UNIVERSITY OF HAWAI'I

CANCER CENTER

50 Years of Progress

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EDITORIAL STAFF:
EDITOR: SHARON SHIGEMASA
CO-EDITOR: PAULA HIGUCHI

CONTRIBUTORS:
JENA FUNAKOSHI
ELIZABETH KUIOKA
LAURA YOUNG

GRAPHIC DESIGN:
ZAKIDESIGN

PRINTING:
OBUN HAWAII

Aloha,

It is an honor to introduce this celebration and overview of the University of Hawai'i (UH) Cancer Center's first 50 years as Hawai'i's Cancer Center and 25 years as the only NCI-designated Cancer Center serving Hawai'i and the U.S.-affiliated Pacific Islands (USAPI). The faculty and staff of the UH Cancer Center are committed to reducing the burden of cancer for the people of Hawai'i and the USAPI. To accomplish this, we work tirelessly to understand the causes of cancer here in the islands, to use that knowledge to better prevent cancer, to bring in the very latest treatments and clinical trials for those diagnosed with cancer, and to develop the new diagnostics and treatments of tomorrow for those cancers where there are limited or no treatments yet available.

To prevent cancer, we must understand the genetic and environmental factors here in Hawai'i that lead to higher risk of developing cancer. This is the focus of the epidemiologists in our Population Sciences in the Pacific Program. They also work to determine the reasons for the higher or lower incidences and mortality of certain cancers among the different ethnicities here. Our prevention and control researchers use that knowledge to create programs that are culturally attuned to the various ethnicities in the islands to educate our population on ways to detect and prevent cancer, such as smoking cessation programs. They also work with cancer survivors to help them thrive.

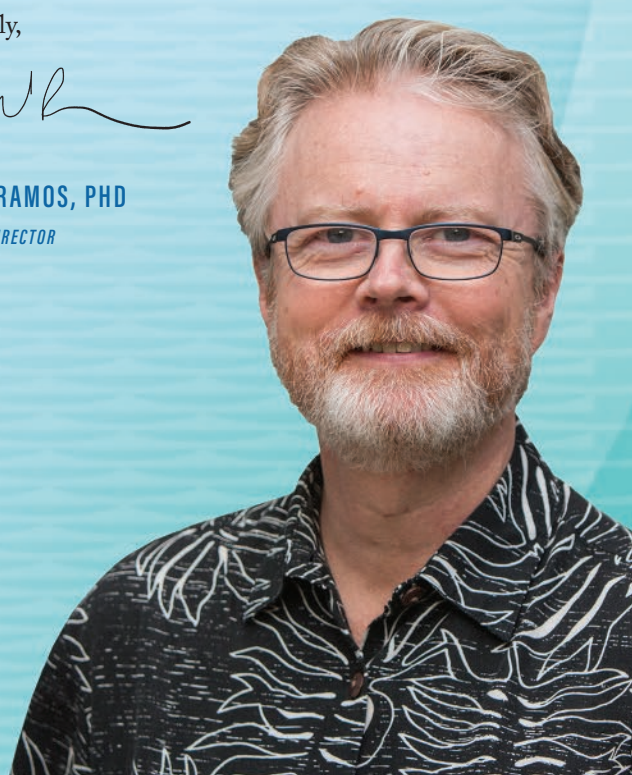
For those who are diagnosed with cancer, our clinical researchers in the Cancer Biology Program and our Clinical Trials Office work closely with our partners in the various hospitals of the Hawai'i Cancer Consortium to identify and activate the best clinical trials here. This enables patients to get the latest and highest quality cancer care here at home among family and friends without the financial stresses of traveling to the mainland for treatment. Patients on clinical trials get the very finest standard of care and, in addition, receive the latest therapeutics that may become future standard treatments.

For those cancers for which we lack good early diagnostics or effective treatments, the researchers in our Cancer Biology Program are working to understand the molecular mechanisms that cause cancers and drive their progression, and then to use this information to devise new therapeutic drug leads and new diagnostics. This work includes searching the natural products made by the varied plants, fungi, and bacteria found only in Hawai'i for new drug leads to treat cancer.

Finally, an essential part of the mission is to train the next generation of researchers and health care workers through the numerous educational programs we offer and the work of our faculty in the diverse undergraduate and graduate programs across the UH. Together we have committed our life's work to reduce the number of people who get cancer, to better treatments for those who suffer from cancer, and to find the treatments and diagnostics of tomorrow for the people of Hawai'i and the greater Pacific. We look forward to the next 50 years serving you.

Sincerely,

JOE W. RAMOS, PHD
INTERIM DIRECTOR



INTRODUCTION

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This year, the University of Hawai'i Cancer Center reflects on two significant milestones. It is the 50th anniversary since inception and the 25th year of continuous designation by the National Cancer Institute. The UH Cancer Center has proven itself to be an invaluable asset to the state since its founding in 1971. The Cancer Center has made seminal discoveries in the areas of cancer biology, epidemiology, cancer prevention and treatment, and contributed to advancing health care for thousands of cancer patients to gain access to the most innovative and latest clinical trials in Hawai'i.

In 1971, the UH Cancer Center became a part of the UH Pacific Biosciences Research Center. This date corresponds with the signing of the National Cancer Act by then President Richard M. Nixon. In 1981 the Cancer Center was established as an organized research unit within UH Mānoa by the UH Board of Regents.

Our current state-of-the-art facility, located in Kaka'ako, was completed in 2013, and is home to 300 research faculty and staff, including some of the nation's leading cancer experts. In addition, another 200 affiliate members are engaged with the UH Cancer Center through other units within the UH community as well as through the Hawai'i Cancer Consortium, a unified effort in clinical cancer research benefiting the people of Hawai'i and the Pacific.

Since 2016, 16,623 individuals have participated in research studies, including cancer clinical trials, through the UH Cancer Center, and currently more than 100 research projects are being conducted in our two research programs, Population Sciences in the Pacific and Cancer Biology.

UH Cancer Center researchers focus on key cancer types that significantly impact communities in Hawai'i and the Pacific. Yet just as importantly, our work contributes to a global body of knowledge that leads to the development of innovative cancer prevention and control strategies, as well as novel life-saving therapies and interventions for all types of cancers.

