The National Cancer Institute

Eliminating suffering and death due to cancer

"The goal of eliminating suffering and death due to cancer… does not mean 'curing' cancer in the classic sense, but, rather it means that many cancers will be eliminated and others will be controlled so that people will live with—and not die from—cancer. Frankly, we owe it to cancer patients around the world—and we owe it to their families as well—to work together to meet this challenge. I also believe we owe it to communities of color who have been so heavily burdened with this disease for so long."

Andrew C. von Eschenbach, M.D.
Director, National Cancer Institute

NCI's Mission

The National Cancer Institute (NCI) was established in 1937 to serve as the nation's lead federal agency for cancer research. In 1971, Congress passed the National Cancer Act, infusing enough dollars and authority into NCI to make the "conquest of cancer a national crusade." As the largest of the 27 institutes and centers that comprise the National Institutes of Health (NIH) today, NCI is an integral part of the U.S. Department of Health and Human Services.

In keeping with its mission, NCI conducts and supports research investigating all aspects of cancer through basic, translational, clinical, and population-based studies. "NCI's mission is to coordinate a national cancer research program. We work with our own scientists—the intramural researchers—as well as non-NCI scientists who are funded through our extramural research program," says Dr. Andrew C. von Eschenbach, NCI director. "Our goal is to investigate as much as we possibly can about cancer's processes and target therapies accordingly," says Dr. von Eschenbach. Ongoing research foci at NCI include cancer biology, detection, diagnosis, treatment, rehabilitation, prevention, control, and epidemiology.

NCI's Research Priorities

After being named director of NCI in 2002, Dr. von Eschenbach issued a challenge goal to the Institute: Eliminate suffering and death due to cancer by 2015. To guide work toward meeting this challenge, Dr. von Eschenbach has established seven key research priorities:

- *Bioinformatics*
- *Integrated clinical trials system*
- *Integrative cancer biology*
- *Molecular epidemiology*
- *Overcoming cancer health disparities*
- *Prevention, early detection, and prediction*
- *Strategic development of cancer interventions*

NIH Main Campus

"While we need to be successful in all of these areas to reach the 2015 challenge goal, overcoming health disparities is one of the most important of all of these priorities.
If we are successful at the other priorities but do not find a way to eliminate cancer health disparities, then our effort to eliminate suffering and death due to cancer cannot succeed."

- Dr. von Eschenbach

Cancer Health Disparities

Cancer Health Disparities

Although the overall health of the U.S. population has improved over the past two decades, there continue to be striking disparities in the burden of illness and death experienced by minority populations, people of low socioeconomic status, and people who live in rural areas. These disparities are believed to be the result of complex interactions among biological factors, the environment, and specific health behaviors. Inequalities in income and education also contribute.

Because of these disparities, certain subpopulations within the United States are significantly more likely than the overall U.S. population to:

- *Be diagnosed with and die of preventable cancers*
- *Be diagnosed with late-stage disease in cancers for which early screening tests exist*
- *Receive either no treatment or substandard treatment*
- *Die of cancers that are generally curable*
- *Suffer from terminal cancers without receiving adequate pain control or other forms of palliative care*

Cancer Disparities Statistics

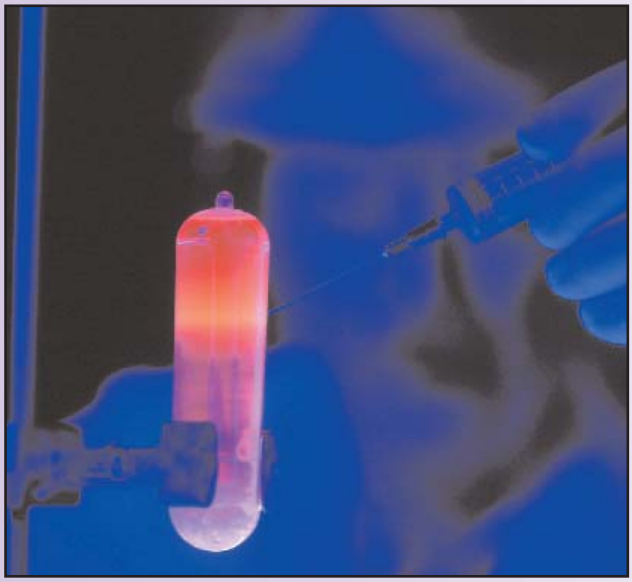
- African Americans have the highest death rates for all cancer sites combined
- Women living in certain rural areas, such as Appalachia, have a much greater likelihood of dying of cervical cancer than other women
- Hispanic/Latina American women have the highest incidence of cervical cancer
- Incidence of invasive cervical cancer is four times higher in Vietnamese women than it is among Asian Pacific Islander American women as a whole
- Rates of cigarette smoking, which accounts for nearly 90 percent of all cases of lung cancer, are especially high among Native American/Alaska Natives, populations with low socioeconomic status, and people who never completed high school
- Asian Pacific Islander American men, followed by Asian Pacific Islander American women, have the highest mortality rate for liver and bile duct cancer, plus the highest incidence and mortality rates for stomach cancer

NCI Profile

Michaele C. Christian, M.D.

Associate Director
Cancer Therapy Evaluation Program
Division of Cancer Treatment and Diagnosis

Dr. Christian received her M.D. from Georgetown University Medical School, where she graduated top in her class. She completed an internal medicine residency and fellowship training in medical oncology and hematology at Georgetown. Dr. Christian has been deeply involved in many initiatives to strengthen NCI's clinical trials program and to provide needed infrastructure for translational research and the development of molecularly-targeted therapeutic agents.



Black Bag: Did you know in med school whether you would choose an academic or a research career?

Dr. Christian: No, I actually didn't know. I think that's something that's probably important for medical students to realize. Like most physicians-in-training, I thought 'I'm a people person and I want to take care of patients'—which I love doing by the way—but I also really loved bench research. I liked working with animal experiments and all of those kinds of things. I ended up in oncology because from a medical point of view, it was an interesting and challenging area to me, and I developed an interest in clinical research because the treatments in oncology are pretty

NCI's Commitment to Reducing Cancer Health Disparities

Research initiatives at NCI are conducted under five extramural and two intramural divisions, all of which are under the leadership of the Office of the Director. The extramural Divisions of Cancer Biology, Cancer Control and Population Sciences, Cancer Prevention, Cancer Treatment and Diagnosis, and Extramural Activities coordinate grant-funded research projects carried out in academic centers, other government agencies, and the private sector. Intramural research is conducted under the auspices of the Center for Cancer Research and the Division of Cancer Epidemiology and Genetics.

