

Center to Reduce Cancer Health Disparities



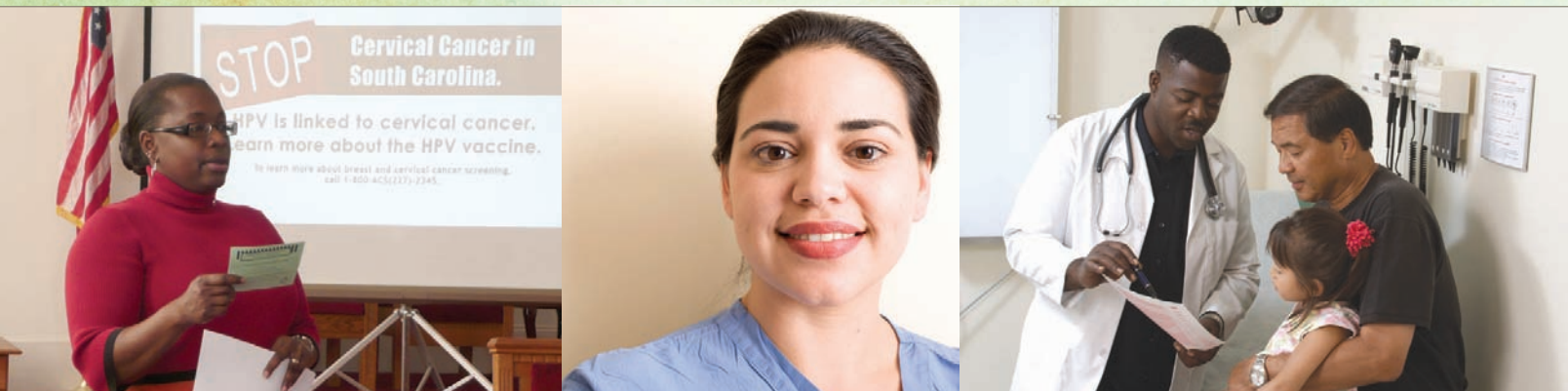
Cancer's burden
is not equally distributed.

There are differences
in the incidence, prevalence,
and mortality of cancer
among specific populations
in the United States.



The Center to Reduce Cancer Health Disparities (CRCHD) is the component of NCI dedicated to confronting these inequities, particularly in understanding how biological, environmental, social, and cultural factors contribute to differences in cancer prevention, care, and treatment.

CRCHD is also central to the NCI's efforts to train the next generation of competitive researchers in cancer and cancer health disparities, and in addition, is creating state-of-the-art regional networks/centers dedicated to cancer health disparities research, training, and outreach.



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*Reducing cancer health disparities...
It's possible.*



A Message from the Director

This past year marked the tenth anniversary of the Center to Reduce Cancer Health Disparities (CRCHD). As I reflect upon the Center's past, present, and future, I am reminded of the words spoken by Martin Luther King, Jr., in his March 25, 1966 speech before the National Convention of the Medical Committee for Human Rights in Chicago: *Of all the forms of inequality, injustice in healthcare is the most shocking and most inhumane.*

Tremendous progress has been made in understanding cancer and delivering care. We have been able to bring advances in cancer research to African Americans, Alaska Natives, Asian Americans, Hispanics/Latinos, Native Americans, Native Hawaiians/Pacific Islanders, and other medically underserved communities. But much work remains to be done to eliminate cancer health disparities. More than forty years later, we still have not achieved a world where *everyone* has equal access to care. Disparities in cancer care and cancer outcomes continue to diminish the quality of life of some populations in this country, including the poor, racially and ethnically diverse groups, and those with limited or no access to healthcare.

CRCHD was established with the sole purpose of confronting and eliminating these inequities.

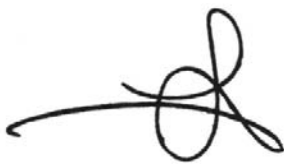
Over the past decade, the Center has tremendously broadened its focus and capacity. While our roots lie in community-based cancer health disparities research, that focus has been complemented with basic research, as the growing body of evidence has taught us that cancer is not a single monolithic issue but, instead, one to which many socioenvironmental and genetic factors contribute. This broader view has enabled a more complex picture of the roots of cancer disparities to evolve and, along with that, better-targeted, more precise interventions.

As the nation's population continues to grow more ethnically and racially diverse, it has become increasingly important to ensure that the science conducted encompasses diverse perspectives to address the health needs of *all* people. CRCHD is fully dedicated to training the next generation of competitive researchers from racially and ethnically diverse, and underrepresented populations in the cancer and cancer health disparities fields. CRCHD continues to lead the National Cancer Institute's (NCI's) efforts in supporting research training and career development experiences beginning as early as high school and continuing through to tenured track appointments.

CRCHD has spawned a broad range of research, training, and community outreach activities to address its overarching goal of eliminating disparities through a variety of programs: Continuing Umbrella of Research Experiences (CURE), Partnerships to Advance Cancer Health Equity (PACHE), Community Networks Program (CNP), and Patient Navigation Research Program (PNRP). The Center has also fostered an unprecedented, state-of-the-science, integrated network infrastructure and geographic system of program management to promote a multidisciplinary and transorganizational team science approach that will ultimately enhance cancer health disparities research, diversity training, and cancer care outcomes.

In this first report from the Center, we are pleased to share with you an overview of who we are, what we do, the impact of our programs, and highlights of our research and training from Fiscal Year 2011. NCI/CRCHD's support, together with the tremendous motivation and efforts of our grantees, has resulted in significant strides in understanding cancer health disparities and real differences in people's lives.

We will continue to build upon these successes in the coming years. At the same time, we know we must work harder still to reduce the unequal burden of cancer that still exists in this country. CRCHD is unwavering in its commitment to moving us closer to the day when diversity is a given and disparities no longer exist.

A handwritten signature in black ink, appearing to read 'Sanya A. Springfield', with a long horizontal stroke extending to the left.

Sanya A. Springfield, Ph.D.
Director
Center to Reduce Cancer Health Disparities
National Cancer Institute

Expanding our
understanding of
the biological,
behavioral, and
socioeconomic roots
of cancer
health disparities

INTRODUCTION

REDUCING CANCER HEALTH DISPARITIES



The National Cancer Institute's (NCI's) Center to Reduce Cancer Health Disparities (CRCHD) is pleased to present *CRCHD's Annual Report on Cancer Health Disparities: Fiscal Year 2011*. This first *Annual Report* describes who we are and what we do. But more importantly, we wish to share the impact of CRCHD's efforts to enhance the understanding of the biological and nonbiological causes of cancer health disparities, increase the diversity of the cancer research workforce, and reduce the unequal burden of cancer in the United States. The report provides an overview of the CRCHD-supported research and training programs in this field, and highlights selected projects, investigators, and partnerships that represent the range of research addressing different cancers, training, and community outreach efforts supported by a variety of NCI grant mechanisms.

Over the past decade, CRCHD has made significant contributions to advancing the science of cancer health disparities and diversifying the cancer research workforce. Today, as a result of CRCHD initiatives, access to quality care is increasingly available to communities experiencing an excess burden of cancer. Our understanding of the biological, behavioral, and socioeconomic roots of cancer health disparities is expanding, resulting in improved cancer outcomes. In addition, more cancer research training opportunities are available to those who, historically, have been underrepresented in the sciences.

Yet, much work remains to be done to reach the ultimate goal of elimination of cancer health disparities, which continue to diminish the quality of life of some populations in this country, including the poor, racially and ethnically diverse groups, the disabled, and those with limited or no access to healthcare. A close look at cancer incidence and mortality statistics reveals that certain groups, such as African Americans, Alaska Natives, Asian Americans, Hispanics/Latinos, Native Americans, Native Hawaiians/Pacific Islanders, and underserved whites, are more likely than the general population to suffer disproportionately from cancer and its associated effects, including premature death.

CRCHD's work in the future will continue to identify and foster new and innovative scientific training and research opportunities and build upon past successes, so that cancer health disparities no longer add to the burden of disease for anyone in America.

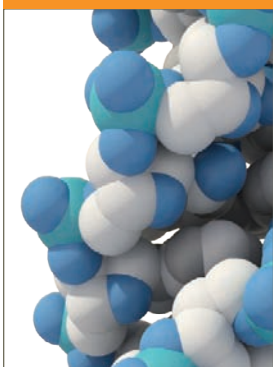
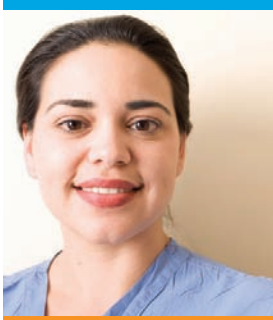
About CRCHD

CRCHD first began tackling the issue of cancer health disparities in 2001, when it was created as an expansion of NCI's Office of Special Populations Research—an office that had been established in 1996 to manage research that addressed health issues relevant to racially and ethnically diverse, and underserved populations. CRCHD (“the Center”) grew over the next decade, particularly in its funding for population-based research, and expanded further when it merged with the Comprehensive Minority Biomedical Branch (CMBB) in 2007. This merger helped provide the critical infrastructure needed to spawn new research examining the biological basis of cancer disparities. The combined resources and expanded focus enabled NCI, for the first time, to link cancer health disparities research and diversity training, thereby establishing a firm foundation for the development of innovative scientific programs geared towards improving outcomes in communities experiencing an excess burden of cancer. Now, in its second decade, CRCHD is poised to make an even greater impact on cancer health disparities reduction across the nation and the globe.

Who We Are

CRCHD is one of the Divisions, Offices, and Centers (DOCs) within NCI, and the cornerstone of NCI's efforts to reduce the unequal burden of cancer in our society. Since its establishment, CRCHD has tremendously broadened its focus and capacity. While the Center's roots lie in community-based participatory research (CBPR)—a unique approach to examining and reducing cancer health disparities by actively engaging communities in the research process—that focus has been complemented more recently with basic research, as the growing body of evidence has taught us that different population groups may have biological differences associated with various cancers. This broader view allows a more complex picture of the biological, behavioral, and socioeconomic roots of cancer disparities, and sets the stage for better-targeted, more precise interventions and community outreach.

CRCHD is also dedicated to training the next generation of competitive cancer and cancer health disparities researchers from underrepresented populations, who otherwise are at risk of being lost from the training pipeline, and creating a workforce that reflects an increasingly diverse America. Funding and training opportunities are provided across the academic continuum, for those as young as high school students to those who have already achieved research independence. Their diverse perspectives are critically important in ensuring that science addresses the health needs of all people.



What We Do

CRCHD takes a comprehensive approach to carrying out its mission and conducts the following activities:

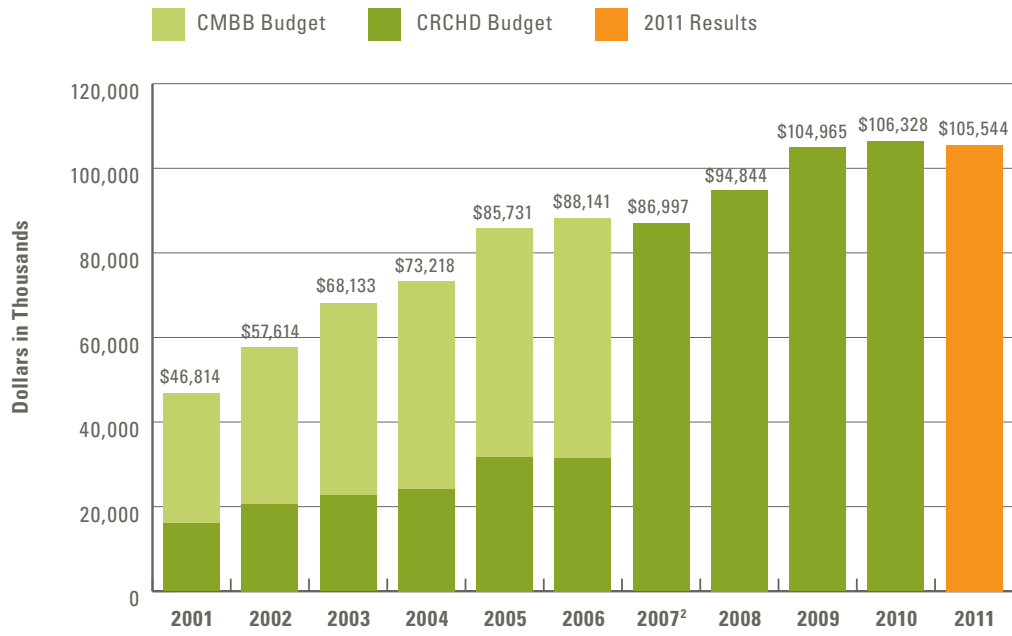
- Spawns, supports, and evaluates basic, clinical, and population-based research that shows the greatest potential for identifying biological, behavioral, and socioeconomic determinants of cancer health disparities
- Supports translational research that integrates cancer research findings into community practice
- Promotes research that incorporates new technologies, such as genomics, proteomics, bioinformatics, biospecimen science, and nanotechnology to achieve improved cancer outcomes
- Advises, engages, and supports researchers across a range of disciplines and theoretical frameworks
- Engages racially and ethnically diverse and underserved communities in the research process to ensure that research, outreach, and education efforts are culturally tailored to meet their needs
- Develops innovative and comprehensive training programs aimed at increasing diversity in the cancer research workforce
- Promotes an integrated, multisite, transdisciplinary, team science approach to enhance research, training, outreach, and education in cancer health disparities
- Forges long-term, comprehensive partnerships between academic institutions serving underrepresented populations and NCI-designated Cancer Centers to build research and training capacity and improve effectiveness of disparities research and outreach to underserved communities
- Advises NCI, the National Institutes of Health (NIH), the Department of Health and Human Services (HHS), other federal and nonfederal organizations, and the media on cancer health disparities research to reduce the disproportionate burden of cancer, and on training programs to achieve diversity among cancer investigators

NCI/CRCHD GRANTS AND CONTRACTS



In Fiscal Year 2011 (FY 2011), NCI invested \$105,544,378 in health disparities research, training, and integrated networks projects via extramural grants (projects conducted outside of NIH), cooperative agreements, contracts, and supplements overseen by CRCHD. As indicated by the funding trend in Figure 1, the Center has seen a steady growth in expenditures since its inception in 2001 until 2009, with funding remaining relatively flat over the past two years.

FIGURE 1 CRCHD Division-Controlled and RPG Actuals¹ Across FY 2001-2011



¹ Includes Division Controlled Awards, RMS, CRCHD Controlled RPG Awards, and NCI Controlled RPG Awards.

² Reflects merger of CMBB & CRCHD.

The accompanying pie chart in Figure 2 indicates the distribution of funding by program and operations (Research Management Support [RMS]). Diversity training accounts for almost one-third of the budget, which includes the Continuing Umbrella of Research Experiences (CURE), as well as Research Project Grant (RPG) Diversity Supplements and P50s. An additional third of the budget funds the Partnerships to Advance Cancer Health Equity (PACHE) program (formerly known as the Minority Institution/Cancer Center Partnership program [MI/CCP]). PACHE supports both training and basic research through partnerships between NCI-designated Cancer Centers and institutions serving primarily racially and ethnically diverse populations. Nearly one-quarter of the budget is devoted to Community Network Program Centers (CNPCs), the basis of which are CBPR programs.

FIGURE 2 CRCHD FY 2011 Division-Controlled & Diversity Supplements

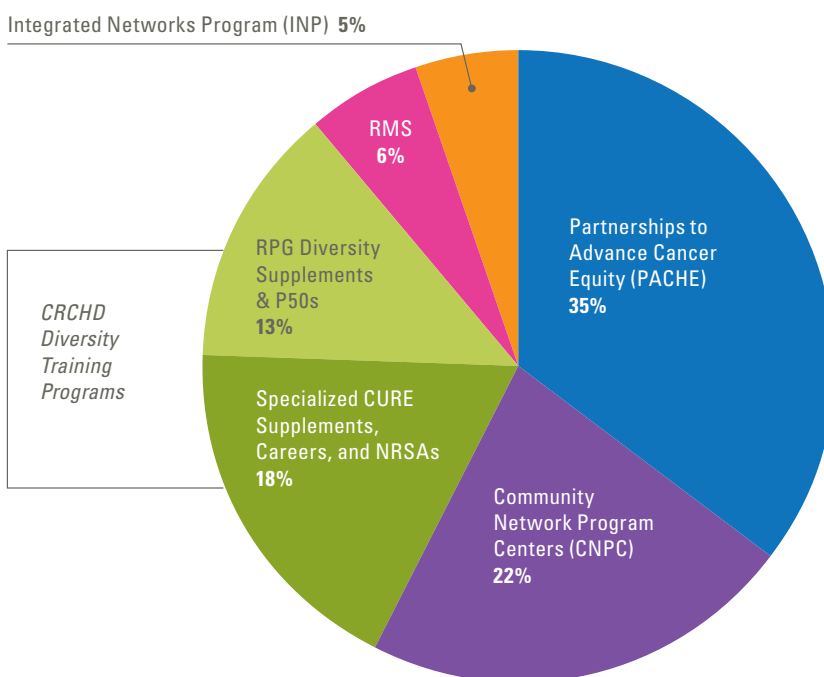


Figure 3 provides a breakdown of the most recent addition to CRCHD's programmatic portfolio, the Integrated Networks Program (INP), which accounts for 5% of the total budget. Almost two-thirds of the INP budget is spent on National Outreach Network (NON) programming, with the remainder supporting the Geographical Management of Cancer Health Disparities Program including Biospecimen Science (G/BMaP).

Figure 4 breaks down CRCHD's diversity training programs by funding mechanism. The bulk of funding (39%) supports diversity supplements, followed by 36% of funding that supports career development awards.

FIGURE 3 Integrated Networks Programs FY 2011

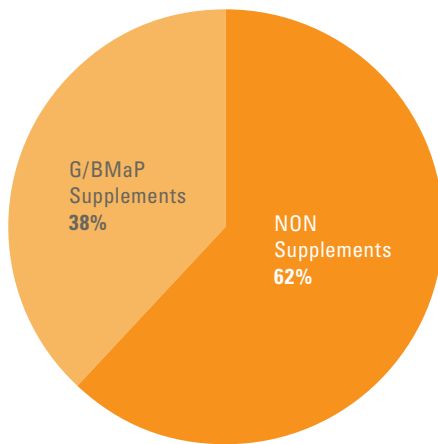
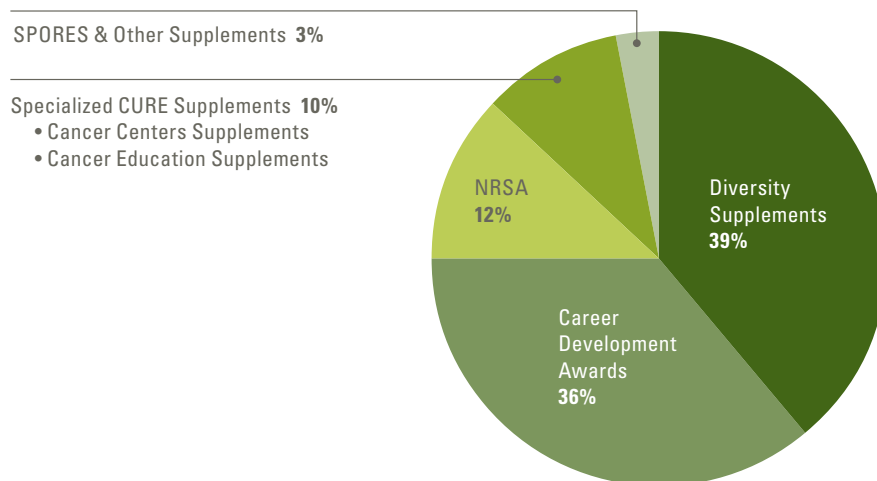
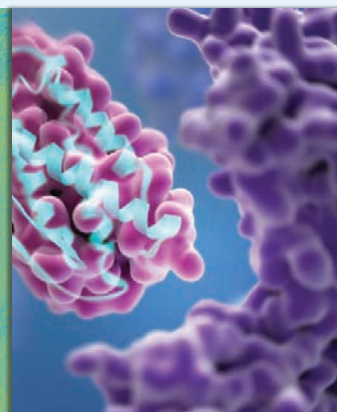


FIGURE 4 CRCHD Diversity Training Programs FY 2011



MAJOR INITIATIVES AND PROGRAMS



In 2011, CRCHD supported three types of programming: research, training, and integration of research, training, and outreach via multidisciplinary teams across regions. Each type supports CRCHD's mission to reduce the burden of cancer and its related co-morbidities, and increase the diversity of the cancer research workforce.

Research

CRCHD's research portfolio is currently divided into two principal areas—basic research and CBPR. Investigators conducting basic research focus on biological variations across racially and ethnically diverse populations that either naturally or in conjunction with environmental exposures lead to differences in susceptibility to cancers and therapeutic responsiveness. Many of these basic scientists are integrated into CRCHD's **Partnerships to Advance Cancer Health Equity (PACHE)** program, which builds linkages between academic institutions serving underrepresented populations and NCI-designated Cancer Centers. Others interested in basic science enter through the **Continuing Umbrella of Research Experiences (CURE)** training program, which offers an array of cancer research training opportunities for individuals from underrepresented populations.

Basic research is a relatively new area of exploration for CRCHD. Historically, the Center's strength lies in its CBPR paradigm and programs, including the **Community Networks Program (CNP)** and its expanded successor, **Community Networks Program Centers (CNPC)**, designed to significantly improve access to and use of beneficial cancer interventions in disparity communities. Communities, in collaboration with trained researchers, participate in all aspects of research, training, and outreach, including helping to define their particular problems that lead to disparities and solutions that are culturally

RESEARCH, TRAINING, AND INTEGRATED RESEARCH, TRAINING, AND OUTREACH

Partnerships to Advance Cancer Health Equity (PACHE)

Continuing Umbrella of Research Experiences (CURE)

Community Networks Program (CNP)

Community Networks Program Centers (CNPC)

Patient Navigation Research Program (PNRP)

Integrated Networks Program (INP)

Geographical Management of Cancer Health Disparities Program including Biospecimen Science (G/BMaP)

National Outreach Network (NON)

NCI Community Cancer Centers Program (NCCCP)

MAJOR INITIATIVES AND PROGRAMS

sensitive to their needs. A number of these research projects and associated grantees are featured within this report. Also described in these pages is CRCHD's **Patient Navigation Research Program (PNRP)**, which has been testing the theory that patient navigators—experts in the healthcare system and its intricacies—can improve service access and quality, and cancer outcomes in underserved populations.

Training

In addition to sponsoring innovative research programs, CRCHD is committed to providing cancer research training to those from backgrounds underrepresented in the fields of cancer and biomedical science. Based on the belief that a diverse workforce is essential for advancing cancer knowledge and, particularly, cancer disparities knowledge, CRCHD developed two innovative and comprehensive diversity training programs—**CURE** and **PACHE**. CURE offers training opportunities for qualified, underrepresented individuals across the academic continuum, starting with high school students and extending to independent cancer researchers. CURE is particularly noteworthy in that it offers full funding to protect research time, incorporates important mentoring relationships with advanced researchers, and includes valuable networking opportunities. PACHE was developed to help expand high-level training opportunities available to CURE trainees. The program fosters partnerships between NCI-designated Cancer Centers and academic institutions serving racially and ethnically diverse, and underrepresented communities. Profiles of trainees and partnerships are featured throughout this report.

Integrated Research, Training, and Outreach

The newest arm of CRCHD is the **Integrated Networks Program (INP)**, which includes two network programs—the **Geographical Management of Cancer Health Disparities Program including Biospecimen Science (G/BMaP)** and the **National Outreach Network (NON)**, and one collaborative initiative with the **NCI Community Cancer Centers Program (NCCCP)**. Each of these programs supports a multidisciplinary, team-based approach to understanding and reducing cancer health disparities. G/BMaP is a national program that links CRCHD's flagship programs—PACHE, CNPC, PNRP, and CURE—within six regional, disparities-focused networks for cancer health disparities research, diversity training, and resource-sharing infrastructure. NON is a program that bridges NCI-supported outreach and community education efforts with cancer health disparities research and diversity training programs by stimulating linkages among NCI, grantee institutions, researchers, and communities. CRCHD collaborates with NCCCP and provides technical support to the program's health disparities efforts. INP's preliminary accomplishments are outlined later in this report.

PARTNERSHIPS AND COLLABORATIONS



CRCHD has increasingly invested in building partnerships and fostering transdisciplinary collaborations. In FY 2011, the Center's steadily growing foundation of partners allowed CRCHD to continue to leverage resources, recruit diverse talent, increase capacity, and improve access among underserved populations. As a whole, partnerships and collaborations provide the potential to accomplish much more than could be done by each partner independently—the ultimate criterion for a successful partnership.

[NCI's Division of Cancer Biology](#)

Since 2005, CRCHD has fostered a partnership with NCI's Division of Cancer Biology (DCB) to strengthen CRCHD's basic research portfolio and shed greater light on potential biological causes of cancer health disparities. DCB supports research in cancer cell biology, cancer etiology, cancer immunology, cancer hematology, DNA/chromosomal aberrations, structural biology, and tumor microenvironments—areas of basic science increasingly implicated in disparities.

In 2011, in an effort to blend DCB's basic research expertise and grantee base with CRCHD's programmatic focus on disparity-experiencing populations, DCB and CRCHD created a basic science R21 Exploratory/Development Grant funding opportunity. This funding opportunity is designed to support pilot studies examining the interplay of race/ethnicity, and cancer biology, with a focus on novel techniques and issues such as biospecimens and ancestral markers. The collaboration has the potential to generate new insights into the biological determinants of disparities and direct otherwise disparate efforts toward one common goal. By combining their expertise, DCB and CRCHD can maximize their efficiency in illuminating the causes of cancer health disparities and the pathways to disparities reduction.