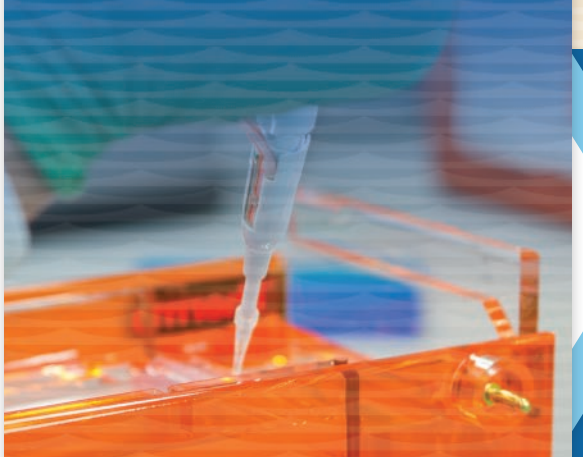
The UH Cancer Center engages in scientific collaborations on a national and international scale, ranging from clinical trials and other research conducted across the U.S. to partnership programs and research collaborations in Guam, the U.S.-affiliated Pacific Islands, Australia, Asia, and Europe.

Now in our 25th year of continuous designation by the National Cancer Institute, the UH Cancer Center has earned its place among the leading cancer research institutions in the world.

UNIVERSITY OF HAWAI'I
CANCER CENTER
50 Years of Progress

50 NATIONAL CANCER ACT 1971-2021

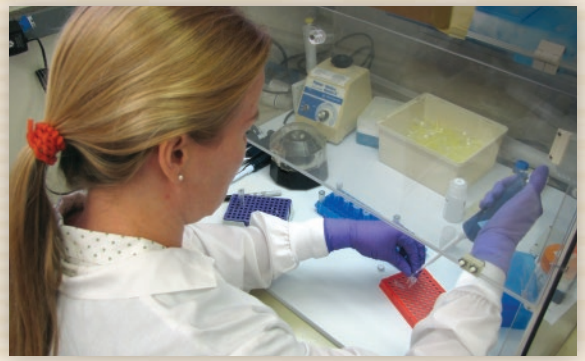
NCI Cancer Center
A Cancer Center Designated by the National Cancer Institute



SIGNIFICANT CANCER RESEARCH DISCOVERIES AND ACCOMPLISHMENTS

EVERY YEAR AN AVERAGE OF 7,000 PEOPLE IN HAWAI'I ARE DIAGNOSED WITH INVASIVE CANCERS AND AN AVERAGE OF 2,350 WILL DIE FROM CANCER.

The mission of the UH Cancer Center 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.



UH Cancer Center researchers work together with community clinicians, local medical centers, and other partners to:

- Identify the mix of genes, behaviors, and environmental exposures that put people at greater risk for developing cancer;
- Educate people about our findings and about the latest breakthroughs in cancer research and lifestyle changes that help prevent cancer;
- Study natural resources of the Pacific that may lead to development of new drugs and therapies to prevent or cure cancer; and
- Bring the most effective cutting-edge therapies to the islands in the form of clinical trials.

We have a 50-year history of research discoveries and accomplishments in fulfilling our mission. Because of our strong relationship with our community partners, these accomplishments have been possible, and the people of Hawai'i have benefited from these advances.

UHCC HISTORIC TIMELINE

1939 — Cancer identified as leading cause of death in Hawai'i.

1960 — Hawai'i Tumor Registry (HTR) established & jointly operated by HI State Dept. of Health, HI Medical Association with funding from American Cancer Society (ACS).

1963 — Hawai'i's unique potential as epidemiologic resource for cancer studies recognized by NCI; UH School of Public Health awarded grant to study shifts in cancer risk among Japanese migrants to U.S. This became start of demographic (population) studies & forerunner of cancer research center's epidemiology studies.

LATE 1960s — HI Cancer Research Laboratory dedicated within Dept. of Biochemistry & Biophysics with funding from local businessman Maurice Sullivan.

1969 — Frederick C. Greenwood, DSc, director of Pacific Biomedical Research Center (PBRC) & Lawrence H. Piette, PhD, UH biophysicist, proposed expanding the research laboratory into a cancer research center.

With one of the most diverse populations in the world, Hawai'i is especially suited to investigate why some ethnic populations are more susceptible to certain cancers than others, and how genetic susceptibility interacts with environmental factors in producing cancer risks. Because of our geographic isolation, Hawai'i is home to many species of flora and fauna found nowhere else in the world, and these may harbor special natural compounds that could provide the key to new therapeutics to prevent or treat cancer.

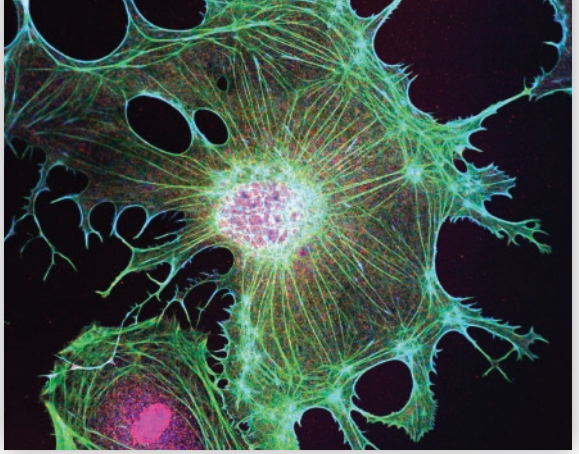
The UH Cancer Center has established research groups focused on the specific cancers that affect us most. For example, Hawai'i has one of the highest rates of liver cancer in the U.S. We have organized a team of the state's top surgeons, oncologists, basic cancer biologists, and epidemiologists to focus efforts to understand the reasons for this high incidence, and find new diagnostics and therapies to improve outcomes for our liver cancer patients. Similar teams are at work on women's cancers (breast and ovarian). These cancers affect Hawai'i at a disproportionate level and many have disparities in incidence and progress of the cancer among our diverse population.

CANCER BIOLOGY PROGRAM

CANCER MECHANISMS & TARGETS

Our Cancer Biology researchers work hard to uncover the fundamental mechanisms that drive the development and progression of different cancers, focusing on those that disproportionately affect Hawai'i and the U.S.-affiliated Pacific Islands. By understanding the processes that cause cancer to form, grow, move to other organs in the body (metastasis), and resist current treatments, we can find new approaches to treating and diagnosing these diseases and developing new drugs to attack the newly discovered mechanisms.

We have contributed to understanding how cancers form from a mix of gene and environmental interactions. Some of these interactions cause damage to key genes in normal cells and when the



cells have challenges fixing those genes, it can lead to cancer. An example is BAP1, a gene that protects cells from carcinogens present in the environment. A new genetic disease, the BAP1 cancer syndrome, caused by inherited mutations of the BAP1 gene, was discovered and named by UH Cancer Center researchers. Affected individuals develop mesothelioma, melanoma, renal cell carcinoma, and other malignancies. However, early studies show their cancers respond well to therapy. Our researchers led an international team of physicians that designed specific diagnostic and clinical guidelines for these patients and their affected relatives. In response to this discovery, the National Cancer Institute opened two clinical trials in which those affected by the BAP1 cancer syndrome are screened for early detection and treated without charge if they develop cancer.

