancer which is diagnosed at a very high incidence rate in Hawai'i," said Dr. Acoba. "Patients who enroll in clinical trials play a significant role in the discovery of new and improved ways to prevent, detect, and treat cancer."

BYRON RODRIGUES, LEFT,
WITH HIS ONCOLOGIST,
DR. JARED ACOPA, RIGHT



CLINICAL TRIAL INFLUENCES CANCER PATIENT TO BECOME AN ONCOLOGIST

When he was just a few months old, Nicolas Villanueva was diagnosed with hepatoblastoma, a rare liver cancer that can affect children between birth and the age of three. Doctors rushed to remove the cancer in Villanueva's liver and began a regimen of chemotherapy. His pediatric oncologist recommended that Villanueva's parents enroll him in a clinical trial through the UH Cancer Center, which would offer them the latest treatment options.

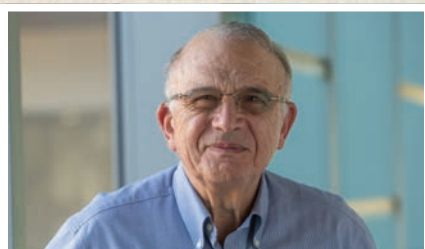
Villanueva spent a lot of time in the hospital as a child and had routine follow-up care to monitor for any cancer recurrence throughout his childhood. Although Villanueva was too young at diagnosis to recall memories of his cancer treatments, he has fond memories of attending camp for childhood cancer survivors and for those undergoing treatment. These experiences, along with his appreciation for clinical trials and having survived his battle with cancer, influenced Villanueva to become a physician. Throughout high school and college, Villanueva volunteered at hospitals, shadowed physicians and participated in cancer research. These activities solidified his decision to become an oncologist and to give back by making a difference for cancer patients.

In 2013, Villanueva graduated from the John A. Burns School of Medicine at the University of Hawai'i. He completed his internal medicine residency at New York Presbyterian Hospital-Columbia Medical Center and did his Hematology/Oncology Fellowship at the University of California San Diego. Villanueva now specializes in adult hematology/oncology at the Sullivan Care Center at The Queen's Medical Center-West O'ahu, The Queen's Medical Center in Honolulu, and Kuakini Medical Plaza. As an oncologist who is also a pediatric cancer survivor, Dr. Villanueva encourages his cancer patients to enroll in clinical trials to receive the best cancer care possible.

"There are a lot of misperceptions about clinical trials," Villanueva said. "Providing more education may help patients understand how clinical trials could possibly fit into their cancer treatment."



AWARDS & HONORS



JEFFREY BERENBERG, MD, MACP

NCI Meeting, Engaging Older Adults in the NCI Clinical Trials Network: Challenges and Opportunities, Infrastructure Working Group

Board of Directors, Alliance for Clinical Trials in Oncology (since 2019)

Member, External Scientific Advisory Panel, NCI Cancer Moonshot Biobank (since 2018)



CHRISTA BRAUN-INGLIS, DNP, MS, APRN, FNP-BC, AOCN

Alliance Nursing Committee - Nursing Research Education Taskforce

Association of Community Cancer Centers (ACCC): Community Oncology Research Initiative Taskforce; Clinical Affairs Committee Member; and Clinical Trials Initiative Task Force (since 2020)

NCI Community Oncology Research Program (NCORP) Landscape Survey Committee

Advanced Practitioner Society for Hematology & Oncology, Research & Quality Initiative Taskforce

NCI Meeting, Engaging Older Adults in the NCI Clinical Trials Network: Challenges and Opportunities, Stakeholder Working Group (since 2020)



ANDREA FLEIG, PHD

Founding Member, Academic Committee for the "Dr. Neher's Biophysics Laboratory for Innovative Drug Discovery," Macau University of Science and Technology

Editorial Board Member, *Trace Elements and Electrolytes*

Member, Editorial Board of American Physiological Society's journal, *Function* (since 2020)



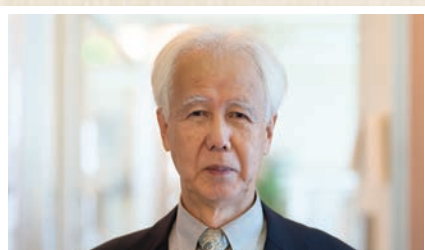
LOÏC LE MARCHAND, MD, PHD

Elected member, Steering Committee of the International Lung Cancer Consortium



JOHN SHEPHERD, PHD

American Institute for Medical and Biological Engineering College of Fellows (AIMBE Fellow)



MASAYOSHI YAMAGUCHI, PHD

Member - The EU Academy of Sciences
Advisory Board Member in the Universal Scientific Education and Research (USERN)

Co-Editor-in-Chief, *Current Cancer Drug Targets*

Editorial Board Member: *Translational Oncology*; *Nutraceuticals*; and *Cancers*

ONGOING ACCOMPLISHMENTS

JARED ACOBA, MD

Member, NCI Gastrointestinal Steering Committee (since 2017)