NCI's Office of HIV/AIDS Malignancy

CRCHD has also forged a partnership with NCI's Office of HIV/AIDS Malignancy (OHAM), enabling CRCHD grantees to expand their expertise to include HIV/AIDS-associated cancer disparities. In 2011, CRCHD and OHAM sponsored a supplement to help CRCHD's PNRP, CNPCs, and U54 grantees investigate the role of HIV/AIDS in cancer health disparities. These projects benefit from cross-disciplinary partnerships that include a CRCHD principal investigator and his or her research team, an academic partner who conducts research on HIV/AIDS, and a community partner.

NCI's Center for Cancer Research

CRCHD also has a strong partnership with NCI's Center for Cancer Research (CCR), home to 250 scientists and clinicians who conduct research intramurally at NCI. Increasing the diversity of this intramural research base, as a complementary effort to CRCHD's attempts to increase the diversity of NCI's extramural grantee research community, is an important component of CRCHD's long-term training vision and CCR's commitment to informing and empowering the cancer research community.

As a result of this partnership, CRCHD encourages promising extramural trainees to apply for intramural NCI positions and training opportunities. These efforts are explicitly targeted at increasing the diversity of the intramural scientist population, encouraging a greater intramural focus on disparity questions, and enhancing the intramural community's awareness of and ability to recruit and retain talented, underrepresented scientists. This partnership enhances the disparities research capacity of NCI as a whole and places NCI in a position to lead the nation in research workforce diversity and highly impactful cancer disparities research.

NCI's Division of Cancer Control and Population Sciences and NCI's Division of Cancer Epidemiology and Genetics

Collaborations that combine research efforts and populations can expand the breadth and depth of the research each partner can perform. For example, by pooling data from multiple sites, investigators are able to analyze a larger cohort than would be possible if they proceeded individually. That is the goal of the multi-partner collaboration among CRCHD, CCR, NCI's Division of Cancer Control and Population Sciences (DCCPS), NCI's Division of Cancer Epidemiology and Genetics (DCEG), and extramural grantees such as MD Anderson Cancer Center; University of California, San Francisco; Vanderbilt-Ingram Cancer Center; and Wayne State University. Access to a large study cohort will enable these researchers to evaluate associations that would otherwise be statistically difficult, if not impossible, to examine in their studies of genetic contributors to lung cancer in underserved African American populations.

National Institute on Minority Health and Health Disparities

CRCHD's long-standing collaborative relationship with the National Institute on Minority Health and Health Disparities (NIMHD, formerly National Center on Minority Health and Health Disparities) is a natural fit, given a shared goal of eliminating health disparities. This aligned vision, complemented by CRCHD's expertise in CBPR, brought CRCHD and NIMHD together to partner on an Intervention Research Phase Grant (R24) that funds CBPR initiatives to reduce and eliminate health disparities. In 2011, this R24 mechanism funded 14 CRCHD grantees. The potential for CRCHD and NIMHD to maintain and deepen collaborative efforts is strong, as both are committed to health disparities, albeit with CRCHD focused more strongly on disparities in cancer health.

CRCHD also has partnered with NIMHD on the HHS-wide, globally attended health disparities conference, *The NIH Science of Eliminating Health Disparities*, co-chairing the NIMHD-led trans-NIH Planning Committee. In addition, CRCHD has participated in NIMHD's Federal Partnerships Collaboration on Health Disparities, and in return, NIMHD has supported several CRCHD grantees. Through this partnership, both CRCHD and NIMHD can apply greater combined influence on the research agenda to include disparities issues and research workforce diversity.

American Association for Cancer Research

One of the world's premier cancer research organizations, the American Association for Cancer Research (AACR), has partnered with NCI/CRCHD for more than 35 years. CRCHD has a special interest in supporting an adjunct group of AACR—Minorities in Cancer Research (MICR)—founded in 1985. Originally a small group of physicians and researchers from backgrounds underrepresented in the biomedical sciences, AACR/MICR currently includes more than 4,000 members and continues to maintain a strong commitment to the issues of preventing and treating cancer in diverse populations, as well as training scientists from diverse backgrounds.



In an effort to promote the increased participation of underrepresented populations in cancer research careers, NCI and CRCHD help spotlight their contributions to science by co-sponsoring the AACR/MICR annual conference on the Science of Cancer Health Disparities. The conference brings together physicians, scientists, health professionals, and healthcare leaders working in a variety of disciplines to share the latest findings related to cancer genetics, epidemiology, and treatments; foster collaborative, interdisciplinary interactions and partnerships; and stimulate new research in cancer health disparities to better meet the needs of underserved populations.



As part of AACR's Third Conference on the Science of Cancer Health Disparities in Racial/Ethnic Minorities and the Medically Underserved in 2011, CRCHD participated in the planning of a plenary session on global cancer research, an area in which the Center is seeking to be more active in the future. *Global Cancer Research and Training: Collaborating Internationally to Improve Health Outcomes* outlined the global cancer burden, as well as important differences in developing countries' standards of care, clinical trials infrastructure, and research and training capacity.

The plenary helped define challenges and goals for the next generation of cancer researchers who increasingly must engage with the impact of a globalized society on cancer and cancer health disparities.

CRCHD also sponsors the attendance of investigators from diverse backgrounds at the AACR Annual Meeting through R13 conference grants, in addition to early-stage, meritorious scientists from institutions serving underrepresented populations through the AACR Minority Scholars in Cancer Research Award. In 2011, CRCHD sponsored 50 awardees. Part of the meeting is devoted to professional advancement topics such as grantsmanship and securing of funds, career development planning, publishing, laboratory setup, networking, and partnerships—all critical elements of the training process. These mutually beneficial sponsorships allow CRCHD to promote diversity training, as well as further AACR's ability to spotlight the cancer health disparities work of its member scientists.

American Cancer Society and Center for Medicare and Medicaid Services

One of CRCHD's most prominent external partners is the American Cancer Society (ACS). Beginning in June 2006, CRCHD, ACS, and the Center for Medicare and Medicaid Services (CMS) collaborated to provide three annual training workshops for the organizations' patient navigators. Collaboration was particularly important in developing these trainings. Each organization had recruited patient navigators—individuals who could help disparity populations better negotiate the barriers to accessing quality cancer care, such as those posed by low income, unreliable transportation, lack of insurance, and limited English and/or health literacy. However, the criteria for selecting patient navigators differed substantially across organizations in terms of professional experience, credentials, and biomedical familiarity. In addition, the parameters of a patient navigator's work were unclear. Through their collaboration, these organizations developed a national standard for patient navigator competencies.

The power and reach of the lessons learned at these training workshops were enhanced substantially through the creation of a network of associates at both the ACS/CRCHD organizational level and at the individual level among patient navigators with different affiliations and backgrounds.

Susan G. Komen for the CURE®

A new partnership with Susan G. Komen for the CURE® in 2011 resulted in an innovative session at CRCHD's Cancer Health Disparities Program Meetings. The outreach and education session was designed to promote networking among National Capital Area (MD, DC, VA) health-related community outreach groups, NCI-supported cancer disparities researchers, members of the community, Komen, and NCI. Partnering with Komen enabled this unique gathering of a range of stakeholders to take place and gave individuals, who otherwise might not collaborate, the opportunity to work together in crossdisciplinary teams and brainstorm strategies to foster improved breast cancer care for at-risk and underserved women living in the National Capital Area. Building upon the success of this first joint effort, CRCHD is partnering with Komen again in 2012 on a community health expo promoting healthy lifestyles among racially and ethnically diverse communities.

MEETINGS AND TRAININGS



Cancer Health Disparities Program Meetings 2011 (July 12-15, 2011)

CRCHD gathered more than 600 national and international cancer researchers, practitioners, trainees, students, and community activists to share new scientific advances, best practices, and resources at the 2011 Cancer Health Disparities Program Meetings. These Annual Program Meetings also serve to foster and expand creative and collaborative approaches to addressing cancer health disparities. Moreover, the meetings provide CRCHD grantees with the opportunity to interact with their colleagues, and with NCI staff and scientists. They also provide an opportunity for CRCHD staff to take stock of the Center's many programs and the state of the cancer health disparities field. Participants at the 2011 Program Meetings attended plenary sessions on new directions in disparities research, presentations of results from grantees' studies, and individual programmatic meetings.



CANCER HEALTH DISPARITIES PROGRAM MEETINGS 2011

Plenary Sessions

Plenary Session I – *Basic and Translational Research for Cancer Health Disparities*, moderated by Dinah Singer, Ph.D., director of NCI/DCB, focused on new developments in the understanding of biological mechanisms of cancer initiation, progression, and metastasis, as well as what the research can teach us about tailored community outreach and interventions. The session included presentations organized around three topics of discussion: genetics and epigenetics—biological differences; tumor biology and cancer health disparities; and imaging technologies, therapeutics, and tailored medicine.



Plenary Session II – *The Influence of Cancer and Other Issues on Disparities Research*, moderated by Robert Croyle, Ph.D., director of NCI/DCCPS, was organized around research that has examined co-morbid conditions and their influence on cancer and treatment practice. The session additionally focused on cancer as a growing cause of morbidity and mortality in Africa. The session addressed the following topics: co-morbid conditions, such as obesity and HIV/AIDS, in terms of their potential impact on cancer, treatment adherence, and delivery of care; obesity and cancer health disparities; and global health and Africa-U.S. cancer health disparities.



Plenary Session III – *Envisioning Community-Based Participatory Research Strategies*, moderated by Regina Smith James, M.D., Medical Officer, Division of Special Populations, National Institute of Child Health and Human Development; Cathy Meade, Ph.D., R.N., F.A.A.N., H. Lee Moffitt Cancer Center; and Dale Watson, M.P.H., Pinellas County Health Department, addressed community engagement and CBPR methods to ensure that culturally sensitive strategies are developed and implemented, and community trust is developed. Presentations highlighted the importance of including communities in key phases of research and community outreach/education. The plenary session focused on the following three topics: acknowledgement of diversity and ethical issues in CBPR; CBPR strategies in action; and community involvement in research planning, implementation, design, evaluation, and dissemination phases.

CANCER HEALTH DISPARITIES PROGRAM MEETINGS 2011



Professional Development Workshop

Professional and career development skills are important aspects of becoming a successful investigator. Thus, an especially useful part of annual Program Meetings for CRCHD research trainees is the interactive Professional Development Workshop to enhance these skills. The 2011 Workshop was organized around the following topics: career path navigation for trainees and students; grantsmanship, including grantwriting and the grant application/review process; and, new this year, extramural and intramural research opportunities at NCI.

As preparing a successful grant application is one of the most challenging aspects of being a successful health disparities researcher, CRCHD devoted a full afternoon during the 2011 Professional Development Workshop to a mock review session. Mock reviews have proven to be a valuable tool for teaching scientists how to be successful in meeting the challenges of the grant application review process through learning about the criteria used for rating the applications.

In preparation for the mock review, selected assistant- or associate-professor-level reviewers participated in two pre-mock review training teleconferences, during which they received training on how to recognize the qualities of a successful grant application and how to score applications. During the mock review itself, the panel scored actual R01 and R21 grant proposals written by the session participants.

The professional development component of the Program Meetings also included a poster competition—an opportunity for trainees to present their research among their peers.

Interactive Sessions

For the first time, CRCHD hosted hands-on sessions that offered participants interactive opportunities to increase their awareness and knowledge of the myriad scientific research databases (e.g., Human Gene and Mutation-Related Databases, Toxicology Network Database), online resources (e.g., Cancer Control P.L.A.N.E.T., Cancer Biomedical Informatics Objects), and tools and strategies (e.g., Health Disparities Calculator, AccrualNet) that are available across NIH/NCI and externally for professional enhancement and research.

CANCER HEALTH DISPARITIES PROGRAM MEETINGS 2011

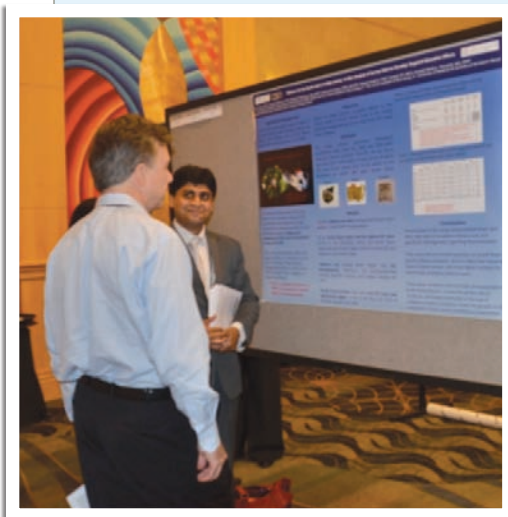
Meet-and-Greet Sessions

At the end of each day of the 2011 Program Meetings, CRCHD hosted a “Meet-and-Greet” session that proved to be a valuable educational opportunity for participants, many of whom were early- and mid-career scientists. It was a chance to network with NCI, NIH, and other government agencies, as well as learn about available programs and related research and training funding options. Participating offices included the CCR, DCB, Division of Cancer Prevention, Division of Cancer Treatment and Diagnosis/Office of Cancer Complementary and Alternative Medicine, National Human Genome Research Institute/The Cancer Genome Atlas, National Institute of General Medical Sciences (NIGMS)/Minority Opportunities in Research, National Institute of Mental Health, NIMHD, Office of Partnerships and Dissemination Initiatives, Small Business Innovation Research (SBIR), Health Resources and Services Administration, Office of HIV and AIDS Malignancy, National Center for Research Resources, and Department of Defense.



Poster Sessions

During the evening Meet-and-Greet sessions, participants had the opportunity to engage in interactive poster sessions with trainees, who presented their research covering a wide range of cancer health disparities topics, including novel cancer health disparities scientific, clinical, and training efforts; cancer health disparities applications in the community; and policy implications of various approaches across the cancer control continuum among diverse populations. Posters were judged on scientific content, clarity of presentation, innovation, thoroughness, as well as presenters’ responses to judges’ questions, and 10 winners were chosen.



CANCER HEALTH DISPARITIES PROGRAM MEETINGS 2011

Komen Community Outreach and Education Session and Luncheon

CRCHD partnered with Susan G. Komen for the CURE® to bring together NCI-supported disparities researchers and health-related community outreach groups from the National Capital Area for a community outreach and education session. Attended by approximately 80 individuals from more than 30 community organizations and research institutions, it was an opportunity to brainstorm and discuss issues of access, research participation, and biospecimen collection for breast cancer prevention and

care among diverse populations. A three-person panel presentation, including Jean Ford, M.D., Johns Hopkins Bloomberg School of Public Health; Heather Patrick, Susan G. Komen Foundation; and a clinical trials participant/breast cancer survivor, offered varying perspectives on obstacles to breast cancer care and research in the National Capital Area. Following the panel presentation, participants engaged in roundtable discussions on barriers to accessing care, participating in clinical trials, and collecting biospecimens. Participants received a *PinkLINK* resource book that included descriptive and contact information about each of the participating organizations, designed to encourage networking and collaboration.

Kenneth C. Chu Award Luncheon

The Program Meetings concluded with a luncheon honoring Ken Chu, Ph.D., former Chief of the Disparities Research Branch at CRCHD, who retired December 31, 2010, after four decades of government service. His dedication to scientific excellence and compassion towards the underserved helped lay the foundation for, and spawn cancer health disparities research encompassing not only social sciences but also basic sciences.



PRODUCTS AND RESOURCES



Minority Health and Health Disparities Report

Each year, every Institute within NIH must submit a report detailing its activities aimed at addressing health disparities in the United States. At NCI, the *Minority Health and Health Disparities Report* is based on a compilation of data submitted by each of the Institute's DOCs. As part of CRCHD's charge to advise NCI, NIH, and HHS authorities on the state of cancer health disparities in the nation, the Center plays a critical role in assessing the information submitted and recommends in the final report how best to strengthen NCI's current disparities research portfolio. In 2011, the CRCHD-produced report continued to recommend diversifying NCI's health disparities research and training portfolio. Historically, the portfolio has been stronger in clinical science research applications and weaker in basic science and outreach programming. CRCHD advised strengthening basic research to enhance translational research and the potential to transform scientific discoveries into clinical applications for cancer health disparities reduction. The 2011 report also recommended that NCI develop and enforce standardized procedures for collecting race and ethnicity data on its trainees and human research participants. By producing this report annually, CRCHD plays a major role in helping to shape both Institute- and national-level policies aimed at reducing cancer health disparities.

Other Government Reports

CRCHD is charged with providing the White House with the *Department of Health and Human Services' Plan on Assistance to Historically Black Colleges and Universities*; the *White House Tribal Consultation Report*; and the *White House Report on Agency-Sponsored Historically Black Colleges and Universities, Tribal Colleges and Universities, and Hispanic-Serving Institutions*.

In addition, the Center is asked to respond to Areas of Special Concerns Requests and other ad hoc items. In 2011, CRCHD produced the following ad hoc products: information for congressional hearings on prostate cancer and brain cancer; a briefing for the White House on HHS activities in Oklahoma (with a special emphasis on Native Americans/American Indians); a response on behalf of NCI to a congressional inquiry

National Cancer Institute

Center to Reduce Cancer Health Disparities

OVERVIEW

Since 2011, the Center to Reduce Cancer Health Disparities (CRCHD) has served as the cornerstone of NCI efforts to reduce the unequal burden of cancer in our nation.

MISSION

To reduce cancer health disparities, CRCHD seeks to:


- Stimulate research that identifies biological and non-biological determinants of cancer health disparities and validates interventions to reduce the disparities.
- Achieve diversity in training researchers who conduct cancer and cancer health disparities research.
- Promote multi-disciplinary, multi-site integrative science teams, which engage communities, in order to build capacity, leverage resources/strengths, and foster synergy between research, training and outreach for cancer disparities reduction.

PROGRAMS

Continuing Umbrella of Research Experiences (CURE)

Launched in 1997, CURE is a national research training and career development initiative that focuses on building and sustaining a pipeline of diverse cancer investigators. Starting with high school students and extending to newly awarded, independent cancer researchers, CURE trains individuals who come from groups that have been shown to be underrepresented in biomedical science and cancer research.

CURE is the first and only NIH program to offer long-term support to qualified, underrepresented students and professionals who are otherwise at risk of being lost from the training pipeline.



The NCI defines cancer health disparities as "differences in the incidence, prevalence, mortality, and burden of cancer and related adverse health conditions that exist among specific population groups in the United States."

Health disparities can occur due to the inequities experienced by racial and ethnic populations, and by marginalized groups such as the poor, rural, and aging populations.

National Cancer Institute

Center to Reduce Cancer Health Disparities

COMMUNITY NETWORKS PROGRAM (CNP) CENTERS

Overview


Building on the successes of the previous Community Networks Program, 23 NCI-supported CNP Centers launched in 2010 with the aim of using research, community outreach, and training to:

- Increase knowledge of, access to, and use of beneficial biomedical/behavioral procedures in cancer health disparities.
- Develop and perform evidence-based cancer health disparities intervention research.
- Train qualified cancer health disparities researchers in community based participatory research and promote their career development.

A hallmark of CNP Centers is the community involvement in all phases of the Centers' research.

Locations

Built as a partnership between an academic institution and various community organizations, the CNP Center is physically headquartered at the academic institution's site. This Headquarters site coordinates the work of affiliated research, community outreach and training sites.



National Cancer Institute

Center to Reduce Cancer Health Disparities

CRCHD TRAINING AND CAREER DEVELOPMENT FUNDING OPPORTUNITIES

CRCHD provides funding opportunities for research training and career development of students and investigators from underrepresented racial and ethnic groups, individuals with disabilities, individuals from disadvantaged backgrounds, and for involving minority institutions in cancer research, research training, education, and outreach.

TRAINING OPPORTUNITY	PURPOSE
HIGH SCHOOL	
PA-08-190 – Research Supplements to Promote Diversity in Health-Related Research	Improve the diversity of the research workforce by supporting and recruiting from groups that have been shown to be underrepresented in cancer and cancer health disparities research.
NCI Cancer Center Supplements for High School and Undergraduate Student Research Experiences (P30)	Engage the scientific curiosity and promoting the potential cancer research careers of promising young high school students and to take full advantage of the community outreach and research capabilities of NCI-supported Cancer Centers.
UNDERGRADUATE	
PA-08-190 – Research Supplements to Promote Diversity in Health-Related Research	Improve the diversity of the research workforce by supporting and recruiting from groups that have been shown to be underrepresented in cancer and cancer health disparities research.
NCI Cancer Center Supplements for High School and Undergraduate Student Research Experiences (P30)	Engage the scientific curiosity and promoting the potential cancer research careers of promising undergraduate students and to take full advantage of the community outreach and research capabilities of NCI-supported Cancer Centers.
GRADUATE/PRE-DOCTORAL	
PA-08-190 – Research Supplements to Promote Diversity in Health-Related Research	Improve the diversity of the research workforce by supporting and recruiting from groups underrepresented in cancer and cancer health disparities research.
PA-11-112 – Ruth L. Kirschstein National Research Service Awards for Individual Postdoctoral Fellowships to Promote Diversity in Health-Related Research (F31)	To improve the diversity of the health-related research workforce by supporting the training of postdoctoral students from diverse populations in biomedical, behavioral, social, clinical, or health services research.
R25T – Diversity Supplements to the NCI Cancer Education and Career Development Program	Provide opportunities for individuals underrepresented in cancer research to be trained in cancer prevention and control, epidemiology, nutrition and the behavioral and population sciences.

regarding NCI's plans for addressing cancer health disparities among Pacific Islanders, Asian Americans, and Native Hawaiians; a response on behalf of NCI to a congressional inquiry regarding NCI's activities addressing breast cancer health disparities due to access, education, and awareness issues; and a breakdown of FY 2011 funding for health disparities research by program for HHS's Office of the Secretary. These standing and ad hoc requests help to expand CRCHD's policy impact.

Communication and Dissemination Resources

In addition to various reports and briefing materials, CRCHD develops and disseminates a range of materials that includes information on cancer health disparities research, education and outreach efforts, and diversity training. A variety of culturally tailored print and electronic formats are produced, depending on the target audience, such as brochures, fact sheets, articles, and slide presentations, which are disseminated across CRCHD and to cancer health disparities researchers, racially and ethnically diverse and underserved communities, and the media to raise awareness and promote the importance of reducing cancer health disparities.

The Center keeps grantees informed of NCI/CRCHD-related disparities activities and training through regular programmatic webinars. During these webinars, information and guidance is shared on supplement and performance expectations, as well as community-based and clinical research activities and best practices.

The screenshot shows the CRCHD website interface. At the top, it identifies the National Cancer Institute and its location at the National Institutes of Health. The main header includes the CRCHD logo and name. A navigation bar contains several menu items. The central content area features a prominent headline about research, training, and outreach, accompanied by a search function. Below the headline, there are several text-based updates and a 'Special Feature' section highlighting a new monograph on workforce diversity. A 'News and Features' section lists recent updates such as job opportunities and program achievements. The bottom of the page includes a banner for the 'Community Health Expo 2012'.

CRCHD also communicates with grantees and the public through its cancer health disparities listserv, which currently has more than 1,500 subscribers, and sends out eBlasts on a monthly basis. These eBlasts keep recipients apprised of funding opportunities, new positions in cancer health disparities research, training opportunities for students and researchers at all academic levels, and other updates to the Web site. By keeping in touch with current and past grantees, as well as members of the interested public, CRCHD systematically disseminates throughout the public and research communities

research findings and culturally sensitive best practices and strategies to improve the lives of those disproportionately affected by cancer.

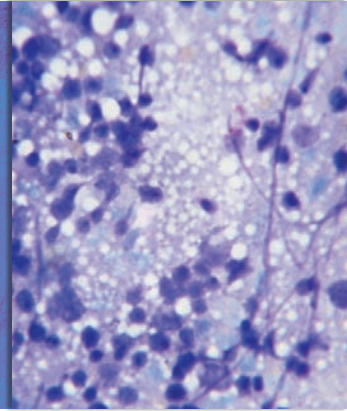
CRCHD has a strong Web presence. Its Web site, <http://crchd.cancer.gov/>, serves as a central clearinghouse for NCI-sponsored information on cancer health disparities and receives more than 4,000 unique visitors every month. The site provides updates on the Center's programs, products, and initiatives; news about cancer health disparities research and researchers; a list of disparities-related tools and resources; information on grant and training opportunities; and availability of jobs. The Center also integrates social media technologies to enhance communication and dissemination activities, and links to NCI's social media sites, including Facebook, Twitter, YouTube, and Flickr.

In addition, the Center produces an internal eNewsletter, the *Inside Scoop*, to provide CRCHD staff with a roundup of selected news articles on cancer and cancer health disparities research, training, and outreach activities.

Broad-based
cancer research
to pinpoint
the causes
of cancer
health disparities

RESEARCH

BASIC RESEARCH



The Center to Reduce Cancer Health Disparities (CRCHD) has begun to expand its research portfolio in recent years, steadily supporting more research around basic science contributions to cancer health disparities among racially and ethnically diverse populations. This new research direction comes from an increasing recognition that ethnic and racial disparities in cancer diagnosis, treatment, and outcomes cannot be explained fully by socioeconomic indicators. CRCHD’s support of basic science studies is an extension of the Center’s historical commitment to community-based participatory research (CBPR). A broader approach to research allowing a more precise picture of the roots of cancer disparities—be they genetic or socioeconomic—may result in better-targeted community outreach and medical interventions and, ultimately, a reduction in cancer health disparities.

