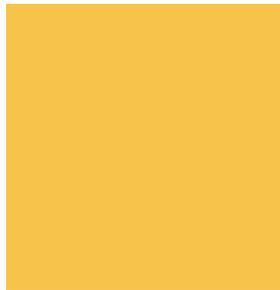


2021



Andy Hill Cancer Research Endowment
Annual Report

Fiscal Year 2021 (July 1, 2020–June 30, 2021)



Andy Hill CARE Fund
Washington's Cancer Research Endowment

Promoting Cancer Research to Improve the Quality of Life for the People of Washington



The Andy Hill Cancer Research Endowment (CARE) Fund, Washington's cancer research endowment, invests in public and private entities to promote cancer research in Washington. Through research grants and strategic partnerships, the CARE Fund aims to improve health outcomes by advancing transformational research in the prevention and treatment of cancer. The Washington State Legislature created the CARE Fund in 2015 and this public investment in cancer research is maximized by private and nonstate matching funds.



Letter from our Board Chair

From Vision to Reality

When the Washington State Legislature created the Andy Hill Cancer Research Endowment (CARE) Fund in 2015, it was with the vision that this bold public-private partnership would advance transformational research in the prevention and treatment of cancer throughout our state. This vision is now being realized. Sustained investment in this partnership is leading to scientific advancements, job creation, and additional private and nonstate investments that will improve health outcomes.

The urgency and momentum to invest in this vision has only grown. Nationally and globally, the necessity of investing in science came into even sharper focus during the pandemic. And while the pandemic has certainly captured our attention, it should not be forgotten that cancer remains the number one cause of death in Washington State. Further, as work supported by the CARE Fund has demonstrated, the pandemic has only made it harder to prevent, diagnose and treat cancer. Faced with the continued and changing challenges posed by cancer, the CARE Fund has increased the number and range of projects we have supported.

This CARE Fund Fiscal Year 2021 Annual Report to the public describes the CARE Fund's investments in cancer research and the impact of its grantmaking. This year's investments include recruitment of world-class scientists to the state, research designed to lessen the impact of COVID-19 on cancer patients, and projects aiming to uncover the next scientific breakthroughs in cancer research. In addition, the CARE Fund launched the population health grant program that focuses on investing in research addressing cancer disparities among populations. With public and private support, the CARE Fund is reducing the impact of cancer on the residents of our state.

Sincerely,



David Byrd, MD

Chair, CARE Fund Board of Directors



Frederick Appelbaum, MD

Immediate Past Chair, CARE Fund Board of Directors



CARE Fund Impact

Benefits to Washington

Below is a report on the benefits to Washington of the CARE Fund's programs to date (per RCW 43.348.040(5)).

The CARE Fund has been hard at work since its inception in 2015. Within the first two years an inaugural plan was developed, a program administrator was selected, and the first grant program was established. Three additional strategic grant programs were subsequently created and launched. CARE Fund grant investments are making an impact in Washington's cancer research community and the state's economy.

When the COVID-19 pandemic emerged last year, the CARE Fund displayed nimbleness and adaptability by issuing the COVID-19 Response grant opportunity. COVID-19 Response Grants are supporting research to understand and ameliorate the impacts of COVID-19 on health outcomes, risks, and well-being for cancer patients in Washington.

Since December 2017, the CARE Fund has awarded 22 cancer research grants, totaling up to \$21,100,000. Twelve of the grantees have completed at least one full year of the funded research. Collectively, these researchers have reported the following results:

- Authored or contributed to more than 150 peer-reviewed publications;
- Received nearly \$100 million in additional research funding, as the principal investigator or collaborating investigator; and
- Oversaw and ran research programs or laboratories supporting more than 70 jobs.

In addition, grantees continue to advance and strengthen the cancer research ecosystem through their ongoing research, mentorship of the next generation of cancer researchers, and collaboration with researchers in Washington and across the United States.

Economic Impacts

ECONorthwest, a Northwest-based consulting firm specializing in economics, finance, and planning, conducted an independent analysis to evaluate the impact of the CARE Fund's grantmaking on Washington's economy.¹ The long-term benefits of the CARE Fund programs stretch far beyond the initial expenditure-related economic impacts.

