Research for North Carolina:
The University Cancer Research Fund

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On November 19, 2007, the North Carolina Department of Health and Human Services announced that cancer had passed heart disease to become North Carolina's number one cause of death.[1] *On February 12, 2008, Ms. Kathleen Casey-Kirschling, a retired school teacher, born one second after midnight on January 1, 1946, became the first baby boomer to receive a Social Security benefit payment.*[2,3]

Cancer currently is, and will continue to be, a major health problem for North Carolina. Our state is growing and growing older. The US Census Bureau projects that by 2030, North Carolina will be the country's seventh most populous state with more than 12 million citizens. The projected growth between 2000 and 2030 is roughly equivalent to absorbing the populace of South Carolina.[4] Over that same period, as North Carolina's estimated 2.3 million baby boomers follow Ms. Casey-Kirschling and become eligible for benefits, the number of North Carolinians aged 65 years and older is expected to double.[5] Because age is the leading risk factor for cancer, North Carolina's current population growth will result in a doubling of the absolute number of cancer patients and survivors, even as research and improved health care lower rates of new cancers and cancer deaths.[6] Already North Carolina's leading cause of death, cancer will remain a daunting health challenge for the state for several decades to come.

Facing that challenge and looking to create a better future for North Carolina, the North Carolina General Assembly established the University Cancer Research Fund (UCRF) in July 2007. The UCRF promotes cancer research at the University of North Carolina at Chapel Hill (UNC) and its UNC Lineberger Comprehensive Cancer Center, the North Carolina Cancer Hospital, and the UNC Health Care System. As part of this *North Carolina Medical Journal* issue highlighting cancer in North Carolina, we describe the University Cancer Research Fund, outline its Year One priorities and plans, and briefly report on its progress.

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The Fund

The University Cancer Research Fund's goal is to save lives and reduce suffering from cancer in North Carolina and beyond through cancer research that emphasizes 3 areas:

- *Discovery.* Creating knowledge that improves our understanding of the causes and course of cancer.
- *Innovation.* Using that new knowledge to develop new and better ways to prevent, find, and treat cancer.
- *Delivery.* Applying advances to improve cancer care, screening, and prevention across the state.

To achieve these goals, the state has invested $25 million to the Fund during FY 2007-2008. That initial investment is set to increase to $40 million in FY 2008-2009 and then to $50 million in FY 2009-2010 and in subsequent years. Revenues supporting the Fund come from the Tobacco Trust (a portion of the state's 1998 Master Settlement Agreement), an increase in the tax on tobacco products other than cigarettes, and the General Fund.[7]

Established as a special revenue fund in the Office of the President of the University of North Carolina and dedicated to funding cancer research at the UNC Lineberger Comprehensive Cancer Center and UNC Hospitals, the Fund is governed by the legislatively-established Cancer Research Fund Committee.[7] The Committee includes the president of the University of North Carolina (Erskine Bowles); the deans of the University of North Carolina at Chapel Hill Schools of Medicine (William Roper), Pharmacy (Robert Blouin), and Public Health (Barbara Rimer); the director of the UNC Lineberger Comprehensive Cancer Center (Shelton Earp); and 2 prominent, national cancer leaders selected by the Committee (Edward Benz, president and chief executive officer of the Dana-Farber Cancer Institute in Boston, MA, and John Mendelsohn, president of the University of Texas M.D. Anderson Cancer Center in Houston, TX.)

Year One Priorities and Plans

During the Fund's first year, it has accelerated cancer research by investing in scientific expertise, technology, infrastructure, and innovative research guided by 8 key strategies:

- Assess cancer in North Carolina, paying attention to disparities.
- Promote innovation in cancer prevention and early detection.
- Bring knowledge about the genetics of cancer to clinical settings.
- Turn basic research into new drugs and other cancer therapies.
- Monitor patients' early responses to therapy and speed clinical trials.
- Apply findings to offer world-class patient care across the state.
- Launch nation-leading research on cancer survivorship.
- Invest in cutting-edge researchers and innovative research ideas.

