UCRF Strategic Plan

Background and Context

Introduction

Cancer has overtaken heart disease as the leading cause of death in North Carolina. An estimated 40 percent of North Carolinians will develop cancer during their lifetimes. Approximately 46,416 North Carolinians are projected to receive a cancer diagnosis in 2009 with 18,277 projected cancer deaths this year. These numbers will increase as the population ages unless cancer prevention, early detection, and therapeutic research intervene. And as with other diseases, the impact of cancer falls disproportionately on disadvantaged communities. For example, African-Americans in North Carolina experience higher cancer incidence and mortality rates compared with other groups.

This growing challenge motivated the state legislature to fund the NC Cancer Hospital and, in August 2007, to create the University Cancer Research Fund (UCRF) "only for the purpose of cancer research under UNC Hospitals, the Lineberger Comprehensive Cancer Center, or both." With up to \$50 million of funding per year from the Tobacco Trust Fund, an increased tax on smokeless tobacco products, and general revenue, the UCRF provides a unique opportunity to develop leading national (and international) cancer research and innovation while improving cancer outcomes for the people of North Carolina.

"The UCRF's mission is to ensure that future generations of North Carolinians will develop cancer less often and live longer and better when they do. Research creates new knowledge, turns that knowledge into innovative treatment, screening, and prevention, and then assures delivery of innovations across the state – that research is the key unlocking the doors to a new and better future. The UCRF is helping make that research possible." (UCRF 2007-2008 Annual Report)

Strategic planning process overview

In order to most effectively realize the vision of improving cancer outcomes in North Carolina and to maximize the return on the State's investment, UNC and its Lineberger Comprehensive Cancer Center (UNC Lineberger) sought to develop a UCRF strategic plan, with a focus on clear goals with measurable outcomes and metrics of success. To that end, the strategic planning firm AltshulerGray was hired to lead the planning process and SRA International was retained to develop an evaluation plan.

AltshulerGray consultants worked with the UNC Lineberger Program Planning Committee (PPC) to establish a two-phase process that included a range of university stakeholders as well as outside experts. The initial phase included interviews with 50 internal and external stakeholders, a survey of 243 UNC faculty members, and six listening sessions conducted by UNC leaders to gather feedback from communities across the state, in addition to regular meetings of the PPC and reports to the UNC Oversight Committee, chaired by Dean and Health System CEO Bill Roper, and the governance committee by the UCRF statute, the Cancer Research Fund Committee, chaired by President Erskine Bowles. This outreach and extensive faculty input built consensus around a vision, guiding principles, and a framework to help determine initial research strategies. The result was the definition of a three-tier investment strategy for UCRF funds, comprised of *Research Priorities*, an *Opportunity Fund*, and *Critical Infrastructure*, described in greater detail below.

Initial faculty feedback and subsequent discussions led to the identification of a list of potential research priorities. These opportunities were evaluated according to three criteria:

- Will it address the needs of North Carolina, in terms of the goal of reducing the cancer burden in the state?
- Can we be world class at it? (Does it build on existing strengths, and is there an opportunity to lead?)
- Is there a strong economic model/justification for UCRF investment?

As a result of extensive analysis and faculty feedback, including a faculty-wide survey, three interconnected thematic research priorities were identified as the initial key strategic focus areas:

Understanding Genetics and its Role in Cancer Causation and Treatment, Developing New Cancer Treatments, and Optimizing NC Cancer Outcomes.

These three areas were the top priority areas identified in the faculty survey.

In the second phase of strategic planning, three "theme teams" comprised of 5-7 faculty were charged with creating strategic and investment plans for each prioritized research area. In addition to laying out a vision of what would be possible with focused investment, the teams were asked to delineate the rationale for investment (i.e., why should this be done now, and why at UNC), current strengths and gaps at UNC, a potential funding model (e.g., how UCRF investment would be expected to generate increased funding from other sources, such as federal funding), and an implementation and launch plan. External experts from leading centers across the U.S. are being brought in to review the plans and provide constructive feedback to the proposals.

