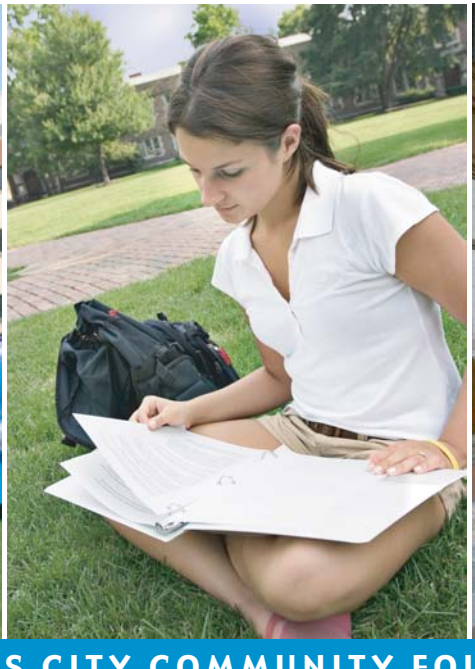
TIME TO GET IT RIGHT

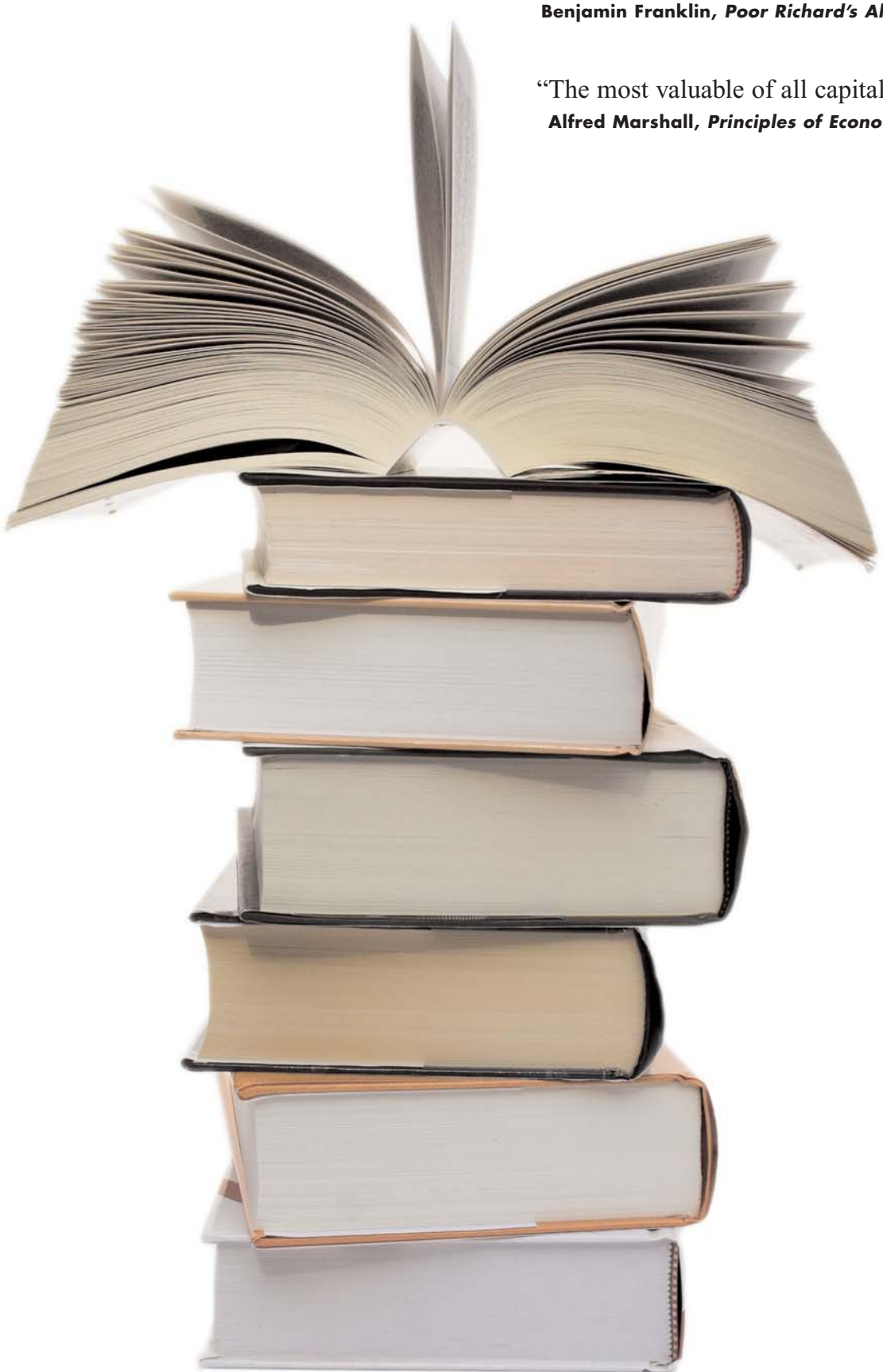
A STRATEGY FOR HIGHER EDUCATION IN KANSAS CITY



GREATER KANSAS CITY COMMUNITY FOUNDATION

"An investment in knowledge pays the best interest"
Benjamin Franklin, *Poor Richard's Almanac* (1758)

"The most valuable of all capital is that invested in human beings."
Alfred Marshall, *Principles of Economics* (1892)



Acknowledgements

THE TASK FORCE WISHES TO THANK THE HUNDREDS OF PEOPLE IN KANSAS CITY, IN MISSOURI, AND IN KANSAS WHO SPENT MANY HOURS GIVING US THE BENEFIT OF THEIR KNOWLEDGE AND INSIGHTS. WE ARE GRATEFUL TO THE FOUNDATIONS WHICH SPONSORED THIS EFFORT FOR INVITING US TO PARTICIPATE IN SUCH AN INTERESTING AND IMPORTANT PROJECT.

WE ARE ESPECIALLY GRATEFUL TO LARRY JACOB, ABBY THORMAN AND KRISTY WEBER OF THE GREATER KANSAS CITY COMMUNITY FOUNDATION, AND TO MUNRO RICHARDSON AND PAUL MAGELLI OF THE EWING MARION KAUFFMAN FOUNDATION. THEY PROVIDED RESEARCH ASSISTANCE, ORGANIZATIONAL SUPPORT, AND COUNSEL OF THE HIGHEST PROFESSIONAL CALIBER. FRED LOGAN PROVIDED WISE COUNSEL THROUGHOUT THE PROJECT. PROFESSOR JOHN MOLLENKOPF OF CUNY OFFERED HELPFUL DEMOGRAPHICS ADVICE. DR. KATHLEEN MULLINIX PROVIDED HELPFUL ADVICE ON TRANSLATIONAL RESEARCH.

WE THANK MS. LIZ COMPERIATI FOR ALL MANNER OF ORGANIZATIONAL AND TECHNICAL ASSISTANCE, ALWAYS RENDERED WITH EFFICIENCY AND GOOD HUMOR.

THE TASK FORCE IS SOLELY RESPONSIBLE FOR THE CONTENTS OF THIS REPORT.

Table of Contents

Executive Summary

There are times in the lives of great cities when they seem caught, almost suspended, between their past and their future. This is such a time for Kansas City. The city stands with one leg planted in an old economy of manufacturing, rail transportation and low-skill jobs, while the other leg is striding briskly into the knowledge economy of high-tech jobs, complex information systems and the dazzling intellectual revolution of the life sciences. Can Kansas City be a center of excellence in the relentless competition of the global knowledge economy? The city has many strengths. It also has some serious problems.

Kansas City enjoys great museums, a broadband of exciting music, from classical and opera to jazz and the blues, a lively visual arts community and a thriving theatre scene. It is working hard to bring life back into its depleted urban core with the biggest downtown building boom in the city's history. High tech jobs are growing at twice the rate of old economy jobs, and the city is home to leading enterprises in telecommunications, information systems, engineering and finance. The learned professions — architecture, law, medicine, management, and the clergy — have a strong presence.

Kansas City has a noble tradition of philanthropy. The city's latest example of creative giving has the potential to be its greatest. The Stowers Institute for Medical Research is in its early days, but already has the largest endowment in the world supporting basic life sciences research. The Stowers Institute currently plans to concentrate its expanding presence in Kansas City, which would make the city home to the world's largest private medical research institute. The promise of Stowers for Kansas City, for the nation and for humanity is enormous. But for Stowers to reach its potential in Kansas City it must be augmented by world-class higher education research capacity in the life sciences and in cognate areas of knowledge such as computer science and electrical engineering, mathematics and statistics and nanoscience. When the huge promise of Stowers is added to Kansas City's other strengths, one can see that the city has some strong foundations on which to build.

Kansas City also faces some serious problems. The city has a long, dismal history of lack of opportunity for its African-American citizens, most of whom are stuck in the blighted urban core. The same lack of educational opportunity and isolation are spreading to Kansas City's Latino population. Together these groups are one-third of the city, and they are growing faster than other groups. Kansas City will not be a great city for anyone if the city continues to fail its African-American and Latino populations. The only way to address this problem is by providing educational opportunity. This is Kansas City's – and America's – greatest challenge.

Kansas City's second great challenge is that it lacks an essential institutional requirement for competitive strength in the knowledge economy. Kansas City is almost alone among important American cities in not having in its midst a world-class research university that is deeply engaged in meeting all the city's opportunities and challenges.

Research universities are the foundation of the global knowledge economy. Universities help cities and regions attract and create skilled human capital which is the most valuable resource today. The discoveries of the university help drive the innovation and entrepreneurship that is the key to economic growth. The fastest growing industries in the information sciences, in biotechnology and in nanotechnology tend to locate where strong basic research universities or private research institutions are found.

With the turning of the millennium, Kansas City has taken stock of itself in a number of excellent studies. Virtually every one of these has identified the absence of research university capacity as the city's most serious competitive weakness. The task force agrees with this assessment, although we go farther.

Kansas City needs not only world-class quality higher

education research capacity; it equally needs a deeply engaged urban university with energy and imagination to focus creatively on the City's opportunities and major problems, especially the expansion of educational opportunity to the city's African-American and Latino communities.

Kansas City cannot defer to Jefferson City or Topeka to plan the city's human capital strategy, although it can enlist the states as collaborators. The cities that prosper in the global knowledge economy will be the cities that are smart and strategic about human capital. This is Kansas City's challenge, and its greatest opportunity.

The city is fortunate to have elements of the higher education capacity it needs in the University of Missouri-Kansas City (UMKC) and the University of Kansas Medical Center (KUMC). But these institutions require substantial enhancement if Kansas City is to enjoy the benefits of a world-class research university that is deeply engaged in the city.

The only feasible way Kansas City can create the higher education capacity it needs is by an integrated, two-state strategy building on all available institutional foundations. This will require an unprecedented level of civic leadership. In building higher education, the city must convert the disadvantage of being divided between rival states to an advantage of being able to work with two state universities to build capacity.

LIFE SCIENCES FIRST

We believe it is clear that research capacity in the life sciences is the broad area of knowledge that offers Kansas City the greatest opportunity. This is the area that holds the greatest promise for economic and humanitarian returns. It is the only broad area of knowledge in which Kansas City has the potential, with Stowers, of becoming one of the world's leading centers of discovery in the decade ahead. It is also the research area that is supported by the most generous external funding. The life sciences are the research area in which the returns on investment are highest. If Kansas City becomes a leading life sciences center, it can become an important center for the biotechnology industry, one of the most dynamic sectors of the global knowledge economy.

The life sciences strategy we recommend has four main elements.

1. Build basic research capacity at KUMC, with the bone biology group centered at UMKC's excellent School of Dentistry a strategic partner. In essence, the strategy seeks to move KUMC's research funding from $75 million today to $300 million in ten years. This will give Stowers a strong basic science collaborator and move Kansas City in a decade to a position among the country's top twenty cities in basic life sciences research. There is no better investment Kansas City could make in its future.
2. Align the basic research at KUMC and Stowers with the translational and clinical research capacity of Kansas City's excellent hospitals. KUMC includes a strong teaching and clinical care hospital, the University of Kansas Hospital. However, most of the clinical capacity in the city is in the three hospitals on the Missouri side, St. Luke's, Children's Mercy and the Truman Medical Center. KUMC needs to collaborate closely with these hospitals.
3. Create a compelling life sciences strategy for UMKC. UMKC has not had the leadership in recent years to put together a life sciences strategy that makes sense for itself, for the city and for the state of Missouri. It has had in the past neither the funding nor the mandate to become a strong life sciences research university.
4. Create a Center for Translational Research that is a matrix organization to facilitate the translation of basic discoveries into useful drugs, devices and therapeutic interventions. Enlist the expertise of the Kauffman Foundation and the Bloch School at UMKC in creating an entrepreneurial pipeline for biotech innovation.

AN ENGAGED URBAN UNIVERSITY

UMKC has embraced in words the strategy of being a "model urban university," deeply engaged with the most important opportunities and challenges of the city that is its home. In some important areas, such as the performing arts and various clinical activities of its schools of dentistry, nursing and medicine, UMKC is an effective, engaged institution. The Bloch School and the Law School also reach out to the community in creative ways. But most elements of the community perceive UMKC to be disengaged. This is particularly true of the urban public education systems of the city.

Effective engagement with urban public education is especially important for UMKC. The task force believes that one of the two highest strategic priorities for education at all levels in Kansas City is to dramatically expand educational opportunity for Kansas City's underserved African-American and Latino communities. This requires every college and university in the city to

become deeply engaged in improving the city's public schools. UMKC should be the leader in this effort. It is far from that today.

The task force believes that there are three critical elements, now largely lacking at UMKC, which must be in place in order for UMKC to achieve its aspiration as a "model urban university." The first of these is a broadening of UMKC's governance to give the Kansas City community a fiduciary role in the university. The second element is leadership, both academic and civic. With governance that has roots in the community, and with effective leadership, UMKC can develop the third critical element: a compelling institutional strategy.

We believe there are currently two areas of strength at UMKC where a focused philanthropic investment would pay significant dividends for Kansas City. The first area is the performing and visual arts. The second is the entrepreneurship program at the Bloch School. UMKC surely needs further philanthropic investment. But further philanthropic investment should await a demonstration of effective leadership and the creation of a sustainable institutional strategy.

A NEW CONSORTIAL INSTITUTION

We believe that Kansas City should consider the creation of a new institution, organized around specific programs, which would be a consortium of a number of universities, private research institutes such as Stowers and Midwest Research Institute (MRI) and charitable foundations.

We believe such consortial institutions will increasingly be the model for translational and interdisciplinary research and teaching at the highest levels. The costs of instrumentation and the demands of wide-ranging interdisciplinary teams are becoming too great for even the richest universities to tackle alone.

A consortial institution in Kansas City might focus on areas in which KUMC and UMKC need reinforcement or do not offer strong foundations on which to build. Examples of such areas would be bioinformatics, computer science, telecommunications, urban education and nanoscience. Such a consortium would itself require a further careful planning exercise.

CONCLUSION

We are enthusiastic about Kansas City's potential to build a world-class urban research university enterprise that drives innovation and offers educational opportunity to the entire community. Because we believe this is the highest strategic priority for the metropolitan area, we are cautiously optimistic that the concerted philanthropic investment and the determined, long-term civic leadership that are required to achieve it will be forthcoming.

I. Introduction

This task force was asked by several Kansas City foundations, led by the Greater Kansas City Community Foundation, to make recommendations on a broad strategic level concerning the future of higher education in Kansas City.[1] There are many reasons why this issue is timely and important. With the turning of the millennium, Kansas City has taken stock of itself in a number of excellent studies. Virtually every one of these studies has identified the absence of research university capacity as the city's most serious competitive weakness. The task force agrees with this assessment, although we go farther.

Kansas City needs not only higher education research capacity of world-class quality. It equally needs a deeply engaged urban university of energy and imagination that can focus creatively on the city's opportunities and major problems, especially the expansion of educational opportunity to the city's African-American and Latino residents.

Kansas City is seeing the early stages of a philanthropic enterprise that can, if nurtured and creatively leveraged, carry the city to new heights of prosperity, creative vitality, and humanitarian contribution. The Stowers Institute for Medical Research gives Kansas City the chance to become one of the world's leading life sciences centers. A comparison of San Diego today and San Diego thirty years ago suggests the colossal potential this has for Kansas City. But the promise of the life sciences will be stunted unless Kansas City can reinforce, augment, and extend the reach of Stowers with very high quality higher education research capacity in the life sciences, in translational and clinical research, and in cognate areas of knowledge essential to the life sciences, such as bioinformatics, bioengineering, mathematics, the information sciences, and nanotechnology.

Stowers is showing the clear capacity, for the first time in the city's history, to bring life science researchers to Kansas City of the highest quality—comparable to those found in the top ten life science centers in the world. Stowers' success is highlighting the urgent need to build Kansas City's research university capacity to complementary quality. Stowers is a major opportunity for Kansas City. If Kansas City becomes an important center for life sciences research, it can follow the path of other research centers and become an incubator of biotechnology entrepreneurship, one of the fastest growing and promising areas of the global knowledge economy. The potential of the life sciences and medicine for Kansas City in the century ahead is similar to the significance for the last century of Kansas City's location at the center of the country, which led to its becoming the second largest rail center in the U.S. It would be an act of civic irresponsibility not to maximize the opportunity presented by the life sciences for Kansas City.

The life sciences comprise the broad range of efforts to achieve scientific understanding of everything that lives: humans, animals including bacteria and the insect world, and plants – how they are created, how they grow, evolve, get energy, interact with each other and the natural world, become diseased or injured, age, die and decay. At the molecular level, there are interesting intersections. The biological systems of humans, animals, and plants have many affinities. When people think about the life sciences, they tend to focus on humans, but understanding animals and plants is as important to humans as understanding humans, and understanding something about animals and plants can often be the key to understanding something about humans. Thus, as Kansas City considers its life sciences strategy, it needs to think about the importance of animal and plant research. This makes economic sense as well. The developmental possibilities of life sciences discoveries regarding animals and plants are as great as those regarding humans.

Stowers focuses on the most basic life sciences research. Capturing the medical and economic benefits of

[1] When we refer to Kansas City we refer to the entire metropolitan area, the Kansas City MSA.

cutting edge basic research will require a robust capacity across a spectrum of translational and clinical research that moves basic science discoveries into animal research and ultimately human applications that can be studied in a variety of clinical settings. This is not Stowers' mission. This essential capacity must be grounded in Kansas City's medical schools and hospitals. If Kansas City pursues a strategy, as we will recommend, of building a greatly enhanced basic life sciences research capacity to reinforce and collaborate with Stowers, it should also add to its existing foundations for translational research. A Kansas-Missouri center for translational research that would be an interface between the city's basic life sciences research and its clinical institutions might be a valuable enterprise in taking discoveries from the laboratory through drug or product development, and attracting venture capital and entrepreneurs to take them to market and bring them to the patient.

Even if Stowers did not exist, Kansas City would have to think strategically about higher education. Kansas City is one of the few American cities of its size and importance which lacks a first-rate urban research university. We live in an era in which knowledge has replaced land, energy, and industrial capacity as the source of the wealth of nations. Human capital is more valuable than any natural resource, and innovation is the key to economic growth. Research universities are the foundation of the knowledge economy. Cities and regions without this foundation will find themselves falling behind in the global competition for talent and innovation that will increasingly drive prosperity.

Kansas City already can see the effects of this missing link. The city is losing population in the crucial 25-34 year-old age group, while the young and old are gaining in number. One does not have to be a demographer to know that this demographic "hollowing out," which unfortunately parallels the city's sprawling physical development pattern, spells trouble. Further, Kansas City is weak in innovation. The city generates fewer than half the patents a city of its size should produce, and its levels of venture capital and entrepreneurial activity are low. These symptoms of uncompetiveness will only worsen if Kansas City does not build a significant higher education research capacity.

A first-rate urban university also can help Kansas City address its greatest historical problem: the isolation of and lack of opportunity for its African-American population concentrated in the urban core. This injustice has spread to Kansas City's growing Latino population. Kansas City will not be a great city for anyone in the future if the fastest growing segments of the city continue to suffer from gross disparities of educational opportunity.

Kansas City has elements of the higher education research enterprise it needs in the University of Kansas Medical Center (KUMC) and the University of Missouri-Kansas City (UMKC). These institutions are strong in a number of respects. Of course, viewed in terms of research capacity, KUMC and UMKC are very different institutions. But, even taken together, these two institutions fall well short of the quality and range of research university capacity Kansas City urgently needs. These institutions also are not as deeply engaged in the city and effective as they might be in addressing the city's most pressing educational needs.

Kansas City would need to think strategically about higher education even if these two public universities were providing the city with what it needs. Public universities across the country are struggling to deal with severe cutbacks in public funding. Kansas and, even more so, Missouri are grim examples of the new fiscal reality. Public institutions in every state are being forced to think of new strategies concerning academic priorities, revenues, philanthropy, governance, and how to persuade reluctant legislatures to provide public support. UMKC appears particularly vulnerable in the current fiscal climate. The entire University of Missouri system is under financial stress, and it is not realistic to expect the system to substantially enhance UMKC when its flagship campus is struggling. In light of this, it is ominous that UMKC has had little success in attracting philanthropic support, despite the fact that it exists in a city with a powerful philanthropic tradition.

As of January 2006, UMKC will have had six chancellors and six provosts in the past seven years. No matter what individual talent this may represent, this revolving door means UMKC has had no sustained, effective leadership for nearly a decade. Moreover, UMKC's relationships with major elements of the Kansas City community are in disarray. The business community, the philanthropic community, the African-American community, the Latino community, and the city's K-12 public education leaders all believe that UMKC has lacked leadership and strategic direction to engage effectively with the city's problems and opportunities.

Perhaps the strongest evidence that UMKC is not on track is that the Stowers Institute has been met by institutional fumbling and lack of strategic engagement. The UMKC Schools of Medicine and Dentistry deserve

credit for trying hard to collaborate with Stowers. Particularly in oral bone biology at UMKC's excellent School of Dentistry, there is good collaboration with Stowers. Otherwise, there is a bit of collaboration on the individual faculty level, but UMKC has no plan for strategic engagement. There is the usual back-and-forth about why this fumble took place, but the fact is that Stowers has had no difficulty fashioning constructive strategic engagements with both KUMC and Johnson County Community College. The notion that UMKC is essentially on the sidelines of what may well be the greatest research enterprise in the history of Kansas City is profoundly troubling. Such a self-inflicted wound would never happen in an institution with effective leadership or effective fiduciary governance rooted in the community.

The disenchantment runs both ways. Considerable segments of the UMKC faculty view the business and philanthropic leadership of Kansas City with mistrust. Many members of the faculty seem to believe that civic leaders want to move UMKC away from core academic values toward a more narrowly utilitarian university serving business interests. This is ironic. The most frequently voiced aspiration of the business community is that UMKC should move in the direction of UCLA, UC-San Diego, or Washington University. These are universities renowned for their strength in the most basic research. They are in that sense considerably more academic than UMKC.

The disconnect between UMKC and the business and philanthropic leaders of Kansas City is not good for UMKC or the city. The task force believes this schism runs much deeper than the recent convulsion over leadership at UMKC. We believe UMKC's problems require strategic changes, not just changes in personalities. In particular, we believe there are fundamental problems of governance at UMKC that have contributed to the absence of effective leadership, of strategic direction, and of private support for the university.

Kansas City is at a crossroads. All elements of the community agree that Kansas City needs much greater higher education research capacity, as well as an urban university deeply engaged in all the city's opportunities and challenges. Such a higher education enterprise can drive the region's prosperity, help attract and create the human capital that is the most crucial resource in the knowledge economy, generate the discoveries and innovations that are key to economic growth, reinforce Stowers and the city's other knowledge enterprises, spread educational opportunity, and invigorate the urban core.

Each of these strategic goals is urgent. The failure to move forward on these issues is not to hold, but to lose, ground. When will there ever be a better time to fashion a compelling higher education strategy for Kansas City? If not now, when?

II. City of Promise — A City Divided

"Since human capital is embodied knowledge and skills, and economic development depends on advances in technological and scientific knowledge, development presumably depends on the accumulation of human capital." **Gary Becker, *Human Capital* (1993)**

"Resources like technology, knowledge, and human capital differ in a fundamental way from more traditional factors of production like land or raw materials: they are not stocks, but flows. People are not forever wedded to one place; they can and do move around."

Richard Florida, *The Flight of the Creative Class* (2005)

It would take the genius of Charles Dickens to convey both Kansas City's promise for the future and its danger of failure in the global knowledge economy. There are many reasons to think that the century ahead could be the best of times for Kansas City. But the city has powerful problems. If the problems prevail, Kansas City will slowly decline. If the promise is seized, Kansas City can move into an era of prosperity and vitality, with momentum similar to Minneapolis, Denver, or Seattle.

The good news is that the choice lies in Kansas City's hands; Kansas City's destiny is its own. The problem is that seizing the city's promise will require the city to act with a very rare degree of unity, and division is one of the city's greatest problems.

A. THE PROMISE

Kansas City has a number of strengths as it prepares for the future in the relentless competition of the global knowledge economy. The metropolitan area is home to a number of firms that are already world leaders in the information economy. High-tech jobs in Kansas City are increasing at double the national rate, and double the rate of other jobs in the city. Kansas City enjoys a disproportionately large presence of knowledge-intensive professionals in areas such as engineering, business support services, technical and scientific services, finance and insurance, telecommunications, law and architecture. It is home to three medical schools and several first-rate hospitals. Kansas City wages are 10% higher than the national average, and per capita GMP is the second-highest in the heartland.

Kansas City is not yet a "new economy" city, but with the right strategy it could be headed in that direction. About 40% of the City's jobs are currently in high-tech and other knowledge-based, "new economy" industries, and 60% are in old industry jobs, such as manufacturing, retail, and transportation. This mirrors the national average. But the city's job growth rate in the knowledge industries is 5% per year – double the growth rate for old economy industries. Thus, the city is slowly but steadily adding to the expert human capital that will increasingly be the key to prosperity for all cities and regions in the future.

The city has a relatively well-educated workforce. Twenty-nine percent of adult Kansas Citians have a B.A. or higher degree, compared to 23% of the U.S. population. Kansas City currently ranks 30th among the country's top 250 cities in the educational level of its residents. Even more significant, educational levels in Kansas City are growing as with high-tech jobs. From 1990 to 2000, the college-educated population grew from 23.4% to 28.5%, again, faster growth than the national trend. However, it is critical to Kansas City that education levels continue to rise, because the city remains well behind such "smart"

cities as Denver, San Diego, Charlotte, Minneapolis, Raleigh and Seattle. Moreover, as a middle-sized city losing ground in population to more rapidly growing urban centers, Kansas City will need to rely more and more on its education and research base to be competitive.

Kansas City enjoys museums, music from classical to jazz and the blues, a thriving visual arts scene, and theatre that would be the envy of cities two or three times its size. Twice as many people attend cultural events in Kansas City as attend the city's vibrant professional sports events. Arts and cultural vitality are a factor of growing importance for creative people in determining where they want to live. These are the people who are more and more critical to the future of cities everywhere.

The urban economist Richard Florida recently published what he calls a "creativity index" of American cities. He looked at measures of technology, the percent of the workforce in creative occupations, and a so-called "tolerance index." Kansas City ranked 30th on Florida's creativity index among metro regions with populations of 1 million or more, but only 71st among all 331 metropolitan statistical areas in the United States.

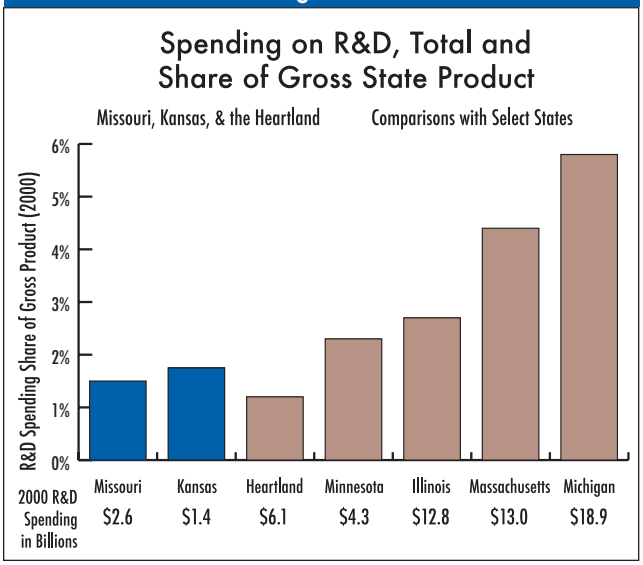
Kansas City's relatively low score on the creativity index reflects the city's serious weakness in measures of innovation. The city generates patents at only half the level of most cities of similar size. Of the top fifty metropolitan areas, Kansas City ranks 18th in high-tech jobs, but only 43rd in venture capital, 44th in patents, 45th in degrees granted in science and engineering and 46th in academic R&D funding. Kansas City urgently needs to move up in these rankings to compete successfully in the global knowledge economy.

Florida's index also includes a housing affordability ranking developed by Kevin Stolarick that measures housing costs in relation to income. Kansas City enjoys a huge advantage. Of the 331 metro areas, housing in Kansas City is more affordable than in 242. Among the 60 largest metropolitan areas Kansas City's housing is more affordable than all save St. Louis and Louisville. Those of us on the task force who have wooed world-class faculty who can go anywhere believe Kansas City's affordable housing and quality of life could be extremely powerful inducements for recruiting, if academic quality could be equalized, at least in prospect. Oceans are nice, but they're hard to live in.

Kansas City's position in the center of the U.S. continues to make the city a vital center for transportation and shipping. But a fact more compelling for the century ahead is that Kansas City ranks second among all American cities in the robustness of its internet backbone. It is a hub of connectivity.

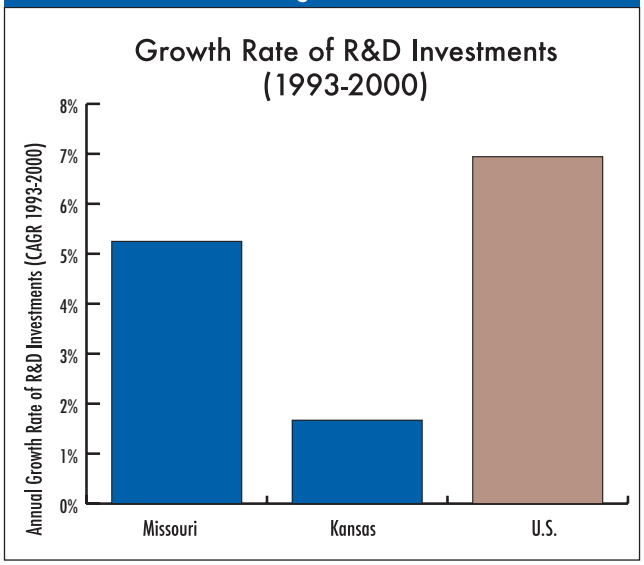
As important as any of these economic or cultural measures is the great civic spirit of Kansas City. The city takes justifiable pride in its sweeping boulevards, its extensive parks, and its array of fountains and sculptures. There are unusually dynamic and well-informed civic, philanthropic, and business organizations that focus creatively and intelligently on the city's problems and

Figure 1



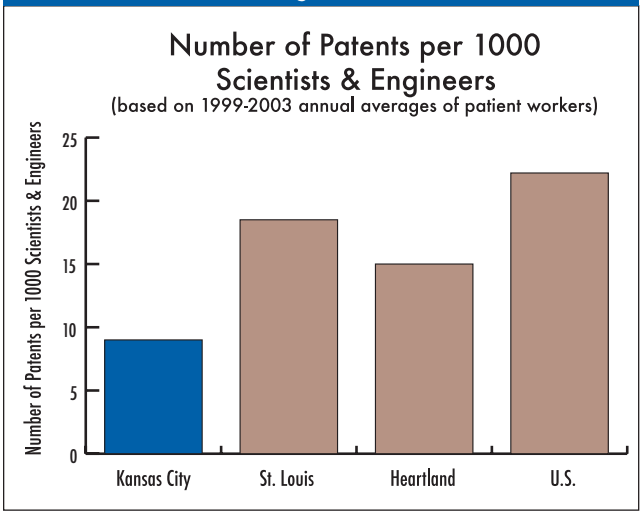
Source: National Science Foundation; U.S. Bureau of Economic analysis; Brookings analysis
Note: Includes funding from all sources

Figure 2



Source: National Science Foundation; Brookings analysis
Note: (*) Kansas Growth rate is calculated by years 1997-2000. R&D spending for 1993 and 1995 seem unusually low.