The two NCI organizations most focused on the work of reducing cancer health disparities are the Center to Reduce Cancer Health Disparities and the Comprehensive Minority Biomedical Branch, both of which are located in the Office of the Director at the top of NCI's organizational chart and under Dr. von Eschenbach's leadership.

NCI Profile

J. Fernando Arena, M.D., Ph.D.

Program Director
Clinical and Genetic Epidemiology Research Branch
Division of Cancer Control and Population Sciences

Dr. Arena received both his medical and doctoral degrees from the University of Campinas, São Paulo, Brazil. He completed a postdoctoral fellowship in medical genetics at the University of Washington School of Medicine and another at the University of Miami School of Medicine. Dr. Arena is a Founding Fellow of the American College of Medical Genetics, a member of the American Society of Human Genetics, and Vice President of the Iberoamerican Society of Human Genetics. His present research is centered in the field of cancer genetics. Dr. Arena joined NCI in July, 2003.

Black Bag: What got you interested in research?

Dr. Arena: I always liked research, but didn't know exactly how to pursue a career in it. When I was a medical geneticist in 1974 in Brazil almost nobody knew what "genetics" was at that time or what I did. Then I had the great fortune to be accepted for a fellowship program in medical genetics at the University of Washington, where I spent two years with some of the best geneticists in the country at that time. That experience gave me the direction I needed.

> *"When I was offered the opportunity to come to NCI last year, it was a dream come true. It allows me to continue my work with health disparities and underserved populations, especially Latin American and African American populations . . . I'm thrilled to do something about disparities in cancer incidence and mortality."*

Black Bag: And what is your new job at NCI?

Dr. Arena: As a program director at NCI, my job has two components: the first is to provide programmatic and scientific assistance to the grantees in my portfolio and the second is to provide leadership and coordination in medical and scientific fields. Basically, you are free to think how you can contribute to move cancer research forward by formulating ideas that may become new concepts that generate future investigations. This is a lot of fun. You are only limited by your own creativity and ability to think. It's a great—and very supportive—environment to work in. I'm very excited that I get to work with my heart and my brain.

Black Bag: What would you say to a reader who was thinking of pursuing a career in cancer research?

Dr. Arena: I think that the research field is wonderful. It's tough, but it's a privilege to create new knowledge. Also, it's incredibly important for minorities to get involved in research

The Center to Reduce Health Disparities (CRCHD)

NCI created the CRCHD in 2001 to address the disproportionate burden of cancer experienced by specific populations within the U.S. The Center is the cornerstone of NCI's efforts to reduce the unequal burden of cancer in U.S. society and provides the organizational locus for NCI's efforts to bridge the gap between basic research and improved delivery of medical care to traditionally underserved populations.

"Working with our divisions to recommend priorities for research coordination and program direction, CRCHD helps the divisions to identify scientific and related policy areas that have potential to offer opportunities for reducing cancer disparities," says Dr. von Eschenbach. The Center also supports broad-based health policy research to develop a better understanding of the causes of disparities.

Using NCI's Strategic Plan for Reducing Cancer-Related Health Disparities, CRCHD is emphasizing new agendas and priorities. "The mission of the Center is to support research programs that address scientific questions pertinent to low-income, minority, and underserved populations; identify gaps in health policy research related to cancer health disparities; develop new health policy research programs to close the gap; and educate policymakers to make informed decisions about how to correct the problem of disparity," says Harold P. Freeman, M.D., director of NCI's Center to Reduce Cancer Health Disparities.

NCI Profile

Harold P. Freeman, M.D.

Director, Center to Reduce Cancer Health Disparities

Dr. Freeman graduated from Howard University Medical School and completed his internship and residency in general surgery at Howard University Hospital. In addition to his NCI position, he also serves as Medical Director of The Ralph Lauren Center for Cancer Care and Prevention in New York City. He holds the academic position of Professor of Clinical Surgery at Columbia University College of Physicians and Surgeons. Dr. Freeman was the chief architect of the American Cancer Society's initiative on cancer in the poor and is a leading authority on the interrelationships between race, poverty, and cancer.

Black Bag: Can you talk a little bit about what some of your current initiatives are at CRCHD and how important it is to have underrepresented minorities in your cadre of researchers to help you reach your goals?

Dr. Freeman: Part of our research portfolio includes eighteen major grants that are distributed throughout the country called the Special Populations Networks research program. Through this competitive program, investigators stimulate community-related research, creating an atmosphere where minority researchers can develop. The program also creates a greater awareness about cancer in those communities. We've had great success with the program—the networks are educating, creating awareness, promoting research among minorities, and developing researchers who could go on to successfully compete for NCI grants in the future.

For this work, I think it's important to have a diverse cadre of researchers—not just at the Center, but in the country as a whole. We always wonder whether we're asking all of the questions we need to ask; questions that I have raised as a researcher have been quite different from a number of my colleagues' questions. So, one of the reasons that we need to bring in diverse researchers is

NCI Training Opportunities

Just as NCI funds extramural and intramural research, fellowship and training opportunities are available extramurally, at institutions across the country with non-NCI scientists, and intramurally, at NCI under the tutelage of NCI scientists.

Extramural: Research Funded by NCI

Extramural awards for training and career development are available for individuals who wish to prepare for careers in basic cancer research, clinical cancer research and/or cancer research in the prevention, control, behavioral, and population-based sciences.

NCI specifically established the handful of opportunities highlighted here for underrepresented minorities. A number of other extramural training and career development opportunities

NCI Grantee Profile

Elmer E. Huerta, M.D., Ph.D.

Director, Cancer Preventorium
Washington Cancer Institute at Washington Hospital Center

Dr. Huerta received his medical degree in his native Peru before completing a fellowship in cancer research at the Johns Hopkins Oncology Center and a fellowship in cancer prevention at NCI. He is principal investigator for the Latin American Cancer Research Coalition, part of NCI's Center to Reduce Cancer Health Disparities' Special Populations Networks, and a member of NCI's National Cancer Advisory Board.