UHCC HISTORIC TIMELINE

1970 Richard K.C. Lee, MD, tasked by UH President Harlan Cleveland to convene a committee to plan a cancer research center that integrated the laboratory & demography programs.

1971 Cancer Research Center of Hawai'i (CRCH) established as part of UH Pacific Biomedical Research Center (PBRC)

1972 CRCH received federal funding for cancer research center planning grant.

1973 HTR joined NCI Surveillance, Epidemiology, & End Results (SEER) & was assumed under operation & management of CRCH.

Our research on the effects of gene damage have provided new insights gained from studying Fanconi-Anemia syndrome, where patients have genetic defects in their ability to repair their genes. These patients are at much greater risk of developing cancers, and our work is helping guide new ways to detect and treat cancers like bladder cancer. Our researchers have also revealed how a gene called RasGRP1 can drive the formation and growth of some skin cancers and how prolonged inflammation (for example, of the mesothelium or lining surrounding the lungs) can lead to cancers like mesothelioma through unusually high activity of proteins like HMGB1.

We were among the first to investigate and discover that cell-to-cell communication can contribute to cancer progression through involvement of proteins called GAP junctions. Over the years our cancer biologists have found specific roles for proteins involved in gene expression like STAT3 and developed powerful new drug leads to target it. These are finding their way through pre-clinical development now and may form new treatment options for breast and other cancers in the future.

Metastasis causes most cancer deaths from solid tumors. Our researchers have identified that a protein called RSK is part of the organizing engine that drives metastasis and are actively working to find ways to stop it. This is being explored as a new therapeutic approach to treating highly invasive brain tumors. We have also revealed details of how cell adhesion (interaction with other cells) through proteins called integrins is altered in cancer cells that are moving and how this is controlled. This is essential to understanding the complex processes that lead to metastasis.

We have also discovered that sepsis, a potentially life-threatening condition in which the body's immune system can cause damage to its own tissues, increases cancer death risk for Native Hawaiians. New discoveries concerning mechanisms of sepsis have brought new approaches to targeting it.

Our Natural Products program has examined plants, algae, and fungi from Hawai'i and the Pacific Basin over the last several decades to discover drug leads with novel structures and mechanisms of action. In the 1990s, one of our research teams identified a natural product, cryptophycin, that was active against cancer and which eventually went into early (Phase II) clinical trials in patients. 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. These studies show the continued promise of natural products as new potential prevention and treatment therapies.

1974 Lawrence H. Piette, PhD, became first director of CRCH (1974-1985) & as Principal Investigator received the first three-year core support grant establishing CRCH as an NCI-designated Cancer Center; CRCH continued to receive a series of core support grants through 1986.

1974 CRCH's Clinical Sciences Program was established with Noboru Oishi, MD, as director & located in The Queen's Medical Center.

CRCH awarded five-year NCI demonstration contract for community-based cancer control activities; one of only six awarded nationwide.

1978 Cancer Information Service (CIS) phone line established as part of CRCH's Cancer Control Program.

1979 New CRCH building on campus of The Queen's Medical Center completed & dedicated with Nobel Laureate Linus Pauling as keynote speaker, increased capacity for interdisciplinary research & community identification.

TRANSLATIONAL & CLINICAL RESEARCH

It is through scientific discoveries in cancer biology that we learn more about different cancers, gaining new insights that translate into developing more powerful and effective new treatment options for cancer patients.

Since its establishment in 1971, the UH Cancer Center has made valuable contributions to cancer research, impacting the steady decrease in cancer mortality and improving health outcomes throughout the Pacific. In 1975, cancer mortality was over 170 deaths per 100,000 residents, and almost 50 years later, that number has dropped below 125. Although health outcomes are improving overall, cancer disparities remain an issue among many populations in Hawai'i and the Pacific region. Researchers at the Cancer Center are studying these groups to learn about the causes of these disparities and eliminate them.

In the U.S., Blacks, Hispanics, American Indians/ Alaska Natives, Asians, Native Hawaiians, and other Pacific Islanders bear a disproportionate burden of disease, injury, premature death, and disability. These groups collectively comprise over 60% of Hawai'i's population. Our efforts toward minority-focused research and advancing cancer clinical trials have greatly contributed to improving health outcomes for thousands of Hawai'i's cancer patients.

Our clinical trials operation has always been completely community-facing. In 1994, we were initially designated a Minority-Based Community Clinical Oncology Program and are currently a Minority Underserved (MU) National Cancer Institute (NCI) Community Oncology Research Program (NCORP). NCORP is a national network that brings cancer clinical trials and care delivery studies to people in their own communities.

Over the years, our MU NCORP and our prior NCI-funded cooperative group research grants have brought practice-changing clinical trials to both children and adults in Hawai'i. The UH Cancer Center contributed to the National Surgical Adjuvant Breast and Bowel Project (NSABP) through many noteworthy NSABP breast cancer prevention studies, and the particularly significant NSABP B-06 trial, which paved the way for effective breast conservation.

NCORP brought personalized oncology to Hawai'i through participation in the NCI-MATCH Precision Medicine Trial that assigned patients to treatment, based on genetic changes in their tumors. We were also important contributors to the impactful TAILORX trial, demonstrating that some women with localized breast cancer did not need chemotherapy. Currently we are recruiting

UHCC HISTORIC TIMELINE

1981 — UH Board of Regents established CRCH as an organized research unit. CRCH joined Southwest Oncology Group as the first of several national cancer cooperative study groups that provided access to participation in cancer clinical trials for Hawai'i's patients.

1983-1986 — CRCH's laboratory program expanded through recruitment of new faculty & nearly $1M in extramural funding.

1985-1988 — Tom Humphreys, PhD, led CRCH as interim director.

1988 — Brian Issell, MD, appointed Cancer Research Center of Hawai'i Director.

Micronesian women, who have low breast cancer screening rates, into the TMIST trial comparing standard 2-D mammography with 3-D tomosynthesis. In 2019, through its affiliation with the UH Cancer Center, Family Health Plan (FHP) Health Center in Guam became an NCORP site making clinical trials available in that U.S. territory.