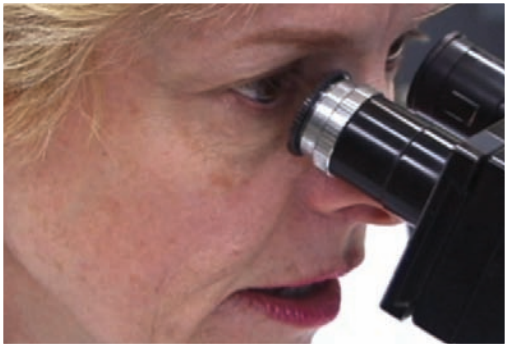
CRCHD’s Expanding Research Portfolio

In 2010, CRCHD made a commitment to increase its focus on biological research by sponsoring two new funding opportunities developed in conjunction with the National Cancer Institute’s (NCI’s) Division of Cancer Biology (DCB). These were a R21 for pilot work to develop research in basic science related to cancer health disparities, and an U01 to support basic research testing new models, methodologies, and technologies in cancer disparities research. Together, these two funding opportunities received more than 60 applications.

CRCHD also supported several basic research Challenge Grants, functioning as offshoots of the American Recovery and Reinvestment Act (ARRA), which were designed to spur economic growth by offering two-year “jumpstart” funds to highly promising areas of research. Together, these grants cover studies that fall within three topic areas: the role of tumor biology in cancer health disparities, epigenetic factors contributing to cancer health disparities, and genetic contributors to cancer health disparities.

The Role of Tumor Biology in Cancer Health Disparities

The research of Patricia E. Berg, Ph.D., falls under the category of tumor biology. Berg and colleagues are investigating the importance of cell development processes that increase cell motility and appear to promote very aggressive breast cancers among African American women.



Patricia E. Berg, Ph.D.

Berg's research has tremendous potential for exploring new approaches to interventions in cancer treatment.

With Berg's work in the vanguard of tumor biology research, her proposal was selected from among 45 applicants to be funded by CRCHD's R21 Exploratory Grant Award to Promote Workforce Diversity in Basic Cancer Research. In 2003, Berg and her team reported that the BP1 gene was active in 89% of the tumors of African American women, compared with 57% of the tumors of white women. High levels of BP1 also are associated with the larger, more aggressive tumors that more frequently occur in African American women, leading to their higher breast cancer mortality rates despite their lower incidence relative to white women. Berg conjectures that BP1 may enhance tumor aggressiveness by increasing the motility of malignant cells and,

hence, leading to deadlier, more broadly metastasizing tumors. Berg hypothesizes that BP1 enhances the epithelial to mesenchymal transition (EMT) through its upregulation of the Twist gene. Her R21-funded research is examining whether African American women's breast tumors undergo EMT more frequently than tumors in white women, and whether these EMT processes are associated with high levels of BP1 expression.

Berg's research has tremendous potential for exploring new approaches to treatment. If BP1 is linked to upregulation in these cellular transition processes, and if the transitions occur more often in the tumors of African American women than in the tumors of Caucasian women, then the genes involved could be targeted for therapies and possibly reduce or prevent the malignant metastases so common in black women's breast cancers. Research like Berg's, which examines whether there are biological differentiators in the tumors experienced across racially and ethnically diverse populations, complements and expands our understanding of cancer health disparities. While Berg's work does not dismiss socioenvironmental issues, such as access to prompt screening, diagnosis, treatment, or follow-up, it does raise the issue that success in eliminating racial/ethnic disparities in survival potentially hinges on biological attributes, as well. Berg's research points the way toward treatments that are tailored for the specific types of genes expressed in the cancer pathway—a pathway that may differ across race and ethnicity.

Epigenetic Influences on Cancer Health Disparities

Breast cancer disparities are also being investigated—from a different perspective—by Maria Elena Martinez, Ph.D., M.A. With funding provided under a U01 grant, which promotes novel methodologies and approaches, Martinez is focusing on epigenetics—genetic changes that result from carcinogenic environmental factors. Her research specifically addresses how epigenetic changes associated with pregnancy can increase breast cancer risk, particularly among Hispanic women. These women, like African American women, have higher breast cancer mortality rates than non-Hispanic whites, despite the lower incidence of breast cancer among Hispanic women.

Although multiparity appears to be protective in the postmenopausal years, cancer risk increases in the five to 15 years immediately following pregnancy for Hispanic women. Childbirth seems to cause important, albeit complex, changes in breast cancer risk. During this postpartum period, the types of breast cancers diagnosed in recent mothers are more aggressive and deadly. Martinez hypothesizes that this increased vulnerability relates to epigenetic changes in the epithelial cells of high-risk women—a vulnerability that evolves from, as yet, unknown genetic and environmental risks. Her research is based on the hypothesis that these risk-enhancing changes will leave a residual signature, visible in the genetics of postpartum breast tumors but absent in those diagnosed outside this period. Martinez's research population—women of Mexican descent—is especially suited to this type of profiling, due to the population's high average parity, younger age at onset of breast cancer, and worse survival rates following diagnosis.

Drawing from the ELLA Binational Breast Cancer study, Martinez has been profiling the epidemiology and genetics of ELLA's stored tissue specimens. The aim of the profiling is to define both the postpartum and nonpostpartum populations' risk factors and correlate them with the types and characteristics of tumors developed. In addition, Martinez hopes to document whether these risk factors are tied to the addition of methyl groups at certain DNA regions; methyls switch off the transcription and, hence, expression of crucial tumor-suppressor genes. Martinez's research is unique in that it focuses on sporadic, early-onset breast cancers that disproportionately affect racial/ethnic minority women. Moreover, if her work demonstrates that cancers arising in



Maria Elena Martinez, Ph.D., M.A.

Martinez is researching how epigenetic changes associated with pregnancy can increase cancer risk.

the postpregnancy period share a common set of silenced genes, it may be possible both to develop drugs targeting these specific DNA regions, as well as take steps to modify lifestyle factors that are associated with increased methylation.

The work of U01 grantees like Martinez highlights the intersection between CRCHD's broader community-based research and its incorporation of basic science. Lifestyle choices and environmental exposures of different populations filter down and have an effect on biological makeup—and vice versa. It is clear that the interplay of myriad influences creates the varying risk profiles of different populations. Untangling these complex influences is the only way to understand and reduce cancer health disparities.

The Role of Genetics in Cancer Health Disparities

Mary Relling, Pharm.D., applied for and was awarded jumpstart funds, as part of an ARRA Challenge Grant to study the influence of genetics in acute lymphoblastic leukemia (ALL),



Mary Relling, Pharm.D.

Relling's work in precision medicine may lessen the gap in cancer survivorship for children and adults of racially and ethnically diverse groups.

the most common cancer in young children. While ALL is highly responsive to drug therapy, with cure rates rising to almost 85% in recent years, such cures are often less effective in patients of Hispanic ethnicity, where relapse rates are far higher than in any other demographic group. In past studies, Relling's research team identified a genetic component to the poor outcomes experienced by Hispanic children; all of the relapse cases possessed genomic variations of Native American ancestry. However, children with these variations had the same low relapse rates vis-à-vis non-Hispanic whites when given alternative therapies, suggesting the important role of genome-drug interactions during therapy.

Relling's RC4 grant seeks to determine how these genomic mechanisms function, in particular, which drug therapies exacerbate such negative interactions and which are best able to circumvent or overcome them in certain racial and ethnic groups. Drawing upon the genotype bank of high-risk ALL patients enrolled in the NCI-sponsored Children's Oncology Group clinical trials, the researchers are correlating genetic ancestry with ALL relapse rates and documenting which

therapies seem to promote better and worse outcomes. They also are attempting to specify exactly which of the genetic variations identified contribute to the differing ALL relapse rates. Teasing apart such genetic and nongenetic factors requires the application of high-throughput genomic analysis, an expensive and new scientific approach in cancer disparities research, making Relling's work exactly the sort that ARRA Challenge grants were designed to promote.

Moreover—and more pertinent to CRCHD’s aims of disparity reduction—Relling’s work is explicitly aimed at translational ends. Having identified genetic variations that seem to promote relapse, her work offers the possibility of precision medicine—a promise that impacts not only pediatric ALL patients but also the more than 20% of adult and pediatric patients who are treated with glucocorticoids, the class of drugs most commonly used in ALL therapy. The hope is that precision medicine will lessen the gap in cancer survivorship for children and adults of racially and ethnically diverse groups.

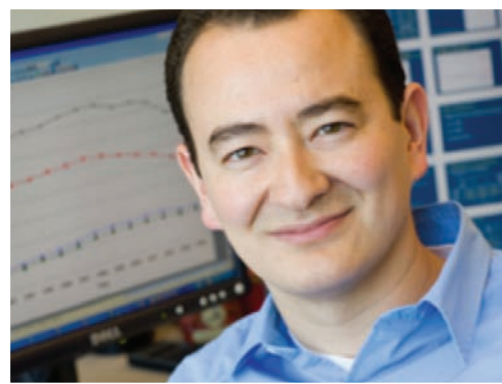
Cancer Stage, Treatment, and Survival in Cancer Health Disparities

CRCHD is committed to supporting cancer researchers in basic science across the training continuum. With the long-term assistance provided by CURE, many of the Center’s trainees have been able to attain successful independent research careers.

While still in medical school at the University of California at San Francisco, Christopher Li, M.D., Ph.D., M.P.H., grew interested in learning about how to combine the principles of epidemiology with clinical practice. That interest brought Li to the University of Washington’s (UW’s) public health program, where, while pursuing his M.P.H., he developed an interest in research and biostatistics. After finishing his M.D. and M.P.H. degrees, he pursued this passion and signed on for the Ph.D. program in cancer epidemiology at UW.

As a predoctoral student, he had the opportunity to be part of the Women's Health Initiative research team that reported a link between combined estrogen-progestin hormone replacement therapy and the national upsurge in rare, lobular, breast cancers among postmenopausal women. He also was involved in exploring the relationship between race/ethnicity and breast cancer—research that points to an array of socioeconomic and lifestyle factors influencing access to, type of, and timing of treatment.

As a clinician with social science training, Li wanted to expand his research skills in molecular and genetic epidemiology, as well as use his clinical background to collaborate more effectively with breast cancer surgeons. To this end, Li applied for and received a K01 Mentored Career Development Award for underrepresented populations, with the aim of researching the relationship between expression of biomarker HER2 in first primary breast cancers and the associated risk for developing secondary, contralateral breast cancers (CBC).



Christopher Li, M.D., Ph.D., M.P.H.

Building on his CURE training, Li is investigating biomarkers and risk factors for second primary breast cancers among breast cancer survivors.

Li's research demonstrated that estrogen-regulated HER2 increased the risk for CBC among young females. In cases exacerbated by obesity, there was a 50% increase in risk; in cases exacerbated by alcohol use, there was a 90% increase in risk; and in cases exacerbated by smoking, there was a 120% increase in risk. These findings led to his conducting further research—as principal investigator for three R01-funded grants and three affiliated grants exploring hormone expression, radiation, and different types of breast cancer risk.

Li's R01-funded research has been focusing on potential carcinogenic effects of the Depo-Provera injectable contraceptive (depo-medroxyprogesterone acetate), a drug more often prescribed to low-income African American women in the United States. His is the first large-scale U.S. study specifically designed to evaluate this relationship, and results indicate that recent use of the injectable contraceptive for at least a year was associated with a doubling of breast cancer risk in young women. However, the risk dropped to that of non-users within several months of stopping Depo-Provera injections.

"Our hypothesis going into this study was that we expected to see an increased risk of breast cancer associated with Depo-Provera," says Li. This increased risk is most likely due to Depo-Provera containing the same synthetic progestin used in the combination estrogen-progestin hormone replacement therapy tested in the WHI study that led to a 24% increase in lobular breast cancer risk.

Advancing from CURE's K01 launching pad, Li has built a successful, high-profile career in basic cancer research that is on the cutting edge of the translational divide. He is a shining example of how CURE training opportunities can provide a springboard for talented investigators from diverse backgrounds. Li's passion and academic preparation, combined with CURE's training opportunities with established scientists, financial resources, protected research time, guidance from mentors, and networking opportunities accelerated his achievement of academic success that may not have been possible otherwise.

Small Business Innovation Research for Cancer Health Disparities

CRCHD also has developed several topic areas in Small Business Innovation Research (SBIR) that have relevance to cancer disparities. These topics are designed to stimulate the development of better tools and resources for cancer disparities research.

One particularly exciting topic is the development of better molecular diagnostic assays to promote early detection of basal-like breast cancer, a highly aggressive, triple-negative type of tumor that does not respond to estrogen, progesterone, or herceptin, and is more common among black women in the United States. Of the five SBIR applications received, two were funded, both of which proposed to develop an increasingly sensitive and specific assay that could, at low cost, distinguish basal-like breast cancer from other subtypes in human cells, tissues, and body fluids. In addition to its preventive potential, the assay could be used as part of posttreatment monitoring to detect possible recurrences of the cancer.

BASIC RESEARCH

Partnerships to Advance Cancer Health Equity



CRCHD's long-standing program, Partnerships to Advance Cancer Health Equity (PACHE), provides funds to several innovative basic science investigations into cancer disparities. The program was designed to foster partnerships that expand diversity training and research opportunities within institutions serving underrepresented populations and enhance the research base and human capital of Cancer Centers seeking to do research with and about the cancer burden of underserved communities.

PACHE PROJECT TITLE: Tissue Procurement Core

PARTNERSHIP: Ponce School of Medicine, Puerto Rico (PSM) and Moffitt Cancer Center (MCC)

GRANT TYPE: U56

POPULATION: Hispanics/Latinos

One such partnership pairs an Hispanic medical school in Puerto Rico and an NCI Cancer Center in Florida in an attempt to generate a resource for the type of cutting-edge research neither could perform on its own. The population of Ponce, Puerto Rico is much different from that of San Juan, the archipelago's capital, most populous city, and site of much of the territory's biomedical research. By comparison, the people of Ponce are socially distinct and ethnically homogeneous—and, hypothetically, genetically dissimilar from the people living in the multicultural, multiethnic capital. The **PSM-MCC** partnership seeks to develop a tissue bank where its researchers can study whether these social and ethnic differences in the Ponce population contribute to distinctive tumorigenicity, and whether such differences can be capitalized upon in developing targeted cancer therapies. The partnership is especially important as it represents one of the first biorepositories devoted solely to Hispanic tissue.

The homogeneity of the Ponce population is a unique attribute and, hence, their tissues have been included in several research projects being developed in concordance with the tissue bank. Samples of 30 tumors from a variety of cancer types were gathered in its first three months. Current R01s are investigating Src kinases and colitis-associated colorectal cancer, for which fresh colon samples are key to accurately determining the cancer's origin. They also are researching heredity breast cancer genetic screening tools, for which access to a broad array of breast cancer tissues is necessary to develop an accurate tool. The program appears well on its way to achieving its long-term goal, that of assembling a critical tissue resource that promotes collaborative research in minority cancer molecular biology.



PACHE **PROJECT TITLE:** An Undersea Pipeline for Drug Discovery

PARTNERSHIP: University of Puerto Rico Medical Sciences Campus (UPRCM) and University of Texas MD Anderson Cancer Center (MDACC)

GRANT TYPE: U54

Another Puerto Rican partnership—between the Medical Sciences Campus of the University of Puerto Rico at Rio Piedras and the MD Anderson Cancer Center—takes advantage of the natural

resources surrounding the islands. The **UPRCM-MDACC** team seeks to find, identify, and study the potential pharmacologic properties of undersea organisms in hopes of finding biologically active molecules not yet documented. One of the team's most promising finds is a compound called eupalmerin acetate (EPA), which is extracted from a species of coral abundant in the Caribbean and appears capable of targeting gliomas, the most common form of primary brain cancer. The UPRCM-MDACC partnership perfectly pairs the resources of both centers—the natural bounty surrounding the Puerto Rican shores and the analytic laboratories available at the University of Texas.

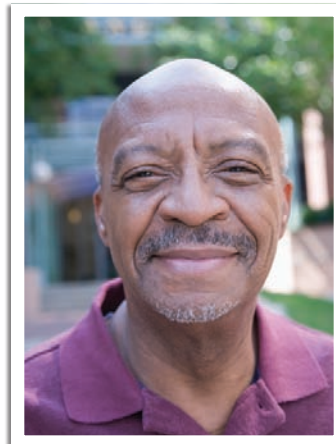
PACHE **PROJECT TITLE:** Optimized Nanoparticle Vaccines for Prostate Cancer

PARTNERSHIP: University of California at San Diego (UCSD) and San Diego State University (SDSU)

GRANT TYPE: U54

POPULATION: African American

Back in the continental United States, researchers in San Diego have been attempting to use nanoparticles to deliver prostate cancer vaccines, hoping that a single-course treatment might surmount problems of noncompliance among males, particularly African American males who experience multiple barriers in access to and utilization of healthcare services. The **UCSD-SDSU** team has focused on using nanoparticles, tiny particles engineered to deliver their specific chemical contents to a targeted cell type, to provoke the immune system's soldier cells (lymphocytes) to attack the tumor. A problem with cancer, however, is that it is composed of a person's own cells, which a person's lymphocytes are programmed not to attack. The San Diego team has been attempting to trick tumor cells into presenting certain non-self, foreign markers that will trigger the lymphocytes.



The investigators have taken three steps: packing nanoparticles with markers derived from prostate cancer-specific proteins, such as survivin and six-transmembrane epithelial antigen of the prostate (STEAP); designing the nanoparticles to find the tumor's cells by targeting them to mannose receptors on the cell surface; and making the nanoparticles responsive to changes in pH, which allows them to more easily be brought inside the tumor cells, at which point their contents are released and transported to the cell surface, triggering an attack by cytotoxic T-cell lymphocytes. The results of this collaboration are promising; the researchers have had great success in generating the nanoparticles, and have provided training opportunities for undergraduates. The UCSD-SDSU partnership model is a testament to the effectiveness of PACHE in integrating training and research opportunities for underrepresented populations.

PACHE PROJECT TITLE: Molecular Profile of a Basal-Like Phenotype of Breast Cancer in African American Women

PARTNERSHIP: Howard University (HU) and Johns Hopkins University (JHU)

GRANT TYPE: U54

POPULATION: African Americans



A long-standing PACHE partnership exists between Howard University in Washington, DC, and Johns Hopkins University in Baltimore, Maryland. Researchers at both institutions continue to investigate whether there is a correlation between tumor development and distinctive molecular changes. Focusing on the basal-like phenotype, a particular subset of breast cancers, the **HU-JHU** team is hoping to identify several unique molecular changes or “biomarkers.” If they can find specific biomarkers, their goal is to determine whether these biomarkers correlate with various clinical, pathological, and demographic features of the patient and his or her cancer.

This HU-JHU team is learning the challenges of discovering correlations; very similar-looking cancers can be the result of very different genetic changes. Amplification and loss changes among the HER2, ER, and PR genes have been particularly difficult to correlate to any one population. Nonetheless, researchers, hoping to promote further biomarker research and collaborations, have been developing a biobank at JHU using 100 cases of African American breast cancers drawn from the HU archives. The HU-JHU collaboration exemplifies the types of partnerships PACHE is aiming to promote—collaborations between educational institutions serving diverse populations and larger universities with expanded research and training resources, thereby creating opportunities for innovative and culturally relevant research targeting underserved populations.

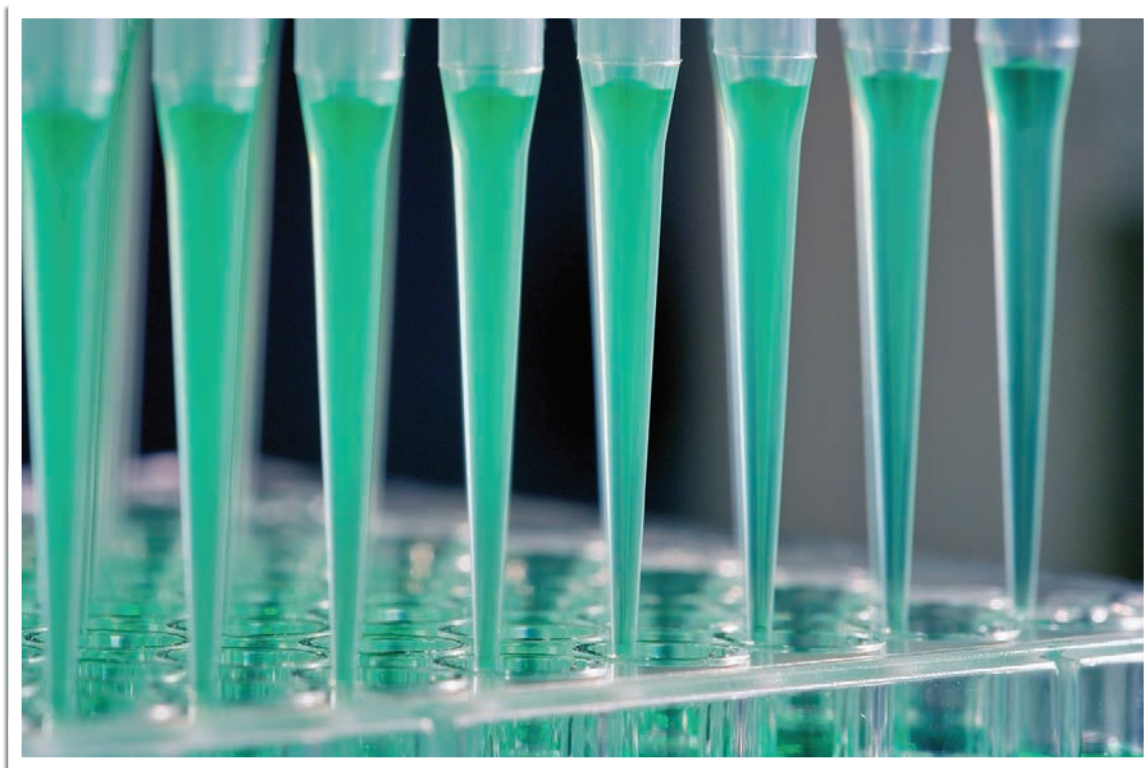
PACHE PROJECT TITLE: Development of Micro-fluidic 3D Apoptotic Cell Arrays for Anti-Cancer Drug Screening and Apoptotic Signaling Profiling

PARTNERSHIP: City College of New York (CCNY) and Memorial Sloan Kettering Cancer Center (MSKCC)

GRANT TYPE: U54

Many researchers have been attempting to develop and screen drugs targeting the apoptotic pathway; however, most have met with limited success.

In a recent PACHE-inspired partnership, **CCNY-MSKCC** researchers have been concentrating on developing a library of cell lines that can effectively “report” to researchers whether apoptosis is occurring by their degree of fluorescence, drastically simplifying the screening measurements. The research team also is constructing a prototype of an artificial, three-dimensional, living environment for cell samples that will be the focus of an R01 grant and a patent application. The creativity and innovation shown by the CCNY-MSKCC team are due to the synergy that is generated and harnessed by partnerships to build technological and scientific solutions to the barriers affecting cancer research.



APPLIED RESEARCH

Community Networks Program Centers



CRCHD's Community Networks Program (CNP), now the Community Networks Program Centers (CNPC), grew out of the same commitment to expanding training and research opportunities that led to the PACHE program. However, its research base includes more than academic institutions and their staff; the community of interest and other organizations involved in alleviating cancer health disparities are also part of the research team. With this paradigm in mind, CNPC seeks to stimulate and develop innovative interventions by maximizing organizational resources and linkages, and mobilizing them to inspire broader community- and societal-level changes supporting improved health.

Partnerships

Building partnerships is essential to CRCHD's mission. Whether partnerships are fostered between academics and the community, between the public and private sectors, or between mentors and their mentees, collaborations hasten progress in tackling cancer health disparities.

CNP/C PROJECT TITLE: Asian Hepatitis B/Liver Cancer Prevention and Intervention Program

PRINCIPAL INVESTIGATOR: Grace X. Ma, Ph.D.

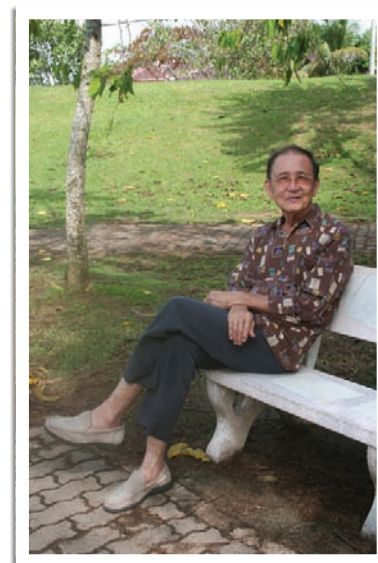
CANCER TYPE: Liver

POPULATION: Asian Americans

LOCATION: Mid-Atlantic States

CNP, one of CRCHD's flagship programs, features innovative partnerships among academic institutions, community organizations, and community-serving healthcare providers in an effort to overcome barriers encountered by underserved populations in accessing prevention services and cancer care. Partnerships can be particularly effective in reinforcing the delivery of health messages and ensuring that individuals receive quality cancer care and improved treatment outcomes.

To this end, researchers from **CNP-Atlantic Region** assisted community organizations and clinicians in partnering to construct a network for Vietnamese, Korean, and Chinese community members, whose liver cancer rates are disproportionately high.



Through this partnership, the researchers and community mobilized and culturally tailored a comprehensive toolbox of approaches—from group education to patient navigation and bilingual physician visits—with the goal of building a network to promote hepatitis B screenings and follow-ups. As a result of this initiative, nearly 1,400 individuals were screened, more than 200 were vaccinated, and 100 were moved into treatment. The effects of the partners' net stretched beyond the original mandate; not only did the communities experience reductions in the prevalence of hepatitis B infection, a major cancer risk factor, but they also demonstrated improvements in psychosocial health.