Figure 3



Source: CHI Research; U.S. Bureau of Labor Statistics, Occupational Employment Statistics; Brookings analysis

opportunities. Kansas City does its homework. There is a stack of compelling reports on the city's strengths and weaknesses. But if civic leadership can be said to have a style, Kansas City's is well-intentional and well-informed, but prizes consensus, avoids controversy, and is not inclined to upset the status quo. Many think the city's leaders are better at studying and talking than at thinking big or making tough decisions. Yet, building research university capacity is going to require exactly that.

Perhaps the strongest element of the city's civic tradition is Kansas City's splendid tradition of philanthropy, which seems poised for great new accomplishments. Kansas City ranks among the top cities in the country in philanthropic capacity with roughly $10 billion of philanthropic assets already committed. There would appear to be additional philanthropic potential of comparable size that might be deployed in the next twenty to thirty years. Kansas City's philanthropic capacity, if focused strategically on the city's most important opportunities and challenges, is equaled in only a handful of cities in America — which is to say in the world, as no other country has anything like America's philanthropic tradition. Indeed, given the dispersed nature of philanthropy in places such as New York, Los Angeles, and Chicago, Kansas City may well have more concentrated philanthropic potential than any place south or east of Seattle.

The power of Kansas City philanthropy can be seen in the city's latest, and possibly greatest, act of super-philanthropy. The Stowers Institute for Medical Research is still in its early beginning. But one can already see its potential, if Kansas City will organize itself to reinforce it and build on it, to help make Kansas City one of the top twenty centers of basic life science research in the country in the next decade. It is hard to exaggerate the significance of this. The Federal Reserve estimates that 15 to 18 percent of the American economy of the future will revolve around the life sciences. Work of the highest quality in the life sciences leads to excellence in medical research and clinical care, and to excellence and energy in other areas of science as well. It can lift the region's colleges and universities to new heights and can have a powerful impact on education at all levels. It can generate a beehive of entrepreneurial activity and wealth creation. Scientists invigorate the intellectual and cultural life of the entire community, and great science is a powerful magnet for human talent of all ages.

When the potential of Stowers is added to Kansas City's other social and 'uman capital, one can see that the city has impressive assets on which to build for the future. But the city faces some serious problems, problems which will erode Kansas City's future if not confronted and fixed.

B. THE PROBLEMS

In a time when any city's prosperity depends on its ability to attract and retain high quality talent that can live where it chooses, Kansas City enjoys no natural advantages. It has neither mountains nor coasts, nor is it close to any major natural attractions. Its climate is not a drawing card. The city's appeal to youthful adults in particular is very weak. In the 1990s even as Kansas City's employment base expanded dramatically, the city lost population in the 25-34 year old cohort by 13%. All other age cohorts gained. Of all the welter of statistics about Kansas City, this is the most revealing.

Kansas City lacks a first-rate "destination university" that attracts college and graduate students from a broad national pool across a range of disciplines. Kansas City also lacks a vibrant, culturally diverse, cosmopolitan, 24-7 downtown area of the kind that is prized by youthful adults and highly creative people of all ages. A lot of good work is underway to revive Kansas City's downtown. A massive $3.4 billion building boom is underway that includes many cultural offerings and residential features. It is important that the city's downtown become an asset rather than a hollowed-out, embarrassing relic of bygone urban vitality.

Kansas City's biggest problem is that it is more plagued by divisions — geographical, political, racial, and economic — than any large city in America. This is a huge problem for a city of relatively modest size, lacking natural attractions, that has to pull together to compete

successfully in the global knowledge economy. Kansas City is the only city in the country divided down the middle by a state line. Moreover, the two states Kansas City is divided between have a history of rivalry and even hostility, with strong political traditions of rural/urban mistrust. Kansas City's power in both state capitals is a fraction of what its political power would be were it a one-state city.

But the state line is much more problematic than simply vitiating Kansas City's political power at the state level. Every urban problem calling for a citywide approach requires an intricate effort to coordinate separate, competing political jurisdictions. In essence, Kansas City lacks a unitary, metropolitan-wide approach to taxation and fiscal policy, transportation, education, housing, jobs and urban development. Public higher education is a particular victim of the two-state division. The only advanced and substantial higher education foundations on which to build in Kansas City are two public universities whose public funding is controlled by distant state capitals in Topeka and Jefferson City, where Kansas City's interests have an uphill political climb.

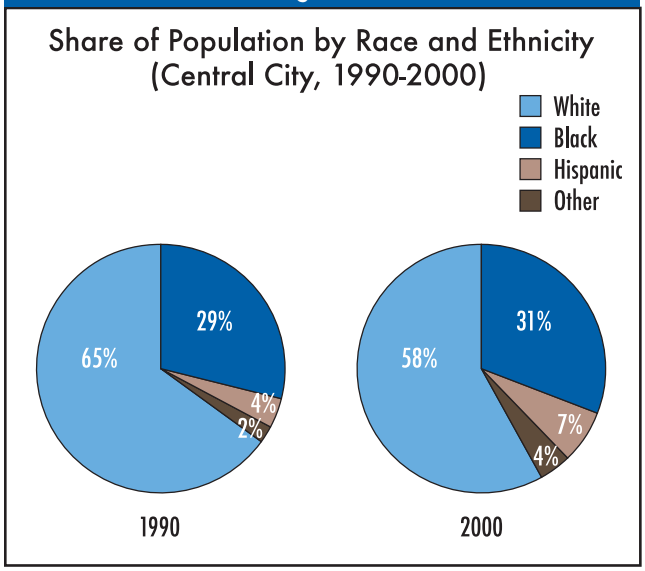
To build first-rate research university capacity in Kansas City would be a daunting task under any circumstances. Neither Kansas City nor either of its parent states is big enough or wealthy enough to support more than the equivalent of one first-rate research university. The only viable avenue to success lies in a unitary, metropolitan-wide, integrated strategy that builds on all available institutional foundations. Such a unitary strategy would be hard to come by in any city, given the competing elements in any complex urban environment. The fact that such a strategy in Kansas City has to rest on a two-state metropolitan foundation and build coherently on two different state universities adds a very substantial difficulty. To give just one example of the type of problem this presents, consider the city's situation in medical research and clinical care. Most of the research capacity resides at KUMC, and most of the clinical research capacity is in the Kansas City, Missouri hospitals, where a good deal of clinical research is underway. Research and clinical care are thus divided institutionally and by the state line. There are significant advantages in aligning basic medical research, clinical research, and clinical care. Yet strategic collaboration between KUMC and the hospitals on the Missouri side of the metropolitan area has been spotty and difficult. Can a sense of common strategic endeavor replace a tradition of interstate and institutional rivalry?

The two other divisions that fracture Kansas City are not unique to the city – indeed they plague many American cities — but they are present in Kansas City in a particularly deep and destructive form. One is the city's long and dismal history of racial isolation, lack of opportunity, and all-around shunting aside of its African-American citizens. Until the mid-twentieth century, Kansas City's African-American population was compelled by restrictive covenants to cluster in the urban core. Since the end of segregation by law, African-Americans remain highly concentrated in the core, held there by poverty and lack of opportunity. As low-skilled manufacturing jobs have dried up, Kansas City's urban core has become a prime example of the urban pathology described by William Julius Wilson in *The Truly Disadvantaged* (1990). The African-American poverty rate is 22.5% and highly concentrated, compared to the white poverty rate of 5.8%, which is relatively spread throughout the metro area. Most American cities face similar divisions between the races. But this task force cannot escape the impression that Kansas City has been singularly unsuccessful in convincing the city's African-American community that it has a critical role to play, and a vital stake, in the city's plans for the future.

Equally distressing is the widespread testimony we have heard that Kansas City's growing Latino community feels the same way. The histories of Kansas City's two large minority communities are very different. Both communities are highly diverse and generalizations are suspect, but there is a shared sense of bitterness, isolation, and even cynicism about whether the city's leaders are committed to opening doors of opportunity for the African-American and Latino communities. This has to change. Fully forty-five percent of Kansas City's net population gain in the past decade was in the African-American and Latino communities. In 1990, African-Americas made up 29% of Kansas City's population, and Hispanics were 4%. In 2000, African-Americans were 31 percent and Hispanics were 7%. At this rate of change, by the year 2040 African-Americans would be roughly 40%, and Hispanics roughly 20%, of Kansas City's total population. Like America at large, Kansas City will not prosper if its growing minority population remains isolated and lacking in opportunity.

In the global knowledge economy, education is the only avenue to opportunity that really counts. In Kansas City, as everywhere, the jobs that offer good wages and greater opportunity over time are those that require a college degree and continual, lifelong learning. People who lack a

Figure 4



Source: U.S. Censs Bureau: Te Brookings Insitutation Center on Urban and the Metropolita Policy.

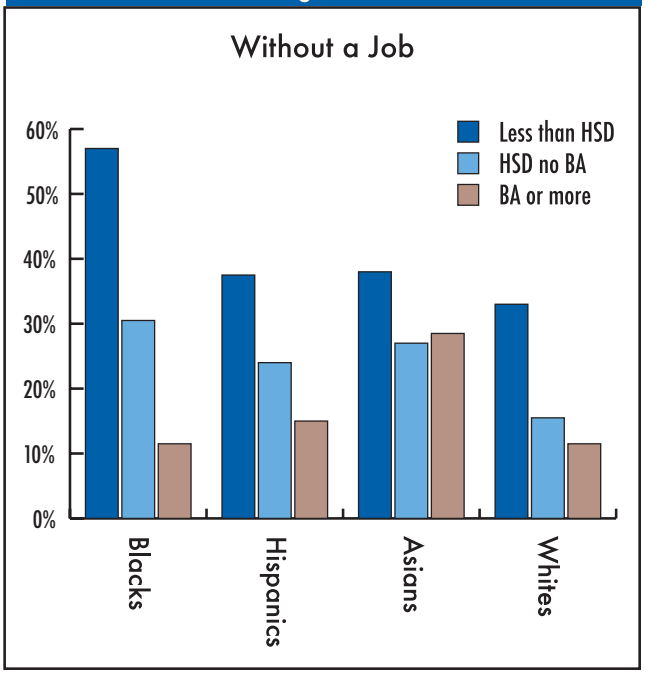
strong education get stuck in low-paying jobs with dismal futures that will not provide an individual, much less a family, with a life of health, opportunity, and security. Thus, schools, colleges, and universities are the foundation of opportunity in the 21st century. These are the institutions that have the capacity to bridge the divides of race, of wealth and poverty, and of participation and isolation, that separate cities and nations. They are the engines not only of prosperity, but of justice. That is why a decent education has become the most fundamental of all civil rights.

How are Kansas City's schools, colleges, and universities doing in their critical mission of offering educational opportunity on a broad, democratic basis? There is not a city in the United States that can take pride in its answer to this question. Kansas City certainly cannot. Many cities are making determined efforts to broaden education opportunity in their schools and to deploy urban colleges and universities, particularly public institutions, as central enterprises in providing educational opportunity to historically underserved groups. Kansas City must become a leader in this effort. It is far from that today.

The disparity between the metropolitan area's predominant racial group, non-Hispanic whites, and those of its non-Hispanic black and Hispanic residents, is evident in Figure 6, which shows educational attainment for all people aged 22 through 35 living in households – in other words not living in institutions or other group quarters. This is the critical young adult age group moving from their families of origin and their educational experiences into the labor force. During this period, people generally move through a series of jobs into the one where they will establish their career. While some continue with their studies, nine out of ten have completed their education by this point.

As can readily be seen, the vast majority of whites have progressed beyond a high school degree and almost 40 percent have earned a BA or better. (The rate of college education is even higher within the small Asian population of Kansas City.) This contrasts sharply with the region's black and Hispanic populations. A sixth of the black population in this age range and almost two-fifths of the Hispanic population has failed to graduate from high school, while less than a sixth of either group has managed to get a baccalaureate degree. This problem is even worse for the men in these groups – only 13.7 percent of black males in this age group and only 10.8 percent of the Hispanic males have BAs.

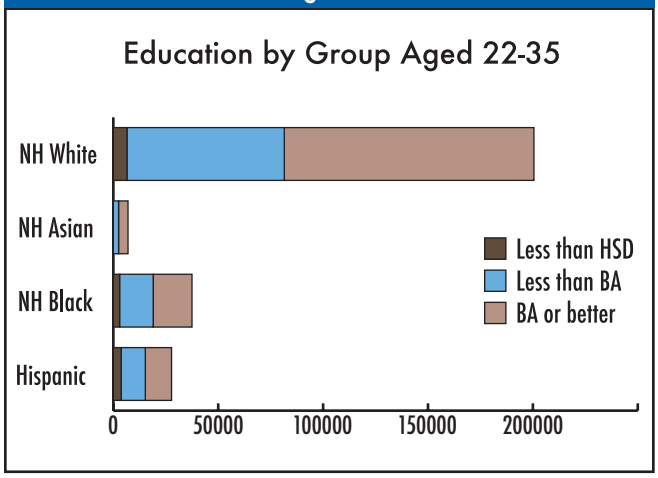
Figure 5



Source: 2000 Census Public Use Microdata Sample, Kansas City Metropolitan Area, Persons in Households

Not only does lack of education play a role in whether one works, it has a strong impact on wage and salary income. As is well known, having a college degree is almost a requirement for entry into a good job with a decent income. Figures 5, 6, and 7 demonstrate how this plays out across different groups of young people by level of education. Attaining a college education produces earning gains of more than $10,000 a year over a high school degree for every group. Clearly, increasing the level of college education among the black and Hispanic young men and women of the Kansas City metropolitan area will be crucial for increasing the level of social equity, as well as the community's competitive position in the regional, national, and global economics.

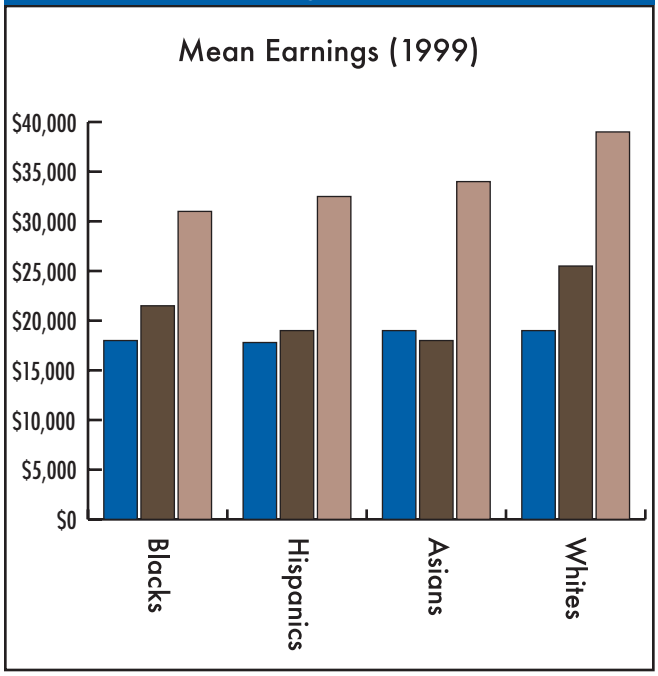
Figure 6



Source: 2000 Census Public Use Microdata Sample, Kansas City Metropolitan Area, Persons in Households

The disparity between the metropolitan area's predominant racial group, non-Hispanic whites, and those of its non-Hispanic black and Hispanic residents, is evident in Figure 6, which shows educational attainment for all people aged 22 through 35 living in households - in other words not living in institutions or other group quarters. This is the critical young adult age group moving from their families or origin and their educational experience into the labor force. During the period, people generally move through a series of jobs into the one where they will establish their career. While some continue with their studies, nine out of 10 have completed their education by this point.

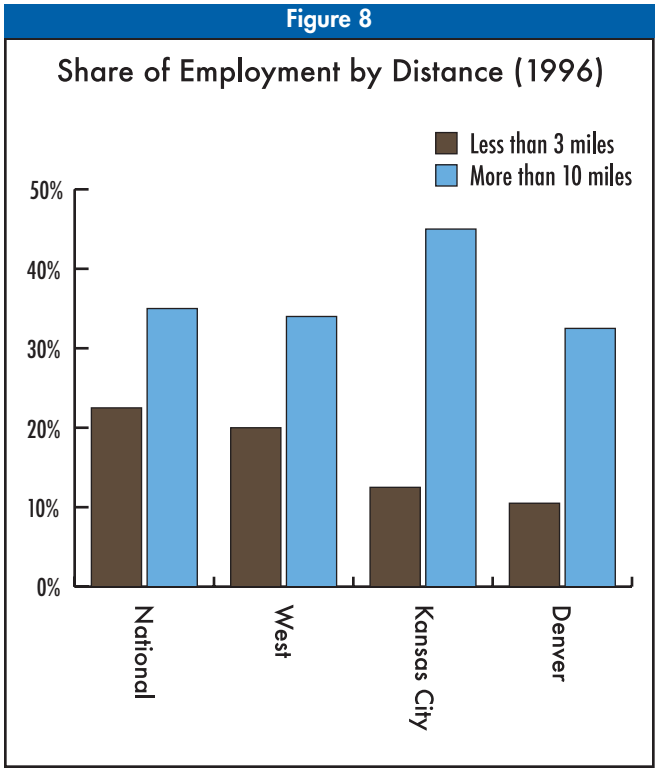
Figure 7



The level of education translates directly into the likelihood of holding a job and the level of earnings from that job. Low levels of education carry a particularly strong penalty for black and Hispanic young people. Once more, gender plays a role, with minority young men without college educations experiencing the highest rates of non-participation in the labor market. Figure 5 shows the share of those without a job by group and level of education for young people aged 22 to 35 in Kansas City.

The third division that seriously impedes Kansas City's aspirations for the future lies in its pattern of development, "blowing out" at the periphery while "hollowing out" in the core. This pattern creates a destructive polarization between booming suburbs and a failing center. Poor, largely minority populations are immobilized in the core, while affluent, mostly white residents rush to the suburbs. The spreading periphery sees rising home values, good schools, and a growing job base, while the center struggles with spreading poverty, eroding property values, failing schools, and widening blight. Kansas City is an extreme example. In the 1990s 80% of the new jobs were created outside the urban core. Meanwhile ever-greater amounts of land, farther and farther from the center, are consumed. Kansas City has been consuming land at more than double

Figure 8



Source: Glaeser analysis of U.S. Census Burea data: The Brookings Institution Center on Urban and Metropolitan policy.

the rate of its population growth. This puts huge centrifugal pressures on the tax base for road construction and maintenance, new schools, expanding sewer and water systems, and other infrastructure, displacing public funding from the core. In the process, the city loses the kind of vital, exciting, safe urban core that tends to be a magnet for the creative people essential to the new knowledge economy.

Creating an engaged urban university enterprise in the urban core is not a full answer to the divisions that fracture Kansas City. But it could be a powerful positive force. The university capacity Kansas City needs cannot possibly be built on other than an integrated two-state strategy. If Kansas City can figure out how to unify itself around higher education, many of its other urban problems will seem relatively simple by comparison. First-rate higher education institutions that focus strategically on expanding educational opportunity for underserved communities can produce a decisive turn-around that can change a city's culture. A first-class research university can bring to the urban core energy and life, jobs, students and faculty, restaurants, music, coffeehouses, bookstores, and other amenities. Creative people of all ages like the ambiance of a great urban university. There are few institutions that could bring so much to Kansas City's depleted urban core.

III. Why Kansas City Needs A World-Class Research University: A Brief Primer on the Knowledge Economy

"The world is flat! Globalization has collapsed time and distance and raised the notion that someone anywhere on earth can do your job, more cheaply. Can America rise to the challenge on this leveled playing field?" **Tom Friedman, *The World Is Flat* (2005).**

In a time when knowledge is the basis of the wealth and when the foundation of freedom and opportunity is education, there is no more important question for any community than to define the higher education capacity it needs. This is why cities from Bangalore to Denver and beyond are recognizing that economic prosperity and social well-being in a global knowledge economy require public and private investment in knowledge resources: educated people, research, and innovation. America is evolving rapidly into a post-industrial, knowledge-based society, a shift in culture and technology as profound as the shift that took place a century ago when our agrarian societies evolved into industrial nations. Industrial production is steadily shifting from material-and-labor-intensive products and processes to knowledge-intensive products and services. A radically new system for creating wealth has evolved that depends upon the creation and application of new knowledge.

Although it has been over 200 years since Adam Smith observed that "a man educated at the expense of much labor and time…may be compared to one of those expensive machines," it is only in the last generation that economists have understood that human capital is the most valuable of all resources. This insight has revolutionized the theory of economic growth and transformed public policy. Many traditional economic precepts have been turned on their ear. Like the tongue of Washington Irving's friend, which he said was the only instrument he encountered that became sharper through constant use, human intelligence grows as it is used and interacts with others. Human capital can't be sold or taken away from owners, as physical or financial capital can be. It has free will and can move where it wants. It is an exponential resource, which gains tremendously in value from aggregation. Scale counts, but high quality counts even more. Human capital tends to be well-informed about where it will find the highest value for itself through association. It is highly susceptible to the economics of urbanization.

This leads to a point of special relevance for Kansas City. In the competition of the global knowledge economy, nations count, but cities and regions count even more. Creative people are drawn to cities. Few people decide to move to Missouri or even to California. They decide to move to Kansas City, Silicon Valley or San Diego. This has an extremely important political corollary: the city, or, more precisely, the metropolitan region, becomes the most critical jurisdiction for planning and strategy. Nations and states still matter; they particularly can do their cities harm. But cities have to take the lead in forging their destinies. San Diego did not become San Diego by looking to Sacramento, nor Seattle to Olympia. Moreover, having a strategy is more than ever important to future prosperity. Of all factors of production, human capital is most

susceptible to intelligent planning. That is why South Korea's prospects are better than Saudi Arabia's and why Dublin is the most dynamic city in the European Union.

Kansas City cannot defer to Jefferson City or Topeka to plan the city's human capital strategy, although it can enlist the states as collaborators. The cities that prosper in the global knowledge economy will be the cities that are smart and strategic about human capital. That is Kansas City's challenge, and its great opportunity.

Unlike natural resources such as iron and oil that have driven earlier economic transformations, knowledge is inexhaustible. But knowledge can be created, absorbed, and applied only by the educated mind. Hence, schools in general, and universities in particular, will play increasingly important roles as our societies enter this new age. As Richard Florida writes in his *Rise of the Creative Class (2002):* "Universities are the intellectual hubs of the creative economy….they are the Ellis Islands of the creative age."

Education is the foundation of innovation. As the source of new products and services, innovation is responsible for the most dynamic sectors of the U.S. economy, contributing as much as 50% of the nation's economic growth since World War II. American cities have a great competitive advantage, as our society is based on a highly diverse population, democratic values, and free-market practices. These factors provide an unusually fertile environment for innovation. Significant public and private investment is necessary, however, to produce the essential ingredients for innovation: new knowledge (research), human capital (education), infrastructure (facilities, laboratories, communications networks), venture capital, and sound public policies (education funding, tax, intellectual property).

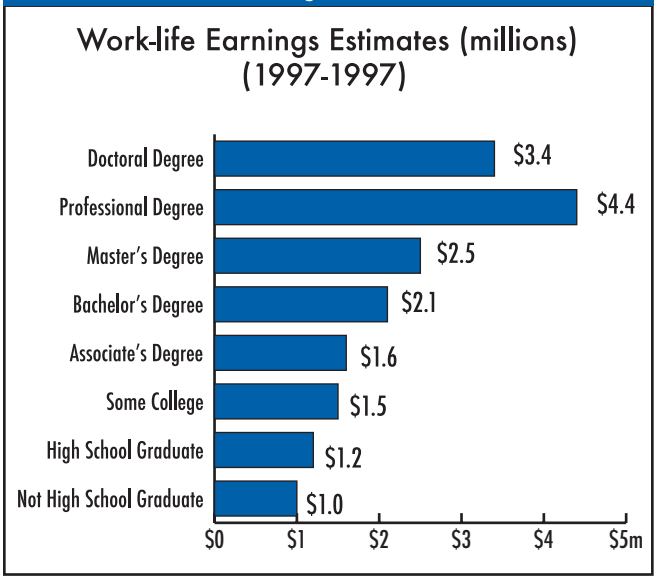
Other nations are beginning to reap the benefits of such investments in technological innovation, creating serious competitive challenges to American industry and business both in the conventional marketplace (e.g. Toyota) and through new paradigms such as the off-shoring of knowledge-intensive services (e.g. Bangalore). These investments are increasingly focused on efforts to build world-class research universities as the source of advanced education, research, innovation, and entrepreneurial energy.

Whether through travel and communication, through the arts and culture, or through the internationalization of commerce, capital, and labor, our cities are becoming increasingly linked with the global community. As the recent report of the National Intelligence Council's 2020 Project has concluded, "the very magnitude and speed of change resulting from a globalizing world—apart from its precise character—will be a defining feature of the world out to 2020. In such a global economy, it is critical that our cities and states not only have global reach into markets abroad, but also have the capacity to harvest new ideas and innovation, and to attract talent from around the world". The best way to do this is to invest in first-class research universities, since these are truly international institutions. These institutions stand at the center of a world system of learning and scholarship. They are the magnet that cities use to attract new talent, new industry, and new resources from around the world.

America's population is changing rapidly, as one can see in Kansas City. Groups we refer to today as "minorities" will become the majority population of our nation in the century ahead, just as they are today in California and Florida and most of the rest of the world. In this future, the full participation of currently underrepresented minorities will be at the heart of our society's commitment to equity and social justice. Kansas City cannot afford to waste the human talent represented by its minority populations. The increasing diversity of the city's workforce with respect to race, ethnicity, gender and nationality is both one of its greatest strengths and one of its most serious challenges. In this respect, Kansas City is a microcosm of America. Far from evolving toward one America, our society continues to be hindered by the segregation and non-assimilation of minority cultures. If we do not create educational institutions that mobilize the talents of all of our citizens, we are destined for a diminished role in the global community and increased social turbulence; most tragically, we will have failed to fulfill the promise of democracy upon which this nation was founded. This is perhaps the most serious challenge facing American society today.

In a global, knowledge-driven economy, a college degree has become a necessity for most careers, and graduate education is desirable for an increasing number. The pay gap between high school and college graduates continues to widen, more than doubling from a 50% premium in 1980 to 111% today. Not so well known is an even larger earnings gap between baccalaureate-degree holders and those with graduate degrees. This reflects the reality that in the knowledge economy, the key asset driving value is intellectual human capital. Little wonder that quality higher education is becoming a powerful political issue, at least in rhetoric if not yet in actual public investment. The National Governors Association stresses

Figure 9



Source: "The Big Payoff: Educational Attainment and Estimates of Work-Life Earnings." U.S. Census Bureau; The Brookings Institution Center on Urban and Metropolitan policy.

that: "The driving force behind the 21st Century economy is knowledge, and developing human capital is the best way to ensure prosperity."

The new technologies driving such profound changes in our world — information technology, biotechnology, and soon nanotechnology — are characterized by exponential growth, increasing in power and price/performance by factors of 100 to 1,000 every decade, a characteristic known in microelectronics as Moore's Law. As Clayton Christensen explains in *The Innovators Dilemma* (2003), while such technologies may be at first inadequate to displace existing technology in existing applications, they later evolve explosively to displace existing institutions. The social impact can be highly disruptive, as the restructuring of economic sectors such as telecommunications, banking, transportation, and manufacturing have made painfully apparent. The National Intelligence Council's 2020 Project concludes that "the greatest benefits of globalization will accrue to countries and groups that can access and adopt new technologies. Indeed, a nation's or region's level of technological achievement generally will be defined in terms of its investment in integrating and applying the new globally available technologies-whether the technologies are acquired through a country's own basic research or from technology leaders. Nations that remain behind in adopting technologies are likely to be those that have failed to pursue policies that support application of new technologies-such as good governance, universal education, and market reforms-and not solely because they are poor."

The skills of a region's work force, the knowledge they produce and the innovation and entrepreneurial energy characterizing their activities provide the capacity to compete in the new world economy. These are the elements that create new markets, products, and services. Creating and adequately supporting institutions capable of providing advanced education, research, and technological innovation of world-class quality is the most important investment Kansas City can make to secure its future.

IV. The Higher Education Landscape in Kansas City

"In the post war era, medical schools have increasingly dominated the research funding of the university campuses that include them." **Graham and Diamond, *The Rise of American Research Universities (1995)***

"The University of Kansas City has notable assets such as a beautiful campus, substantial buildings, well-established professional schools, and a devoted faculty. It has suffered from confusion as to purpose, administrative turbulence, lack of financial support, and attempting to do too much with too little." ***The McHenry Report* (1957)**

Kansas City needs to ground its higher education strategy in a broad approach that builds on all possible institutional foundations. No single institution can provide Kansas City with the higher education quality and capacity the city needs. An integrated, two-state metropolitan strategy building on all university assets, and even creating some new institutional capacity, is the only realistic prospect for a world class higher educational research capacity in Kansas City's future.

Although Kansas City lacks the first-rate, urban research university enterprise that it needs, the city has some strong higher education foundations on which to build. A mistake often made in strategic planning is to focus more on where one wants to be in the future, rather than on where one is today and on the steps by which a future goal can become a reality. So we will take some pains to make a realistic and candid assessment of higher education institutions in Kansas City, not only in terms of present capacity but, even more important, in terms of capacity for growth and improvement.

A. COMMUNITY COLLEGES

We have the least to say about Kansas City's excellent community colleges, not because they are not vitally important to the future of the city — they are — but because they are currently meeting the needs of the city with admirable energy and educational quality. We offer three strategic recommendations. First, the community colleges should become even more deeply engaged than they are in the K-12 systems in their communities. There should be a task force of the community colleges, the private colleges, UMKC, KU, K-12 and a diverse group of civic leaders to create a concerted strategy of active involvement by every higher education institution in the public schools to raise academic standards, increase high school graduation, and lay the groundwork for much broader access to college. A possible model to consider might be the College Now program of the City University of New York, in which CUNY provides direct assessment and academic immersion programs for students starting in the ninth grade. College Now is designed to determine whether students are on a path in reading, writing, and mathematics to graduate from high school and succeed in college. CUNY provides summer immersion programs, Saturday programs, and after-school programs for students, and CUNY faculty work closely with high school teachers to align the curriculum with what is needed for success in college. CUNY also runs summer immersion programs for students and others who need to learn English.

Other universities which offer models of engagement include UCLA and Johns Hopkins. Yale offers a free masters' program in urban education studies to students who commit to teach for at least three years in

New Haven's public schools.