At the same time, faculty groups were convened to evaluate opportunities for disease-focused UCRF investment. 51 faculty members served on 12 disease teams. Each team produced a report outlining the opportunities and resource needs for its specific disease area and highlighting how research in these areas could best leverage investments in the three prioritized research initiatives. The theme teams used this disease team input to further refine their own plans. Critical needs identified by the disease teams to bolster clinical excellence and outreach — essential for conducting UNC and state-wide clinical cancer research — were considered as part of the planning for UCRF critical infrastructure investment.

Guiding principles and philosophy

Based on the stakeholder interviews in the first phase of strategic planning, the PPC developed guiding principles for investment:

- The UCRF should fund breakthrough innovation and excellence in cancer research, propelling UNC to national and international leadership
- UCRF research should focus on areas of great concern to the citizens of North Carolina
- UCRF research should have a real and tangible impact on the health of the state of North Carolina and beyond

Following from these guiding principles, a clear set of ground rules was established for determining how UCRF funds would be best spent. Specifically, it was agreed that UCRF funds *should*:

- Focus major resources on a limited set of opportunities in order to have the greatest impact
- Fund initiatives where UNC has the opportunity to establish a leadership position
- Be catalytic, self-sustaining, and provide leverage for additional funding from extramural sources
- Build fundamental cancer-related research capabilities that benefit UNC research programs
- Enhance North Carolina's economy by creating jobs, intellectual property, and start-up companies.

At the same time, it was agreed that UCRF funds *should not*:

- Invest diffusely in an attempt to make incremental improvements everywhere
- Provide in perpetuity funding that would limit future flexibility
- Undermine faculty innovation and competitiveness by eliminating the need for extramural grant funding
- Substitute for existing university or health system funding or new philanthropy
- Make expenditures based upon institutional or other needs outside cancer research.
- Negatively impact other research on campus, for example by appropriating shared research infrastructure or resources

Strategy Overview

The UCRF strategic plan is comprised of three tiers: Research Priorities, Opportunity Fund and Critical Infrastructure Fund.

The term *Research Priorities* refers to a limited number of initiatives, where with focused investment in major scientific programs, disease-based initiatives, or cutting-edge research platforms, UNC could have a substantial impact and achieve recognition as a world leader.

The initial UCRF research priorities are:

- Understanding Genetics and its Role in Cancer Causation and Treatment
- Developing New Cancer Treatments, and
- Optimizing NC Cancer Outcomes.

The first two will interrelate, making fundamental observations that will, as quickly as possible, be turned into clinical applications. The third will seek to understand North Carolina's cancer problem at a level unprecedented in the United States, and design research interventions to rectify these problems at the community, health system, and practice level.

The *Opportunity Fund* will ensure that the UCRF will remain nimble, allowing the opportunistic pursuit of programs, projects and capability development that cannot be foreseen in a strategic plan and would expand the capacity of the major initiatives.

Finally, the *Critical Infrastructure Fund* will enable these major initiatives by providing critical resources for cancer research that are not readily obtainable by extramural funding but upon which future progress relies. (See figure below).

Tier III Cancer Genetics/ Genomics Cancer Treatments Developing New Cancer Treatments Tier II Opportunity Fund Innovation, Technology & Recruitment Infrastructure Clinical Excellence & Outreach, Clinical/Translational Research Cores, Tissue Procurement & Informatics, Population & Basic Science Cores

Further detail on each of these strategic investment areas is provided in the next section.

Research priorities

Supporting high-priority research is at the core of the UCRF strategic plan, as reflected in the guiding principles described above. In considering which areas to identify as initial research priorities, the PPC and UNC leadership assessed the relative merits of selecting specific cancer types or broader research themes. Understanding that basic and clinical discoveries often cut across multiple diseases, it was concluded that the UCRF would have the greatest impact if structured around addressing a set of critical research questions that could catalyze breakthroughs in all cancer types while extending the reach of UCRF investment beyond the fund itself (e.g. through resource acquisition and development available to all UNC). Nevertheless, disease-specific UCRF investment is seen as critical, and will occur within the initiatives, as well as via the Opportunity Fund and the clinical excellence infrastructure investment. Creating individual clinical/translational research efforts led by visible clinician-scientists will be central to the national recognition to which UNC, with the help of UCRF, aspires.