CNP/C PROJECT TITLE: Partnerships with the Witness Project

PRINCIPAL INVESTIGATOR: James R. Hébert, Sc.D., M.S.P.H.

CANCER TYPE: Breast, cervical

POPULATION: African Americans

LOCATION: South Carolina

In South Carolina, CRCHD researchers focused on forging partnerships to promote cancer prevention by linking rural African American churches with academics from **CNP-South Carolina**. Adapting American Cancer Society evidence-based “Witness Project” materials to the local South Carolina context, CNP researchers trained women, who had been recruited by their churches, to serve as witnesses who would discuss their cancer journeys, emphasizing early cancer detection, in meetings with other church members. Building upon its initial success, the program spread across upstate South Carolina to several additional churches, eventually reaching more than 900 women. The partnership facilitated outreach to the churches in rural communities and engaged trusted church members, rather than outsiders, to deliver health messages and effect change within the community.

CNP/C PROJECT TITLE: Spanish Radio Station Broadcasts

PRINCIPAL INVESTIGATOR: Beti Thompson, Ph.D., M.A.

CANCER TYPE: Breast, cervical, colorectal, lung, prostate, testicular

POPULATION: Hispanics/Latinos

LOCATION: Lower Yakima Valley, and Washington

Empowering local communities to assist in addressing their health needs is at the heart of CNP's collaborative efforts. In Washington State, a team from the **Lower Yakima Valley-CNP** partnered with a local Hispanic radio station to disseminate cancer prevention messages. The radio station interviewed and held call-in question-and-answer sessions with Spanish speakers, ranging from physicians to cancer survivors, who had been identified by Cancer Center researchers. The station also worked with the community to develop more

than 60 advertisement-like information capsules, aired throughout the year, which discussed multiple forms of cancer and cancer prevention. By empowering the radio station to reach out to its listeners and allowing the community to be involved in shaping its messages, the partnership was successful in making cancer and cancer prevention topics of discussion in the community. In focus group testing after two years of programming, all advertisements and on-air interviews received 100% positive feedback.

Community-Based Participatory Research (CBPR) Interventions

CBPR interventions encourage partners to share effective resources and approaches in one environment and one population, allowing them to be modified and adapted for future use. Modification of evidence-based materials is part of the work of CNPs. It is also part of the creative process required to generate evidence-driven interventions.

GNP/C PROJECT TITLE:

WALK: Feel Alive

PRINCIPAL INVESTIGATOR:

Edward Partridge, M.D.

CANCER TYPE: Breast,
cervical, colorectal

POPULATION: Rural and urban
underserved African Americans

LOCATION: Alabama Black Belt
and Mississippi Delta

CNP-Deep South, in an attempt to develop social networks for information dissemination, adapted the “WALK: Feel Alive” heart health and fitness program originally developed by the University of Alabama at Birmingham and piloted throughout urban Alabama. In adapting the program for CNP-Deep South’s rural constituents, researchers used a Social Network Model. Community health workers and CNP members recruited community members, encouraging them to join a WALK team and participate in health-promoting physical exercise. While walking, team members were motivated by cancer awareness and screening messages.



Rolled out in 22 counties, the program initially enrolled almost 1,900 walkers, retaining 60% one year later. The WALK teams proved capable of changing not only lifestyles in that year but environments, as well. Rural residents from the Mississippi Delta successfully lobbied their county governments to develop walking trails—a testament to the empowering attitudes the WALK program instilled. Creative thinking about how to adapt a proven method for engaging communities and encouraging health behavior changes, such as physical activity and cancer screenings, allowed CNP-Deep South to modify “WALK: Feel Alive” to work across highly varied communities and environments.

CNP/C PROJECT TITLE: Improved Access to Mammography through Food Pantries

PRINCIPAL INVESTIGATOR: Mark Dignan, Ph.D., M.P.H.

CANCER TYPE: Breast

POPULATION: Underserved and rural

LOCATION: Appalachia

Similar ingenuity was displayed by **CNP-Appalachia**, where researchers adapted evidence-based materials from the American Cancer Society’s “Tell-A-Friend” program, deploying them in 18 rural food pantries throughout Indiana County, Pennsylvania. Adapting the program’s three-contact approach that included information dissemination, one-on-one education, and phone calls, CNP researchers distributed promotional flyers in food bags,

sent volunteers to visit each pantry to provide education and answer questions, and arranged for health workers to call every interested woman and provide information on scheduling a mammogram.

Of the 379 women contacted, 302 were eligible on the basis of age. Half of the eligible women received mammograms, and three were diagnosed with breast cancer and entered treatment. At the community level, the use of no-cost breast cancer screenings increased by 28% during the intervention year. Originally designed to help women speak with friends about breast cancer, the “Tell-A-Friend” approach was creatively tailored to a new demographic and a novel dissemination venue to increase breast cancer screening. CNP-Appalachia expanded and modified the program to include community interactions and target rural women who were otherwise at risk of missing important health behavior messages.



CNP/C PROJECT TITLE: Culturally Tailored Colorectal Awareness Program

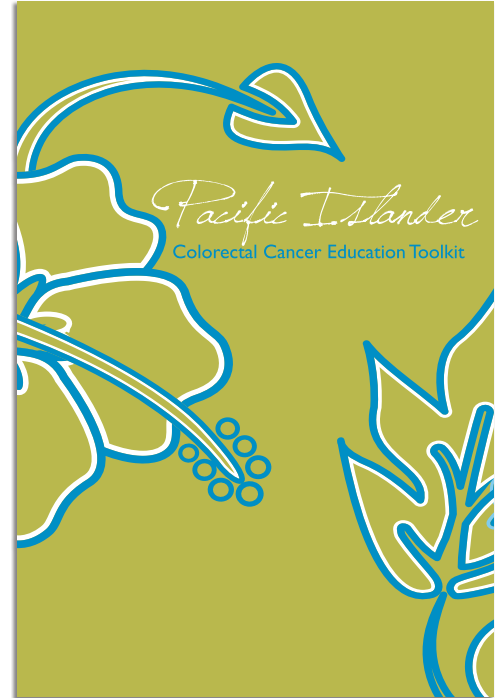
PRINCIPAL INVESTIGATOR: Sora Park Tanjasiri, Dr.P.H., M.P.H.

CANCER TYPE: Colorectal

POPULATION: Pacific Islanders

LOCATION: Southern California

Depending on community need, CNPs may do more than simply modify resources to make them more relevant to the environment or target disease. **CNP-Southern California** in Fullerton, California set out to tailor educational resources to meet the needs of a specific ethnic group—Pacific Islanders, and specifically, Native Hawaiians and the Marshallese—of whom only about 61% receive any type of cancer screening exam. After a community working group identified a lack of culturally appropriate information resources as a reason for the low screening rates, researchers began with NCI’s “What You Need to Know About Cancer” series, and developed two videos, a bookmark, a colorectal information sheet, an educational flip chart, and a flyer outlining no- or low-cost screening opportunities. All of the resources were adapted to integrate with Pacific Islander local knowledge regarding health and illness, and each was translated into four Islander languages. The process produced a library of resources specifically designed to target particular Pacific Islander communities in which culturally accessible and appropriate information was scarce.



Prevention

Within ethnically and racially diverse, and underserved communities, certain primary lifestyle factors are known to increase cancer risk, and these risks are frequently compounded by underuse of screening measures. Many of the CNPs' evidence-based interventions and materials are focused on understanding and removing barriers communities experience in making environmental and lifestyle modifications, and using screening opportunities, which is accomplished by supporting and/or developing community outreach programs aimed at both primary and secondary prevention.



CNP/C PROJECT TITLE: Use of Smokeless Tobacco (Iqmik) in Yukon-Kuskokwim Delta Pregnant Women

PRINCIPAL INVESTIGATOR:

Judith Salmon Kaur, M.D., M.A.

CANCER TYPE: All

POPULATION: Alaska Natives

LOCATION: Yukon-Kuskokwim Delta, Alaska

In rural Bethel, deep in the heart of Alaska's Yukon Delta, **CNP-Minnesota** has been working to support primary preventive behavior change measures related to tobacco

use. Alaska Natives in Bethel are known for making a chewing tobacco, known as Iqmik or Blackbull, from leaf tobacco combined with the ash formed when burning a tree fungus. Almost 80% of Bethel's women use Iqmik and/or other forms of tobacco during pregnancy, to the detriment of both mother and fetus.

Focus group discussions convened with adults and youth in the Delta region indicated that Iqmik was commonly perceived as a safe alternative to tobacco for pregnant women, as it was diluted with the fungus ash. To combat this misperception, a culturally tailored video was developed, which has been used while counseling pregnant women about tobacco use. In addition, the Minnesota group has begun storing biospecimens for potential use in biobanking or other proteomic research, with the collaboration of the Centers for Disease Control's Arctic Investigations Program, which conducts a broad array of approaches designed to document, intercept, and investigate "carcinogenic" lifestyle choices.

APPLIED RESEARCH SPOTLIGHT

Overcoming Barriers to Healthy Behavior

Filipino women in the United States have the highest mortality rate due to breast cancer compared with other Asian Americans, even though they do not have the highest incidence of breast cancer. They also have low rates of mammography screening and are diagnosed with later stages of breast cancer than are Chinese and Japanese women, the two other major Asian groups in Hawaii.

Working closely with the community to try to reduce these disparities, **CNP-University of California Davis Cancer Center (UCDCC)** conducted focus groups with physicians and Filipino women. Results indicated that the fear associated with a cancer diagnosis could be addressed by a broad-based educational campaign employing print, radio, and television media that targeted Filipino women. Messages about the importance of early detection and its relationship to survivorship were disseminated through a variety of means, including brochures in physicians' offices, newspaper articles, posters on bus routes, radio and TV public service announcements and interviews, training of key leaders, and community gatherings. Partnerships became an important way to extend the reach of this campaign to promote breast cancer screenings, and were developed with the American Cancer Society, the Hawaii Cancer Information Service, the State of Hawaii Department of Health, the Hawaii Breast and Cervical Cancer Control Program, and many Filipino community organizations.



After four years of an aggressive marketing effort directed to Filipino women in Hawaii, CNP-UCDCC's **Asian American Network for Cancer Awareness, Research and Training (AANCART)** demonstrated an increase in mammography screening rates from 38% to 62% in Filipino women. AANCART's efforts were also able to reduce the percentage of Filipino women who had never had a mammogram from 19% to 10% between 2002 and 2008. With this significant improvement in the mammography rate, it is anticipated that Filipino women will be diagnosed at earlier stages of breast cancer, thereby lowering the mortality rate from the disease.

The strong impact this program has had exemplifies the success of CNP's CBPR approach to understanding and addressing the barriers experienced by communities in making healthy lifestyle changes to reduce cancer disparities.

CNP/C PROJECT TITLE: Healthy Colon, Healthy Life

PRINCIPAL INVESTIGATOR: Moon S. Chen, Jr., Ph.D., M.P.H.

CANCER TYPE: Colon

POPULATION: Vietnamese Americans

LOCATION: California, Hawaii, Washington State

In order to understand the barriers to, and best methods for increasing colorectal screening among Vietnamese Americans, researchers from **CNP-Northern California** evaluated two interventions: one offering Vietnamese Americans culturally tailored brochures and a fecal occult blood-testing (FOBT) kit, and another combining the kit and brochures with telephone counseling.

When evaluating the two interventions, it became clear that the intervention that used only the kit and brochures led to a significantly greater increase in the number of colorectal screenings compared to the intervention with added telephone counseling. This result was surprising: the more intrusive involvement on the part of the researchers (added telephone counseling) was not the best route for increasing screenings among Vietnamese Americans. This was a counterintuitive but important discovery that enabled CNP-Northern California, as well as other cancer interventionists, to promote more effectively screening in this particular Asian American population.



CNP/C PROJECT TITLE: Reaching the Hispanic Population in a Rural Setting—Colorectal Home Health Parties

PRINCIPAL INVESTIGATOR: Beti Thompsom, Ph.D., M.A.

CANCER TYPE: Colorectal

POPULATION: Hispanics/Latinos

LOCATION: Lower Yakima Valley, Washington State

By contrast, **CNP-Lower Yakima Valley** found that home health parties, which had a high level of intrusiveness, optimally addressed the 16%

screening gap between Hispanic and non-Hispanic whites in this rural region. These parties consisted of a trained promotora (lay health worker) visiting a family and their friends in their homes to discuss the importance of colorectal screening.

Over a six-month period, the parties reached nearly 70 age-eligible individuals, who were predominantly female. While only 12% of these participants had received an FOBT at baseline, this number had increased to more than 30% at the three-month follow-up point. A 6% increase also was seen in colonoscopy rates three months following the intervention. More importantly, by encouraging families to change their health behaviors, more than 70% of individuals found the parties enjoyable.

CNP/C PROJECT TITLE: Barbers Against Prostate Cancer

PRINCIPAL INVESTIGATOR: Cathy D. Meade, Ph.D., R.N., F.A.A.N.

CANCER TYPE: Prostate

POPULATION: Underserved

LOCATION: Tampa Bay, Florida

Secondary prevention messages need not be disseminated only in homes or via community health organizations. In an interesting twist, **CNP-Tampa Bay** trained barbers to deliver prostate cancer health education from the comfort of their barbershops. The intervention recruited eight barbers from four barbershops and ran for two months.

During this time, 115 educational encounters occurred with clients. Three-quarters of those clients claimed they intended to pursue discussions with their primary care physicians regarding prostate cancer screenings. Self-rated measures of prostate cancer knowledge increased significantly, as well. The researchers indicated that community support and media interest were perhaps the most noteworthy indicators of the program's success. This CNP's innovative initiative clearly demonstrated that by bringing health messages into daily life, screening and prevention behaviors became normalized at both the individual and community levels.

Community Health Workers

As with the *promotoras* employed by CNP-Lower Yakima Valley, past research and experience indicate that one of the most effective ways to engage communities in health behavior programming is by developing cadres of health workers, drawn from the community itself, who can promote, model, and educate about the behaviors proposed by outside researchers. Community-to-health-worker interactions underpin the success of many of CRCHD's programs, and community engagement is the fundamental principle upon which CNP and all of CRCHD's CBPR programs are built.

CNP/C PROJECT TITLE: Woman to Woman – Micronesians United

Lay Educator Program

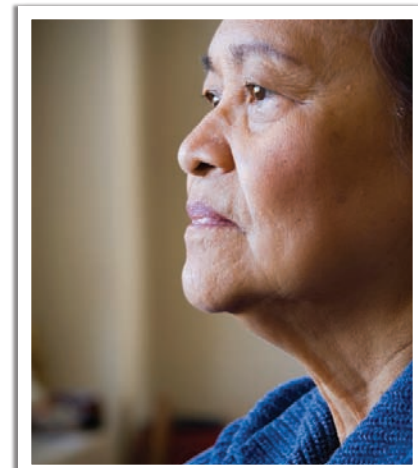
PRINCIPAL INVESTIGATOR: Clayton D.K. Chong, M.D.

CANCER TYPE: Breast, cervical

POPULATION: Native Hawaiians

LOCATION: Hawaii

Micronesians represent the Hawaiian Islands' newest immigrants. Many of them come to the United States from underresourced backgrounds, and few are aware of publicly available cancer screening and treatment sites.



When researchers with **CNP-Hawaii** realized the lack of awareness of health resources and, specifically, that eligible Micronesian women were not using free mammogram and Pap smear programs, they began a training program for a small group of O'ahu's Micronesian women. They taught the women to work as lay educators, equipping them with a toolkit of educational materials and providing them with a small stipend if certain program goals were met.

In six months of outreach, 16 lay educators made 567 peer education contacts, representing half the female Micronesian population on O'ahu over the age of 40. Of these contacts, close to 150 made screening appointments, from which 10 breast cancers were detected. CNP-Hawaii's results demonstrate the effectiveness with which individuals can spread new information and practices throughout their home communities, even if those practices seem alien to community members.



CNP/C PROJECT TITLE: Breaking Free! Breast Cancer Awareness for Black Beauties

PRINCIPAL INVESTIGATOR:

Paul A. Godley, M.D., Ph.D., M.P.P.

CANCER TYPE: Breast

POPULATION: African Americans

LOCATION: Eastern/Central North Carolina

CNP-North Carolina trained individuals to work as lay community health workers/

advocates to reach young African American women. Eighteen Eastern and Central North Carolina beauty salon employees learned about breast self-examinations, routine clinical breast examinations, and the importance of mammograms, and were given information to allow them to make proper referrals to local healthcare providers.

During the program, all 49 individuals who came in for screenings claimed to have come because trusted friends—their hairdressers—told them to do so. This result underscores the principle behind community health educators: individuals who are established, reliable members of a community's life are perhaps the most effective advocates for encouraging health behavior changes.

CNP PROJECT TITLE: From the Flying Deck, Get a Breast Check!

PRINCIPAL INVESTIGATOR: Daniel Blumenthal, M.D., M.P.H.

CANCER TYPE: Breast

POPULATION: African Americans

LOCATION: Hartfield-Jackson Atlanta International Airport

Community health workers can be found even at the world's busiest airport—Atlanta's Hartfield-Jackson International Airport—where **CNP-Georgia** developed a worksite breast health program for the community of more than 56,000 employees. Critical to the program's success was its use of multicultural and multilingual community health advocates (CHAs), including particularly effective male CHAs who coordinated daily educational activities at the airport's on-site clinic, held lunch-and-learn events, helped schedule appointments at the clinic, and arranged mammography referrals, both to primary care physicians and free community providers.

Eventually reaching approximately 3,500 employees, the program conducted more than 200 clinical breast examinations in the on-site clinic and referred upwards of 150 women for mammograms. By using community health workers to unify and engage the airport community, CNP-Georgia integrated prevention and care into the life of the airport. As a result of the intervention, health messages surrounded employees throughout their workday.

Clinical Trials

Increasing awareness, recruitment, and retention of racially and ethnically diverse, and underserved populations to clinical trials are major goals of NCI's and CRCHD's community education and outreach efforts.

CNP PROJECT TITLE: Recruitment of African Americans to Clinical Trials

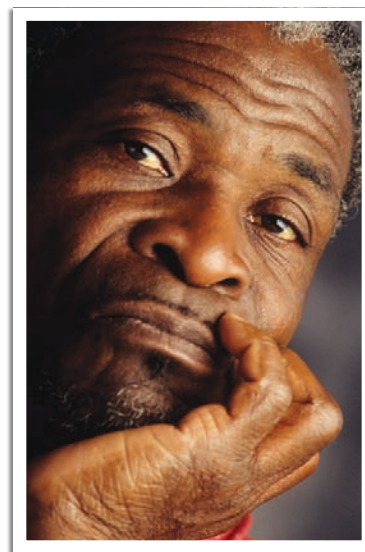
PRINCIPAL INVESTIGATOR: Steven Wolff, M.D.

CANCER TYPE: All

POPULATION: African Americans

LOCATION: Tennessee

A CRCHD-sponsored Minority-Based Community Clinical Oncology Program (MB-CCOP) comprehensive partnership between Meharry Medical College and Vanderbilt-Ingram Cancer Center has had a major impact on recruiting African Americans to clinical trials using an innovative approach. **MB-CCOP-Tennessee** began collecting information on minority cancer patients immediately following diagnosis, assessing their needs



and potential logistical obstacles (such as lack of transportation or insurance). The team also identified studies in which the patients would be eligible to participate, taking into account co-morbidities that frequently rule out racially and ethnically diverse patients.

This information was presented to the patients' physicians, so that by the time the physicians were ready to discuss treatment options with their patients, they had a full array of relevant clinical trials to present, along with solutions to any logistical impediments to participation. Participating patients were then assigned individual research nurses/navigators to help them navigate the vagaries of treatment and the clinical trials process. Over the project's seven-year span, the research team worked with more than 1,000 African American patients newly diagnosed with cancer and managed to accrue 25% of them to clinical trials (of those, 68% were identified as eligible). Compared with national accrual rates of between only 2% and 4%, the program was highly successful, due in large part to its combination of trust-building efforts, navigation, eligibility screening, and tailored information and options.



CNP/C PROJECT TITLE: Developing a Recruitment Model for Pediatric Hematology-Oncology Patients

PRINCIPAL INVESTIGATOR: Amelie G. Ramirez, Dr.P.H., M.P.H.

CANCER TYPE: Hematologic

POPULATION: Hispanics/Latinos

LOCATION: Lower Rio Grande Valley, Texas

CNP-Texas also experienced success in mobilizing communities to increase clinical trials participation using trained, bilingual patient navigators.

Focusing on pediatric Hispanic/Latino populations in South Texas' Lower Rio Grande Valley, CNP-Texas patient navigators provided patients and families with a full package of support for clinical trials enrollment by expediting paperwork and doctor/patient communications; assisting patients and families with concerns about nutrition, physical activity, and medicines; contacting and educating families in novel venues, such as summer water parks; and developing bilingual educational brochures.

As a result of a multipronged approach, researchers saw a 48% increase in the number of Hispanic/Latino children accrued to local hematology clinical trials. Patient navigation appears to fill a niche need by providing the comprehensive support many populations need to encourage research participation. The strong success of the CNP-Texas approach to clinical trial recruitment was noted in NCI's 2012 Annual Bypass Budget.

PNRP **PROJECT TITLE:** Boston Patient Navigation Research Project Clinical Trials Supplement

PRINCIPAL INVESTIGATOR: Karen M. Freund, M.D., M.P.H.

CANCER TYPE: Breast, cervical

POPULATION: Low-income, urban females

LOCATION: Boston

PNRP-Boston explicitly tested the ability of patient navigation to promote and facilitate clinical trials participation within underserved populations. In Boston, navigators screened individuals and prioritized suitable clinical trials. They also attempted to include providers in their outreach and education efforts. As a result of their efforts, the Boston research team increased the percentage of racially and ethnically diverse, and underserved individuals enrolling in clinical trials from 28% to 49% over four years.

PNRP **PROJECT TITLE:** Denver Patient Navigation Research Project Clinical Trials Supplement

PRINCIPAL INVESTIGATOR: Peter C. Raich, M.D., F.A.C.P.

CANCER TYPE: Breast, prostate, colorectal

POPULATION: Uninsured, low-income urban residents

LOCATION: Denver

Meanwhile, **PNRP-Denver** patient navigators managed to increase clinical trials recruitment by also serving as community outreach officers and offering skill-based clinical trials education to local physicians. Both PNRP pilot projects indicated that, even when developed as an addendum to an established research program, patient navigation offers tremendous return on investment. The relationships patient navigators are able to build with communities and individuals can have an overwhelming impact on breaking down trust barriers between researchers and the community.

CNP **PROJECT TITLE:** Project CONNECT

PRINCIPAL INVESTIGATOR: Melissa Green, M.P.H.

CANCER TYPE: All

POPULATION: African Americans

LOCATION: North Carolina

Another project that supports research recruitment of racially and ethnically diverse, and underrepresented populations was developed by **CNP-North Carolina**.

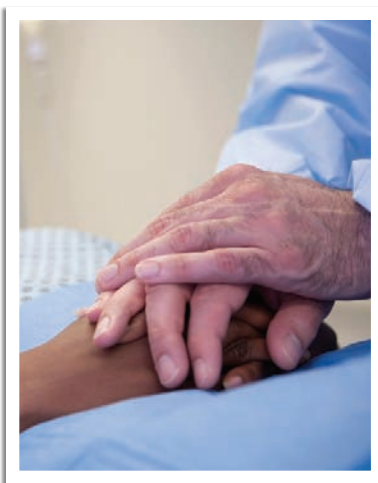
The researchers engaged their communities in education by partnering with local organizations and training individuals as community research advocates to serve as lay health advisors. They also implemented a statewide advisory



board. The project's efforts focused on developing, evaluating, and improving clinical trial communication tools, increasing diversity of participants in local clinical trials, and building local awareness and acceptability of research participation. As a result of the project, 716 individuals enrolled in a statewide clinical trials registry, through which they could be contacted about studies for which they might be eligible, and 158 individuals reported interactions with community research advocates.

Biobanking

An emphasis on increasing the diversity of clinical trials comes as a result of CRCHD's commitment to expand its research portfolio to include basic science contributions to cancer disparities. This expanded focus has filtered down to several CNP projects. In addition to expanding the base of research participants, these projects are promoting biospecimen collection from diverse populations for use in research, examination of cancer co-morbidities, and evaluation of differences in pathogen exposure.



CNP/C PROJECT TITLE: Community Attitudes Project

PRINCIPAL INVESTIGATOR: Graham A. Colditz, M.D., Dr.P.H., M.P.H., M.B.

CANCER TYPE: Breast, prostate, colon, lung

POPULATION: Underserved, low-income, rural, and/or African American

LOCATION: St. Louis, Missouri

There are frequently barriers involving communities in basic science undertakings. To better understand and potentially address distrust of basic research as opposed to community-based research, **CNP-Missouri** conducted a qualitative investigation in St. Louis to identify barriers to engaging African American men and women, and their physicians in research.

After interviewing local community leaders and physicians, as well as focus groups within the African American community, the researchers uncovered three major barriers to participation. While the black community believed strongly in the importance of medical research, they simultaneously held a deep distrust for the healthcare establishment. There was, in addition, a great deal of fear of the unknown and of potential adverse effects from receiving undocumented treatments. Finally, the lack of reciprocal relationships among researchers, physicians, and the community also served as a barrier to constructing the sort of trusting interactions necessary for alleviating the community's entrenched suspicions.

While CNP-Missouri's research indicates areas that need attention, it also reinforces the directions that NCI and CRCHD must pursue to increase research participation—building partnerships and relationships with communities and researchers, and providing culturally tailored educational outreach that addresses barriers.