Dr. Huerta is dedicated to health outreach and education, particularly to Latino groups, which are relatively linguistically isolated in the U.S. In his native Peru he saw first-hand the devastation of cancer on people who are poorly educated, who lack access to medical advice, and have a fatalistic attitude toward cancer. Often, in fear or ignorance, people waited too long to seek medical aid. "I thought to myself, these people are so knowledgeable about their novellas (soap operas) and sports and entertainment programs, yet they know so little about basic health matters. I asked, can we use radio and TV to sell health like the tobacco companies use the media to sell cigarettes?"

To reach out to Latino communities with cancer prevention and health promotion messages, Dr. Huerta uses the broadcast media. "The best cure for cancer is prevention and early detection," he says. As host of "Cuidando su Salud" (Taking Care of Your Health), the 51-year-old oncologist presides over the only national syndicated daily Hispanic radio program on health. His one-minute reports on virtually every

are available to all individuals with doctoral-level science and/or health degrees. Details about these extramural programs will be featured in a future edition of The Black Bag. In the meantime, find more information about the opportunities that are *not* highlighted here from:

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http://cancertraining.nci.nih.gov/recent/training_brochure.pdf

Comprehensive Minority Biomedical Branch (CMBB)

NCI recognizes that the success of research to reduce the disproportionate burden of cancer in underrepresented minority populations will depend significantly on the presence of a cadre of culturally sensitive, well-trained underrepresented minority researchers who are able to compete successfully for grant monies. The ultimate goal of the CMBB is to significantly increase the number of underrepresented minorities participating as competitive NCI-funded cancer researchers. To this end, the CMBB seeks to:

- Increase the participation of underrepresented minority individuals in cancer-related research and training activities
- Raise the competitive research capacity of minority-serving institutions
- Become a national resource and help raise the level of effectiveness of other programs and organizations inside and outside NCI that are sincerely interested in increasing the number of competitive underrepresented minority individuals and institutions participating in cancer research

Continuing Umbrella of Research Experiences (CURE) Program

The CMBB offers long-term funding to qualified underrepresented minority students and professionals. Funds are also provided for innovative programs that offer long-term funding to qualified underrepresented minority students and professionals who may otherwise be lost from the biomedical research pipeline. CMBB recognizes that today's path to a competitive career in cancer research is a multi-year, multi-institutional educational and research continuum that extends from high school to the first professional appointment. Candidates must:

- Be from a group that has been determined by the grantee institution to be underrepresented in cancer-related biomedical, behavioral, clinical, or social sciences research (e.g., racial and ethnic minority groups, first generation college graduates, economically disadvantaged, etc.)
- Be U.S. citizens, permanent residents of the U.S., or non-citizen alien nationals eligible for a training visa

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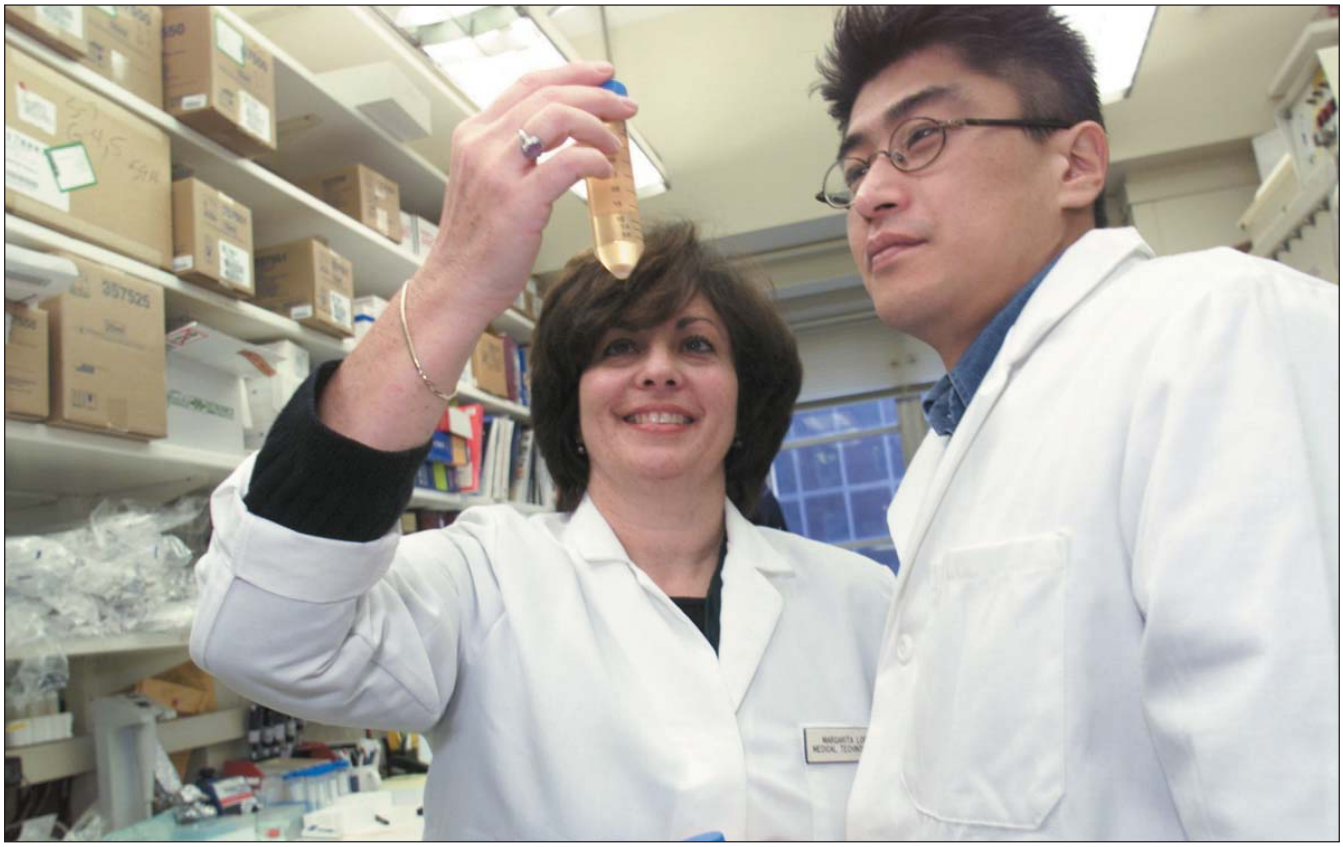