A broad review of UNC strengths and key opportunities led to the selection of *Understanding Genetics* and its Role in Cancer Causation and Treatment, Developing New Cancer Treatments, and Optimizing NC Cancer Outcomes as the three initial research priorities. These three research themes span the basic, clinical, and public health research spectrum, but in a focused manner that will add critical knowledge – from improving our understanding of the underlying causes and progression of cancer, to developing novel therapies based on this new understanding, to optimizing the dissemination and delivery of state-of-the-art care to the citizens of North Carolina. An overview of each thematic initiative is provided below.

Understanding Genetics and its Role in Cancer Causation and Treatment

Goal: To discover the genes that predispose families to cancer, and cancer patients to poor treatment outcomes. To investigate the mutant genes in specific cancer subtypes that lead to cancer therapy failure.

Why do certain cancers run in some families and not others? Why do patients respond to treatment differently? The answer to these questions lies in the genes we inherit from our parents. And cancer itself is caused by the mutation of these inherited genes. Although tremendous progress has been made in our understanding of genetics over the past two decades culminating in the sequencing of the entire human genome, these advances have not been sufficiently focused on the practical matter of human health and have yet to enter the clinical arena and tangibly improve the care of patients. Integrating basic research with clinical care will enable us to detect earlier and more curable forms of cancer and to develop more effective, highly targeted therapies. With significant expertise across the genetic spectrum enhanced by extraordinary support from UCRF, UNC is well positioned to realize the promise of the "Genetic Revolution".

The UCRF Cancer Genetics initiative will seek to track down inherited differences to determine whom to target for early detection, prevention and specific therapies, and will identify the derangements in individuals' tumors in order to individualize therapy. The initiative will pursue these goals by integrating and expanding existing strengths at UNC in genetic and molecular analysis from basic science through clinical application, and enabling integrated, high-throughput analyses. This vision will be realized through strategic recruitment of faculty in emerging fields, farsighted investment in cutting-edge technology, enhanced organizational capability for integrative analysis, and a focus on cancers that are especially amenable to this approach. This collaborative and multi-disciplinary strategy will incorporate disparate disciplines into a unified effort with the ultimate goal of improving our ability to prevent, detect, and treat cancer in North Carolina and beyond. This strategy will also provide fundamental knowledge upon which the next initiative will base its attempt to create new therapies.

Developing New Cancer Treatments

Goal: To devise novel therapies targeted to the specific vulnerabilities of treatment resistant cancers. To develop new ways of delivering therapeutic agents to reduce toxic side effects for all patients.

Of the 1.5 million people who will get cancer next year, fully 500,000 will die with untreatable forms of cancer. Some who receive curative treatment will have to live with debilitating side effects. Clearly, today's armamentarium is insufficient to deal with many forms of advanced cancer. In addition, our therapies need to be based on biologic principles rendering them more effective and less toxic. Tremendous progress in our understanding of cancer has set the stage for new methods. However, it is true that many elegant basic cancer research observations never prove of value in the clinic. For example, although nearly 50,000 papers have been published on p53, a protein that is known to be involved in preventing cancer, our understanding of how to exploit this molecule for therapeutic endpoints remains virtually nil. For a novel discovery to benefit an actual human cancer patient, the new understanding must provide a "druggable" approach to therapy – the overriding challenge with regard to curing cancer.