CNP/C PROJECT TITLE: HPV in Lakota and Caucasian Women:

Epidemiology and Risk Factors

PRINCIPAL INVESTIGATOR: Dedra S. Buchwald, M.D.**CANCER TYPE:** Cervical**POPULATION:** American Indians**LOCATION:** Northern Plains

In an attempt to engage communities in basic research, **CNP-Washington State** has begun epidemiological studies of the human papillomavirus (HPV) strains. The incidence of HPV is highest among Native American women of the Northern Plains at rates that top 20%. Comparing the strains of HPV found in two Native American reservations with that present in a predominantly white community led to several surprises. Among the Native American population, a significantly higher percentage of patients had experienced multiple HPV infections. Moreover, the viruses responsible for the infections came from very different subsets than those infecting patients at the white community's tertiary hospital. While this work raises a plethora of further research questions, it is also critical in helping bring us closer to an understanding of the factors leading to the higher incidence and lower survival rates for cervical cancer in Native American women. However, further research will not be possible without the research participation of the Native communities themselves.

CNP/C PROJECT TITLE: Tissue banking**PRINCIPAL INVESTIGATOR:** Clayton D.K. Chong, M.D.**CANCER TYPE:** Cervical**POPULATION:** Native Hawaiians**LOCATION:** Hawaii

Biobanking is a key area of focus for CNPs interested in using their community networks more effectively to engage disparity-experiencing populations in basic research. Biobanks serve as central repositories where biospecimens are sorted, inventoried, and stored.

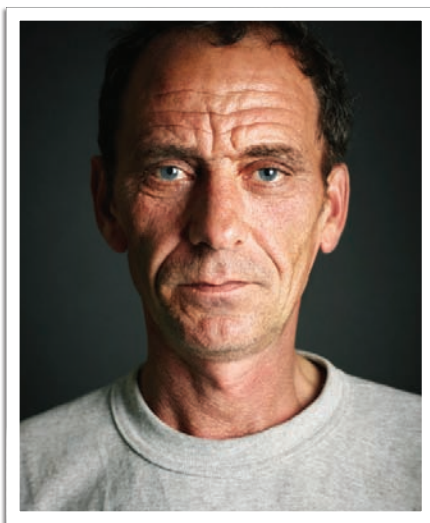
For the biobank at The Queen's Medical Center in Hawaii, **CNP-Hawaii** is surveying and conducting focus groups with a broad swath of Hawaii's four racial/ethnic communities—whites, Hawaiians, Japanese, and Filipinos— while taking the necessary steps to open a biobank to determine local attitudes toward tissue collection and storage. The goal is to use the findings to develop educational interventions for staff collecting specimens and for patients being asked for permission to collect their tissues, as well as to establish protocols for collection and research with the tissue samples.

CNP-Hawaii researchers know they are broaching ethically difficult territory involving issues of informed consent, anonymity, ownership, fear, mistrust, storage and disposal, and the public reporting of results. By engaging the community ahead of time in efforts to establish the biobank, CNP-Hawaii is helping to make such basic science interventions more acceptable and build a sense of local ownership, understanding, and commitment to biospecimen collection and basic research.

Education and Outreach

Perhaps the most important step in tackling cancer health disparities involves taking knowledge gathered from both the lab and the community and translating it into concrete differences in the ways in which states, municipalities, and neighborhoods function.

Reducing—and, ultimately, eliminating—cancer health disparities requires the active participation of diverse communities. Education and mobilization of communities to present their concerns persuasively to local, state, and national stakeholders are critical to enhancing community influence on public agendas in cancer health disparities and changing disparity-producing power and resource-distribution structures. An important part of the CNP mandate is to engage communities in advocacy training to address structural barriers to cancer prevention, detection, and care.



CNP PROJECT TITLE: State Legislation and Policy Addressing Clinical Trials Participation

PRINCIPAL INVESTIGATOR: Claudia Baquet, M.D., M.P.H.

CANCER TYPE: Prostate

POPULATION: African Americans, Hispanics/Latinos, Native Americans, rural and urban, low-income whites

LOCATION: Maryland

CNP-Maryland has pursued this goal through legislative engagement; in 2007, it coordinated a group of community members, cancer survivors, and academics to testify before Maryland's General Assembly about prostate cancer services for uninsured men. This testimony led to Maryland Senate Bill 283, which established a three-year program for prostate

cancer screening, referral, and treatment for uninsured/economically disadvantaged men in rural Charles County, MD.

Researchers also provided technical assistance and data to support the development and passage of Senate Bill 459, creating a task force to review physician shortages in rural areas of the state. CNP investigators were included in the task force and supported its conclusions, making provisions for a state-based physician loan repayment program. The inclusion of underserved communities and researchers in the legislative process facilitated the development of policies and laws that reflect the cancer health needs of rural communities.

CNP PROJECT TITLE:

Biannual Legislative Briefings

PRINCIPAL INVESTIGATOR:

Ronda Henry-Tillman, M.D., F.A.C.S.

CANCER TYPES: Breast, colorectal, prostate

POPULATION: Underserved and rural

LOCATION: Arkansas



CNP-Arkansas pursued a similarly civic-oriented advocacy approach, promoting policymaker awareness of patient, physician, researcher, and structural barriers surrounding cancer health disparities. Through biannual briefings, researchers apprised state and local policymakers of the most up-to-date scientific evidence about cancer in Arkansas, drawn from their research collaborations. They also offered policy recommendations for reducing the health and economic burdens of cancer.

As a result of a powerful 2008 presentation on the positive effects of an expiring pilot program for colorectal cancer screening among the underserved, CNP researcher-advocates were able to stimulate the development and passage of The Colorectal Cancer Prevention, Early Detection, and Treatment Act of 2009—legislation that places Arkansas at the forefront of cancer-preventing states in instituting no-cost, statewide, colorectal cancer screenings for those unable to pay. Efforts like these, which ensure that high-quality, community-based,

and other relevant data are at hand when forming legislative policies, are critical to removing structural barriers to cancer care in underserved communities.



CNP/C PROJECT TITLE: Hawaii AANCART Legislative Advocacy

PRINCIPAL INVESTIGATOR: Moon S. Chen, Jr., Ph.D., M.P.H.

CANCER TYPE: Lung

POPULATION: Asian Americans

LOCATION: Hawaii

The Hawaiian team affiliated with **CNP-Northern California** has consistently been active in health policy in and around O'ahu. In addition to working with Filipino civic organizations, the Hawaii team has advocated for several pieces of Hawaiian legislation related to cancer control. One key bill is House Bill 895 HD2 (2009), which increases the tax on all tobacco products other than cigarettes to 80% of the wholesale price. A portion of the tax's proceeds is then devoted to a special fund supporting community health centers, where screening for lung cancer commonly occurs.

To support the bill, the Hawaii team coordinated testimonies from several Filipino community and healthcare provider organizations. These testimonies proved so inspirational that the bill, despite initially being vetoed by Hawaii's governor, received an immediate and resounding two-thirds majority override vote in both houses of the legislature. CNP-Northern California served as an important and powerful conduit for bringing community voices and needs into the legislative arena.

CNP PROJECT TITLE: Community Mobilization around Disparities—

Use of Media and Outreach

PRINCIPAL INVESTIGATOR: Kasisomayajula Viswanath, Ph.D.

CANCER TYPE: Breast, cervix, colon, lung

POPULATION: Low socioeconomic status

Researchers at **CNP-Massachusetts** used community mobilization techniques and media advocacy to address structural barriers to cancer care. Working with the community, they trained members to become activists to influence the public agenda on health disparities. At the same time, they conducted media workshops to educate local media outlets and journalists about cancer disparities.

These media workshops, as well as public screenings of a PBS documentary on socioeconomic and racial disparities in cancer health, reached more than 1,000 individuals in the Boston area. Such media advocacy stimulates critical reflection among journalists and media outlets, the general public, and disparities communities themselves about how social structures contribute to health. Moreover, it brings marginalized communities and their health concerns into the mainstream dialogue, where disparities need to be addressed.

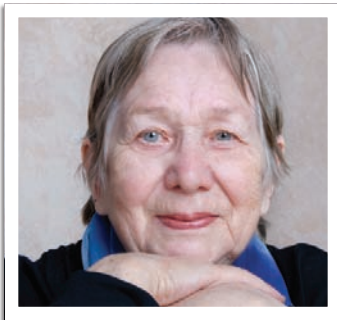
APPLIED RESEARCH

Patient Navigation Research Program



Patient navigation interventions are designed to limit or eliminate barriers that prevent patients, particularly those from vulnerable populations, from accessing quality and timely cancer care. Trained navigators provide expertise in and assistance with negotiating the healthcare system, helping patients cope with financial barriers (e.g., insufficient or lack of insurance), communication barriers (e.g., based on language or culture), systemic barriers (e.g., fragmented medical care, missed appointments), psychological barriers (e.g., fear, distrust), and social barriers (e.g., lack of reliable transportation or childcare options).

Promising as they may be, navigation interventions have not been assessed rigorously. To determine whether navigation can actually succeed in mitigating patient access barriers, NCI-CRCHD supported the development and evaluation of patient navigation interventions at eight academic research sites across the country, with a ninth additional site funded by the American Cancer Society.



Over the course of five years (the intervention concluded in September 2010), the Patient Navigation Research Program (PNRP) aimed to determine whether navigation can (1) improve the timeliness and quality of care from the point of a cancer screening abnormality through confirmed diagnosis and completion of therapy; (2) do this work cost-effectively; and (3) improve patients' satisfaction with their care and resultant quality of life.

In order to perform this evaluation, PNRP followed more than 12,000 individuals who received abnormal results on breast, cervical, colon, or prostate cancer screening tests. These individuals were roughly evenly divided between the program's control and intervention arms, and represented diverse, underserved populations including Hispanics/Latinos, African Americans, and low-income whites.

PNRP sites collected information on patients' demographics and cancer details, as well as on the navigator services they received and background characteristics of their navigators. A comprehensive data dictionary consisting of more than 800 patient data elements was developed and ratified by all nine principal investigators, ensuring consistency in measurement indicators across sites. In order to assess these collected data, the investigators were tasked with developing new tools and tailored metrics to measure PNRP's key outcomes (timeliness of care, cost-effectiveness, and patient satisfaction).

One of the key tools developed by the sites was Patient Navigator Tracking Logs. Used at all of the PNRP sites, these logs allow navigators to record patient barriers to screening and cancer care—drawing from a predefined list—and to detail the actions they undertake to overcome those barriers. Generating common descriptions of barriers and actions allows PNRP principal investigators to compare barriers across the country, identify particularly intractable ones, and note actions associated with improvements. The plan is that, as with the other PNRP-generated surveys and tools, the Navigator Tracking Logs can be applied in navigation programs nationwide.

PNRP PROJECT TITLE: Colorado Patient Navigator Training

PNRP: Denver Health and Hospital Authority, Denver, CO

PRINCIPAL INVESTIGATOR: Peter Raich, MD

POPULATION: Hispanics/Latinos, African Americans, and underserved

CANCER TYPE: Breast, prostate, colorectal

The need for specialized navigator training is an important topic for several of the PNRP sites. At **PNRP-Denver**, researchers have put together a package of training courses for students, current navigators, and other healthcare professionals interested in learning or advancing their navigation skills. These courses are delivered several times a year, in both face-to-face workshops (for basic skills acquisition) and as an online training program (for advanced skills acquisition and specialized topics). Developing and maintaining these curricula promotes a standardized body of knowledge across the nation's patient navigator corps, as well as allows navigators to access specific training as their needs dictate.

PNRP PROJECT TITLE: Online Resource Guide and Professional Network for Navigators and Other Health Workers

PNRP: University of Texas Health Science Center, San Antonio, TX

PRINCIPAL INVESTIGATOR: Donald Dudley, M.D.

POPULATION: Underserved

CANCER TYPE: Breast, cervical

Online training tools also are being deployed at **PNRP-San Antonio**, where the University of Texas research team has developed an online Health Worker Network that provides networking and training opportunities for navigators and community health workers. The site has proven so popular since its launch in June 2010 that the San Antonio Community Worker/Promotora Association began using it as the main venue for interacting with its members.

PNRP-San Antonio's community health workers have additionally developed an online compilation of the resources most commonly used during their PNRP experiences. The site lists more than 115 local medical, social, and financial support options, including transportation services, utility assistance programs, affordable housing solutions, childcare resources, and

food assistance programs. Developing these sites has allowed the San Antonio research team to increase both the reach and the effectiveness of their programs across South Texas.

PNRP has developed new statistical tools to measure primary outcomes and piloted innovative methods to assess secondary outcomes. Using scientifically valid and reliable methods, PNRP has helped to fill a gap, both in the literature and in practice, in enhancing our understanding of how to make patient navigation a successful intervention. Furthermore, the program has ensured that these discoveries and methodologies will be useful more broadly—in setting the standards for and encouraging further research into patient navigation interventions.

FIGURE 5	The Many Roles of the Patient Navigator
Empowering Patients	<i>"As a patient navigator, it is rewarding to help someone who otherwise would have been delayed in treatment because of barriers. It is equally rewarding to empower patients so that they can self-advocate in matters of their healthcare and the healthcare of their friends and families."</i>
Working With Healthcare Providers	<i>"Doctors and nurses are happier with the care because they know what is going to happen next with the patient; there is a plan. Also, the doctors know that there is one person in charge of this patient regarding their abnormal results. In the past, there were different clinic staff calling the patient regarding the abnormal result, and now there is one central person—the patient navigator. This way is more organized. It is a big help to the providers, the doctors stay organized, and the patients stay on track."</i>
An Unspoken Oath	<i>"Just as doctors take a medical oath, we, as navigators, have an unspoken oath to our patients based on their needs and current situation. In this job, you need to be flexible, yet have boundaries."</i>
Addressing Barriers	<i>"There are many issues that patients face after receiving their diagnostic testing. The patient-patient navigator relationship enables constant and helpful communication that is of vital importance in the process."</i>
Empathizing With Patients	<i>"It is important to have patience and be understanding about what the patient is going through. Patients have so many fears and other things going on. Patience is needed with all patients because the fears are always there. It is important to take the time to listen and help."</i>

Nurturing a
diverse workforce—
a crucial component
to the future
of cancer health
disparities research

DIVERSITY TRAINING

DIVERSIFYING THE CANCER BIOMEDICAL WORKFORCE



A fundamental component underpinning all Center to Reduce Cancer Health Disparities' (CRCHD's) training and research programs is attracting and training a cadre of talented students and trainees from underrepresented populations in biomedical research. A diverse workforce is crucial to the future of disparities research and a critical first step in reducing the burden of cancer for an increasingly diverse America. Diversity training ensures that cancer research opportunities and advances reach all individuals, especially those who otherwise might be excluded. Recipients of diversity training, in turn, are well-positioned to leverage community partnerships that develop and implement education and workforce development efforts.

According to data released by the 2010 U.S. census, the United States is well on its way to becoming a “minority-majority” nation. However, the growth in diversity within the general population has not been coupled with proportional increases in representation among the biomedical scientific ranks. This disparity is apparent in the lower number of underrepresented students expressing an interest in science and mathematics in high school and extends all the way to fewer successes in doctoral programs and independent scientific careers. A recent publication by Donna Ginther et al.¹, for example, reports that the probability of black scientists securing NIH R01 grants was 13.2% lower than that of white scientists during the 2000 - 2006 fiscal years. Even after controlling for other factors that could explain the disparities, such as scientists' demographic characteristics, education and training, NIH experience, and research productivity, and employer characteristics, black applicants were still about 10 points less likely than whites to receive R01 grants. The authors found that success rates for R01 awards for all applications submitted by Ph.D. investigators during this same period were 16.1% for blacks, 28.1% for Hispanics, 29.3% for whites, and 28.1% overall.

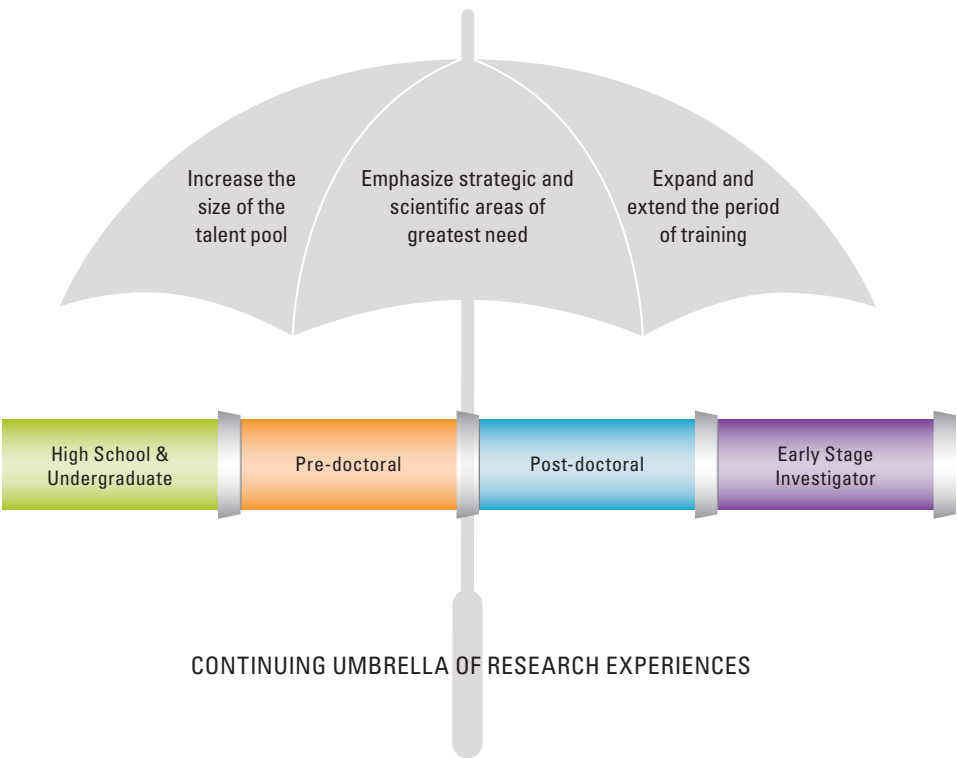
The question then arises as to where the gaps are in the training pipeline through which talented individuals from underrepresented populations fall?

¹ Ginther, D.K., et al. Race, Ethnicity, and NIH Research Awards. *Science*, August 19, 2011; 333 (6045): 1015-1019.



For more than a decade, the NCI Continuing Umbrella of Research Experiences (CURE) program has concentrated on identifying and closing those gaps by offering training support to individuals from sociodemographic groups that are underrepresented in the biomedical and cancer research fields. Support is available at every point along the career development continuum, from the high school level extending through to the independent cancer researcher level. The goals of CURE are to (1) increase the size and diversity of the cancer research talent pool; (2) emphasize research areas of greatest need; and (3) expand and extend the training period for underrepresented individuals (Figure 6).

FIGURE 6 CURE Continuum of Training and Career Development Opportunities



Foundation in Diversity Supplements

Today, the CURE program has impacted positively not only the careers of individuals from backgrounds underrepresented in the biomedical sciences who have gone through the program, but also NCI and NIH as a whole through an expanded pool of competitive, diverse researchers.

The foundation of CURE is a chain of diversity supplements to existing NCI grants that bridges one challenging transition point to another, enabling underrepresented individuals to have the financial support they need to pursue cancer research training. Diversity supplements can be awarded at any point in an individual's academic and career development beginning as early as high school, and can serve as an introduction to cancer research. Such supplements are an excellent means to draw talented individuals into the cancer research career pipeline to begin their journey toward research independence.

In order to target specific points in the career development pipeline, CURE has developed a series of awards to complement these diversity supplements. The various awards span training during high school and college, across predoctoral levels via F31 National Research Service Awards, across both mentored (K01, K08, and K23) and nonmentored (K22) early-stage investigator awards, and exploratory/development grants (R21). With each grant designed to expand research training and professional skill building to boost competitiveness and career progression, CURE is the first and only NIH program to offer long-term, continuous training support to underrepresented students and professionals.



CURE has grown significantly since its inception. In FY 2011, 180 diversity supplements were awarded, of which 91 were new and 89 were noncompeting. Broken down by educational level, the following supplements were awarded: high school (2), undergraduate (10), graduate (70), postbaccalaureate (18), postmaster's (5), postdoctoral (55), and junior faculty (20).

CURE's reach into underrepresented populations has brought an increasing flow of individuals from these populations into cancer research. The more CURE-trained investigators who remain in cancer research and mentor new CURE trainees, the closer CURE will be to achieving the goal of building and sustaining a diverse cancer research workforce.

High School and Undergraduate Training

CURE begins its outreach at an early stage by targeting underrepresented high school students and, via P30 supplements, enrolling them in research training and education that partner them with laboratories and scientists at NCI-designated Cancer Centers. The goal of CURE's high school and undergraduate component is to stimulate and nurture young people's curiosity about science and biomedical research.

CURE supports several innovative high school and undergraduate programs. Its latest foray, launched in 2009 and continuing through 2011, is the Emerging Technology Continuing Umbrella of Research Experiences (ET CURE) program, developed in partnership with the NCI Center for Strategic Scientific Initiatives. ET CURE funds research experiences for young people in elective areas centered on emerging and advanced technologies, such as clinical proteomics, nanotechnology, biophotonics, and genomics.

One example of an NCI-designated Cancer Center that has used CURE funding to establish an ET CURE program is the University of California (UC), Davis. The Cancer Center forged a partnership among its Medical Center, the UC Davis National Science Foundation-funded

Center for Biophotonics and Technology, and Sacramento High School—a local charter school with a predominantly underrepresented student population. The partnership is formulated as a year-long Research Academy that includes coursework, field study, and laboratory research in cancer science. Research Academy participants are encouraged to pursue degrees in medicine and research.



**Temesgen Woldeyesus and mentor
Lorenzo Berti, Ph.D.**

"In a perfect world, having my own lab and practicing medicine, I'd like to prescribe a drug I discovered."

Temesgen Woldeyesus, the son of Eritrean immigrants and a current ET CURE UC Davis student, has discovered a fascination with brain tumors and clinical medicine through his Research Academy experience. Woldeyesus' research, which focuses on helping the chemotherapeutic drug, doxorubicin, target cancerous cells exclusively, has led to recognition and awards at undergraduate poster presentations across the country. He proposed a DNA "nanocarrier" made of iron oxide nanoparticles, which can be manipulated inside the body via electromagnetic fields, as a solution to the doxorubicin delivery problem.

The excitement of this cutting-edge research and the inspiration provided by his mentor, Lorenzo Berti, Ph.D., have clearly had an impact on Woldeyesus. That is precisely the aim of CURE program supplements—to foster an ability to envision an ambitious and successful career trajectory among promising young scientists from underrepresented

backgrounds—and is made possible through their focus on unique and state-of-the-science research experiences.

Ruth L. Kirschstein National Research Service Award for Individual Predoctoral Fellowships to Promote Diversity in Health-Related Research (F31)

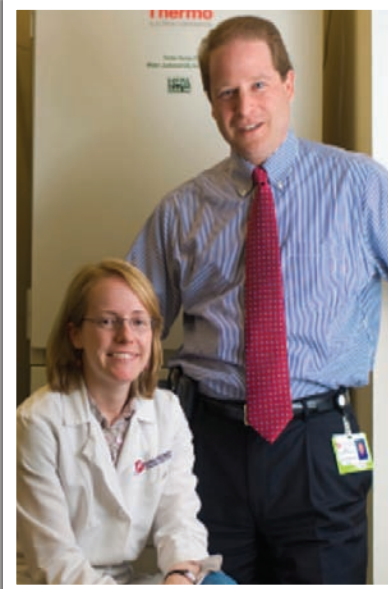
The next step in the CURE training progression is the predoctoral research experience. This is a particularly critical transition period and one in which many underrepresented trainees are lost from the pipeline. In response to this problem, CURE added the existing National Research Service Award (NRSA)(F31) to its mechanisms to support underrepresented students pursuing doctoral degrees or combined doctoral plus professional degrees.

Student trainees at this stage have the commitment and potential to develop into independent and productive cancer researchers. Recipients of this highly competitive, peer-reviewed, F31 award pursue work in a variety of biomedical research areas, including basic cancer biology, tumor immunology, emerging technologies, and drug development, as well as behavioral, clinical, and health services research. Investigators with proven track records of mentoring success, in addition to CRCHD-based program directors, guide these trainees through the research process, technical skill-building courses, networking opportunities, and short- and long-term training and career plans. The guaranteed funding of the predoctoral F31 award ensures that these trainees can count on the resources and time to pursue their research while continuing their academic studies.

Michelle L. Stewart, Ph.D., of the Dana-Farber/Harvard Cancer Center, benefited from an F31 grant. Harnessing her cross-disciplinary training in chemistry, structural biology, and cancer medicine, Stewart discovered a new approach to disabling a key protein in cancer cells that otherwise enables them to resist cancer drugs.

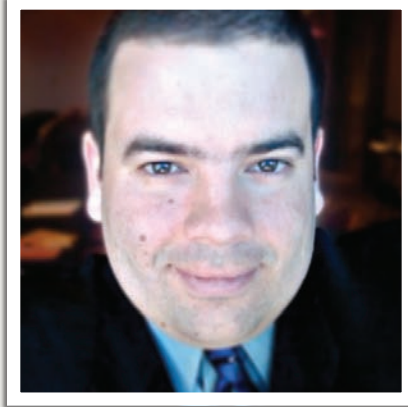
By targeting the protein MCL-1, which helps cancer cells survive, and by using a sophisticated technique known as “peptide stapling,” Stewart figured out how to block MCL-1 activity, thereby allowing cancer drugs to kill tumor cells by apoptosis (programmed cell death).