K Series Awards

NCI awards career development funds to individuals and institutions via the K series funding mechanism. While the awards described below were specifically established for underrepresented minorities, K awards are also available for training and career development to any qualified individual, regardless of minority status. For more information, see *http://www.cancer.gov/researchandfunding#fundingopportunities.*

Mentored Patient-Oriented Research for Underrepresented Minorities (K23)

The K23 is for underrepresented minorities in clinical oncology to develop independent research skills and gain experience in the advanced methods and experimental approaches needed to conduct patient-oriented research and to increase the pool of minority clinical researchers who can conduct patient-oriented studies. Candidates must:

- Be from a group that has been determined by the grantee institution to be underrepresented in cancer-related biomedical, behavioral, clinical or social sciences research (e.g., racial and ethnic minority groups, first generation college graduates, economically disadvantaged, etc.)
- Have a doctoral-level health professional degree or the equivalent (e.g., M.D., D.C., D.D.S., D.O., D.V.M. or be a doctoral-level oncology nurse)
- Have completed their clinical training, including specialty and/or subspecialty training, before the period of award begins
- Name an accomplished clinical investigator as primary mentor and a second basic research mentor in the proposed research area
- Commit 75% of their full-time professional efforts to attaining the goals defined by the award
- Be U.S. citizens, permanent residents of the U.S., or non-citizen alien nationals eligible for a training visa

Domestic institutions apply on behalf of the candidate for the K23 for up to five years of support. The K23 provides for annual salaries up to $75,000 plus fringe benefits and other costs up to $30,000. Salary is based on a full-time twelve month staff appointment and must be consistent with the established salary structure at the institution. The K23 is not renewable.

http://minorityopportunities.nci.nih.gov/mTraining/K23.html

Mentored Clinical Scientist Award for Underrepresented Minorities (K08)

The K08 is directed to recently-trained, underrepresented minority candidates who possess a doctoral-level health professional degree. The award enables them to acquire research experience in laboratory-based cancer research. Candidates may submit an application before completing their clinical training and must identify a mentor who is recognized as an accomplished independent investigator in the proposed area of basic research.

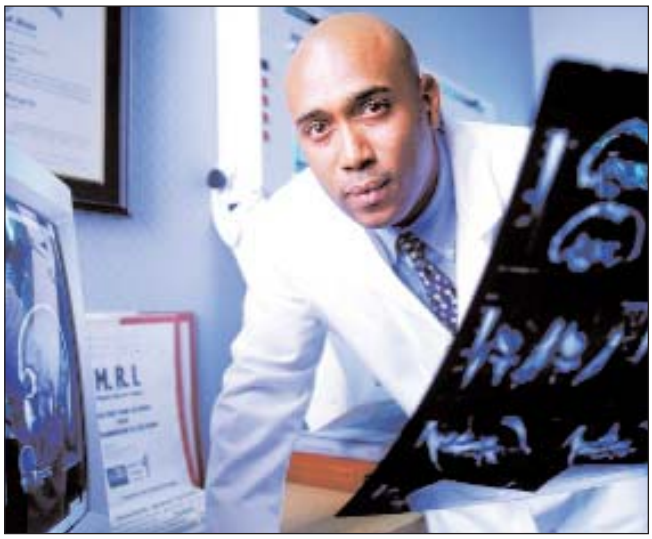
Domestic institutions apply on behalf of the candidate for the K08 for up to five years of support. The K08 provides for annual salaries up to $75,000 plus fringe benefits and other costs up to $30,000. Salary is based on a full-time twelve month staff appointment and must be consistent with the established salary structure at the institution. The K08 is not renewable.

http://minorityopportunities.nci.nih.gov/mTraining/K08.html

NCI Transition Career Development Award for Underrepresented Minorities (K22)

The K22 provides protected time for advanced postdoctoral and/or newly independent researchers to develop and receive support for their initial cancer research program. This award is intended to facilitate the transition of a minority postdoctoral research scientist from the mentored to the independent stage of their careers in cancer research. The unique feature of this award is that individuals may apply before they have identified a sponsoring institution and before they have finished their mentored positions. Candidates must:

- Have a doctoral level research or health professional degree or its equivalent (e.g., Ph.D., M.D., D.C., D.D.S., D.O., D.V.M., or be a doctoral-level oncology nurse)



- Have been in a "mentored" postdoctoral research position
- Have completed two years or more of research in this capacity at the time of application, or be in a suitable independent position for less than two years.

Once identified, domestic institutions apply on behalf of the candidate for the K22 for up to three years of support. The K22 provides for annual salaries up to $75,000 plus fringe benefits and annual research and development support of $50,000. Salary is based on a full-time twelve month staff appointment and must be consistent with the established salary structure at the institution. The K22 is not renewable.

http://minorityopportunities.nci.nih.gov/mTraining/postK22.html

Minority Supplement to NCI Institutional Clinical Oncology Research Career Development Award Program (K12S)

The K12S is for postdoctoral fellows interested in pursuing translational research. Any NCI-supported Institutional Clinical Oncology Research Development Award (K12) principal investigator may apply for this supplement, which must be used for the sole purpose of including an individual from an underrepresented minority group in the K12 program. Candidates must have an M.D., D.O., or doctorate-level R.N. degree and have completed their clinical training.

NCI will provide support for salary and fringe benefits, supplies, and travel, not to exceed $105,000.

http://minorityopportunities.nci.nih.gov/mTraining/postK12.html

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http://minorityopportunities.nci.nih.gov/index.html

Note: Underrepresented minorities who qualify for the K series awards mentioned above and/or other opportunities in the CMBB's CURE program are also encouraged to apply for broader-partipation NCI awards sponsored by programs matching their specific area of research interest.

NCI Grantee Profile

Felipe Samaniego, M.D.