Another strategy we recommend for the community colleges as well as Kansas City's other colleges and universities is to work with the public school systems to locate high schools on college campuses, and allow the high school students to use the college's libraries, gyms, laboratories, and other facilities. New York City will soon have 15% of its high schools located on CUNY campuses. The Gates Foundation is supporting small, new, college-based high schools in a number of cities.

Another possible model (currently in collaborative design by both the KCK and KCMO school districts) is the development of a partnership with the Missouri Higher Education Loan Authority and the National College Access Network to establish programs aligned with these districts' high school reform initiatives to increase college access and college-going. These new college access programs would be coordinated by the Civic Council's new PREP-KC initiative and a proposal that includes these college access programs is currently under review at the Gates Foundation.

Our third suggestion is that the community colleges, and particularly Penn Valley, look at Johnson County Community College's life sciences collaboration with KU's Edwards Campus and Stowers. This appears to be a highly successful collaboration that might well be replicated. Kansas City is going to need considerable numbers of well-educated life sciences technicians and specialists at all levels.

The general vitality of Kansas City's community colleges calls attention to several advantages these institutions enjoy which other public higher education institutions would do well to try to emulate. The community colleges have a fiduciary governance structure that roots them firmly in the communities they serve. With such rooted governance, they have the ability to support themselves with local tax dollars, an option neither UMKC nor KUMC is now in a good position to explore. It is not sound policy that Kansas City's community colleges are in many ways more generously and securely funded for their missions than are Kansas City's public baccalaureate and graduate institutions. In an era when state funding for public higher education is in decline, public universities need to look to other means of support, including local tax support for those located in cities that understand the critical importance of higher education for their futures. Finally, their governance structures have allowed the community colleges to develop strong sustained leadership. Chuck Carlsen, for example, has been the president of the excellent Johnson County Community College for more than 20 years. It is not an accident that JCCC is Kansas City's highest ranked educational institution in its national peer group.

B. UMKC

"A page of history is worth a volume of logic."
Oliver Wendell Holmes, Jr., *The Common Law* (1881)

The University of Missouri-Kansas City is one of four campuses that comprise the University of Missouri System. The flagship campus is located at Columbia, in the middle of the state. Founded in 1839, the University of Missouri is the oldest public university west of the Mississippi and a long-time member of the Association of American Universities (AAU), a 62-university group that represents the strongest research universities in the country. The two other campuses are the University of Missouri-Rolla, an engineering school that was established in 1870 as the Missouri School of Mines, and the University of Missouri-St. Louis, another urban campus created in 1963, the same year the University of Missouri system took over the private, financially-strapped University of Kansas City and made it UMKC.

A statewide Board of Curators provides the fiduciary governance for all four UM-System campuses. There are nine Curators, by law one from each Missouri Congressional District; no more than five can be from one political party. Currently, one Curator lives in Kansas City. The UM-System's chief executive is the President; he appoints (by recommendation to the Curators) the Chancellors of the four campuses and has the power (again, under the oversight of the Curators) to fire them. There is no campus-based fiduciary governance, although each campus has an advisory group of supporters. At UMKC, for reasons of history, this group is called the Trustees, but they are not trustees in the usual sense, and they have no governance power at the campus.

BEGINNINGS

UMKC began as the University of Kansas City, established bravely in 1933 in the teeth of the Great Depression after nearly 20 years of fitful efforts by civic leaders to create a university. In Kansas City, 1933 was an interesting year: November saw the beginning of the Kansas City symphony orchestra, and December witnessed the opening of the Nelson-Atkins Museum.

As the institution grew, the University of Kansas City absorbed several free-standing professional schools: the

Kansas City School of Law (1938), the Kansas City-Western Dental College (1941) and the Kansas City College of Pharmacy (1943). Although the university seemed reasonably solid through the post-war years, by 1952 it had declining income, declining enrollment, and uncompetitive faculty salaries. A crisis was seemingly averted in 1953 when an energetic chancellor, Earl McGrath, a former United States Commissioner of Education, was recruited. There was a brief period of optimism, and McGrath expanded the university by starting a business school, an education school, and bachelor of science programs in engineering, medical technology, and home economics. But McGrath resigned suddenly in 1956, apparently having concluded that the University's financial situation was not viable. A year before, he had insisted that the university needed to raise $10 million. The Board authorized a $1 million campaign, but only $550,000 was raised. There ensued a curious period where waves of institutional energy—for example, leading to a merger in 1958 with the excellent Kansas City Conservatory of Music—alternated with periods of gloom over the chronic failure to raise money, budget cuts, and increasing deficits.

About this time a coalition of foundations provided support for an outside group led by Dean McHenry of UCLA to review the higher education scene in Kansas City. In a pungent report (sample: "Kansas City is remarkably uneven in civic competence"), McHenry bluntly informed the foundations that to remain private the university would need to double its $20 million endowment. Failing that, McHenry concluded, the university's only viable option was to seek public funds. McHenry suggested the university might become a campus of the University of Missouri. McHenry proved more prescient than persuasive. His appeal for financial support for the beleaguered university fell on deaf ears. Here is how the President of the University at the time it became a public institution in 1963 described the five years following the McHenry Report:

> "The next five years are a story of repeated financial drives and campaigns, assisted by competent professional staff, aimed at keeping the University private and solvent, ultimately to no avail. The University seemed to have enjoyed a low priority in the minds and hearts of Kansas Citians."

By 1960, the Board announced that the university was "stronger educationally and in community acceptance than at any time in its history, and that correspondingly it stands in greater financial need than at any time in its history." Finances continued to erode until 1963, when the trustees finally accepted that the financial situation was hopeless.

Fortunately for Kansas City, University of Missouri President Elmer Ellis and the Missouri Curators were persuaded to absorb the University of Kansas City into the UM-System. This was no easy task. The university's $20 million endowment, which was transferred to the UM-System, fell far short of what was needed to make the university viable.

To provide the public funds necessary for the operation of the University, the legislature had to be persuaded to raise the sales tax throughout the state by one cent, and to apply most of the proceeds to UMKC. Moreover, in creating a UM campus in Kansas City, the UM-System had to treat St. Louis with parity, so 1963 also saw the beginning of the University of Missouri-St. Louis, an institution that had to be built from scratch.

PART OF THE UNIVERSITY OF MISSOURI SYSTEM

Since becoming part of the UM-System, UMKC has experienced substantial growth. From a student body of just over 3,000 in 1963, UMKC last year had a total enrollment of 14,256, with 7,097 undergraduates, 3,369 graduate students, and 1,494 students in professional schools. UMKC also serves 2,296 high school students in its "dual credit" program. Because roughly 25% of its undergraduates are part-time, as are two thirds of its graduate students, UMKC's FTE enrollment last year was 5,778 undergraduates, 1,785 graduate students, 1,468 students in professional schools, and 575 in the high school dual credit program. UMKC serves a substantial number of nontraditional, older students. More than 2,100 of the undergraduates are 25 or older, with 1,100 over age 30. Two-thirds of its graduate students are over 30. Two-thirds of the students are Missouri residents, 18% are from Kansas, 8% are from other states, and 7% are international. UMKC charges undergraduates from Kansas metro counties the same tuition as Missouri residents, which in 2004 was $7,175, a high rate among public universities in the heartland. (KU's resident tuition is $4,737.) Non-resident college tuition is $16,622. Like KU, UMKC keeps its tuition dollars.

UMKC has been making good progress with its undergraduate enrollment, which has increased by 25% in the past five years. Freshmen averaged 24 on the ACT in 2004. African-American undergraduate enrollment has increased from 734 to 969 since 2000, and Hispanic enrollment has increased from 222 to 295.

Figure 10

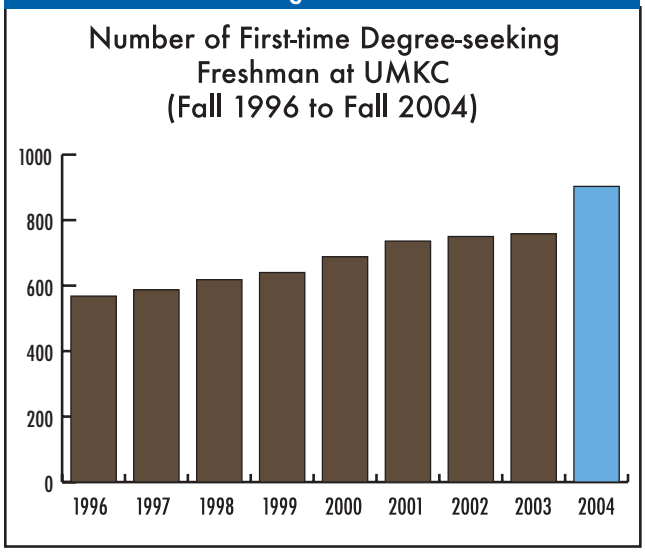
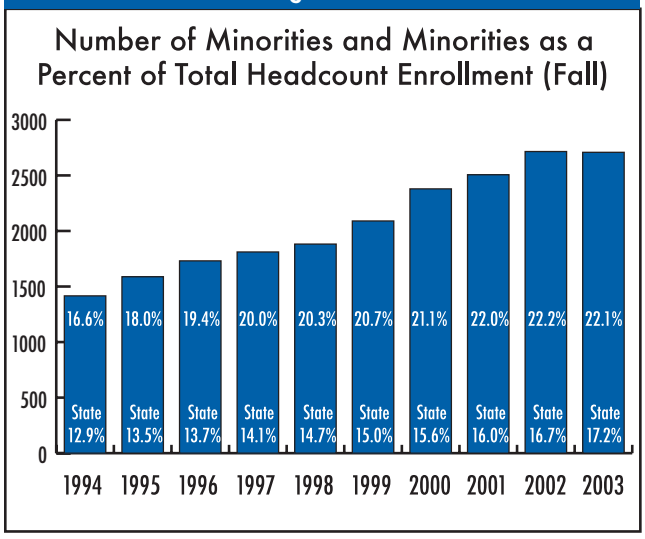


Figure 11



UMKC AS A RESEARCH UNIVERSITY

Kansas Citians need to understand that UMKC as a "research university" is highly unusual. Its PhD program is small and unusual. In FY 2004, UMKC awarded 65 doctoral degrees. This is less than one-quarter of the average number of doctorates awarded annually by the country's top 100 universities. Half of UMKC's doctorates were in what is called "Multi/Interdisciplinary Studies." With the approval of a faculty committee, PhD students can put together their own interdisciplinary PhD programs. Substantial numbers of doctoral degrees were also awarded in Visual and Performing Arts (26% in FY 2004), Psychology (15%) and Education (6%). In FY 2004, there were no PhD's in the biological sciences, the physical sciences, computer science, engineering, or any of the humanities or social sciences other than psychology. A number of the interdisciplinary degrees involved humanities, however. Thus, although UMKC is classified as a doctoral-granting research university, its PhD program is very small and concentrated in interdisciplinary studies program and the arts.

The PhD program is not the only respect in which UMKC is unusual. With its history of absorbing pre-existing institutions, the absence of fiduciary governance focused on it and rooted in Kansas City, and a lack of strong, long-term leadership, the university has the culture more of a coalition of entities than a unified institution. This history also probably explains the wide variation in the quality of different programs. All of UMKC's high-quality programs, with the exception of the Bloch School's entrepreneurship program, pre-existed the university.

Performing arts programs in music, dance, and theatre are ranked among the top 50 in the country, and if they were placed in a more prestigious university would probably rank well up among the top 25. Its School of Dentistry, the only school of its kind in Missouri or Kansas, is outstanding. Its students scored fourth nationally on the National Dental Board Exam in 2005, and in the previous year ranked second. Other areas of promise in terms of research capacity are the Bloch School of Business and the Law School. If not yet among the top 100, these schools are very close and the Bloch School is improving fast. If these schools could bring together strong leadership, including strong governance, strategic focus, and investment, they would have a lot of potential. Very few, if any, of UMKC's other schools or disciplinary areas would rank in the top one-hundred.

Medicine and the life sciences at UMKC are organized in a most unusual way. The medical school was created in 1970 around a highly distinctive vision. It admits students as college freshmen to a 6-year program offering both a baccalaureate and an M.D. degree. Students spend their first two years on the main campus (known as the Volker campus), where other undergraduate programs are located, and then four years at the medical school located at Hospital Hill. They complete their basic science courses on the Volker campus, taught largely by faculty whose appointment is in the School of Biological Sciences and not the medical school. This structure led in the past to serious problems as medical students did poorly on their stage 1 boards (on basic science). This caused the medical school to create a small basic science department to

improve teaching, and stage 1 results have improved to average. But the medical school remains virtually unique among the 126 American M.D.-granting institutions in its minimal research in the life sciences. Its faculty is almost entirely drawn from clinicians at the school's main hospital partners: Truman Medical Center, St. Luke's, and Children's Mercy. An outside review of the medical school in 2004 concluded that the faculty felt primary allegiance to the hospitals and did not conceive of themselves as university faculty in the usual sense.

This unusual vision has produced a medical school that has been highly creative about teaching and professional mentoring, and enjoys strong loyalty from its students and graduates. It is a vision that draws able students. For the class entering in fall 2004, the medical school admitted 147 out of 537 applicants (27%), and enrolled 117 (80%). The average ACT was 28.

But the vision has also produced a medical school that is extremely limited in its research capacity. Of the 121 medical schools that received NIH grants in FY 2003, UMKC's medical school ranked 113th with $4 million in funding. Its NIH funding is about one-ninth that of the University of Kansas School of Medicine. UMKC is also drastically underfunded as medical schools go. A former dean suggests that state approval of the school involved a tacit understanding with the state that the medical school would need very little public funding because it would eschew research and use independent hospitals as its teaching hospitals. Whether or not this is the case, it is the fact that the UMKC medical school has had only a tiny fraction of the operating and capital funding from state funds that public medical schools typically receive.

Of the 74 public medical schools in the U.S., UMKC gets the lowest state appropriation, about $6 million in FY 2003. When we first learned of this paltry support, we assumed it was so low because state support was focused on the flagship campus at Columbia. Not so. Missouri is not much more generous with the medical school at UM-Columbia. It received roughly $9 million in state appropriations in FY 2003. This compares with average state appropriations to public medical schools across the country of $44 million in FY 2003. In that year, Kansas supported the KU-Medical School with $70 million. Thus, Kansas' state support for its medical school is more than eleven times Missouri's support for UMKC-Medical School, and nearly five times Missouri's combined support for its two public schools. Missouri's combined support is one-third of the national average. This task force is utterly astounded that a state of Missouri's population and resources would rank at the bottom in public support for its medical schools, the institutions where excellence is rewarded with the greatest federal and philanthropic funding and where research productivity drives the greatest economic growth.

With its tiny state support, with very small NIH funding of $4 million in 2003, with virtually no endowment income, UMKC Medical School is dependent on its tuition revenues. This is very unusual among public medical schools and calls attention again to the fact that UMKC Medical School is essentially a teaching medical school rather than a research and teaching institution of the kind found in research universities.

The budget disparity helps explain why KU Medical School has ten times the NIH funding and nearly 15 times the number of basic science faculty compared to UMKC Medical School. It helps explain why KUMC has a robust plan to build 700,000 square feet of new or renovated research space in the next ten years, while UMKC will have to scramble to pull together one-fifth that amount. It helps explain why Stowers has found an active collaborator at KUMC but not at UMKC. What is not explicable, at least to this task force, is why the state of Missouri is so penurious with its two public medical centers, institutions that could offer the greatest academic and economic returns to the state.

These comments are not made in a spirit of criticism of UMKC. On the contrary, we are impressed that UMKC Medical School is as strong as it is as a teaching enterprise given the paucity of state support.

The budget and peculiar organization of the UMKC medical school helps explain why UMKC overall is very weak in federal science and engineering funding among public universities with medical schools, with funding of $17.3 million in FY 2002. Within the region, this compares to $92 million at UM-Columbia, $87 million at St. Louis University, $381 million at Washington University, and $87 million at KU. Despite the fact that UMKC's mission within the UM-system emphasizes life sciences and medicine as one of three broad areas of academic emphasis (the others are visual and performing arts, and urban affairs), and despite being one of only 26 universities in the nation granting degrees in four health science areas, it has largely missed out on the massive NIH funding that underwrites this centrally important area of graduate teaching and research at virtually all high-quality research universities with medical schools.

UMKC ranked 198 among universities nationally in total R&D funding in FY 2002, coming in behind such

RESEARCH AND DEVELOPMENT EXPENDITURE LEVELS **FIGURE 12**

UMKC:	$ 24 million	UC-Santa Barbara:	$131 million
University of Toledo:	$ 25 million	UC-Davis:	$456 million
University of Akron:	$ 28 million	UC-Irvine:	$209 million
University of Memphis:	$33.6 million	University of Miami:	$171 million
University of Cincinnati:	$218 million	Emory:	$271 million
University of Pittsburgh:	$400 million	University of Illinois-Chicago:	$260 million
University of Louisville:	$ 81 million	University of Maryland-Baltimore:	$267 million
University of Alabama at Birmingham:	$240 million	Wayne State:	$199 million
Arizona State University:	$123 million	Case Western:	$219 million

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Research and Development Expenditures at Universities and Colleges, Fiscal Year 2002

universities as the University of Akron, the University of Toledo, Jackson State, and the University of Southern Mississippi. To provide a sense of what Kansas City has missed as a result, see Figure 12 for a few examples of total R&D expenditure levels at other universities located in cities comparable to Kansas City.

UMKC is not only missing out on research funding. It is also missing what the funding underwrites, namely the creative faculty and graduate students who generate discoveries, patents and business opportunities and are the foundation for a city's entrepreneurial energy. Also, faculty interested in research tend to look to external funding, particularly in the sciences, as a guide to the overall quality and competitiveness of the institution. Thus, UMKC's meager funding sends a message of weakness.

It is difficult to judge research quality in academic areas outside science and engineering, where federal funding is a good indicator of research quality. However, the evidence suggests that, with the exception of the arts, dentistry, and a few specific areas at the business and the law school, UMKC's research capacity in other academic areas, relative to other research universities, is weaker than it is in the life sciences and medicine. In *The Rise of American Research Universities*, Hugh Graham and Nancy Diamond (1995) looked at per capita faculty research productivity at 178 research universities measured by R&D funding, journal publications in all fields, journal publications in top-rated science and social science journals, and arts and humanities publications and awards. Graham and Diamond grouped the universities into four broad categories. UMKC was put in the fourth category, along with fifty other universities. The top three groups totaled 127 universities. The University of Kansas and the University of Missouri-Columbia were put in the second group, following 55 public and private research universities in group one. Graham and Diamond then ranked the universities by each criteria. Among the fifty-one universities ranked in group four, UMKC ranked last on the publication index.

Several things need to be said about the Graham and Diamond rankings. The book is nearly ten years old, so the data is not current. We suspect, however, that more up-to-date information on UMKC's research capacity would not reveal much change. If anything, UMKC's relative position may have slipped over the past decade, as most research universities have undertaken aggressive efforts to improve themselves. There has not been the kind of investment in UMKC that would significantly enhance its relative position in the past decade. The second thing that needs to be said about Graham and Diamond is that it is a considerable accomplishment to make their list at all. There are over 4000 colleges and universities in the U.S. Kansas City may need research university capacity markedly exceeding that of UMKC, but to rank in the bottom group of the top 200 research universities in America requires a talented and hardworking faculty.

Thus, when we describe UMKC research capacity as weak relative to the top hundred or so American universities, we are comparing it to a high standard. Again, these comments do not imply any criticism of UMKC or its faculty. UMKC has never had the funding or the mandate to become a first-rate research university. It takes much more than an able, dedicated faculty to create a world-class research university. It takes a robust strategy. It takes continuity of leadership at both the executive and trustee levels. It takes investment. UMKC has had none of these.

THE STATUS QUO

Kansas City owes the University of Missouri system a tremendous debt of gratitude for not letting the University of Kansas City fold. UMKC may not be the strong research university that Kansas City needs, but the fact that there is an institutional foundation on which to build is due to the commitment to the city shown by the UM-system since 1963. No sensible person could advocate that UMKC become a private institution. State appropriations may cover only one-quarter of UMKC's operating budget, but the $73.3 million in state appropriations (FY 2004) is critical to UMKC's financial equilibrium. It would take $1.5 billion in new endowment funding to cover the gap should the state not fund UMKC at its current level.

But to recognize that UMKC should remain a public institution should not be confused with the expectation that the UM-system is at all likely to be able to do what it will take to raise UMKC to the level of a top-100 research university. The fact is, to put it bluntly, that Missouri is currently a miserable funding environment for public higher education. According to the Center for the Study of Educational Policy annual study[2], in FY 2005, Missouri ranked 46th in state appropriations for higher education per capita and 43rd in appropriations per $1000 in personal income, by far the lowest among the 12 "heartland" states. Kansas, by contrast, ranked 13th and 15th among the states on the two measures. On a per capita basis, Missouri appropriated $150 to higher education in FY 2005; Kansas appropriated $260. Higher education funding was 10.9% of Missouri's state appropriations budget in FY 2003, compared to a national average of 12.8%. On top of this, in most years since 2000, the Governor has withheld additional sums from higher education. If Missouri supported higher education at the national average in terms of the percent of its state appropriations, it would need to add roughly $200 million annually to higher education.

There has been a steady erosion in Missouri funding for public higher education for the past decade. In 1995, higher education appropriations represented 1.20% of the state general fund budget. In FY 2005, it was less than .96% of the general fund, a greater than 25% decrease. State appropriations as a share of the UM-system's operating budget have also been declining steadily. In FY 1989, state appropriations were 63.5% of the budget; in FY 1998, 52%; in FY 2004, 26%; in FY 2005, 23%. When one considers that UMKC's external funding is very low compared to other research universities in the 12 heartland states, and that its $200 million endowment contributed only about 3% of its operating budget; it is easy to see why UMKC's tuition levels are high, its faculty salaries low (about $4000 less than its peers) and funds to support innovation are hard to come by. This is a big disadvantage in faculty recruiting, especially at the younger levels.

Public university systems under severe financial stress, as the UM-system clearly is, are not likely to make the investment necessary to build substantial research capacity on a campus other than the flagship campus. Thus, the status quo and business as usual is not a foundation on which Kansas City can rest any realistic hope that UMKC can become a first rate research university. Kansas City needs to understand that this is not unusual.

Nationwide it has been uncommon for the newly established public urban universities that cropped up in many cities during the 1960s and 1970s to develop first-class research university capacity. Most of these new, or newly absorbed, public urban institutions had aspirations to follow the path of UCLA. But only California, with its uniquely prestigious UC system, and its huge population and resources, managed that feat multiple times. In populous New York, the SUNY system accomplished the feat twice at Stony Brook and Buffalo, and it appears likely to pull it off a third time at SUNY-Albany, where the university and the region have benefited from a $1 billion state investment in nanotechnology. The four other cities that took public urban campuses to a high level were Chicago, Birmingham, Dallas, and Cincinnati. In all of these instances, the strategy was to build research capacity around strong urban medical centers. In all, moreover, determined civic leadership and philanthropy played a decisive role. But these are the exceptions, not the rule. As Graham and Diamond put it:

> "The evolution of public research universities in America has been a slow, Darwinian process in which the dominant flagship campuses developed formidable defenses. Most challengers spent much of their energy on the struggle for survival."

If Kansas City believes that it needs first-rate research university capacity, it cannot realistically look to the state of Missouri and the University of Missouri system to provide it. There are important ways the state and the UM-system can help, but the leadership, the strategic vision, and the bulk of the investment must come from Kansas City.

UMKC AS AN URBAN UNIVERSITY

For several reasons, it is harder to assess whether a

[2] See appendix.

university is a committed, engaged urban institution than it is to assess its research capacity. There are no R&D funding levels or publication indexes to fall back on. There is not even a clear definition of what an engaged, public urban university is. A number of urban universities offer interesting models. They range from large, world-class comprehensive research universities such as UCLA, to medical-research centered institutions such as UA – Birmingham, or U-Illinois – Chicago; to vast multi-campus enterprises like CUNY. The Kellogg Foundation recently issued a thoughtful report on how the public, land-grant model of the nineteenth century needed to be manifest today in the urban public research university.

> "Engaged institutions will produce graduates who will be ready to move along a path of self-directed learning and growth. These graduates will understand the connection between what they have learned in the classroom and the strategies that are necessary to apply these concepts to problems they will face in their careers and in their communities. They will be the product of 'interactive universities' which have developed partnerships with civic, business and political leaders to build better communities."

The task force believes that the most important responsibilities of an engaged urban university in Kansas City would include the following:

1) Providing the research capacity needed to drive the regional economy
2) Serving as a magnet for talented students and faculty
3) Expanding educational opportunity for underserved and disadvantaged groups, especially minority groups and the poor
4) Providing educational opportunity for adults and students who work and have families
5) Engaging deeply in K-12 public education to improve urban public schools
6) Enriching and providing the educational foundation for the arts
7) Providing educational capacity to all the city's important professional groups
8) Focusing on work force preparation
9) Applying expertise and hands-on solutions to the city's most pressing problems
10) Bringing energy and vitality to the urban core.

There is no doubt that UMKC has the ambition to be an engaged urban university. In its 1999 self-study prepared for its reaccredidation, UMKC describes its central vision to be "a premier comprehensive urban university bettering people's lives and tomorrow's communities and seeks to be a national model for contemporary urban higher education by the year 2005." The self-study went on to say that "accomplishing such goals, in an era of unprecedented competition for funding resources, means tackling complex university challenges with a fresh eye, an entrepreneurial spirit, a willingness to forge new partnerships, and an unfailing commitment to quality and effectiveness."

Unfortunately, since those words were written, UMKC has not been able to coalesce around the leadership or a coherent strategy for making the stated vision a reality. Indeed, the effort to fashion such a strategy caused a convulsion. There is engagement with the city by individual faculty and students, but with a few notable exceptions, the various important elements of the Kansas City community do not perceive UMKC to be engaged creatively with the city at a strategic level. On the contrary, the most common description this task force heard about UMKC from various elements of the city was that UMKC was disengaged and apart. This view seemed especially strong in the African-American and Latino communities.

The major exception to this perception is the arts, where UMKC is seen as a strong educational partner and a source of artistic talent and excellence. It is no accident that the areas of UMKC's highest academic excellence are the areas of UMKC's most successful collaborations with the city. In music, dance, and theatre UMKC is living up to its vision to be a model for urban higher education. In the visual arts and history of art there are also successful collaborations with the Kansas City Art Institute, the city's excellent museums, and its artists. This is an important strength for UMKC both in building its capacity as an urban research university of quality and in becoming an engaged institution. Universities such as Yale, UCLA, USC, and Indiana have demonstrated that excellence in the arts can be a foundation for building broader academic excellence.

Other areas where UMKC has developed successful engagements with the urban community are in clinical care, medicine and dentistry. The Law School and the Bloch School are also seen as strong urban partners in a number of ways. Also, UMKC established a Center for the City in 2001 to coordinate faculty and student participation in community projects. This Center has a lot

of potential, but it is not independently funded and it is not clear whether its role will flourish in a time of financial stress. UMKC also has developed a creative "students in the city" program in which students get credit for service learning engagements in the community. In 2004, 739 students participated in 33 different civic-engagement courses.

Beyond these strong examples of urban engagement, almost all elements of the Kansas City community perceive UMKC as disengaged. An extreme example is K-12 public education in Kansas City. We could not find a single superintendent of any public school system in the metro area who believed that UMKC was effectively engaged with urban K-12 education. Indeed, most believed that the School of Education was not able to or even interested in preparing teachers for the special challenges of urban K-12. We are aware that the school has embarked on the Institute for Urban Education, and recruited the first cohort of future urban teachers. This is a good first step, but UMKC needs to demonstrate that it can sustain the effort. We have no doubt of the sincerity of the school's leaders, but it is in UMKC's and Kansas City's interest to confront candidly the fact that K-12 leaders are dubious that much will come of the effort. Astonishingly, many K-12 leaders in Kansas City believe that both Northwest Missouri State and Central Missouri State are far more interested in public education in Kansas City than UMKC. We take these views with a grain of salt because it is commonplace for K-12 leaders to criticize the lack of engagement of schools of education. But even if there is an element of exaggeration in these reports, the perception that UMKC is neither engaged nor particularly interested in urban public education in the city that is its home is devastating to the university's effort to be seen by the community as an engaged university making a positive difference for Kansas City. K-12 is the aspect of the city with which UMKC should be most, not least, engaged.

C. THE UNIVERSITY OF KANSAS (KU) AND THE UNIVERSITY OF KANSAS MEDICAL CENTER (KUMC)

"Nothing is more revealing than movement."
Martha Graham

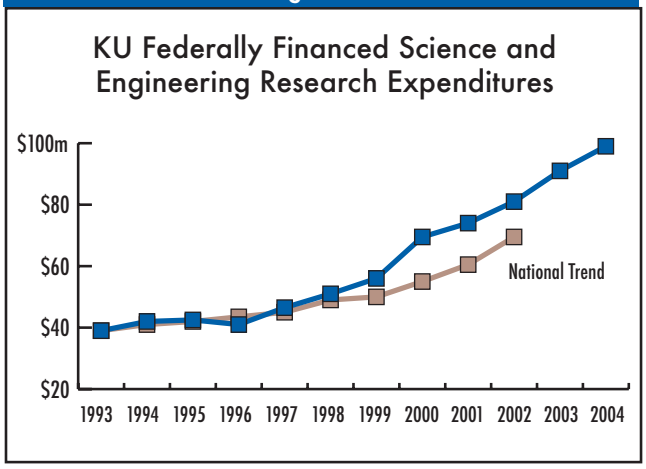
KU

The University of Kansas is a good research university that has been steadily building its research capacity for the past two decades. It has been a member of the AAU since 1909. U.S. News ranks KU 42nd out of 162 public universities. Among all universities, private and public, KU ranked 87th in federal R&D funding in 2003. This is a pretty good proxy for measuring research strength in the sciences. KU's undergraduate programs are well-respected. Its freshmen in 2004 averaged 24.3 on the ACT (the national average is 20). It has a strong honors program of some 1500 undergraduates whose ACT scores averaged 31. About 27,000 students attend the main campus at Lawrence, Kansas, a city of 80,000 residents about 40 miles west of the center of Kansas City. Three-quarters of the students in Lawrence are undergraduates; the remaining 25 percent are graduate or professional students. About one-third are from out of state. In FY 2005, resident tuition was $4,737 and for non-residents was $12,691.

In 1899, KU decided to locate its medical center in the heart of Kansas City, just a few feet west of the state line that bisects the city. The KU Medical School serves some 240 graduate students, 700 medical students, and 630 medical residents. The faculty includes 147 in the basic sciences, 43 in clinical research, and 289 in clinical practice. A School of Allied Health, serving some 400 students, and a School of Nursing, serving some 450 students, are also located at the medical center. KU's excellent School of Pharmacy is located on the Lawrence campus: it ranked 2nd nationally in NIH funding in 2004. Including the medical center, KU has a larger emphasis on graduate education than most public flagship universities.

KU has been beefing up its research capacity for some time. In the 1950s, under the leadership of Franklin Murphy, who went on to transform UCLA, KU put its highest priority on research and graduate education. This has continued to the present. Graham and Diamond identified KU as one of 21 "rising public research universities", based on gains relative to other universities

Figure 13



in the 1970s and 1980s in the institution's per-capita faculty productivity. KU has continued this momentum to the present. In 1993, all R&D expenditures at the Lawrence campus and at KUMC totaled $102.7 million. Ten years later, that figure had increased to $257.9 million. Federal R&D funding, a good measure of quality because it is rigorously awarded by peer-review, grew even faster, from $49.1 million to $135.7 million, a 170 percent increase in the decade. From 2003 to 2004, federal funding increased 14.4 percent, to $155.2 million.