“Stewart’s research has important implications for combating drug resistance in cancer patients,” said Stewart’s mentor, Loren Walensky, M.D., Ph.D., of the Dana-Farber Cancer Institute. “The discovery could help advance the development of new drugs to



Michelle L. Stewart, Ph.D., and her mentor, Loren Walensky, M.D., Ph.D., at the Dana-Farber Cancer Institute

treat a broad range of cancers in which MCL-1 overexpression has been linked to cancer pathogenesis, including leukemia, lymphoma, multiple myeloma, melanoma, and some forms of poor-prognosis breast cancer.” Stewart’s F31-funded research, published as a cover article in *Nature Chemical Biology*, was also the basis of her Ph.D. dissertation at Harvard University.



Manuel Ruidiaz, Ph.D.

With the assistance of an F31, Ruidiaz's research has the potential to develop therapeutic approaches tailored to each patient's unique cancer.

Manuel Ruidiaz, Ph.D., is another F31 recipient whose research has implications for improving patient care. While working toward his Ph.D. in bioengineering at the University of California, San Diego, Ruidiaz focused on the development of a device to provide rapid point-of-care analysis of the state of antibody drugs in cancer patients’ serum. He used the monoclonal antibody, alemtuzumab (anti-CD52), as a developmental model for assay refinement in patients with chronic lymphocytic leukemia (CLL).

Leveraging research supported by his F31, Ruidiaz has published three peer-reviewed papers on further developing the technology to improve the reliability and sensitivity of this assay. With the assistance of the F31, Ruidiaz has been able to pursue his line of research that has the potential to facilitate targeted drug development efforts and make possible a therapeutic approach tailored to each patient’s unique cancer.

Like Manuel Ruidiaz, Melissa Anderson was initially supported by a diversity supplement and subsequently received an F31 grant to support her research on Rhesus monkey rhadinovirus (RRV). RRV, a gammaherpesvirus, is a close viral relative of Kaposi sarcoma (KS)-associated herpesvirus (KSHV or HHV8) and the causative agent of three human malignancies: Kaposi sarcoma, primary effusion lymphoma, and multicentric Castleman’s disease. Anderson, a first-generation college student and doctoral candidate at the University of Virginia, has generated, in a two-step, sophisticated procedure, unique Rhesus monkey fibroblast (RF) cell lines that express the RRV tegument protein.

As her research has progressed, Anderson has mastered numerous molecular biology techniques, allowing her to become proficient in retroviral/lentiviral constructs. In addition, she was selected for a coveted science teaching position for an undergraduate microbiology course at a local community college. Like Ruidiaz, Anderson is an example of the power of CRCHD’s F31 awards to open doors to productive cancer research careers for talented individuals from diverse and underrepresented populations.

Career Development Awards (K01, K08, K22, and K23)

After earning a doctoral degree, postdoctoral training is often the next step on the career ladder to seeking biomedical research independence. In addition to diversity supplements, CURE offers four Career Development Awards that are differentiated based on the area of cancer research being pursued, background of the candidate, and mentored or nonmentored status. These awards provide funding and three to five years of protected time to support underrepresented individuals in intensive, mentored and nonmentored, cancer-related biomedical, behavioral, or clinical research career development experiences.

Career Development Awards are a critical step in the CURE program; they prepare trainees to apply for and obtain NIH Research Project Grants (R01), the gold standard for research success, and/or equivalent grants from other funding organizations, leading to independent careers as cancer and cancer health disparities investigators.

In FY 2011, 58 career development grant applications were submitted and reviewed. Of the 38 mentored applications (K01, K08, and K23), 13 (34% success rate) were funded, and of the 20 nonmentored applications (K22), six (30% success rate) were funded. In addition, 52 noncompeting Career Development Awards were funded.



Of the 71 mentored and nonmentored career development grants in FY 2011, slightly more than half (54%) were awarded to female grantees.

Broken down by race and ethnicity, grantees were mostly Hispanic/Latino (48%) and African American (45%). Whites and those who identified themselves as more than one race accounted for 3% each. Of the 71 grantees, only one (1%) was Native American. Clearly, a greater focus is needed on promoting biomedical research careers among Native Americans. Encouraging Native American awardees to continue to serve as mentors and role models to other Native Americans is a key part of this promotion.

As the accompanying pie charts in Figures 7 and 8 indicate, slightly more than half (52%) of trainees are engaged in basic research, with the most frequently studied cancer types being lung, breast, colorectal, hematologic, and prostate—cancers with the highest prevalence in racially and ethnically diverse, and underserved populations. In 2011, 104 publications resulted from these research efforts.

FIGURE 7 Career Development Awards by Research Area

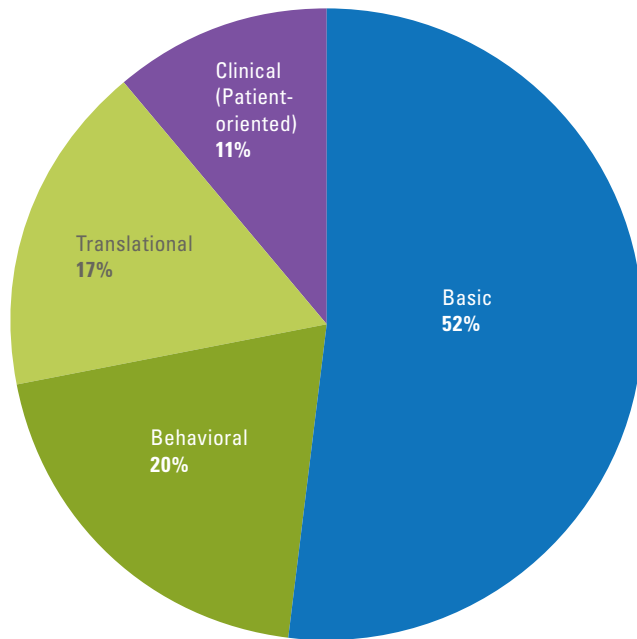
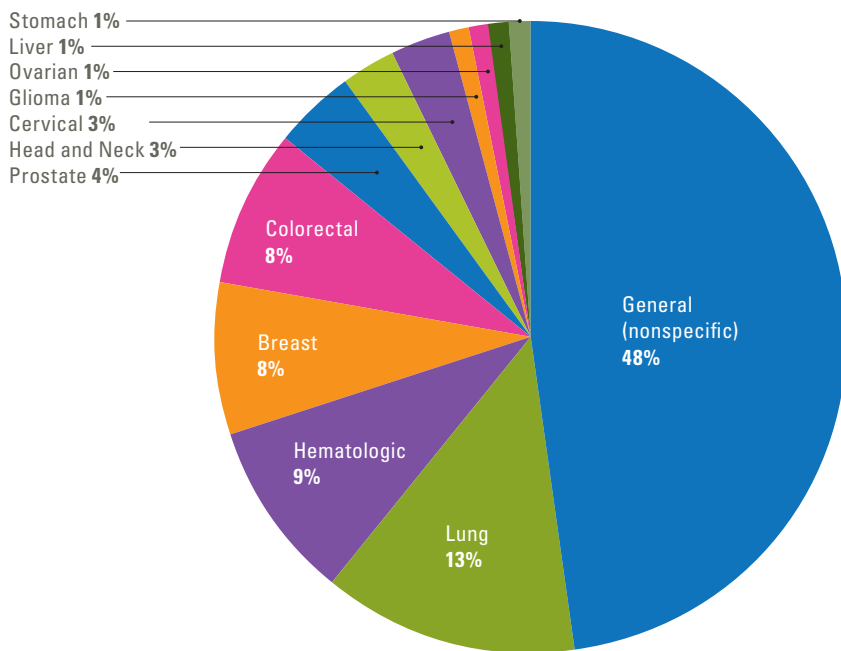


FIGURE 8 Career Development Awards by Cancer Type



Mentored Career Development Awards (K01, K08, K23)

A critical component in the design of the Mentored Career Development Awards and a major contributor to recipients' training is the mentoring received by candidates. The K01, K08, and K23 CURE mentor is both a programmatic resource—helping trainees plan, direct, and execute their research program, and a professional resource—modeling the behaviors, values, and skills necessary for biomedical career success. Mentorship is routinely cited by grantees as among the most valuable features of the K-series training awards. Many CURE trainees who flourish under the encouragement of their mentors go on to become mentors to a new generation of CURE trainees, applying the same methods and offering the same constructive combination of encouragement, guidance, teaching, and networking that their mentors so successfully provided to them.

The original, and one of the most common Career Development Awards received by CURE early-stage investigators with a research or health professional doctoral degree is the K01 Mentored Research Scientist Career Development Award. The K01 offers support for three to five years of protected time that is free from teaching and other institutional requirements often linked to faculty funding. During this period, the early-stage investigator is expected to pursue an intensive basic research career development program, guided by an established mentor. The goal is to prepare these scientists to apply for independent research funding.

Two additional K awards geared toward early-stage physician-scientists complement the K01 award: the Mentored Clinical Scientist Development Award (K08) for health professionals with a clinical degree and the Mentored Patient-Oriented Research Career Development Award (K23) for research-oriented clinicians. As with the K01, the K08 and the K23 awards are specifically designed to promote career development of scientists from diverse backgrounds who have a doctoral degree and are committed to a career in basic biomedical, behavioral, translational, or high-quality, patient-oriented clinical research on cancer or cancer health disparities. These awards provide individuals with an intensive, supervised, research career development experience, including support and protected time, as they progress toward research independence.

Chyke Doubeni, M.D., M.P.H., is clearly a CURE mentored career development success story, having moved through the CURE pipeline from beginning to end. Doubeni's initial diversity supplement documented declines in the use of mammography in breast cancer survivors over time, a trend exacerbated by low socioeconomic indicators. Interested in learning more about



Chyke Doubeni, M.D., M.P.H.

As a CURE awardee, Doubeni was able to focus his research on socioeconomic issues related to colorectal cancer outcomes.

how socioeconomic factors might lead to disparities in access and treatment, he began focusing his research on issues related to colorectal cancer outcomes. Doubeni applied for and received an NCI Mentored Career Development Award in Clinical Science (K08).

With 75% of his time protected for career development and research activities, Doubeni used his K08 to build a knowledge base in gastrointestinal and behavioral sciences. His research identified a potentially modifiable web of system-level factors that contributes to colorectal cancer disparities, including economic circumstances, minority status, accumulated risk, neighborhood location, educational background, type of health insurance, and even the specialty of an individual's primary care doctor. All of these factors contribute to lower screening rates, increased cancer diagnoses, and poorer prognoses for African American populations.

This research laid the foundation for his success in receiving his first independent R01 grant, which investigated the effectiveness of colonoscopy screening in reducing deaths from colorectal cancer in underserved populations. He also was successful in receiving a highly competitive American Recovery and Reinvestment Act (ARRA) Challenge grant to conduct a case-control study comparing the effectiveness of particular colonoscopy screening techniques for different cancer sites.

Today, Doubeni is a fully established cancer researcher, with a laboratory at the University of Massachusetts Medical School in Worcester, MA. Like many other successful CURE alumni whose career trajectories continue to rise, Doubeni maintains his connections with the CURE program and continues to mentor trainees from diverse backgrounds. Doubeni's story and

passage through the CURE pipeline is a testament to the impact consistent support and mentoring can have on talented young scientists from underrepresented populations.



Roberto P. Benzo, M.D.

"NCI's CRCHD K23 award has been the catapult of my academic career."

Roberto P. Benzo, M.D., represents another CURE pipeline success story. A clinically trained professional with a commitment to patient-oriented research, he used a CURE K23 award to successfully transition to independent researcher status with two current R01 grants and an R44 grant from NIH's National Institute of Aging. He is currently working at the Mayo Clinic as an Assistant Professor of Medicine in the College of Medicine, and as a consultant in the Division of Pulmonary and Critical Care Medicine.

Skilled in behavioral intervention science and evidence-based practices targeting diverse populations, Benzo focuses on innovative participatory behavioral intervention research directed at rehabilitation of conditions such as metastatic lung cancer and chronic pain syndrome. He uses disease self-management care models in which patients direct their own care. Another area of research interest for Benzo is the effect of mindfulness meditation on patient quality of life.

DIVERSITY TRAINING SPOTLIGHT

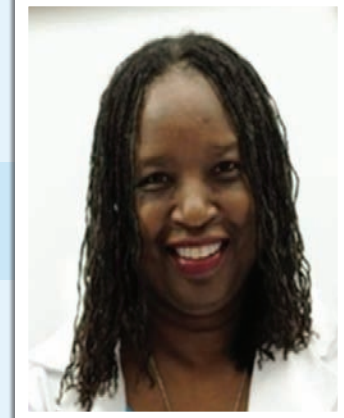
SPOTLIGHT ON MENTORING: Helping to Build a Legacy for Future CURE Grantees



Joellen Schildkraut, Ph.D., M.P.H.



Cathrine Hoyo, Ph.D., M.P.H.



Jennie Williams, Ph.D.

The Mentored Career Development Award is not only about instilling skills and supporting career development for the betterment of current CURE trainees, although this most definitely is its major focus. It is also about building a legacy for future CURE trainees—struggling early-stage investigators whom these current CURE mentors and mentees will one day inspire and draw into the research pipeline, just as they, themselves, became entrenched.

As in the case of one multigenerational trio of women, CURE mentorship sometimes comes in threes. Cathrine Hoyo, Ph.D., M.P.H. (Duke University), is originally from Sierra Leone, where limited financial resources and research infrastructure had prevented her from acquiring background and skills in cutting-edge molecular biology and epidemiology. Hoyo's K01 award provided her with protected time to concentrate on research and training, enabling her to update her knowledge and technical skills. Her K01 research demonstrated both genetic and environmental interactions in the transcription and deployment of tumor suppressor proteins, which helped explain the differing prevalence of certain esophageal and prostate cancers in African American and white populations despite similar rates of exposure to such risk factors as obesity and cigarette use.

Hoyo tapped into the genetic and epigenetic background of her mentoring team both from Duke University and the University of North Carolina at Chapel Hill to guide her research. The relationship with Joellen Schildkraut, Ph.D. (Duke University), and the rest of her mentoring team helped her explore her research questions from diverse disciplinary angles and use an array of techniques, data sets, and laboratory equipment to construct a more comprehensive, nuanced picture of adenocarcinomas.

DIVERSITY TRAINING SPOTLIGHT

Schildkraut is a long-time NCI grantee whose research focuses on genetic risk factors in women with ovarian cancer living in North Carolina. Her research seeks to understand the biological factors that elevate cancer risk among specific populations. With her strength in genetic epidemiology and mentorship, she had much to offer the young postdoctoral student.

"Mentoring is creating opportunities for a promising trainee."

- Joellen Schildkraut, Ph.D., M.P.H.

"I learned tremendously from a group of people with diverse experiences."

- Cathrine Hoyo, Ph.D., M.P.H.

Hoyo credits her mentoring team's ability to clarify the short- and long-term milestones she encountered along the way, and Schildkraut's "knowing when to regroup and redirect efforts," for teaching her important lessons about flexibility and adaptation in academic research.

From Schildkraut's perspective, her job as a mentor is tailoring a training program to meet her mentee's needs. In Hoyo's case, this meant connecting her with coursework in molecular epidemiology, and skills training in writing and grantsmanship. She cautions that mentorship also involves knowing where to draw the line between offering advice and allowing space for a trainee to pursue research and career goals with increasing independence. The mentorship process proved successful in catapulting Hoyo's career: she was awarded an R21 Exploratory Grant in 2006 and, in rapid succession, three R01 Independent Research Grants in 2008, 2009, and 2010.

Hoyo, herself, has begun applying the lessons she learned from her mentorship with Schildkraut to her own mentee and K01 recipient, Jennie Williams, Ph.D. (Stony Brook University).

Just as Hoyo expanded upon the research of her mentor, combining Schildkraut's interest in genetic risk factors with environmental contributions to cancer in underserved populations, Williams is building upon Hoyo's research. She is focusing on developing chemotherapy regimens, which are tailored to individuals' genetic backgrounds, and that can affect the molecular pathways instigated by genetic and epigenetic factors. In 2010, Williams was granted her first R01 to investigate how chemotherapy affects colon cancer tumorigenic proteins in African Americans and whites.

Williams is developing chemotherapy regimens tailored to an individual's genetic background.

Now, with the same CURE commitment to pay it forward and strengthen the pipeline, Williams has begun taking on mentees herself—a local community college student, a chemistry undergraduate, and a group of Malverne High School AP Biology students.

Nonmentored Career Transition Award (K22)

While the early K-series grants highlight mentored research experiences, an important transition step is learning to move out from under a mentor's tutelage and begin autonomous research. To this end, CURE offers the NCI Nonmentored Career Transition Award (K22) to facilitate young researchers' transition from the mentored stage of their careers to early-stage investigator positions or the equivalent. CURE aims to recruit and retain advanced postdoctoral and new investigators from its target demographic who are beginning research programs in their own independent labs. Previous CURE grantees, particularly recipients of mentored K awards, are highly encouraged to apply, thereby extending CURE's pipeline of support.

Nora Engel, Ph.D., fits the Career Transition Award criteria perfectly. After receiving her Ph.D. in molecular biology from the University of Buenos Aires, she pursued a Postdoctoral



Nora Engel, Ph.D.

As a CURE grantee, Engel is exploring the molecular mechanisms that regulate genomic imprinting.

Fellowship at the University of Pennsylvania. In 2009, when Engel applied for K22 funding, she was an Assistant Professor in Biochemistry and Molecular Biology at the Fels Institute for Cancer Research, Temple University, PA, and an early-stage investigator just starting up her own lab. The K22 award enabled Engel to establish herself as an independent investigator in the emerging field of cancer epigenetics.

Studying mice in her lab, and focusing on the KCNQ1 and CDKN1C domains, Engel is exploring the molecular mechanisms that regulate genomic imprinting by using gene targeting and transgenic technologies to generate mutations designed to disrupt imprinting. Her study of epigenetic mechanisms has the potential to open avenues of research that will improve our understanding of how the genome functions as a developmental blueprint and how disturbances of gene expression and imprinting patterns can lead to genetic diseases and cancer.

Nora Engel exemplifies the significance of the support afforded by this transition award. In 2011, two years after her K22 award, she was able to secure an independent research R01 grant to continue her important line of study. Among K22 recipients, 24% have competed successfully for R01 grants.



Robert Winn, M.D.

Winn has competed successfully for several major NIH-funded research grants, including an R21 project and an R01 grant.

Another K22 success story, Robert Winn, M.D. (University of Colorado), received a Career Transition Award to study the role of WNT7A and Frizzled 9 (FZD9), an elaborate network of proteins, in non-small-cell lung cancer (NSCLC). Specifically, he evaluated the effects of this signaling pathway on mechanisms of tumor initiation and metastasis associated with lung epithelial cells. Winn's research demonstrated that WNT7A is frequently lost in NSCLC and that the reestablishment of WNT7A and FZD9 in lung cancer contributes significantly to the reversal of transformed cell growth seen in NSCLC. He went further to define the mechanism by which WNT7A and FZD9 are able to inhibit transformed cell growth by ERK5-dependent activation of the known tumor suppressor gene PPAR.

In addition, Winn and his coworkers reported an association between the prostacyclin pathway and WNT. This work is particularly interesting given the recent finding that activation of the prostacyclin pathway has a positive effect on the prevention of early lung cancer in smokers. Winn and colleagues also published findings from a study showing that the effect of prostacyclin is

independent of its receptor, but is dependent on the presence of FZD9. This finding suggests the possibility of future small-molecule targeted therapy for NSCLC.

Winn, working with his team of multidisciplinary investigators, has competed successfully for several major NIH-funded research grants over the course of his career. This includes an NIH-funded R21 project and an R01 grant to further study the role of the WNT pathway in lung cancer. In addition, Winn continues to see and treat patients, and is active in numerous community-based activities aimed at attracting young people into research careers.

Mechanisms like the K22 are increasingly important for developing and sustaining investigator independence throughout the CURE pipeline. The support offered at the K22 phase, including secure funds, protected time to allow for additional coursework and experience, and networking across institutions and disciplines, is essential to CURE's harvesting and promoting of talent from underrepresented populations.

Exploratory Grant Award to Promote Workforce Diversity in Basic Cancer Research (R21)

The R21 Exploratory Grant, the most recent expansion of CURE's training opportunities, is intended for investigators from diverse populations with interest in research projects focused on the basic biology of cancer. The purpose of the grant is to close the gap that currently exists between new investigators and R01-funded investigators and ensure that those who have entered the research pipeline remain in the pipeline. The R21 funding mechanism also provides a bridge to investigators who have completed their training and require extra time to develop full R01 proposals.

Tonya Webb, Ph.D., (University of Maryland School of Medicine) is a former CRCHD K01 trainee who successfully competed for two R21 grants in August 2011. Her research under the K01 Mentored Career Development Award examined mechanisms to enhance immunity in cancer patients. Webb's studies focused on expanding natural killer T (NKT) cells from healthy donors and cancer patients, and investigating their efficacy in an in vivo human melanoma/severe combined immunodeficiency (SCID) mouse model.

"The K01 award has been instrumental in my retention in the biomedical research workforce and has greatly enhanced my career development," said Webb. "I was offered a tenure-track faculty position at the University of Maryland School of Medicine, due to my successful K01 application."

Building upon the K01, which helped her establish herself in the cancer immunology field, Webb transitioned to R21 Development Grants to gain additional support. One of Webb's R21-funded projects is examining whether restoring NKT cell function may be a novel immunotherapeutic strategy for breast cancer. Her research characterizes immunosuppressive lipids shed by mammary carcinomas, which abrogate CD1D-mediated NKT cell activation, and determines whether inhibiting these lipids can restore NKT cell function.

Webb's other R21-funded work also explores NKT cell activity and examines how altered cellular bioenergetics influence NKT cell-mediated responses to lymphoma. Webb is hoping that the additional data these two studies are providing will strengthen her chances of being awarded an R01 grant and bring her goal of research independence within much closer reach.



Tonya Webb, Ph.D.

"The K01 award has been instrumental in my retention in the biomedical research workforce and has greatly enhanced my career development."



Partnerships to Advance Cancer Health Equity

Partnerships to Advance Cancer Health Equity (PACHE) programs are located throughout the United States and increase opportunities for students and professionals from underrepresented populations to pursue careers in cancer and cancer health disparities research. PACHEs represent the collaboration of two bodies: an institution that works primarily with racially/ethnically diverse and/or underserved communities, and an NCI-designated Cancer Center. These collaborations allow each partner to more effectively train diverse scientists and bring new cancer discoveries to traditionally neglected communities.

As part of its training component, each partnership program invests in students at different academic levels, some offering training opportunities geared toward high school- and undergraduate-level students, and others aimed at master's-, doctoral-, and postdoctoral-level students. While some partnerships have chosen to target specific professions and groups, such as nurses and population scientists, others focus on specialty curricula and experiential program enhancements, such as bioethics and hands-on laboratory experience. Each partnership enhances workforce diversity in ways best suited to the needs of its local population.



PACHE PROJECT TITLE: Providing Summer Research Experiences for Students and Science Educators
PARTNERSHIP: Bowie State University (BSU) and University of Maryland School of Medicine (UMSOM)
GRANT TYPE: P20
TRAINEES: High School Students
POPULATION: African American

In Maryland, the **BSU–UMSOM Partnership’s** summer research program is encouraging high school students to consider careers in the biomedical and behavioral sciences. Using the successful undergraduate internship program as a model, the BSU-UMSOM partnership developed an eight-week, mentored, summer research experience for African American high school students from urban Baltimore.

The program offers participants hands-on laboratory experience, contact with research and clinical role models, and seminars on topics such as research safety and ethics. The goal is to offer promising young scientists a realistic understanding of the biomedical research environment, while fostering their self-confidence and belief that scientific careers are attainable.

PACHE PROJECT TITLE: High School Program in Medical Physics

PARTNERSHIP: University of Texas El Paso (UTEP) and University of Texas Health Science Center at San Antonio (UTHSCSA)

GRANT TYPE: P20

TRAINEES: High School Students

POPULATION: Hispanic

UTEP–UTHSCSA is another partnership that is encouraging high school students to pursue cancer research careers. UTEP-UTHSCSA offers an outreach program designed to attract Hispanic high school students in El Paso, TX, to careers in medical physics and radiation oncology, with the larger goal of promoting diversity in the cancer research workforce, particularly among radiation oncologists.



Through a novel “learning laboratories” approach, students learn the essentials of X-ray generation, detection, and use. The high school program is a key component of the partnership’s larger effort to carve an educational path that guides El Paso students through a master’s degree in medical physics at UTEP and a doctoral degree in medical physics in the radiation oncology department at UTHSCSA.

PACHE PROJECT TITLE: Undergraduate Student Training in Cancer Research

PARTNERSHIP: New Mexico State University at Las Cruces (NMSU) and Fred Hutchinson Cancer Research Center (FHCRC)

GRANT TYPE: U54

TRAINEES: Undergraduate and postbaccalaureate students, and postdoctoral fellows

POPULATION: Hispanic and Native American

Focusing on the undergraduate/postbaccalaureate steps of the educational pathway, the **NMSU–FHCRC Partnership** offers Hispanic and Native American NMSU students either a nine-week summer internship (for those enrolled in undergraduate coursework) or a one-year internship (for those who completed their bachelor’s degrees) in cancer research.

Both internships include mentorship by FHCRC faculty and postdoctoral fellows—an important learning experience for the fellows, as well; educational and research experiences in basic and clinical sciences, human biology, public health, or infectious disease; and the opportunity to present at a national conference. To date, six undergraduate and two postbaccalaureate students completed the program, with both postbaccalaureate students currently pursuing graduate training.