The Cancer Center relies on members of the Hawai'i Cancer Consortium (HCC) and the greater Hawai'i oncology community to provide its clinical research studies to cancer patients. HCC members include Adventist Health Castle, Hawaii Medical Service Association, Hawai'i Pacific Health, Kuakini Medical Center, The Queen's Health Systems, and the John A. Burns School of Medicine. In addition, our clinical trials network involves the majority of medical and radiation oncology practices on O'ahu and Tripler Army Medical Center. These partnerships have made cutting-edge cancer treatments accessible to the people of Hawai'i, contributed to improved patient outcomes, helped diversify clinical trials representation, and aided in the reduction of cancer disparities for all people.

POPULATION SCIENCES IN THE PACIFIC PROGRAM

CANCER EPIDEMIOLOGY

UH Cancer Center and the University of Southern California epidemiologists established the Multiethnic Cohort (MEC) Study in 1993. Over the years, the study has provided many advances in understanding differences in cancer risk that exist among racial/ethnic groups, and has had significant impact identifying ways to prevent cancer.

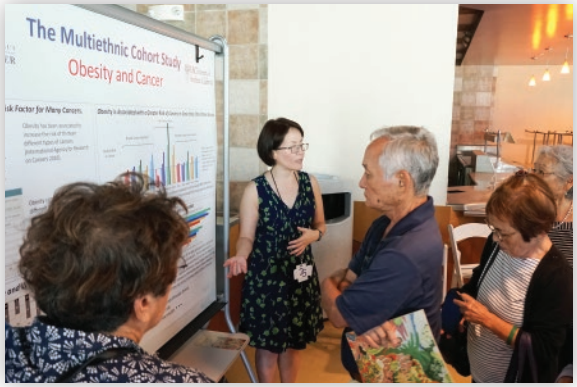
The MEC Study, the most ethnically-diverse and long-standing longitudinal cohort study in the world, has gained national and international recognition among biomedical scientists. It has followed 215,000 residents of Hawai'i and Los Angeles, age 45 to 75 since 1993, for the development of cancer and other chronic diseases. It includes men and women of five main ethnic groups: Japanese Americans, Native Hawaiians, African Americans, Latinos, and Whites.

1993 Multiethnic Cohort (MEC) Study began by CRCH and University of Southern California (USC).

1996-1998 CRCH received NCI designation (via P30 Cancer Center Support Grant).

1996-1998 CRCH partnered with pharmaceutical company Eli Lilly to patent a drug from cryptophycins, anti-cancer compounds discovered by cancer center scientists in blue-green algae.

1999 Dr. Brian Issell stepped down as Director of the Cancer Research Center of Hawai'i & was succeeded by Carl-Wilhelm Vogel. MD, PhD.



Countless researchers throughout the U.S. and the world have used data from the MEC Study, contributing many cancer discoveries throughout the years. Hawai'i's diverse populations are represented in the MEC, and the findings from these world-renown cancer studies are directly relevant to our state and our people. The MEC Study has focused on the role of alcohol, coffee, diet quality, meat-cooking methods, dietary supplements, body fat distribution, physical activity, reproductive factors, hormones, inflammation, diabetes, air pollution, gut microbiome, genetics, and more in determining a person's risk for cancer and other diseases. Generating more than 800 scientific publications, the MEC Study findings have been used nationally to formulate guidelines for diet and nutrition, cancer screening, and cancer risk reduction.

Our 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 has provided some of the most convincing data on the changing cancer rates among different generations of immigrants and the effect of dietary changes.

The breast and colorectal cancer risks of Japanese in Hawai'i have increased, but at different rates across generations: risk of colorectal cancer matched those of Whites as early as in the first generation of immigrants, whereas it took three generations for the breast cancer risk of Japanese to equal those of Whites, suggesting very different effects of diet and lifestyle on these cancers. This observation foreshadowed the current colorectal cancer rates in Japan, which are now among the highest in the world.

Obesity has overtaken viral hepatitis as the major cause of chronic liver disease and liver cancer in Hawai'i's populations. Despite having a lower body mass index (BMI), Asian Americans have a predisposition to accumulate intra-abdominal fat (as visceral fat), which puts them at higher risk for metabolic diseases, such as diabetes and certain cancers. Visceral fat is also an independent risk factor for breast cancer. Obesity is the only lifestyle risk factor related to prostate cancer and increases risk of aggressive prostate tumors.

The lung cancer risk of Native Hawaiians matches that of African Americans and is ~50% greater than that of Whites. Genetic variants that cause a more active metabolism of nicotine (the addictive substance in tobacco) drive smoking rate and intensity, and result in an elevated risk of lung cancer.

UHCC HISTORIC TIMELINE

2000 CRCH's NCI designation was renewed.

2002 Blue Ribbon Panel on Cancer Care in Hawai'i Final Report submitted to Gov. Benjamin Cayetano on availability, quality, & access to information, resources, & services available to Hawai'i's cancer patients & their families; barriers preventing easy access to information & resources; & specific recommendations for improvement.

2003 Cancer Information Service (CIS) of Hawai'i expanded its outreach services to the Pacific region.

2004 First 5-year Hawai'i State Cancer Plan introduced to serve as a guide to the state's cancer control and prevention efforts & enhance collaboration between public & private agencies to achieve state's vision of "No More Cancer".

2004 U56 Comprehensive Planning Grant awarded to lay groundwork for establishment of CRCH & University of Guam (UOG) partnership to foster development of cancer research infrastructure at UOG.

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, researchers uncovered a growing public health problem among Hawai'i's youth. Research with youth and adults has defined the relatively high rate of e-cigarette use in Hawai'i and the Pacific region, discovered the relation of adolescent e-cigarette use to initiation of cigarette smoking, and shown how e-cigarette use is related to respiratory diseases including asthma and Chronic Obstructive Pulmonary Disease (COPD).

Cultural and recreational use of areca (betel) nut by an estimated 600 million individuals is widespread throughout Southeast Asia and the Pacific including Guam. Research has shown the devastating effects of its use resulting in cancers of the oral cavity and other organs. Our researchers have developed the first cessation program for betel nut use and demonstrated its effectiveness in a clinical trial.


ARECA (BETEL) NUT

Other studies have shown that physical activity can reduce the risk of cancer recurrence. Our researchers conducted a study with breast cancer survivors to assess whether hula can be an effective strategy to increase physical activity after treatment. In addition to the benefits of exercising for health and well-being, an unexpected outcome of this study was its psychosocial impact on the participants. Motivated to attend the twice weekly hula classes, participants found companionship and emotional support among the close-knit circle of hula sisters.

We have conducted research to increase screening rates for colorectal cancers among Native Hawaiian men to reduce the high rate of cancer deaths in this population. The dissemination of colorectal cancer screening information was done in the culturally appropriate way during men-only sessions. This educational screening activity resulted in a positive outcome for the participants with most getting screened, and a small number of cancer cases detected early.