The analysis concluded that CARE Fund grantmaking had a significant impact for Washington's economy, including:

CARE Fund grants were matched by nonstate dollars at an average rate of **\$3.50 for every one dollar** of public investment.

The CARE Fund's average grant disbursements of \$1.9 million per year, is associated with an additional \$6.9 million in matching funds. These funds support \$18.9 million in economic output in Washington State of which \$6 million is in the form of labor income.

¹ ECONorthwest, a Northwest based firm specializing in economics, finance, and planning, conducted an independent analysis of 10 of 22 CARE Fund grantees who had completed at least one full year of their grant and submitted an annual finance report. ECONorthwest (2021). *Andy Hill CARE Fund Economic Impacts Report*



A short video (1:40) highlighting the innovative research CARE Fund grant investments help make possible is available through the QR Code to the left.

Public-Private Partnership (July 1, 2016-June 30, 2021)

State Appropriations
Since 2016

**\$28.3
Million**

67 Grant
Applications Requested

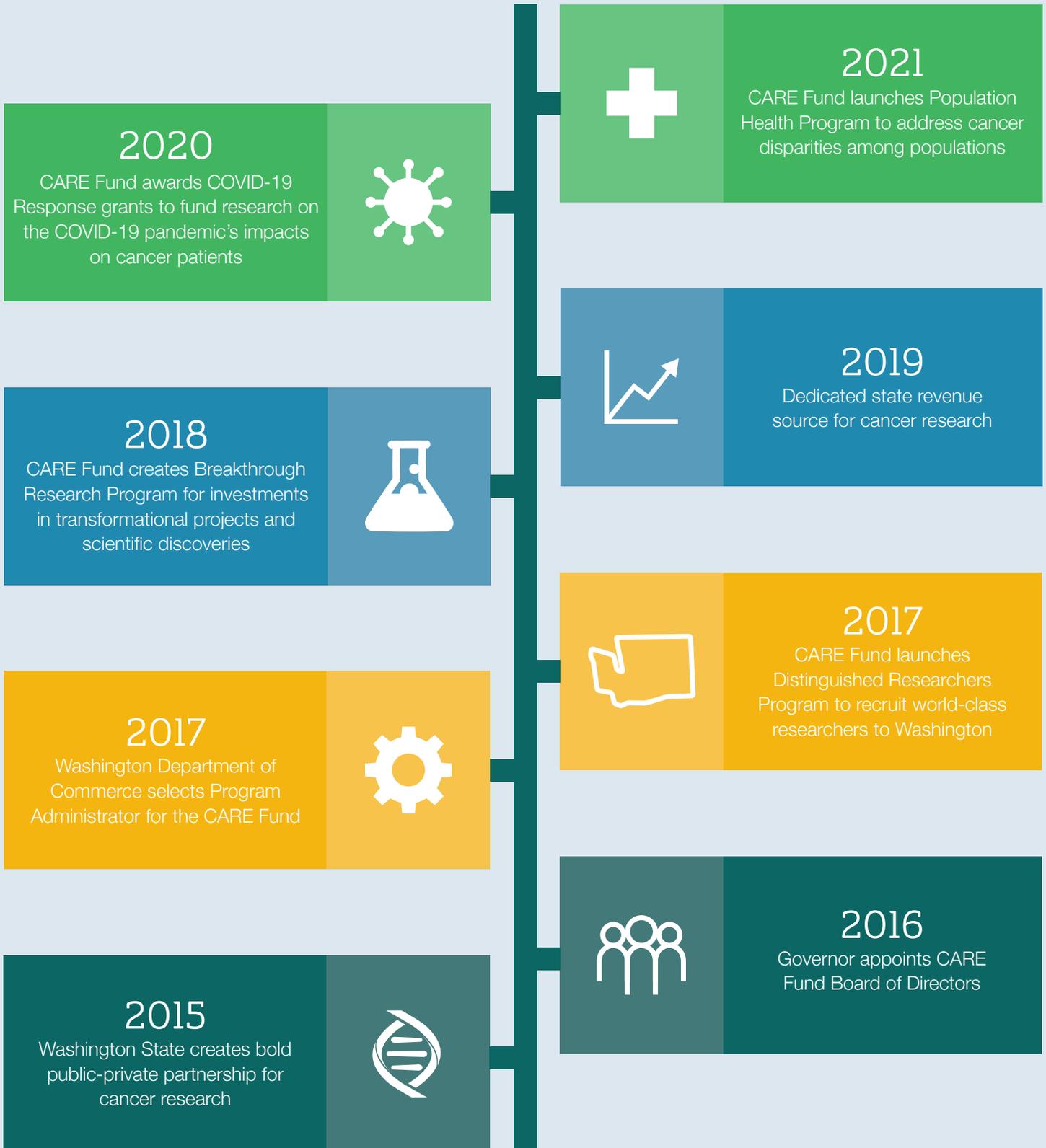
**\$148
Million**

Median
Grant Award
Amount **\$500,000**

Grants
Awarded

22

CARE Fund Timeline (2015–2021)



Year in Review

Despite the challenges resulting from the pandemic, the CARE Fund continued to award grants to important and high-quality cancer research projects, created a new population health grant program focused on addressing cancer disparities among populations for which disparities are most prevalent, and supported efforts to better understand the impact of the COVID-19 pandemic on cancer care.

Grant Awards (July 2020 through June 2021)

The COVID-19 pandemic continued to negatively impact cancer patients and survivors through 2020 and into 2021. In September 2020, the CARE Fund followed up on its initial **COVID-19 Response grant program** by issuing a second cycle of funding. The following three \$100,000 grants were awarded to implement research at the intersection of COVID-19 and cancer:

Fred Hutchinson Cancer Research Center Garnet Anderson, PhD

Assessing COVID-19 Related Cancer Care Disparities Among an Aging Population: A Population-Based Study

Institute for Systems Biology Wei Wei, PhD

