Our Time, Our Future:

The UNC Compact
With North Carolina

Strategic Directions for 2013-2018

Partial
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THE FIVE GOALS

In considering the challenges facing North Carolina, the broad changes affecting higher education, and the University's historic commitment to serving all citizens of the state, the UNC Strategic Plan for 2013-2018 focused on five high-priority goals:

1. Setting degree attainment goals responsive to state needs
2. Strengthening academic quality
3. Serving the people of North Carolina
4. Maximizing efficiencies
5. Ensuring an accessible and financially stable university

Higher education represents a significant investment, and citizens rightly expect a return. That is especially true during a time of constrained public resources and general economic difficulties. The University must create real value, and all stakeholders – students, parents, teachers, citizens, and lawmakers – must be good stewards of the public trust.

It is clear that higher education is undergoing dramatic structural changes in response to economic and technological forces that extend far beyond North Carolina. This represents both a challenge and an opportunity, one that must be met with a culture of evidence that values data-driven analysis and strategic thinking. The University must confidently embrace these changes to sustain and strengthen what the citizens of North Carolina have built over the past two centuries.

In meeting the goals above, our approach has been to:

- Collect, analyze and critique data from internal and external sources
- Set aside preconceived notions and allow facts to drive the outcomes;
- Establish actionable strategies that are clear, measurable, and affordable;
- Define sources and uses for all funds, creating clear accountability for strategic investments.

The plan that follows is faithful to this approach and to our longstanding commitment to North Carolina.

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HISTORICAL CONTEXT

The University of North Carolina, the oldest public university in the nation, traces its roots to the state's 1776 constitution, which held that "All useful learning shall be duly encouraged and promoted in one or more universities." Chartered in 1789, the University opened its doors to 51 students in the spring of 1795. Today, more than 220,000 students are enrolled at 16 University campuses across the state and at the North Carolina School of Science and Mathematics, the country's first public, residential high school for gifted students.

From its earliest days and through most of the nineteenth century, North Carolina remained largely poor and suffered massive out-migration. The state's leadership was reluctant to invest in roads, ports, and other and basic infrastructure necessary to foster trade and economic prosperity. With opportunity lagging for most citizens, 30 percent of North Carolina's native-born white population was living outside of the state by 1860. Revisions to the state Constitution in 1835 paved the way for lawmakers to promote public education and infrastructure improvements. These were slow to emerge but proved key to the state's future development.

The University endured through the Civil War but faced considerable hardship in the years that followed. Beginning in 1871, the University shuttered for four years, emerging in 1875 with a radically new curriculum. Evolving from its traditional roots in classical education, the "Battle Plan" — named for legendary University President Kemp Battle — created a new structure of colleges and schools within the University. This reorganization provided the underpinning for University liberal arts education ever since, bringing the scientific, technical, engineering, and agricultural fields into the University. Forged amid daunting economic and social challenges, the new curriculum demonstrated

> *". . . an eff ort by the trustees to 'keep step with the century in its march of knowledge, invention and discovery.' Their metaphors testified to a radically new vision of education and society. The University would serve no longer as a mere repository of knowledge . . . . By 'gathering, creating and distributing knowledge,' it would become 'a potent force in the world's progress, a wide-felt influence throughout the State to make all men love and seek after learning.'* (1)

Between the University's emergence from Reconstruction and the Great Depression, the state of North Carolina adopted or created new colleges and universities (by modern reference): Fayetteville State University, UNC-Greensboro, UNC-Pembroke, North Carolina State University, North Carolina A&T State University, Elizabeth City State University, Appalachian State University, East Carolina University, North Carolina Central University, Western Carolina University, Winston-Salem State University and UNC-Asheville.

The Great Depression prompted the first consolidation of the University, with its original campus in Chapel Hill, and what is now North Carolina State University and UNC-Greensboro, which had been founded in 1887 and 1891 respectively. The other state-supported colleges remained autonomous. Following the Second World War, returning service members supported by the GI Bill dramatically increased enrollment at the various institutions, marking the beginning of a phenomenal expansion. North Carolina established education centers across the state to serve returning veterans, and two of these centers grew into universities

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(now UNC-Charlotte and UNC-Wilmington). In 1963, the state established the first public arts conservatory in the United States, now known as the UNC School of the Arts.

In the last century, political and cultural progress opened the University's doors at every campus to women and minorities, further cementing the institution's central role in North Carolina's public life and economic development. The post-World War II era marked the beginning of the rapidly expanding manufacturing and industrial base in North Carolina.

As demand for a higher education increased and the population in North Carolina expanded, so did the University. In 1969 and again in 1971, legislative action further consolidated the University by putting all public, 4-year institutions in the state under one general administration. In 1980, the state created the North Carolina School for Science and Mathematics, a public residential high school for exceptional juniors and seniors to focus on the intensive study of science, mathematics, and technology, and it was made a constituent institution of the University in 2007.

Over two centuries, the University has evolved into one of the strongest and most successful systems of public higher education in the country. It remains today, as Governor Zebulon B. Vance described in 1866, "the pride and chiefest ornament of North Carolina." University graduates have become leaders in business, politics, journalism, law, medicine, religion, art, and teaching. They have risen to national prominence, serving as President and Vice President of the United States, cabinet members and federal officials, and military officers of the highest rank. They have become Pulitzer Prize-winners, Nobel laureates, civil rights pioneers, astronauts, inventors, Olympic athletes, business leaders, and renowned artists.

The University's centuries-old roots remain central to its modern role. North Carolina still needs outstanding teachers, a diverse industrial base, innovative business leaders, and an educated citizenry. Today's mission — to discover, create, transmit, and apply knowledge to address the needs of individuals and society — remains true to the University's founding ideal of shared knowledge in a free society. That mission is still carried out through teaching, pathbreaking research and dedicated scholarship, driven by the creativity and energy of students and faculty and guided by an unwavering commitment to public service.

From the state's earliest days, visionary leaders have worked tirelessly to secure the future of the University. It was William R. Davie's time in 1789 to establish the country's first public institution of higher learning. It was President Kemp Battle's time in 1875 to build the University's liberal arts foundation. It was President Edward Kidder Graham's time in 1913 and President Frank Porter Graham's time in 1931 to guide the University through a rapidly changing world. It was Governor Robert W. Scott's and President William Friday's time in 1972 to establish the University as a consolidated system of higher education. Along the way, countless others have shaped the future of the University and this great state. It falls to us to renew the University's covenant with its people and secure the promise of public higher education for all of North Carolina. It is our time and our future.

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STRATEGIC PLANNING AND MISSION

The UNC Board of Governors has engaged in strategic planning, oversight, and evaluation since the Board was created by the North Carolina General Assembly in 1972. The Board adopted its first long-range plan in 1976, during the administration of President William Friday. The most recent plan was approved in 2006, when the Board adopted the *Supplement to Long-Range Planning 2004-2009*. Further updates were adopted through the 2007 report of the UNC Tomorrow Commission, which was informed by broad discussion with the public through a statewide listening tour.

From the outset, UNC's long-range planning has been guided by strategic directions recommended by the President and approved by the Board of Governors. These strategic directions serve as the foundation for current and future priorities, resource planning and allocation, program development, and review and refinement of missions, and strategic planning by constituent institutions and affiliated entities. The strategic directions also reflect the University's deep commitment to teaching, research, and public service, historic responsibilities that remain vital in meeting the state's 21st-century challenges.

The mission of the University is shaped in large measure by the constitutional and statutory mandates by which public higher education is established and maintained. Article IX of the Constitution of the State declares:

> *Sec. 8. Higher education. The General Assembly shall maintain a public system of higher education, comprising The University of North Carolina and such other institutions of higher education as the General Assembly may deem wise.*
>
> *Sec. 9. Benefits of public institutions of higher education. The General Assembly shall provide that the benefits of The University of North Carolina and other public institutions of higher education, as far as practicable, be extended to the people of the State free of expense.*

This constitutional mandate for a public system of higher education is effected by Chapters 115 and 116 of the General Statutes. Chapter 115A, enacted in 1963, provides for a statewide network of community and technical colleges and institutes which offer two-year college transfer and technical and vocational programs. Chapter 116 of the statutes, as amended by the General Assembly effective July 1, 1972, provides in Section 3 that:

> *The board of trustees of the University of North Carolina is hereby redesignated, effective July 1, 1972, as the 'Board of Governors of the University of North Carolina.' The Board of Governors shall be known and distinguished by the name of 'the University of North Carolina' and shall continue as a body politic and corporate and by that name shall have perpetual succession and a common seal.*

Section 4 of the statute defines the University of North Carolina as the 16 public senior institutions in the state.

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The Higher Education Reorganization Act of 1971 placed those 16 institutions under one governing board and defined the basic objectives for the University: to develop a well-planned system of higher education, to improve the quality of education, to extend its benefits, and to encourage an economical use of the state's resources. In the same act, the legislature reaffirmed the core role of the University in public life, declaring that "Teaching and learning constitute the primary service that the university renders to society."

CHALLENGES

As a public institution, the University's fortunes are wedded to those of North Carolina. For more than two centuries, the University has both shaped and been shaped by the dramatic transformation of the state's economy, society and politics.

That relationship remains paramount today, even as some of the most urgent issues confronting the University emerge from broad trends affecting all of higher education. Across the world, colleges and universities are responding to the same technological and economic forces that have reshaped fields from manufacturing to publishing. Some of these changes will prove beneficial, others disruptive. By democratizing information, new technologies offer unprecedented opportunities to radically expand the University's core mission of transmitting knowledge. They also raise fundamental questions about the role of higher education, both today and in the years ahead.

It is vital that the University be proactive in shaping the relationship between traditional models of education and new methods of instruction. Students today have a far wider array of choices in pursuing higher education, and many of these emerging options place a greater value on speed, convenience, and flexibility. Demand for consumer-focused information, greater accountability, and transparent performance analytics is growing among policymakers, students, and the public.

It is incumbent upon the University to explore new and innovative ways to leverage and deliver our most valuable asset — the knowledge and experience of our faculty. The University of North Carolina enjoys a sterling academic reputation, a long history of pathbreaking scholarship, and intellectual talent that rivals the finest institutions in the world. It is our responsibility to ensure that these advantages are matched by a technological infrastructure and an entrepreneurial ethos that enable the University to compete effectively without compromising core values.

For the University's diverse campuses, that competition is playing out regionally, nationally, and around the globe. The United States once held a commanding lead in higher education attainment, but that position has been eroding for decades. In 2010, according to the Organization for Economic Cooperation and Development, the U.S. fell to 12th place among 36 developed countries in postsecondary attainment among 25-to-34-year-olds. "If the United States is to regain its status as the leader in educational attainment and increase its economic competitiveness, the nation must make an investment in higher education access, admission and success for all students," wrote the College Board in its 2011 report (2). Policymakers at every level and across the political spectrum have called for the United States to improve the

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preparedness of high school graduates for college-level work, and for colleges and universities to more effectively guide enrolled students toward degree completion.

That challenge is magnified by the changing nature of student demographics. The average UNC-system student today is 22 years old, white, female, a North Carolina resident, and attending college full-time. But that traditional profile is giving way to an increasingly diverse population of prospective students. The 2010 Census detailed strong population growth in the South; a doubling of the the state's Hispanic residents, part of an ongoing shift away from a majority-white population (3); and an increase in the average age of the population as the Baby Boom generation begins to reach retirement (4).

These trends will inevitably impact the demands made on the University. Today, 68 percent of the University's students matriculate directly from high school. Growth in the state's K-12 population, especially among historically underserved populations, will push the University to help ensure better college readiness among high school graduates. At the same time, there is increasing demand from adult learners seeking access to higher education. As economic pressures and an aging population combine to drive more adult learners into college, UNC campuses will need to serve a wider array of students with different educational needs, varying levels of academic preparation, and demands for more flexible methods of instructional delivery.

The uncertain future of higher education funding magnifies all of these challenges. The University's reliance on public funding is both a historical strength, binding the institution closely to the needs of North Carolina, and a near-term difficulty, given the state's weak fiscal position in the aftermath of the Great Recession. Largely static funding for the past five years has coincided with continuing enrollment growth to produce a meaningful reduction in resources across the UNC system.

Even with a slow recovery in state revenues, there is little question that public resources for higher education will remain severely constrained. Like state governments across the country, North Carolina is grappling with intractable increases in health care costs, particularly funding for Medicaid. "The pressures of mandatory budget items will likely mount in the future, as the population ages and health care costs rise," noted a 2012 report by Demos (5). Those mounting pressures underscore the importance of work by the UNC Health System to develop new, cost-efficient models of care.

While universities across the country have responded to stagnant state support by leaning more heavily on student revenues, UNC has honored its bedrock commitment to low tuition. Maintaining that emphasis on affordability is critical to ensuring the University's role as an engine of opportunity for all students, regardless of income or background, particularly given the changing demographics of the state.

Higher education faces additional uncertainty at the federal level. The federal government invests in higher education through funding for financial aid, appropriations for teacher training, education benefits for veterans, research grants and contracts, and other sponsored programs. Given the ongoing political focus on deficit reduction and cuts to discretionary federal programs, these resources will at best remain flat and more likely decline. Even now, long-

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standing federal programs like the Pell Grant and basic research funding have failed keep pace with growing enrollment and stagnant middle class incomes.

More than ever, it is incumbent on the University to demonstrate that it is an able and efficient steward of public money and student investment. In 2006, the University initiated a business transformation project known as PACE (President's Advisory Committee on Efficiency & Effectiveness), and followed up that effort with the 2008 implementation of UNC FIT (Finance Improvement and Transformation). These best practices and business-oriented strategies — developed further in this plan — are meant to strengthen the University's competitive position and better utilize resources to enable our faculty, staff, and students to focus on the centuries-old mission of serving North Carolina.

The world is changing in ways that are both heartening and challenging. With confident action and innovative thinking, there is immense opportunity for the University to renew its commitment to North Carolina, to help chart the course for the state, and to inspire the dreams, foster the creativity, and open a world of opportunity for our students and citizens.

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THE UNC COMPACT: A COMMITMENT TO NORTH CAROLINA

The University commits to the people of North Carolina:

Academic excellence and the opportunity for success for all students

- We will admit and educate students who are academically prepared to succeed;
- We will equip students for lifelong learning by providing a high quality, rigorous education to develop students with the knowledge, skills, and integrity needed to become engaged citizens;
- We will ensure that our graduates have engaged in core studies to master critical thinking, verbal and written communication, computational competence, a global awareness, and the ability to work collaboratively;
- We will be student-centered and offer multiple pathways for student learning;
- We will perform our duties and responsibilities with integrity and dedication to the highest ethical standards;
- We will support scholarly work that meets the highest intellectual standards; and
- We will value the talents and contributions of the University's faculty and staff, as well as their continued role in the shared governance of the constituent institutions and the University system.

Value for students and for North Carolina

- We will maintain our commitment to low tuition and reasonable student fees;
- We will recruit and retain faculty and staff whose communication, teaching, and research skills are broadened and enriched through new technologies and classroom innovations; and
- We will use every dollar efficiently and effectively by fostering shared services, greater collaboration, and interconnectivity that strengthens each campus and the system as a whole.