At the Lawrence campus, over 100,000 square feet of laboratory space has been added in the past four years, and construction of another 100,000 square feet is nearing completion. Plans are under way to expand research space at Lawrence by 50 percent in the next four years.

KUMC

"I'm amazed at the number of great scientists you've been able to recruit." **Elias Zerhouni, Director, NIH, speaking at KUMC in 2005**

The KU Medical Center, located near the center of Kansas City, has played a big part in the University of Kansas' momentum. Since most of the basic science research takes place at the School of Medicine that is the focus of our discussion of KUMC. In FY 2005, funded research amounted to $76 million, with NIH funding of $40 million. KUMC has roughly doubled its overall R&D and its NIH funding over the past six years. It has the capacity to double its R&D funding in the next four years and again in the four years after that, if it receives a strategic investment of the kind we recommend in section VI.

To put these numbers in perspective, KUMC currently ranks 77th in the U.S. among all medical centers and 47th among public university medical schools in NIH funding. The 25th ranked among public medical schools, UC-Davis, has about $85 million in NIH funding this year, and the 25th ranked medical center overall, Mt. Sinai-New York, has about $160 million in NIH funding.

Unlike most medical centers, which get the bulk of their external funding for clinical research, KUMC's research strength lies in basic science. KUMC's basic science departments rank much higher in research funding than its overall ranking. For example, the Department of Anatomy and Cell Biology ranked 19th among all such medical schools departments in NIH funding with over $11million of grants in 2005 and ranked 11th among public medical schools. Similarly, Physiology was 42nd (25th among publics), and Microbiology, Virology and Immunology was 45th (27th among publics). Thus, in basic science KUMC is already among the top 50 medical schools. This is extremely important to note in assessing KUMC's capacity to be a strong research collaborator with Stowers, which focuses on the most fundamental life science questions: how genes and proteins regulate cells.

The School of Medicine has transformed itself in the last four years. Of 511 full time faculty in the School, 262 have been recruited in the last four years. Moreover, 122 of the new recruits are new positions, including 36 new positions in basic research and 29 in clinical research. In all, 147 faculty are in basic science departments. The School has managed this extraordinary growth by changing its faculty culture to require much higher percentages of faculty salaries to be carried on grants and clinical income. External R&D funding tends to lag new faculty recruitment by three years, so the School can expect to see significant increases in its NIH and other R&D funding in the next few years.

The School of Medicine has demonstrated a growing ability to recruit high-quality senior research faculty. Recent recruits include established researchers from such excellent medical centers as Duke, Vanderbilt, Emory, UCLA, NIH, Baylor and Tufts. With the growing reputation of Stowers and its own strong momentum, the task force believes KUMC can attract a more and more competitive faculty and PhD student cohort, comparable in

Figure 14

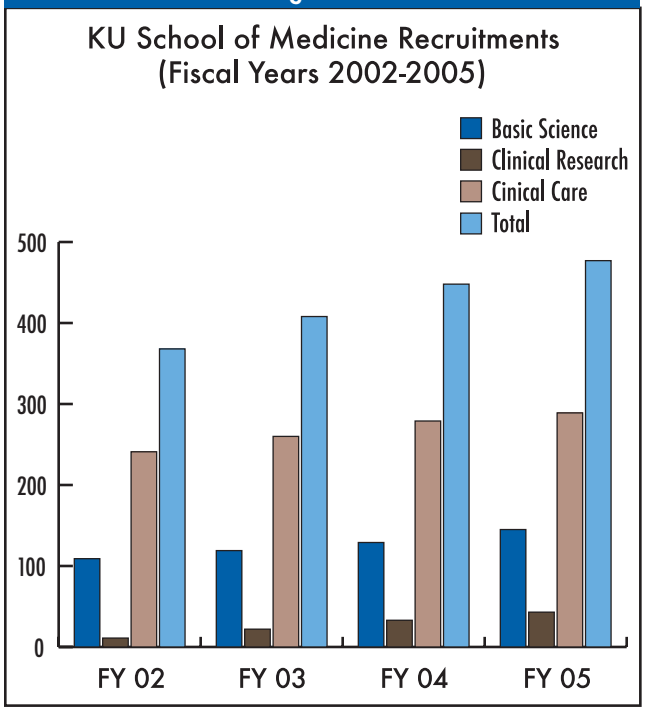
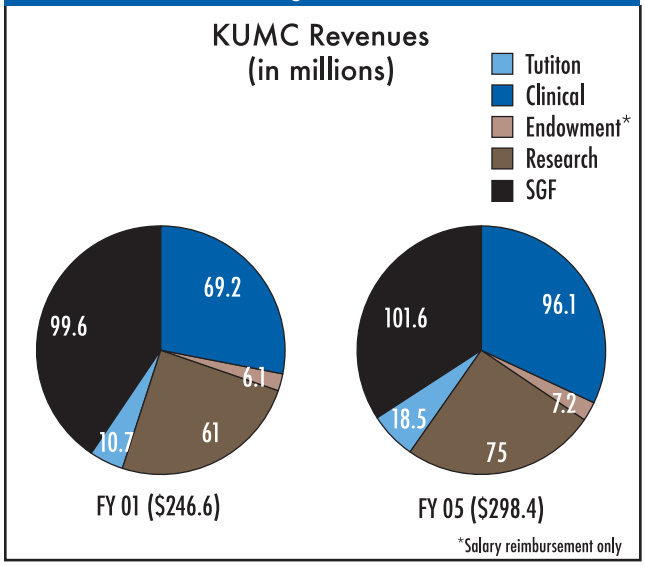


Figure 15



4-5 years to those found at the country's top 30 medical centers. This is the standard of quality needed for strong collaboration with Stowers.

Kansas is generous in its public support for KUMC. Even though the "state general funds" portion of the KUMC's operating budget has only gone up one percent in the last four years, Kansas still ranks in the top ten percent of states in state support for its public medical center. The KU School of Medicine receives $70 million from state general funds. The national average for public medical schools is $44 million.

KU has a long tradition of strong leadership. The leaders of Kansas' public universities report directly to the Board of Regents, with no executive layer in between. The university benefits from having a strong, private endowment board. At present, both the University of Kansas as a whole and KUMC have strong, tested leadership. They have robust and realistic strategies for the next five and ten years, and they have shown the capacity to execute in the past. In universities and especially medical schools, momentum counts for a lot. Both KU and KUMC have momentum, and it should build, not wane, over the next decade if the University gets the support it deserves.

The two serious clouds on the horizon for KU lie in its eroding state support and in the threat of restrictive stem cell research legislation. For two decades, inflation-adjusted state appropriations have steadily declined. From 1994 to 2004, appropriations per FTE student declined by almost ten percent in inflation-adjusted dollars ($6,100 to $5,600). Kansas is struggling with a judicial mandate to increase public K-12 education spending; even so, from 2004 to 2005, appropriations for public higher education increased by 5.5%. The state now provides about 30% of the KU operating budget. It should be noted, moreover, that Kansas devotes twice as much of its general tax revenues to public higher education than does Missouri (5.6% compared to 2.8%). Moreover, since 2001, state appropriations have been separated from tuition revenue, which the University "owns". Also, in 2004 Kansas passed a ten-year $500 million life sciences initiative which can be used for facilities and start-up funding for outstanding researchers. There will be political pressure to spread this money around the state, but the fact that the most productive, highest-return use of this investment would be at KUMC should result in substantial funding being focused there. We will discuss this further later in this report.

IS KU KANSAS CITY'S RESEARCH UNIVERSITY?

In its Initiative 2001 strategic plan, one of the top four strategic priorities stated for the University of Kansas was: "Be the Research University for the Greater Kansas City area (added at the conclusion of the initial planning process to recognize KU's role in the Kansas City Area Life Science Institute)". It is a strategic question of great significance how far Kansas City can look to KU-Lawrence for the higher education research capacity the city will need to flourish in the 21st century.

Obviously, the University of Kansas Medical Center is a core Kansas City institution. Although not "downtown," it is located near the geographical center of the city and is a ten minute drive from Stowers and the KC-MO hospitals. In 1993, KU opened its Edwards Campus in the southwestern part of Kansas City, about one mile from Johnson County Community College. The Edwards Campus is geared to programs for working adults and offers undergraduate and graduate courses in 25 programs ranging from graduate engineering and education programs and the MBA to undergraduate majors in literature, molecular biosciences, public administration and social work. The Edwards Campus and JCCC have worked out a creative collaboration under which undergraduates take their first two years at JCCC and transfer with full credit to baccalaureate programs at Edwards. In return, Edwards' students in molecular bioscience get to use JCCC's excellent laboratories and other facilities. The Edwards Campus is still relatively small, with about 2,000 students, but it is slated for expansion. Last year, 74% of the students worked full-time, half were married,

and the average age was 32. Whether KU would ever decide to center any major graduate and research programs at Edwards, as it decided a century ago to do with KUMC, is obviously a question of considerable importance to Kansas City. If KU were to decide to locate most or all of its bioengineering and bioinformatics at the KUMC, and to take its engineering programs at Edwards to a level of parity with its engineering programs at Lawrence, Kansas City would benefit greatly.

KU has recently held talks with community leaders in Johnson County, Kansas to explore the possibility of a two-mill property tax levy in the County to fund a significant expansion of the Edwards Campus. If this kind of property tax funding authority were used to create a major research presence in science and engineering at the Edwards Campus, the benefits for Kansas City and the entire region would be substantial.

A question of great importance for Kansas City is how well KU's graduate and research programs at Lawrence fill the city's needs for the presence of a high quality research university to drive the economy and vitality of the city. There is no question that Kansas City benefits greatly from the growing research capacity of KU-Lawrence. But there are many important functions that a great urban university located in the heart of Kansas City could serve that KU-Lawrence is too far removed to provide effectively. Bench scientists collaborate most effectively face-to-face. Faculty and PhD students need their classrooms, labs, and libraries in close proximity.

Certain kinds of simple academic collaborations can work well at a remove, but most work much better in the spontaneity and creativity of close juxtaposition. It is telling that every Stowers researcher with a joint appointment at KU has it in a department at KUMC, not at Lawrence. Likewise, all the KU PhD students working in Stowers Labs are based at KUMC, not at Lawrence.

The Lawrence campus is not a convenient option for non-traditional students from Kansas City who have families, jobs, and other responsibilities. For such students convenience can equate to viability. Faculty and students at a campus 40 miles from the city center are less likely to become immersed in urban affairs than faculty and students who live and work in the heart of the city. KU-Lawrence does not have the deep, visceral sense of being rooted in the city that comes from location in the heart of the city. We can think of no other cities in America that consider a university 40 miles from the urban center to be their university. That is not how New York City thinks of Princeton or SUNY-Stony Brook. Denver is planning a major expansion of the University of Colorado's research university presence in the heart of the city because Boulder, only 30 miles away, does not give Denver what it feels it needs by way of a great urban research university. Ann Arbor is only 30 miles from downtown Detroit, but no one thinks of the University of Michigan at Ann Arbor as Detroit's urban research university. That responsibility is carried by Wayne State.

Finally, KU-Lawrence is not able to contribute much life and excitement to the urban core, and its capacity to bring human capital to Kansas City is not what it would be if it were located in the city. We repeat, because we do not want to be misunderstood on this point, that KU-Lawrence is a very valuable asset for Kansas City and it deserves the city's strong support. But there are many advantages of a great urban research university that KU-Lawrence does not provide.

D. OTHER INSTITUTIONS

There are over fifty post-secondary institutions in the Kansas City metropolitan area. A number of these are excellent institutions that make a vital contribution to the vitality of Kansas City. We have already mentioned the community colleges which serve some 65,000 students. Others worth noting include:

- Kansas City University of Medicine and Biosciences, a school of osteopathic medicine which has recently added a bioscience research agenda to its mission. Its research activities are in their early stages (it has had several hundred thousand dollars of NIH grants over the past four years) and it serves 900 students. This school has recently created a two-year masters program in biomedical sciences, which will prepare students to be research associates or to continue in doctoral programs.
- Park University, originally established in the heart of Missouri in 1875, has campuses downtown and in Independence that serve over 9,000 students in day, night, and weekend programs. Park is the largest provider of online education to the military. It is one of the top 100 universities in graduating African-American and Latino students.
- William Jewell College is a top-notch small liberal arts college serving 1,300 students. It wins many awards for its programs, and makes a big contribution to Kansas City's performing arts scene.
- Baker University, the oldest college in Kansas, is a strong baccalaureate and masters university serving 3,000 students.

- Rockhurst University, one of the country's 28 Jesuit universities, offers high quality baccalaureate and masters programs to 2,700 students.

All these institutions and others not named are important and worthy of support. But in terms of the two great higher education needs of Kansas City, much greater research university capacity and a deeply engaged urban institution with the scale to tackle the city's biggest problems and opportunities, the two institutions on which to build are the University of Kansas Medical Center and UMKC.

E. KANSAS CITY HOSPITALS

We close our overview of higher education with some brief comments about Kansas City's excellent hospitals because they represent an important element in the city's research capacity in the life sciences and medicine. The hospitals need to play a central role in building an integrated, two-state metropolitan life sciences strategy on all available institutional foundations.

A significant amount of specialized clinical activity and related patient care takes place on the Missouri side: at St. Luke's located near the Plaza and at the hospitals on Hospital Hill, Children's Mercy, and the Truman Medical Center. As previously discussed, KUMC is unusual among medical schools having more than three times the number of basic scientists (147) compared to clinical researchers (43) on its faculty. Thus, Kansas City's dominant medical school basic science research activity at KUMC is separated institutionally and by the state line from powerful centers of clinical research and care. This separation must be overcome.

The singular vision of the UMKC Medical School, with its lack of research, has led the Kansas City, Missouri hospitals to develop research capacity of their own. The hospitals need to be recognized as significant elements in Kansas City's life sciences and medical research strategy. Moreover, one of the prime objectives of the integrated, two-state metropolitan strategy must be to align elements of KUMC's basic and clinical research capacity with the centers of clinical research and care at St. Luke's, Children's Mercy, and the Truman Medical Center.

THE UNIVERSITY OF KANSAS HOSPITAL

KU Hospital will play an important role in KUMC's life sciences and medical research mission. Although the hospital is an independent authority, it works well as an integral part of the KUMC in the usual way that university-affiliated teaching hospitals work hand-in-hand with medical schools on medical education, clinical research, and patient care. In 2005, KU Hospital managed 393 active clinical trials, $11.5 million of research contracts were awarded, and $4.9 million received. The major areas of research emphasis are neurology, hematology, oncology, gastroenterology, and cardiology.

KU Hospital has 475 beds, with 88 more opening in the fall of 2006. The hospital is growing in both physical presence and in patient care. The hospital has purchased 17 acres of land adjacent to the main campus to accommodate growth. Since 1998, total hospital inpatient volume has grown 48 percent.

The hospital has also expanded its Cancer Center in 2006 from 11,000 to 26,000 square feet. At the same time, the outpatient volume for cancer has grown 171 percent since 2001. The hospital uses a multidisciplinary approach to meet the needs of its patients. Favored by the National Cancer Institute (NCI), this approach organizes physicians, such as specialized oncologists, radiologists and surgeons, to work together with the patient.

In addition to its growth in cancer programs, it has also made significant advances with its heart program. Next fall, the program will move into a new 238,000 square foot Center for Advanced Heart Care and it is expanding its work with basic scientists on campus.

As the KUMC beefs up its research capacity, it will need to continue its work with KU Hospital and reach across the state line to leverage all available resources.

ST. LUKE'S HEALTH SYSTEM

The St. Luke's Health System includes the main hospital in Kansas City, Missouri and nine smaller hospitals located across Kansas and Missouri. St. Luke's research emphasis is on translational and clinical research projects; there are currently 228 active research protocols underway. The primary areas of clinical research are heart disease, stroke and other brain diseases, and cancer care. In NIH funding, St. Luke's ranked 85th among the nation's hospitals with $353,000 in FY 2002. In 2005, its NIH funding is $500,000.

St. Luke's has a significant emphasis on cardiovascular research through its Mid-America Heart Institute (MAHI), which won a Malcolm Baldrige National Quality Award in 2003. MAHI's research budget is $5 million per year. It focuses on outcomes, vascular biology for diabetic patients, and cardiovascular imaging. There are currently 120 ongoing clinical trials.

St. Luke's is the lead institution for the largest NIH grant in the country dealing with patient outcomes

following cardiovascular surgery. St. Luke's cardio-outcomes database goes back over two decades, covers 25 major clinical centers across the country, and is the richest database in the U.S. In this project, St. Luke's is working with basic science researchers from Washington University and Yale who conduct gene typing and biomarker analysis of blood samples from the patients in the study. This promising research seems likely to reveal genetic markers for heart disease which can lead to the development of beta blockers that target these markers.

St. Luke's also has a focus on brain research through its Mid America Brain and Stroke Institute. It is one of five national sites for trial testing the first electronic device for reversing acute stroke. St. Luke's has the highest level of stroke reversal of any hospital in the U.S. (UCLA is second). There are ten clinical trials in stroke care underway, and plans are in place for research protocols for multiple sclerosis, migraine headaches, epilepsy, and Alzheimer's.

Finally, St. Luke's has established a Center for Innovation and Research that is an incubator and interface between its clinical research activities and other R&D activities in the region.

CHILDREN'S MERCY HOSPITAL

Children's Mercy Hospital, located on Hospital Hill, is one of the nation's best pediatric hospitals. In FY 2002, Children's Mercy had $3.7 million in NIH funding, placing it 40th among all hospitals and 12th among children's hospitals. Last year, total research funding was roughly $9 million, and focused on neonatology, juvenile diabetes, pediatric cancer, kidney disease, genetics, and pharmacology. In the past five years, Children's Mercy scientists have received three patents. In 2004, researchers published 159 papers in scientific journals. Most of the researchers hold faculty appointments at the UMKC School of Medicine. Children's Mercy obviously has a substantial role to play in Kansas City's life sciences and medicine strategy.

THE TRUMAN MEDICAL CENTER

The Truman Medical Center is Kansas City's general medicine hospital for adults. It serves the largest and most diverse population of patients. The Center has 247 acute care beds and admits 12,000 acute care patients yearly. The Center's emergency room has 55,000 visits annually and last year the Center cared for more than 800 trauma patients. The Center's medical staff of 330 doctors are virtually all faculty members of UMKC Medical School.

The Center has no NIH grants although it participates in clinical research grants administered by UMKC. The Center does conduct industry-sponsored clinical trials focusing on general medicine areas such as diabetes, hypertension, asthma, pulmonary disease, women's health, and heart disease. It also runs trials in emergency room medicine and trauma.

V. Building Research Capacity

"We wish to suggest a structure of the salt deoxyribonucleic acid (DNA). This structure has novel features which are of considerable biological interest."

Francis Crick and James Watson, "The Double Helix", *Nature* (1953)

"One of the great things about science is you make a little opening and a lot of smart people out there see how it can help them solve their problems, of many of which you aren't even aware. The applications create ripples and then the whole thing explodes"

Paul Berg, 1993 interview quoted in Frank Rhodes, *The Creation of the Future* (2001)

A. LIFE SCIENCES FIRST

The research capacity Kansas City most urgently needs is in the basic life sciences. This is the only broad scientific research area in which Kansas City has significant capacity today and, because of Stowers, it is the research area that Kansas City can build to the highest levels of quality. Moreover, because such a large percentage of life sciences research is externally funded, it is the area of basic science in which Kansas City can get the largest and fastest return on investment. UC-San Diego, Washington University in St. Louis, UA-Birmingham and a number of other universities have demonstrated that with leadership and bold investment a strong life sciences university can be sustained largely with federal dollars. For the coming half-century, moreover, the life sciences is the area where advances in knowledge hold the greatest promise for our understanding of ourselves and the world, for advancing human and animal health, and for driving economic prosperity. The life sciences will almost certainly be for the first half of the 21st century what physics was for the first half of the 20th century, and what the information sciences were for the second half. Thus, the answer to the question-in-chief in strategic planning—what is the highest priority—seems rather clear.

To be a great life sciences research center requires building research capacity in a number of cognate areas. The biological sciences are rapidly converging with computer science, mathematics, statistics, and the full range of information sciences. The completion of the initial sequence of the human genome, combined with dramatic improvement in imaging tools and exponential advances in information technology, allow scientists wholly unprecedented avenues to understand the genetic and molecular mechanisms causing disease. Scientists now have a window into how the roughly 3 billion base pairs in the DNA strands of a single human cell trigger the production of proteins that regulate cell expression. Observation at this level yields huge data sets that require for understanding the joint efforts of mathematicians, computer scientists, information technologists, and life scientists working together. The convergence of bioinformatics, genomics, and proteomics is transforming the biological sciences. To take a homely example, The New York Times reported in August 2005 that genetic analysis of one gram of soil, which for decades scientists have thought contained roughly 10,000 different species of bacteria, was found to contain roughly one million different species.

The revolution in the biological sciences has opened up the vastly productive fields of technology and nanotechnology. The ability of scientists to construct a recombinant DNA molecule, containing parts of DNA from different species, has opened up possibilities of genetic engineering that will almost certainly lead to

genetic cures for many diseases. It is no wonder that bioengineering has been the fastest growing branch of engineering in American universities since 1990. Biotechnology has spawned a vast and thriving entrepreneurial sector. Experts estimate that the biotechnology industry will grow to become the size of the computer industry.

Breakthroughs in nanotechnology are also driving the life sciences to a convergence with computer science, mathematics, the physical sciences, and engineering. To study nature at the nanoscale, and to have the ability to build new molecular structures for all kinds of purposes, calls on the knowledge of many disciplines. An atom is an atom, whether it is being observed or manipulated by a physicist, a biologist, a chemist or an engineer. Electrical engineers working at the nanoscale are looking to the superiority of structures from nature whose molecules, proteins, DNA and antibodies contain in effect their own assembly instructions, which are far more efficient and versatile than any human-made structure engineered top-down. By the same token, medical researchers are designing nano-electrical structures that have revolutionary medical potential—for example, structures can be "planted" in retinas to give persons who have lost their sight the ability to discern light and shapes, bring hearing to the deaf, control and distribute insulin and, even, attract coral larvae to propagate new ocean reefs. These investigations require teams of molecular biologists, materials scientists, electrical engineers, software designers, and many other disciplines. The extraordinary potential of the field makes it easy to understand why most of the leading university research centers are investing heavily in nanoscience capacity.

Cities that have built significant basic research capacity in the life sciences have found that harvesting the economic benefits requires a significant investment in translational research and in the entrepreneurial pipeline that can move discoveries from the laboratory to the market. This is a complex undertaking different cities have approached in different ways. We will discuss this aspect of Kansas City's life sciences strategy in a separate section.

B. OTHER SCIENCE AND ENGINEERING

The other areas of scientific research capacity Kansas City would benefit from are telecommunications, the information sciences, and engineering. Creating education and research capacity in these areas would reinforce Kansas City's leading industries and stimulate new business to come to the city. However, in contrast to the life sciences, where there are multiple foundations on which to build, there is currently very little institutional activity in these areas. This is odd, since one would have thought that the strength of Kansas City's telecommunication, information systems, and engineering sectors would have led to academic concentration in these areas. This has not happened.

A central strategic question therefore is whether Kansas City can pull together and focus the financial resources necessary to build to the highest quality in the life sciences, and still have enough capacity to build a research presence in these other fields. That an investment in higher education in these fields would pay Kansas City back many times over is not in question. External R&D funding is not as plentiful in these areas as it is in the life sciences, but external funding can still play a big role in building capacity. However, the political dynamics of Kansas City are not well-aligned to promote public investment even in such obvious public goods, so the question is likely to turn on philanthropic vision and capacity.

C. OTHER IMPORTANT RESEARCH CAPACITIES

A great city needs academic capacity that supports and informs the full range of its activities and aspirations. This calls for an academic center of excellence and depth in the performing and visual arts. Higher education activities in these areas can be a powerful force to attract and nurture the human talent which drives artistic excellence. Fortunately, Kansas City has strong educational capacity in these areas; but relatively modest investments would take the city's educational capacity in the arts to even greater heights. Those are well worth making. Excellence in the arts sends a powerful message of academic and civic vitality. The arts will be of increasing importance in attracting and keeping in Kansas City the young, talented professionals the city needs to flourish.

Other obvious areas where higher education capacity would benefit Kansas City are business and economics, especially in the areas of entrepreneurship and new business creation, and law. Kansas City has a large financial services industry and a heavy concentration of middle managers. There is a sizable legal community. Top-fifty business and law schools would bolster these important professions and be a magnet for talent. Finally, research capacity, strong professional training, and hands-on expertise across a broad range of urban affairs would be of great value to the city. Research capacity and involvement in urban public education would help Kansas

City address the crisis of educational opportunity for its growing African-American and Latino populations. This must be a central element in the city's higher education strategy.

D. THE UNIVERSITY AS A CIVIC ASSET

Apart from specific research and professional fields where higher education can invigorate cultural and economic vitality, a university which offers high quality undergraduate education across the range of the humanities, social sciences and natural sciences is a major civic asset. In this sense, Kansas City already enjoys great benefit from UMKC. Each year UMKC graduates roughly 2,500 students, 1,000 with basic undergraduate degrees, along with roughly 100 physicians, 85 dentists, 60 pharmacists, 20 nurses, 140 lawyers, 150 MBA's, 100 teachers, 500 additional master's degrees, and 90 PhD's. Seventy percent of these graduates remain in the metro area. UMKC ranks 21st among metro area employers with 2,100 full-time and 1,500 part-time employees. It is particularly valuable because it is located in the urban core.

If UMKC could enhance the quality and reputation of its undergraduate programs, it would attract to Kansas City a more and more talented group of students, many of whom would stay to enrich the city. Universities are assets that do not depreciate. Universities don't get bought and downsized. They don't get merged or move out of town. Universities are clean. They are a magnet for talented people, bringing vitality, safety, and dollars into the urban core.

In this report, we give priority to building research university capacity in the life sciences, the arts, the professions of medicine, law, and business, and urban education. But we recognize that UMKC has significant potential across the broad educational scope of its activities, including undergraduate education. The better UMKC becomes, the better it will be for Kansas City. The city should do what it can to help UMKC flourish.

VI. A Plan to Make Kansas City A World-Class Life Sciences Center

"Make no small plans. They have no magic to stir men's blood." **Daniel Burnham**

In building life sciences research capacity, quality is the most important thing. The only practical way Kansas City can sustain a serious life sciences enterprise is with the massive external funding, especially from NIH, that supports high quality research. Excellent graduate students are a very important component of the talent base that makes for research excellence. A robust, reliable long-term plan is essential. It is vastly more effective in building human capital, external funding, and research capacity to have a credible plan than to proceed ad hoc. A financial investment in research capacity that is long-term and predictable is far more valuable than an even larger investment that is sporadic and unplanned.

A sound life science strategy needs to address a host of issues:

1) What level of quality and scope of activity should be the goal?
2) What is the right balance of basic, applied, and clinical research?
3) What institutions should carry the strategy and what should be their relationship?
4) How should the strategy be phased?
5) What sort of institutional, scientific, and civic leadership will be required for success, and where will it come from?
6) What investment of money is required, when, and from what sources?

The task force believes that with the potential of the Stowers Institute, Kansas City's aspiration for the life sciences should be to become one of the top 20 centers of basic life sciences research in the country by 2015. In the decade after that, if Stowers remains focused in Kansas City, we believe that the city will have the opportunity to become one of the top fifteen life sciences centers in the U.S., if it wishes to make further investment. We believe the benefits of the first decade of investment will be so substantial that the city will want to continue the effort to build. These are ambitious goals, but they are achievable and well worth the necessary investment.

A. KANSAS CITY LIFE SCIENCES TODAY

The Kansas City Area Life Sciences Institute (KCALSI) estimates 2005 life sciences research expenditures in Kansas City at about $250 million This includes the roughly $50 million at the Lawrence campus, which in our view is not in Kansas City, although it is a very valuable part of the regional effort. $200 million is a modest level for a city of Kansas City's size, but the important fact is that life sciences research in Kansas City is growing fast both in quality and volume.

Stowers is currently at about $60 million in annual research spending, and it is just beginning to ramp up. Stowers is funded and organized to see research expenditures increase by 20-25% per year. Stowers is on

track to support research levels of roughly $150 million by 2010 and $300 million by 2015.

We are not sure that the civic leadership of Kansas City fully grasps the extraordinary potential of Stowers. With an endowment of $2.5 billion today, we believe Stowers is already the largest endowment in the world devoted to basic life sciences research. Of Harvard's $25 billion endowment or Yale's $15 billion, no more than five percent, if that, is directed to basic life science research. Rockefeller University's endowment is $1.4 billion, Mayo's is $2 billion with much of that directed to clinical care. The Stowers endowment is already larger than the sum of all the research endowments in San Diego, including UC-San Diego, Salk, Scripps, and others. And the Stowers endowment is scheduled for major growth, perhaps doubling or more in the fullness of time.

A snapshot of Rockefeller University suggests where Stowers is headed. With over $200 million in annual research expenditures, Rockefeller supports 74 laboratories with more than 70 principal investigators, 186 additional research scientists, 355 postdoctoral investigators, 200 PhD/MD students, and 1,050 support staff. Rockefeller University's endowment, remember, is a little more than half the size of Stower's current endowment.

But the most significant aspect of Stowers is not its financial resources it is its quality. In hiring researchers, Stowers requires that an independent panel of world-class life scientists agree that the recruit is of a quality equivalent to Howard Hughes Medical Institute investigators. There are 341 of these nationwide. Yale, for example, has fifteen Hughes investigators and MIT has twenty-two. In short, they are the best of the best. Stowers has demonstrated its capacity to attract senior and junior researchers who are comparable in quality to the best young research scientists hired at the top ten research centers, places such as UC-San Diego, MIT, Cal Tech, Washington University, Yale, or the University of Michigan. The opportunity to collaborate with Stowers will give KUMC increasing leverage in recruiting top-quality researchers and graduate students, and can invigorate basic and clinical research at UMKC and the Kansas City, Missouri hospitals.

The data in Figure 16 is four years old, and cover all R&D expenditures. Life sciences and medical research tends to be about 75 percent of all R&D expenditures. One can assume increases in funding over the past four years of about 30-35 percent. Thus, the numbers above are a pretty good estimate of what those cities' life sciences research expenditures are for the current year. Therefore, if Kansas City can double its life sciences research expenditures in each of the next four years, it should break into the top twenty cities by 2015. That is the goal our strategic plan seeks to achieve.

Figure 16

The top twenty cities in university R&D expenditures in 2001 (the most recent year data is available) were:

Los Angeles	$1.25 billion
Baltimore	$1.24 billion
New York*	$1.0 billion
Boston*	$979 million
San Francisco	$971 million
Houston	$716 million
Chicago	$685 million
Madison	$627 million
Ann Arbor	$620 million
Seattle	$589 million
San Diego*	$556 million
Stanford	$482 million
Philadelphia	$469 million
St. Louis	$466 million
Minneapolis/St. Paul	$460 million
Davis, Cal.	$432 million
College Station, TX	$407 million
Urbana-Champagne, IL	$390 million
Columbus, OH	$375 million
Durham, NC	$375 million
Kansas City	**$ 65 million**

* Would rank much higher if independent research institutes or independent hospital R&D expenditures were added

B. STEP 1: BUILD BASIC LIFE SCIENCES AT KUMC

We recommend a ten-year strategy to build basic life sciences research capacity at KUMC. The essence of our strategy is to add 100 high-quality researchers, to double the size of KUMC's PhD program from 100 to 200 students, and to increase external R&D research funding at KUMC from its current level of $76 million to roughly $300 million by 2015. We also recommend creating significant bioinformatics and bioengineering programs at KUMC, with roughly fifteen faculty in each. KUMC has the scale, the leadership and the momentum to carry out such a plan successfully.