Discerning the Dysfunctional Immune Response to SARS-CoV-2 Infection in Patients with Chronic Lymphocytic Leukemia

University of Washington Chaitra Ujjani, MD

Efficacy of the SARS-CoV-2 Vaccine in Chronic Lymphocytic Leukemia

In November 2020, the CARE Fund launched the first cycle of the **Population Health grant program**. The new grant program seeks to support research projects that aim to improve cancer outcomes, especially among populations for which cancer disparities are most prevalent. CARE Fund grants will support research focused on everything from better understanding the causes of cancer to survivorship. The following two \$200,000 Population Health grants were awarded:

Fred Hutchinson Cancer Research Center Kikkeri Naresh, MBBS, DCP, MD, FRCPath

Understanding the Contribution of the Immune Tumor Microenvironment to the Observed Regional Disparities in Mortality Among Different Lymphoma Types in Washington State

Washington State University Brieann Satterfield, PhD

Night Shift Work as a Carcinogen: Molecular Mechanisms, Biomarkers, and Therapeutic Targets



“Through this [Night Shift Work as a Carcinogen] study, we hope to identify biological mechanisms we can target to develop countermeasures to mitigate the long-term health impact of working nonstandard hours.”

— Brieann Satterfield, PhD, Population Health Grant Recipient

Night Shift Work as a Carcinogen: Molecular Mechanisms, Biomarkers, and Therapeutic Targets

COVID-19 and Cancer Research Data Project

The COVID-19 and cancer research data project is a collaboration between Fred Hutchinson Cancer Research Center (Hutchinson Institute for Cancer Outcomes Research and the Office of Community Outreach and Engagement) and MultiCare Institute for Research & Innovation. This ambitious statewide data project aims to assess the impact of the COVID-19 pandemic on cancer care, with particular emphasis on low-income groups and underrepresented minorities.

The COVID-19 and Cancer Research Data Project will result in the following:

Washington State COVID-19 and Cancer Research Data Repository

Researchers are using available insurance claims data, cancer and COVID-19 data registries, and cancer surveillance systems, to create a patient-level data repository to include information on the care, outcomes, and experiences for cancer patients in Washington State during the COVID-19 pandemic.