Solutions to North Carolina's biggest challenges

- We will pursue and share knowledge and research that advance the state's economy and improve the quality of life for all North Carolinians;
- We will support and reward faculty who demonstrate an entrepreneurial spirit and seek new frontiers of knowledge, commercialize technology, and create opportunities for students;
- We will support faculty and other university researchers in tailoring research and knowledge in ways that advance the state's economy;

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- We will nurture and protect the University's culture of inquiry, innovation, and the free exchange of ideas;
- We will rededicate ourselves to improving the health of all North Carolinians;
- We will engage businesses, nonprofits, state agencies, and others in a continuous effort to improve North Carolina's competitiveness; and
- We will identify social, scientific, and economic trends that affect the State's well-being.

Connection and engagement with North Carolina communities

- We will engage in outreach and development that nurtures the connections between the University and the people and communities of North Carolina;
- We will promote diversity and maintain an environment that celebrates and values the many perspectives, cultures, and traditions of our state;
- We will continue to make rich contributions to the cultural and artistic life of the state, and;
- We will devote the University's knowledge and talent to protect, preserve and promote the natural and cultural resources of North Carolina.

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SETTING DEGREE ATTAINMENT GOALS RESPONSIVE TO STATE NEEDS

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Setting Degree Attainment Goals Responsive to State Needs

The University of North Carolina's degree attainment goals are grounded in projections of state workforce demand for employees with a bachelor's degree or, and also take into account the broader economic and social impact of higher education. The guiding principles in degree attainment goal development were:

(6) the goal must meet state needs;

(7) the goal must be achievable without sacrificing quality;

(8) the goal must be based on the best data available, recognizing that various data sources are created for reasons other than setting attainment goals and thus may have limitations; and

(9) the plans based on this goal should reflect the changing nature of state and prospective-student demographics, the economic landscape, and underlying data, and they should be flexible enough to accommodate evolving understanding of all three.

BACKGROUND

Post-secondary education is recognized as a top priority nationally and in North Carolina (1). While current research is insufficient to establish a clear causal link, the preponderance of evidence shows a strong correlation between post-secondary degree attainment and higher earnings, lower unemployment, better health, lower probabilities of incarceration, less dependency on government programs such as Medicaid, SSI, and food stamps, and more civic participation (2-4).

While all of these factors are important, there must be solid linkages between education, jobs, and the economy.

Projections of future jobs needs vary, but this plan is based on North Carolina-specific data wherever possible (5-8). This plan focuses on setting an appropriate state attainment goal for individuals 25-64 years of age with a bachelor's degree or higher. Thus data must relate to:

- How many new graduates will be needed over the plan period (2013-1018)?
- What type of graduates (bachelor's, professional, graduate) will be needed?
- How do campus missions and capabilities fit into an overall plan?
- What can be achieved, how do we go about it, and what will it cost?

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GOALS

- The University of North Carolina will help the state reach a bachelor's and higher degree attainment level of 32% by 2018.
- North Carolina will become one of the top ten most educated states by 2025, aiming for 37% of the population with a bachelor's degree or higher.

METHODOLOGY

How did we arrive at these projections, which must be supportable, achievable and linked to jobs and the economy?

WORKFORCE DEMAND

The strategic direction for degree attainment was developed using a range of workforce demand projections and the data and the methodologies behind them. Two publications illustrate the range of the workforce-informed pathways for North Carolina. Both use the same data as a foundation for their projections, but their methodologies lead to different results (6, 9).

The State of North Carolina Workforce 2011-2020, published by the North Carolina Commission on Workforce Development, uses data collected by the North Carolina Department of Commerce, Division of Employment Security, which is responsible for the cooperative Occupational Employment Statistics Program (between the state and the federal Bureau of Labor Statistics, or BLS) (5). The Commission's report presents projections made from these data by Economic Modeling Specialists, Inc. (EMSI). In addition to projecting industry and occupation growth, these projections link educational requirements to those occupations.

Those linkages are the primary distinction between the Commission's projections of what education levels employers will demand of future employees and other approaches to projecting the workforce demand for education. The EMSI projections assign educational requirements for various occupations based on BLS determination of the "typical entry level" education required for a given occupation. All individuals in a given occupation are assumed to have currently and to require in the future only that "typical entry level" education. For example, all registered nurses are assumed to possess and to require in the future only an associate's degree, and all economists are assumed to require only a master's degree.

The Georgetown Center on Education and Workforce has produced a series of reports (e.g., Projections of Jobs and Educational Requirements through 2018) that use the same baseline labor statistics, but take a different approach to assigning educational requirements for those occupations (6, 10). Their approach is to look at annual Census Bureau survey data (American Community Survey) and from that to compute the percentage of individuals in each occupational category who have given levels of education (11). Looking back historically, the Georgetown researchers computed the change in workers' education levels and projected those rates of change to continue in the future. It is that projected distribution of actual degree

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attainment on which the Georgetown Center based its assessment of what the workforce will demand.

Both of these approaches have flaws. The approach based on BLS coding of typical entry-level educational requirements understates the actual distribution of degrees so drastically that it suggests North Carolina needs to reduce bachelor's-or-higher degree attainment by nearly 5 percentage points. This approach is at odds with what is already found in state's labor market. The Georgetown model is criticized for overstating demand due to underemployment, and that underemployment is magnified in the current economy. Others counter with data that show the "wage premium" paid to individuals with higher degrees is still present and has grown over time, despite the economic downturn.

Neumark, et al, who look at national rather than North Carolina data, suggest an alternative to the previous two approaches. These authors project that 31.4% of workers will require a bachelor's degree or higher by 2018, in contrast to the 21.5% estimate based on BLS national employment projections and 32.6% based on the Georgetown approach (12).

In addition to these and other reports, UNC General Administration staff and consultants from the National Center for Higher Education Management (NCHEMS) developed projections based on the same EMSI labor projections, through 2020 rather than 2018, and following similar methods to those described above. (One notable difference, however, was that the UNC/NCHEMS approach attempted to adjust the low-end projection to be consistent with the Census-based age group of 25-64-year-olds that was the basis for the high-end projection, such that the populations in question would yield a more direct comparison.) The results showed projections of North Carolina workforce demand for bachelor's degree or higher in that 25-64-year-old population of 23.4% and 32.1%, respectively (13,14).

An additional caveat that should be considered when looking at these projections relates to timeframe. Short-term economic conditions do not necessarily reflect long-term trends or needs. While current unemployment/underemployment is relevant when making projections and evaluating the impact of near-term options, it should be discounted when interpreting available data for longer-term strategic planning.

ECONOMIC AND SOCIAL BENEFITS

There is substantial data to support the widely held belief that higher education yields broader benefits than employment and the wages that accrue to individuals. While it is not possible to separate correlation from causation in existing studies (3), data show that North Carolinians with bachelor's and higher degrees require less support from public programs (Medicaid, welfare, food stamps, etc.) and, in general, those who are college-educated have higher volunteerism rates, civic participation, and positive health and educational outcomes for their children (15).

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CURRENT SITUATION

How many graduates are being produced in North Carolina? For the 2010-2011 academic year, UNC campuses accounted for 47,955 graduates, or 70.6% of the North Carolina total (16).

	Bachelor's	Master's	Research Doctorate	Professional Doctorate
UNC	34,462	11,236	1,237	1,020
Private Inst.	13,959	4,208	483	1,259
Totals	48,421	15,534	1,720	2,279

For the 2000-2001 year, UNC produced 32,007 graduates (undergraduates and graduate students), or 67.2% of state total). During the intervening years UNC has accounted for 78.7% of the increase in graduates compared to private institutions. Over the 10-year period, UNC graduates grew at compound annual growth rate of 4.13%.

BACKGROUND DATA ON THE UNIVERSITY SYSTEM (16)

There are a number of characteristics and trends that are informative and serve as reference points for subsequent discussions in this section and others in the Plan.

	2002	2011
Total Enrollment	177,000	220,330
Full Time	137,600 (77.8%)	176,800 (80.2)
Part Time	39,400 (22.2)	43,500 (19.8)
In State	151,300 (85.5)	188,200 (85.4)
Out of State	25,600 (14.6)	32,100 (14.6)
Female	99,900 (56.4)	124,900 (56.7)
Male	77,000 (43.6)	95,400 (43.3)
Average Age	24.2 yrs	24.1 yrs

As shown above, not much changed over the period, except that slightly more students attended full-time in 2011. By comparison, out-of-state enrollment at private institutions was 38.3%.

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As of fall 2011, racial and ethnic demographics for all students in the UNC system broke down as follows:

White	61.5%
Black	21.5
Hispanic	4.1
Asian	3.3
American Indian	1.0
Hawaiian / Pacific Islander	0.1
Two or more races	1.7
Race unknown	3.2
Nonresident alien*	3.6

* Note: Race/ethnicity is not reported for nonresident alien students.

Approximately 67% of graduates in 2010-11 were white and 33% non-white. Systemwide retention and graduation rates for undergraduates improved between 1995 and 2010.

	1995	**2010**
1-year retention	80.5%	82.2%
4-year graduation	32.1	37.4 ('07)
5-year graduation	52.6	55.3 ('06)
6-year graduation	57.2	59.4 ('05)

Transfers to UNC campuses in 2011 (totaling 13,579) came from out of state (24.7%), community colleges (52.6%), private institutions (6.6%) and intra-system (16.0%). Transfers out to private institutions and community colleges totaled 2,076.

While the enrollment mix varies widely among campuses, on average, only 32.7% of enrolled students come from their institution's home county or adjacent counties.

Summer school enrollment in 2011 was 90,034 students. Summer school students took 582,551 credit hours, or an average of 6.1 hours per student.

THE JOBS SITUATION IN NORTH CAROLINA

In 2010, approximately 19% of North Carolina jobs "required" a bachelor's degree or higher. Degree attainment estimates were in the range of 26-28% statewide, but differed regionally, with Charlotte at 36.1% and Raleigh-Durham at 34.7% (5, 32). Unemployment stood at 9.1% as of November 2012 (34), and researchers at UNC-Chapel Hill estimated the state's underemployment at 17.9% in 2011 (15). Interestingly, GDP in North Carolina increased during 2010-2012, indicating an increase in productivity per worker.

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Between 2002 and 2012, North Carolina gained 21% in population but only 0.3% in jobs. Estimates indicate that the state needs 6,000 new jobs per month to keep pace with work force growth; however, in 2011 the state netted only 3,600 jobs per month. One somewhat sobering statistic also showed an 8.7% job loss for engineers as a whole between 2001 and 2011, although biomedical engineering jobs increased (7).

GOING FORWARD

The NC Commission on Workforce Development report projected 555,151 new jobs between 2010 and 2012, with 150,017 (27%) requiring a bachelor's degree or higher (5). The report stresses that job seekers must be connected to education and training by enrolling in courses that teach skills linked to industry trends. The need for advanced degrees was projected to grow somewhat faster than bachelor's. It is noteworthy that average wages advance sharply with increased education, with obvious ramifications for the tax base and general economic well-being in North Carolina.

Educational Band	Emp 2010	Net new jobs (10-20)	Annual growth rate	Average Wages (2010)
Advanced degree	150,103	38,494	2.3%	99,634
4-year college degree	615,400	111,523	1.7%	73,909
Tech degree/post	353,273	81,105	2.1%	43,771
HS, some experience	667,049	59,980	0.9%	42,677
HS degree	793,478	94,882	1.1%	33,615
Below HS	1,442,115	169,167	1.1%	22,274
Totals	4,021,418	555,151	1.3%	39,838

Attempting to foretell the future of job growth and particular sector needs is difficult at best. That said, if future job requirements and the pool of qualified workers do not match up as expected going forward, it would be far easier to put on the brakes on degree attainment than to scramble to gear up quickly.

In setting a degree attainment goal, we must also consider other factors, as previously noted. The system should not grossly overshoot, however, thereby running up costs and saddling students with debt, only to find that they are unemployed or under-employed. Oregon, for example, has implemented a "40-40-20" program to reach 40% of the population with a bachelor's degree or higher by 2020 (17). In 2010, state attainment in Oregon stood at 28.8%, so this is a very tall order. In 2010, 19% of jobs in Oregon required a bachelor's degree or higher. while employers said they would like 25% if they had a choice. One of the questions raised in the report was, "Should we train everybody to meet the needs of half the jobs?"

If the projected need in North Carolina is 28%, then the state could choose to adopt various approaches:

- Accept the workforce projections for job/occupation growth and associated requirements for bachelor's degrees or higher, along with status quo rates of increase in attainment.

- Try to increase demand for higher-level and better-paying jobs by raising degree attainment, competing with other states and working to ensure that jobs will come.
- Deliberately overshoot projected labor/occupation/education requirements for various tangential reasons, such as improved health, lower dependencies, and so forth.

Neumark noted that "economists are naturally uncomfortable talking about shortages because in a market economy shortages are resolved by the market, and hence do not, literally speaking emerge." (12) With respect to attracting good-paying jobs by raising the state's degree attainment level, national attainment is projected to reach 31% by 2018, so North Carolina should not be hampered in efforts to compete for jobs and industries that require an educated workforce (14).

Taking everything into consideration, the University recommends targeting a 32% degree attainment goal (among 25-64-year-olds) by 2018.

MODELING THE PATHWAY TO A DEGREE ATTAINMENT GOAL

This proposed North Carolina attainment goal can be reached through a combination of UNC graduates, private institution graduates, and the in-migration of credentialed new residents. For example, during 2006-2010, North Carolina averaged an annual net in-migration of 28,000 people with a bachelor's degree or higher (14).

UNC enrollment is fed from the following sources:

- High school graduates;
- Community college graduates and transfers;
- "Part-way home" students (individuals with some college credit, but no degree);
- Military-affiliated students/veterans
- Adult and distance learners

The number of graduates can be increased not only through increasing enrollment, but also by improving retention and graduation rates among current and future students (18). In addition to increasing the number of North Carolinians who hold college degrees, this dual strategy has the added advantage of doing so in a way that lowers student indebtedness and associated default rates and requires only modest investments of new resources. In addition to investments in expanded enrollment and advising services for high school graduates, enhancing degree completion options for transfer students and adult learners will require that we implement a variety of technology-enhanced and distance- delivered degree programs and student support services. These steps would also dampen the negative financial impact of dropouts (18, 19, 20).

Note that all of these methods and sources of new graduates are associated with a natural "lag-time," meaning that if retention and graduation rates are increased, it will inevitably take two to six years to move students through to degree. Therefore, degree attainment increases

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may not be linear. This could also be affected by flat enrollment rates recorded over the past couple of years.