Assistant Professor
M.D. Anderson Cancer Center

Dr. Samaniego received his M.D. from Harvard Medical School. He completed his residency in internal medicine at the University of Colorado Health Sciences Center. Dr. Samaniego completed a medical oncology fellowship at Memorial Sloan-Kettering Cancer Center and a research fellowship at NIH.

Black Bag: What got you interested in medicine originally?

Dr. Samaniego: As an undergrad, I loved biology and so I thought that medical school would be a good way to learn a lot about biology. So it was really science that drove me to medical school.

Black Bag: What made you decide to go to med school instead of pursuing a Ph.D.?

Dr. Samaniego: My folks didn't make much money, and so it was a big issue for me whether I could make it and be comfortable in the Ph.D. route. The security of the role of a physician, while at the same time being able to pursue science and research, was very appealing. I knew I would be able to carve out my own training and other opportunities.

Black Bag: Did you always have a specific interest in cancer research or did that come later?

Dr. Samaniego: From early on I predicted that most of the science that would be useful and could be put to work was going to happen in cancer research. And so I chose it because I thought it was going to be supported by grants and so forth. In addition, I thought it would be challenging and fulfilling–and it has been!

> *"The security of the role of a physician, while at the same time being able to pursue science and research, was very appealing."*

Black Bag: How did you get involved with NCI?

Dr. Samaniego: Right after my clinical fellowship at Memorial Sloan-Kettering, I was awarded a training grant through the Robert Wood Johnson Foundation. It gave me the liberty to work anywhere I wanted to and so that was the stimulus to go to NCI and work with research regarding RNA-binding proteins.

Black Bag: What's your career like now at M.D. Anderson?

Dr. Samaniego: I have a Career Development Award from CMBB that funds my role here as a physician-scientist. A physician-scientist means you happen to be a doctor, but you run a laboratory: supervising post-doctoral fellows, putting together research projects, writing papers, and getting grants. Then 20% of my time is dedicated to patient care, clinical trials, as well as teaching several courses.

Black Bag: What would you tell students in the "if I knew then what I know now" category?

Dr. Samaniego: The mentoring in research is not as strong or as obvious as you would like it to be. You really need to work with somebody who's in a top research position and who can help get you to those places where you want to be. As people who have not been in science for very long, underrepresented minorities don't have the advantage of knowing

Intramural: Research and Training at NCI

NCI has exceptional opportunities for young scientists aspiring to become future leaders in cancer research. NCI fellows have access to the vast resources of NIH and work under the guidance of world-renowned cancer researchers.

"For people with interest in academic medicine, having a period of research at an institution like NCI is viewed as premier training," says Dr. Harold Freeman. "If you're a student in medical school, and you can show that you spent some time in a laboratory or population studies unit—even during the summer—it makes your resume much more powerful, even beyond the point of the experience itself. It really is an extraordinary benefit to have a research component mixed in with your training, even if you are ultimately going to be a clinician."

Increasingly, NCI training programs are a multi-disciplinary effort: molecular epidemiology and prevention, clinical prevention, public health prevention, and other areas. "Science is becoming more and more interdisciplinary," says Shine Chang, Ph.D., associate director of NCI's Cancer Prevention Fellowship Program. "On one project, you may need nutritionists, behavioral scientists, epidemiologists, clinical oncologists, and biostatisticians."

"Training is a most important responsibility. Accelerated progress in cancer research depends on sustained entry of new, well-trained, highly motivated scientists. We are committed to providing the support and mentoring that will launch new careers in science and medicine," says Dr. von Eschenbach.

Predoctoral Fellowships

The Summer Research Fellowship Program is open to first-, second-, and third-year medical, dental, and other doctoral students who are interested in pursuing careers in biomedical research. The goal of this program is to match the student's research interests with a laboratory or population studies unit in which those interests can be pursued.

Participants receive training in research procedures and the principles of independent investigation. Students work with senior research scientists at facilities on or near the NIH campus.

In addition to the laboratory or epidemiological studies experience, students may attend grand rounds, lectures, and seminars to enhance their educational experience. The program runs for a minimum of eight weeks, usually from early June to the end of August.

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Interns in Residence Program

The Center for Cancer Research (CCR) offers development and training in the newest biomedical technologies to students through the CCR Cancer Research Interns in Residence program. Students from underrepresented populations and/or disadvantaged backgrounds are eligible if they are U.S. citizens or permanent residents, 18 years of age or older, and have a GPA of 3.0 or higher.

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www.training.nih.gov/student/index.asp

StarCatcher

NCI maintains a resume databank of interested candidates to be considered for postdoctoral fellowships, intern, and professional positions in science. Candidates are encouraged to post their contact information and resumes in a job category of their choice. After posting a resume candidates may also view and apply for current fellowship and intern opportunities offered in NCI's intramural and extramural divisions.

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Postdoctoral Fellowships

NCI supports the specialized research training of more than 1,000 postdoctoral fellows within its intramural research program. NCI facilities are located in Bethesda, Rockville, Gaithersburg, and Frederick, MD. These are among the best-funded and best-equipped laboratories and population studies research groups in the U.S. NCI offers an environment that permits postdoctoral fellows to interact with scientists from a wide range of medical and life-science disciplines, attend lectures given by internationally-renowned scientists, and participate in meetings sponsored by national scientific associations and societies.

NCI offers an environment that permits postdoctoral fellows to interact with scientists from a wide range of medical and life-science disciplines.

The postdoctoral experience at NCI can serve as a first postdoctoral training assignment or offer experienced postdoctoral scientists the opportunity to further their training in advanced research methods; to acquire new research capabilities; to make changes in the direction of their research; or to receive training in fundamental sciences, clinical disciplines, or epidemiology for the purpose of enhancing the transfer of biotechnology to cancer clinical programs. Program duration is usually two to five years.

NCI Profile

Lauren V. Wood, M.D.

Principal Investigator
HIV and AIDS Malignancy Branch
Center for Cancer Research

Dr. Wood received her M.D. from Duke University School of Medicine and completed clinical training in internal medicine and pediatrics at Baylor College of Medicine Affiliated Hospitals. She received further subspecialty training in allergy and immunology at the National Institute of Allergy and Infectious Diseases before joining NCI in 1992. As a Senior Immunologist in the Pediatric HIV Working Group, her clinical research involves investigation of antiretroviral and immune-based therapies in children and adolescents with HIV infection.