Population Health Assessment

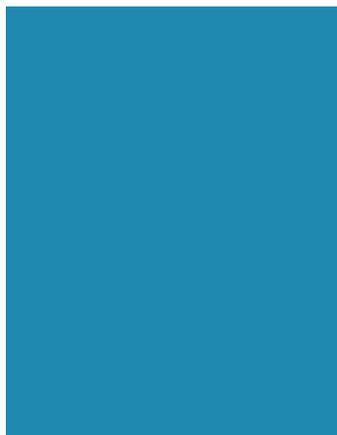
Researchers are conducting a general population health assessment survey focused on cancer-related beliefs, behaviors, screening adherence, access to care, and social determinants of health (e.g., food insecurity, housing instability, and discrimination). The survey will capture information on participants' history of novel coronavirus infection, risk perceptions, behaviors, resilience, and mitigation practices.

Cancer Care Delivery Assessment

Researchers will examine the impact of the COVID-19 pandemic on cancer care delivery by conducting focus groups with patients and surveying health care providers at oncology clinics in Washington.

CARE Fund Governance and Administration

This year the CARE Fund welcomed two new governor-appointed members to the board of directors. The Washington Department of Commerce engaged an external auditor to complete the CARE Fund's first program performance audit as well as selected a new Program Administrator to support the CARE Board.



Grantee Highlights

Summary of Research, Prevention, and Care-Related Findings



OFER AMRAM, PhD

Washington State University
COVID-19 Response Grant

Dr. Ofer Amram is an Assistant Professor at the Elson S. Floyd College of Medicine, Washington State University. A spatial epidemiologist, Dr. Amram uses geographic informational systems to identify how geographic and environmental factors impact access to health services and health outcomes.

Dr. Amram and his team were awarded a COVID-19 Response Grant to evaluate the impact of deferring cancer preventive care during the COVID-19 pandemic. Dr. Amram led the collaborative effort with researchers at Washington State University and MultiCare Health System, which has hospitals and clinics throughout Washington, to evaluate the impact of the COVID-19 public health measures on cancer screenings.

Initial results of the study showed a substantial decline in breast cancer screening during the COVID-19 pandemic in women living in Washington state. Moreover, the study identified inequities in this decline, with racial minority women having greater reductions in breast cancer screenings from 2019 to 2020, than White women. In addition to racial inequities, women living in rural areas had a greater reduction in screenings compared to women in urban areas. Finally, there was a greater reduction in screenings among women who self-paid or were insured by Medicaid than compared to women with commercial insurance or Medicare coverage.

The initial results of the study begin to reveal the impact of the pandemic on cancer screenings and implications for the potential long-term impacts for patients who may have a delayed cancer diagnosis due to delayed screenings.



YAW NYAME, MD

University of Washington
Distinguished Researchers Grant

Dr. Yaw Nyame is a urologic surgical oncologist who focuses on addressing prostate cancer disparities, particularly in Black men. His research focuses on the intersection of biology, environment, and health services. This comprehensive approach has the potential to uniquely and effectively address the complexity of prostate cancer disparities and will promote multidisciplinary research across disciplines at the University of Washington and other cancer research institutions in the state.

Dr. Nyame's research goes beyond documenting disparities. He was part of a recent study that modeled the impact of tailored screening guidelines for Black men to reduce mortality and limit overdiagnosis. He recently published an editorial making the case that to address the disproportionate burden of prostate cancer in Black men, there needs to be tailored national guidelines and enough information available to inform targeted screening recommendations for this population.

Dr. Nyame and colleagues at the Fred Hutchinson Cancer Research Center and the University of Washington have started a community-based research coalition to facilitate the work of doing outreach to understand the barriers to preventive screenings and treatment for Black men in Washington. While Dr. Nyame, aims to improve prostate cancer outcomes with his research and interventions, he recognizes that socioeconomic, environmental, and structural factors must also be addressed to improve cancer outcomes.



LUCAS SULLIVAN, PhD

Fred Hutchinson Cancer Research Center
Distinguished Researchers Grant

Dr. Lucas Sullivan, a research scientist, is an Assistant Professor at the Fred Hutchinson Cancer Research Center. Dr. Sullivan studies cellular metabolism and how it affects cancer. Metabolomics, the study of the chemical reactions that occur in organisms, cells, or tissues, is a rapidly growing but relatively underserved part of the cancer biology field. These reactions produce small chemicals (metabolites) which play critical roles in keeping cells healthy and functioning properly. Advances in metabolomics has the significant potential to identify new mechanisms, models, and targets for a wide range of tumor types. Increased understanding about the fundamental aspects of these processes in cancer cells will further add to the therapeutic potential of the approach.