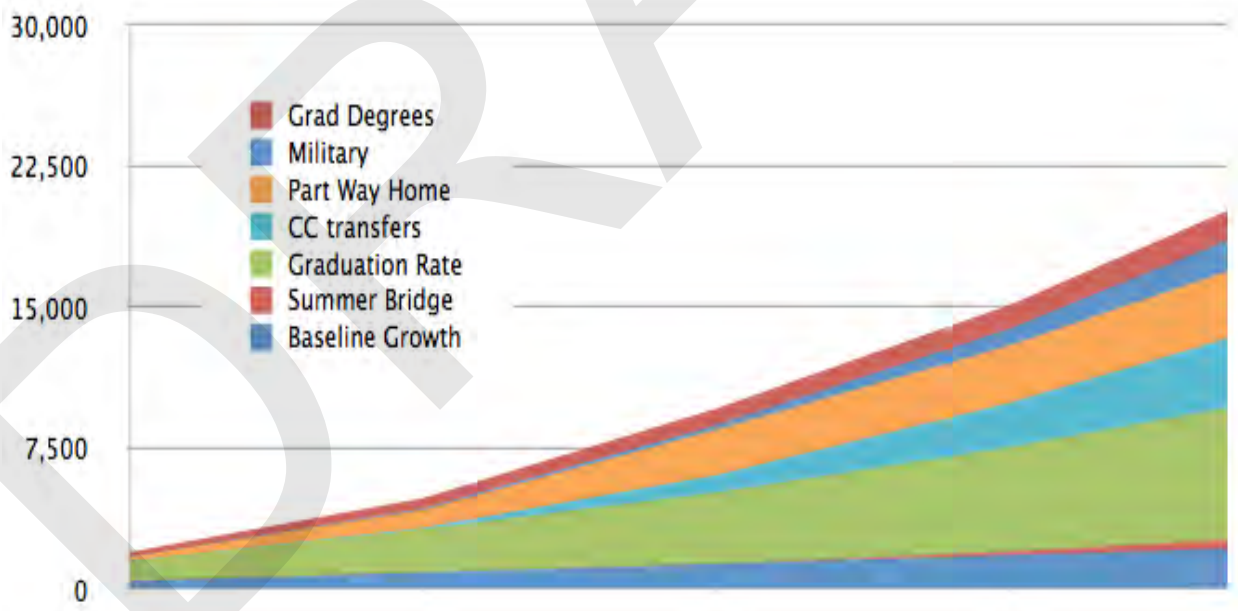
FORMULAIC APPROACH

Degree attainment was modeled using UNC system graduates, private institution graduates, net in-migration, baseline attainment, older population aging out of the cohort, and the percentage of college graduates remaining in the state (21-26). UNC graduation rates are dependent on input rates from all student sources, plus any increases in retention/graduation rates. The following general assumptions were made:

- Net high school graduation rate increase of 1.25%;
- Self-employment of 10%;
- Approximately 73% of graduates remain in North Carolina;
- 228,248 58-64-year-olds with bachelor's degrees age out of the cohort by 2018; and
- Average net in-migration of 28,100 per year over the 5-year period.

This, combined with other contributors previously discussed, leads to the attainment levels shown in Figure 1 (below) and Table 1 (end of section).

Figure 1



While there remains legitimate debate about the data, the approach, and the projections for jobs, the case for raising degree attainment has been stated forcefully by David W. Breneman, a professor of public policy at the University of Virginia, reflecting on the findings of his book, Financing American Higher Education in the Era of Globalization (32).

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“We looked closely at the rationale for trying to increase the proportion of degree holders and found none of the projection methods particularly compelling, at least with regard to specific numbers or percentages,” he wrote. “Indeed, some observers have questioned the need to do more. While we do not endorse any given set of numbers, we do argue that the weight of evidence sides with those who seek to raise the percentage of college-educated people in our population. Our economic competitive advantage as a nation will continue to depend on innovation and skilled human capital. Losing ground to other developed (and developing) nations would be a disastrous outcome.”

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TABLE 1

Year	25 to 64 Population Projections	Cummulative Current Net Degree Production	Cumulative Net Migration	Additional Net Degrees Produced	Cummulative Additional Net Degrees Produced	Current Degree Holders Not Aging Out of Cohort	Current Degree Holders Aging Out of the Cohort	Projected Attainment % Status Quo	New Projected Attainment
2011-12	5,045,524	38,072	28,100	887	887	1,422,771	32,607	29.5%	29.5%
2012-13	5,088,309	76,144	56,200	1,775	2,662	1,390,164	32,607	29.9%	30.0%
2013-14	5,136,886	114,217	84,300	1,950	4,612	1,357,558	32,607	30.3%	30.4%
2014-15	5,188,604	152,289	112,400	2,878	7,490	1,324,951	32,607	30.6%	30.8%
2015-16	5,241,186	190,361	140,500	4,776	12,266	1,292,344	32,607	31.0%	31.2%
2016-17	5,288,373	228,433	168,600	5,526	17,792	1,259,737	32,607	31.3%	31.7%
2017-18	5,332,286	266,505	196,700	6,765	24,557	1,227,131	32,607	31.7%	**32.2%**
2018-19	5,371,217	304,577	224,800	7,099	31,656	1,194,524	32,607	32.1%	32.7%
2019-20	5,405,858	342,650	252,900	7,986	39,642	1,161,917	32,607	32.5%	33.2%
2020-21	5,439,479	380,722	281,000	8,874	48,516	1,129,310	32,607	32.9%	33.8%
2021-22	5,470,296	418,794	309,100	9,761	58,277	1,096,703	32,607	33.4%	34.4%
2022-23	5,501,197	456,866	337,200	10,648	68,925	1,064,097	32,607	33.8%	35.0%
2023-24	5,535,020	494,938	365,300	11,536	80,461	1,031,490	32,607	34.2%	35.6%
2024-25	5,567,866	533,011	393,400	12,423	92,884	998,883	32,607	34.6%	**36.2%**

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STRATEGIES

To meet UNC's share of these statewide degree attainment goals, UNC must focus on improving graduation rates of existing students, increasing part-way home and transfer student success, and expanding the pipeline vis-a-vis North Carolina's military, adult learners, and UNC largest historical source of undergraduate growth, high school graduates.

A. **Strengthen and diversify a changing pipeline.**

Growth in the number of North Carolina high school graduates is projected to slow to an annual rate of approximately 1.6% in the coming decade, about 2 percentage points lower than the past decade. Moreover, that projected growth will be fueled largely by increases in Hispanic students, who have historically attended college at lower rates and have had lower graduation rates, once enrolled.

Adapting to the changing K-12 pipeline and closing gaps in student access and success are necessary to meet degree attainment goals and North Carolina's workforce needs. Our modeling assumes only a 1.25% annual growth rate in the number of new North Carolina high school graduates, and it builds in expectations that slowing growth rates and the impact of more stringent academic entry requirements will be offset by the following programs and continued improvement in graduation rates. To that point, with the exception of the Summer Bridge Program (the impact of which is projected separately), all of these programs are assumed to contribute to ongoing enrollment in the context of a changing population.

Action Steps

1. Implement GEAR UP programs to improve college preparedness of high school graduates, and deliver on the goals set for that grant program.
    - GEAR UP is federally funded and does not require any additional state investment. It is mentioned here as an example of related activities in which UNC is engaged to meet the needs of students coming through the K-12 pipeline.
2. Continue to grow College Application Week to serve all eligible high schools so that low-income students have the information and resources necessary to apply to higher education institutions.
    - College Application Week resulted in the submission of nearly 26,000 additional college applications over the past two years (2011 and 2012). Because it focuses on high schools with low-income populations, it is an important program for maintaining a flow of students from the changing high school pipeline.
3. Expand the Minority Male Mentoring Program
    - UNC's Minority Male Mentoring Program is in the pilot stage on five campuses. The preliminary data show that this program has great potential to improve minority male students' persistence and graduation rates. Expansion and sustainability of this project is estimated at $1 million annually, based on an expansion to all 16

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campuses, with approximately 40 students served on each campus. The NC General Assembly has recognized the value of this program to the state, funding it within the NC Community College System at $800,000-900,000 annually since 2006. Data from systemwide programs in Georgia and New York also suggest positive impacts on both enrollment and graduation rates of minority male students (percentage point annual increase in graduation rates, for example).

4. Build on success of the EDUMetric data and accountability.

   - EDUMetric is a robust data tracking system, built and maintained through EAR-UP funding, that is designed to identify and track K-12 students participating in pre-college educational programs and services across the state. EDUMetric has been recognized by the U.S. Department of Education as an innovative tracking system. It allows for a greater level of accountability and program evaluation by enabling a link between the various services provided and student outcomes. Expansion should include, but not necessarily be limited to, pre-college programs such as TRIO, Caroline College Advising Corp, and the Minority Male Mentoring Program.

5. Evaluate Mathematics and Science Education Network (MSEN) Pre-College Program outcomes to determine next steps with program enhancements and potential expansion.

6. Expand the number of students served and number of campuses participating in the UNC Academic Summer Bridge and Retention Program.

   - Results from UNC's longest-standing summer bridge program at Fayetteville State University point to retention rate increases of 6-13 percentage points over the other low-income students. Based on these results, we project that the investment to expand the program from 300 to 1,600 participants will add 570 additional graduates by 2018 from among some of our most at-risk students. After all affected students move through the pipeline, the full impact of this investment is projected to be 3,000 additional graduates over 10 years.

   - This program is an intensive "boot camp," a rigorous academic experience for students who are the first in their families to attend college or are not sufficiently prepared to begin college coursework. Students participate in a 5-6 week intensive residential program and take six hours of math and English coursework (not remedial). They are provided with tutoring, academic support labs, mentoring, and advising. Upon successful completion of the summer program, they are accepted into the university for the fall term, at which time various mandatory academic support services continue. The success of summer bridge programs has been well-documented (28, 29).

B. **Improve retention and graduation rates:** Greater Efficiency with Those Already in the Pipeline

Analysis: Approximately 68.8% of students who have completed three quarters of their degree requirements eventually graduate. Transfer students' graduation rates vary depending on from where they come and at what point in their education they enter. The

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most successful transfer student population is the group that enrolls with an associate degree (AA/AS), 74% of whom finish within four years of entering UNC.

Assumptions/projections: Based on historical gains seen by many UNC campuses and their national peers, as well as the experience of individual campuses that have made quick strides with targeted efforts, we assume an incremental increase in graduation rates among all cohorts, growing from a 2-point increase in 2013 to a 3-point increase by 2018. This increase in graduation rates would result in an additional 7,567 graduates by 2018, based on staff analyses.

Action Steps

1. Implement the student success initiatives, created by the Faculty Assembly and recommended by the Academics First Steering Committee, that are designed specifically to increase retention, student success, and timely degree completion. These include, for example, early warning systems and standards for increased grade point requirements for satisfactory academic progress (18).

2. Increase number of courses offered in the summer to help narrow the degree completion gap of underrepresented students and reduce time to degree for all students.

    - This estimate assumes that additional funds for summer programs will allow summer course enrollment to expand by approximately 200,000 credit hours. Based on available data showing summer course-taking patterns, we estimate this will affect participation by approximately 25,000 undergraduates annually. Based on research finding regarding the effects of summer enrollment on the time to degree and probability of graduation, we project that over the period of this plan (ramping up to full funding in 2018), this initiative will result in an additional 3,366 graduates. Over the next decade, the full impact of the five-year investment will be 5,940 total graduates. Note that these results have been spread (about 840 each) over all categories except baseline and summer bridge.

C. Part-Way home students: help them find the rest of the way

Data indicate that approximately 1.5 million North Carolinians have some college credit, but no degree (22).

UNC Charlotte has had great success identifying and bringing back students who for one reason or another have stopped their educational pursuits. (Examples from other states include Wisconsin and New Mexico).

Matching UNC student data to national enrollment and completion data from the National Student Clearinghouse, we find that over the past six years, nearly 11,000 bachelor's-seeking students left UNC with 90+ earned credit hours, but no degree, and did not subsequently graduate from or enroll in another U.S. higher education institution. Because in-migration and private institutions account for more than half of the total degrees added each year in North Carolina, and recognizing that additional UNC students departed more than six years ago without completing their degrees, we conservatively estimate another

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11,000 potential students statewide who have not yet enrolled on a UNC campus. Making assumptions that are somewhat conservative, lower than the percentages seen at UNCC, and also in line with experience at campuses outside of North Carolina, we project that just over 3,775 students (15%-16%), of this available 22,000-student pool could be brought to UNC over a five-year period and could complete their degrees by 2018.

Action Steps

1. Recruit students who have stopped-out from a UNC campus with at least 90 earned hours and a 2.0 GPA or higher.

2. Provide support to guide returning students in the readmission process.

3. Hire academic advisors to assist students with navigating the University and serve as an ombudsman between academic departments and students.

4. Create support programs to assist students returning to complete their degree. Increase academic advising by faculty.

D. **Community College transfer pipeline: promote greater access and success**

Assuming a ramping-up of community college and other transfer enrollment, with emphasis on those with an AA or AS degree, we assume that approximately 9,400 additional transfer students (1.25% annual growth over baseline) will be admitted to UNC through 2018. Allowing for a two-year lag time before they begin to graduate, and assuming that just under three-quarters of them graduate within four years, we project the resulting cumulative additional degree count by 2018 will be roughly 4,134 (recognizing that many brought into the pipeline during this period will graduate after 2018).

Background data:

- In 2010-11, more than 6,500 students earned an AA or AS degree from the NC Community College System, but in the following academic year, fewer than 3,000 new AA/AS transfers enrolled on a UNC campus. Accounting for estimates of those enrolling at private or out-of-state institutions, there was a potential pool of approximately 2,000 AA/AS recipients annually who did not continue on to the bachelor's level (30).

- In addition to new AA/AS recipients, earlier graduates who did not pursue a bachelor's degree represent an additional potential pool of bachelor's degree-seekers, similar to but not counted in the part-way home population.

- Associate degree growth in the NCCCS has been roughly 5% annually over the last two decades, and about twice that rate recently. For AA/AS degrees specifically, the number of degree recipients rose over 11% from 2010-11 to 2011-2012.

- In addition, hundreds of students graduate each year from 2-year programs at private North Carolina colleges, and thousands of additional potential transfers from NCCCS, private institutions, and out of state have accumulated significant lower-division

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coursework but no degree. Currently, the majority of transfers to UNC come without a degree.

Because the data show that those with an AA or AS degree are more likely to be successful, we propose to focus primarily on these students as a potential pool of future graduates. However, there are numerous other populations for whom success is likely, and some of the same actions and policies that facilitate AA/AS transfers' access and success will benefit other transfers, as well.

Action Steps

1. Complete revision of the Comprehensive Articulation Agreement between UNC and the NCCCS.

2. Create a transcript warehouse to improve the efficient transfer of course credit between UNC and NCCCS and among UNC campuses.

3. Create Transfer and Adult Student Success offices at each UNC campus.

E. Military and veteran population: improve and increase service to those in the Service

Roughly 116,000 military personnel are stationed in North Carolina and are eligible for tuition assistance benefits from the U.S. Department of Defense. UNC institutions claim a very small share (almost zero) of the military personnel using tuition assistance. As a result, this is a targeted area for recruitment and growth.

As military personnel separate from service in North Carolina and transition to veteran status (for benefits purposes), UNC should recruit these students to use their veterans education benefits at a UNC institution. Our projections are based on the approximately 250 service members who separate from the Marine Corps at Camp Lejeune every week. According to base education personnel, approximately 150 of these service members will use their veterans education benefits immediately. Our estimates assume that UNC can ramp up to serve one-third of those seeking to use their higher education benefits. (Because the projections are based only on this Marine Corps base, there is significant potential to grow this projection in the long run by connecting with other bases and veterans). With the expectation of 82% graduating within 4-6 years, based on historical UNC-system data showing an elevated graduation rate for military-affiliated students, we project this to result in an additional 1,907 degrees by 2018 and a cumulative total of just over 6,000 over the next decade (due to the lag in graduations resulting from the ramping up in the first five years).

Action Steps

1. Develop a system-wide recruiting strategy for the military-affiliated student population to include custom academic pathways, academic success contracts, targeted collateral material, and other best practices.