Black Bag: What first interested you in medicine?

Dr. Wood: I had scarlet fever several times as a child and so initially I grew up wanting to be a nurse. I had chemistry kits and a microscope and even a little room off our basement where I got to do my experiments. While I was in elementary school, we moved to New Rochelle, NY, and so we needed to find a new pediatrician. I remember being in the waiting room, and when she walked in, I thought, wow, the doctor is a woman! It was just like a light bulb went off in my head—women can be doctors! It's strange because even though I knew my father was a physician, and he eagerly encouraged my interest in science, I made no connection to the fact that becoming a physician was something I could do. Once I saw my new pediatrician, Dr. Lucille Gunning, that's when I decided that I wanted to be a doctor, too. Having made that decision, I never wavered or changed my mind.

Black Bag: Did you know in medical school that you wanted to be a researcher?

Dr. Wood: I was pretty sure that I was going to be an academician and that I was going to do research. I never really saw myself practicing general internal medicine or pediatrics; I always saw myself as a physician. I decided to do a combined med-peds residency because my initial plan was to treat children with childhood cancer and then follow the long-term survivors into adulthood. I envisioned that there would be a need to monitor these children as they survived into adolescence and young adulthood for late effect complications and toxicities related to the chemotherapy they received, as well as for the occurrence of secondary malignancies. At Duke, I took advantage of the fact that you can actually have the opportunity to do research as a medical student and so my third year I combined my elective coursework with a research lab experience. It was fascinating to be in a research lab with all the equipment—the test tubes and the pipettes—working with cells and running experiments. I think that laboratory experience further cemented my interest in doing biomedical research.

Black Bag: What would you counsel our readers who are interested in a research career?

Dr. Wood: During medical school, I would take advantage of every opportunity to pursue a research elective, whether it is a clinical elective or working with somebody who is conducting a clinical trial for a specific disease, or an elective that involves basic laboratory research at the bench. You've got to

NATIONAL CANCER INSTITUTE

Fellowships in NCI's Center for Cancer Research (CCR)

CCR places particular emphasis on training the next generation of investigators in basic, interdisciplinary, and translational cancer research. Programs offered in CCR include residency and clinical fellowship training programs accredited by the Accreditation Council for Continuing Medical Education (ACGME), as well as other translational and interdisciplinary research opportunities.

Within CCR, a fellowship is truly a training experience—a time for the fellow to demonstrate to the scientific community that s/he can contribute to their chosen field independently. This can only happen if trainees have new experiences, take new career directions, and expand their knowledge. The environment, the quality of science, and the quality of life at CCR uniquely combine to allow that transition. The CCR staff strives to create a research environment that is second to none in the quality of science and the quality of life for the division's scientists and clinicians. CCR's clinical and basic research fellowships and training programs include:

CLINICAL RESEARCH

ACGME Clinical Residency Programs:
Radiation Oncology
Anatomic Pathology
Dermatology

ACGME Clinical Fellowship Programs:
Medical Oncology
Johns Hopkins University/NCI Pediatric Hematology/Oncology
Hematopathology
Cytologic Pathology

Additional Clinical Fellowship Programs:
Surgical Oncology
Urological Oncology
HIV and AIDS Malignancy
Gynecologic Oncology
Neuro-oncology

BASIC RESEARCH

Translational Fellowships:
Multidisciplinary Fellowship in Breast Cancer Research
Gynecologic Cancer Foundation/NCI Fellowship in Gynecologic Oncology
Postdoctoral Fellowships in Radiation Sciences
Biostatistics/Mathematics Training Fellowship (Informatics Training Program)
Program for Interdisciplinary Training in Chemistry (PITC)
Clinical Cancer Training for Ph.D.s
Comparative Molecular Pathology Research Training Program
University of Cambridge/GlaxoSmithKline Oncology Fellowship

Basic Science Fellowships:
Cancer Research Training Awards
Visiting Fellow Program

To participate in any of CCR's nine clinical fellowship programs, candidates must:

- Have an M.D. degree from an approved U.S. or Canadian medical school or hold an E.C.F.M.G. certificate (many candidates also have a Ph.D. degree, and some have completed a general or subspecialty residency)
- Be U.S. citizens, permanent residents of the U.S., or non-citizen alien nationals eligible for a training visa

CCR does not participate in the National Resident Matching Program.

For more details about specific programs, including application dates, visit *http://ccr.cancer.gov/careers/*

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NCI Profile

Michael E. Menefee, M.D.

Hematology/Oncology Postgraduate Fellow
Center for Cancer Research

Dr. Menefee graduated from Meharry Medical College and did his internal medicine internship and residency at the Mayo Clinic. His research at NCI involves a study of combination chemotherapy and surgical resection to treat adrenocortical cancer.

Black Bag: When did you get interested in science and medicine?

Dr. Menefee: I guess my interest in medicine first began toward the end of my high school years. I actually was interested in orthopedic surgery and sports medicine at the time, with thoughts of becoming a physician for a professional sports team. However, after I matriculated to Meharry Medical College, I was mentored by Dr. Ernest Turner at the Sickle Cell Center and developed an interest in clinical research. During my training at Mayo, I spent a great deal of time caring for oncology patients and saw the need for research along with the opportunity to provide meaningful care to patients.

Black Bag: Can you talk a little about your experiences in the Fellowship program?

Dr. Menefee: I'm in my second year of the Postdoctoral Fellowship program, working in the Cancer Therapeutics Branch. The emphasis of our team is on using novel therapeutics to help overcome what we call multi-drug resistance in tumors. Currently, I am involved in two clinical trials, one involving patients with renal cell carcinoma (kidney cancer) and another involving adrenal cancer. In addition to the clinical trials that I am involved in, I'm also participating in a master's program through Duke University. It's a program that is offered to all clinical fellows at the NIH and provides an opportunity to learn and refine one's skill in clinical research. The remainder of my time is divided between patient care with my continuity clinic at the National Naval Medical Center, developing new protocols, and participating in the didactic components of our training program.

Black Bag: How important at this point do you see NCI's program to what you anticipate will be your clinical and teaching future?