Dr. Sullivan's research program focuses on investigating metabolic liabilities in cancer cells in three areas: 1) investigating mechanisms of aspartate metabolism for cancer therapy; 2) determining the roles of coenzyme homeostasis to support proliferative metabolism; and 3) discovering metabolic products and pathways using a novel metabolite tracing strategy.

The work by Dr. Sullivan and his team has shown that supporting aspartate levels in cancer cells in the body can increase tumor growth rates. This indicates that aspartate is a metabolic limitation for tumor growth in the system and that suppressing aspartate would inhibit tumor growth. Additional studies are ongoing to understand how different biological processes impact aspartate metabolism and how cancer cells sense and respond to aspartate limitation.



PATRIK JOHANSSON, MD, MPH

Washington State University
COVID-19 Response Grant

Dr. Patrik Johansson is an Associate Professor at the Elson S. Floyd College of Medicine, Washington State University and the Director of the Northwest Health Education and Research Outcomes Network (NW HERON). Using his expertise in conducting community-based participatory research and developing partnerships with health care clinics and local health departments, Dr. Johansson's research focuses on chronic disease prevention and management in rural and Indigenous populations.

Dr. Johansson was awarded a COVID-19 Response grant to study the impact of the pandemic on the well-being of rural and American Indian cancer patients in Washington. Leveraging their existing research network in rural and tribal communities, the research team is examining the impacts of COVID-19 on select health, sociocultural, and economic outcomes among cancer patients from 15 clinics that serve rural residents and American Indians in Washington.

Using a mixed-methods approach of focus groups and surveys, the study aims to learn directly from patients the impact the COVID-19 pandemic has had on their health, access to care, community support, economic security, and other life factors. Furthermore, the study aims to translate the survey and focus group results into changes at health care systems and communities by adapting existing programs and identifying new approaches to meet the needs of rural and American Indian cancer patients.

Grant Awards

CARE Fund Grants Awarded

Below and on the following page are the number and dollar amounts of grants awarded and the grantees for the prior year (per RCW 43.348.040(5)).

Grants Awarded, FY2021			
Total of all grant commitments made during the fiscal year			
Grant Program	Grantee	Amount	Date Awarded
Breakthrough Research	Institute for Systems Biology (James Heath, PhD)	\$3,000,000	Feb 2021
COVID-19 Response	Fred Hutchinson Cancer Research Center (Garnet Anderson PhD)	\$99,907	Feb 2021
COVID-19 Response	Institute for Systems Biology (Wei Wei, PhD)	\$100,000	Feb 2021
COVID-19 Response	University of Washington (Chaitra Ujjani, MD)	\$100,000	Feb 2021
Population Health	Fred Hutchinson Cancer Research Center (Kikkeri Naresh, MBBS, DCP, MD, FRCPath)	\$200,000	Apr 2021
Population Health	Washington State University (Briann Satterfield, PhD)	\$197,370	Apr 2021
Total Awarded in FY2021		\$3,697,277	

Grants Awarded, FY2020			
Total of all grant commitments made during the prior fiscal year			
Grant Program	Grantee	Amount	Date Awarded
Breakthrough Research	Institute for Systems Biology (James Heath, PhD)	\$3,000,000	Feb 2020
Breakthrough Research	University of Washington (André Lieber, MD, PhD)	\$491,714	Apr 2020
COVID-19 Response	Bloodworks Northwest (José López, MD ; Dominic Chung, PhD)	\$100,000	Jun 2020
COVID-19 Response	University of Washington (Brian Beliveau, PhD ; Shreeram Akilesh, MD, PhD)	\$100,000	Jun 2020
COVID-19 Response	University of Washington (Christine Queitsch, PhD ; Richard James, PhD)	\$100,000	Jun 2020
COVID-19 Response	Washington State University (Ofer Amram, PhD)	\$99,997	Jun 2020
COVID-19 Response	Washington State University (Patrik Johansson, PhD)	\$99,984	Jun 2020
Distinguished Researchers	University of Washington (Yaw Nyame, MD, MBA)	\$500,000	Jun 2020
Total Awarded in FY2020		\$4,491,695	

“The joint project with MultiCare led to further research investigating the increase in telehealth service utilization during the pandemic and whether this change in the delivery of primary care had an impact on utilization of cancer screening services.”