2. Provide early resident status to certain non-resident veteran students who expect to establish formal residency. Prior to FY 2011-12, the federal Post 9/11 GI Bill capped

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tuition payments based on the highest in-state tuition in a given state. Beginning in FY 2011-12, tuition is capped at the actual in-state tuition at public institutions of higher education, lowering the amount of tuition covered for most nonresident students. Allowing the University flexibility to confer early resident status would eliminate this barrier to veteran students.

3. Establish system-level support and logistical assistance for UNC institutions that are recruiting, enrolling, and graduating military-affiliated students.

4. Establish successful academic advising centers at Fort Bragg and Camp Lejeune.

5. Streamline admission and transfer policies for consistency in determining residency and value of credit.

6. Incentivize faculty to develop flexible online courses that can be taken outside the normal semester system to meet degree requirements.

7. Create a web-based with clear information about veteran and Department of Defense tuition benefits, academic credit articulation, academic programs, admissions, and student services.

8. Create and utilize faculty and staff development tools (such as Virginia Commonwealth University's "Green Zone" and the Center for the Deployment Psychology's "UC4" program) to nurture a culture of acceptance and support for military-affiliated students on UNC campuses.

F. Improve graduate student education

The projections of graduate student degrees are modeled on an annual growth rate of 1% in masters and Ph.D. programs, combined with a cumulative 3% increase in masters and doctoral graduation rates across the 5 years covered by this plan. Together, these changes would result in 1,600 additional cumulative graduate degrees by 2018. While our projection of graduate enrollment growth is based on an aggregation of campus-based biennial graduate enrollment projections, it is worth noting that both nationally (35) and in North Carolina, the enrollment of new U.S. masters and doctoral students has actually decreased over the last two years. Thus, to meet the enrollment growth target modeled here, aggressive new investments in faculty, doctoral students, and industry-responsive masters programs such as the Professional Science Masters (PSM) will be of utmost importance. (See Section 3 of this document for complete details of these resource needs, and proposed returns on investment.)

In order to have an impact on our overall degree attainment goal, our model assumes that a disproportionate share of enrollment growth will be comprised of out-of-state and international graduate students, enrolled in programs with strong, attractive North Carolina employment opportunities. Our model is based on the goal of increase graduation rates of masters and Ph.D. students by 3% across all disciplines. Evidence from the only existing national study of Ph.D. completion rates and best practices for improving them shows that guaranteed, multiyear funding packages and enhanced professional development and

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career advising are the two high impact interventions that can significantly improve completion rates (36).

While there are few studies of masters degree completion, early evidence from the Council of Graduate Schools study of this topic suggest similar factors are important (37). In order to meet the proposed graduate degree attainment goal, we therefore, propose, the following actions.

Action Steps

1. Support existing and develop new Professional Science Master's programs (see section 3) and other industry-responsive programs.

2. Grow doctoral enrollment in programs aligned with state and campus strategic goals by providing the resources sufficient to attract and retain them, including tuition remissions and graduate research assistantships, and faculty and laboratory support (see section 3)

3. Improve degree completion rates and time to degree completion through the development of centrally supported campus-based professional development and career advising programs.

4. Recruit entrepreneurially-minded graduate students (see section 3) will result in an increase in graduate program enrollment, improvements in graduate program graduation rates, and an increase in the percentage of graduates choosing to remain and work in North Carolina.

G. **Further embrace distance education**.

Utilize technology-enhanced distance education as a means to facilitate increased access to educational opportunities for the citizens of North Carolina in pursuit of all of the above strategies.

Action Steps

(See section 2 on academic quality for additional elements of a comprehensive eLearning and distance education strategy.)

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STRENGTHENING ACADEMIC QUALITY

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JANUARY 7, 2013

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Strengthening Academic Quality

ROLES AND RESPONSIBILITIES

Improving the quality of education for all citizens was among the core goals for the consolidation of University of North Carolina, as set forth in General Statutes governing the University. "In order to foster the development of a well-planned and coordinated system of higher education, to improve the quality of education, to extend its benefits and to encourage an economical use of the State's resources, the University of North Carolina is hereby redefined in accordance with the provisions of this Article." N.C.G.S. 116-1(a).

That charge continues to guide us today, as the University renews its commitment to the highest levels of student success and academic rigor. We do so through a commitment to becoming a national leader in the assessment of student learning outcomes, through the use of new instructional technologies to foster student access and success, through our dedication to improving K-12 education, and through the development of valuable work and life skills among our own students. We do so in deep appreciation of the public trust and investment in UNC and with a full understanding that we are accountable for responsible use of academic resources and for full transparency in our decision-making processes.

The General Assembly made clear that "[t]eaching and learning constitute the primary service that the university renders to society," and that "[t]eaching, or instruction, is the primary responsibility of each of the constituent institutions." N.C.G.S. 116-1 (b). Under state law, then, the fundamental responsibility for delivering a quality education rests with the individual campuses and their faculties, with accountability shared by the Board of Governors, the University president, campus trustees, and chancellors. University policies reflect this shared governance in connection with program development and review and in requirements for granting and maintaining faculty tenure.

In addition to efforts focused on curricula and program administration, the University's commitment to excellence in scholarship and teaching is the foundation for tenure and promotion standards and post-tenure review on all campuses. In accomplishing their statutory responsibilities as arbiters of hiring, promotion and compensation policies and practices, and as stewards of institutional resources and the alignment of those resources with the highest academic priorities, the President, Chancellors, Trustees, and members of the Board of Governors all work to ensure that UNC institutions deliver programs and services of uncompromising quality, consistent with individual campus missions.

National higher education accrediting bodies acknowledge the shared responsibilities and engagement of governing bodies, administrative leadership, and faculties in ensuring academic quality. Quality enhancement is at the heart of the accreditation philosophy of the Southern Association of Colleges and Schools Commission on Colleges. This outlook presumes that

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each member institution is engaged in an ongoing program of improvement and is able to demonstrate how well the institution fulfills its stated mission.

Although evaluation of an institution's educational quality is complex, accreditation standards require that an institution document the quality and effectiveness of all of its programs and services and use those results in an ongoing quality enhancement process. SACS accreditation standards also specify that institutions:

- maintain a faculty sufficient in size and quality to deliver high quality programs, consistent with their missions,
- have policies and practices in place to ensure faculty engagement in the development, review, and improvement of the curricula, and
- have developed a Quality Enhancement Plan that identifies a particular aspect of institutional performance for focused action and improvement.

Not only is a robust quality enhancement infrastructure required for basic accreditation, but a commitment to promoting the highest standards of excellence is also built into discipline-based accreditation processes, such as those of the Association to Advance Collegiate Schools of Business and ABET (formerly the Accreditation Board for Engineering and Technology).

CHANGING HIGHER EDUCATION ENVIRONMENT

The only certainty of the 21st century is the constancy and rapidity of change. Students entering the workforce today are likely to hold five to eight jobs over the course of their working lives, and a significant number of those just now entering the University will enter a job at graduation that does not yet exist. Arguably, the personal and public value of higher education has never been greater. However, the imperative that universities prepare the next generation of leaders with the skills to navigate a rapidly globalizing and changing society requires that the University retool, as well. It also requires that they adapt to meet the changing aspirations of students and the growing expectations of those who invest in higher education.

Change is not new to the University. During the past hundred years, the curriculum expanded in scope from the classics to the sciences to the social sciences. And the evolution of technology—radio, television, and now the internet—has opened the opportunity learn anywhere and at any time. As a result, student enrollment has morphed from full-time residency only, to part-time commuters, and increasingly from part-time to any-time students.

Adaptations to the curriculum and the evolution of instructional delivery have progressed toward greater personalization of the educational experience and more customized teaching methods. Students can now choose a variety of paths to obtain a course or degree. They can attend classes full- or part-time. They can choose hybrid classes that mix face-to-face meetings with online work, or they can take classes fully online.

At the same time, advances in cognitive science have significantly improved our understanding of how people learn. The use of active learning pedagogies, the "flipped classroom,"

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modularized approaches to skill development, and instructional technologies that allow professors to understand in real time the facts, concepts, or skill sets with which their students are struggling means that we are now able to not only individualize instruction, but also to improve learning outcomes for all students.

A recent UNC Faculty Assembly survey found enthusiasm for technology and its use in all learning spaces, from fully online to the traditional face-to-face classroom. Of the 1,700 faculty who responded, more than 85% used a learning management system (LMS) to organize their classes, with Blackboard being the most widely used. In addition to widespread use of now "familiar" technologies (e.g., PowerPoint, recorded lectures, commercial and personally produced video materials, online discussion forums, web-based assignments, student response systems, email, social media), nearly 20% (300/1,700) reported that they also used other technologies for teaching.

In addition, 23% of survey respondents used the LMS in a highly specialized manner, 16% produced their own audio or video content, and 15% held synchronous online conferences to enhance student-teacher interaction. Faculty reported using technology for a variety of objectives, including skills development, performance assessment, online collaboration, and media production. While an overwhelming majority expressed enthusiasm about and interest in technology use, some also expressed concerns. Approximately 30% of those who were interested in expanding the use of instructional technologies were frustrated by the lack of infrastructure, institutional support, and opportunities for professional development to stay abreast of new practices and emerging technologies.

It is in this environment of rapidly changing technology and student demographics that UNC renews its commitment to the highest levels of student success, as measured by timely degree completion and the development of work and life-related skills and values. We commit to being a nationally recognized leader in the assessment of student learning outcomes and in the use of instructional technologies to foster student access and success. We do so with deep appreciation for the public trust and investment that has been placed in UNC and with a full understanding that we are accountable not only for the highest levels of efficiency in the use of academic resources, but also for full transparency in our decision-making processes.

ASSURING HIGH-QUALITY DEGREES

Student Learning Outcomes

A survey of employers conducted by Hart Research Associates (2010) found employers expect current and future employees to use a broader set of skills and have higher levels of learning and knowledge than they have in the past. In order to meet projected increases in the complexity of workplace demands, 96% of those same employers said they would place as much or more emphasis on hiring individuals with four-year degrees, particularly those who had acquired depth of knowledge in their major and the broad skills often associated with the general education curriculum, including the ability to apply college learning to real-world situations and the ability to conduct research and develop evidence-based analyses. It is clear that North Carolinians also expect students seeking a UNC undergraduate degree to master

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the knowledge and skills essential to 21st-century competitiveness, including those skills "necessary to good government and the happiness of mankind." [1]

UNC institutions and faculty are committed to delivering high-quality programs that position students for success in a global, ever-changing society. A variety of assessment methods are used to measure student learning at the course, major/degree, and general education levels. Examples include embedded pre- and post-learning assessments to determine content-learning in courses; use of standardized tests such as the Collegiate Learning Assessment (CLA) or the National Survey of Student Engagement (NSSE) to determine generalized learning outcomes such as critical thinking; writing across the curriculum and writing in the discipline programs that use faculty teams to evaluate student improvement as they progress from freshman to graduates; student achievement rates after graduation; portfolios; and capstone experiences.

Using a variety of complex assessment methods, the UNC system is already in full compliance with standards set by SACS and multiple disciplinary accrediting bodies. UNC is also already aligned with best practices in higher education assessment.[2]

The major challenges to effectively using student learning outcome data as a tool to improve the effectiveness of the curriculum and the quality of our higher education programs are threefold. First, there is no national consensus about a single methodology, sampling design, or test that can provide the types of robust and granular student learning outcome data necessary to inform institutional or program improvement strategies. Second, as eloquently stated by the Faculty Advisory Council in "Our University, Our Future," "Appropriate assessment processes must not be limited to any one measure that attempts to capture all of the complexity of the desired competencies.

Useful assessment – assessment that results in a full picture of what is working (and not working) to prepare students for their careers and lives – uses multiple methodologies, includes longitudinal studies of student performance, is formative in nature, is coupled with a continuous cycle of improvement designed to maximize the success of our students, and must "embody creativity, adaptability, reliability, and validity" (AAHE Principles of Good Practice.)" (See Appendix xx for a copy of the full Faculty Advisory Council report.) Finally, efforts to develop appropriate and useful assessment tools are complicated by the rapid movement away from course-based approaches to measuring student learning outcomes towards the more flexible, but in many ways more challenging, competency-based approach.

E-Learning

In July 2007, UNC General Administration launched The University of North Carolina Online (http://online.northcarolina.edu/), the official online site providing organization and integration of services and resources to assist prospective students, current students, and UNC institutions with increasing access to high-quality degree-credit online programs for North Carolina citizens. UNC Online is the public face of online education across North Carolina's public

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[1] Northwest Ordinance, adopted July 13, 1787, by the Second Continental Congress

[2] See Peter Ewell, Discussion Paper at www.nchems.org/pubs/detail.php?id=52 and "*Our University, Our Future: A Faculty Vision for UNC Strategic Directions Moving Forward.*"

University system. It creates a single point of entry to the resources and services offered by the University and increases access to information about degree programs and courses.

Currently, UNC offers 628 authorized distance education degree and certificate programs. Of these, 313 are offered online: 70 undergraduate, 132 graduate, 2 doctoral, 2 intermediate, and 102 certificate/licensure. Online enrollments are increasing: in the five years from FY 2007 to FY 2011, online student credit hours taken by distance education students increased by 88.6%, from 152,854 to 288,339.

Since 2010, UNC Online has provided a test Proctoring Network for students and faculty. The network standardizes and streamlines the proctoring process for instructors and students. While some universities in the U.S. have made approved proctor lists available to students and others have internal proctoring systems, UNC's network is unique in that it offers this level of automation to all campuses. The network filters available proctors based on student location, exam type, length, and test-time, and allows students to auto-schedule exams.

Also available through UNC Online is the E-Mentoring Network, which enhances the academic experience for students in identified cohorts by connecting them with mentors from the workforce. A good mentoring relationship promotes a student's professional development and provides first-hand information about what is expected in a chosen profession.

In November 2012, another enhancement was added to the UNC Online site: The Exchange. The Exchange assists students in selecting online courses offered in the student's major program or in disciplines or languages not offered on the student's home campus.

Twelve years ago, faculty from eight UNC campuses created a German Inter-Institutional Agreement by which they would share courses across their campuses. German instructors from several campuses created a path to a German studies degree that involved video-conference courses delivered synchronously. This agreement had a number of advantages for participating programs. Most notably, two new German degree programs were created without additional resources. Today, the UNC Online German Exchange – with faculty from the eight participating campuses –forms the largest "federated German department" in the country. Currently, three languages have formal agreements that are being served by The Exchange – German, Russian, and Portuguese. A number of disciplines are now exploring options for leveraging learning opportunities, including general education courses, across UNC campuses.

The UNC Online website recently underwent an extensive upgrade and now offers a more user-friendly and easily navigable interface. The upgrade included an overhaul of the back-end database that drives the site and functional capabilities such as the test Proctoring Network, the E-Mentoring Network, and The Exchange.

Nevertheless, UNC has not yet fully capitalized on the opportunities that advances in technology and developments in the delivery of distance education can provide. In addition to expanding UNC's ability to deliver high-quality, low-cost education to the substantial numbers of adult learners who have been traditionally underserved, we now have the opportunity to redesign courses and degrees in ways that maximize learning for all students. In addition, personalized learning will allow students to gain a degree more quickly by determining what knowledge the student has already mastered and focusing on the knowledge that the student still needs. With more clearly specified learning outcomes and with more sophisticated use of

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student learning outcomes data to improve the quality of both courses and degrees, UNC can make great strides in preparing students for productive careers, healthy lives, and engaged citizenship.