Fellowships in NCI's Division of Cancer Epidemiology and Genetics (DCEG)

DCEG scientists conduct an international program of population-based studies to identify environmental and genetic determinants of cancer. In carrying out its mission, DCEG is at the cutting edge of developing approaches to unravel complex gene-environment and gene-gene interactions in cancer etiology. Investigators at all levels of their careers work collaboratively to bring together the scientific disciplines needed to conduct these studies. This environment is exciting and productive, and presents extraordinary opportunities for young scientists who are launching their research careers.

Courses are tailored to the unique research needs in cancer and genetic epidemiology.

DCEG fellows design, conduct, and analyze research related to the etiology of cancer in human populations. Fellows gain experience with interdisciplinary and multi-center collaborations. Investigations include cohort and case-control studies in the U.S. and international locations. Fellows participate in protocol development, feasibility studies, case-control and prospective cohort studies, family studies, genetic and biochemical assays, data collection and analysis, and manuscript preparation and publication. Opportunities exist to initiate new investigations and to compete for funding.

Professional skills development and preparation for a future career in epidemiology are an integral part of DCEG fellowships. Courses are tailored to the unique research needs in cancer and genetic epidemiology. Topics include: molecular epidemiology, radiation epidemiology, clinical pathology applied to epidemiology research, and career development, including grant writing, preparing scientific publications, communicating, negotiating, and interviewing.

DCEG Research Areas:

Cancer Health Disparities
Molecular Epidemiology
Biostatistics
Radiation Epidemiology
Viral Epidemiology
Nutritional Epidemiology
Occupational and Environmental Epidemiology
Hormonal and Reproductive Epidemiology
Genetic Epidemiology
Clinical Genetics

Postdoctoral training within DCEG lasts for up to five years under the mentorship of NCI senior scientists. Fellows may work with multiple researchers on a variety of projects, conduct studies independently, participate in all DCEG activities, and attend and present at scientific meetings. Candidates must:

- Have a doctoral-level degree (e.g., Ph.D., M.D.), or be pursuing such a degree in epidemiology, biostatistics, genetics, or fields related to the fellowship program of interest
- Have prior training and research experience in epidemiology
- Be U.S. citizens, permanent residents of the U.S., or non-citizen alien nationals eligible for a training visa

NCI Profile

Barry L. Gause, M.D.

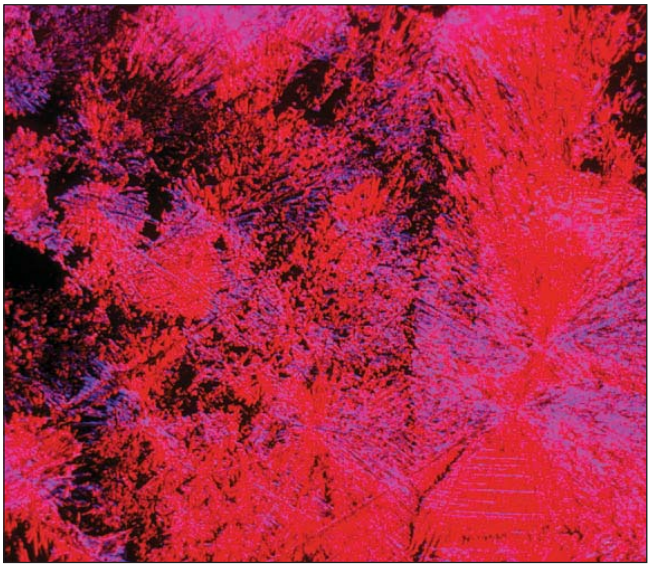
Principal Investigator
Medical Oncology Clinical Research Unit
Center for Cancer Research

Dr. Gause received his M.D. from Michigan State University, College of Human Medicine. He completed clinical training in internal medicine at Emory University, followed by training in medical oncology and tumor immunology at NCI. Dr. Gause worked in the extramural community at the Howard University Cancer Center and now serves on its advisory committee. His major interests are in tumor vaccine development. Dr. Gause also directs NCI's Fellowship Training Program in Medical Oncology.

Black Bag: Can you tell us a little about your own current research?

Dr. Gause: Right now, we're studying cancer immunotherapy, and the objectives of our research are to develop immunotherapeutic models for the treatment of various cancers. We think that vaccines may one day prove even better than chemotherapy for the treatment of certain cancers, and we are starting to get to some of the basic biology behind the development of these vaccines. We've learned a lot about the immune system—especially since the 1970s—so that people have been able to target the immune response to tumors. It's becoming very high-tech. At the present time, we are evaluating the clinical and immunological activity of two vaccine types: idiotype vaccines in patients with advanced stage indolent lymphomas and patients with multiple myeloma. We are also evaluating the ability of various biological agents to act as adjuvants.

We do realize the limitations of these vaccines, however. Vaccines work best in patients who have very low volumes of disease. They would either be more effective in someone who has had cancer before and you know that they are at increased risk of the disease coming back, or a person who is already at an increased risk of cancer. Also, cancer is a multitude of diseases



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Apply online:
http://dceg.cancer.gov/fellowships.html

NCI's Cancer Prevention Fellowship Program (CPFP)

CPFP provides state-of-the-art training in cancer prevention and control to physicians and postdoctoral scientists from a multiplicity of health-related disciplines. The CPFP offers training toward a Master of Public Health degree at any accredited university in the U.S. during the first year, followed by mentored research with investigators at NCI. In addition to the outstanding opportunities for cutting-edge basic science laboratory studies, epidemiologic research, and behavioral research that have been the hallmarks of the program since its inception in 1986, specialty training is offered in clinical cancer prevention research and in the ethics of cancer prevention and public health. Other educational opportunities are provided throughout the fellowship to complement Fellows' training, including the NCI Summer Curriculum in Cancer Prevention, the Molecular Prevention Laboratory, the weekly NCI Cancer Prevention and Control Colloquia Series, and the weekly Fellows' Research Meetings, as well as leadership and professional development training and a variety of training opportunities outside NCI.