It is not our intention to bypass UMKC in a higher education life sciences strategy for Kansas City. UMKC has one area of exceptional basic science research strength in bone biology. This group is centered at the School of Dentistry, and includes faculty from the School of Medicine and the School of Biological Sciences. This group has a strong collaboration with Stowers and with researchers at KUMC. This group should receive the same sort of investment we recommend for the basic science departments at KUMC. Otherwise we recommend a basic science focus on KUMC.

We will discuss in the next section the important complementary role UMKC and the Kansas City, Missouri hospitals should play in translational and clinical research and trials. Moreover, UMKC's capacity in basic life sciences research should certainly be enhanced over the next decade. But UMKC needs time for its new leadership to engage with the faculty to develop a credible basic life sciences research strategy that has the support of the faculty in its various schools and that has a high probability of success. Only at that point would a significant investment in basic life sciences research at UMKC, apart from the bone biology group, make sense.

Two years ago a distinguished task force of life sciences leaders, led by Dr. William Danforth, the former Chancellor of Washington University, issued a report on what it would take to make UMKC a strong partner in building basic life sciences research capacity. The first recommendation of this report was that UMKC should recruit one or more leaders "to provide a vision and scientific direction for life science research as well as effective external relations and promotion of life science initiatives…. This new life sciences leadership must include a nationally visible researcher or research leader who would have credibility with bench scientists, university administrators and state and federal officials." This recruitment has not taken place.

Once leadership was in place and had developed a strategy of research focus, the Danforth Report recommended that 40 to 50 high quality research faculty be recruited over a 5-10 year period and that 20 graduate students be added in a joint graduate program with KUMC and Stowers. The Report also noted that approximately 320,000 square feet of research laboratories would have to be built. The Report did not recommend specific areas of research focus "because the scientific leadership in the community should define the program," but it recommended that resources be focused on no more than three or four research initiatives. The Report indicated that the costs of the program it recommended would be recurring costs of $5 million in year 1, building to roughly $19 million in year 10, and one-time costs of $48 million. Thus, if funded by private philanthropy with sufficient endowment to fund recurring costs, the total cost of the Danforth plan would have been approximately $430 million.

We have confirmed that the Danforth task force did not consider the question of where $430 million might best be invested to get the greatest return for Kansas City in life sciences excellence and productivity. The task force was commissioned by the Chancellor of UMKC to answer the question of what would be required to make UMKC a strong partner in basic life sciences research. It considered the question of where a major life sciences investment would best be focused in Kansas City to be beyond its mandate. The Danforth task force, moreover, did not consider the question if a philanthropic investment were available for UMKC, in what academic fields should that investment be made. It was given a different specific question to answer and it answered that question.

We agree with the general thrust of the Danforth Report, which is to invest in basic life sciences research capacity and to focus that investment. But we believe it is clear that KUMC can produce a much higher return on a life sciences investment in terms of quality and productivity than UMKC can at this time. A major investment in basic life sciences at UMKC is premature. UMKC needs leadership, a credible strategy, and sound governance to warrant a significant investment.

Because KUMC is a much stronger institution in the life sciences on which to build, our strategy is more ambitious than that set out in the Danforth Report. Moreover, we believe the state of Kansas is likely to be a more constructive partner in building life sciences capacity at this time than Missouri would be.[3] KUMC is Kansas' flagship medical center and has a history of strong state funding. UMKC Medical School is not the flagship, and its state funding is the lowest in the country. Moreover, Kansas has created a very creative $500 million life science investment fund that should have a major impact on life sciences in Kansas City.

Our recommendation that Kansas City invest in basic life sciences research capacity at KUMC carries with it important responsibilities for that institution. It must be, in the life sciences and medicine, "Kansas City's research university," to quote from KU's 2001 strategic plan. This means that KUMC must become an effective, proactive partner with the Kansas City, Missouri hospitals, with

[3]This may change in the future. Missouri passed a statute in 2003 requiring that 25% of its tobacco settlement money, starting in 2007, be put into a Life Sciences Research Trust Fund. If this plan is followed Missouri would have roughly $38 million per year to invest and might become a strong life sciences partner.

UMKC, with Midwest Research Institute (MRI), and with the translational research and biotech pipeline we discuss in the next chapter. The life sciences strategy we recommend will not work unless basic research, clinical research, translational research, and clinical care are aligned. This has not happened in the past. For whatever reasons, KUMC and the Kansas City, Missouri hospitals have had considerable difficulty working together. This has to change. There is simply too much at stake for turf battles, institutional insularity, or professional rivalries to stand in the way of working together.

We know this will not be easy. Civic leadership may have to assert itself and help to forge productive partnerships. Working together will benefit all of Kansas City's institutions. If Harvard, MIT, and Mass General can work together, if the University of Minnesota Medical Center can work with the Mayo Clinic, if Case Western can work with the Cleveland Clinic, then KUMC, UMKC, and the Kansas City, Missouri hospitals can figure out how to work together, as well.

C. A LIFE SCIENCES PLAN

The strategy we recommend to build basic life sciences research capacity at KUMC has eleven major elements, and divides into two phases of roughly six and four years. Because KUMC needs to build its clinical research and care capacity along with its basic science, we are combining the two to present a unitary institutional plan. The most important elements of the plan are:

1. Recruit an additional 30 senior faculty and 50 junior faculty over next five years. Add 20 senior faculty and 60 junior faculty in years 6-10. The balance of research to practice faculty should be roughly 2 to 1.
2. a) Plan and build a new basic science or cancer research center of roughly 255,000 sq. ft. in the next five years. Cost: $90 million.
   b) Renovate an additional 400,000 square feet of research laboratory facilities over next 5 years. Cost: $24 million. Build 220,000 sq. ft. ambulatory care facility in next five years. Cost: $70 million. Add 250,000 sq. ft. research facility in years 6-10. Cost: $100 million.
   c) Build a new academic teaching center for the medical school. Cost $44 million
3. Fund competitive start-up costs: $3.5 million for each new senior research faculty; $800K for each junior researcher and each clinical practitioner.
4. Achieve comprehensive cancer center designation if possible by 2012.
5. Double PhD program by adding 100 students over next five years. Improve stipends to competitive levels for all PhD students.
6. Add 40 post docs.
7. Double overall R&D and NIH funding in next five years. Double again in years 6-10.
8. Work with KU, Stowers, UMKC, MRI, UM, other universities to create top 25 bioinformatics research and PhD program.
9. Work with KU, UM, other universities to create high-quality bioengineering program.
10. KUMC should take the lead in creating a consortium to focus on comparative medicine, animal health, bio-terrorism, and agro-terrorism. This consortium should build on K-State's strong animal health programs, K-State's research efforts in bio-terrorism and agro-terrorism, UM-Columbia's strong School of Veterinary Medicine, MRI's epidemiology and biostatistics capacity, and the region's strong private industry in animal health.
11. Create strong alliances with St. Luke's, Children's Mercy, Truman Medical Center, and UMKC to align KUMC with Kansas City's clinical and translational research centers.

If this plan is implemented, Kansas City should be among the top 20 life sciences centers in the country by 2015. Stowers will have a robust collaborator in KUMC that is one of the top 25 medical centers in basic life sciences and one of the top 50 in R&D generally. Kansas City's hospitals will have stronger basic sciences research collaboration than ever, and can align their clinical research and clinical care programs most productively.

We will briefly discuss each element of the plan, including costs and funding mechanisms, and offer some thoughts on financing strategies. We wish to repeat a point that we have emphasized before: the most essential element in the strategic plan to move KUMC to a new level is the talent of the people brought in at all levels, from PhD students to senior faculty. With the presence of Stowers, KUMC has a chance to compete with the best, for the best, but it must be able to equal the research and financial incentives offered by the best medical centers to succeed.

ACHIEVE COMPREHENSIVE CANCER CENTER DESIGNATION

KUMC has put a high priority on achieving Comprehensive Cancer Center (CCC) designation from the National Cancer Institute within 6 years. This is central to

its strategy to make KUMC a world-class medical center.

Some have questioned whether this should be KUMC's first priority in view of its low level of clinical cancer care. The CCC issue highlights the need for KUMC to forge strong alliances with the Kansas City, Missouri hospitals to broaden its clinical capacity and to create the strongest possible alignment of basic research with translational and clinical capacity. This task force is neutral about whether CCC designation should be the first priority, or should become a longer-term objective within an overall strategy of building basic and clinical research capacity. We present the Cancer Center first because the KUMC's leadership holds it currently as a first priority. There must be a rigorous assessment of whether CCC designation is likely and timely and of the clinical base in cancer care that is necessary to achieve it. It should be recognized that the quest for CCC designation can energize and focus KUMC's drive to become a world-class medical research center even if the designation does not come as quickly as KUMC might hope. We also note that there are many examples in other states of how the quest for CCC designation has energized politicians to support the effort. It is a worthy enterprise and one the public can rally around.

If the designation occurs, Kansas City will be one of the thirty-nine American cities with CCC designation (there are 60 CCC's nationwide). Center designation will bring $40-50 million in additional NIH funding. It will be a critical element in enhancing the reputation of KUMC, giving a serious lift to both faculty and student recruitment. Since the Center will collaborate closely with all Kansas City's hospitals, it will enhance the reputations of Kansas City's major hospitals for quality clinical care. Cancer is probably the weakest area of clinical care currently at Kansas City's otherwise strong hospitals.

KUMC has recruited a strong leader for the CCC effort, Dr. Roy Jenson, who played a leading role in Vanderbilt's CCC designation. KUMC and Dr. Jenson need to recruit three senior deputies to provide leadership in basic science research, clinical programs, and drug discovery and development. Stowers has agreed to fund and help recruit the basic science research leader. All three need to be of the highest quality. In addition to leadership, the other vital elements are faculty recruitments and building a state-of-the-art Cancer Research Center. KUMC needs to enhance significantly its cancer research and clinical care base to reach a critical mass of talent for CCC designation. Ten new senior faculty, mostly in clinical research and care need to be recruited, and roughly 25 new junior faculty need to be added to strengthen basic science research. Alliances must be also created with Kansas City, Missouri hospitals.

After a two or three year start-up period during which KUMC must carry their salary and laboratory start-up requirements, research faculty cover 80-90 percent of their continuing costs with their grants. Senior research faculty start-up costs vary considerably depending on laboratory size and equipment requirements. In the past three years, senior faculty start-up costs at KUMC have averaged $3.275 million. We have increased this to $3.5 million to reflect KUMC's need to be competitive with the best medical centers in recruiting. Junior faculty start-up costs are much less, since they typically join functioning labs. At KUMC they have been averaging about $750,000. We have increased this to $800,000. Clinical practice faculty also have start-up costs that amount to about $800,000. After their first three years junior research faculty also have about 80 percent of their costs carried by grants. Clinical practice faculty cover roughly 90 percent of their costs with clinical income. If the 10 senior faculty are divided equally between research and practice, their start-up costs will be $21.5 million and their continuing costs not covered by grants will be about $500,000 per year. For the 25 junior faculty recruits, of whom, we expect about two-thirds will be research and one-third clinical, the total start-up costs will be about $20 million and their continuing costs not covered by grants will be about $860,000 per year.

The third element of the plan to achieve CCC designation is to plan and build a first-class Cancer Research Center of some 250,000 square feet which will house the labs of 70 principal investigators. It is estimated that it will take four years to plan and build the Cancer Research Center and that the cost will be about $90 million.

CCC designation is phase one in a long-range 10-15 year plan to develop a much larger cancer center at KUMC. After phase one, the plan is to add 300,000 square feet for a 150-bed cancer hospital, 150,000 square feet for an outpatient diagnostic and treatment center, and another 250,000 square feet for a research laboratory.

ADDITIONAL FACILITIES

In addition to the facilities planned for the Cancer Center, KUMC has other research lab needs. KUMC will open a new 225,000 square feet Biomedical Research Building in September 2006. Researchers can then vacate the aging labs in Wahl East, Wahl West, and the Hixon

building, all of which require modernization. Also the Lied Biomedical building needs renovation. The estimated costs for these renovations are $24 million. This will provide space for seventy principal investigators.

The new and renovated lab buildings along with the Cancer Research Center, which should be completed by 2010, will give KUMC sufficient new, start-of-the-art research facilities for the influx of new faculty researchers provided for in the first five years of this strategic plan. In the second five years of the plan, research faculty expansion will call for another 250,000 square feet laboratory building. It will take two additional new buildings in the next five years to support the new level of clinical services offered and to provide space for the School of Medicine's medical education activities. The first of these is a Center for Advanced Medicine, a 170,000 square feet facility for clinical research, clinical teaching, and ambulatory care. This is estimated to cost about $53 million, with the KUMC Hospital expected to carry half the cost. The second building is a medical education building of 143,000 square feet with a 500-seat auditorium. This is estimated to cost $40.5 million.

ADDITIONAL FACULTY

In addition to the 35 new faculty recruited as part of the CCC designation effort over the next 5 years, KUMC needs to add about 20 additional senior faculty and about 35 additional junior faculty in the same time period in other research areas to raise its basic and clinical research to the levels needed. We believe these faculty should be recruited under a strategic plan that dovetails with Stowers' strategic recruitment plan. Most of the junior appointments should be in the basic science departments which currently have strong senior faculty leaders. Most of the senior appointments should be in clinical research. If 20 senior research faculty are added over the next seven years, the start-up costs would total $70 million, and the continuing costs, once they are all on grants, will be $1.2 million per year. If 35 junior research faculty are recruited, the total start-up cost will be $28 million, and the continuing costs about $1.4million annually.

In the second five years of the ten-year plan, the School of Medicine would recruit an additional 50 research faculty, one-third senior and two-thirds junior, and an additional 30 clinical practice faculty. The start-up costs for the 16 senior research faculty will be roughly $56 million, and for the junior researchers $27.2 million. Their continuing annual costs will be $960,000 for the seniors and $1.36 million for the juniors. The 30 new clinical practice faculty will have start-up costs of $24 million and continuing costs of $600,000.

EXPAND PhD PROGRAM

KUMC currently admits 20 PhD students each year, and since PhD's generally take 5 years to degree, the PhD cohort is about 100 students. This program needs to be doubled over the next 5 years to provide the graduate students necessary to work in the labs of the new researchers recruited to KUMC and to Stowers.

Graduate students are the lifeblood of high quality life sciences research. They bring energy and new ideas into their laboratories, and working with them brings out the creativity of junior and senior faculty. The quality of graduate students is as important to faculty as the reverse. Thus KUMC must make sure that as it adds 20 new PhD candidates each year, it is also recruiting the highest possible quality. The School of Medicine's PhD stipends are now $20K per year. This is not competitive. To be competitive stipends should be raised to $25K in 2006 and $30K in 2009. After two years, about 80 percent of the students' stipends will be carried by grants supporting the labs to which they are assigned.

The school plans to phase in the additional students gradually, adding 5-10 students in classes starting next fall, depending on the availability of outstanding students. Thus the start-up cost of doubling the size of the program and raising the stipend to $25,000 in 2006 and $30,000 in 2009 is approximately $14 million, spread over roughly seven years, and the continuing costs are an incremental $2.5 million per year over what is being spent to support PhD's today. With the School of Medicine rapidly improving its reputation in basic and clinical research, and with the chance to work with Stowers, the increased stipends should help the school bring the quality of its PhD students to a significantly higher level.

ADD 40 POST-DOCS

Post-doctoral personnel recruited for specific research projects and not yet ready to become junior faculty are a very valuable element of a thriving research enterprise. KUMC needs to add 40 post-docs over the next five years to work with the new research faculty and additional PhD's. They receive stipends averaging $32,000 per year. After 2 years, 80% of their stipends are covered by grants. Thus, the start-up costs for this effort will be $4 million and the continuing costs will be $320,000 per year.

BIOINFORMATICS

Bioinformatics plays an increasingly central role in biomedical research as vast data sets have to be harvested and analyzed to guide discovery. This brings biology to the intersection of mathematics, statistics, information systems analysis and computer science. It requires a sophisticated interdisciplinary effort. KU and KUMC have a plan to create a bioinformatics program that would physically be divided between the Lawrence campus and KUMC. It will be important to locate as much of the bioinformatics program as possible at the KUMC. KU has pledged ten faculty positions toward the effort and KUMC has pledged five faculty positions. KUMC has to find the resources to recruit these five faculty, two seniors, and three juniors, in addition to the new faculty we have discussed above. Bioinformatics is a field that receives strong NIH funding support, so the economics is similar to the other research faculty we have discussed. The start-up costs for the two senior appointments will be about $7 million and their continuing cost will be $120,000 per year. The juniors will have start-up costs of $2.4 million and continuing costs of $120,000 per year.

Bioinformatics is so vital to advanced life sciences research that we recommend a second research consortium in the field be located adjacent to Stowers and UMKC. As we will discuss in the section on a proposed new Kansas City Institute for Advanced Study, this consortium would combine faculty from the UM system and other faculty contingents invited from universities such as Washington University, Johns Hopkins, and others.

These researchers would work very closely with researchers and clinicians at KUMC, Stowers, UMKC, and the Kansas City, Missouri hospitals. It is very important that the network infrastructure extend to KUMC, Stowers, UMKC, and the hospitals so the full life sciences community can share the massive databases necessary for contemporary life sciences research. Several of Kansas City's industries, such as Cerner and Lab One, will probably want to participate in the bioinformatics enterprise as well.

BIOENGINEERING

KU and KUMC have a similar plan to develop a bioengineering program, with Lawrence committed to 10 faculty and KUMC to 5. Again, KU should be encouraged to locate this program at KUMC. Bioengineering is a key element in building life sciences capacity that can generate innovation and economic growth. It is an extremely dynamic area of applied science which has been the fastest growing area of engineering since 1990. As we will discuss presently in the chapter on translational research, bioengineers are increasingly working on basic science issues in the leading life sciences centers. Proximity to KUMC will therefore be important. The costs for KUMC will be similar to those for the bioinformatics program.

THE COSTS OF EXCELLENCE –AND THE RETURN

The life sciences strategic plan we recommend, coupled with the ramp-up of research activity at Stowers, can cause a decisive change in the future of Kansas City. It will bring roughly 300 life sciences researchers of the highest quality to Kansas City in the next decade. It will bring 40 new PhD students each year, joining a cohort of 200 PhD's working in life sciences research. A good number of these PhD's will undoubtedly stay in Kansas City if it has the momentum in the life sciences that Stowers and this plan will create. Over the course of the decade 1.5 million square feet of state-of-the-art life sciences research laboratories will be built and equipped. Over 1,500 technical support jobs will be created.

Life sciences and medical research R&D funding in Kansas City, most of it from external sources, will move from about $200 million currently to about $800 million annually, and this is not counting any private industry life sciences R&D, which will also expand dramatically if this plan is put in place. Such a dramatic increase in life sciences research will put Kansas City in the forefront of excellent places for life sciences industries to locate and expand. This plan will also make Kansas City a center of innovation and entrepreneurship in biotechnology, as we will discuss in the next chapter.

D. WHAT WILL THE PLAN COST?

Excluding the costs of Stower's expansion, which Stowers will bear, the cost of the life sciences plan, rounded up for contingencies and inflation, are:

Facilities:	$330 million
Start-up Costs for New Faculty:	$285 million
Continuing Annual Costs for Faculty:	$ 7.4 million
Expand PhD's and Raise Stipends	
Start-up	$14 million
Continuing Annual Costs	$2.5 million
Add 40 Post-Docs	
Start-up	$4 million
Continuing Annual costs	$320,000
Total One-Time Costs:	**$645 million**
Total Continuing Costs:	**$10.2 million per year**

E. THE RETURN ON INVESTMENT

In thinking about whether this strategic plan is worth the investment, two assumptions need to be made. Should the increased activities of Stowers be considered a benefit of implementing this plan? The argument for including Stowers is that putting this plan in place makes it much more likely that Stowers will conclude that Kansas City is an environment in which it should continue to concentrate its expanded presence. Also, this plan will reinforce Stowers in significant ways. The argument for excluding Stowers is that it is already here and will, of course, cover all the costs of increasing its activities. Our intuition is to include Stowers in the calculus, but we present it both ways.

The second major assumption is based on whether external federal and private funding of life sciences and medical research will continue, and, continue to grow. We believe the correct answer to both questions for strategic planning purposes is clearly yes. Life sciences and medical research has a unique and growing appeal in American politics, and the returns on investment are substantial. NIH funding has doubled in each of the past five years. It is doubtful whether such rapid growth will continue, but it is highly unlikely that NIH funding will decrease. Moreover, bio-terrorism and agro-terrorism are among the most horrific and potentially devastating types of damage this country could suffer and there will undoubtedly be growing federal investment in research that could prevent or mitigate the consequences. There is also growing concern about pandemic diseases that spread from animals to humans, such as avian flu and "mad cow" disease.

With Stowers included, the investment question is pretty simple: Is it worth spending $645 million over the course of a decade, and $10.2 million a year thereafter, to bring an additional $600 million a year in R&D expenditures into the community? It doesn't take a tedious analysis of multiplier effects to see that the investment produces huge recurring returns.

If Stowers is taken out, the investment thesis is still compelling. A $645 million investment, and $10.2 million of annual continuing costs, brings to Kansas City $300 million of annual R&D expenditures, which historically has risen much more than inflation.

It is hard to imagine any investment that could produce such huge returns for Kansas City. And this is without even considering the most valuable returns: the likelihood that life sciences firms start up in, move to or expand in the city, the enhancement of Kansas City's reputation as a center of excellence and creativity, the innovations and new enterprises this vastly enhanced research capacity will generate, and the humanitarian contribution of medical breakthroughs.

F. A FINANCIAL STRATEGY

Of all the elements of a sound life sciences strategy for Kansas City, crafting a financial strategy will be the most distinctively local. A group of outsiders can only suggest strategies that have worked in other places and might work in Kansas City. It is up to the civic, academic, and political leadership in Kansas City and the states of Kansas and Missouri to figure out how to get this done.

We believe the major philanthropies of Kansas City will need to take the lead to get a financial strategy in place with reasonable promptness. The strategy we suggest would be to provide a powerful incentive for the political process in Kansas and for individual philanthropists and small foundations to focus support on building life sciences capacity at KUMC. The sooner the financial strategy is set, the sooner Kansas City can get the benefit. Dithering and uncertainty are lethal to strategies for substantial change. This needs to be a two-state metropolitan effort in terms of philanthropy, and the state of Kansas needs to be a responsive partner in the effort. A possible approach might be the following:

1) A coalition of Kansas City philanthropies commit $175 million over a ten-year period to KUMC, conditioned on certain actions by the state of Kansas (see 2 and 3) and conditioned on KU and KUMC matching that gift by raising equal amounts of philanthropy to support life sciences research at KUMC and KU-Lawrence. Under this scenario the $175 million nucleus gift would trigger a special capital campaign for KU and KUMC focused on life sciences and medicine. Most medical centers have launched focused capital campaigns. Such a capital campaign would give KU a chance to highlight the tremendous promise of the life sciences at KUMC and Lawrence. The campaign could be expanded to K-State, as well. The $175 million from the Kansas City philanthropies would flow to KUMC when matching philanthropy is in place. This would bring $350 million to KUMC to help to fund its faculty and student expansion and its building program.
2) In recognition of the substantial value to the state of building KUMC's capacity and the external research funding that it will bring, the state of Kansas agrees to add $1 million per year for ten years to the School of Medicine's operating budget, above the regular

annual increase, to cover the continuing costs of grant-supported faculty and students.

3) The state of Kansas and KU come up with a ten-year capital plan which funds the Cancer Research Center, the lab renovations in Wahl, Lied, and Hixon, and the Biomedical Research Building II that needs to be built in years 6-10 of the plan. KUMC figures out how to finance the Ambulatory Care Building; which will generate clinical income, and the Medical Education Building. Federal earmarks should be sought to support these capital improvements.
4) One possible source of Kansas' contribution is the Kansas Economic Development Fund, the $500 million, ten-year life sciences investment fund. Where else could Kansas invest this fund that would have such huge economic and other benefits for the state? Of the $500 million, KUMC ought to receive at least $150 million in facilities and faculty over a ten-year period.
5) We believe the voters of the metropolitan Kansas City counties should be given the opportunity to provide local tax support for life sciences and medical research at KUMC. The benefits to the counties is at least as obvious and substantial as the benefits provided by the area's community colleges, which are given local tax support.

If a financial strategy of this kind can be implemented, the consequence will be that a $175 million philanthropic commitment will trigger what would be for a private university the rough equivalent of a $1 billion investment in life sciences research capacity. With the presence of Stowers, this level of investment would give Kansas City momentum in the life sciences matched by only a handful of other cities in the country.

G. A CIVIC LEADERSHIP STRATEGY

The life sciences plan we recommend will require organized civic leadership to take stewardship of the strategy. Whatever the form of this leadership group, it must have the stature and power to work as a strong strategic partner with KU, KUMC, and the Kansas Board of Regents. It must have the confidence of Stowers and the ability to strengthen productive relations between Stowers, KUMC, UMKC, K-State, UM-Columbia and the hospitals in Kansas City, Missouri have important roles to play.

This leadership group also must have the influence to engage powerfully with the governors and legislative leaders of both states to get academic, political, and philanthropic strategies coordinated fast. In our opinion, the leadership entity should not be a stakeholder group, with the inclination to spread money around, but rather an entity that will focus relentlessly on quality, strategic momentum, and accountability. Stakeholders should have a strong say, but the strategy needs to be in the hands of a group whose fiduciary anchor is the greater good of Kansas City. The group needs to have the persuasive power that comes with the ability to deploy substantial dollars.

It may be that the reformed, muscular KCALSI that is under discussion is such a group. Or it may be better to create a private 501(C)(3) life sciences investment board that would control the nucleus philanthropic fund we have recommended. In our opinion, the life sciences leadership group should not be subsumed into an endowment board attached to any particular institution. It needs the independence to work effectively with all the institutions in the city. The major philanthropies who contribute to the nucleus fund would undoubtedly have considerable influence over how this leadership group is structured. However, we do not believe the group should be a committee representing different philanthropies. Once the group is constituted, it should represent Kansas City, not the philanthropic organizations or individual donors.

Strategy must be evergreen, and should change as circumstances and experience dictate. Thus, the leadership group must have the clear authority to revise strategy or insist on new approaches. Finally, the group must have staying power. There needs to be continuity of strategy, investment, and oversight for ten years. At that point, and perhaps before, it will be time for fresh thinking about life sciences strategy.

We do not exaggerate when we say that the life sciences leadership group will undertake a responsibility that is as important to the future of Kansas City, and holds as much promise of civic benefit, as any strategic enterprise in the history of the community.

VII. Translational Research and the Biotechnology Pipeline

A common misperception of the relationship between industry and universities assigned to universities the role of generating fundamental (basic) knowledge and to industry the role of performing applied research and developing medical technologies. A closer look at the ways medical innovations arise and spread suggests that both parties perform much more complex, subtle, and wide ranging roles than conventional wisdom suggests.

***The Impact of Academic Research on Industrial Performance*, 78, National Academy of Sciences (2003)**

In the thirty years since the founding of Genentech in 1976, the biotechnology industry in the United States has grown from a lone start-up to an industry with $46 billion of revenues. In 2004, the industry consisted of 330 public companies and 1,114 private firms. It employed 187,500 people. Since 1989, revenues of public biotech companies have grown at a 16% annual compound growth rate. The industry is not slowing as it matures. Revenue-growth in 2004 was 19.2% and in 2003 was 25%. In 2004, the industry attracted $20.6 billion in equity investment, including a record $3.6 billion in venture capital, 21% of all venture investments. A robust, growing biotech industry in the Kansas City region will be the most significant economic benefit if Kansas City becomes a leading life sciences research center.

Biotechnology is the science of putting cells and biomolecular processes to work to solve problems. Cells have powerful manufacturing capabilities and the discovery of recombinant DNA in 1974 has made it possible to create new molecules that put DNA and proteins to work in cells. This has enabled the discovery and development of new drugs and agricultural products, new kinds of instruments, and new classes of diagnostic tests. The 1970s also saw the discovery of monoclonal antibodies, which made it possible to penetrate the mysteries of human, animal, and plant immune systems.

The biotechnology industry has traditionally referred to the array of entrepreneurial start-ups that, beginning in the 1970's, saw the commercial and humanitarian possibilities of recombinant DNA and monoclonal antibodies. Traditionally, the biotechnology industry has been distinguished from the twenty or so large worldwide pharmaceutical companies ("biotech" vs. "big pharma"), although the products, the research, and even the size of the two sectors increasingly overlap. The cultures of the two sectors, however, remain distinct. Biotech is entrepreneurial, very close to the academy, mostly about research, and ever in pursuit of the new. Big pharma is also a massive R&D operation, but its relative advantage lies in marketing and sales, regulatory expertise, and the ability to put huge amounts of money into product development. These two branches of the life sciences industry are relentlessly competitive, but they need each other. Most of the innovation in drugs, new molecular entities, and medical devices comes from biotech start-ups. The ability to navigate regulatory channels, to focus huge resources on product development and to take things to market is the province of big pharma.

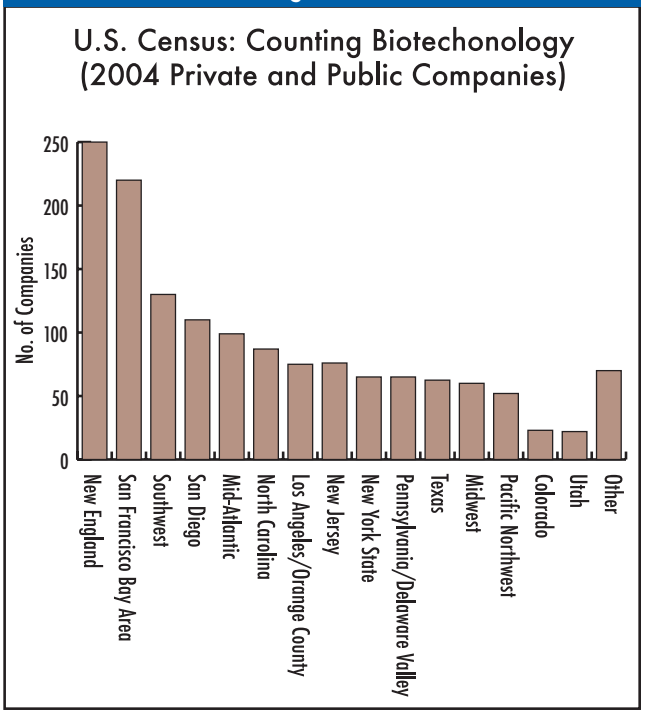
Historically, investment in biotechnology has been drawn to the centers of academic research. Measured by market capitalization of public biotechnology companies, the San Francisco Bay area, powered by research at UCSF, Berkley, and Stanford, is first with $107 billion, Los Angeles - Orange County, with UCLA, Cal Tech, USC,

and UC-Irvine is second with $87 billion, the Boston region, with Harvard, MIT, and Boston's superb hospitals, is third with $40 billion. The industry pattern closely reflects the history of NIH university research funding.