As part of the Strategic Directions process, President Ross engaged Bruce Chaloux of the Sloane Group to consult with members of the UNC community, including representatives from the Board of Governors, General Administration staff, and institutional representatives, in October 2012. Following interviews with key stakeholders, a full review of reports and documents provided prior to and during his two-day visit, as well as a review regional and national reports on e-learning and current trends and future directions in higher education, Dr. Chaloux submitted his analysis to the President in a report entitled "E-Learning as a Strategic Asset for UNC."

To paraphrase and adopt the overarching recommendation from that report, the following principles will guide our implementation of a revised, comprehensive e-learning strategy, one built on a "strong and clear statement of the importance of e-learning as a central strategy for addressing broader goals at UNC:

- Be delivered with the quality expected of higher education services from UNC
- Be a mainstream component to the traditional campus model, not a supplement to it
- Be a viable tool that can help expand access for both traditional and 'non-traditional' students in North Carolina
- Assist in increasing degree attainment for a variety of populations in the state, in particular adult learners and those where traditional campuses are not in proximity to their residence
- Increase efficiencies across the entire university and at individual institutions by:
    - Increasing the capacity of institutions without increases in building and infrastructure
    - Reducing program duplication
    - Providing a larger number of student enrollment options with opportunities from across the university
- Increase access points to the university
- Strengthen the link between educational programming and state workforce needs, and
- Create enhanced teaching and learning environments for both faculty and students."[3]

[3] For full report, see Appendix TBD

ACCOUNTABILITY MEASURES

In addition to clear expectations about the content and rigor of the baccalaureate curriculum, in 2012, discussions of quality in higher education also inevitably entail a discussion of the personalization of learning, the customization of delivery modality, and the credentialing process that today's universities will use to certify mastery of degree-related skills, content, and values. UNC students and other stakeholders demand an education that is uncompromising in quality, but flexible in course timing, duration, pedagogical approach, and use of educational materials conducive to different learning styles. Increasingly, the expectation is that universities will meet students where their prior experience and learning has taken them and that they will provide the resources necessary to support and credential student learning in as expeditious and cost-effective a manner as possible.

As demonstrated in Section 1 of this document, to be competitive now and in the future, North Carolina needs an increased number of four-year degree recipients, living and working in the state, who have mastered sophisticated, in-depth technical competencies and broader, transferrable skills typically associated with the general education curriculum, including critical thinking and quantitative analysis, written and oral communication, scientific inquiry, historical and social perspectives, and human expression and creativity.[4] To reach the State's educational objectives, public universities must operate at maximum efficiency to deliver the highest quality education to an increasingly diverse student body.

In this context, it is imperative that UNC engage in a full examination of the policies need to ensure:

- Students who are admitted are prepared to succeed;
- Students have access to the courses they need to complete degree requirements on time and with minimal unnecessary duplication of courses or course content;
- Faculty have access to state-of-the art- learning technologies and related professional development opportunities necessary to deliver a high-quality, cost-effective education;
- Baccalaureate study at UNC will encompass mastery of the 21st-century skills demanded by employers and associated with general education requirements in addition to the technical skills and competencies associated with a specialized field of study;
- Employer feedback and data on student learning outcomes guide the continuous improvement of courses and degree programs.

RETURN ON INVESTMENT

We propose that one measure of the return on the combined investment for the strategies proposed below would be a 4% reduction, per year, in the average number of hours to degree attempted by UNC undergraduate degree completers. In the 2011-2012 academic year, the

[4] Note that the Faculty Advisory Committee's "Our University, Our Future" report identifies these five skills as common to the general education programs at all 16 undergraduate degree-awarding institutions within UNC.

UNC system total average hours attempted was 138.5. The goal is to reduce the total system average of hours attempted to 133 hours, a system-wide reduction of 5.5 hours (4%) by 2018. This reduction will be accomplished within the following timeline with the following projected cost avoidance:

Year 1: 0.5 reduction. Total projected cost avoidance $6,468,750 (Weighted average for both the state and the student tuition contributions to per-undergraduate credit hour cost is $375X0.5 hours X34,500 – average number of undergraduate students who graduate each year).

Year 2: 1.5 reduction. Total projected cost avoidance $19,406,250.

Year 3: 2.5 reduction. Total projected cost avoidance $32,343,750.

Year 4: 4.5 reduction. Total projected cost avoidance $58,218,750.

Year 5: 5.5 reduction. Total projected cost avoidance $71,156,250.

There likely will be substantial differences in how much progress can be made in this regard for various subgroups of students, e.g. transfer students, students who change majors, etc., and an effort must be made to specify and address subgroup targets.

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STRATEGIES

A. Assess the impact of minimum admissions requirements

Complete comprehensive data analytics review of the effects of the recently increased minimum admissions requirements (MARs) on student success at both the campus and system levels. Propose changes or amendments to those standards, consistent with the research results.

Actions Steps

1. Complete analytics research on the likely impacts on student success if the new minimum admissions requirements had been applied to past cohorts.
2. Develop a process for tracking those who fail to gain admission to UNC under new standards to determine if, and where, they go to begin post-secondary education and whether and how soon they ultimately enter a UNC institution.
3. Complete a comprehensive assessment of the predictive utility of current GPA and test score standards on the retention and graduation rates of future cohorts, and analyze whether different, additional, or weighted measures of student academic preparation should be included in the minimum admission requirement policy.

B. Set core competencies for General Education programs

Guarantee a set of minimum competencies for General Education programs, based on recommendations from faculty from across the UNC system, to assure seamless transfer opportunities between UNC campuses and from North Carolina Community Colleges.

Action Steps

1. Complete revision of the Comprehensive Articulation Agreement consistent with time line submitted by UNC and NCCCS to the Educational Oversight Committee. (See Appendix TBD)
2. Appoint a General Education Council composed of faculty and chief academic officers to undertake a comprehensive review of existing General Education programs across all 16 UNC undergraduate-degree granting institutions and recommend a set of minimum competencies that will strengthen and streamline learning outcomes. (Committee to be appointed by March 2013; recommendations and analysis received no later than January 2014)
3. Consider the following for possible inclusion in the set of system-wide general education competencies, recognizing that general education is not limited to these areas and must be aligned with each institution's mission:
    - Critical thinking and quantitative analysis;
    - Scientific inquiry;

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- Communication skills;
- Historical and social perspectives;
- Human expression and creativity;
- Health and wellness awareness;
- Information and technology literacy;
- Global and cultural awareness, diversity, and citizenship

4. Use results of council review as basis for discussion of a common set of general education competencies and value outcomes across UNC and of the proposed tools and methodologies that will be used to measure them. (January 2014-May 2014) Initiate pilot projects designed to refine the proposed quantitative measures of student learning and develop appropriate and cost-effective test administration protocols. (Fall 2014) cross-referenced below

5. By December 2013, ensure that all general education courses at all UNC institutions meet transfer-level quality SACS accreditation standards.[5]

6. Update and expand current course equivalency library (Transfer Navigator) to include a search function not only by course name and title, but also by minimum course objectives and competencies. (2016-2017)

7. By fall 2015, ensure that any change to campus curricula be assessed for compatibility with the equivalency library and Comprehensive Articulation Agreement (CAA) before implementation.

8. Develop system for continuously updating course equivalency portal. (January 2017 – May 2017)

C. Become the national leader in the assessment of student learning gains

Increase the transparency and coverage of current student learning assessments, fully implement a robust general education learning outcomes assessment strategy that is integrated with current assessments of learning in the major, and develop a strategy to measure longer-term career and responsible citizenship outcomes of UNC degree recipients.

Action Steps:

1. Increase the transparency of current student learning outcomes assessments.

   a. Ensure all campuses report all required information to the Voluntary System of Accountability (VSA) in a timely manner.

   b. Publish expected learning outcomes for each degree program on each campus' website.

[5] See SACS Policy on Quality and Integrity of Undergraduate Degrees at http://sacscoc.org/pdf/081705/Quality%20and%20Integrity%20of%20Undergraduate%20Degrees.pdf

c. Make licensure pass rates, currently reported annually to the Board of Governors, more accessible to prospective students and other key stakeholder groups.

d. Develop and regularly report on a suite of indirect student learning outcome measures, e.g., percent of students attending professional or graduate school, percent employed in field within six months of graduation, or other indicators derived from the National Survey of Student Engagement results.[6]

e. Publish existing Employment Security Commission employment and income data by major on publicly available web sites such as the College Foundation of North Carolina and the University of North Carolina.

2. In partnership with one or more nationally recognized higher education assessment organizations (for example, Educational Testing Service) develop and fully implement a robust competency-based general education learning outcomes assessment strategy that is integrated with current assessments of learning in the major.

   a. In the fall of 2013, pilot on five UNC campuses the use of the revised College Learning Assessment (CLA) test with a statistically valid sample of the freshman cohort admitted for fall 2013.

   b. By January 2014, receive recommendations from the General Education Council (see 2.ii above)on 1) the common core competencies and value outcomes that characterize a 21-st century undergraduate education, and 2) proposed operational definitions, tools and research design for measuring the agreed-upon core competencies at the campus-level across the system. Recommendations will be informed by a thorough evaluation of the data collected from the CLA pilot program (referred to in 3.ii (a)), an analysis of constraints that might limit the capacity to deliver the test to a more expanded set of students, and what policy or methodological changes would be required to address the recently documented shortcomings in a low-stakes testing environment.[7]

   c. By May 2014, complete an alumni satisfaction survey to determine students' perception of educational value and quality.

   d. By fall 2014, implement pilot projects designed to refine the proposed quantitative measures of individual student learning and develop appropriate and cost effective test administration protocols.

   e. By May 2015, identify steps necessary to bring a comprehensive competency-based measurement approach to scale across all UNC campuses.

   f. Beginning in the 2013-14 academic year, pilot an e-portfolio approach to documenting student learning across general education and the major. E-portfolios will include learning derived from both traditional and non-traditional classroom experiences, co-curricular activities, and capstone projects or seminars.

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[6] http://nsse.iub.edu/html/about.cfm

[7] See Liu et al. (2012) for full study details.

Information included in e-portfolios should help students document their ability to apply knowledge, skills, and responsibilities to complex problems and new settings in the workplace and civic life[8].

g. By September 2015, bring a competency-based approach to assessing general education to scale across the system and determine whether or not to adopt a common e-portfolio platform and framework.

h. As appropriate, join national efforts (currently led by the State of Massachusetts) to develop a robust database for comparing campus learning outcomes with those of their peers.

3. Establish a system-wide Prior Learning Assessment (PLA) program (Fall 2014 – Fall 2016).

4. Implement a robust strategy for measuring the longer-term career and responsible citizenship outcomes of UNC degree recipients.

   a. Conduct alumni surveys at 1-year, 5-year, 10-year, and 20-year intervals after graduation, to include information on employment and career mobility, civic wellness (e.g. participation in voting, volunteering, service work, in children's education and development, and individual benefits (e.g. health, happiness, stress).

D. Implement a comprehensive eLearning strategy

Builds on the assets of the University, take advantage of developments in the marketplace, and enhance the quality of academic programming offered to all students by creating and launching a systemwide eLearning strategy.

Action Steps

1. Eliminate distance education tuition charges for full-time students to maximize access to online courses and reduce time to degree. Ten UNC campuses charge additional tuition and fees to full-time, on-campus students who take distance education courses in excess of the full-time tuition cap (12 hours). Funds are requested to allow students enrolled full-time in traditional campus-based degree programs to take distance education classes offered by their home institution at no additional cost.

2. In collaboration with a Chancellor's Advisory Group, identify key strategic partnerships that will enhance UNC's ability to leverage its reputation for academic excellence and its current investments in UNC Online, CFNC, UNC-TV, and UNC Health Care. Based on a careful evaluation of the quality of the product, the capacity to extend UNC's reach to new student populations, the viability of the business model, and its adaptability to a range of disciplines and institutional types, sign an MOU with one or more providers of eLearning and MOOC platforms (e.g., Coursera, EdX). (March 2013 – December 2013)

[8] http://www.aacu.org/meetings/annualmeeting/AM12/EPortfolioResources.cfm

3. Develop and deliver up to ten new competency-based distance-delivered general education or other bottleneck courses (including laboratory courses) and five MOOC's that meet the highest standards of instructional quality and student learning and meet lower-division general education requirements at all UNC campuses. (Beginning September 2013, develop and launch two new competency- based general education courses and one MOOC per year, in each academic year of the strategic plan).

4. Become a national leader in the use of technology-enhanced pedagogies that measurably improve student learning outcomes, decrease course non-completion rates, and reduce hours to degree.

    a. Develop a Request for Proposal (RFP) that provides incentive to faculty to leverage technology in the redesign of courses within the general education core that have high DWIF rates. (Annually, beginning September 2013)

    b. Pilot the development of online competency-based courses that effectively utilize distance technologies to assess and track learning outcomes (Annually, beginning September 2013)

    c. Deliver faculty development that focuses on formative assessment and learning analytics in teaching and learning of general education core courses. (Begin February 2013 and ongoing)

    d. Institute a series of faculty development sessions to be hosted annually that allow for the exchange of best practices in the use of technology to deliver instruction that is affordable, accessible, and scalable. (Begin February 2013 and ongoing)

5. Initiate and implement primary market research on key target audiences and influencers of distance education opportunities including: high school students, community college students, part-way home students; military personnel and veterans, adults with an earned baccalaureate degree, and school counselors (university, community college, and high school).

    a. Develop RFP for market research contract with a company (e.g., Noel Levitz) specializing in higher education enrollment management services to identify specific programs of greatest interest to non-traditional student populations we wish to serve as part of our degree attainment goal (March – July 2013)

    b. Award contract with a May 2014 due date for agreed upon deliverables (November 2013)

    c. Develop system-wide implementation plan based on results of market research (May 2014-August 2014)

    d. Design courses and initial degree programs responsive to results of market research (June 2014-July 2015)

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e. Implement a portfolio of distance-delivered programs responsive to needs of adult learners, including military personnel and veterans, part-way home students, and transfer students. (August 2015 – June 2018)

6. Launch UNC Online marketing campaign to drive visibility of website, degree and program offerings, and other services and resources offered online (January 2014).

7. Develop and aggressively market a fully online inter-institutional undergraduate degree in Liberal or Interdisciplinary Studies that is designed with flexible delivery options specifically for adults with some college, but no degree, as well as military personnel and veterans.

   a. Develop and deliver initial online courses that are requirements for an undergraduate degree in Liberal or Interdisciplinary Studies (September 2014-June 2015)

   b. Continue necessary course development and begin marketing and delivery to target populations (August 2015-June 2017)

   c. Complete and deliver all required courses for the fully online inter-institutional Liberal or Interdisciplinary studies baccalaureate degree.

8. Expand the number 2+2 programs delivered via distance education.

   a. Launch an aggressive marketing campaign to promote availability of existing 2+2 programs (September 2013, and ongoing)

   b. Enhance existing 2+2 online degree inventory with programs identified as high-interest/high-need by market research completed in December 2013. (Through an RFP process beginning September 2014 and annually thereafter.)