The typical duration of the Program is three years. Applications are reviewed on a yearly basis (application deadline September 1). Candidates must:

- Possess a Ph.D., M.D., J.D., or other doctoral degree
- Be a U.S. citizen or permanent resident of the U.S. at the time of application

http://cancer.gov/prevention/pob

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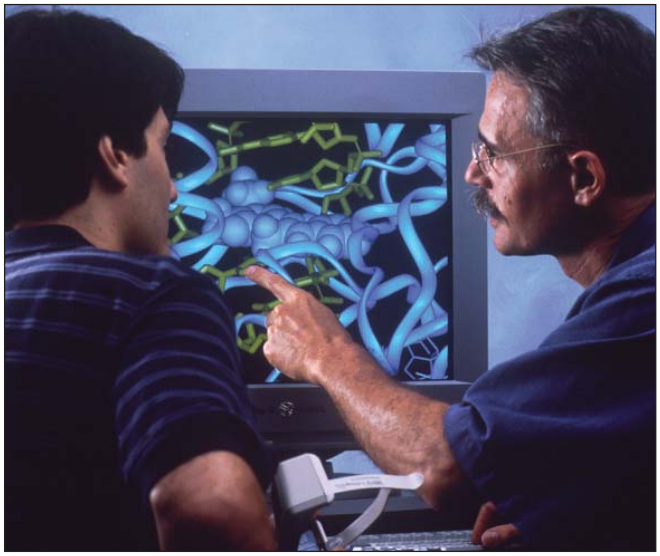

NCI Profile

Gladys M. Glenn, M.D., Ph.D.

Staff Scientist and Medical Officer
Genetic Epidemiology Branch
Division of Cancer Epidemiology and Genetics

Dr. Glenn received an M.D. and a Ph.D. in Molecular Biology from the University of Pennsylvania School of Medicine and Graduate School, respectively. She completed her medical internship and residency at the Thomas Jefferson Hospital and fellowship training at the Johns Hopkins Oncology Center. Dr. Glenn joined NCI's Laboratory of Immunobiology in 1984, beginning, with colleagues, the early molecular biology investigations that led to identifying the von Hippel-Lindau disease gene, the first of several hereditary kidney cancer susceptibility genes later identified. Dr. Glenn is now with the Family Studies Section of the Genetic Epidemiology Branch and continues work as the primary physician in the screening clinic for hereditary kidney cancer syndromes.

Black Bag: Did you always know you wanted to go into research?

Dr. Glenn: I was originally going to be a teacher because I already had children when I went back to college. But my first semester, I had an outstanding teacher in an exploratory life sciences course who inspired me greatly from the first day in her class. Plus, the way she presented the material was so much more interesting than my boring high school biology class. I was captured from then on. Also, molecular biology was beginning to come into its own at that time and I had a strong desire to understand biological phenomena at the molecular level. I found it very intriguing. Although I was interested in the more basic sciences, I decided to go to medical school for purely practical reasons when another one of my professors counseled me that at the time, the job market for Ph.D.s was terrible. In the end it all turned out well, because now I work mainly with patients, and I enjoy the patients so much.

Black Bag: Describe the research you are doing currently?

Dr. Glenn: The work I'm doing now—finding genes that cause cancer in families—was actually started in the laboratory, and continued when I began to see the patients with the cancers I had studied in the lab. That was so great because I was seeing the cancer syndromes from both sides and that's what I always wanted to do. Currently, I work with two research teams: one clinical team, most of whom are surgeons or clinical research nurses, and a second team consisting of basic scientists working in the laboratory and on informatics. I really do get the best of both worlds. Along the way, a lot of people told me I couldn't do both, but I am!

Black Bag: How did you get involved with NCI?

Dr. Glenn: Because I had not yet done any bench work in molecular biology, after a two-year medical oncology fellowship, I came to NCI for a staff fellowship in a laboratory and to get some experience in molecular biology. NCI has been great. There are so many opportunities here to do great work and to learn. We have speakers and conferences regularly, focusing on many scientific disciplines related to advances toward cures for cancer. We share our findings through our publications in the world literature, participation in national and international meetings, and collaborations with scientists inside and outside of NCI. I would say the collegial atmosphere contributes to the nurturing culture of the Institute.

Black Bag: What advice would you give to a minority med student considering a career in research?

Dr. Glenn: I would recommend that they ask themselves, "What would I like to be doing ten years from now? Then, envision themselves in each of the settings as they ask: Would I like to be in a private practice seeing patients, or would I

NATIONAL CANCER INSTITUTE

NIH Loan Repayment Programs

NIH Loan Repayment Programs (LRPs) are a vital component of our nation's efforts to attract health professionals to careers in clinical, pediatric, health disparity, or contraceptive and infertility research. In exchange for a two-year commitment to a research career, NIH will repay up to $35,000 per year of the applicant's qualified educational debt, pay an additional 39% of the repayments to cover federal taxes, and may reimburse any state taxes that result from these benefits.

NIH will repay up to $35,000 per year of the applicant's qualified educational debt.

Extramural LRPs

Doctoral-level clinical researchers receiving nonprofit or U.S. government funding (NIH grants are acceptable but not required) are eligible for these extramural LRPs:

- Clinical Research LRP
- Clinical Research LRP for Individuals from Disadvantaged Backgrounds
- Health Disparities LRP
- Contraception and Infertility Research LRP
- Pediatric Research LRP

Extramural LRP candidates must:

- Have a doctoral-level science or medical degree
- Be funded by a domestic nonprofit or U.S. government entity
- Commit 50% of their time for two years to the research
- Have an educational debt that is at least 20% of their "institutional base salary" (the salary paid by the institution where they conduct research)
- Not be full-time federal government employees
- Be U.S. citizens or permanent residents of the U.S. at the time of application

Intramural LRPs

The intramural LRPs established to attract health professionals to conduct research at NIH include:

- General Research LRP
- General Research LRP for A.C.G.M.E. Fellows
- Clinical Research LRP
- Clinical Research LRP for Individuals from Disadvantaged Backgrounds

Intramural LRP candidates must:

- Have a doctoral-level science or medical degree
- Be funded by a domestic nonprofit or U.S. government entity
- Be employed by or have a firm commitment of employment from an authorized official of NIH in the NIH intramural research program
- Have an educational debt that is at least 20% of their annual NIH base salary
- Be U.S. citizens or permanent residents of the U.S. at the time of application

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