If a strong basic life sciences research capacity is the foundation for building a biotechnology sector, it is not, by itself, sufficient. One research powerhouse where biotech has not taken off is New York City. New York missed out because of the combined failure of its research universities, the state, and the city to create commercial wet lab incubators for new ventures, funding mechanisms to help with start-up capital requirements, and venture-friendly public policies. This is changing. New York City is now making aggressive efforts to promote itself as a biotech center.

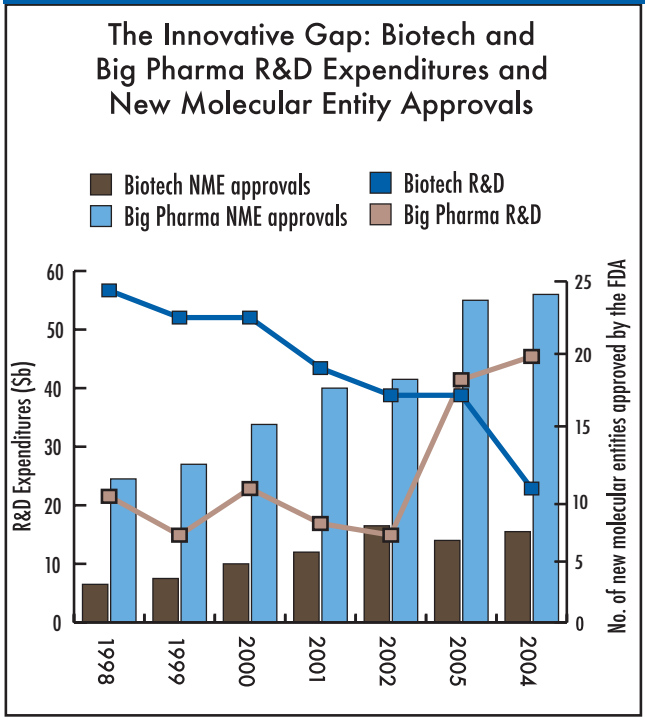
To become an important biotech center, Kansas City needs first and foremost to augment its basic life sciences research capacity. But the experience of other cities shows the need to build as well a strong translational research enterprise that can take basic discoveries from the laboratories, translate them into drugs and therapeutic devices, manage animal testing and clinical trials, and get them in the hands of enterprises that can take them to market. Given Stowers' and KUMC's basic science emphasis and UMKC Medical School's focus on teaching,

Figure 17



Source: Ernst & Young.

Figure 18



Source: Source: Ernst & Young. Approvals include only new molecular entities, and exclude label approvals, new formulations and combinations. Certain drugs partnered between biotech and big pharma companies are counted in both groups. Big pharma is defined as the 20 largest global pharmaceutical companies by market cap. Companies that do not meet the definition of big pharma and do not meet Ernst & Young's definition of biotechnology are excluded from the analysis. Biotech R&D expenditures include large acquired in-process R&D charges resulting from mergers in some years.

building translational research capacity may require the development of new institutions. Moreover, Kansas City needs to invest in the entrepreneurial pipeline that takes new discoveries to market. This may require investment in wet-lab and business-infrastructure incubators, start-up and venture capital, and an information network that combines scientists with entrepreneurs and venture investors for new business development.

Translational research is the bridge between the university, or nonprofit research institute, conceptually engaged in the pursuit of knowledge for its own sake, and the dissemination into the marketplace of useful, profitable products by business entities. Universities engage in translational research in the clinical departments of medical schools, in veterinary and agriculture schools, in applied science and engineering departments, and in social science departments. Industry engages in translational research as well, and supports such research by universities in return for a share of the rights to the intellectual property created by academic researchers.

There are few hard and fast lines of demarcation that separate translational research between that which is appropriately academic and that which is right for business. The dividing line is functional: when a discovery has a clear enough profit potential to attract private capital for its development into a product or service that can succeed in the marketplace, it moves from the university lab to either a new business typically funded by venture capital or into the product development function of an existing business. Even when a discovery makes such a move, its academic inventors are likely to go with it to work on its development, at least on a part-time basis.

Most cities and universities have concluded that basic scientific discoveries and the marketplace need some institutional and financial assistance to promote this technology transfer process. Universities have many reasons for promoting technology transfer. They run the spectrum from altruism to direct pecuniary interest. Columbia University for example, has received more than $1.2 billion of licensing income since 1998 from its share of the intellectual property created by a single researcher, the Nobel laureate Richard Axel. Faculty recruitment in science and medicine is heavily influenced by whether researchers believe their universities offer a constructive environment for technology transfer, and are located where new biotech ventures can flourish. Thus, faculty researchers, universities, their host cities, and states are natural partners that all stand to benefit from the economic returns of technology transfers.

Fortunately, Kansas City has substantial expertise and hands-on capacity in how to build the translational research and entrepreneurial pipeline. The Kauffman Foundation and the Bloch School of Business entrepreneurship program, led by Professor Michael Song, are important sources of knowledge and experience in this area. Kansas City should rely on them for leadership in this area.

Kansas City can also look to several cities that have successfully aligned basic research, technology transfer, translational research, new ventures, and commercial success to become growing biotech centers. Three interesting examples are Seattle, New York City, Boston, and San Diego, with New York City demonstrating both what not to do as well as what works. Minneapolis and Cleveland are other possible models. We will briefly discuss each of these cities in terms of the strategies Kansas City may want to embrace in the following case studies.

A. CASE STUDIES

SEATTLE

The University of Washington, Seattle and the State of Washington have successfully created one of the world's most powerful centers of biomedical research. Although Seattle, the site of most life sciences activity in the state, has the advantage of an attractive location, the University of Washington is the only major research institution located in the region, not one of several as is the situation in Boston, San Diego, New York City or the San Francisco Bay area. Moreover, the state of Washington lacks the resources of California, New York, or Massachusetts. In spite of such limitations Seattle has become a leading biotech center. It took the following steps:

1) The University made a commitment in the 1960's to build a talented faculty in the biological sciences that attracted an ever-increasing NIH-funded research base;
2) It attracted world-renowned clinical investigators, notably Donnall Thomas, the pioneer in the field of bone marrow transplantation, around whom the Fred Hutchinson Research Center was established which, in turn, attracted a further outstanding group of clinical research investigators;
3) It had enormous federal financial help from Senator Warren Magnuson that resulted in the establishment in 1972 of the Fred Hutchinson Cancer Research Center as a Comprehensive Cancer Research Center. This center is outstanding in its integration of basic research in the health sciences and the translation of research results to disease treatments. The center helped the University of Washington rise to the first tier through its ability to recruit increasing numbers of extremely talented scientists. The Howard Hughes Medical Institute designated several faculty members as HHMI investigators. More good fortune followed in the Gates Foundation Professorship, funded at $12 million, which was used to recruit Leroy Hood from Caltech. Professor Hood was not only an outstanding biochemist. He also was an accomplished entrepreneur who had founded several successful biotechnology instrumentation companies. He became chairman of the Department of Molecular Biology, was a driving force in making the University a leader in the emerging genomics-based revolution, and founded several biotechnology companies in Seattle;
4) The establishment of the Institute for Systems Biology (ISB) in 2000 was the next innovative step. In 1999, Professor Hood left the University of Washington to start the Institute, which focuses on biological systems. Research in the Institute integrates the disciplines of biology, chemistry, physics, computation, mathematics and medicine. It currently has 170 staff members, including 11 faculty members, occupies a 65,000 square foot facility, and is affiliated with the new Accelerator, the purpose of which is to develop new companies.

Today, the University of Washington receives more research funding from the NIH than does any other public university in the country, $473 million in 2004, and it is second only to Johns Hopkins University in receipt of NIH funding among all universities, public or private. It has led the way in the establishment of multi-disciplinary departments, the most notable of which are the Departments of Biochemistry and Genome Sciences.

Washington State is home to 23 publicly traded biotechnology companies and more than one hundred private biotechnology, instrumentation and medical device companies, 90% of which are located in the Seattle area. One area company, Immunex, which was founded by scientists from the Fred Hutchinson Comprehensive Cancer Center in 1981 and sold to Amgen in 2002 for $16 billion, was one of the most successful biotech companies ever. It developed a revolutionary treatment for rheumatoid arthritis that became the company's leading drug, Enbrel.

Seattle's latest move is the creation of an incubator facility for new companies that work in areas related to those of the faculty of the ISB. Known as The Accelerator, it is a commercial facility, built and privately financed by a

[4]The investors recall such examples as Icos, Dendreon, and Rosetta Inpharmatics, three biotechnoogy companies that were direct spin-offs of University research. the discoverer of Cialis, Icos today as a market capitalization of $2 billion, and has approximately 700 employees in Botell, Washington. Dendreon was started in 1995 by scientists from the University and the Fred Hutchinson Cancer Center. Today the company has a market capitalization of approximately $400 million, and it employs approximately 250 people in Seattle. The third example, Rosetta Inpharmatics, was formed in 1996 by two members of the Fred Hutchinson Comprehansive Cancer Center, its director, Nopel Prize laureate Leland Howell and Dr. Stephen Friend, and Professor Leroy Hood, then of the University of Washingtoon. The foucus of the company is the application of computational algorithms to the analysis of genomic data. Rosetta was purchased by Merck in 2002 for $620 million, is now a wholly-owned subsidiary of Merck, and today employs approximately 300 people in Seattle.

These are but three of dozens of biotechnology success stories in Seattle. While the specific genealogy of each company in unique, there is a consistent and common theme: Universit scientists are alert to opportunities to translate their basic research findindgs into strategies for commercial products. These scientists find a friendly environment in whch their scientigic visions can mature because they have access to the critically important resources of entrepreneurial leadership, equity capital, facilities, and a skilled workforce.

real estate investment trust, Alexandria Real Estate Equities, Inc. of Pasadena, California. Its physical space of 20,000 square feet is within a larger research building. The governance of the accelerator involves scientists from the ISB, Alexandria, and venture capitalists who have invested in the project.

The Accelerator demonstrates the power of the biotechnology industry in Washington as an engine of economic development. Privately financed by Alexandria and participating venture capital groups, it is based on the assumption that there is a market in Seattle for space for start-up companies that do not currently exist. Alexandria and the participating venture capitalists have committed $10 million for initial investment in the start-up companies that will occupy the space. The venture capitalists who are involved in the project not only have an equity interest in the facility but have access to the promising new companies that will do translational research and product development in the Accelerator. Anyone who has tried to pry money out of venture firms for early stage companies will recognize what an extraordinary testament it is to the promise of the Accelerator that money has been invested before companies even exist. These investors know that the history of biotechnology companies in Seattle supports the profit-potential of integrating the Accelerator with the University, ISB, and the Fred Hutchinson Comprehensive Cancer Center.[4]

NEW YORK CITY

Historically, New York City has been a center of excellence not only in basic research in the life sciences but also in patient care and clinical research. New York City ranked third among American cities in receipt of NIH funds in 2004 with $1.3 billion. 11 of the top 100 NIH-grantee institutions reside in New York City.

The city is home to two AAU research universities, 7 medical schools and 96 hospitals that have over 40,000 beds. It has 4 NIH-funded comprehensive cancer centers. New York City universities collectively have 13 Nobel Prize laureates, 41 Howard Hughes Medical Institute investigators, and 87 members of the National Academy of Sciences among their faculties. Columbia University, with a sophisticated system for the protection of intellectual property rights and technology transfer, is first among all universities in receipt of royalty income from inventions that it owns. Memorial Sloan Kettering is a leader among hospitals in technology transfer and royalty income. Seventeen major pharmaceutical companies including Bristol-Myers Squibb, Pfizer, Merck, Johnson & Johnson, Novartis, Hoffman-La Roche, and Sanofi-Aventis have their worldwide or US headquarters in the New York metropolitan area.

Despite all this, New York has not attracted biotechnology companies to locate in the region at anything near the level that one would expect from its enormous academic and medical assets. Currently there are only two home-grown biotechnology companies that have reached market capitalizations of $1 billion, Imclone, of insider trading notoriety, located in New York City, and OSI Pharmaceuticals, located in Long Island.

The absence of a significant biotechnology industry presence in New York becomes even more striking when the strength of the financial markets in New York is considered. The great majority of investment banking business for the biotechnology sector takes place in New York. Venture capital firms involved in the biotechnology sector are mainly divided among California, Massachusetts and New York. It is almost impossible to find a biotechnology company that does not have venture capital financing as a significant part of its life story, and a large portion of venture capital financing transactions in the sector involve the venture capital firms of New York City. New York is a stunning example of the reality that although the presence of an outstanding research base is essential in order to attract biotechnology companies, it is not sufficient.

Why did New York fail? First, the extremely high costs of real estate in the city, coupled with the high costs of the infrastructure required in laboratory buildings, has been a major deterrent to the ability of the city to attract biotechnology companies. Second, real estate development has to traverse a political and regulatory swamp that swallows vast amounts of money and time. Not only is there a lack of available commercial laboratory space for start-up, there is little contiguous expansion space for the start-up companies that might be successful. Third, the universities, the hospitals, the civic leadership, and the political leaders of the city and the state were passive and did not make the biotechnology sector an economic development priority. This has changed.

The current enthusiasm for initiatives to make New York City a friendly place for biotechnology companies is based on the success of the Audubon Research Park facility initiated by Columbia University. In 1982, as the biotechnology industry was getting off the ground, Columbia's administration realized that many of its most distinguished scientists were becoming founders of companies located in California and Massachusetts. Recruiting began to suffer. The University also saw the

economic opportunity. The University approached the City with a plan to build the Audubon Research Park for biotechnology companies, the basis of which would be the University and City each contributing land to the project and the University, the City and the State providing the funds to build the first building, a 100,000 square foot incubator facility for start-up companies. The City and State governments embraced the project but, as an example of the difficulty of doing business in New York, the development of the first phase of the project took 13 years to complete. The first building opened in 1995.

This incubator, managed by Columbia, has been a great success. It has housed 48 companies since 1995, currently has 18 tenants and is 98% occupied. Over 600 new jobs have been created at the Center. To date, approximately 575,000 square feet have been built on the site: in addition to the first building there are two additional academic buildings for diabetes and cancer research on the site, and a second commercial building is planned. As is typical for incubators near universities, almost all the companies at the Center have ties to local faculty. Two start-up companies have been based on the work of two of Columbia's Nobel laureates, and a third company is based on the work of a Nobel laureate who is on the faculty of Rockefeller University.

Based upon the success of the Audubon facility, the New York City Department of Economic Development is developing a vast new commercial incubator, the East River Science Park. The developer of this new facility is Alexandria Real Estate Equities, Inc., the company that financed and developed the Accelerator in Seattle.

The East River Science Park is financed by New York City and the Partnership for New York City, as well as those of Alexandria. The site, 4.7 acres on Manhattan's East River on the Bellevue Hospital campus, is owned by the City and will be leased at a favorable rate to Alexandria. The first two buildings will comprise 870,000 square feet of space and will cost $700,000 million for construction that will be privately financed. The first building will open in 2008. The city expects more than $2 billion to be invested over the next decade. The project is expected to create more than 2,000 permanent jobs, 4,000 construction jobs, and is expected to have an annual economic impact of $350 million from ongoing operations. The New York City Investment Fund, the economic development arm of the Partnership for New York City, has committed $10 million in funding to support the Park.

New York City is notoriously sluggish and inept about economic development. For the city to put together a $1 billion biotech development facility shows the city's belief in the tremendous potential of the life sciences as an economic engine of growth. New York City has also finally heard the pleas of the city's research universities and hospitals that they have been at a significant disadvantage in recruiting leading life scientists when competing against Boston, Seattle or California.

Academics in the biological sciences today want to see their discoveries change people's lives. They want to have a chance at the wealth that can accrue to those who have equity in successful biotechnology companies. They want the opportunity to interact with scientists at companies who do the essential translational work on inventions that they themselves don't want to do. New York City has finally recognized that biotechnology is such an important and exciting part of the knowledge economy that cities on the sidelines will be seen as economically and creatively second-rate. One thing is clear: neither New York City, nor the many other regions of the country that are building biotechnology capacity, believe that it is too late to get into the game in a big way.

BOSTON

Boston offers a number of important lessons. First, institutions that are relatively weak in the life sciences can rise to eminence in one to two decades if they have leadership, a determined strategy, and the benefit of creative philanthropy. Second, even the strongest institutions need to work together. Third, translational research in the life sciences requires large and flexible interdisciplinary teams. Interdisciplinary is the key to success. Fourth, universities have to figure out how to work with industry and private-sector start-ups.

Although most top-tier universities have long traditions of commitment to the study of biology, some of the powerhouses of today have been built on relatively recent initiatives. The Massachusetts Institute of Technology (MIT) provides an example. MIT, now ranked as one of the top three universities in the biological sciences, had very little presence in biology until the early 1960's. When MIT made a commitment to develop strength in biology, it was considered to be very weak relative to the Harvard departments across town. There was a lot of skepticism both within and outside MIT.

A significant development occurred in 1974 when MIT received a grant for a Center for Cancer Research from the National Cancer Institute. That grant, which did not have a

clinical component, supported basic science research directed toward the understanding of fundamental principles of biology that would lead to better treatments for cancer. It served as a basis for the major expansion of the biology department in faculty size, numbers and quality of graduate students and postdoctoral fellows, and new research facilities.

Perhaps it was because the biology department at MIT was a young, can-do enterprise that Jack Whitehead settled on MIT as the site of his visionary institute in 1982. The Whitehead Institute was created as a private institute, affiliated with MIT, that would take a multidisciplinary and translational approach to the study of basic biological principles. Its buildings comprise hundreds of thousands of square feet of newly created research space; it houses approximately 20 faculty members and 200 students, and is viewed as one of the premier centers in the world for study of biology and its translation to human health applications. The Whitehead Institute has served as a nucleus around which other research institutes have been formed. The Broad Institute, established in 2003 through a founding gift of $100 million, is a center of interdisciplinary research focused on the applications of computer science to the understanding of biological data. This institute involves scientists from MIT, Harvard, and the Harvard-affiliated hospitals. Its new 236,000 square foot building will open in early 2006. The McGovern Institute for Brain Research was established in 2000 through a gift of $350 million. The first building of its planned four-building neuroscience complex will open in November, 2005.

Today, MIT stands for excellence in the life sciences. The department of biology has 60 faculty members, including four Nobel Prize laureates and 22 Howard Hughes Medical Institute investigators. The preeminence of MIT in the biological sciences has derived from an institutional commitment, made not that long ago, to become a major player in the intellectual revolution occurring in basic biological research.

Boston is a prime example of how the interdisciplinary requirements of translational research have caused institutions with strong traditions of insularity to forge creative alliances. These often begin as personal interactions. For example, the field of tissue engineering grew out of a partnership between a pediatric surgeon at Mass General and a professor of chemical engineering at MIT. They created a polymer scaffold that could be seeded with living cells and that, immersed in growth factors, would multiply and grow into three-dimensional tissue. Once the basic structure was solved, R&D teams focused on creating organs and body parts, such as skin, pancreas, heart valves, arteries and veins, and so on. This spawned a new industry in tissue engineering, consisting of more than 50 start-ups launched by academic researchers and venture firms.

The success of these translational partnerships caused Boston's institutions to create interdisciplinary consortia. An example is the Center for Integration of Medicine and Innovative Technology (CIMIT), an alliance of Harvard's teaching hospitals, MIT, and the independent Draper Laboratory. CIMIT focuses on the acceleration of minimally invasive therapies that improve the quality and lower the cost of medical procedures. CIMIT has industry partners who fund CIMIT research to gain access to scientists and clinicians, prepublication reports on research, and the opportunity to take CIMIT discoveries to market.

A National Academy of Sciences Panel on Medical Devices described CIMIT this way:

> "To maximize the potential for interdisciplinary collaborations, CIMIT is organized as a matrix, with clinical focus areas: cardiovascular, stroke, trauma and critical care, supported by a technological infrastructure comprised of technology teams; biomaterials; endoscopic tools; endovascular tools; energy delivery; medical imaging; microsensors; simulation and modeling; surgical planning; and tissue engineering."

The Panel stressed that although academic researchers are usually the innovators and builders of original prototypes of new medical devices, they are often unable to take projects to clinical completion because enabling technologies are too specialized to be found in the university. To overcome this, researchers need to create partnerships with existing firms or with entrepreneurs and venture capitalists. But the academics may lack information about how to do this, which is why matrix organizations such as CIMIT become important to technology transfer.

The Panel also stressed that translational research requires extraordinary flexibility that blurs the boundaries between basic and applied research, between scientists and engineers, and between universities and industry. The Panel noted:

> "Both academic and industrial institutions are involved in the whole innovation cycle-research, development, manufacturing, evaluation, marketing, and product modification. Industry

> and universities have distinctive, complementary skills, as well as overlapping competencies. In fact, one characteristic of innovation in medical devices is close collaboration, even codependency, between universities and industry firms…[A] very different kind of collaboration developed between mechanical and chemical engineers and clinical researchers, in which the engineers became directly involved in defining the problem, not merely helping to find the solution. This manifested itself in studies of fluid mechanics and transport phenomena in blood flow, characterizing the interactions between biological fluids and synthetic materials….In these cases, engineers did not borrow from other fields but became involved in direct research in the biological systems to understand the unique phenomena of those systems."

The medical devices industry shows the dominance of entrepreneurial start-up ventures in the innovation that drives economic growth. In 1999, the industry had 65 percent of firms with fewer than 20 employees, and only 12 percent had more than 100. A study of the industry in 1995 concluded "nearly all significant new and innovative products and procedures were pioneered by start-up companies." Even in drug development, with staggering average costs of $800 million per new drug, start-ups develop half of new drugs. Moreover, despite the fact that big pharmaceutical companies spend $50 billion annually on R&D, compared to $20 billion by the biotech industry, since 2003 the biotech industry has developed more new molecular entities (NMEs) than has big pharma.

SAN DIEGO

San Diego is the most extraordinary of all the great biotechnology success stories because it had almost no university research foundation to build on when it began. What it did have was notable private research institutes, a beautiful location, the credibility that comes with being part of the nation's best public university system, and visionary civic and academic leadership.

San Diego is special because it demonstrates how a university can build excellence by collaborating with private research institutes. UC-San Diego was able to attract senior life scientists of international stature because of its collaborations with Scripps and Salk and because the commitment of the UC system gave its ambitions early credibility. UC-San Diego focused its resources on basic science research, but it recognized that its basic research needed strong connections to industry, to venture capital investment, and to biotech entrepreneurs. The university and these private sector groups set up a matrix organization called CONNECT, that links basic scientists to the entrepreneurial pipeline. CONNECT worked so well that San Diego was able to bypass the stage of building a large incubator facility and instead approached translational research opportunities in a customized way, creating the particular university-industry team and developing the research space suited to the particular project. Working with industry and venture capital firms, CONNECT was able to facilitate early stage investment, thus avoiding the notorious biotech "funding gap" that delays or frustrates many promising translational opportunities.

The results have been spectacular. San Diego has joined the traditional life sciences leaders of the San Francisco Bay area, Los Angeles-Orange County, and the greater Boston area as one of the four greatest biotech centers in the world.

In 2004, NIH awarded San Diego's research institutions nearly $600 million. UC-San Diego received $304 million, the Scripps Research Institute received $223 million, and the Salk Research Institute received $50 million. In 2004, San Diego was home to more than 100 biotech companies, 31 of which were public with a market capitalization of $14 billion. In that year, the life sciences industry in San Diego was responsible for 55,600 jobs and generated annually $5.8 billion in economic output.

B. A KANSAS CITY APPROACH

We recognize that suggesting models such as Seattle, New York, Boston, and San Diego for Kansas City may induce a sense of vertigo. Kansas City is unlikely to achieve the heights of these high-flying life sciences centers, at least in volume of research and private biotech activity. But the strategies these cities have employed are directly relevant to Kansas City.

These are the lessons from other cities that we believe Kansas City should ponder:

1. Build basic life science capacity first and foremost.
2. Align clinical research and clinical care with basic science.
3. Create a powerful organizational framework for translational research by integrating the basic research enterprise integrated into applied and clinical research institutions, and into industry and venture capital.
4. Institutions must CONNECT. If Harvard, MIT and Mass General can overcome decades of institutional aloofness so can KUMC, UMKC, St. Luke's, Children's Mercy, Truman Medical Center and MRI. Translational research is a team sport.
5. Universities must recognize the biotech industry and the entrepreneurial pipeline as an ally and an extension of the academy. Knowledge is good in itself, as Aristotle and Cardinal Newman have insisted, but knowledge is also good when it gets taken to market and improves peoples' lives.
6. Translational research and the entrepreneurial pipeline require organizational thrust and investment. There must be an organizing, investing center for translational research in Kansas City. The universities, hospitals, and Stowers should see this center as an ally, not a competitor.

When the intellectual resources of the Kauffman Foundation and Professor Michael Song and his entrepreneurship group at the Bloch School are added to the science expertise at Stowers, KUMC, UMKC, St. Luke's and Hospital Hill, Kansas City clearly has the know-how to create a robust discovery-translational research-entrepreneurship pipeline, provided a two-state metropolitan strategy, the necessary investment, and strong governance can be put into place.

We are uncertain whether a Center for Translational Research needs to include a wet lab incubator facility at this time. KUMC already has a small wet lab incubator which is unoccupied. It may be that real estate and facilities are sufficiently easy to find in Kansas City that a San Diego strategy of providing facilities for translational research on a customized, ad hoc basis would be preferable to investing in an incubator. Or it may be that demand will indicate that one or more wet lab incubators is a good investment, as other cities have found.

The most important function of a Center for Translational Research in Kansas City would be to broker partnerships between universities, hospitals, Stowers, MRI, industry, venture capital, and entrepreneurs. The Center might have a facility planning and financing function, as well.

It is important for the Center to have funds to provide early-stage funding at the first phase of translational projects, and co-investment funds to be deployed at the venture phase. The experience of other cities suggests that $10-20 million should suffice. This should be looked at as an entrepreneurial opportunity not a philanthropic endeavor, although it will do a lot of good. The objective of translational projects is to create profitable enterprises. It is critical to make Kansas City an inviting partner for biotech start-up companies. This will help everyone understand why it is important to invest in basic life sciences research capacity.

VIII. UMKC — A Strategy For a First-Rate Urban University

If higher education is to play an optimal role in Kansas City, UMKC needs to become a true destination university that can attract and retain talented undergraduates, very promising professional students, and able graduate students. Kansas City also needs UMKC to become strategically engaged in meeting the city's challenges, the greatest of which is bringing true educational opportunity to the city's African-American and Latino populations.

UMKC needs Kansas City. It is not likely to develop into a first-rate urban university without sustained, substantial philanthropic investment. UMKC needs civic, as well as academic, leadership. Kansas City and the university have a deep mutual interest in alignment of academic and civic goals. That is wanting today. UMKC needs Kansas City's support, but it will get it only if it embraces balanced governance that gives the city a strong voice in the university's governance. UMKC needs a governance process that enables strong executive leadership and that encourages the university and the major elements of the community to unify around a robust strategy for the future.

We recommend a strategy for UMKC that has three phases: short-term (2-3 years), medium-term (3-10 years), and long-term (10-20 years). In the first phase, we recommend a focus on leadership, governance and creating a sound institutional strategy for the next two phases.

The main strategic objective during phase 1 is to lay the foundations of sound governance and empowered leadership for a robust strategy for phases 2 and 3 that all the elements of UMKC and the major elements of the Kansas City community can embrace. The last time this was tried, the university fell into turmoil. We hope the key players at UMKC and in the community have learned enough from that debacle not to repeat it. A third possible objective during phase 1, once balanced governance and leadership is in place, would be to identify one or two areas of excellence or strong promise at UMKC that could rise to new levels of excellence with targeted investment.

The focus of phase 2 (3-10 years) would be to execute on the key strategies developed in phase 1. The most important of these will concern 1) the role UMKC should play in building life sciences research capacity, especially in translational and clinical research, 2) how UMKC should engage with urban K-12 public education, and 3) how the university can expand educational opportunity for the city's African-American and Latino populations. The other emphasis during phase 2 should be to build areas of excellence and promise with the aim of having several programs in the top 25 nationally and moving the Bloch School and the Law School to top-fifty status. By the end of phase 2, UMKC should be able to make good on its stated mission of being a model of an engaged urban university.

The goal of phase 3 (10-20 years) should be to move UMKC to an unquestioned position among the top one hundred research universities in the U.S. Today, universities in the lower ranks among the top 100 have federal R&D expenditures of about $90 million, or about 5 times where UMKC is today. For example, in fiscal 2003, the latest data available, UM-Columbia ranked 93rd in federal R&D expenditures with $84 million, Virginia Commonwealth was 99th with $81 million, Wayne State was 76th with $102 million, Cincinnati was 42nd with $185 million. A university in the lower ranks of the top 100 will have 5-10 programs in the top 25, and many more in the top 50. Making UMKC a top-100 university will not be easy, but it is well worth the effort and investment. If UMKC can move anywhere near the top 100, then when the life sciences research capacity of Stowers and of KUMC is joined to it, as well as KU's Edwards Campus, Kansas City would have in twenty years the equivalent of one of the top 50 research universities in the country, and one of the top 25 medical centers. This is the higher education enterprise the city needs to secure its future in the global knowledge economy

A. PHASE 1: GOVERNANCE AND LEADERSHIP

In our opinion, the leadership, the philanthropic investment, and the political support that UMKC requires if it is to become a strong urban research university will not be forthcoming unless there is a significant change in UMKC's governance. UMKC needs to add to its governance an element that gives Kansas City a place at the table.

The governance structure we recommend would create a dynamic balance with roots in Kansas City and coordination, accountability and oversight of academic strategy at the state level. Only governance with roots in the city can achieve the strategic vision for urban higher education that Kansas City needs. Only rooted governance can attract the substantial philanthropic investment required. Only rooted governance provides the possibility of local tax support for UMKC. Only rooted governance can lead to the continuity of leadership required. Only rooted governance can convince all elements of the Kansas City community that UMKC is Kansas City's university.

When we recommend governance rooted in Kansas City, we absolutely do not suggest that UMKC be reconstituted as a private institution. This would be impractical and unwise in view of UMKC's important public responsibilities to the Kansas City community and to Missouri. UMKC should remain a proud part of public higher education in Missouri.

We wish to stress that our governance recommendations have nothing to do with current or past leaders of the UM system or on any campus. They reflect our structural assessment and not any judgment about individuals.

There are two ways to achieve the governance balance we recommend. One is to change the public governance structure. Under this approach, the Curators would delegate considerable authority to a publicly constituted UMKC board of governors, appointed by the appropriate public authorities and confirmed by the legislature. A strong, empowered Board of Curators would coordinate state-wide public higher education strategies; approve mission statements and master plans, both operating and capital, for all the public institutions in the UM-System; ensure a strong statewide system of academic accountability and possibly present a consolidated public higher education budget annually to the Governor and the Legislature.

Governance at the campus level should achieve substantial autonomy, under appropriate state-level oversight, including fiduciary authority over academic policies and strategies, the power to select and empower campus leadership, and the power to manage endowments or other private revenue or philanthropic investments at each campus. Campus authority might include the power to submit budget requests directly to the Governor and the Legislature. It is clear to us that the current Board of Trustees at UMKC is not the logical place to delegate this authority. Although the Trustees are fine civic leaders who have contributed much to the vitality of UMKC, the board of governors of a public institution should be a public board, appointed by the appropriate public authorities and subject to legislative confirmation.

Such a system of delegated authority would enable the State of Missouri to follow the highly successful approach of California, which determined as a state objective that each important urban center in the state should have a public university of the highest quality suited to that urban center's educational and research needs. Another model is New York, where New York City was recognized to have distinctive urban higher education needs, and CUNY, the twenty-campus public university for the city, was therefore organized with its public board of trustees rooted in the city. The California and New York strategy is clearly the right strategy for Kansas City, and it is in the interest of the entire state to create a governance structure that can make this strategy work.