9. Pilot of a series of competency-based online post-baccalaureate certificate programs that are matched to specific economic needs within the state and based on prior market research analysis.

   a. Plan and begin initial development of post-baccalaureate certificate programs identified through market research as in high-need by employers and in high demand by potential students. (January 2014 – August 2014)

   b. Fully develop and launch three online competency-based post-baccalaureate programs matched to specific workforce and economic development needs. (January 2015- August 2016)

10. Explore avenues to expand access to the UNC Online Exchange for World Languages with new markets through new and existing partnerships such as the Southern Regional Education Board and the U.S. military and establish programs to enable assessment of sustainable and scalable revenue-generating models for a state, national, and international online presence that generates potential new revenue. (Beginning

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September 2014 and ongoing)

E. Reduce attempted hours to degree through more comprehensive advising

Implement a system of academic and career advising that will reduce undergraduate attempted hours to degree and help students and institutions better align student interests and content mastery with employer expectations and demands.

Action Steps:

1. Initiate a biennial employer satisfaction survey.

    a. Using the response categories excellent, good, fair, needs improvement, and poor, the survey must include the following items: written skills, oral communication skills, ability to work with others, problem-solving skills, ability to understand and use technical information, work ethic, and adaptability/flexibility.

    b. Institutions should consider asking an open-ended question of employers about how they could better prepare future graduates.

    c. General Administration will work with campuses to develop an approved employer sampling procedure that will generate valid results.

2. Each campus will implement electronic advising support software. At a minimum, software will be used to create a comprehensive advising portfolio that documents all advising encounters, makes the record of advising available to students and advisors, and follows the student across majors in different colleges and degree programs. The technology will allow advisors to focus more exclusively on major selection and navigation of workforce options.

    a. Explore scaling electronic advising solution to include the North Carolina Community College system.

    b. Hire additional professional and academic career advisors and provide staff and other resources necessary to support high-quality faculty advising.

    c. Implement strategies for assessing and improving student satisfaction with academic and career services.

    d. Pilot a series of post-baccalaureate certificate programs that are matched to specific economic needs/employer demands within the state (based on employer surveys and prior market research analysis).

    e. See also Section on UNC Serves for additional action steps related to internships and university/employer partnerships

F. Prepare more higher-quality teachers and school leaders

Driven by a robust research agenda, UNC has made important programmatic, curricular, and policy strides that have produced measurable results in increasing the number and the

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effectiveness of North Carolina primary and secondary teachers and principals. These efforts must continue and be augmented by additional focused strategies designed to improve the recruitment of teachers and school leaders, their collegiate preparation, and their support in the critical early years of a teaching career or as principal. All of these initiatives will be developed from and guided by the University's nationally recognized outcome-based research on teacher quality.

The demand for new licensed teachers is driven by growth in the number of students in the state and, more critically, by the need to replace teachers who leave. Because University of North Carolina institutions produce approximately 33 percent of the new teachers in the state, they are vital in producing the new teachers needed to meet a growing population and in addressing current deficits of teachers high demand fields such as special education, science, mathematics, and middle grades.

However, given the role that high turnover rates play in driving the supply of PK-12 teachers, UNC also plays a critical role in developing the best practices that reduce turnover rates among early career teachers, improving both their retention and effectiveness. Research clearly indicates that the mentoring that reduces career dissatisfaction and attrition also increases novice teacher effectiveness. Elementary reading and mathematics teachers, middle school mathematics teachers, and all high school teachers are, on average, significantly more effective in their second year than their first. Thus, the three legs of the PK-12 Teacher and School Leader Education agenda are, producing more teachers, improving the preparation and therefore effectiveness and quality of newly licensed teachers, and initiating best practices that reduce early career attrition and are supportive of the continued professional development of mid- to later-career teachers, school principals, and other school leaders.

Action Steps

1. Calibrate the quantity of teachers

   Ensure that UNC campuses are individually and collectively contributing to the State's need for high quality PK-12 teachers and school leaders.

   a. Update statewide market research and use in teacher recruitment planning to drive each campus' enrollment growth plan implementation (December 2013).
   b. Renew campus-based enrollment growth plans aimed at increasing the number of initially-licensed teachers for NC's public schools, particularly in identified high need licensure areas (mathematics, science, middle grades and special education). (December 2013)
   c. Ensure each campus preparing teachers has a recruitment plan that is aligned to current market research and system plan, is responsive to the State's supply/ demand needs, and is informed by the results from UNC's teacher quality research. (May 2014)
   d. Assess and track campus productivity of initially licensed teachers contributing to the State's supply and demand: overall productivity and productivity in identified

high-need licensure areas (mathematics, science, middle grades and special education). (Fall 2013 and annually thereafter)

e. Report to the Board of Governors and the State Legislature on campus productivity of initially licensed teachers contributing to the State's supply and demand (Fall 2014)

f. Recalibrate the number of initialy licensed teachers and school leaders prepared by UNC campuses, individually and collectively, to more effectively meet the state's PK-12 teacher and school leadership needs (Fall 2014).

2. Strengthen teacher quality

Ensure the quality of North Carolina PK-12 teachers and school leaders prepared by UNC schools of education is evaluated and monitored regularly.

a. Continue to expand UNC's agenda of outcome-based research on teacher and school leader preparation and ensure that the research is utilized by system and campus leadership to examine program quality and facilitate evidence based program improvements. (Annual Teacher Quality research agenda established annually in August)

- The research agenda for 2013-14 will include analysis to inform increased admissions requirements for teacher preparation, and a schedule by which the new requirements will be implemented. (Completed by June 2014)

b. Report annually to the Board of Governors on the assessed impact(s) of teachers prepared by UNC teacher preparation programs as evidenced by analysis conducted through UNC's teacher quality research initiative (Teacher Portals report delivered February 2014; UNC Teacher Preparation Program Effectiveness report deliver February 2015. Two reports alternate annually thereafter.)

3. Improve teacher retention

Seek to improve the performance of early-career teachers by adopting practices and policies intended to improve teacher preparation through more effective student teaching internships, meaningful mentoring, and comprehensive induction experiences.

a. Design implementation strategy for bringing NC New Teacher Support Program to full scale. (September 2013-May 2014)

b. Begin implementation of fully scaled New Teacher Support Program (June 2014 – June 2015)

c. Complete implementation of the fully scaled program (May 2018)

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SERVING THE PEOPLE OF NORTH CAROLINA

D R A F T
JANUARY 7, 2013

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Serving the People of North Carolina

JOBS AND GROWTH

Since North Carolina's economy bottomed out in February 2010, the state has begun a recovery. While an average of 4,400 net new jobs per month have been created, those jobs haven't replaced the jobs lost during the downturn. At the end of 2012, there were still 181,000 fewer North Carolinians going to jobs every day than there were in December 2007, when the national recession first struck,[9] and North Carolina's unemployment rate continues to hover above the national average.

Job growth throughout the United States faces obstacles for the foreseeable future, as workers have become more productive, as machines have replaced people in many work environments, particularly in manufacturing, and low-cost competitors in other parts of the world perform work historically done in the U.S. In manufacturing-rich North Carolina, the challenge of job growth is even more acute.

North Carolina's future success will hinge less on our ability to make things than to think things —to relentlessly create new knowledge, new technologies, new products, new processes, and new ways of organizing and doing work.

The University of North Carolina must play a key role in that future. UNC connects campuses to companies and communities, forming bonds between the University, the state, and the world that create value in the form of art and science, new products and processes, and new innovations.

Now more than ever, UNC must embrace its mission to *serve North Carolina.* As our global economy creates and destroys jobs at lightning speed, UNC must look for ways to serve as an innovation hub, creating the discoveries and growing the discoverers who can lead and shape our state and its economy going forward. UNC should be a destination for entrepreneurial faculty, students, and staff, while building on its historic stengths to become an even more trusted partner for the state's business, nonprofit, and governmental leaders.

[9] Analysis by South By Strategies, January 3, 2013 at http://www.sbnstrategies.com/archives/12491

RESEARCH INVESTMENT

Our public University system has always been an incubator for world-class thinkers and discoverers. Evidence of that comes in part from an analysis of the growth over time of external investment in our research. Over the past 15 years, that investment has continued and accelerated—with sponsored research grants more than doubling during that period.

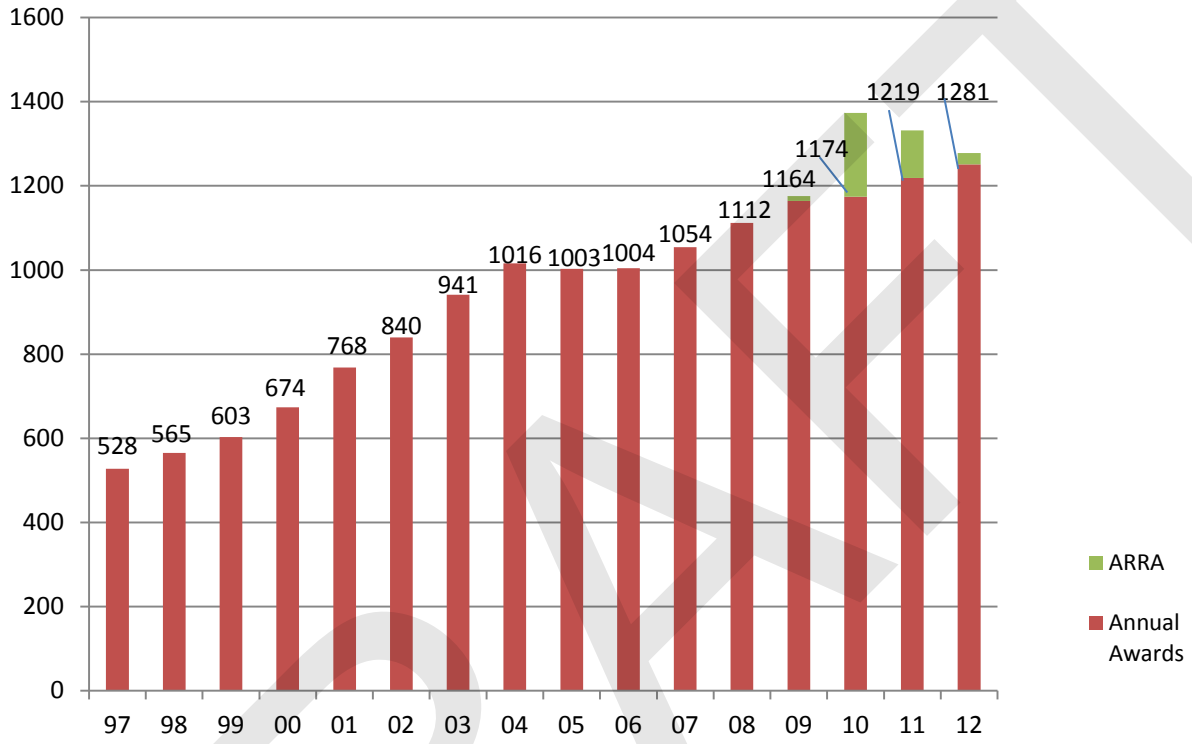

Figure 3a. Awards to UNC from FY 97 through FY 12. Amounts are in $ millions. For FY 09 through FY 12, the green bar indicates the amount received through the American Reinvestment and Recovery Act (ARRA). The amount indicated above each bar does NOT include ARRA funding.

This impressive growth has helped move North Carolina into an enviable position: the state ranks 5th nationally in academic R&D performed per $1,000 of Gross State Product. [10]

We must continue to build on this success going forward, conducting cutting-edge research that will continue to attract investment from federal agencies, which provide 69% of support for sponsored research throughout the UNC system (Figure 2), as well as from state and local government, the private sector, and international investors.

[10] http://www.nsf.gov/statistics/seind12/c8/interactive/table.cfm?table=46

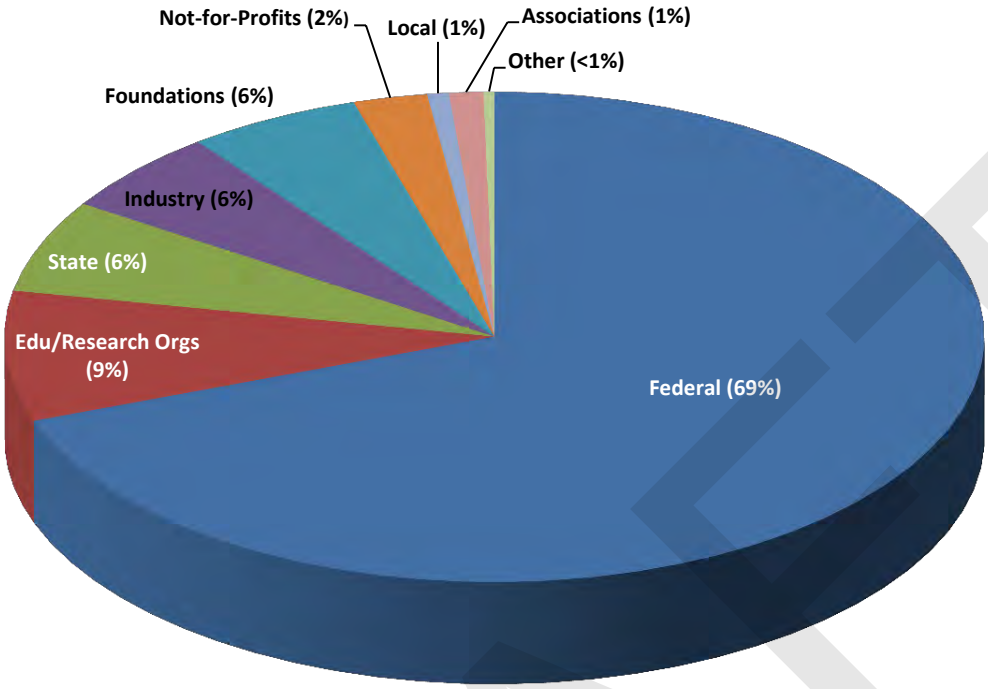

Figure 3b. Percentages of sponsored funding from ALL sources for FY 11.

Every $1 million investment in sponsored research creates an average of 17.25 new jobs—meaning that more than 22,000 jobs were created directly through UNC research funding last year.[11] But research also plays a critical role in the entrepreneurial infrastructure of a state, enabling it to relentlessly turn out new ideas and companies, create new ways of targeting drug treatments, run efficient production lines, manage public policy challenges, or finance and deliver health care.

UNC must provide resources, space, permission, and responsibility to skilled problem-solvers working to solve complex challenges on regional, state and global levels. The big ideas they develop can change the world as we know it. Their strategies and focus will provide a clear road map toward the jobs of the future and the actionable policy ideas that will help the state function successfully in the decades ahead.

Across the region and state, economic and business leaders face challenges and opportunities for which UNC faculty can help find solutions: discovering new energy solutions; improving security for the nation and the world; recreating manufacturing products and processes; making sense of the vast array of data that we produce; discovering jobs and value in our scenic beauty and cultural heritage; creating the public policies needed to keep the state strong; and connecting to economies and thinkers across the world.

[11] "An Economic Engine: NIH Research, Employment and the Future of the Medical Innovations Sector," Everett Ehrlich, 2011, United for Medical Research.

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We must commit to being both globally and locally connected so that we can better understand and draw on the world's knowledge and resources in order to create new knowledge that works for North Carolina.