The UCRF New Cancer Treatments initiative will seek to devise novel therapies targeted to the specific vulnerabilities of cancers, to prevent the emergence of resistant cancer cells and to eliminate the small proportion of cancer initiating cells which appear to prevent cancer cure by evading therapy and repopulating tumor sites. To reduce the toxicity of existing and novel therapies, research will also focus on new ways of delivering those drugs. In doing so, it will become the model for academic drug discovery and delivery research in cancer, providing an outlet for UNC investigators to test innovative ideas in drug development, which will improve delivery and efficacy of cancer therapies. Through a framework of collaboration and significant financial support for new therapeutic ideas, this initiative will 1) find and convincingly validate new targets for cancer therapies, 2) develop small molecule compounds to modulate identified targets, and 3) provide better delivery and formulation of promising therapeutics.

As a result of these efforts, patients at our hospital will initially benefit from a larger portfolio of novel clinical trials involving agents that underwent some portion of pre-clinical development at UNC. In the longer term, we expect to see this initiative bring new start-up companies to the region that will employ North Carolinians, attract venture and federal funding, and eventually lead to discoveries with the potential to treat, ameliorate, and possibly even cure cancer.

Optimizing NC Cancer Outcomes

Goal: To use the state of North Carolina as a laboratory tracking the occurrence and treatment of cancer through data systems and large population- and hospital-based studies. To use these data to initiate research aimed at improving community prevention, early detection in the population, and the quality of oncology and survivor care.

There is a strong evidence base of prevention, early detection, and quality-of-care precepts that, if applied uniformly, would improve cancer outcomes and reduce the burden of cancer in North Carolina. But while advances in medical care and treatment have had a notable impact on improving cancer outcomes in some areas, there remain enormous challenges in closing the gap between what is known to work to reduce cancer burden and what actually takes place. In addition, the application of prevention and quality care are not uniform across our state or among its constituent populations.

As an additional opportunity for this UCRF initiative, the nation is about to undergo health care reform, and many are concerned about the potential "rationing" of critical cancer care services. Thus, the time is especially ripe to answer the questions: What works in cancer prevention and early detection? How do we make it cost effective? Do cancer risk factors and outcomes vary across our state? How do we ensure that lower socioeconomic populations receive the best preventive and cancer care services? And how do we get doctors and health departments to adopt evidence-based practices?

The UCRF Optimizing Cancer Outcomes initiative will seek to optimize cancer outcomes in North Carolina by conducting innovative research to understand how best to deliver preventative and early detection services and high quality care in populations. Working in settings that range from rural communities to physician practices to local governments, researchers from UNC's nation-leading Schools of Public Health and Medicine will systematically design, test, disseminate, implement, and evaluate methods to identify and modify cancer risk factors to ensure that all North Carolinians have an opportunity to lower their cancer risk, get appropriate treatment and to improve the quality and length of life for cancer survivors. Findings and practices found to be effective will be disseminated and implemented across the state.

UCRF funds will make this work possible by enabling 1) the creation of a unique, comprehensive cancer information data system that tracks cancer patients, cancer services, and cancer treatment outcomes at a level of detail unprecedented in the United States; 2) the accrual of a 10,000 cancer patient cohort at UNC Hospitals to investigate many questions related to cancer outcomes among cancer survivors including response to therapy, 3) nation-leading research in population health disparities that lead to different cancer risk profiles and poorer outcomes among African Americans and lower socioeconomic status North Carolinians; and 4) research into cost effective methods to increase adoption of evidence-based cancer prevention, early-detection, and quality of care practices by individuals, communities, health systems, and providers. Since no such fully integrated and interactive system exists in the United States as envisioned here, North Carolina will be able to assume a true leadership position in this critical area.

Opportunity Fund

Goal: To promote innovation broadly by funding novel approaches and taking advantage of emerging technologies. To sponsor recruitments that bring new directions to the research initiatives and contribute to the overall UCRF mission.

The UCRF is committed to ongoing innovation and renewal. Recognizing that science is dynamic and that a research-focused strategic plan must be nimble, the UCRF will designate funds to support emerging opportunities outside the initial three identified research priorities. This Opportunity Fund will consist of three main components: a competitive peer-reviewed innovative pilot projects program; a competitive peer-reviewed technology and equipment acquisition program; and support for high-profile faculty with significant potential to enhance the UCRF's mission.