These initial strategies, which capitalize on existing institutional strengths, are fundamental stepping stones to the future of cancer care, prevention, and early detection in North Carolina. We must apply our burgeoning understanding of genetics to identify people and families predisposed to cancer, find new targets for drugs, and improve patients' outcomes by tailoring treatments to the specific characteristics of their cancers. We must develop and exploit new knowledge about nanotechnology—generated at the interface of chemistry, physics, materials science, and biology—to create, evaluate, and deliver cancer drugs and imaging tests that are more effective and have fewer side effects. We must not only increase the number of cancer survivors in North Carolina, we must understand their needs and challenges so that they live better, as well as longer, with cancer. To benefit the state, we must increase access to, and quicken the pace of, clinical trials so we can identify the best new treatment, prevention, and screening techniques. Then, having identified those new best practices, we must have the ability to ensure delivery of those advances to all corners of North Carolina. Finally, we must also understand why some people do not benefit from these advances in prevention, detection, and treatment, and we must then turn that understanding into strategies to overcome those barriers that lead to disparities in outcomes.

The Fund's Year One strategies will be neither the only nor the final strategies. Cancer and cancer research are dynamic. New directions will emerge as once well-regarded approaches lead to dead ends. Development of strategic planning and evaluation processes are an integral part of the Fund's Year One priorities and plans. In addition, the Fund has conducted 6 public listening sessions across the state in Asheville, Charlotte, Greensboro, Greenville, Raleigh, and Wilmington. Informed by public input, guided by strategic planning, and monitored by an independent evaluation, the Fund will be dynamic and responsive.

First Year Progress

Although the Fund's impact on North Carolina's cancer burden will evolve over many years, we have begun to make significant progress during Year One. These initial advances are laying the foundation for long-term success.

Attracting and keeping top-notch scientific expertise in strategic areas, such as drug discovery and development, is critical to the Fund's success. This past year the Fund helped bring 2 outstanding researchers to the UNC Eshelman School of Pharmacy and the UNC Lineberger Comprehensive Cancer Center—Drs Stephen Frye and William Zamboni. By designing and synthesizing compounds, medicinal chemists bridge the gap between the therapeutic target and drug. As the worldwide head of discovery medicinal chemistry at GlaxoSmithKline, Dr Stephen Frye and his group developed Avodart and the compound that became Tykerb, a recently approved drug for advanced breast cancer. At the University of North Carolina at

"After what I went through as a veteran woman, I want other veteran women to know they are not alone."

— Margo
Breast Cancer

Chapel Hill, Dr Frye will lead the Center for Integrative Chemical Biology and Drug Discovery. Helping move newly developed drugs into early phase clinical trials requires additional specialized expertise in clinical pharmacology and facilities. Dr William Zamboni, who came to UNC from the University of Pittsburgh Medical Center, is developing a program in translational drug development that will include establishing a Good Laboratory Practice (GLP) Analytical Facility at UNC. This GLP facility will enable researchers to assess patients' metabolism of drugs at the level required by the Federal Drug Administration (FDA). The facility, which will be the only one of its kind in the southeast, will stimulate testing of novel drugs in clinical trials both at UNC and, through collaboration, at other centers and sites.

Fund investments in new technology and equipment have also set the stage for success, both clinical and economic. Physicist Dr Otto Zhou and his colleague Dr Jianping Lu are applying carbon nanotube technology to imaging. With Fund support for equipment, Dr Zhou is building a prototype nanotube tomosynthesis 3-dimensional system for breast imaging, an approach that could lead to high-quality breast cancer screening without painful compression of the breast. Dr Zhou has also led the development of an imaging-guided radiation therapy device that allows oncologists to see the tumor in real-time during treatment. This device, which is a product of XinRay, a Research Triangle Park joint venture with Siemens Medical, will soon begin testing in clinical trials at UNC Chapel Hill.