2004 Continuing Umbrella of Research Experiences (CURE) supplement to CRCH's P30 Cancer Center Support Grant (2004-2018) provided cancer research training experiences to Hawai'i high school students & undergraduates from underrepresented minorities each summer.

2006 Tobacco tax increase bill became law & revenues support CRCH building & operations of the new cancer center in Kaka'ako.

2009 Michele Carbone, MD, PhD, became Interim Director then officially named Director in 2010.

2009 UH Cancer Center/UOG Partnership Grant (U54) received funding to support cooperative activities.

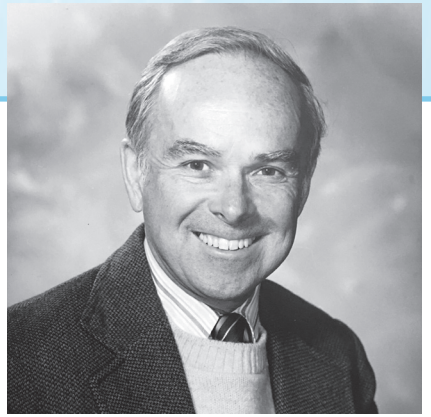
FORMER UH CANCER CENTER DIRECTORS

(Read more about legacies at www.uhcancercenter.org/50years)

Mahalo nui to our former UH Cancer Center Directors for their vision, leadership, and commitment to serve the people of Hawai'i and the Pacific, as well as inspiring our researchers and staff to fulfill our mission. They guided us through our infancy, growth, challenges, and successes for the past 50 years as a cancer center and 25 continuous years as an NCI-designated cancer center. With our Directors' support we succeeded in establishing, growing, and strengthening our programs, expanding the reach of our Cancer Center, and achieving significant research discoveries through collaborations with researchers and community partners at home, across the nation, and the world.

LAWRENCE H. PIETTE, PHD

(1974-1985)



AS THE FIRST DIRECTOR of the Cancer Research Center of Hawai'i (CRCH), Dr. Lawrence H. Piette worked with many stakeholders to help create the CRCH through his determined efforts to persuade, promote, and educate for a sound encompassing approach in cancer research. Dr. Piette held a firm conviction that Hawai'i had much to offer with its solid research foundation, diverse ethnic population, and unique opportunities to study distinctive tropical flora and fauna. He believed Hawai'i had a strong place in this endeavor nationally and internationally, obtaining and maintaining NCI-designation from 1974-1985. Piette led the effort to build a cancer research building on the campus of The Queen's Medical Center, which was home to the CRCH from 1979-2012. Today, the University of Hawai'i Cancer Center, formerly CRCH, stands as an institution carrying on this mission.

UHCC HISTORIC TIMELINE

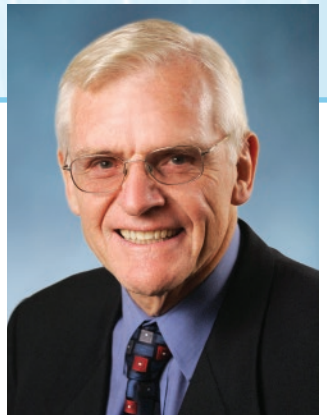
2010 Second 5-year Hawai'i State Cancer Plan introduced to serve as a guide to achieve state's vision of "No More Cancer".

2010 Ground breaking and construction of the new cancer center in Kaka'ako occurred in October on the shared campus with UH John A. Burns School of Medicine.

2010 Hawai'i Cancer Consortium (HCC) was established by CRCH & included The Queen's Medical Center, Hawaii Pacific Health, Kuakini Medical Center, & John A. Burns School of Medicine representing a unified effort to coordinate & facilitate broad cancer research efforts benefiting all citizens of Hawai'i & Pacific Rim.

2011 CRCH's name & logo replaced with new name of University of Hawai'i Cancer Center and new logo

BRIAN ISSELL, MD
(1988-1999)



DURING DR. ISSEL'S tenure, the CRCH experienced unprecedented growth, remarkable research accomplishments, and service to the community. In 1996, the CRCH regained National Cancer Institute (NCI) designation along with receiving many new large federal grants, such as funding for the Wai'anae Coast Cancer Research Project, the first Cancer Information Service community partnership program in the country in 1990, the large Multiethnic Cohort Study grant in 1993, and the Hawai'i Minority-Based Community Clinical Oncology Program (MBCCOP). In 1994 Hawai'i's cancer care providers participated in the MBCCOP, which offered national cancer treatment, prevention, and control clinical trials to cancer patients throughout the state. In addition, there were many other new research projects, program projects, and training grants.

CARL-WILHELM VOGEL, MD, PHD
(1999-2008)

DR. VOGEL was successful in renewing the CRCH's NCI designation in 1999 and again in 2005 with increased funding. In 2006, he was able to secure an increase in the State Tobacco Tax to provide support of the CRCH resulting in a public investment of millions of dollars annually to sustain existing programs and build the new cancer center facility in Kaka'ako. He also expanded programs and activities from Hawai'i to the U.S.-affiliated Pacific Islands, resulting in successive grants with the University of Guam under the Minority Institution Cancer Center Partnership Program of the NCI. Another expansion into the Pacific was through the Cancer Information Service (CIS) contract with the NCI that supported a position on Guam, and renamed from CIS-Hawai'i to CIS-Pacific. Also, Guam and American Sāmoa are represented in the NCI's Geographical Management Program (GMaP). Today, many of our activities in research, education, and community outreach have a Pacific component. Lastly, as a result of these efforts there is now a fully developed cancer registry on Guam. The Guam Cancer Registry, was able to secure sustained funding from an increase of Guam's tobacco tax.

2012 UH Cancer Center's NCI-Designation renewed.

2012 The new UH Cancer Center facility was nearly completed and faculty & staff move into building, with last of Cancer Center staff arriving in 2015.

2013 Grand Opening of UH Cancer Center occurred February 12 with blessing, entertainment, & science fair during the day & evening reception.

2014 Dr. Michele Carbone stepped down as UH Cancer Center director, & Jerris Hedges, MD, MS, MMM, Dean of the John A. Burns School of Medicine, was named Interim Director.

2014 UH Cancer Center-led clinical trials initiative received funding for the Minority/Underserved NCI Community Oncology Research Program (NCORP) with the overall goal to provide access & facilitate enrollment of Hawaii's diverse, multiethnic population to NCI-sponsored trials.