Innovative Pilot Projects

This competitive peer-reviewed effort continues the successful Innovation Award program ongoing during the UCRF's first two years. Projects funded by the Innovation Awards have and will continue to produce data that allow researchers to obtain external funding to expand their research. Opportunity Fund pilot projects will complement those funded by the three research priority initiatives, diversify the UCRF's portfolio of innovative cancer research, and build research funding and excellence at UNC. Moreover, the Opportunity Fund pilot projects will provide an antidote to the current extramural peer-reviewed funding systems, which has been criticized for its conservative investment in incremental, rather than innovative, research.

Innovative Technology and Equipment

Being at the technologic-forefront increasingly distinguishes leading research universities from the rest and provides a competitive advantage in research funding. Leading-edge techniques enable leading-edge research and discovery. The Opportunity Fund technology and equipment program will support the acquisition of novel, leading-edge technology and equipment for the use by multiple faculty members and the development of shared research resources. As with the Innovation Awards, this program will be competitive and rigorously peer-reviewed.

High-Impact Faculty Recruitment

UNC has the opportunity to attract faculty with significant potential for a positive effect on the UCRF mission – but who do not fit neatly into one of the three research priorities. This third portion of the

Opportunity Fund will support the opportunistic recruitment of promising or established faculty. For example, the vast majority of our patients who die do so from metastatic cancer. The mutant genes driving metastasis will be the purview of the Cancer Genetics initiative and the drugging of targets promoting metastasis will be an outstanding aim for the New Cancer Treatments initiative. The Opportunity Fund will seed the recruitment of scientists in epithelial motility, metastasis genes, cell signaling systems biology, etc. and would enable the major research initiatives as well as the disease-specific programs. Opportunity Fund recruits over the next five years will include fundamental, translational, and population scientists. Prominent academic clinicians would be a high priority. They will propel UNC to national leadership in a particular clinical care specialty while helping to anchor a research program in that specialty.

Critical Infrastructure Fund

Goal: To expand the clinical care and research excellence of our faculty and provide all UNC researchers with the core resources necessary for clinical and translational cancer research. To initiate and maintain an outreach program beyond UNC for performing clinical care and quality of care research. To develop core resources in imaging, informatics, and fundamental research that will serve all faculty members. To plan and implement the UCRF research effort including its cancer research educational mission.

Innovative cancer research builds upon and is promoted by a strong, underlying infrastructure. External funding (NIH, etc) to enhance this infrastructure is lacking, despite acknowledgement that a healthy and proactively advanced research infrastructure is critical to innovative research and necessary to compete successfully for external research funding. To complement the three research priority initiatives and the Opportunity Fund, the UCRF will establish a Critical Infrastructure Fund. Initially, this Fund will focus on four critical underlying research infrastructure components: clinical excellence and outreach, informatics, imaging, and key existing shared research resources and services. Investing in this critical infrastructure will enable and enhance not only UNC's cancer research; it will also strengthen the infrastructure and effectiveness of the campus's entire research enterprise.

Clinical Excellence and Outreach

Maintaining a strong foundation of quality cancer care and outreach at UNC Chapel Hill is critical for enabling leading-edge clinical research and its successful translation into community practice. The new NC Cancer Hospital provides an ideal setting for pioneering clinical research. The Critical Infrastructure Fund will help UNC recruit oncologists to expand the patient base for enhanced clinical and translational research. In addition, the NC Cancer Hospital, combined with UCRF Infrastructure support, will provide the videoconferencing/telemedicine hub that links UNC with cancer centers and oncologists across the state. These links and other services will increase physician collaboration, both promoting research and patient care quality, while increasing statewide access to UNC clinical trials.