The second approach would be to introduce into the current governance arrangement one or more private 501C(3) endowment boards that would exercise fiduciary responsibility over endowments and other philanthropic investments made in UMKC. By directing the flow of endowment income and new philanthropy, such private boards can have a strong voice in institutional governance without displacing the constitutional or statutory authority vested in public boards. The virtues of introducing an element of private governance to promote philanthropy are obvious at a time when public universities must depend increasingly on private giving. That is why a large majority of public institutions in American today have such boards as part of their governance. The University of Kansas pioneered this arrangement in 1891 by creating KU Endowment, an independent, non-profit board recognized by KU as the official foundation for raising and managing private funds for the University.

Private endowment or foundation boards can take a number of forms. They can be university-wide, as with KU Endowment and similar boards at many public universities. They can also be school-specific. The University of Virginia is a good example of this approach. UVA Law School has its own private board, as does the business

school, the school of architecture, and so on. Or they can be programmatic, such as private endowment boards to support music or the arts across a range of schools and curricular and extracurricular activities.

The task force strongly believes that both of the types of governance change we have discussed should be the long-term goal of Kansas City. We recognize that governance change may come step-by-step over time. We also recognize that the political will may not exist in Jefferson City at this time to devolve fiduciary responsibility for UMKC to trustees rooted in Kansas City. Nevertheless, we believe this must be the long-term governance objective, in the best interests of Kansas City, UMKC, and the state of Missouri.

Changes in governance are never easy. Particularly after periods of turmoil they may generate controversy. But the changes we are proposing to bring Kansas City into UMKC's governance are hardly radical. They are in fact typical of what is done in most good public universities. Without such changes, we doubt that UMKC can build strong, sustained executive or civic leadership to advance its interests. And we need to be blunt about this point: Without some change in governance of the kind we recommend there is little chance that UMKC can attract the philanthropic support from Kansas City that it will need to improve its standing as an urban public research university of quality.

When taxpayers consider that a sensible restructuring of governance holds the potential for philanthropic investment and for a university that can attract a much larger stream of federal funding, and that those resources support Kansas City and Missouri, they should not only welcome but demand the changes we recommend. Moreover, when the necessary restructuring offers the potential for enhanced quality and improved responsiveness, it seems clear that the benefits are of a magnitude to justify the inevitable controversy that any such changes will entail.

This is why we present a restructuring of governance as the first strategic goal for UMKC. It is the change that makes other changes possible.

LEADERSHIP

The other element of phase 1 strategy is to build leadership, at various levels. It will take time for the new governance instrument to get up and running, to begin to iron out its relationship with the Curators and the UM-system, and to engage with various elements of the Kansas City community that need to be heard on what UMKC needs to become. It will also take some time for UMKC's new Chancellor, who takes office in January 2006, to engage with the faculty, to get in place his new leadership team, and to develop his own sense of strategic priorities. The new Chancellor also needs time to engage with the various elements of the Kansas City community to learn about their hopes and concerns about UMKC. This process should not be rushed. It will take at least one year after the Chancellor's arrival, and possibly longer.

It is not likely that anyone will want to make a significant philanthropic investment in UMKC without knowing that the Chancellor's overall institutional strategy is supportive of the investment. And yet, without the clear potential of such investment, it may be hard to generate political and faculty support for getting Kansas City roots into the governance process.

The only way around this conundrum is for several philanthropies and individuals to announce at the beginning of phase 1 what they are prepared to do in phase 2 if rooted governance and strong leadership with faculty support is demonstrated. Therefore, at least some phase 2 academic strategies, and the philanthropy to support them, need to be offered in prospect at the start of phase 1.

B. PHASE 2 (3-10 YEARS) ACADEMIC STRATEGIES

Without steady leadership university-wide, school and program strategies are at best provisional. Accordingly, the recommendations we offer for UMKC in phase 2 should be taken more as directions for strategic thinking than actual strategies recommended for implementation.

In general, the strategic directions we recommend for UMKC in phase 2 are:

1) Enhance UMKC's stature as one of the top 20 universities in the arts.
2) Make the Bloch School a top-fifty business school with programs in entrepreneurship and biotechnology among the top-ten.
3) Create a strategic plan to make the Law School a top-fifty school, with two or three programs among the top-twenty.
4) Create a life sciences strategy that complements the strategy at KUMC and creates strong collaboration between UMKC, Stowers, KUMC, St. Luke's, and Hospital Hill.
5) Commit to a deep engagement in both research and practice with urban K-12 public education.
6) Create and implement attraction and retention programs that will lead to further improvements in

the enrollment and graduation rates of African American, Latino and other underserved populations.

7) Consider the creation of a privately-funded undergraduate Honors Program.

8) Create a proactive work force preparation program.

Taken together, these moves would commit UMKC to becoming an engaged urban institution focused on the major opportunities and challenges facing Kansas City. Many of them would also significantly enhance UMKC's research capacity and improve its academic stranding among American research universities.

We will comment briefly on these strategic directions and suggest what financial resources might be required.

THE ARTS

Even in an age that tends to think of education in cramped utilitarian terms, excellence in the arts offers universities a powerful platform for enhancing the quality and reputation of their undergraduate, graduate, and professional programs. This is the strongest foundation on which to build at UMKC. It is the only broad academic sector in which the university can stake out a claim in the near term to clear top-25 national stature.

Some might contend that if the arts are the strongest elements in UMKC philanthropic investment should be directed elsewhere. We disagree. There is nothing so invigorating to universities seeking to improve as the example of programs that are already world-class. Moreover, excellence in the arts offers two unequalled advantages. Nothing is more broadly enticing to students and faculty in all other academic fields. And nothing equals the arts (not even football and basketball!) in drawing the public into universities and enabling it to appreciate the creativity of the faculty and students. Yale has long distinguished itself among the Ivy League institutions as being the best place for musicians, actors and playwrights, painters and sculptors. When USC was better known for its football than its research capacity, the fact that music students could study with Jascha Heifitz was a powerful symbol of quality. It was a brilliant early president of Indiana University who persuaded the Governor and Legislature of that state to create one of the world's best music programs to give faculty and students a sense of cultural excitement about Bloomington.

Most Governors and Legislatures are not so easily persuaded, and so the quality of university arts programs tend to depend on enlightened philanthropy. This is a wonderful opportunity for Kansas City philanthropies and individual donors to improve both UMKC and the quality of life in Kansas City. Relatively small investments in the arts go a long way. For example:

- In music, a $10 million endowment gift would enable the Conservatory to hire 3 new faculty under the Missouri matching program, improve faculty salaries substantially, and improve financial aid for forty of the most outstanding doctoral, masters, and undergraduate students. This would put the conservatory clearly among the top 15 university music programs in the country. An investment in music at UMKC could directly contribute to music initiatives in the community. For example, support for jazz studies could be integrated with the project to make 18th and Vine one of the premier jazz venues in the country.
- In theatre, a $6 million endowment gift would, with the match, allow UMKC to hire a playwright-in-residence, and three scholars in English specializing in Elizabethan drama, American drama, and modern European drama. This would bolster the excellent repertory theatre at UMKC and improve the stature of UMKC's already highly ranked theatre studies department.
- In English, with the state match, a $1 million endowment gift could support a writer-in-residence and a poet-in-residence.
- In the visual arts, what is needed is the leadership and financial support required to make the excellent Kansas City Art Institute a full collaborator, and indeed leader, in UMKC's visual arts programs. There is collaboration today, but it is not nearly as deep and productive as it might be.
- In history of art, a $3 million endowment would allow the appointment of three distinguished senior professors, either if matched by the state or if they were joint appointments with the Nelson-Atkins or Kemper Museums.

In short, a philanthropic investment in the $20 million range would substantially improve the arts at UMKC to a top-notch urban university level.

THE BLOCH SCHOOL

The Bloch School has had significant philanthropic investment in recent years and has a clear strategy to become a top-fifty school. It is building an ambitious program in entrepreneurship under the leadership of Professors Michael Song and Mark Perry. It has a bi-state advisory council and a board created according to the terms of a gift from Henry Bloch that has authority over

how the gift's endowment income is directed.

We believe the Bloch School is a good candidate for philanthropic investment for many reasons. First, the School has leadership and a strategy. Like most business schools, it is sufficiently autonomous within UMKC that the absence of university leadership has not prevented it from moving forward on a clear strategy. Second, the school's primary academic area, entrepreneurship, is also the focus of Kansas City's largest philanthropy. Third, entrepreneurship will be at the heart of the life sciences strategy. Fourth, the school enjoys the support of one of the city's great philanthropic families, the Blochs. Fifth, the school is in a good position to model the new structure of governance and philanthropy that represents UMKC's best hope for improvement. Sixth, the school is in an excellent position to model effective engagement with the community, especially in the areas of new business creation, venture capital, entrepreneurial management, and biotechnology. Finally, it would be good for Kansas City to have the best business school between Chicago and Los Angeles.

We believe the Bloch School is the second part of UMKC, along with the arts, where a phase 1 concerted, ambitious philanthropic strategy would pay the largest dividends for Kansas City. We recommend that the school be used to model the power of a robust strategy, steady leadership, and governance in which the philanthropic community can have confidence. The entrepreneurship institute seems an ideal candidate for demonstrating this model. We believe the philanthropic community should commit to fund the entrepreneurship plan over the next 6-7 years, so long as the philanthropists are made partners in the strategy, satisfactory governance is in place, and clear quality benchmarks are met. We understand the investment needed would be approximately $25 million. This investment would not only create great value in the Bloch School. It could have a galvanizing effect on the rest of the university as well.

C. OTHER STRATEGIES AT UMKC

The arts and the Bloch School are the only areas at UMKC in which this task force feels a reasonable degree of confidence in recommending near-term philanthropic investment. The other six strategic directions for UMKC we recommend require that UMKC's new leadership team, the broader university community, and the civic leadership of Kansas City come together to fashion robust strategies. The ability to engage in strategic planning is one indication of the ability to execute a strategy. UMKC fell apart over strategic planning the last time it tried. With new leadership, with a new balance of governance, and with renewed commitment to Kansas City, the university has to demonstrate that it is capable of joining with the important elements of the Kansas City community to fashion a life sciences strategy, a plan for serious engagement with urban K-12, a plan to expand educational opportunity for the African-American and Latino communities, a serious approach to workforce preparation, a plan for an Honors College, and a plan to take the Law School to the next level. We believe UMKC can come together around strategic planning for these objectives. Now it has to prove it.

The investment plan we proposed in the arts and in the Bloch School amounted to $45 million. We recommend that Kansas City's foundations and individual philanthropist express a readiness to make a similar investment in phase 2 once UMKC demonstrates that it has a strong and realistic strategy for institutional improvement. The Governor, legislative leaders, and the UM-system need to be engaged in this strategic planning process as well. Civic leaders need to press the issues of governance, whether the state can improve its paltry support for the life sciences and medicine at UMKC, and whether the UM-system will confer true flagship status on UMKC in the arts, urban affairs, the professions, and the health sciences.

If these strategic planning issues are satisfactorily addressed, we believe philanthropic investment should follow. We believe a $100 million philanthropic investment in UMKC would put the university on the path to being the engaged urban university Kansas City needs.

IX. Inventing The Future: A Consortium For Advanced Studies

Kansas City has an opportunity to pioneer a consortial approach to higher education research capacity that is likely to be the model for the most advanced university research in the future. In a number of areas of research, the costs of being at the most advanced cutting edge of knowledge are too great for even the wealthiest universities to bear alone. Moreover, translational research requires such a broad range of interdisciplinary capacity that few universities can go it alone. In the future, research universities will have to figure out how to work together on problems of great complexity. This will require expanding the concept of the campus beyond a single geographical or institutional enclave.

This approach has been taken in the past with scientific instrumentation that is too expensive and too important for any one institution. For example, the particle accelerator at Brookhaven is used and operated by a consortium of a number of universities whose faculties and graduate students work together in cross-institutional teams on nuclear physics research. Another example is the Center for Structural Biology on the CUNY-City College campus in Harlem in New York City, which houses the most powerful imaging technology in the Western Hemisphere (the only one more powerful is in Tokyo). It is owned and administered by a consortium of New York institutions including CUNY, Columbia, NYU, Cornell, Memorial-Sloan Kettering, Mt. Sinai, and Albert Einstein. They all contribute to its capital costs and operating budget. By coming together, these institutions were able to persuade the state to cover most of the capital costs.

Other areas where there is a strong consortial tradition is with research libraries and student access to courses. The universities in The Research Triangle in Raleigh, North Carolina, to take one of the many examples, pool their collections in their acquisitions and dissemination strategies. The seven colleges in Western Massachusetts give students access to multiple campuses for courses and work with collections. Students at CUNY can take courses on any of the system's twenty campuses. Translational research has caused institutions to come together in matrix organizations such as CIMIT or CONNECT (described earlier in this report).

Several universities have tested the idea of expanding beyond the boundaries of a single campus enclave. The University of Chicago Business School has a campus in Singapore. Carnegie-Mellon has a campus in Silicon Valley. For obvious reasons, Johns Hopkins decided to locate its School of Advanced International Studies in Washington D.C.. Cornell has a medical school campus in Qatar.

Kansas City has an opportunity to pioneer the consortium model on a programmatic basis. The idea would be to invite a number of universities, including KU and the UM-System, to partner with foundations, with private research institutes such as MRI, Brookings, or the Manhattan Institute, with Kansas City hospitals, and with private sector enterprises in Kansas City, to create an entity that we will call the Kansas City Institute For Advanced Studies (KCIAS). This enterprise would be organized around specific program areas which are important to Kansas City and which are either not present at KUMC, KU-Edwards, UMKC, Stowers, MRI, etc. or where the capacity of those institutions needs reinforcement.

Obvious areas of focus for such an enterprise would be bioengineering and bioinformatics, various engineering disciplines such as electrical engineering, computer engineering, systems engineering, and telecommunications. Urban public education is an area where a new, multi-institutional approach might also contribute greatly to Kansas City. More broadly, urban affairs might be an important interdisciplinary focus.

KCIAS might prove to be a vehicle for organizing translational research teams such as CIMIT in Boston. It

could also be a good place to house an incubator facility such as Seattle's Accelerator where academic researchers could join with industry, entrepreneurs and venture capital to set up translational teams and start-up ventures. The Bloch School could play an organizing role in this process.

Finally, a potential field of focus for KCIAS is the exploration of bioethics. Kansas City would be leveraging an existing strength in this area. The Center for Practical Bioethics is a nationally recognized institution located in Kansas City. KCIAS can expand the Center's strong work with additional national and international researchers. There will be an increasing need to work with policy makers and the public on the complex ethical issues facing science, health and health care.

If Kansas City could provide an institutional vehicle for universities such as Washington University, Johns Hopkins, Carnegie-Mellon, and other first-rate research institutions to work together with Stowers, KU and the UM-System, MRI and the Kauffman Foundation, it would be possible to build on a small scale with very high quality from the outset. We know that the opportunity to work with Stowers is powerful attraction for Washington University and Johns Hopkins. Other universities might relish the opportunity to work with the Kauffman Foundation, MRI, the Nelson-Atkins Museum, or the Kansas City Art Institute. Universities will be well aware of the advantages of working in a community with such a powerful philanthropic tradition. Cal Tech and Rockefeller University demonstrate the high quality relatively small entities can quickly achieve.

At this point, we can only sketch out the roughest details of such an enterprise. Governance would be lodged in a private board of trustees which might include key foundation leaders, chancellors from KU, UM, and other partner universities, civic leaders, and national academic leaders. A good location might be next to or within UMKC, adjacent to Stowers, Kauffman, and MRI. A five-year target for development might be 50 faculty-20 in engineering, 20 in sciences, and 10 in social sciences or humanities programs, working with 100-200 PhD and postdoctoral students. KCIAS could think outside the box on such issues as joint appointments with foundations and industry, tenure arrangements, incentive compensation, and so on. Start-up funding requirements would grow to about $20 million a year by the fifth year, but if KCIAS were to focus on science and engineering it should attract approximately $15 million annually in external funding by the fifth year.

Obviously, the creation of such an enterprise would require a major investment in capital facilities in the $150 million range, in start-up operational support, and ultimately in endowment. But the investment might well be justified. Such an institution could focus on areas of greatest need. It would achieve very rapid impact and traction, on a timescale comparable to Stowers. It would be a very visible commitment to building the R&D base for success in the knowledge economy. Its location near Stowers, UMKC, KUMC, Kauffman, and MRI would provide those institutions with intellectual resources. It would avoid the governance issues and contentious politics of UMKC while giving that institution an opportunity to be a partner in a research enterprise of the highest quality. In the long run, if UMKC develops into an AAU-class research university, KCIAS might be merged into it.

All we can do at this point is sketch the consortial idea. If the leadership of Kansas City thinks the idea has promise, a task force would have to engage in a careful planning exercise, other universities would have to be tested for interest, financial models would have to be crafted, and governance relationships would have to be refined. We believe the consortial idea has merit, that it could serve Kansas City's interests, and, in the process, offer a model of entrepreneurship in higher education for the nation.

X. Politics and Higher Education

"Politics are now nothing more than a means of rising in the world." **Samuel Johnson, *Boswell's Life of Johnson*, vol. Ii, 369 (1770)**

"All politics is local." **Tip O'Neill**

A. TWO STATES

The fiscal politics of public higher education has been transformed in the past two decades. State budgets are caught in a seismic squeeze between mandatory, or seemingly mandatory, spending increases on medical care, expanding penal systems, unfunded federal mandates, mushrooming pension obligations for state employees, and crumbling highways and infrastructure on the one hand, and, on the other, an increasingly strained revenue base and growing anti-tax sentiment. This budgetary grind has been exacerbated in many states, including Kansas, by judicial mandates to increase spending on public K-12 education, and in others, including Missouri, by automatic limits on spending even if tax revenues rise. The consequence is that discretionary spending, no matter how worthy in policy terms, takes it on the chin. Spending on public higher education tends to be the discretionary spending cut of least political resistance. The immediate pain is felt by a narrow constituency, the tuition increases that follow are blamed mostly on the universities, and a lot of people tend to look on university priorities such as research and scholarship, sustaining library collections and tenure as wasteful.

Aside from people in the universities, the political constituency that understands best the crucial importance of high-quality public research universities tends to be well-educated, urban professionals and business leaders. This constituency is not necessarily adroit at slogging through the trenches of state politics. For all these reasons, public universities are under unprecedented financial strain. Universities with the quality to do so are relying more and more on alternate income streams: federal research funding, private gifts, endowments and higher tuitions. These public universities look increasingly like private universities. Public universities who lack the quality or strategic sense to develop these alternate revenues are in decline.

This national pattern, found in every state, has special significance in Kansas City, because the city's electoral impact is divided. The civic community must therefore think in fresh and fundamental ways about how it can influence politics in both Kansas and Missouri to promote high quality public higher education in Kansas City. Those who understand the benefits of strong public universities need to become much better organized and assertive if they want to influence this transformed policy landscape.

Kansas City's interest in higher education seems to resonate better in Kansas than in Missouri. Perhaps this is because Kansas' university presence in the city is its flagship medical center and it is not competing with other institutions in the KU-system, as is the case in Missouri. Perhaps this is because Kansas values public higher education more highly. Perhaps it is because Johnson County, Kansas is the wealthiest and fastest-growing in the state. Whatever the reasons, Kansas City is fortunate that

KU decided one hundred years ago to locate its flagship medical center in what is now the geographical heart of the city, and that the state has been relatively generous in its support.

But this does not mean the city's civic leadership should be satisfied with politics-as-usual in Kansas. Kansas has cut its state support in real terms for KU in recent years and this is likely to continue unless political dynamics change. Moreover, Kansas City will not get the research university capacity it needs unless KUMC makes a quantum leap in quality, reputation, and external R&D funding, and unless KU can be persuaded to locate bioengineering, bioinformatics, computer science, and engineering in the city. As we have seen, these strategies will require significant state financial support. The fact that these moves would clearly be good for the University of Kansas and the state is not likely to suffice unless Kansas City, as a whole, becomes a much more powerful advocate in Topeka for the role of KU in the city.

The city's need to raise its political profile in Missouri is even more pressing. In the politics of public higher education, Kansas City's voice seems especially weak in Jefferson City. We reiterate that the city should be extremely grateful to the state of Missouri and to the University of Missouri system for rescuing the University of Kansas City in 1963 and supporting it since. But Kansas City's leaders need to recognize that the political process in Missouri has delivered a clear, bipartisan message for decades on the academic stature of UMKC. Unless Missouri's politics change, UMKC will not be given the public investment necessary to raise it to the level of a top-100 research university. How else can one read the fact that the UMKC Medical School receives the smallest state support of any public medical school in the country? And the fiscal politics of public higher education in Missouri is trending down. The flagship campus at Columbia is under great fiscal stress, and its academic position relative to other public flagships in the heartland is in decline.

We conjecture that the excellence of Washington University in St. Louis may contribute to Missouri's anemic support for public higher education. The point is not that Washington University's advocates are in any way lukewarm in their support of public higher education in Missouri. On the contrary, the Washington University community knows very well that few things would be better for the University and the state than for all four campuses of the University of Missouri to be preeminent public research universities. But politics is about intensity and interest, as well as understanding. The fact that St. Louis is home to one of the world's leading research universities almost certainly contributes to the low priority Missouri politics assigns to competitive excellence for public higher education.

What is to be done? We recommend that the civic leadership in Kansas City organize itself to exercise political power in Topeka and Jefferson City. The political effort should be bipartisan, high-minded, as supportive of UM-Columbia and KU-Lawrence as of public institutions in Kansas City, and bare-knuckled. We recommend that the civic leaders create deep-pocket political action committees to support public higher education in Kansas and Missouri. The message of these PAC's should be clear: Legislative champions of public higher education from both parties will receive strong support. Those who do not support higher education can expect to face well-financed opponents who will make the case for investment in education and economic growth. In governors' races, Kansas City's leaders should make clear that support for public higher education is the decisive issue determining whether candidates get support.

The other political strategy we believe Kansas City should consider is to use philanthropic capacity to leverage political support. We have already suggested that the philanthropic investment in KUMC be conditioned on state support for building KUMC's research capacity. Similarly, we believe the philanthropic commitments to UMKC we have recommended should depend on governance changes of the kind we have recommended. Kansas City philanthropies should consider whether there are other ways the philanthropies and the states can become partners in building the research university and the urban university capacities that Kansas City needs.

B. FEDERAL

Kansas City must press its interests at the federal level, as well. Kansas' and Missouri's powerful Senators and Representatives are familiar with earmarking federal support for important state priorities. The recent federal transportation legislation passed in August, 2005 contained a record 174 earmarks for colleges and universities adding up to more than half a billion dollars. Included was $14.5 million for the University of Kansas for advanced vehicle design, $3.5 million for K-State for rural transportation, and $16 million for UM-Rolla to set up one of ten national university transportation centers. Alaska's universities received $25 million, the University of Alabama received $36 million.

Kansas and Missouri senators, two of whom are powerful members of the Appropriations Committee, should be reminded of the legacy of Warren Magnuson in building the Fred Hutchinson Cancer Center in Seattle. House members should be persuaded that building a life sciences bridge in Kansas City to the knowledge economy of tomorrow is as worthy a federal objective as building a $223 million bridge across the Tongass Narrows to Ketchikan, Alaska, the notorious “bridge to nowhere” in the 2005 transportation act.

Congress currently earmarks over $2.1 billion annually for higher education, and the amount has been growing at ten percent annually for the past five years. Missouri and Kansas Senators constitute four percent of the Senate, but their collective clout is a lot more than that. If Kansas' and Missouri's congressional delegations could be persuaded to support a ten-year life sciences and medicine strategy in Kansas City by targeting one percent of total federal earmarks for higher education over that period, which is a modest objective for a two-state region of greater Kansas City's importance, the result would be a federal investment of $250-300 million. This is in addition to the yearly NIH and NSF grant funding that can be expected.

C. LOCAL

We have noted earlier in this report that Kansas City needs to explore the possibility of local tax base support for KUMC and UMKC. We wish to emphasize this as a political priority of the highest importance. We understand that Kansas City's tax base is already strained. But economic growth is the best relief. It should be relatively easy to demonstrate to the residents of the metro counties that they will benefit greatly from a modest but consistent tax support for KUMC, the Edwards Campus, and UMKC, just as they have from the work of Kansas City's excellent community colleges. Civic leadership should force this issue onto the local political agenda and not let up.

Conclusion

"Nothing great was ever achieved without enthusiasm." **Ralph Waldo Emerson**

This task force is cautiously optimistic about Kansas City's prospects to create a higher education enterprise that can lead the city to prosperity and opportunity in the global knowledge economy of the future. The reason for our caution is that certain things need to come to pass in Kansas City that have not happened before.

The first is civic leadership for the long haul in the life sciences. Leadership must carry forward three essential responsibilities. First, leadership must not only stimulate but focus the necessary philanthropic and state investment on basic research at KUMC. We have called for the equivalent, in philanthropic and in state capital and operating funding, of what would be a $1 billion private university investment. That sounds like a lot of money. There will be pressure to spread it around. That would be a serious mistake.

Basic life sciences research is a vast and almost unfathomable universe in which quality and scope are critical. KUMC is the only academic enterprise in Kansas City with the current capacity to generate a high quality and broad scope of basic research activity in a reasonable time and with a high probability of success. Focus is essential, but it may not be popular in all quarters. Civic leadership must stay focused.

The second responsibility of civic leadership is to ensure that all the life sciences and medical institutions work together. Basic research capacity at KUMC must collaborate successfully not only with other basic research, such as at Stowers, but with the translational and clinical research and care that takes place at UMKC and the Kansas City, Missouri hospitals. One has only to look at the record of the past to see that this will require a new level of cooperation. This may not be easy to bring about. Civic leadership must insist on this.

Third, civic leadership must insist on accountability and alignment with strategy. This is not always easy with institutions that are proud and have traditions of autonomy. Moreover, the life sciences strategy needs to be long-term beyond the tenure of some current institutional leaders. Leadership changes must not cause strategic commitments to waiver. Thus, civic leadership must carry the responsibility for continuity, as well.

We have no doubt that Kansas City has civic leaders who are eminently capable of carrying out these responsibilities. But it has not been done before. It will require an unprecedented commitment of skill, energy, and fortitude, as well as philanthropic and state investment.

A second group of civic leaders is required to oversee phases 1, 2, and 3 of building UMKC's capacities as an engaged urban university. This is going to require a long-term focus on governance, academic leadership, and on improving Missouri's very low levels of support for its public universities. The philanthropic investment required may be less than that called for by the basic life sciences effort, but it is still substantial. And let us be as clear as possible about a basic strategic imperative: improving public education in Kansas City and bringing educational opportunity to underserved minority groups is as important to the future of the city as is building the research capacity to compete in the global knowledge economy. We have no doubt that civic leadership has the capacity. But there is also no precedent in the history of UMKC for the civic and academic leadership required.

Our second area of cautious optimism covers Kansas City's philanthropic capacity. The strategy we have recommended for KUMC and UMKC will call for roughly $325 million of concerted philanthropic investment over a ten-year period, assuming that UMKC achieves rooted governance, solid leadership, and sound strategy. It is presumed that this philanthropy will trigger further philanthropy and substantial state investment, especially from Kansas for KUMC. Will all this come together? It should. The case for investment is compelling. And Kansas City foundations and individual philanthropists clearly

have the capability. But this too is an unprecedented level of investment in higher education in Kansas City. Thus, caution is warranted.

Third, the higher education strategy we recommend intersects with the politics of two states, and politics is unpredictable. Even when the most compelling case is made, politics can still disappoint.

We hope that the challenges of robust strategies for UMKC and KUMC will not be so heavy that Kansas City shies away from giving serious consideration to the consortial enterprise we sketched out in section IX. We believe such an enterprise might have great value to the region.

If our optimism is hedged with caution, our enthusiasm for what Kansas City can accomplish is unbridled. We have been deeply impressed with the wisdom, good will, and energy of the many exceptional individuals we have met from all parts of the diverse urban community. Kansas City has tremendous strengths. Few cities have more robust or better-informed philanthropic institutions and individuals. Few cities offer to higher education such opportunities for collaboration with great private research, arts, and cultural institutions. No city in America has the capacity to look for help to two states, and to two AAU-class public universities, to help create the higher education enterprise it needs. No other city has it in its grasp to be the home of the largest private medical research institution in the world. If Kansas City can harness its higher education potential, the results will be impressive indeed.

Judge Learned Hand once wrote “the spirit of liberty is the spirit that is not too sure it is right.” We present this report in that spirit. We are outsiders who have tried to bring our knowledge of higher education and urban development in other places to bear on the unique opportunities and challenges of Kansas City. We are certain that we have missed some things and gotten other things wrong. However, we are also certain that Kansas City needs a strategy for higher education. The status quo requires fundamental change. If our reflections in this report cause the entire Kansas City community, in all its broad diversity, to come to grips with the city's urgent need to fashion a compelling strategy for higher education, then we will consider our contribution to the effort to have been very worthwhile.

Appendix

BLUE RIBBON TASK FORCE MEMBER BIOGRAPHIES

DR. BENNO C. SCHMIDT, JR., BLUE RIBBON TASK FORCE CHAIR

Benno C. Schmidt, Jr. was the president of Yale University from 1986 to 1992, where he was known for his outspoken defense of freedom of expression and liberal education.

During his presidency, Yale's endowment grew from $1.7 billion to nearly $3 billion, the highest rate of growth among the major endowed private universities in this country. Benno presided over one of the largest building programs in Yale's history, he fashioned a model partnership between the university and the city of New Haven, and he helped build a number of new interdisciplinary programs, especially in environmental sciences and policy and in international studies.

Before joining Yale, Benno was the dean of Columbia University Law School. He joined the faculty in 1969 and four years later, in 1973, he became, at age 29, one of the youngest tenured professors in Columbia's history. He was named Harlan Fiske Stone Professor of Constitutional Law in 1982.

Benno served as law clerk to Supreme Court Chief Justice Earl Warren. He received both his college and law degrees from Yale University. He is a trustee of the National Humanities Center and a member of the American Academy of Arts and Sciences.

In August of 1999, Schmidt was appointed by New York Governor George Pataki to serve as the Vice Chairman of the Board of Trustees of the City University of New York (CUNY). Later, in April of 2003, Pataki promoted Schmidt to the position of Chairman of the Board of Trustees of CUNY. Schmidt previously served as Chairman of the Mayor's Advisory Task Force on CUNY, appointed by Mayor Rudy Giuliani in May of 1998.

His task force report has helped put CUNY on a path to record enrollment, an unprecedented increase in full-time faculty, higher academic standards, and the largest capital improvement in CUNY's history.

Benno is also the Chairman of the Board of Directors for Edison Schools, Inc. Schmidt has been with Edison since its founding in 1992. According to its website: "Edison Schools partners with school districts, charter boards, and states to raise student achievement and educational outcomes through its research-based school design and curriculum, achievement management solutions, professional development, and extended learning programs."

DR. JAMES J. DUDERSTADT

Dr. James J. Duderstadt is President Emeritus and University Professor of Science and Engineering at the University of Michigan. He also serves as Director of the Millennium Project, a research center in Michigan Media Union concerned with the impact of technology on society. Dr. Duderstadt chairs the University's program in science, technology and public policy in the Gerald R. Ford School as well.