DIRECTORS' LEGACIES

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MICHELE CARBONE, MD, PHD
(2009-2014)

DR. CARBONE'S legacy is teamwork, achievements, and seminal discoveries in cancer research. He secured the renewal of the NCI core grant in 2012. He led the establishment of the Hawai'i Cancer Consortium to give cancer patients in Hawai'i access to clinical trials via the UH Cancer Center. Dr. Carbone worked with the local firm Kobayashi Group's architect Jeff Nakamura to design and build a modern research facility in Kaka'ako with open spaces, resulting in one of the most beautiful cancer centers in the U.S. He was able to recruit 24 top-notch new faculty members and reorganized administration to work with consortium members. During his directorship, the UH Cancer Center renewed its NCI designation, tripled its NCI funding, rallied the community behind the Cancer Center, and raised over $30M in philanthropic funds. At the same time, Dr. Carbone and his collaborators discovered the "BAP1 cancer syndrome", a discovery that is not only helping save lives but has become the model to study gene x environment interaction in cancer.

RANDALL F. HOLCOMBE, MD, MBA
(2016-2021)

DR. HOLCOMBE'S greatest impact as UH Cancer Center Director was to renew and strengthen the focus of all of the Cancer Center's research on the people of Hawai'i and the U.S.-affiliated Pacific Islands, including population sciences, cancer epidemiology, basic cancer biology, clinical and disease-focused research, and cancer prevention. This renewed focus, addressing the cancer burden and cancer outcome disparities among unique populations, led to innumerable successes, including the renewal of the Cancer Center Support Grant in 2018; renewal and addition of new members to the Hawai'i Cancer Consortium; renewal of the NCORP clinical trials grant, for which he served as multiple-principal investigator (MPI), with expansion of the Cancer Center clinical research network across Hawai'i and Guam; renewal of the Pacific Island Partnership for Cancer Health Equity grant, for which he also served as MPI; and securing State and National Institutes of Health (NIH) funding to establish an early phase clinical research center to serve the people of Hawai'i and the Pacific. These successes, along with high impact research relevant to Hawai'i and the Pacific conducted by a dedicated and enthusiastic faculty and staff, has put the UH Cancer Center on a sound foundation to enable ongoing, future success.

UHCC HISTORIC TIMELINE

2015 UH Cancer Center/UOG Partnership Grant (U54) renewed.

2016 UH Cancer Center participated in Vice President Joe Biden's national Moonshot Summit along with other NCI-designated cancer centers across the country.

2016 Third Hawai'i State Cancer Plan was announced & to serve as guide for next 5 years to achieve state's vision of "No More Cancer".

2016 UH Cancer Center helped establish Hawai'i chapter of Society of Clinical Research Associates (SOCRA) to offer educational resources & programs beneficial to clinical research professionals.

2016 Randall Holcombe, MD, MBA, appointed new director of UH Cancer Center & officially began his tenure in October.

A HUB FOR CANCER RESEARCH EDUCATION

PRIOR TO THE INCEPTION OF A CANCER RESEARCH CENTER IN HAWAIʻI, A MAJOR AIM OUR VISIONARIES PROJECTED WAS TO TRAIN STUDENTS AND CREATE AWARENESS OF CANCER AMONG THE MEDICAL COMMUNITY AND THE PUBLIC.

During the past 50 years, cancer education has been ongoing through the UH Cancer Center, with provision of substantial financial support, researcher and staff time, and resources for training and mentorship. These investments are focused on shaping researchers, both current and future, and healthcare professionals, while increasing cancer awareness in the community.

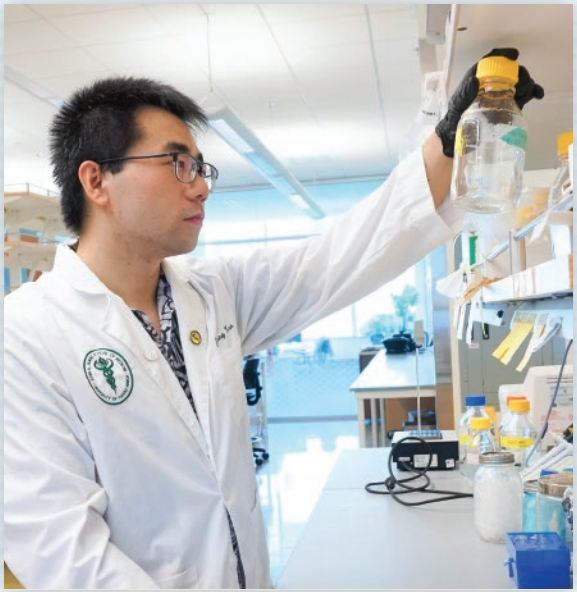
As the core of the cancer research education hub within Hawai'i and the Pacific, the UH Cancer Center is committed to providing exceptional education and training. We continuously develop new strategies for student, professional and public education, resulting in innovative research discoveries, and solutions to better serve the people of Hawai'i and the Pacific.

2017 UH Cancer Center's 20By25 campaign kicked off with the goal to enroll 20% of individuals diagnosed with cancer each year in Hawai'i onto clinical trials by 2025.

2017 UH Cancer Center was one of top enrollment sites in the U.S. for NCI's Molecular Analysis for Therapy Choice (NCI-MATCH Trial), a precision medicine cancer treatment trial.

2018 UH Cancer Center's NCI-Designation renewed.

2018 Multiethnic Cohort (MEC) study celebrated its 25th year anniversary with a large gathering of study participants & participating scientists from around the world for festivities & poster session.



STUDENT LEARNING

MENTORING STUDENTS

The UH Cancer Center is home to some of the nation's leading cancer researchers, who serve as mentors to students at various stages of their education and professional careers. The Cancer Center has undertaken various educational initiatives to provide students with an understanding of cancer research and opportunities for hands-on research experience.

SUMMER INTERNSHIP PROGRAM

The Cancer Center's summer internship program for high school and undergraduate students began in the 1980s with the support of private funds. In 2004-2018, the National Cancer Institute (NCI)-funded the Continuing Umbrella of Research Experiences (CURE) Program, which funded the summer internship program, followed by two additional years of support from the Friends of the UH Cancer Center and private funds in 2018 and 2019.

In 2020 an innovative research education and training initiative, supported by funds from the UH Mānoa Provost Strategic Investment Competition, resulted in eight undergraduate internships that began in the summer and continued though the fall and spring semesters. The goal of this initiative was to reinforce the students' intent to graduate with a science degree and consider a career to address the burden of cancer in Hawai'i and the Pacific.

Building on the successes of our previous internship program, the inaugural Cancer Research Education, Advancement, Training and Empowerment (CREATE) Program, is funded by a $1.36M five-year grant from the National Institutes of Health. It began in summer 2021 for undergraduate

UHCC HISTORIC TIMELINE

2019 NCI approved addition of Family Health Plan (FHP) Health Center in Guam to its NCI Community Oncology Research Program (NCORP), allowing patients on Guam to participate in NCI-sponsored cancer clinical trials.