The Fund has initiated programs and collaborations to reach out across the state. In December 2007, East Carolina University, the Brody School of Medicine, and the Leo W. Jenkins Cancer Center established a Fund-supported cancer research partnership with the University of North Carolina at Chapel Hill, the UNC School of Medicine, and the UNC Lineberger Comprehensive Cancer Center. This partnership will expand access to clinical trials and promote collaborative clinical and translational research in addition to integrating ongoing cancer research at the 2 centers. Dr Cathy Melvin, director of the UNC Lineberger's Dissemination Research Core, is leading the development of NC SPEED—Statewide Push for Excellence, Engagement, and Delivery. In a collaboration involving the Fund, the North Carolina Advisory Committee on Cancer Coordination and Control, and the American Cancer Society, NC SPEED is developing and studying methods to accelerate the movement of proven interventions from academia to communities. Also supported by the Fund, Dr Thomas Shea, UNC Lineberger associate director for clinical outreach, is working with regional centers to build effective communication and interaction that can promote dissemination of best cancer care clinical practices as well as involvement in clinical trials.

The Fund is investing in infrastructure and resources that enable cancer research. The North Carolina Central Cancer Registry is the state's data source on new cancer cases and an invaluable research partner for cancer researchers across the state. The Fund is helping the Registry enhance its data collection by electronically connecting to pathology laboratories and identifying new melanoma, prostate cancer, and other cancers that are escaping the traditional hospital-based reporting system. The Fund is also establishing the UNC Survivorship Cohort Study at the University of North Carolina at Chapel Hill. Over the next 10 years, this study will identify, enroll, and monitor thousands of consenting cancer patients. Study data, which will include epidemiologic, psychosocial, clinical, and biologic measures, will provide a unique and rich resource for understanding cancer outcomes, including how to increase the quality and length of life for cancer survivors long after their treatment ends. From the current pilot effort focusing on colon cancer, the Survivorship Cohort Study plans to expand to other cancers and then partner with other institutions statewide.

The Fund is supporting and stimulating new research. The Jeanne Hopkins Lucas Breast Cancer Study, named after the North Carolina state senator who died of breast cancer in 2006, seeks to understand a deadly form of breast cancer that more often affects African American women. Led by Dr Robert Millikan and colleagues, this interdisciplinary, population-based study will be one of the largest studies of cancer racial disparities ever conducted. The Fund has also supported innovative cancer research through its 2 competitive seed grant programs, the Innovation Awards and the Clinical Innovation Awards. During Year One, these 2 programs combined have made 26 awards totaling $2.8 million to cancer researchers.

The Fund's investments have already begun to bear dividends. The Fund's presence and commitment to cancer research has led to more than $40 million in grants from external sources, including private philanthropy, foundations, and the National Institutes of Health.

Summary

In 2008 an estimated 40 000 North Carolinians will be diagnosed with cancer. This disease is the number one cause of death in our state and will claim more than 17 000 lives this year.[8] North Carolina is swimming against a demographic tide of growth and aging that will bring 80 000 new cancer cases by 2050, despite continued improvements in cancer prevention, early detection, and treatment.

By establishing the University Cancer Research Fund, North Carolina has taken a bold, nation-leading step forward toward improving the future health and well-being of its citizens. Research that creates new knowledge, turns that knowledge into advances in treatment, screening, and prevention, and then ensures delivery of those advances across the state—that research is the key that unlocks the doors to a new and better future. The Fund will make that research possible.

As has often been the case, North Carolina was ahead of the national curve by creating the UCRF in July 2007. In November 2007, Texas passed a $3 billion bond referendum to provide $300 million annually to support cancer research over the next decade.[9] In 2005, California passed a $3 billion bond referendum to support stem cell research.[10] Perhaps noting the downturn in federal funding for biomedical research, other states are watching these states' investments to see if they improve their citizens' health and make researchers nationally competitive. We will rigorously evaluate the UCRF to show the nation that North Carolina has taken a bold and wise step.

The North Carolina General Assembly and the people of North Carolina have presented the University of North Carolina at Chapel Hill, the UNC Lineberger Comprehensive Cancer Center, the North Carolina Cancer Hospital, and UNC Health Care with an astounding opportunity and responsibility. We embrace that opportunity and that responsibility and pledge ourselves to our shared vision of a better future for the citizens of North Carolina. **NCMJ**

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