ERIN BANTUM, PHD

Member, Symptom Management and Quality of Life Steering Committee, National Cancer Institute (since 2020)

MICHAEL CARNEY, MD

Member, Gynecologic Cancers Steering Committee, National Cancer Institute (since 2020)

JAMI FUKUI, MD

Breast Immuno-oncology Task Force (since 2018)

SWOG Cancer Research Network's Symptom Management and Quality of Life Committee (since 2019)

BRENDA HERNANDEZ, PHD, MPH

Study Section Member, Cancer, Heart, and Sleep Epidemiology Study Section, Center for Scientific Review, NIH (since 2020)

GERTRAUD MASKARINEC, MD, PHD

Member, Editorial Board of the British Journal of Nutrition (since 2020)

Member, Board of the Journal of Nutritional Sciences (since 2020)

CARL-WILHELM VOGEL, MD, PHD

Fellow, National Academy of Inventors (since 2019)

2021 *by the* NUMBERS

61

PRINCIPAL
INVESTIGATORS

166

FUNDED RESEARCH
PROJECTS

25

YEARS OF CONTINUED
NCI DESIGNATION

293

PUBLICATIONS IN PEER
REVIEWED JOURNALS
FOR FY 2021

\$57.1M

AWARDED
RESEARCH FUNDS

Note: updated 10/01/21

ALOHA & MAHALO, DR. HOLCOMBE

STRONG LEADERSHIP TRANSFORMED THE UH CANCER CENTER

In August, the UH Cancer Center bid aloha and mahalo to former Director Randall Holcombe, MD, MBA. Since his arrival in 2016, Holcombe brought in over \$47 million in extramural research, education and infrastructure funding, while making countless contributions to the community through his tremendous leadership efforts. Holcombe stepped down from his role as Director to take on a similar position at the University of Vermont Cancer Center in Burlington.

During his tenure, Holcombe successfully renewed the UH Cancer Center's National Cancer Institute designation, engaged two new institutions as members of the Hawai'i Cancer Consortium, oversaw the renewal of the UH Cancer Center as a National Community Oncology Research Program site, established the Community Advisory Board, and introduced training for clinical research professionals. He also collaborated with the state's Department of Human Services Med-QUEST Division to cover treatment costs for Medicaid beneficiaries participating in clinical trials, and secured funds for the development of the Early Phase Clinical Research Center.

Holcombe's efforts throughout the past five years will have a lasting impact on the UH Cancer Center, and will continue to change the lives of cancer patients, their loved ones and many others in Hawai'i and throughout the Pacific for years to come.



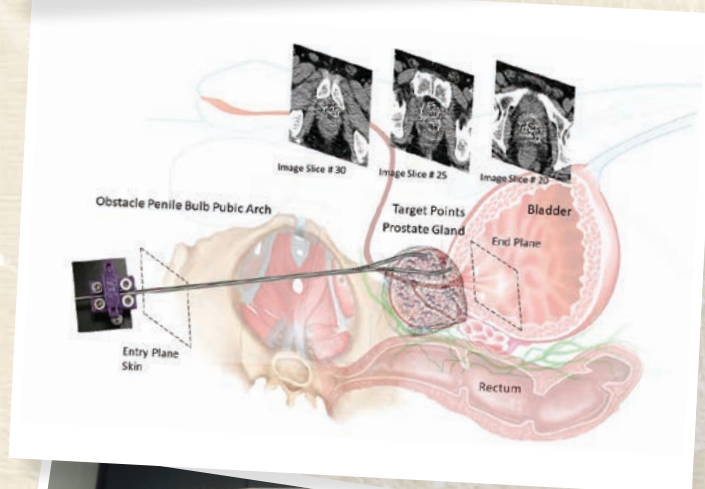
AI AND ROBOTICS

With the ongoing developments in technology, the future of cancer research is brighter than ever. Artificial intelligence (AI) has opened new doors for cancer detection and risk assessment, and advances in robotics have allowed physicians to perform operations more precisely—improving surgical outcomes for cancer patients.

UH Cancer Center associate member Bardia Konh, PhD, received over \$700,000 in funding over a four-year period to study the use of medical robotics in prostate brachytherapy. This popular form of prostate cancer treatment uses needle insertions to place radioactive seeds into the prostate gland to kill the cancer cells. The study aims to formulate the first dynamic model for active needle insertions into soft tissue to improve the procedure's accuracy, and ultimately the survival rate from prostate cancer.

In another study, UH Cancer Center Interim Deputy Director John Shepherd, PhD, investigated the use of AI to evaluate cancer risk through mammograms. Although breast density can sometimes be used to determine breast cancer risk, it is likely that there are other unknown factors hidden in mammograms that can help researchers be more accurate in their evaluations.

These studies, along with many others, will contribute to technological advancements leading to the development of new and improved cancer risk assessments and outcomes. Read more at www.uhcancercenter.org/about-us/newsroom.