2019 Hawaii Medical Service Association (HMSA), the state's largest private health insurance company joined Hawai'i Cancer Consortium.

2019 With sponsorship of late Sen. Breene Harimoto, state legislature allocated $6.5 million for construction of Early Phase Clinical Research Center (EPCRC) & Organoid Generation Facility in UH Cancer Center's annex shell space.

2019 NIH awarded matching $6.5 million as building grant for the EPCRC & organoid facility.

sophomores and juniors and first-year graduate students. The goal of the program is to offer distinctive training experiences for students in cancer biology and population sciences.

The UH Cancer Center also supports graduate education and training through a program that has been ongoing for many years. It began with funding one graduate student from the John A. Burns School of Medicine at the UH Cancer Center's Cancer Biology Program for one year, then expanded to include two students. Several years later the program grew further to include funding for two graduate students from either the UH Cancer Center or medical school to study and train in the Cancer Center's Population Sciences in the Pacific Program.

PACIFIC ISLAND PARTNERSHIP FOR CANCER HEALTH EQUITY (PIPCHE)

The Pacific PIPCHE grant, first awarded to the UH Cancer Center and the University of Guam in 2003, has supported establishing new research and training initiatives in other areas within the Pacific, where research infrastructure is less developed. Since the grant was first awarded, funds have supported the training for over 100 underrepresented students and early career scientists.

JENNIFER DOUDNA, PHD, 2020 NOBEL LAUREATE IN CHEMISTRY, SPOKE AT THE UH CANCER CENTER. A GRADUATE OF WAIĀKEA HIGH SCHOOL ON HAWAI'I ISLAND, SHE HAD REMARKED BEING INSPIRED TO PURSUE A SCIENCE CAREER BY A FEMALE RESEARCHER AT THE CANCER CENTER.

2020 Hawai'i Cancer Consortium (HCC) agreement renewed with community medical centers, & Adventist Health Castle joined as a new clinical member.

2020 UH Cancer Center received $1.36 million grant to train undergraduates in the lab in the long running Summer Research Program.

2020 The inaugural Clinical Research Professional Certificate Program conducted to help fill the need for clinical research associates in Hawai'i.

2020 UH Cancer Center/University of Guam Partnership Grant (U54) renewed.

PROFESSIONAL EDUCATION

In addition to educating students, the UH Cancer Center faculty and staff receive the most up-to-date information and highest levels of training, such as Inter-Programmatic Faculty Seminars that are held twice a month to foster collaboration and inter-programmatic research.

WEINMAN SYMPOSIUM

Since 2010, the Weinman Symposium convenes top scientists and experts, from across the nation in cancer research, specifically cancer syndromes, at the UH Cancer Center to present their research findings and explore opportunities for research collaborations. A number of these scientists have been past Nobel laureates. Many high school students attend this event to learn from these expert scientists. This effort is supported by generous donations from the Barry and Virginia Weinman Foundation.

CLINICAL RESEARCH PROFESSIONAL (CRP) CERTIFICATE PROGRAM

More recently and in collaboration with UH Mānoa's Outreach College, the UH Cancer Center held its first CRP Certificate Program. Designed to train Clinical Research Associates (CRAs) to work at the Cancer Center, our affiliated hospitals, and other academic centers in support of clinical trials, this program addresses the state's shortage for highly-qualified CRAs, who play an important role in the delivery of cancer care.

PUBLIC EDUCATION

QUEST FOR A CURE: PROGRESS IN CANCER RESEARCH

Knowledge empowers people, and as part of our mission, the UH Cancer Center is committed to educating the public. This year marks the 11th year of the Quest for a Cure: Progress in Cancer Research, an annual public education event where researchers and clinicians share the latest information on various cancers and cancer-related issues. This year with the COVID-19 pandemic, the Quest event was held as a series of four monthly evening lectures via Zoom.

UHCC HISTORIC TIMELINE

2021 UH Cancer Center Director Randall Holcombe resigned to assume directorship of University of Vermont Cancer Center.

2021 UH Cancer Center celebrated its 50th Anniversary as a cancer research center & 25th Anniversary as an NCI-designated cancer center via a hybrid event on August 14.

CATCHMENT AREA MAP

COMMUNITY PARTNERSHIPS ESSENTIAL IN BROAD CATCHMENT AREA

AREA WE SERVE

The UH Cancer Center is the main institution focused on cancer research in the State of Hawai‘i and the U.S.-affiliated Pacific Islands (USAPI), and is located 2,300 miles from the nearest National Cancer Institute (NCI)-designated cancer center. We are the only cancer center whose research and community engagement initiatives are centered on the Pacific Islands with unique populations of Native Hawaiian and other Polynesian, Micronesian, Japanese, Chinese, Korean, Filipino, and European descent. There is no racial or ethnic majority in Hawai‘i, due to the diverse population in the state.

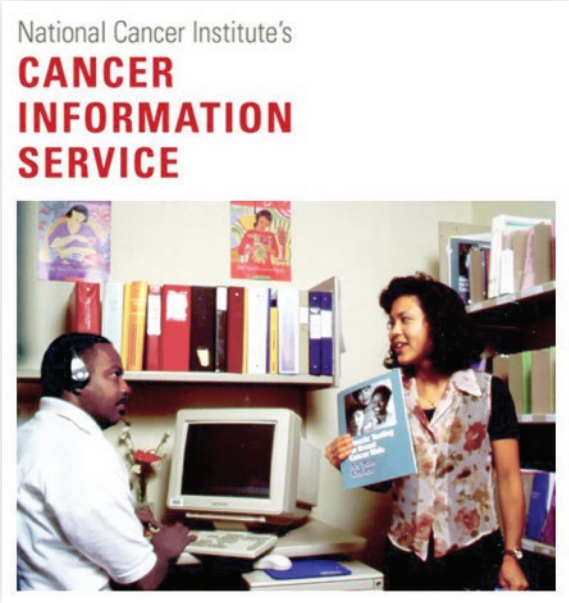
We aim to reduce the burden of cancer through research, education, patient care, and community outreach for those who live in Hawai‘i and the USAPI. This area is approximately 11 million square miles, slightly more than double the area of the continental United States, and includes 2.02 million people.

PARTNERSHIPS

Community outreach and engagement has been a fundamental activity of NCI-designated cancer centers since the initiation of the Cancer Centers program in 1971. As an NCI-designated cancer center, we seek to establish partnerships with trusted community-based organizations and cancer stakeholders, who conduct activities in the areas of research, education, patient care, and community outreach to address the cancer disparities in Hawai'i and the USAPI.