— Ofer Amram, PhD, COVID-19 Response Grant Recipient

Evaluating the Impact of Deferred Cancer Preventive Care in the Era of COVID-19

Number and Amount of Grants			
Total grant awards by year and program			
Fiscal Year	Grant Programs	Total Awards	Total Amount
2021	Breakthrough Research	continued funding	\$3,000,000
	COVID-19 Response	3	\$299,907
	Population Health	2	\$397,370
	Total	5	\$3,697,277
2020	Breakthrough Research	continued funding	\$3,491,714
	COVID-19 Response	5	\$499,981
	Distinguished Researchers	1	\$500,000
	Total	6	\$4,491,695
2019	Breakthrough Research	2	\$1,150,000
	Distinguished Researchers	5	\$2,500,000
	Total	7	\$3,650,000
2018	Distinguished Researchers	4	\$2,000,000
	Total	4	\$2,000,000
Total Awarded through: 6/30/2021		22	\$13,838,972

Findings and Promising New Areas of Investment

“Washington state is home to a thriving and entrepreneurial environment that has catalyzed the fast-paced growth within the life science sector, with particular attention to the innovation and success stemming from our cancer research ecosystem. Cutting-edge research in this sector is helping fuel our state’s economic recovery from the pandemic and transform lives worldwide.”

—Dr. Lisa Brown, Director, Washington State Department of Commerce

The CARE Fund awarded grants to advance cancer research across a wide range of research types through its four grant programs: Distinguished Researchers, Breakthrough Research, COVID-19 Response, and Population Health. Below is a summary of research, prevention, and care-related findings, including promising new areas for investment (per RCW 43.348.040(5)).

The COVID-19 pandemic, the associated stay-at-home orders, and supply chain issues negatively impacted many grantees’ planned research. However, for some, it was an opportunity to adapt their approach and use videoconferencing to communicate with patients and study participants. Researchers used at-home collection kits or mobile collection sites to collect data and biospecimens. The redesigned approach allowed for an expansion of the study population, particularly among underrepresented populations, by reducing the burden of traditional in-person visits to a study site. The use of videoconferencing and remote biospecimen collection may have an impact beyond the pandemic to increase access to clinical trials or research studies for populations who have traditionally been underrepresented.

As public health measures changed, grantees returned to their laboratories and made progress across a broad spectrum of cancer research areas. Some CARE Fund-supported studies are using multi-omic technologies to understand how the body’s genes, proteins, metabolites, and the microbiome influence cancer. The

use of multi-omics is informing the role of the microbiome in cancer survivorship; metabolites for cancer therapies; and proteins as a marker for cancer metastasis. Multi-omics is expected to continue as an important approach in cancer research.

CARE Fund grantees are also working in the field of immunotherapy to identify specific biomarkers to identify cancer and develop cancer therapies and vaccines. The CARE Fund is awaiting the results of funded research projects at the cutting edge of immunotherapy and multi-omic technologies.

CARE Fund grantees are also studying how therapies can counter carcinogens to reduce cancer risk and improve cancer treatment efficacy. Progress on these studies were significantly slowed by the pandemic but initial results are promising, and the research will continue.

The CARE Fund’s investments in research at the intersection of COVID-19 and cancer have illuminated the impact of the pandemic and interventions on cancer care in Washington. Early indications are that fewer cancer screenings were performed during the pandemic and that there was a disproportionate impact for some populations. The impacts of the pandemic on reduced cancer care utilization, delayed cancer diagnoses, and disparate health outcomes will continue to be studied and are promising new areas for investment.

Financial Summary (July 1, 2020–June 30, 2021)

Fiscal Year 2021 (FY21) Financial Summary (Unaudited)

Below is information that shows the Endowment’s administrative expenses and provides an assessment of the availability of funding for cancer research, prevention, and care from sources other than the Endowment (per RCW 43.348.050(5)).