In late 2012, UNC General Administration staff and campus leaders conducted a statewide listening tour involving business leaders and economic developers across North Carolina. Participants in all regions of the state spoke clearly about the important role UNC can play in helping to shape the future growth of the state.

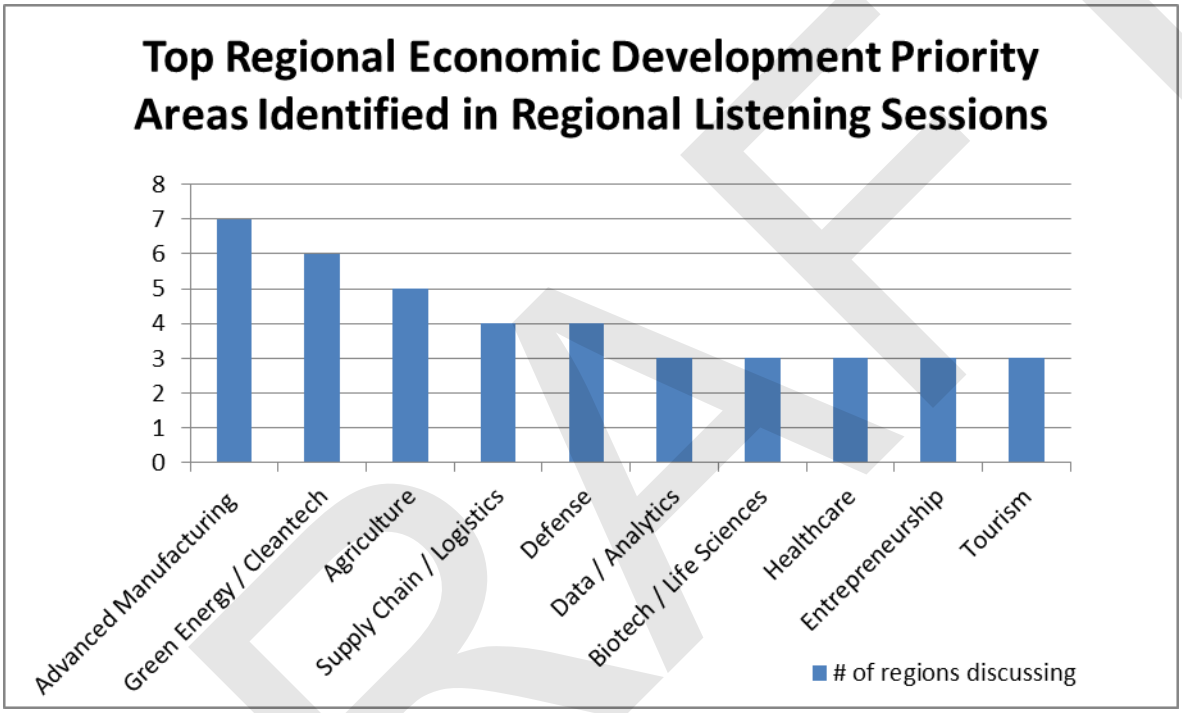

Figure 3c: Based on eight regional listening sessions conducted between Nov-Dec 2012 in eight regions across North Carolina.

These business leaders encouraged UNC to focus attention on sectors of critical and growing importance; to translate faculty research into new products, new processes, and new policies; and to pay particular attention to the state's fastest growing economic sector—health care—which affects every citizen's and every business' bottom line, and is the fastest-growing line item in the state budget.

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STRATEGIES

UNC can't solve all of these challenges, but there are some areas where with targeted investment the University can make a meaningful difference. In a resource-limited environment, we recommend strategic investments in three major areas:

1. Support game-changing research and scholarship that creates big ideas to solve big problems.
2. Translate our discoveries and insights into action, policy and products.
3. Meet healthcare needs through innovative research, training and outreach.

A. Game-changing research and scholarship that solves the problems of North Carolina — and the world.

UNC cannot be good at everything, but there are some areas where, working in partnership with each other and with businesses, the University can "move the needle," making new discoveries and helping to create new jobs and opportunities. Investments must have a high probability of yielding game-changing results and return on investment.

Drawing on conversations from those eight listening sessions across the state, recognizing the areas with potential for extramural funding, and building off of the strengths of UNC researchers, we recommend focused investment over the next five years in seven sectors. They include five areas traditionally associated with scientific research—pharmacoengineering (a particular biotechnology field), data sciences, advanced manufacturing, energy, and defense/military—as well as tourism and cultural development, a top employer in each part of the state, and applied public policy, to help state and local governments effectively address the rapidly changing financial and economic environment. Our greatest opportunities for game-changing excellence come at the intersection of UNC's research strengths and the priorities of the private sector, the economic development community, and regional and state government entities.

Pharmacoengineering is the science behind the development of materials and technologies to improve the delivery of therapeutic and diagnostic agents. Potential solutions to the world's biggest challenges increasingly are hidden in the space between disciplines, and discovering the answers that will enable us to make breakthroughs must come through cross-disciplinary and cross-institutional work. Building on the success of medicine and life science at UNC-Chapel Hill and engineering at NC State, and leveraging the success of the existing biomedical engineering joint program between those institutions, this proposed joint program focuses on both education and research and building collaborations between UNC-Chapel Hill's Schools of Medicine and Pharmacy and College of Arts and Sciences, and NC State's Colleges of Engineering, Agriculture and Life Sciences, Science, and Veterinary Medicine.

The pharmacoengineering effort will lead to new generations of drugs, drug delivery systems, and novel means to assess drug safety and efficacy through imaging and biosensing and will take over a critical role that the big pharmaceutical companies have

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been shedding. Investments in these programs will yield a highly trained workforce for North Carolina's pharmaceutical and biotechnology industries, as well as partnerships with the pharmaceutical industry that will yield significant economic benefits to the state.

Data science: The volume of data available for making decisions has increased exponentially over the past ten years, creating a corresponding need to make sense of and take advantage of that vast data to inform decision-making in fields ranging from science to finance to retail. Nearly every sector of the U.S. economy is struggling with growing data volumes, resulting in "big data" becoming an increasingly important research field. Big data has become so essential that every federal agency is now mandated to have a "big data plan," and the President of the United States has launched a cross-agency federal research program in data science.

Big data is a big market, too. The data management and data analytics sector alone is worth over $100 billion and is growing at a rate of almost 10% per year (*The Economist* Feb 25, 2010), and there are other big data markets (health care, financial, emergency management). UNC has strengths in big data that, if collectively harnessed, can provide national leadership in this important sector. UNC-Chapel Hill has deep technical talent in data management and platform technologies; NC State has great strengths in structured and unstructured data analysis, statistics, and computer science; UNC Charlotte is connected regionally with the financial sector in utilizing big data; and East Carolina is using big data to incorporate weather and climate information into emergency management decisions. By strengthening the interactions among these programs, local industry, and national needs, the state of North Carolina will be well-positioned to become the national leader in big data research.

Advanced manufacturing, or AM, integrates information, automation, computation, software, sensing, networking, and new materials in the production of products. AM is applicable to a number of significant industry sectors in North Carolina, including aerospace, auto manufacturing, furniture, and textiles. AM practices lead to a high level of product quality, compliance with industry-specific certification standards, and savings for business and consumers. Products and processes are often innovative, made from advanced materials and components, and produced through technology-driven equipment and processes. AM requires the use of cutting-edge technologies and materials and a highly skilled workforce operating in lean and continuous improvement cultures.

UNC offers a range of research, teaching, and outreach in AM. These include:

- The Joint School of Nanoscience and Nanoengineering at NC A&T and UNC Greensboro housed at the Gateway University Research Park in Greensboro, preparing students from a variety of disciplinary backgrounds to conduct basic and advanced research in nanoscience and nanoengineering in industrial, governmental, or academic settings;
- The Integrated Manufacturing Systems Engineering Institute at NC State, providing a manufacturing presence and program environment where faculty, graduate students and industry can engage cooperatively in multidisciplinary graduate

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education, basic and applied research, and technology transfer in areas of common interest related to modern manufacturing systems technology.

- The Triangle Materials Research Science and Engineering Center (MRSEC), with faculty and students from NC State, NC Central, UNC-Chapel Hill, and Duke University. The MRSEC focuses on soft-matter materials science through generation of new fundamental insights and theoretical understanding, new design principles, and new applications and uses for colloidal and macromolecular materials and their higher order assemblies.
- The Center for Rapid Product Realization at Western Carolina, helping clients refine existing products, develop new ones, remove obstacles to product commercialization, and develop process improvements. Collaborating with the Small Business and Technology Development Center (SBTDC) and with the Center for Entrepreneurship and Innovation in WCU's College of Business, the Rapid Center assists individuals and companies whose combined successes will improve the economic strength of the state, the region and the Southeast.
- The Center for Precision Metrology, an interdisciplinary association of UNCC faculty and student researchers, allied with industrial partners in the research, development, and integration of precision metrology as applied to manufacturing.

Advanced manufacturing provides high-quality jobs and is recognized by the White House for its importance to the economic well-being of the nation. The National Science and Technology Council in early 2012 laid out a strategic plan for the nation to accelerate investment in advanced manufacturing technology, expand the skilled workforce in advanced manufacturing, create and support a network of public-private partnerships, optimize federal support for AM across multiple agencies, and increase U.S. public and private investment in AM research and development (*A National Strategic Plan for Advanced Manufacturing,* February 2012, National Science and Technology Council). An integrated approach to AM research, teaching, and outreach across UNC would enable our faculty and students to be leaders on the national scene.

Energy touches the lives of every person every day. Critical activities ranging from transportation to operation of factories and offices to heating and cooling our homes hinge on our ability to produce and consume energy. Recognizing that most sources of easily accessible energy are limited and many are non-renewable, UNC must be at the forefront in making discoveries that will fuel our state and the world in the future, and we have a robust foundation on which to build.

For example, NC State's (Future Renewable Electric Energy Distribution and Management) FREEDM Systems Engineering Research Center is leading the nation in developing a smart-grid paradigm shift that will enable the U.S. to take advantage of advances in renewable energy. UNC-Chapel Hill's Center for Solar Fuels (with participating faculty from NCCU) focuses on capturing the power of sunlight to drive solar fuel reactions and help create a more sustainable energy future. NC A&T's Center for Energy Research and Technology (CERT) serves as the epicenter for energy analysis, research, instruction and outreach skills in the Triad area. UNCC's Energy Production and Infrastructure Center (EPIC) is supplying a highly trained technical workforce and making advancements in

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technology for the global energy industry, while supporting the Carolinas' multi-state economic and energy security. Appalachian State's North Carolina Small Wind Initiative, a collaborative research and demonstration project, is providing advice and information about small wind technology, wind resource assessment, potential energy production, and the economics of wind energy.

Investment in a comprehensive effort to take full advantage of the wide array of energy research, development, outreach, and training provided by these and other programs will surely yield scientific advances in the field and economic advances for the state.

Defense and military: North Carolina has a robust and growing military community, with the third-largest military population in the United States distributed among six military installations, including Ft. Bragg and Camp Lejeune. North Carolina also is home to more than half of all U.S. Special Operations Forces, including three of the five subordinate commands of the U.S. Special Operations Command: the U.S. Army Special Operations Command (USASOC), U.S. Marines Corps Forces Special Operations Command (MARSOC), and Joint Special Operations Command (JSOC).

UNC has established unique partnerships with these North Carolina-based military entities, which have a range of science and technology needs. UNC's strong relationships with these operational end users—and with the U.S. Army Research Office (ARO), an important extramural basic research organizationlocated in Research Triangle Park—offer a distinct advantage: face-to-face interactions with military customers, combat developers, and program managers to better understand DOD research and development needs, programs, and processes. The most important factors in "breaking the code" to DOD research are relationships, knowledge of requirements, and understanding of funding pathways and opportunities.

UNC has distinct talents and cutting-edge technology that can benefit the military, particularly in areas such as biomedical and health sciences, engineering, and data science. The University can leverage its scientific capacity and existing partnerships with the military commands, ARO, and local defense businesses to expand the level and diversity of UNC research in areas impacting defense and national security and bring more defense R&D revenue to the state.

Culture and tourism: In 2011, visitors to North Carolina spent more than $18 billion, supporting more than 40,000 businesses, directly supporting 200,000 jobs, and providing $1.5 billion in state and local tax revenue (nccommerce.com/tourism). UNC institutions in all regions of the state can enhance this important facet of our state's economy by identifying new ways of documenting, describing, presenting, and displaying the state's cultural heritage and scenic beauty. Many research centers, such as Appalachian State's Center for Mountain Winegrowing, contribute to sustaining and growing local economies through attention to cultural and natural assets. ECU's Center for Sustainable Tourism offers solutions for the tourism industry in North Carolina and beyond as it strives to balance economic vitality with environmental and socio-cultural stewardship. NCSU's Tourism Extension initiative aims to help rural North Carolina communities develop vibrant, prosperous, and enduring tourism enterprises.

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Applied Public Policy: Faced with ongoing funding challenges, state and local governments need new ways of thinking about how they deliver and organize a broad range of services. At the same time, government agencies have downsized their capacity for strategic thinking and long-range planning. UNC should create organized capacity to respond quickly to policymakers' need for easily understandable and objective public policy options by conducting, facilitating, and supporting high-quality, thorough, responsive, neutral, and timely research related to important policy issues facing North Carolina. Through a new Center for Applied Public Policy, faculty experts drawn from multiple universities and multiple disciplines will work on important regional and statewide issues, including conducting research in partnership with or on behalf of nonprofit and public sector organizations.

Action Steps

1. **Form seven consortia in areas of excellence and develop plans to recruit and retain talent**

   In each of these priority research areas, UNC should form consortia, modeled on the existing UNC Defense Applications Group (DAG, see box below), to identify opportunities, focus staff and expertise around promising areas, identify gaps in faculty and staff expertise, and develop hiring plans to propel UNC institutions to national prominence in these areas. UNC's overall efforts must be closely connected to the state's overall economic development goals and priorities. Through such consortia and other initiatives, UNC should coordinate campus efforts to connect research and student training to regional and statewide economies, and it should ensure that every campus has an economic development strategy that is responsive to regional and state needs. UNC General Administration and campus economic development staff will work with state and regional leaders to develop an actionable five-year economic development plan that connects UNC resources and capacities to regional and state entities.

The UNC Defense Applications Group (DAG) brings together a multidisciplinary group of UNC faculty and staff, including a core group of subject-matter experts with technical expertise in fields of critical importance to defense. The DAG is a cross-disciplinary team of scientists from various UNC campuses who have expertise ranging from electronics to analytics, biometrics, nanomaterials, chemical-biological defense, countering explosive devices, etc.. In close cooperation with the Army Research Office, the DAG supports U.S. Special Operations Forces and the broader Department of Defense community and seeks to hasten the transition of basic research to practical applications for the military.
The group leverages the scientific talent and state-of-the-art capabilities of the entire UNC system—as well as other academic and industry organizations—to address these gaps through basic and applied research. This involves mobilizing UNC researchers and engaging local defense industry partners to deliver effective solutions. The DAG also coordinates student internships at military bases and projects whereby UNC students design and fabricate prototypes such as vehicle components and medical technology for military applications. The DAG also hosts technical discussions and workshops focused on military challenges in areas

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such as human performance and computational analytics to better understand human dynamics and behavior.