CANCER INFORMATION SERVICE

The NCI launched the Cancer Information Service (CIS) (1-800-4-CANCER) in 1976 to provide the public with the latest and most accurate cancer information. The CIS Pacific region phone line was established in 1978 as part of the Cancer Research Center of Hawai'i's Cancer Control Program. To address growing cancer disparities, the CIS expanded service to include an outreach and dissemination component in the early 1980s and became CIS Hawai'i. Beginning in 2000, CIS services to the USAPI were initiated.



The CIS provided health education, training, capacity building, program planning for healthy lifestyles, cancer risk reduction, and increased screening and early detection. Throughout its 26-year history, the CIS-Pacific Region was involved with many successful projects and initiatives due to valued partnerships across the U.S. Pacific and in Hawai'i. The NCI ended the program in 2010 due to advances in internet communications.

CIS IMPACT:

1995: COMPLETED THE WAI'ANAE CANCER RESEARCH PROJECT, A COMMUNITY-ENGAGED PARTICIPATORY RESEARCH PROJECT, WHICH EXAMINED EFFECTS OF TAILORED INTERVENTION TO INCREASE BREAST AND CERVICAL CANCER SCREENING IN NATIVE HAWAIIANS.

2000: CIS COLLABORATION WITH THE AMERICAN CANCER SOCIETY AND LOCAL CANCER CONTROL ORGANIZATIONS TO DEVELOP KA LŌKAHI WĀHINE: THE HEALTHY BALANCE OF WOMEN, A SERIES OF TOOLS PROVIDING NATIVE HAWAIIAN CULTURAL SENSITIVITY TRAINING FOR HEALTH PROFESSIONALS.

CROSSROADS—AN ORIGINAL TOBACCO PREVENTION DRAMA FOR MIDDLE SCHOOL STUDENTS—REACHED OVER 4,000 YOUTH THROUGH PERFORMANCES IN SCHOOLS ACROSS THE STATE, A COLLABORATIVE PROJECT WITH KALIHI-PALAMA HEALTH CENTER AND SUPPORTED BY THE HAWAI'I COMMUNITY FOUNDATION AND HAWAI'I COMPREHENSIVE CANCER COALITION'S PREVENTION ACTION TEAM.

CIS ADVISED 11 FEDERALLY-FUNDED COMPREHENSIVE CANCER CONTROL PROGRAMS AND ASSUMED LEADERSHIP POSITIONS ON THE HAWAI'I COMPREHENSIVE CANCER COALITION AND ITS VARIOUS COMMITTEES.

IN TOBACCO CONTROL, CIS LED EARLY EFFORTS IN CESSATION AS A MEMBER OF THE COALITION FOR A TOBACCO-FREE HAWAI'I, AND ADVISED ON THE LAUNCH OF HAWAI'I'S STATE QUITLINE.

IMPACT OF PARTNERSHIPS

The UH Cancer Center promotes discovery that leads to interventions, which directly impact individuals in Hawai‘i and the Pacific with cancer or are at risk for cancer.

Hawai‘i Administrative Rule for mandatory 7th grade vaccination, including for HPV, beginning in 2020, was the result of a partnership with the Hawai‘i State Department of Health and UH Cancer Center’s active participation as a member of the Hawai‘i Comprehensive Cancer Coalition’s the Vaccine-Preventable Workgroup.

The Hawai‘i Department of Human Services Med-QUEST Division worked with the UH Cancer Center to ensure access to clinical trials for cancer patients in Hawai‘i by issuing a memorandum for coverage of routine costs for those who participate in clinical trials.

A legislative highlight in 2006 was that Hawai'i became the first state to set the legal age for e-cigarette sales to 21 years.

UNIVERSITY OF GUAM

An 18-year partnership between the UH Cancer Center and the University of Guam continues to flourish and focus on the challenges faced by residents of the USAPI. Important research has emerged addressing key cancer disparities affecting USAPI, a journey that began over 25 years ago. Significant milestones include:

- Establishment of the University of Guam Cancer Research Center
- Stabilization of the Guam Cancer Registry
- Guam Cancer Trust Fund established by law to provide direct services for Guam cancer patients
- 1% Tobacco Tax sustains the Guam Cancer Registry
- Landmark legislation in Guam that resulted in decreased tobacco use and increased tobacco taxes

LOOKING TO THE FUTURE...

As we look to the future, the UH Cancer Center is committed to the people of Hawai'i and the Pacific by providing the highest quality research, education, and patient care. This will be done in close partnership with departments and schools throughout the UH, community organizations, and medical centers. Collaboration and building new partnerships will be essential to better attain our goals. They will also be important to create more opportunities to improve the clinical care of cancer patients through the Early Phase Clinical Research Center and continue to bring in the latest clinical trials in partnership with our Hawai'i Cancer Consortium medical centers.

We will create new resources to better understand the mechanisms driving cancers in our diverse population and to find new therapeutics and diagnostics such as the envisioned Organoid Generation Facility. We will move our population sciences program into the next phase through identifying new opportunities and re-imagining resources like our Multiethnic Cohort Study to revitalize it and explore new ways to identify the mechanisms underlying disparities in cancer incidence and mortality in Hawai'i and across the U.S.-affiliated Pacific Islands.

We will continue building innovative new programs to educate the people of Hawai'i on the causes of cancer in the islands and strategies to better prevent cancer or be diagnosed and treated early. We will grow our education programs that are designed to provide career enhancement and cancer-related education at every stage from high school, to undergraduate, graduate, medical, and continuing education of our scientists, physicians, and clinical research staff. This will be done in partnership with departments across the University of Hawai'i and our community partners and throughout the state.

We will continue the mission to find innovative and better ways to reduce the burden of cancer in Hawai'i. We invite you to join us in our fight to create a world where there is "no more cancer"!

A warm mahalo nui loa to our community partners and generous donors for 50 years of continuous support for the University of Hawai'i Cancer Center. Please know that your assistance and gifts will have an impact long into the future. We are humbled and honored to partner with you on our journey to a world where there is "no more cancer".

We also extend our sincere appreciation to the Friends of the UH Cancer Center for your continuous and unwavering advocacy and support and for sponsoring this 50th Anniversary celebration publication.

FRIENDS OF THE UH CANCER CENTER

Thank you to our new friends, Royal Kona Coffee for your donation of delicious coffee.

ROYAL KONA COFFEE FOR ROYALTY

UNIVERSITY OF HAWAI'I CANCER CENTER

50 Years of Progress

NCI Cancer Center

A Cancer Center Designated by the National Cancer Institute