Informatics

Modern research methods, such as high-throughput sequencing and other genomics approaches, generate vast pools of data. Informatics is the alchemy transforms that base information into knowledge. Informatics takes raw output from across the research spectrum and creates well-characterized, well-managed data from across the spectrum of research that can be powerfully linked together and then mined and analyzed. Although fundamental to innovative science and the UCRF's research priorities, informatics, particularly bio-and clinical informatics, is in short supply at UNC and at most research institutions. The Critical Infrastructure Fund will support development of informatics at UNC by recruiting faculty scientists who can push the envelope of this emerging field.

Imaging

In the years ahead, imaging will drive many vital advances in cancer research, diagnosis and treatment. By providing researchers and clinicians with the ability to literally see in real-time the cancer tumor inside the patient (or animal, in the case of research), powerful new imaging technologies offer significant promise of diagnosing cancer earlier than previously possible and of more closely monitoring response to treatment (whether experimental, or in the clinic). UNC is extremely well-positioned to lead in

developing and applying these new imaging capabilities via its Biomedical Research Imaging Center and the under-construction Imaging Research Building. Supported by a forward-looking investment from the State of NC, the Imaging Research Building will be the largest research facility on campus. The UCRF will leverage this investment by the state and others by supporting purchase of key equipment and the recruitment of leading faculty and staff. The Imaging Research building will also have designated space for expanding the Developing New Cancer Therapies/Initiative both for drug development and nanomedicine as well as additional wet lab cancer research space.

Other Resources and Services

UCRF Critical Infrastructure funds will also help develop and expand other key research core facilities (such as tissue procurement and proteomics), clinical trials infrastructure, trainee support for the next generation of researchers, and research administration (including clinical trial contracting, clinical research administration, and other research administration). These resources will directly benefit the three research priorities, but will also have a broader impact -- benefiting all UNC researchers as well as partners outside of the university.

Taken together, the three-tiered UCRF investment strategy ensures that UNC maintains a strong focus on a few key areas where it can leverage existing strengths, achieve breakthrough results in cancer research, and make a tangible impact on cancer outcomes in North Carolina and beyond.

Investment Plan

In the first two years of the UCRF, while a long-term strategic and investment plan was being developed, funds were directed towards building or expanding clinical excellence to prepare for the opening of the North Carolina Cancer Hospital; critical research infrastructure; basic, population and clinical science faculty; the technological base for topnotch genetic and animal models cancer research; and a state-wide outreach program for both clinical and public health research. Key faculty recruitments and retention in areas of UNC strength were accomplished in the first two years. Many of these initial investments were prescient, laying important groundwork for what have now been identified as UCRF strategic priorities. The investment plan presented in this document begins in year 3 of the UCRF, with a fully-funded budget of \$50 million per year, but builds on the critical investments of the first two years.

For the next five years the Strategic Plan would, on average, allocate \$8 million yearly to the three initiatives (Cancer Genetics, New Cancer Treatments and Optimizing Cancer Outcomes). These initiatives will benefit, as will all UNC cancer research, from the \$16-17 million yearly Critical Infrastructure investments in clinical excellence faculty recruitment, clinical and translational research core resources, and imaging and informatics. A \$9-10 million Opportunity Fund will drive innovation, technology development and translational research opportunities that initially fall outside the research themes. The interrelatedness of cancer biology and discovery, and their translation from model systems to human applicability make it highly likely that research initiatives will also benefit from these recruitments and investments in innovation.

To accomplish the aims of UCRF in each of its three-tiered components, faculty must seek extramural funding to expand the overall capacity of UNC cancer research. The objective is for the UCRF investment to produce funding replacing existing expenditures, thereby freeing up UCRF funds for re-investments. Cancer research is a dynamic process and UCRF investments, if used correctly, will be catalytic in not only expanding the size of UNC's overall cancer research effort but also its accomplishments and reputation.