2. **Hire critical rainmaker faculty**

   UNC's growth in areas of excellence will hinge on its ability to attract and retain faculty recognized nationally and globally for their excellence in our priority areas. While our campuses must continue to recruit and develop junior and mid-career faculty in targeted areas of excellence, so-called "rainmaker" faculty also bring with them external research funding and the ability to garner more, as well as the ability to attract other top talented researchers to join in their labs or research areas. Over the next five years, UNC should hire 24 such faculty members in priority areas to help "move the needle" on research. To ensure continued excellence in these key areas of focus, funding is also needed to retain top faculty and to provide professional development for faculty and staff.

3. **Develop new laboratory and research space**

   New faculty in areas of research excellence and rainmaker faculty require laboratory and office space to conduct their work. These needs should be met through a combination of leased space and new construction.

4. **Purchase strategic, shared research equipment**

   As the UNC teams working in areas of excellence develop strategies and ideas, they will also identify high-end equipment and technologies that will be of service to multiple campuses. A competitive equipment fund, overseen by UNC General Administration, should be created to enable faculty in consortia to recommend and acquire shared equipment that can assist in performing world-class research.

5. **Connect campuses throughout the world**

   In a globally connected world, game-changing researchers and innovative faculty and students must be aware of and linked with regions critical to the state's economic and strategic future. UNC should therefore build international beachheads in key areas, deepening student, faculty, staff, and institutional connections to innovators and colleagues in China, India, Brazil, Mexico and Africa. These connections will help prepare students to succeed in the global economy and connect our institutions to key colleagues and resources important to future discovery and development. UNC should coordinate support for expansion in these key countries and provide support to facilitate the spread of innovative campus-based programs to other UNC campuses.

6. **Expand Professional Science Master's degree programs**

   UNC campuses have been working with industry groups to create Professional Science Master's degree programs, which equip graduate students with industry-specific skills in key areas related to science technology, engineering and math (STEM). UNC General

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Administration should move to coordinate future growth in this key area, consistent with measurable success.

7. **Recruit highly-entrepreneurial graduate students and post docs**

   Since the future will be fueled by a need for continuous innovation, North Carolina must identify and grow a cadre of highly entrepreneurial students. UNC should provide significant support for 60 President's Graduate Fellows, who would receive two years of support to attend UNC campuses and pursue their interests, and for ten President's Postdoctoral Fellows, who would receive one year of support to further develop promising ideas or technologies. These ideas will help us to both recruit and retain top students and help them begin the process of turning ideas into reality.

8. **Graduate "job-ready" students**

   Responding to employer demands for graduates with more applied experiences, UNC should form a partnership with businesses across the state to support growth in experiential learning opportunities for students (internships, coops, student teaching, clinical experiences, service learning, collaborative research) prior to their graduation and incent development of increased campus-based experiential learning opportunities. The system should also create a statewide portal for industry-sponsored internships and co-ops and better integrate career counseling and academic advising.

9. **Grow the number of superstar STEM students**

   Students at the North Carolina School of Science and Mathematics, who represent the best and brightest from every county in North Carolina, receive an excellent education to help them maximize their talents. They graduate with many options. To expand service by the school and to increase the number of NCSSM students who enroll at UNC institutions following graduation, NCSSM should increase its residential capacity by 70 students. Completion of a new dormitory is essential to this proposed expansion.

B. Convert discovery into innovation

Great minds can work on great problems to develop great ideas with great potential. But as Thomas Edison noted, "Vision without execution is hallucination." It is in translating those ideas into action that change happens. Theory becomes policy; technologies become products. Ideas and discoveries need real, tangible support to bring them to fruition. Tangible support can come via acquisition of specialized tools and equipment to carry out cutting-edge research, technology to connect researchers with colleagues, and new funding sources, both inside and external to the university. We need these new tools and resources to translate ideas into action.

Since a public-private task force jointly convened by UNC and IBM issued its paper "Innovate, Collaborate, Accelerate"[12] in 2009, UNC campuses have taken a number of

[12] See report at https://www.northcarolina.edu/research/initiatives/tech_transfer/Innovate-Collaborate-Accelerate.pdf

steps to improve their ability to move discoveries, ideas, and technologies from the lab or academic journals into the marketplace. But there is more work to be done if we are to most effectively respond to the needs of the state.

Action Steps

1. **Establish Collaboration Seed Fund**

   UNC should establish a fund to support multi-campus collaborative projects with high potential for securing external funding from federal or industry sources. This type of seed funding will support such projects early in the scientific life cycle, enabling them to collect preliminary data, form strategic partnerships, host workshops/conferences, and/or craft winning grant proposals.

2. **Develop new Innovation Discovery Teams**

   UNC institutions have widely varying capacity to assess, protect, develop, and commercialize intellectual property. UNC should establish and support a "scout team" and core support staff that any campus could utilize for market assessment, legal assistance, new venture services, and other operational support for commercialization.

3. **Move forward promising early stage ideas through proof-of-concept fund**

   Promising ideas and technologies often struggle to find the support they need to determine whether they can be developed from concept to reality. UNC should provide competitive funding to assist campuses in moving promising technologies and strategies from theory into reality by facilitating proof-of-concept work.

4. **Advance ideas ready for commercialization through investment**

   Translating a developed idea or technology into a product with commercial impact requires additional investment. UNC should provide funding for promising ideas with potential commercial impact, including patenting costs and matching funds for UNC-generated Small Business Innovation Research and Small Business Technology Transfer (SBIR/STTR) companies.

5. **Increase effectiveness of REACH-NC as a portal to our campuses**

   REACH NC is a systemwide portal that improves the effectiveness of all partners by connecting agencies, business, and industry to UNC faculty and capabilities; connecting university experts to one another; and providing a clear window into the collective capabilities of the University. UNC should expand and support the capacities and services of REACH NC to network researchers from across departments and institutions to industry partners and more diverse governmental funding agencies.

C. Help meet the growing healthcare needs of the state through innovative research, training, and outreach

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Preparing for the future of health care in North Carolina requires a comprehensive strategy for educating a variety of health care workers to navigate health care delivery for the next generation.

Chronic disease is a growing burden. North Carolina ranks 32nd nationally in overall health outcomes, 36th in diabetes and smoking, and 30th in obesity rates (1). In 2008, the leading causes of death in North Carolina were heart disease, cancer, chronic lower respiratory disease, and stroke (2).

The rise in chronic disease and the implementation of new models of care have highlighted the need for an adequate supply, distribution, and skill set among health professionals in North Carolina.

Health trends providing context for the future include:

- An estimated 30% increase in the population over age 65, requiring increased medical care for longer periods. Approximately 13% of North Carolina residents were beyond the age of 65 in 2011, and that number will almost double to 26% by 2021.
- The population of North Carolina increased 18% between 2000 and 2010, double the national rate. The state's population is expected to grow from 9.7 million in 2011 to 13.7 million by 2030.
- One-third of all physicians currently in the U.S. are expected to retire by 2020. There will be a national physician shortage of more than 60,000 doctors by 2015, according to the American Association of Medical Colleges.
- Between 1990 and 2009, the number of nurse practitioners in North Carolina increased by 357%, and the number of physician assistants increased by 202%. Over the same period, the use of physicians increased by only 32%.
- Shortages of behavioral health professionals are particularly acute in North Carolina. The North Carolina Institute of Medicine reports there are 17 counties without a psychiatrist, 24 counties without a psychologist, and 73 counties with fewer than one psychiatrist per 10,000 residents (3).

UNC has an opportunity, through its health education and health delivery entities, to play a critical role in helping North Carolina to respond to these challenges. North Carolina has a tremendous opportunity to transform the health care system and bring about changes that are needed to provide seamless, quality, team-based patient care.

There are significant deficiencies in the way care is currently delivered, including a lack of coordination, variations in quality, and an inability to integrate team-based approaches—all of which impact the quality of care and significantly inflate costs. This is especially true in caring for individuals and populations living with chronic illness and with multiple illnesses, including older adults, the uninsured, and Medicaid-dependent populations. Those with multiple illnesses (e.g., Medicare beneficiaries) are also using multiple medications and account for 60% of all potentially preventable hospitalizations. The financial strains on Medicare and Medicaid are enormous (4, 5).

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Accountable Care Organizations (ACOs) and Patient-Centered Medical Homes (PCMH) are among the most promising approaches for delivering higher-quality, more cost-effective care. ACOs are healthcare organizations centered around coordinated care and characterized by a payment model that seeks to tie provider and practice reimbursements to quality metrics and reductions in the total cost of care for a population of patients. The coordination of care within and across these systems is absolutely essential.

Community Care of North Carolina has been a primary vehicle for developing these new approaches to coordinated care for chronically ill Medicaid and Medicare recipients. Teams of primary care physicians, pharmacists, nurses, physician assistants, and other health care workers have approached the care of these patients in a coordinated fashion by providing a medical home. Patients in need of care have better health at a lower expense because care is delivered not at the emergency room but in a medical office located in the patient's own community. It was estimated that CCNC saved the state of North Carolina nearly $1 billion over four years, while Medicaid was projected to spend almost $13 billion in federal and state funds in 2012. It is critical that new approaches to delivering higher-quality care are identified and implemented to address unmet patient care needs (6, 7).

Experiences in other states have shown that primary care delivered as part of a well-organized system can lead to hospitalization cost savings of as much as 7% (8). Without the appropriate practitioners capable of providing medical care, however, the savings anticipated in health care redesign will not be achieved.

The recommendations included in this plan build upon lessons from research and development of primary health care in North Carolina and set the stage for improved health outcomes for all North Carolinians.

Action Steps

1. **Establish a health care redesign task force**

   The University of North Carolina should play a leading role in helping redesign the state's health care delivery system and educating the next generation of health care professionals.

   To achieve this, we recommend establishing a health care redesign task force, reaching across the entire system, with a charge of:

   - Helping the state redesign health care delivery to address ongoing changes in the design, delivery, and funding of health care;
   - Evaluating the health status and care needs of North Carolina residents;
   - Anticipating the changing needs of health care professionals at all levels of health care delivery;
   - Matching those needs with the resources and capacities of educational programs across UNC, coordinating existing resources and identifying expansion opportunities; and

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- Collaborating with other agencies and resources, including government departments, community colleges, private universities, and other health care providers

2. Expand AHEC to support community-based training of physicians, dentists, and other health professionals

For 40 years, the Area Health Education Centers (AHEC) has delivered health care education in communities across the state. This recommendation provides for 40 new physician residency slots, primarily in rural areas of the state, in primary care, general surgery, and psychiatry specialties—all specialties in short supply and critical to the proper functioning of local health care delivery. The recommendation also provides AHEC with funds to recruit new community preceptors and part-time faculty to train and supervise the additional health care students who will be stepping into these novel roles in a refashioned health care delivery system. In addition, funds will be provided to house ECU dental students in their placements across the state and to create a center focused on health care delivery innovation in rural areas.

a. **New residencies**: This plan calls for funding 40 new physician residencies at the level of $100,000 per position, with the remaining cost required as a match by the teaching hospital. This recommendation was included in the 2008 UNC Plan for Medical Education approved by the UNC Board of Governors. AHEC conducted extensive research on its past experience and demonstrated that students trained in local communities are most likely to remain in practice in the state, often in the same community where they were trained. In 2011, 63% of AHEC physician residents remained in North Carolina to practice medicine. The average economic impact of one family physician is $904,696 (9, 10).

b. **Additional community-based training**: The plan recommends making additional funding available for AHEC to expand its community education opportunities. AHECs will work in partnership with community institutions such as community health centers, hospitals, health departments, and other agencies to develop innovative community-based training sites. In these community and rural teaching sites, students will be exposed to high-quality health care delivery and to preceptors and mentors who are prepared and motivated to teach.

   For the health system of the future, where there is likely to be even greater emphasis on higher quality and reduced costs, it is clear that health professionals must be trained differently. Health care will be delivered in a community setting by inter-professional teams of providers. There will be new types of health professionals needed, including those working in information technology, community outreach, case management, and other skilled areas that are not part of the traditional health professions.

c. **Dental housing:** AHEC made a commitment to house the students from the new School of Dental Medicine at ECU during fourth-year rotations at community learning centers across the state, beginning in 2014. AHEC already provides housing in some 50 sites around the state, but does not have housing available in the sites where the ECU learning centers will be located. Initial sites are in Ahoskie, Elizabeth City, and Sylva, but there will be a total of ten centers by 2014. AHEC will

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add a housing unit for 4-6 students at these ten sites across the state. This investment will also add housing capacity for additional students from UNC campuses and other schools while they participate in off-campus clinical training across North Carolina.

d. **Center for Rural Health Innovations**: There is a critical need to better understand and address persistent health disparities in rural North Carolina. AHEC will create the Center for Rural Health Innovations, designed to prepare students to work in a broad array of health fields in rural North Carolina, with a particular focus on northeastern North Carolina and providing inter-professional, community-based teaching sites for students.

3. Pharmacy 0ractice and educating and training the next generation of pharmacists

UNC-Chapel Hill, through the Eshelman School of Pharmacy, is strategically positioned to work collaboratively in both redefining the practice of pharmacy in North Carolina and the education of health care professionals. These efforts will improve the quality of patient care for the citizens of North Carolina and position students, as integral members of the health care team, to help develop significant reforms of the health care system.

The appropriate use of medications and a comprehensive, coordinated approach to managing drug therapy is critical to ensuring high quality care. This remains one of the greatest unmet needs in the delivery of care and one that we simply cannot continue to ignore. This issue not only exists in North Carolina's Medicaid population, but also in chronically ill, medically complex older adults and the uninsured. Among the most widely cited studies is an economic analysis conducted in 1997 in which the authors concluded that delivering pharmaceutical care (also known as medication management) could save over $105 billion annually if universally available (11).

a. Expand the clinical preceptor base to support early student immersion in the patient care environment and increase the time devoted to immersion in patient care.

b. Add 20 new pharmacy residency positions to increase the workforce contributing to the delivery of direct, patient care services.

c. Recruit leadership and expand core teaching faculty and teaching assistants to support curricular transformation efforts and expand the number of faculty specifically devoted to the School's educational mission. Recruit a tenure-track faculty member to lead the planned Center of Excellence in Pharmacy Practice (CEPP).

4. Doctor of Nursing Practice (DNP) Programs in UNC

As health care provision becomes more complex and fast-paced, the nursing profession is recognizing the need for more and more advanced education for providers, including nurse practitioners, clinical nurse specialists, certified registered nurse anesthetists and certified nurse midwives. As with pharmacy, physical therapy, psychology, medicine and audiology, nursing is adopting a practice-focused doctorate

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as the appropriate level of graduate education. The Doctor of Nursing Practice (DNP) prepares nurses for direct clinical practice and for executive roles in areas that support clinical practice, such as administration, organizational leadership, and health policy. At this time, no UNC institutions offer the DNP.

a. Six UNC institutions have submitted five proposals for new DNP degree programs; these proposals are currently in the external review phase of the academic program planning process. Campuses proposing to offer the degree are ECU, UNC Chapel Hill, UNC Greensboro, Winston-Salem State University, and a consortial proposal from UNC Charlotte and Western Carolina University. Each UNC institution proposing the DNP will shift some existing resources from MSN programs towards the DNP, but new resources are still needed to implement the proposed programs.

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