PACHE **PROJECT TITLE:** Master's Degree Program in Cancer Biology, Prevention, and Control

PARTNERSHIP: University of the District of Columbia (UDC) and Georgetown Lombardi Comprehensive Cancer Center (LCCC)

GRANT TYPE: U56

TRAINEES: Master's students

POPULATION: African American

The master's training period offers another opportunity to bring underrepresented students into cancer research. The **UDC–LCCC Partnership** targets Washington, DC-area master's students, offering curriculum enhancements, such as workshops in technology and community outreach, lectures by distinguished experts, and mentorship opportunities to improve student

retention and academic performance. The partnership also offers a six-week, paid, summer research intensive at LCCC.

The program has successfully trained as many as 15 students per year and proposed a new Ph.D. program in cancer education at Georgetown University in 2010, with curriculum development supported by two R25 Cancer Education Grants—one from the National Institute of General Medical Sciences (NIGMS) and one from NCI.

PACHE **PROJECT TITLE:** Certificate and Postdoctoral Training in Cancer Research

PARTNERSHIP: San Diego State University (SDSU) and Moores Comprehensive Cancer Center, University of California San Diego (UCSD)

GRANT TYPE: U54

TRAINEES: Graduate and postdoctoral students

POPULATION: African American, Hispanic, and Asian

Aimed at graduate and postgraduate students, the **SDSU–UCSD Partnership** offers African American, Hispanic, and Asian sociobehavioral and population scientists the opportunity to study for a certificate or receive postdoctoral training in cancer research. The three-course advanced certificate program is available to graduate students in health and behavioral

sciences programs, as well as other interested graduate and postdoctoral students. The postdoctoral training opportunity places fellows in labs with highly productive mentors for two years of mentored research experience.

Beginning with only three participants in 2009, the program has grown to a total of 32 trainees. The partners continue to refine and expand the program, developing still more supportive ways to promote cancer research to underrepresented investigators.

PACHE **PROJECT TITLE:** Training the Next Generation of Hispanic Cancer Researchers

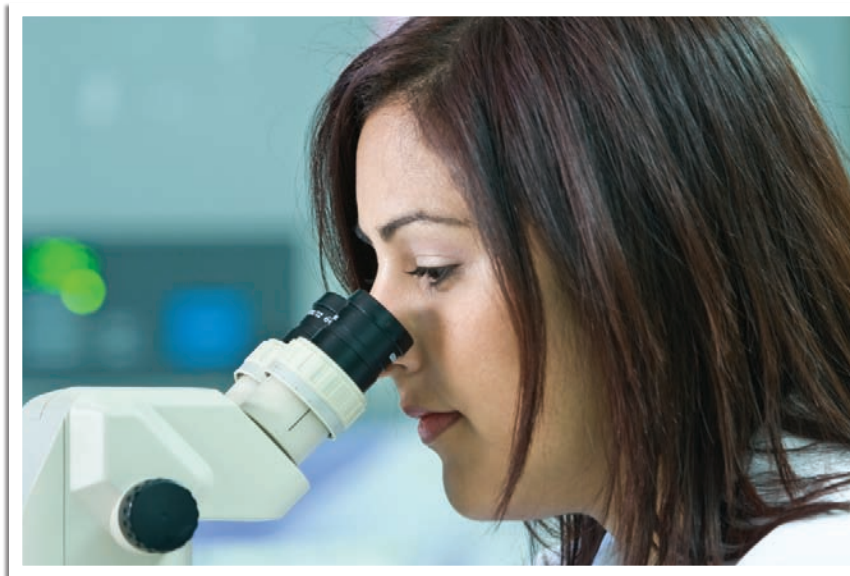
PARTNERSHIP: University of Puerto Rico Comprehensive Cancer Center (UPRCCC) and University of Texas MD Anderson Cancer Center (MDACC)

GRANT TYPE: U54

TRAINEES: Undergraduates through professionals

POPULATION: Hispanic

In a different approach, the **UPRCCC–MDACC Partnership for Excellence in Cancer Research** aims to attract Hispanic scientists at any academic level to cancer research. The partners offer mentored cancer research assistantships, as well as a week-long cancer biology course for undergraduate and graduate trainees. STEP-UP, a summer internship program, is aimed at postbaccalaureate Ph.D. or M.D./Ph.D. candidates and focuses on developing their biomedical science background. Another summer program—this one for undergraduate and medical trainees—provides mentored basic, clinical, or translational research experiences. In addition, an M.D./Ph.D. dual-degree program is offered for those pursuing population sciences and translational research.



In addition to increasing the Hispanic cancer research workforce, this partnership catalyzed the passage of a law funding increased infrastructure and recruitment of top-quality faculty to UPRCCC—one step toward helping it regain its distinction as an NCI-designated Cancer Center.

PACHE PROJECT TITLE: Continuum of Undergraduate Research Training (COURT)

PARTNERSHIP: City College of New York (CCNY) and Memorial Sloan Kettering Cancer Center (MSKCC)

GRANT TYPE: U54

TRAINEES: High school through postdoctoral students

POPULATION: African American

CCNY–MSKCC is another partnership that trains students at several educational levels. The COURT program is designed to promote cancer-related research careers to undergraduates from underrepresented populations. Expanded in 2009 to reach more than 300 students, COURT has simultaneously broadened its curriculum to include translational research and, through an ARRA supplement, nanotechnology research, in collaboration with ET CURE. The eight-week Summer Clinical Oncology Research Experience (SCORE) is a new offering that employs female clinicians to mentor undergraduate and postbaccalaureate female students. By offering a range of training options, CCNY-MSKCC is helping to attract and train a diverse cancer research workforce.



PACHE PROJECT TITLE: Nursing Research Training and Outreach Doctoral Program

PARTNERSHIP: San Francisco State University (SFSU) and UCSF Helen Diller Family Comprehensive Cancer Center (UCSF/HDFCCC)

GRANT TYPE: U56

TRAINEES: Master's nursing students

POPULATION: African American, Latino, Filipino, and Asian

Unique among the partnership programs, the **SFSU–UCSF/HDFCCC Partnership** is training allied health professionals—specifically, master's-level African American, Latino, Filipino, and other Asian nursing students—to pursue doctoral degrees focusing on cancer and cancer health disparities. The program, originally a pilot, achieved permanence, successfully winning \$1.6 million in funding from the California Wellness Foundation, the California legislature, and SFSU. It has enrolled 23 students, with three graduates planning to pursue their Ph.D. degrees.

In addition to these programmatic successes, UCSF/HDFCCC also has been able to develop closer ties with its surrounding communities, resulting in increased enrollment of underrepresented groups in cancer prevention trials. These burgeoning community linkages demonstrate one of the underlying principles of diversity training—that researchers from underrepresented populations are better able than majority population researchers to liaise with their underserved communities.

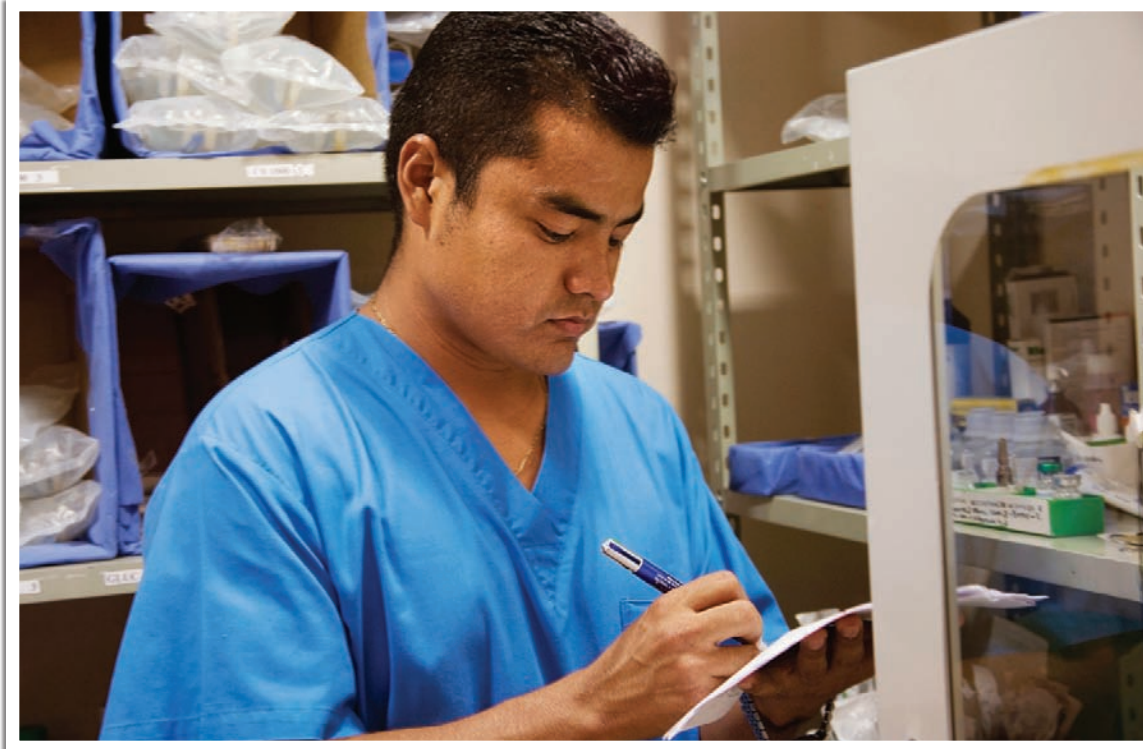
PACHE PROJECT TITLE: Health Disparities, Bioethics, and Policy Course

PARTNERSHIP: Morehouse School of Medicine (MSM),
Tuskegee University (TU), and University of Alabama at Birmingham
Comprehensive Cancer Center (UABCCC)

GRANT TYPE: U54

TRAINEES: Undergraduate and graduate students in science
and health-related studies

Some PACHes, such as the **MSM-TU-UABCCC Partnership**, are focusing on specific areas of cancer research. At MSM-TU-UABCCC, the partners have devised a curriculum geared toward both graduate and undergraduate students that links the principles of ethical research, genetics, race/ethnicity, health disparities, institutional review, policy, and strategies to deal with potentially unethical events. Situated in a region with a large, historically underserved, African American population, this education program addresses a large range of ethical considerations that can arise between institutions serving majority and nonmajority populations, and between institutions and underserved communities.



Community Networks Program Centers



CRCHD's Community Networks Program (CNP), now the Community Networks Program Centers (CNPC), has been working to improve access to and use of beneficial cancer interventions in communities experiencing disparities through community-based participatory research (CBPR), education, and training. One of the key ways the program has been building capacity is through the development of strategic partnerships and collaborations that can enhance training efforts. All CNPCs also commit to mentoring new and early-stage investigators, providing individualized modeling, support, and encouragement to these young researchers. To date, 160 investigators have been trained in the use of CBPR techniques for community-based interventions.

CNP/C PROJECT TITLE: Increasing the Number of Latino Scientists Involved in Cancer Health Disparities
PRINCIPAL INVESTIGATOR: Amelie Ramirez, Dr.P.H., M.P.H.
CANCER TYPE: Breast, cervical, lung, colorectal, prostate, liver, and stomach
POPULATION: Hispanics/Latinos
LOCATION: Texas, California, New York, Florida

Both partnerships and mentoring were key components of **CNP-Texas's** research that focused on improving training at key decision points in the academic career process for underrepresented researchers. By partnering with both major academic institutions, and public and professional organizations across the country, CNP-Texas has recruited master's- and early doctoral-level trainees to join their research program, and monitored and nurtured their progress.

Through these efforts, CNP-Texas provided training and mentorship to 81 individuals during its first four years, focusing particularly on Hispanic/Latino populations. In addition, the Texas researchers supported five master's-level students to attend the Summer Institute at the University of California, San Francisco, which aims to increase the numbers of diverse applicants to doctoral programs in cancer research. Notably, the Texas team identified a critical point at which many diverse, early-stage investigators lose confidence and/or drop out of research careers—the transition from the master's to the doctoral level. It is this type of evidence-based change, based on CNP research, which can help strengthen the training pipeline at its weak points.

CNP/C PROJECT TITLE: ATECAR-Training & Mentorship

PRINCIPAL INVESTIGATOR: Grace X. Ma, Ph.D.

CANCER TYPE: Colorectal, breast, cervical, lung, prostate, and liver

POPULATION: Asian Americans

LOCATION: Pennsylvania; New Jersey; New York City; New Jersey; Delaware; Washington, DC; Maryland

CNP-Mid-Atlantic is another example of shining success with mentorship. Over a three-year span, senior researchers mentored more than 60 early-stage investigators and supported their mentees in developing 14 pilot studies related to the CNP's activities, as well as several additional independent studies. These research projects, supported by various sources, including NCI, leveraged almost \$10 million in funds.

The clear success of these emerging researchers in project development can be traced back to their beneficial mentor/mentee interactions, which built confidence, developed skills, and ultimately, inculcated successful practices among the trainees. Mentorships, such as these, help build a critical mass of scientists focused on health disparities research.

CNP/C PROJECT TITLE: SCCDCN Recruiting and Training Students

PRINCIPAL INVESTIGATOR: James Hebert, Sc.D., M.S.P.H.

CANCER TYPE: Breast, cervical, colorectal, esophageal, lung, oral, and prostate

POPULATION: African Americans

LOCATION: South Carolina

In another approach, **CNP-South Carolina** used its training component to develop a seminar series for emerging researchers. As part of the series, these trainees, most of whom were African American, learned to write proposals and grant applications, use different research methodologies, and, through hands-on field-training sessions, apply CBPR strategies. In addition, the emerging researchers were given opportunities to network with leading cancer disparities researchers from across the state, and to collaborate with each other on manuscripts and presentations. The South Carolina research team invested in its students, promoting their success by improving their ability to access the intellectual, experiential, and human resources necessary for a successful career in cancer disparities research.



An integrated
network strategy
that links
disparate research
disciplines,
infrastructures,
and resources

INTEGRATED RESEARCH, TRAINING, AND OUTREACH

LINKING RESEARCH, TRAINING, AND OUTREACH



The field of cancer health disparities is complex and is affected by a multitude of biological and nonbiological factors. Despite the National Cancer Institute's (NCI's) continued focus on understanding and addressing cancer health disparities, substantial differences in the burden of cancer still exist within certain populations. This persistent gap suggests that a new approach may be needed to better understand and reduce cancer health disparities.

To this end, the Center to Reduce Cancer Health Disparities has been developing, with initial support from American Recovery and Reinvestment Act (ARRA) funds, an unprecedented, integrated network infrastructure that fosters linkages, leverages resources, and ultimately, enhances cancer health disparities research, diversity training, and community outreach and education. This Integrated Networks Program (INP) is a conscious paradigm shift from a silo- to a partner-based approach for the study of cancer health disparities, using multidisciplinary and transorganizational team science. INP does not dictate how these collaborations are to proceed; rather, it facilitates the development and maintenance of networks to serve as the infrastructure for such collaborative opportunities to grow.

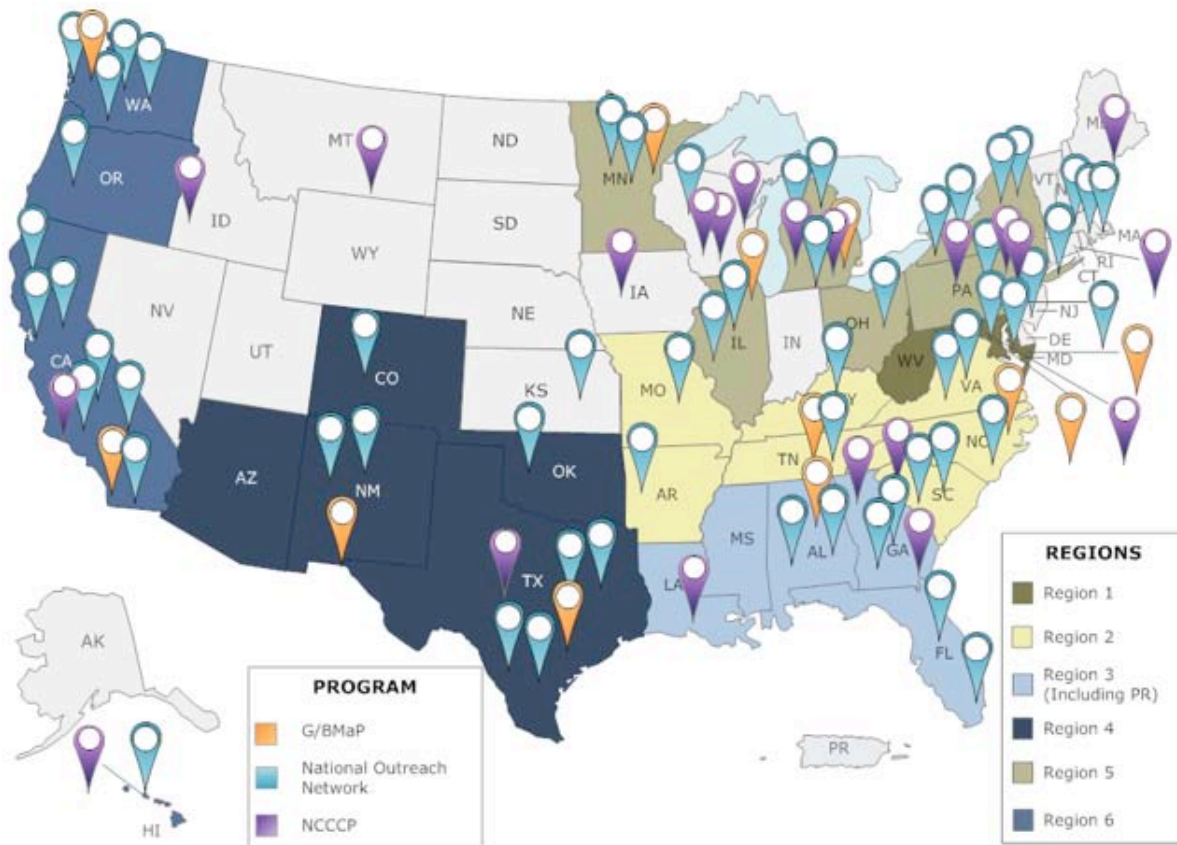
A network strategy offers multiple benefits, such as leveraging the strengths of people, programs, and resources to more effectively engage communities, and increase access to clinical trials participants and tissue collection from diverse populations. It also offers improved tracking and support of patients who move between jurisdictions for treatment and screening, as well as enhanced outreach and training opportunities, with seamless transitioning of students and trainees through advanced education in cancer and cancer health disparities. The latter, in turn, helps grow the talent pool of investigators and community outreach workers from underrepresented populations who are skilled in cancer health disparities research.

Geographical Management of Cancer Health Disparities Program including Biospecimen Science

The Geographical Management of Cancer Health Disparities Program including Biospecimen Science (G/BMaP), initiated in 2008, was the first of two programs established within INP. The program's aim is to reduce cancer health disparities using a comprehensive, regionally based network approach to support and efficiently manage multidisciplinary and team-based disparities research, diversity training, and outreach and educational efforts.

G/BMaP divides the United States and its territories into six regional, disparities-focused networks, many of which include NCI-designated Cancer Centers, in addition to other institutions currently receiving CRCHD support. By bringing together regional experts and resources, and fostering inter- and intra-disciplinary collaborations, G/BMaP is creating networks that bridge, support, and manage CRCHD's cancer health

FIGURE 9 The G/BMaP Network



disparities research and diversity training flagship programs across six regions (Figure 9). The programs participating include the Partnerships to Advance Cancer Health Equity (PACHE) (formerly the Minority Institution/Cancer Center Partnership [MI/CCP]), Continuing Umbrella of Research Experiences (CURE), Community Networks Program Centers (formerly Community Networks Programs [CNP]), and the Patient Navigation Research Program (PNRP).

To ensure that these networks have the greatest impact on cancer health disparities research and resource capacity, each regional G/ BMaP hub focuses its work on key elective or specialty areas. Each of these electives—biospecimen science, bioinformatics, clinical trials recruitment and retention, and emerging technologies—represents a new horizon in cancer disparities research. The hope is that by linking disparate research infrastructures and resources, and applying these four electives, synergies will evolve that will increase efficacy, decrease redundancies, and speed progress toward the reduction of cancer health disparities.



The partnering institutions across all six regions are actively involved in recruiting patients for clinical trials.

All six regions have focused on building infrastructure, capacity, and resources to support regional biospecimen collection, enhanced access to biobanks, and culturally sensitive biospecimen research. Within Region 3, two-thirds of its partnering institutions are fully prepared with standard operating procedures for collecting, processing, and storing specimens, and conducting biospecimen outreach and education activities. This region also produced a seminal article on the topic of using qualitative research to ascertain knowledge, beliefs, and attitudes about biospecimen research among diverse communities.

The clinical trials-focused elective aims to improve recruitment and retention of diverse populations in cancer research and clinical trials. Additionally, education and outreach efforts are underway to address the barriers that have contributed to the disproportionate number of clinical trial participants from underserved populations. Partnering institutions across all six regions are actively involved in recruiting patients for clinical trials, with region 5 reporting particularly strong capacity (11 institutions with 1,349 open trials). Region 4 forged a partnership between New Mexico State University at Las Cruces and the University of Texas Health Science Center at San Antonio to collaborate on a project designed to assist Hispanics in making informed decisions about participation in clinical trials. The Clinical Trials Education and Outreach for Latinos project involves a two-stage intervention to test bilingual



The G/BMaP network is made up of 75 partnering institutions, including 16 NCI-designated Cancer Centers.

clinical trial education and outreach modules, and a training program for community health workers to facilitate recruitment and retention of participants in clinical trials.

Five of the six G/BMaP regions have at least some bioinformatics capacity. Region 1, which covers the District of Columbia, Maryland, Virginia, and West Virginia, has made particularly substantial progress; all nine partnering institutions within the region have bioinformatics support or access to biomedical

informatics. Region 1 also has shown great promise in the area of emerging technologies. One of the key research advances emanating from partnering institutions in the region is the use of microarray/chip technology in genome analysis.

All regions are engaged in community-based participatory research (CBPR), resource sharing, and communication and outreach with their partners and communities. Region 6, focusing its efforts on colorectal cancer, conducted a large needs assessment of Comprehensive Cancer Control (CCC) Programs to gather information regarding the work they are doing around colorectal cancer and their willingness to partner on G/BMaP-related implementation activities. A key finding of the assessment was that the major activity of CCC Programs is community outreach and education, and that there is willingness to share their outreach resources with G/BMaP. Region 2 is using a CBPR approach to deal with its obesity disparity. All six states in the region have a higher prevalence of obesity and overweight, which are known to be gateway conditions for chronic diseases, including cancer. Not surprisingly, the region is overwhelmed by cancer and other chronic disease disparities compared with the rest of the United States. Given the important health implications of obesity, Region 2 is testing the feasibility of using a team science approach to develop a faith-based obesity intervention for racially and ethnically diverse, and underserved populations. In addition, all regions are leading efforts in training students and junior investigators from underrepresented populations who will be part of the next generation of competitive investigators in cancer and cancer health disparities research.

The G/BMaP Network now includes 75 partnering institutions, including 16 NCI-designated Cancer Centers. To date, NCI has invested \$4.9 million (\$2.8 million in ARRA funds in FYs 2009 - 2010) in G/BMaP. Twelve pilot programs supported by these funds already showed preliminary evidence of successful regional capacity building in cancer health disparities research, training, and outreach. Eleven joint GMaP and 11 joint BMaP research proposals are in progress, and one bioethics supplement was awarded. In addition, two joint

GMaP and three joint BMaP research papers are in progress. In an effort to engage a wider network of disparities researchers, 17 GMaP and 25 BMaP presentations were made at major national conferences, as well as at individual meetings with approximately 300 disparities researchers and practitioners.

CRCHD organized its first annual Geographical Management of Cancer Health Disparities (GMaP) Program Summit at the end of FY 2010 with the goal of exploring and generating new concepts and approaches to serve as the foundation of the GMaP network's team science, transdisciplinary approach to cancer health disparities research and training for FY 2011 and beyond. Discussion topics included network science, emerging technologies, clinical trials, bioinformatics, biospecimens, communication and dissemination, and training, and attracted more than 100 researchers from 67 institutions across the country. The ideas generated from the meetings helped shape GMaP's continued growth and development.

With infrastructure in place to support regionally based hubs and implementation plans based on comprehensive needs assessments already submitted, the regions have shown their clear support for the integrated network paradigm. All of this points to the strong potential of G/BMaP to make important strides toward reducing cancer health disparities in the United States.

National Outreach Network

The National Outreach Network (NON) is the second of two programs within INP and differs somewhat in approach from G/BMaP. Whereas G/BMaP concentrates primarily on improving horizontal connections across the research and training communities at the regional level, NON focuses on building a network that is structured at the local level, connecting at-risk and underserved individuals to community outreach groups and research institutions. NON's cohesive network infrastructure promotes community participation and a greater voice for underserved populations in the research and cancer care decision-making process. This process of collaboration helps ensure that research and resources are culturally tailored to the needs and expectations of the target community, and that research advances reach racially and ethnically diverse, and underserved communities in a timely manner.

Perhaps the most critical link in the NON network is the cadre of community health educators (CHEs) who network between the community, the NCI-funded cancer health disparities research institution, and NCI. CHEs essentially wear two hats—they are developers of tailored community outreach and education programs, as well as members of institutional research teams dedicated to reducing local cancer health disparities. CHEs are strategically positioned



CHEs are strategically positioned between the community and academic research worlds.

between the community and academic research worlds—bidirectional conduits who bring the community voice to the research team and NCI, and vice versa. They identify community needs, provide the information to researchers, and disseminate research findings and health promotional materials. A key part of their communication and dissemination activities involves tailoring materials and messages according to the community's culture and literacy levels, and delivering them through culturally appropriate media. CHEs also engage in coalition-building efforts

with community-, civic-, and faith-based organizations to share and extend resources and outreach around cancer information, scientific advances, prevention, clinical trials participation, and biospecimen collection.