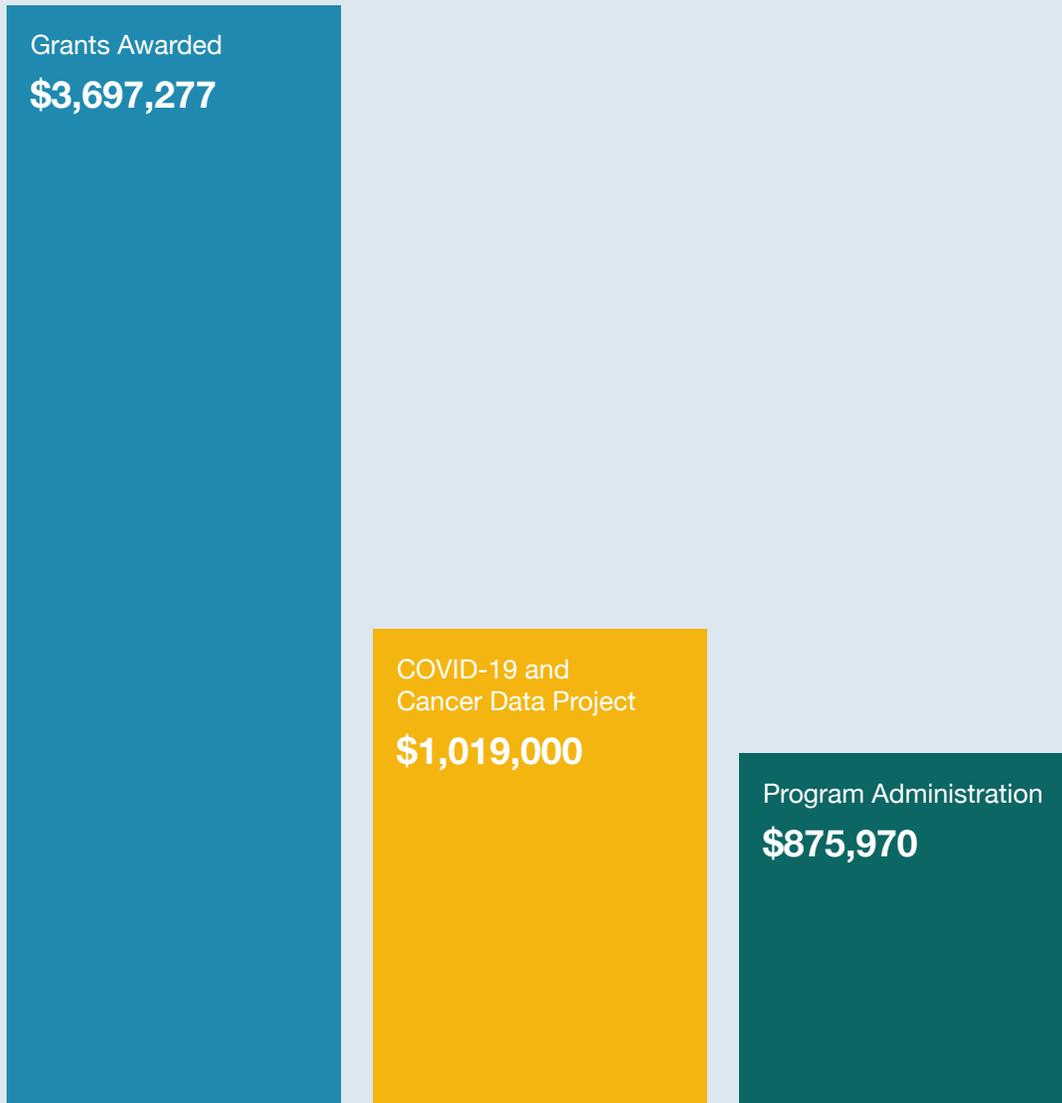
The Washington State Legislature is authorized to appropriate up to \$10 million per year to the CARE Fund. From the CARE Fund’s inception in FY16 through FY21, the state Legislature has appropriated \$28,335,000 to the CARE Fund.