Organization and Implementation

The Cancer Research Committee—Erskine Bowles, Chair

The legislation creating the UCRF specified that allocations be made at the discretion of a Cancer Research Committee that would consist of five ex officio members and two appointed members. The five ex officio members are the President of The University of North Carolina, the Director of the Lineberger Comprehensive Cancer Center, and the Deans of the School of Medicine, School of Pharmacy, and School of Public Health. The remaining two members shall be selected from persons holding a leadership position in a nationally prominent cancer program. This group elected Ed Benz, President of Dana Farber Cancer Institute, and John Mendelsohn, President of MD Anderson. The Cancer Research Committee meets at least quarterly. The committee has been operating for two years and during its quarterly meetings has made decisions initiating many aspects of the research initiatives and critical infrastructure. They have received interim reports from the strategic planning process and will ultimately be responsible for approving and implementing the plan.

The Oversight Committee—William Roper, Chair

An Oversight Committee chaired by Dr. Roper, Dean of the UNC School of Medicine, CEO of the UNC Health Care System, and Vice Chancellor for Medical Affairs, provides ongoing monitoring of the UCRF. This committee includes leaders from throughout the Health Affairs Schools and the College of Arts and Sciences and is scheduled to meet quarterly to: monitor progress; provide advice on within year budget alterations; approve the award of innovation, program development, and research initiative pilot and project funding. They will also assess that expenditures and recruitments are congruent with the precepts of UCRF and the Cancer Research Committee.

UNC Lineberger Senior Leadership and Research Initiative Committees

The day-to-day management, planning, and coordination for the UCRF will be the responsibility of the UNC Lineberger senior leadership in frequent consultation with the Office of the Dean of the School of Medicine. The long-standing senior leadership team consisting of the director and associate directors for clinical research, basic science, population science, and outreach will be expanded to include the leaders of the three UCRF research initiatives. These will be considered to be at the associate director level. Each of the initiatives will be led by a committee that will consist of a rotating membership comprised of faculty members and senior scientists with specific expertise. Broad faculty input will come to the Cancer Center senior leadership through the program planning committee and the initiative leadership committees.

Other members of the senior leadership team will assume responsibility for the Opportunity Fund and Critical Infrastructure components of the UCRF. The full senior leadership will meet on a weekly basis to discuss activities and make decisions that affect the entire UNC Lineberger. Thus, UCRF leaders will be made aware of, and will participate in decision-making regarding, issues that extend beyond the UCRF. At the same time, a subcommittee of the senior leadership comprised of UCRF leaders may choose to meet to address UCRF-specific issues as they arise.

Each initiative committee will also be advised by a set of leaders in their relevant fields from top cancer centers across the United States. These advisors will meet with the committees at least yearly to review plans and observe the progress of each thematic area. These advisors will also be invited to join the UNC Lineberger Board of Scientific Advisors.

The UNC Lineberger senior leadership, in consultation with the School of Medicine Dean's Office, will develop and revise plans and propose detailed budgets for upcoming fiscal years. Those plans and budgets will be presented to the UCRF Oversight Committee, chaired by Dean William Roper, and if approved by that committee, presented to the Cancer Research Fund Committee, chaired by UNC President Erskine Bowles.

Ensuring Success

Defining success and measuring progress

While it will be years before the full effect of North Carolina's visionary investment in cancer research will be fully evident, it will be possible, and indeed, essential, to track progress and to adjust the strategy as needed. Specifically, it will be important to assess in an ongoing way whether UCRF funds are being spent most wisely and are being clearly directed towards improving the health of North Carolinians.

Is the UCRF being invested to generate the greatest possible return?

While it is impossible to predict where research will lead and what finding will emerge, it is possible to evaluate whether funds are being invested in such a way as to maximize their return. That is the purpose of this strategic plan – to focus UCRF funds on their best use -- however, the plan may need to be modified over time.

As described above, the UNC Lineberger Board of Scientific Advisors will be asked to evaluate the scientific progress associated with UCRF investment. As part of this evaluation, they will be asked explicitly to assess whether the funds are being used most effectively.