NON has seen increasing growth in its CHE corps in the two years since its inception. There were 17 CHEs originally funded, attached primarily to sites already supported by current CRCHD community-based research grants. By the end of 2011, the corps had grown to 50 CRCHD-supported CHEs operating at community and research sites. Of these, 23 are supported by CRCHD's Community Networks Program Centers (CNPCs). To date, CHEs have conducted more than 700 community education and outreach efforts in cancer prevention, diagnosis, and treatment among at-risk populations.



The goal of a CHE's communication and dissemination activities is to tailor materials to the community through culturally appropriate media.

Some CHEs have expanded the content of their awareness and education efforts to include information on biospecimen research and collection (more than 24 CHEs), clinical trials participation (21 CHEs), and smoking cessation (seven CHEs). CHEs are focusing their efforts on a variety of cancers, including breast (28 CHEs), colorectal (28 CHEs), cervical (17 CHEs), prostate (15 CHEs), lung (13 CHEs), colon (two CHEs), and general (17 CHEs). Their work is directed toward racially and ethnically diverse, and underserved groups, including African American (32 CHEs), Hispanic/Latino (22 CHEs), American Indian and Alaska Native (19 CHEs), white (15 CHEs), Native Hawaiian and other Pacific Islander (six CHEs), lower socioeconomic status (11 CHEs), and rural (three CHEs) populations.

NON's CHEs are an integral component of CNPCs, serving as resident experts on communities and messengers of communities' perceptions of proposed interventions. This kind of seamless integration of the community perspective into the research environment is exactly what NON aims to facilitate. The program's long-range goal is to develop a comprehensive and collaborative forum of voices that can reach a critical mass of researchers, stakeholders, and diverse community members. Such cross-cutting collaboration is at the heart of INP's strategy—and at the heart of CRCHD's vision to further integrate its three pillars of research, training, and outreach to underserved populations. Building upon this infrastructure, NON is now well-poised in 2012 to strengthen this paradigm of interconnectivity.

INTEGRATED RESEARCH, TRAINING AND OUTREACH SPOTLIGHT

Creating Positive Change with Digital Storytelling

Laura Revels is a CHE at Native People for Cancer Control (NPCC), a Regional Native American CNP housed at the University of Washington's Center for Clinical and

Epidemiological Research. NPCC works with American Indian and Alaska Native communities in Washington, Alaska, Oregon, Idaho, Montana, Wyoming, and North and South Dakota. Revels, exploring innovative ways to tailor outreach and cancer prevention education to tribal communities, pairs traditional storytelling with new media, and using the blend of the two—digital storytelling—to create powerful visual narratives about cancer.



Laura Revels

Storytelling workshop participants, who include community members, leaders, and health workers, create their own digital videos focusing on major cancer-related turning points in their lives, using recorded voice, music, and images. Over the past four years, Revels has led 45 such workshops, each encompassing six to 12 attendees, across villages and reservations.

Revels understands that she can't just walk into a community, be immediately accepted, and start giving workshops. Her first task is penetrating the wall of mistrust Native communities often have towards researchers, whom they perceive as "empty baskets that come into our community, take things, and leave nothing behind." Revels tries to reverse that perception by leaving behind tools for the community's use.

She openly shares information about her own personal experience of cancer to help open the door to an educational dialogue on cancer, a taboo subject in these communities. Breaking down the initial barriers helps Revels earn community members' trust and acceptance, and paves the way for her to introduce digital media to the community, empowering individuals to continue cancer dialogue, education, and behavioral change on their own. "Some tribes say that to even use the word 'cancer' is to invite it into your life," says Revels, "so, these stories are a way to ease communities into opening up and talking about cancer."

Workshop evaluations with Alaska Natives indicated participants felt the storytelling experience enhanced their cancer knowledge, reduced their fear of cancer, encouraged them to make healthy lifestyle behavior changes, and empowered them to share their stories to help others reduce cancer risk. In a survey four months to a year after participating in a storytelling workshop, attendees reported sharing their digital stories, on average, five times to 26 people at community events in their villages and reservations to catalyze discussion of cancer issues. Some of the initial workshop participants now are returning to create second digital stories to describe the personal and community impact of sharing their cancer-related experiences.

INTEGRATED RESEARCH, TRAINING AND OUTREACH SPOTLIGHT

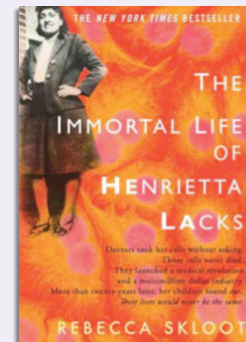
Examining Attitudes and Beliefs about Medical Research among African Americans

When the Detroit Public Library chose *The Immortal Life of Henrietta Lacks* by Rebecca Skloot as its “2011 One Book One Community” reading selection, the wheels immediately started spinning for Jena Baker-Calloway, M.P.H., a CHE at The Southeast Michigan Partners Against Cancer Center (SEMPAC). “I thought about how to utilize the book and the Detroit Public Library's built-in audience as jumping-off points to raise awareness about human participation in medical research, biobanking, and bioethics issues,” says Baker-Calloway.

Winner of several awards, the book tells the story of how scientists took cancerous cell tissue from an African American woman without her knowledge or consent and cultured it to create an immortal human cell line used in numerous medical research studies.

Baker-Calloway, a public health professional at Karmanos Cancer Institute's Population Studies and Disparities Research Program, worked with SEMPAC to sponsor some of the book's author readings. In addition, she and SEMPAC initiated panel discussions in and around Detroit for health professionals, medical students, and the general community on the many concerns the book raised, including myths and realities around clinical trials and biospecimen collection, patients' rights, safeguards that are in place, and bioethics.

The CNP also implemented a community education outreach project using Skloot's book as a catalyst for discussion to examine attitudes and beliefs about medical research within Detroit's African American community. They found that the community generally believes in the importance of medical research but distrusts researchers. The project staff also learned that people do not feel respected by the medical community nor do they feel they have benefitted from research. In general, people preferred to discuss participation in biomedical research with members of their own community.



"I thought about how to utilize the book...as a jumping-off point to raise awareness about human participation in medical research, biobanking, and bioethics issues."

Linkage with NCI Community Cancer Centers Program

In addition to INP's two network programs, G/BMaP and NON, a collaborative initiative is in place with NCI's Community Cancer Centers Program (NCCCP). Since 2007, CRCHD has supported NCCCP's work in health disparities by providing technical assistance in developing the NCCCP disparities program and a physical home for NCCCP's disparities staff liaison. In addition, CRCHD has offered NCCCP the opportunity to partner with CRCHD's CNP principal investigators and Patient Navigation Research Program (PNRP) patient navigators.

NCCCP was piloted in 2007 as a public-private partnership among 16 hospital-based community cancer centers in 14 states. In 2010, with the assistance of ARRA funding, the original NCCCP pilot program was expanded to 30 centers in 22 states. With 40% of its NCI funding directed to reducing healthcare disparities across the cancer care continuum, NCCCP, administered by NCI's Office of the Director, was developed to explore methods to enhance patient access to state-of-the-science cancer care and increase clinical trials accrual in community settings, where more than 85% of U.S. cancer patients receive treatment.

NCCCP's disparities-related efforts have focused on standardizing metrics for race and ethnicity data collecting as well as developing strategies for cultural competency, training, community outreach and patient navigation. Evaluation of the three-year pilot project indicated a number of improvements in care outcomes for underserved populations. The number of screening events held across sites increased by 60%, as did the number of individuals who were screened (41%). In addition, the number of patients navigated increased by 164%. Clinical trial accruals by NCCCP member hospitals also improved: there was an 84% increase in racially and ethnically diverse participants and a 220% increase in elderly participants. In addition, NCCCP-participating hospitals substantially expanded (150% increase) the number and variety of their partnerships with community groups focused on issues affecting the underserved.



NCCCP-participating hospitals expanded the number and variety of their partnerships with community groups focused on issues affecting the underserved.

As a result of its success, NCCCP is now prepared to share best practices for helping hospital-based community cancer centers and communities better focus their efforts on addressing cancer healthcare disparities. NCCCP is also developing disparities-related resources and tools that are applicable to a broad range of community-based cancer programs. CRCHD's collaborative role has proven essential in achieving NCCCP's goals of enhancing access to state-of-the-science cancer care, increasing clinical trials participation, and expanding research opportunities within racially and ethnically diverse, and underserved communities.



With the support of 2010 ARRA funding and CRCHD's collaborative input, NCCCP is supporting disparities projects focused on increasing partnerships, outreach, and coordination of care in racially and ethnically diverse, and underserved communities. Project 5 funds 15 NCCCP sites as they test new approaches to engaging community partners and providers in the development of targeted outreach programs. Project 6 supports research to improve coordination of care across 14

NCCCP sites, focusing particularly on developing effective navigation strategies that track racially and ethnically diverse, and underserved patients who receive community screening or primary care referrals. Project 7 promotes linkages between CRCHD's CNP/CNPC sites and nine NCCCP sites, increasing community participation in primary prevention and early detection among racially and ethnically diverse, and underserved communities.

APPENDICES

Disparities Research Branch

Diversity Training Branch

Integrated Networks Program

Administrative Core

Communications and Dissemination Core

Performance and Evaluation Core

List of Acronyms

Disparities Research Branch

Description:

The Disparities Research Branch (DRB) stimulates and supports research to identify and reduce the determinants of cancer health disparities by integrating the assessment of racial and ethnic differences in basic, translational, clinical, behavioral, sociocultural, and community-based participatory research. These interdisciplinary research activities spanning the cancer continuum through end of life are critical to understanding which population differences contribute to cancer health disparities and at which intervention points. Research findings will foster evidence-based diagnostic, prevention, and intervention best practices to reduce cancer health disparities.

Goals/Objectives:

- Stimulate and support basic biomedical and behavioral research focused on identifying, validating, and reducing cancer health disparities.
- Stimulate and support translational research efforts focused on integrating racial and ethnic basic knowledge differences with clinical practice to reduce cancer health disparities.
- Stimulate and support clinical and applied research to assess evidence-based prevention, early detection, and targeted treatment options for racially/ethnically diverse and other underserved populations within communities and globally that focus on minimizing or eliminating differences that reduce cancer health disparities.

Strategies to Achieve Goals/Objectives:

- 23 Community Networks Program Centers (CNPCs) throughout the United States
- 9 Patient Navigation Research Program (PNRP) sites
- Investigator-initiated research (R21/U01)

Highlights/Accomplishments:

- Funded 23 CNPCs
- PNRP
 - » Guided patients through the medical system
 - » Defined the metrics for measuring patient navigation research used by other patient navigation programs, including those of the American Cancer Society and the U.S. Health Resources and Services Administration
 - » Created analytic database of 12,000 participants

Future Directions:

- Develop new programs to support basic, translational, clinical, and applied research in cancer health disparities.
- Evaluate patient navigation.
- Pursue basic, translational, and clinical research, as well as collaborative and crossdisciplinary research.

Diversity Training Branch

Description:

The Diversity Training Branch (DTB), leads NCI's efforts in the training of students and investigators from diverse populations who will be part of the next generation of competitive researchers in cancer and cancer health disparities research. Through the Continuing Umbrella of Research Experiences (CURE), DTB supports a number of training programs that increase the number of underrepresented individuals, including racially/ethnically diverse, socioeconomically disadvantaged, disabled populations, and those re-entering the research workforce. These activities will foster the next generation of competitive researchers in cancer and cancer health disparities.

Goals/Objectives:

- Establish and maintain the pipeline of investigators from diverse populations by expanding and extending the period of training and career development.
- Stimulate and support a cadre of investigators from diverse populations who can compete successfully for independent Research Project Grants (RPGs).
- Emphasize strategic and scientific areas of greatest need (e.g., basic, clinical, translational, behavioral, and population sciences, and emerging technologies).

Strategies to Achieve Goals/Objectives:

- Exploratory Grant Award to Promote Workforce Diversity in Basic Cancer Research (R21)
- Partnerships to Advance Cancer Health Equity (PACHE), (U54, P20)
- NCI Mentored Research Scientist Development Award to Promote Diversity (K01)
- NCI Mentored Clinical Scientist Research Career Development Award to Promote Diversity (K08)
- NCI Mentored Patient-Oriented Research Career Development Award to Promote Diversity (K23)
- NCI Transition Career Development Award to Promote Diversity (K22)
- Ruth L. Kirschstein National Research Service Awards for Individual Pre-doctoral Fellowships to Promote Diversity in Health-Related Research (F31)
- Research Supplements to Promote Diversity in Health-Related Research (Administrative Supplement)
- Research Supplements to CURE (P30, T32, K12, R25T)
- Supplements to Promote Re-entry into Biomedical Research Careers (Administrative Supplement)

Highlights/Accomplishments:

- Developed R21 funding opportunity to promote workforce diversity in the area of basic cancer research.
- Assisted more than 1,000 students (high school, undergraduate, graduate) and trainees (postdoctoral and junior investigators) and hired 83 new faculty through the PACHE program.
- Achieved 20% success rate of R01 procurement in the Transition Career Development Awards

Future Directions:

- Develop new programs targeting middle school students to stimulate accelerated entry into science.
- Increase training opportunities in translational and cancer health disparities research.
- Expand the emphasis in promoting diversity training in the area of emerging technologies.

Integrated Networks Program

Description:

The Integrated Networks Program (INP) focuses on promoting and facilitating new and ongoing linkages among cancer health disparities research, diversity training, community education and outreach, and information dissemination, emphasizing a transdisciplinary approach to reducing cancer health disparities. INP was created to help advance the understanding of the complex biological and nonbiological causes of cancer disparities. It supports two network programs—the National Outreach Network (NON) and the Geographical Management of Cancer Health Disparities Program including Biospecimen Science (G/BMaP), and one collaborative initiative, the NCI Community Cancer Centers Program (NCCCCP).

Goals/Objectives:

- Advance the science of cancer health disparities and reduce cancer health disparities using a comprehensive, regionally based network approach and team science.
- Contribute to the next generation of cancer health disparities researchers.
- Build and sustain an integrated NON for NCI-supported education, outreach, and research dissemination within community-based cancer health disparities programs.
- Disseminate culturally relevant cancer information adapted from NCI materials to fit specific needs and expectations of targeted, underserved communities and foster research participation.
- Develop appropriate models for community input into research agenda.

Strategies to Achieve Goals/Objectives:

- Develop opportunities for collaboration and partnerships among basic, clinical, and behavioral researchers, practitioners (including lay community practitioners), trainees, and community leaders.
- Maintain and expand ongoing communication/dissemination linkages and foster dialogue with racial/ethnic and other underserved populations, to improve community outreach, cancer information dissemination, and cancer public education efforts.

Highlights/Accomplishments:

G/BMaP

- Collected GMaP pilot data highlighting research/training capacity in biospecimen science, clinical trials, informatics, and emerging technologies in each of six regions
- Put into place one full-time equivalent (FTE) national GMaP coordinator, 12 FTE G/BMaP regional coordinators, and 17 CHEs
- Partnered with more than 67 participating academic institutions, including 13 Cancer Centers
- Provided G/BMaP grantees with “101” elective webinars on NCI resources in biospecimen science, clinical trials, informatics, and emerging technologies
- Held GMaP Summit to convene GMaP partnering institutions/regions across the United States

NON

- Supported 50 CHEs to conduct NCI-coordinated NON activities through supplements
- Held eight teleconferences and webinars for NON CHEs to share information on such topics as biospecimen collection
- Conducted more than 700 community education and outreach efforts in cancer prevention, diagnosis, and treatment among at-risk populations via NON CHEs

NCCCCP

- Provided guidance, direction, and technical assistance to NCCCCP via three working groups, subcommittees, annual meeting, and site teams on health disparities program activities
- Consulted on identifying and implementing disparities vision and program priorities, namely, community outreach, patient navigation, and strategic partnerships to enhance NCCCCP disparities research capacity

Future Directions:

- Create sustainable regional networks in cancer health disparities research, training, and infrastructure for cancer health disparities elimination.
- Establish network sustainability to foster community involvement in research that reflects state-of-the-science cancer best practices.
- Design online social networking tools to help scientists identify potential collaborators.
- Create centralized databases of measures and instruments for team-based science.
- Pursue opportunities for public/private partnerships to contribute to long-term solutions to reduce disparities.

Administrative Core

Description:

The Administrative Core provides coordination of administrative resources and services to the Center to Reduce Cancer Health Disparities (CRCHD). These services include development of effective and efficient business processes for administrative resources for scientific support, office organization, time and budget management, information technology support, human resources management, grants management, research assistance, facilities management, procurement and property management, printing and graphics support, communication and dissemination support, and mail and messenger operations.

Goals/Objectives:

- Establish systematic structure and clear managerial guidelines, file and retrieve documentation, and maintain administrative resources to provide support to professional scientific staff.
- Develop and implement standard operating procedures.
- Manage CRCHD project resources to achieve consistency with work plans, deadlines, and staff resources.
- Promote the development of skilled and productive administrative support staff.
- Promote clear and accurate internal communication and awareness of operational policies and procedures for project and personnel management issues.
- Assist in the production of high-quality reports and documents.

Strategies to Achieve Goals/Objectives:

- Use software to identify activities and monitor the status of tasks from assignment to completion.
- Establish a process for logging and communicating the receipt of applications, with future use of scan and receipt database.
- Host conferences and workshops that facilitate training for scientific and administrative staff.
- Reorganize and maintain CRCHD shared drive.
- Revise CRCHD Central Calendar.

Highlights/Accomplishments:

- Reorganized shared drive
- Reviewed process effectiveness and development of process improvement and standard operation procedures

Future Directions:

- Develop a committed, knowledgeable, results-oriented team of administrative support personnel focused on accomplishing CRCHD goals with the highest standards of excellence and integrity.

Communications and Dissemination Core

Description:

The Communications and Dissemination (C&D) Core advances the mission of the Center by developing, coordinating, and disseminating cancer information, education, outreach efforts, and cancer health disparities research results to cancer health disparities researchers, as well as to racially/ethnically diverse and underserved communities, to improve the lives of those disproportionately affected by cancer. Working closely with CRCHD staff and NCI-supported cancer health disparities researchers, C&D uses state-of-the-science dissemination methods to reach diverse audiences and meet their needs for the latest culturally and linguistically appropriate, evidence-based cancer information, products, and programs. C&D is also responsible for strategic communications planning, messaging, materials development, and media relations for CRCHD.

Goals/Objectives:

- Promote best practice, audience-focused communication strategies to provide state-of-the-science communications support across CRCHD, NCI, and cancer health disparities research community, and enhance message delivery and understanding of cancer health disparities research/training.
- Use a systematic and coordinated approach for the identification, adaptation, and dissemination of culturally sensitive information, products, and programs for targeted audiences aimed at cancer health disparities reduction.

Strategies to Achieve Goals/Objectives:

- Work closely with CRCHD staff, as well as other Divisions, Offices, and Centers (DOCs) across NCI, to determine communications objectives, audiences, messages, channels, activities, and strategies for important CRCHD-related initiatives and to help promote cancer health disparities research.
- Plan, prepare, and produce CRCHD-related resources, including Center and programmatic brochures, fact sheets, articles, slide presentations, webinars, talking points for interviews, CRCHD Welcome Packages, CRCHD Information Packages, special reports, clearance support, written correspondence, and other select publications, which are critical to understanding and reducing cancer health disparities.

- Refresh CRCHD Web site, provide ongoing maintenance and, with technical assistance, design, develop, and update Web content, in addition to Web pages for special events, to support a systematic and comprehensive process for disseminating cancer health disparities-related information, researcher profiles, products, and programs to researchers, practitioners, and other key stakeholders, and to ensure and enhance CRCHD's reputation as a definitive source of NCI-supported cancer health disparities research and capacity.
- Develop a brand for CRCHD print and electronic media.
- Produce bimonthly CRCHD eBulletin to rapidly disseminate findings from cancer and cancer health disparities research supported by the Center, so that they may be adopted for broadest impact on cancer health disparities outcomes.
- Disseminate monthly eBlasts to more than 1,500 subscribers to inform them of Web site updates.
- Produce *Inside Scoop*, featuring selected articles from the cancer/cancer health disparities research and NIH/NCI communities to inform CRCHD staff of new developments.
- Manage CRCHD exhibit program to support a CRCHD presence at national, regional, and local conferences and meetings to enhance understanding of cancer health disparities research.
- Host G/BMaP and NON webinars to inform grantees of NCI/CRCHD disparities activities and training.
- Link to NCI's social media sites, including Facebook, Twitter, YouTube, and Flickr.

Highlights/Accomplishments:

- Developed a branding program that provided CRCHD with a unified presentation format to enhance overall visibility and consistent messaging with external audiences
- Received more than 4,000 Web site visits monthly
- Produced 25 eBulletins and 36 *Inside Scoops*, and exhibited at four conferences
- Disseminated eBulletin to 2,500 subscribers, and to associated programmatic listservs and distribution lists
- Hosted eight programmatic webinars for grantees

Future Directions:

- Spawn research to fill gaps in communications and dissemination.
- Continue to integrate social media technologies to enhance communication and dissemination activities.
- Continue to evaluate effectiveness of communications and dissemination.

Performance and Evaluation Core

Description:

The Performance and Evaluation Core (PEC) plans and coordinates the monitoring and evaluation of CRCHD program performance, effectiveness in achieving stated goals and priorities, and outcomes. PEC is responsible for developing program analytic plans, handling performance system reviews, and conducting evaluations of CRCHD programs and activities. In addition, PEC prepares and disseminates annual and ad hoc reports of the progress and impact of NCI/CRCHD programs and initiatives in addressing cancer health disparities.

Goals/Objectives:

- Develop infrastructure and procedures for systematic monitoring and evaluation of the performance and outcomes of CRCHD programs aimed at reducing cancer health disparities.
- Use performance and evaluation information (constructive, data-based reviews and portfolio analysis) to increase understanding of successful interventions and determine continuation, modification, expansion, or termination of programs.
- Communicate and disseminate annual and ad hoc reports on the progress and impact of NCI/CRCHD programs and initiatives in addressing cancer health disparities coherently, concisely, and with transparency.
- Strengthen problem-solving collaborations (within CRCHD and externally) and work together to improve performance management practices and outcomes within CRCHD and among CRCHD grantees.
- Conduct portfolio analysis and secondary data analysis to determine areas to target to reduce cancer health disparities.
- Help to foster public trust and cooperation.

Strategies to Achieve Goals/Objectives:

- Develop and maintain a central CRCHD database for storage, retrieval, and analysis of data on all CRCHD research and training programs.
- Identify performance measures and corresponding core data elements for all CRCHD-funded research and training programs to be included in the new CRCHD database, as well as develop standard operating procedures for entry, storage, retrieval, and analysis of data.
- Prepare all annual reports as required by law, in addition to ad hoc reports in response to congressional and/or NCI leadership requests.

Highlights/Accomplishments:

- Developed CRCHD database and began populating the database with program-specific data
- Prepared annual reports of NCI's Minority Health and Health Disparities activities and funding, and responded to several ad hoc congressional and NCI leadership inquiries
- Secured 1% evaluation set-aside funds to conduct feasibility of CNP evaluation

Future Directions:

- Automate the collection and storage of program data in the CRCHD database.
- Work toward real-time portfolio analysis and analytical capabilities to facilitate efficient evidence-based management decision making.
- Develop standardized outcome and performance measures for similar programs within CRCHD.
- Secure funding for longitudinal data tracking and long-term impact and outcome evaluations of CRCHD programs.
- Collect race/ethnicity data on research participants.
- Collect race/ethnicity data on trainees and junior investigators for tracking career development.

LIST OF ACRONYMS

AACR	American Association for Cancer Research
ACS	American Cancer Society
ARRA	American Recovery and Reinvestment Act
C&D	Communications and Dissemination
CCR	Center for Cancer Research
CMBB	Comprehensive Minority Biomedical Branch
CMS	Center for Medicare and Medicaid Services
CNP	Community Networks Program
CNPC	Community Networks Program Centers
CRCHD	Center to Reduce Cancer Health Disparities
CURE	Continuing Umbrella of Research Experiences
DCB	Division of Cancer Biology
DCCPS	Division of Cancer Control and Population Sciences
DCEG	Division of Cancer Epidemiology and Genetics
DOCs	Divisions, Offices, and Centers
DRB	Disparities Research Branch
DTB	Diversity Training Branch
ET CURE	Emerging Technology Continuing Umbrella of Research Experiences
G/BMaP	Geographical Management of Cancer Health Disparities Program including Biospecimen Science
HHS	Department of Health and Human Services
INP	Integrated Networks Program
MB-CCOP	Minority-Based Community Clinical Oncology Program
MI/CCP	Minority Institution/Cancer Center Partnership
MICR	Minorities in Cancer Research
NCCCP	NCI Community Cancer Centers Program
NCI	National Cancer Institute
NIGMS	National Institute of General Medical Sciences
NIH	National Institutes of Health
NIMHD	National Institute on Minority Health and Health Disparities
NON	National Outreach Network
NRSA	National Research Service Award
OHAM	Office of HIV and AIDS Malignancy
PACHE	Partnerships to Advance Cancer Health Equity
PEC	Performance and Evaluation Core
PNRP	Patient Navigation Research Program
SBIR	Small Business Innovation Research





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