Through the fiscal year ending June 30, 2021, the CARE Fund has awarded 22 grants to Washington State organizations across four programs: Distinguished Researchers (10 awards), Breakthrough Research (2 awards), COVID-19 Response (8 awards), and Population Health (2 awards). CARE Fund grants support cancer research projects across a broad range of disciplines, including developing technologies to detect cancer recurrence, reducing

cancer risks associated with environmental exposures, and addressing cancer disparities in Washington. The tables on pages 9 and 10 detail the CARE Fund grants awarded through FY21.

The CARE Fund is also investing \$1,019,000 in a 2-year COVID-19 and Cancer Data Project to better understand the impact of the COVID-19 pandemic for cancer patients and providers in Washington State. As of June 30, 2021, \$168,203 has been expended. The remaining balance of \$850,797 is anticipated to be expended in FY22.

In FY21, the cost of CARE Fund program administration was \$875,970. This amount includes the cost of the CARE Fund program administrator, the statutorily required program performance audit, Department of Commerce costs, Assistant Attorney General services, and investment management fees.



Board of Directors (As of June 30, 2021)

The work of the CARE Fund would not be possible without the vision and guidance of the CARE Board of Directors.*

Elaine Albert, MD, MHA
Seattle Children's Hospital

Leslie Alexandre, DrPH
Life Science Washington

Frederick Appelbaum, MD
Immediate Past Board Chair
Fred Hutchinson Cancer Research Center

Cliff Berkman, PhD
Washington State University

Thomas Brown, MD, MBA
Syapse

David Byrd, MD
Board Chair
University of Washington

Carol Dahl, PhD
The Lemelson Foundation

Steven Harr, MD
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Sana Biotechnology

Eunice Hostetter
Board Secretary
American Cancer Society Cancer Action Network

Jennifer Kampsula Wong, JD
American Cancer Society Cancer Action Network

Gary Kaplan, MD
Virginia Mason Franciscan Health

Elizabeth Lawlor, MD, PhD
Seattle Children's Research Institute

*Organizational affiliations are for identification purposes only.



CARE Fund Program Administrator

The Washington Department of Commerce selected the Latino Community Fund of Washington (LCF) to act as the Program Administrator for the Andy Hill Cancer Research Endowment (CARE) Fund effective July 1, 2021. LCF supports the CARE Fund by providing financial and accounting management

services; establishing policies and procedures to facilitate the process of grant applications; review, selection and notification of awards; and distributing and ensuring compliance of CARE Fund grant awards to selected entities.

Future Program Directions

Below is a summary of future program directions with respect to cancer research, prevention, and care (per RCW 43.348.040(5)).

The CARE Fund is built on a public-private partnership model and incentivizes additional investment by requiring private or other nonstate resources to match public funds. Future program directions will take into consideration and may prioritize the following:

- Research in areas where Washington's research community has distinct insights and capabilities to make progress on the issue.
- Research that relates to areas of cancer research that lack sufficient external funding and is of particular relevance to Washington residents (e.g., rural health, disproportionate by cancer type, hotspots of cancer incidence, environmental risk, farmworker health, indigenous health).
- Research that addresses cancer incidence, access, and outcomes disparities.
- Collaborative and cross-disciplinary cancer research projects.

For additional details, please see the CARE Fund (July 30, 2021–July 1, 2023) Strategic Plan.





Andy Hill CARE Fund
Washington's Cancer Research Endowment

Andy Hill CARE Fund
c/o Evergreen Social Impact
P.O. Box 429
Bothell, WA 98041
wacarefund.org

Laura Flores Cantrell, Executive Director
laura@wacarefund.org

Peter Choi, Senior Program Officer
peter@wacarefund.org

Sarah Hiller, Director of Operations
sarah@wacarefund.org

Sooyoun Park, Program Coordinator
sooyoun@wacarefund.org

The Andy Hill Cancer Research Endowment (CARE) Fund is named in honor of State Senator Andy Hill who was a dedicated legislator and public champion of cancer research. He lost his battle with cancer at the age of 54. The CARE Fund carries on his legacy of promoting cancer research and ensuring access to scientific advancements for all Washingtonians.