In addition to this qualitative review, there are other, more quantitative ways of measuring whether UCRF funds are being most effectively spent. One key metric is the growth in extramural funding, and in particular, in federal research funding. If UCRF funds are spent wisely, UNC researchers will be able to compete more successfully for additional research support. An increase in federal grants will serve as an important validation of the quality and value of UCRF investments. It will also satisfy a critical goal for the UCRF articulated during the planning process – to be catalytic, self-sustaining, and provide leverage for additional funding from extramural sources.

Estimating precise increases in extramural funding levels is difficult, as the federal research budget in the last decade has been extremely variable, doubling over the first five years and remaining flat over the most recent five years. However, with substantial resources from UCRF, a good strategic plan, and continued recruitment of outstanding faculty, UNC should significantly increase its funding relative to other major public and private universities. UNC currently ranks in the top 15 nationally in funding from the National Cancer Institute with \$44 million (total annual costs). Over the next seven years, we should aspire to move into the top five among cancer centers, as assessed by a combination of funding, high-impact publications, and peer assessment. Space for new recruitment is a major constraint and the BRIC building will come open in four years, thus the use of the seven year timeframe. The combination of UCRF and new space would be needed to achieve this aspiration. With respect to overall funding from federal, foundation, and private sources, which now totals ~\$700 million to UNC at Chapel Hill, it's reasonable to assume that the \$50 million UCRF should at least generate a 4:1 stimulation, thus adding \$200 million to the university's overall funding.

Will the UCRF directly impact the health of NC citizens?

It will take a long time before efforts can be measured as improvement in health at the state level or beyond, but important interim steps can, should, and will be tracked. In some cases, there will be clear and tangible benefits in the short term.

For example, the Optimizing NC Outcomes initiative includes activities designed to test the impact of interventions in defined communities across North Carolina, with a focus on counties that disproportionately contribute to the cancer burden in the state. If successful, these communities will see a direct benefit, and the findings will be disseminated more broadly across NC. Investments designed to bolster the level of cancer clinical care at UNC will have an immediate impact on the care of cancer patients, while providing the necessary conditions for cutting edge clinical research. The number of

patients engaged in clinical trials, and thus able to benefit from important new therapies, will thus be an important metric to be tracked. Finally, the development of novel therapeutics can take years, but ultimately are expected to have widespread impact. Interim steps include the development of promising drug candidates for pre-clinical and clinical testing.

An outside, independent evaluation will be conducted based on this strategic plan. A process to identify the organization that will conduct the evaluation is underway.

Contingencies that could hinder progress

Space constraints

One major potential risk in achieving UCRF goals is the current lack of adequate research space to carry out the strategic plan. This space constraint will be alleviated to some extent when two new buildings, the Imaging Research Building and the Genome Sciences Building, come on line in four years. However, the recruitment of both junior and particularly senior faculty requires more space than is currently available. This will either delay some of the major components of the plan, or interim solutions must be found. There is the potential to rent some space offsite for core facility development and expansion. In order to recruit the high-quality faculty necessary to achieve the objectives of the plan, they will need to be offered laboratory space on the Chapel Hill campus. One potential is to use some UCRF funds for renovation of campus space, for example, in the Mary Ellen Jones building, or for short-term utilization of other space being constructed on the campus, for example, the new Dental Research building. If for any reason sufficient space is not made available, this will curtail UNC's ability to recruit new faculty and to carry out the specific activities described in this strategic plan.

Ongoing evaluation and refinement of the strategic plan

While the strategic plan lays out a roadmap and expected budgetary priorities for future years, it is expected that specific opportunities and needs will require modifying these plans over time. As described above, the UNC Lineberger Executive Committee, advised by the UNC Lineberger Board of Scientific Advisors, will regularly review progress and will adjust the plans accordingly. As well, in the fourth year of the five-year strategic plan period, UCRF leadership will undertake a thoroughgoing review of UCRF performance to date, as well as an assessment of emerging opportunities in cancer research, as part of developing a new five-year strategic plan.