TOP: RESEARCH TEAM AT ADVANCED MATERIALS & MEDICAL INSTRUMENTS (AMMI) LAB WORKING ON ROBOTIC BRACHYTHERAPY SYSTEM.
MIDDLE: NEEDLE ARRANGEMENT PLANNING FOR HIGH-DOSE-RATE PROSTATE BRACHYTHERAPY USING ACTIVE (CURVED) NEEDLES.
BOTTOM: EVALUATING CANCER RISKS THROUGH A MAMMOGRAM

THE FUTURE OF CANCER RESEARCH

CUTTING-EDGE TREATMENT FOR HAWAI'I'S PATIENTS RIGHT AT HOME

My passion is ensuring that cancer patients in Hawai'i have access to the same cutting-edge treatments through early phase trials as cancer patients on the mainland. A center where these trials can be safely performed is of paramount importance to reduce the burden of cancer in our state."

SENATOR BREENE HARIMOTO

The Ho'ola: Early Phase Clinical Research Center (EPCRC) was near and dear to Hawai'i State Senator Breene Harimoto's heart. Sadly, he will not see it to completion, as his long battle with pancreatic cancer ended in June 2020.

IMPACT ON HAWAI'I'S CANCER PATIENTS

Early phase trials are essential for patients with cancers that are particularly difficult to treat, or patients who have failed to respond adequately to standard therapies or previous clinical trials.

The EPCRC project—the first of its kind in Hawai'i—in collaboration with the Hawai'i Cancer Consortium, will provide access to novel, cutting-edge, early phase clinical trials. The EPCRC will allow cancer patients to receive such treatments here in Hawai'i, avoiding the time and expense of traveling to the mainland.

"I was qualified for an early phase clinical trial on the mainland to treat my metastatic breast cancer. I'm a young mother with four kids, the thought of uprooting my family was not an option, taking the kids out of school and financially, was impossible. However, if there was a clinical trial available here on island, I would definitely participate."

SARAH, BREAST CANCER PATIENT, AGE 35



SENATOR BREENE HARIMOTO, LOWER RIGHT, WITH HIS WIFE CHERYL, AND UH CANCER CENTER'S DEPUTY DIRECTOR, JOE W. RAMOS, AND DIRECTOR, RANDALL HOLCOMBE, (L-R) AT THE OPENING CEREMONY OF HAWAI'I STATE LEGISLATURE, JANUARY 2017.

Currently, Hawai'i's cancer patients who are eligible for early phase or phase 1 trials must travel to the mainland to participate, often for several months, separated from family and friends. The ongoing COVID-19 pandemic and travel restrictions make participation even more challenging.

Additionally, roughly 90% of clinical trial participants are Caucasian, leaving Asian and Pacific Island groups underrepresented in the research. When research involves a large proportion of a group of similar people, findings regarding efficacy and side effect profiles may not end up applying to everyone else. Therefore, it is critical for cancer patients representing Hawai'i's unique diverse populations be able to participate in these trials.

"There are already multiple stressors for patients undergoing cancer treatments. Obtaining new treatments should not be one of them."

JAMI A. FUKUI, MD

BREAST MEDICAL ONCOLOGIST, HAWAI'I PACIFIC HEALTH AND ASSOCIATE PROFESSOR, UH CANCER CENTER

THE FUTURE OF CANCER RESEARCH

GIVING OPPORTUNITY

The Early Phase Clinical Research Center (EPCRC) project is funded by a grant from the National Institutes of Health, along with support from the Hawai'i State Legislature, local organizations, foundations, and individual donors. However, continued support from the UH Cancer Center's community will help to ensure sustainability of the Early Phase Clinical Research Center program, providing for the future of cancer care for years to come.

Mahalo to our Partners

(AS OF 12/31/2021)

ALANA DUNG RESEARCH FOUNDATION
DIANE T. ONO IN MEMORY OF MINA HUMPHREYS
ESTATE OF NORMA NICHOLS
FIRST HAWAIIAN BANK FOUNDATION
FIRST INSURANCE COMPANY OF HAWAII CHARITABLE FOUNDATION
FRIENDS OF THE UH CANCER CENTER
HAWAI'I STATE LEGISLATURE
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ISLAND INSURANCE FOUNDATION
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WALLACE, ELIZABETH & ISABELLA WONG FAMILY FOUNDATION

To learn more about becoming a partner in ending the suffering caused by cancer, please contact Lynne Wooddell at lynne.wooddell@uhfoundation.org or (808) 356-5757.



UNIVERSITY OF HAWAI'I
CANCER CENTER

The University of Hawai'i Cancer Center is the only National Cancer Institute-Designated Cancer Center in Hawai'i and the Pacific. The Cancer Center's mission is to reduce the burden of cancer through research, education, patient care, and community outreach with an emphasis on the unique ethnic, cultural, and environmental characteristics of Hawai'i and the Pacific. The UH Cancer Center is a research organization within the University of Hawai'i at Mānoa and located in Kaka'ako. The Cancer Center directly employs 300 faculty and staff, with another 200 affiliate members through the Hawai'i Cancer Consortium.

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