Dr. Duderstadt received his baccalaureate degree in electrical engineering with highest honors from Yale University in 1964 and his doctorate in engineering science and physics from the California Institute of Technology in 1967. After a year as an Atomic Energy Commission Postdoctoral Fellow at Caltech, he joined the faculty of the University of Michigan in 1968 as Professor of Nuclear Engineering.

Dr. Duderstadt became Dean of the College of Engineering in 1981 and Provost and Vice President for Academic Affairs in 1986. He was appointed as President of the University of Michigan in 1988, and served in this role until July, 1996. He currently holds a university-wide faculty appointment as University Professor of Science

and Engineering.

Dr. Duderstadt's teaching and research interests have spanned a wide range of subjects in science, mathematics, and engineering, including work in such areas as nuclear fission reactors, thermonuclear fusion, high powered lasers, computer simulation, science policy, higher education, and information technology.

During his career, Dr. Duderstadt has received numerous national awards for his research, teaching, and service activities, including the E. O. Lawrence Award for excellence in nuclear research, the Arthur Holly Compton Prize for outstanding teaching, and the National Medal of Technology for exemplary service to the nation.

He has been elected to numerous honorific societies including the National Academy of Engineering, the American Academy of Arts and Science, Phi Beta Kappa, and Tau Beta Pi.Dr.

Duderstadt has served on and/or chaired numerous public and private boards. These include the National Science Board; the Executive Council of the National Academy of Engineering, the Committee on Science, Engineering, and Public Policy of the National Academy of Sciences; the Nuclear Energy Research Advisory Committee of the Department of Energy; the Big Ten Athletic Conference; the University of Michigan Hospitals, Unisys, and CMS Energy.

He currently chairs several major national study commissions, including a National Academy of Science task force examining the impact of information technology on the future of the university, a National Research Council panel developing a guidebook concerning scholarship in the digital age, and a Department of Energy committee developing a long-range strategy for nuclear energy research in the United States.

DR. FARRIS W. WOMACK

Farris W. Womack has served as a consultant to a variety of venture capital and Internet companies, in addition to universities and governments across the country. Womack's financial acumen is renowned and sought after in government and higher education communities.

Womack served two state governments as Chief Financial Officer (CFO), the State of Arkansas from 1981 - 1983 and the State of North Carolina from 1986 - 1988. During his appointment as a North Carolina state official, he was also the CFO of the University of North Carolina, Chapel Hill.

Womack has extensive experience managing the finances of public universities, most recently at The University of Michigan as Executive Vice President and CFO from 1988 - 1998. His academic career also includes the University of North Carolina from 1983 - 1988 as Vice Chancellor for Business and Finance, the University of Arkansas from 1975 - 1981 where he filled a number of financial roles, most notably as Executive Vice President and Arkansas State University from 1971 - 1975 as Director of Institutional Research.

Womack holds a Doctorate in Education from the University of Arkansas in Educational Administration, a Masters in Education from the University of Arkansas and a Bachelor of Arts from the University of Central Arkansas. He currently resides in Raleigh, North Carolina.

THE HONORABLE KURT SCHMOKE

Currently, former Baltimore Mayor Kurt Schmoke is the Dean of the Howard University Law School, a position he has held since January 1, 2003.

In July of 1999, Schmoke became the senior fellow of the Yale Corporation. The senior fellow serves as the elder statesman of the Yale Corporation and speaks with the university president on a regular basis about all areas of university policy.

Schmoke was elected Baltimore's first black mayor on November 3, 1987. He developed a reputation for being one of the most innovative mayors in the country. In December 1998, Schmoke decided not to seek re-election.

Prior to his service as mayor, Schmoke was elected Baltimore's State's Attorney from 1982 to 1987. The State's Attorney is the city' chief prosecutor.

His other public service included his appointment as assistant director, White House domestic policy staff, under then-President Jimmy Carter.

Schmoke attended Baltimore public schools and, in high school, was the star quarterback and the first African American elected class president. In 1971, received a bachelor's degree in history from Yale University. Before graduating from Harvard Law School in 1976, he pursued graduate studies on a Rhodes scholarship at Oxford.

SARA MARTINEZ TUCKER

Since 1997 Sara Martinez Tucker has been the president and chief executive officer of the Hispanic Scholarship Fund (HSF), the nation's leading organization supporting Hispanic higher education.

During its 27-year history, HSF has awarded more than 61,000 scholarships, totaling more than $115 million, to deserving students studying at more than 1,700

universities and colleges throughout the United States, Puerto Rico and the U.S. Virgin Islands. Her goal is to double the number of Hispanics receiving college degrees by 2006 and to achieve an 18 percent increase in the rate of Hispanics earning college degrees by 2010.

Martinez Tucker was named the 2000 Hispanic of the Year by Hispanic magazine. In April 2003, Martinez Tucker was chosen as one of America's top 80 Elite Hispanic Women by Hispanic Business magazine and in March 2002, the readers of HispanicOnline.com honored her with the Latino's Choice Award for Favorite Hispanic Leader. In 1999, Martinez Tucker was included in Hispanic Business magazine's 100 Most Influential Hispanics for the third consecutive year.

In 2004, Governor Arnold Schwarzenegger appointed Martinez Tucker to the California Community College Board of Governors.

In 2001, President George W. Bush appointed Martinez Tucker to the Board of Directors of the Student Loan Marketing Association, the wholly owned government-sponsored enterprise subsidiary of USA Education, Inc., widely known as Sallie Mae.

Also during this time, Martinez Tucker was named to the newly created North American Diversity Advisory Board of Toyota Motor Corporation to raise employee awareness of ethnic and minority issues, and to counsel the company on race relations in North America.

Martinez Tucker spent 16 years with AT&T in a variety of departments. In 1990 she became the first Hispanic female to reach AT&T's executive level when she was promoted to Director of Human Resources and Quality for the Network Services Division.

Martinez Tucker is a native of Laredo, Texas. She received her undergraduate degree in journalism, graduating with honors from the University of Texas. She was a general assignment reporter for the San Antonio Express-News before returning to the University of Texas, where she received a master of business administration degree with high honors.

DR. RICHARD C. ATKINSON

Richard C. Atkinson, seventeenth president of the University of California, took office on October 1, 1995. His last day as president was October 1, 2003. Before becoming president of the UC System, he served as chancellor of UC San Diego; prior to that he served as director of the National Science Foundation and was a long-term member of the faculty at Stanford University.

Currently, Dr. Atkinson serves as a member of the Board of Directors of the California Charter Schools Association.

An internationally respected scholar and scientist, Atkinson became the fifth chancellor of UC San Diego in 1980. During his tenure, the university doubled in size to about 18,000 students while increasing the distinction and breadth of its programs. The campus consistently placed among the top five universities in federal funding for research. In 1995, the quality of its graduate programs was ranked tenth in the nation by the National Research Council.

Atkinson was appointed deputy director of the National Science Foundation by President Gerald Ford in 1975. Two years later, President Jimmy Carter promoted him to director. At NSF, he had a wide range of responsibilities for science policy at a national and international level, including negotiating the first memorandum of understanding in history between the People's Republic of China and the United States, an agreement for the exchange of scientists and scholars.

Atkinson began his academic career at Stanford University after military service in the U.S. Army. He was a member of the Stanford faculty from 1956 to 1980, except for a three-year period at UCLA. In addition to serving as professor of psychology at Stanford, he held appointments in the School of Engineering, School of Education, Applied Mathematics and Statistics Laboratories, and Institute for Mathematical Studies in the Social Sciences.

Atkinson's research dealt with problems of memory and cognition. His theory of human memory has been influential in shaping research in the field. It has helped in clarifying the relationship between brain structures and psychological phenomena, in explaining the effects of drugs on memory, and in formulating techniques that optimize the learning process.

Atkinson has also been interested in the more applied problems of learning in the classroom. He developed one of the first computer-controlled systems for instruction, which served as a prototype for the commercial development of computer-assisted instruction. Reading instruction under computer control for young school children has been an important application of his work. He was co-founder of the Computer Curriculum Corporation.

Atkinson's scientific contributions have resulted in election to the National Academy of Sciences, the Institute of Medicine, the National Academy of Education, and the American Philosophical Society. He is past president of

the American Association for the Advancement of Science, former chair of the Association of American Universities, the recipient of numerous honorary degrees, and a mountain in Antarctica has been named in his honor.

His wife, Rita Atkinson, holds a PhD in psychology. Their daughter, Lynn, has an M.D. degree and is a neurosurgeon.

A NOTE ON SOURCES

Those who wish to delve more deeply into the themes of this report should refer to:

Hugh Graham and Nancy Diamond, *The Rise of American Research Universities* (John Hopkins University Press, 1997);

Frank Rhodes, *The Creation of the Future* (Cornell University Press, 2001);

Gary Becker, *Human Capital: A Theoretical and Empirical Analysis* (2nd edition, Princeton University Press, 1975);

Richard Florida, *The Flight of the Creative Class* (Harper, 2005);

George Psacharopoulos, *Economics of Education* (Pergamon Press, 1987);

William Julius Wilson, *The Truly Disadvantaged* (University of Chicago Press, 1987);

James Duderstadt, *A Roadmap to Michigan's Future: Meeting the Challenge of a Global Knowledge -Driving Economy* (The Millennium Project, 2005);

Carleton F. Scofield, *A History of the University Of Kansas City (Lowell Press, Kansas City, Missouri, 1976);*

Dean E. McHenry, et al, Higher Education in Kansas City (1957);

Ernst & Young, *Beyond Borders: Global Biotechnology Report 2005;*

Battelle Technology Partnership, *State Biosciences Initiatives 2004;*

National Academy of Science, *The Impact of Academic Research and Industrial Performance* (2003)

We have relied on a large number of excellent reports on Kansas City, including:

Kansas City: Organizing for Success (Brookings, 2004);

Citistates Report/Kansas City, Curtis Johnson and Neal Peirce (2003);

2005 Greater Kansas City Economic Forecast (Chamber of Commerce);

Greater Kansas City Regional Workforce Summit Report (Full Employment Council, 2001);

Missouri Workforce Gap Analysis: Needs Assessment (MERIC, 2004);

Growth in the Heartland (Brookings 2002);

The Kansas City Region: Economic Opportunity in the Heartland (Brookings 2004);

UMKC Overview: Who We Are and Where We Are Going (UMKC 2004);

Funding of Higher Education in Missouri: A Report to the Civic Council (MGT 2003);

Sponsored Research at the University of Kansas 2004 (KU 2004);

Animal Health Initiative (Chamber 2005)

Thomas Friedman, *The World is Flat: A Brief History of the 21st Century* (Farrar, Strauss, and Giroux, 2005);

National Intelligence Council, *Mapping the Global Future,* Project 2020 (Washington: Government Printing Office, 2004)

James Duderstadt and Farris Womack, *The Future of the Public University in America: Beyond the Crossroads* (Johns Hopkins University Press, 2002);

National Academies, *Rising Above the Gathering Storm* (*www.nationalacademies.org 2005*)

TABLE 1. TOTAL R&D EXPENDITURES AT UNIVERSITIES AND COLLEGES, RANKED BY FISCAL YEAR 2002 TOTAL R&D EXPENDITURES: FISCAL YEARS 1995-2002 *[Dollars in thousands]*

Institution and ranking	1995	1996	1997	1998	1999	2000	2001	2002
Total, all institutions	22,169,797	23,044,839	24,368,723	25,853,712	27,528,325	30,062,741	32,767,087	36,332,641
[1] Johns Hopkins U., The	788,687	798,468	829,241	853,620	874,518	901,156	999,246	1,140,235
[2] U. CA Los Angeles	303,668	354,645	398,865	447,367	477,620	530,826	693,801	787,598
[3] U. MI all campuses	443,070	468,876	483,485	496,761	508,619	551,556	600,523	673,724
[4] U. WI Madison	403,541	412,570	419,810	443,695	499,688	554,361	604,143	662,101
[5] U. WA	389,160	406,472	409,959	438,191	482,659	529,342	589,626	627,273
[6] U. CA San Francisco	329,742	320,757	343,384	379,970	417,095	443,013	524,975	596,965
[7] U. CA San Diego	357,333	371,509	376,655	418,790	461,632	518,559	556,533	585,008
[8] Stanford U.	318,871	351,526	395,310	410,309	426,549	457,822	482,906	538,474
[9] U. PA	272,393	288,430	296,141	333,477	383,569	430,389	469,852	522,269
[10] Cornell U. all campuses 2	343,786	339,534	351,030	363,511	395,552	410,393	443,828	496,123
Total, 1st 10 institutions	3,950,251	4,112,787	4,303,880	4,585,691	4,927,501	5,327,417	5,965,433	6,629,770
[11] U. MN all campuses	336,524	341,179	363,095	360,323	371,384	411,380	462,011	494,265
[12] PA State U. all campuses	330,881	337,938	339,955	362,643	379,402	427,575	458,066	492,739
[13] U. CA Berkeley 2	291,200	316,320	377,376	420,426	451,539	518,514	446,273	474,746
[14] U. CA Davis	244,116	254,604	267,341	288,796	307,950	364,789	432,396	456,653
[15] MA Institute of Technology 2	370,800	380,612	410,930	413,098	420,306	426,299	435,495	455,491
[16] Duke U.	218,703	242,235	251,536	282,388	348,274	356,625	375,133	441,533
[17] TX A&M U. all campuses	362,539	366,983	366,798	393,720	402,203	397,268	407,041	436,681
[18] OH State U. all campuses	246,287	262,147	289,100	301,518	322,810	361,399	390,652	432,387
[19] U. IL Urbana-Champaign	246,174	268,995	286,470	329,266	358,247	373,024	390,863	427,174
[20] Washington U. St. Louis	209,100	218,640	262,426	269,550	315,606	362,216	406,642	416,960
Total, 1st 20 institutions	6,806,575	7,102,440	7,518,907	8,007,419	8,605,222	9,326,506	10,170,005	11,158,399
[21] Baylor C. of Medicine	190,375	184,613	192,744	216,528	272,198	334,175	381,461	411,924
[22] Columbia U. in the City of New York	244,991	236,403	244,337	267,007	279,587	319,693	354,497	405,403
[23] Harvard U.	276,422	282,443	299,961	306,100	326,193	341,810	372,107	401,367
[24] U. Pittsburgh all campuses	186,457	189,826	202,533	213,842	249,477	294,809	348,792	400,200
[25] U. CO all campuses	243,932	251,301	269,816	311,203	318,618	353,908	365,472	399,818
[26] U. AZ	292,351	279,656	285,278	302,328	320,245	345,090	367,128	390,827
[27] U. FL199,216	255,099	272,373	274,862	304,447	313,692	347,892	386,316	
[28] U. Southern CA	222,159	244,258	259,246	268,806	280,741	300,445	340,597	372,397
[29] U. NC Chapel Hill	209,118	208,529	221,380	235,296	252,767	269,072	303,576	370,806
[30] Yale U.	231,819	234,901	245,536	262,680	274,050	296,706	321,514	354,243
Total, 1st 30 institutions	9,103,415	9,469,469	10,012,111	10,666,071	11,483,545	12,495,906	13,673,041	15,051,700
[31] GA Institute of Technology all campuses	211,875	225,633	240,237	259,233	263,725	304,511	306,533	340,347
[32] U. MD College Park	209,945	216,957	215,927	223,190	257,628	252,429	267,383	324,980
[33] U. TX Austin	228,676	241,606	239,021	244,843	258,122	272,811	295,104	320,966
[34] IN U. all campuses	145,512	154,260	165,198	171,754	194,790	227,737	259,899	299,080
[35] NC State U.	180,191	190,748	229,292	254,254	270,621	277,946	299,259	290,018
[36] MI State U.	182,009	182,589	190,178	193,611	207,912	238,436	265,946	289,787

[37] U. IA	164,893	178,228	184,414	199,063	207,135	236,944	255,348	288,808
[38] LA State U. all campuses	186,723	196,328	205,441	208,928	225,808	251,233	268,911	287,363
[39] Purdue U. all campuses	203,419	206,951	206,588	216,479	226,411	234,536	254,917	285,778
[40] U. GA	206,256	209,357	225,457	217,945	237,493	258,476	272,298	284,660
Total, 1st 40 institutions	**11,022,914**	**11,472,126**	**12,113,864**	**12,855,371**	**13,833,190**	**15,050,965**	**16,418,639**	**18,063,487**
[41] Northwestern U.	173,731	187,262	200,943	223,235	233,809	245,774	257,933	282,154
[42] Emory U.	148,178	149,168	163,619	172,884	189,170	206,070	236,997	271,238
[43] U. MD Baltimore	107,874	122,207	134,808	143,321	140,903	224,346	239,007	266,822
[44] U. TX Southwestern Medical Ctr. Dallas	125,301	130,162	140,589	153,711	165,520	189,216	222,376	263,958
[45] U. TX M. D. Anderson Cancer Ctr.	122,181	120,964	129,578	141,260	155,126	182,196	212,746	262,145
[46] U. Rochester 2	158,539	144,914	155,311	174,617	177,126	197,335	234,261	261,601
[47] U. IL Chicago	119,381	121,540	139,296	151,739	175,093	195,839	233,098	259,852
[48] Rutgers The State U. NJ all campuses	192,263	185,103	183,038	197,053	213,838	225,268	236,793	258,829
[49] U. AL Birmingham, The	158,779	170,193	203,758	227,720	232,115	233,461	231,702	255,053
[50] SUNY Buffalo all campuses	143,768	137,701	135,663	151,650	166,823	187,692	186,829	239,735
Total, 1st 50 institutions	**12,472,909**	**12,941,340**	**13,700,467**	**14,592,561**	**15,682,713**	**17,138,162**	**18,710,381**	**20,684,874**
[51] U. KY all campuses	111,934	118,721	124,804	161,346	174,034	202,392	211,721	236,275
[52] VA Polytechnic Institute & State U.	148,501	143,815	169,808	167,118	169,250	192,672	216,323	232,560
[53] U. Chicago 2	126,261	135,693	150,531	151,635	162,805	170,678	194,125	225,264
[54] NY U.	148,935	145,874	153,288	156,452	167,179	182,205	190,722	222,978
[55] CA Institute of Technology 2	138,016	157,005	177,888	185,066	212,216	222,666	215,085	220,004
[56] Case Western Reserve U.	141,089	143,435	161,825	176,330	182,332	193,057	198,253	219,042
[57] U. Cincinnati all campuses	91,159	127,733	141,604	159,695	153,002	171,906	192,895	217,739
[58] U. UT	105,642	114,423	135,911	142,956	153,843	187,661	197,597	216,707
[59] U. CA Irvine	109,908	119,647	119,669	130,415	141,842	158,437	179,866	209,469
[60] Vanderbilt U.	111,224	117,003	122,598	135,214	149,675	171,926	186,504	208,305
Total, 1st 60 institutions	**13,705,578**	**14,264,689**	**15,158,393**	**16,158,788**	**17,348,891**	**18,991,762**	**20,693,472**	**22,893,217**
[61] Wayne State U.	106,140	112,151	124,383	138,456	146,832	156,814	175,984	199,007
[62] U. South FL	92,758	94,157	99,649	104,325	123,961	145,397	171,550	197,894
[63] Boston U.	103,709	110,266	120,392	130,054	141,102	154,029	172,031	192,612
[64] IA State U. 2	154,932	151,914	155,433	156,766	161,301	175,558	179,196	188,664
[65] U. TN system	151,316	149,331	154,230	150,694	158,930	163,690	161,898	188,261
[66] Carnegie-Mellon U. 2	125,659	136,514	134,954	137,450	142,174	137,980	144,882	188,191
[67] Mt. Sinai School of Medicine	92,008	92,405	94,776	109,448	127,765	149,846	176,946	185,335
[68] SUNY Stony Brook all campuses	122,611	126,377	136,624	141,766	148,982	163,307	168,487	184,045
[69] U. VA all campuses	136,679	97,334	114,085	139,135	131,138	140,416	149,547	182,340
[70] CO State U.	122,172	126,701	128,580	140,179	150,281	152,279	161,144	178,845
Total, 1st 70 institutions	**14,913,562**	**15,461,839**	**16,421,499**	**17,507,061**	**18,781,357**	**20,531,078**	**22,355,137**	**24,778,411**
[71] U. of Medicine and Dentistry NJ	96,365	98,535	110,383	114,491	126,277	140,951	162,417	178,156

[72] U. MO-Columbia	122,870	119,079	128,178	136,061	149,002	158,861	174,782	177,011
[73] U. KS all campuses	100,702	100,649	108,893	117,115	132,752	148,670	156,467	172,131
[74] U. CT all campuses	139,956	147,522	140,840	134,448	134,986	161,084	164,366	172,003
[75] U. NE Lincoln	107,721	102,460	117,100	118,857	131,046	136,023	157,520	171,431
[76] U. Miami	128,736	130,056	135,888	136,972	139,608	145,795	153,772	171,319
[77] U. OK all campuses	102,337	109,071	114,387	126,861	142,085	150,902	148,695	169,373
[78] Rockefeller U.	99,348	105,595	109,999	115,494	121,519	124,138	145,571	166,603
[79] Princeton U. 2	104,157	112,380	114,549	115,996	124,237	134,875	149,411	164,408
[80] U. HI Manoa	78,429	111,202	120,107	148,007	156,810	161,300	156,976	161,823
Total, 1st 80 institutions	**15,994,183**	**16,598,388**	**17,621,823**	**18,771,363**	**20,139,679**	**21,993,677**	**23,925,114**	**26,482,669**
[81] OR State U.	123,402	131,334	131,467	138,240	139,285	140,751	153,925	161,735
[82] OR Health Sciences U.	74,726	80,333	98,319	109,374	120,429	131,486	136,785	158,729
[83] MS State U.	72,145	84,124	84,157	100,410	110,896	132,503	146,939	158,652
[84] Yeshiva U.	94,739	91,430	96,819	99,000	111,771	139,618	148,230	157,124
[85] U. NM all campuses	129,354	116,618	116,152	125,910	115,850	133,980	156,619	150,598
[86] U. TX Houston Health Science Ctr.	74,664	82,803	95,638	101,993	105,307	119,587	125,439	138,380
[87] Clemson U.	82,883	84,836	84,034	90,150	99,341	114,903	123,885	134,840
[88] FL State U.	86,060	78,125	95,908	94,463	97,673	105,095	113,817	134,351
[89] U. MA Worcester	62,441	63,341	71,346	82,950	83,040	97,587	111,221	132,729
[90] Medical U. SC	57,495	54,426	57,111	57,940	55,819	65,243	116,687	132,030
Total, 1st 90 institutions	**16,852,092**	**17,465,758**	**18,552,774**	**19,771,793**	**21,179,090**	**23,174,430**	**25,258,661**	**27,941,837**
[91] U. CA Santa Barbara	78,737	91,284	91,149	96,034	104,561	118,154	116,372	131,795
[92] U. TX Health Science Ctr. San Antonio	87,336	83,028	86,019	82,357	87,804	103,824	115,154	129,616
[93] U. TX Medical Branch Galveston	72,569	73,759	77,683	86,488	93,580	97,896	102,722	129,534
[94] Dartmouth C.	50,525	52,945	61,619	64,964	69,522	78,874	109,096	126,839
[95] U. SC all campuses	79,710	78,619	77,855	92,785	105,835	104,398	109,973	123,108
[96] AZ State U. main campus	77,009	84,653	80,740	92,019	107,184	108,117	118,763	123,016
[97] UT State U.	82,468	81,709	91,292	94,228	95,364	103,161	121,359	121,621
[98] U. AK Fairbanks all campuses	72,216	71,381	70,943	75,606	88,825	102,500	110,195	116,279
[99] WA State U.	96,810	98,641	97,700	95,422	96,943	104,796	107,937	112,469
[100] U. CA Riverside	62,539	71,495	75,486	79,775	75,821	83,580	94,455	111,936
Total, 1st 100 institutions	**17,612,011**	**18,253,272**	**19,363,260**	**20,631,471**	**22,104,529**	**24,179,730**	**26,364,687**	**29,168,050**
[101] Wake Forest U.	68,388	75,331	75,290	76,893	82,827	86,840	98,343	111,634
[102] VA Commonwealth U.	76,529	79,018	78,948	80,538	79,785	88,220	99,180	109,619
[103] Brown U.	56,269	67,621	71,411	73,977	76,330	81,476	91,636	109,482
[104] U. MA Amherst	66,082	73,678	85,811	89,970	86,576	96,907	97,976	109,332
[105] Tufts U.	77,093	79,356	83,568	92,130	100,872	105,783	105,806	109,291
[106] Auburn U. all campuses	85,566	87,358	85,460	87,768	80,544	92,612	106,347	108,775
[107] KS State U.	71,103	71,222	76,896	81,233	85,580	91,790	94,030	106,804
[108] NM State U. all campuses	81,455	76,493	81,024	77,370	79,877	79,695	86,963	103,078
[109] Tulane U.	100,231	83,660	86,427	87,858	87,324	89,785	99,761	102,998
[110] Thomas Jefferson U.	65,705	69,154	69,228	69,460	78,410	89,626	88,936	102,974
Total, 1st 110 institutions	**18,360,432**	**19,016,163**	**20,157,323**	**21,448,668**	**22,942,654**	**25,082,464**	**27,333,665**	**30,242,037**

[111] Woods Hole Oceanographic Institution	80,235	73,015	77,407	75,011	71,722	81,547	91,029	99,964
[112] Medical C. WI	44,169	47,365	51,629	56,021	61,446	70,581	83,857	96,700
[113] Georgetown U.	102,421	112,582	119,114	116,611	111,426	133,211	99,228	96,450
[114] OK State U. all campuses	75,906	82,960	62,480	71,466	83,108	88,285	90,311	94,987
[115] U. NH	42,548	45,693	45,886	52,359	57,613	72,108	87,879	93,222
[116] U. VT	54,065	53,659	59,526	57,832	64,049	63,391	75,597	88,602
[117] George Washington U.	43,488	49,263	55,158	74,481	66,757	69,300	73,805	86,288
[118] U. DE	53,161	54,154	65,095	69,896	73,521	74,711	77,491	85,157
[119] WV U.	53,072	54,844	63,312	62,362	63,392	66,130	71,311	84,985
[120] U. AR main campus	59,410	59,753	64,868	71,686	61,585	70,817	78,303	83,063
Total, 1st 120 institutions	**18,968,907**	**19,649,451**	**20,821,798**	**22,156,393**	**23,657,273**	**25,872,545**	**28,162,476**	**31,151,455**
[121] TX Tech U.	40,824	43,000	46,645	53,126	58,488	66,263	69,918	82,785
[122] U. Louisville	22,835	29,655	33,434	39,147	57,051	64,062	72,857	80,974
[123] Rush U.	44,322	48,772	49,969	55,277	60,957	68,189	70,219	79,394
[124] MT State U.-Bozeman	47,998	50,097	49,440	52,292	55,475	65,324	69,593	78,211
[125] U. ID	52,529	56,198	57,582	58,967	62,531	61,347	67,496	76,758
[126] ND State U. all campuses	40,677	43,661	35,197	40,007	44,696	50,063	64,882	72,105
[127] U. NE Medical Ctr.	38,287	42,612	45,365	50,453	54,205	51,547	60,695	71,000
[128] U. CA Santa Cruz	44,294	51,062	49,428	56,533	52,902	56,212	64,253	70,967
[129] U. MS all campuses	26,862	26,215	26,231	28,079	32,129	44,927	57,597	67,838
[130] SUNY Albany	38,771	66,247	57,415	50,568	64,278	82,792	70,119	67,493
Total, 1st 130 institutions	**19,366,306**	**20,106,970**	**21,272,504**	**22,640,842**	**24,199,985**	**26,483,271**	**28,830,105**	**31,898,980**
[131] U. NV, Reno	46,783	47,977	52,703	45,476	47,939	56,248	59,229	66,721
[132] U. Central FL	37,147	21,488	38,592	35,530	42,466	47,646	79,287	66,351
[133] San Diego State U.	35,287	43,201	40,586	41,915	45,579	55,002	58,332	64,302
[134] Temple U.	54,742	56,533	54,500	63,024	53,940	52,466	60,182	63,850
[135] U. ME	31,901	34,684	33,144	33,106	41,452	54,821	64,070	62,149
[136] NJ Institute of Technology	30,940	39,110	38,728	40,982	40,982	47,895	44,177	61,424
[137] U. Houston	44,993	49,178	45,916	42,297	43,370	48,902	51,567	59,707
[138] Southern IL U. Carbondale	29,631	28,578	30,043	30,490	33,169	36,354	43,207	53,604
[139] U. RI	43,103	39,575	40,522	37,940	44,452	48,135	50,835	53,347
[140] U. of Notre Dame	23,332	24,556	24,116	28,873	30,483	34,524	46,096	52,371
Total, 1st 140 institutions	**19,744,165**	**20,491,850**	**21,671,354**	**23,040,475**	**24,623,817**	**26,965,264**	**29,387,087**	**32,502,806**
[141] Medical C. GA	31,369	35,971	38,725	39,806	41,103	45,596	52,191	51,705
[142] TX A&M U. System Health Science Ctr.	–	–	–	–	–	25,736	40,859	49,636
[143] Charles R. Drew U. of Medicine & Science	12,500	16,386	17,205	17,205	24,484	31,045	36,717	48,839
[144] U. AL Huntsville, The	36,736	38,176	32,817	36,946	40,203	41,274	43,731	48,353
[145] Rice U.	34,446	39,696	43,601	41,067	41,069	41,840	42,675	48,169
[146] U. LA Lafayette	13,416	13,429	22,381	24,768	30,735	32,692	32,073	47,796
[147] FL International U.	16,375	16,856	17,359	17,880	25,061	34,649	44,291	47,654
[148] Brandeis U.	36,451	36,760	40,145	44,589	48,305	47,658	52,818	47,122
[149] U. Dayton	46,084	43,188	45,437	45,000	36,937	39,345	41,343	46,554
[150] Rensselaer Polytechnic Institute	37,247	37,917	38,803	38,560	39,034	40,762	45,010	45,955
Total, 1st 150 institutions	**20,008,789**	**20,770,229**	**21,967,827**	**23,346,296**	**24,950,748**	**27,345,861**	**29,818,795**	**32,984,589**

[151] Syracuse U. all campuses	33,939	34,322	34,642	37,322	39,640	40,063	42,476	45,870
[152] Naval Postgraduate School	27,510	30,706	32,333	34,095	34,095	37,502	40,889	45,227
[153] U. AR for Medical Sciences	28,389	33,354	37,336	39,487	44,066	49,074	51,921	45,046
[154] GA State U.	17,867	18,114	27,069	31,153	36,523	36,600	38,960	44,564
[155] Drexel U.	19,389	19,322	19,267	19,603	22,397	24,876	27,698	44,465
[156] U. OR	30,386	33,654	31,487	33,315	32,695	35,934	36,881	43,723
[157] U. WY	40,470	40,553	47,753	48,500	47,197	43,094	41,632	41,632
[158] C. of William and Mary all campuses	20,597	25,183	24,051	25,966	31,322	33,299	35,829	39,858
[159] U. MT, The	18,881	21,421	21,151	20,133	24,372	29,590	33,535	39,367
[160] George Mason U.	22,221	23,230	19,126	22,543	26,766	26,793	32,881	38,849
Total, 1st 160 institutions	**20,268,438**	**21,050,088**	**22,262,042**	**23,658,413**	**25,289,821**	**27,702,686**	**30,201,497**	**33,413,190**
[161] Northeastern U.	19,850	17,980	19,822	26,385	30,209	35,340	34,467	38,540
[162] U. MD Ctr. for Environmental Science	21,100	21,448	21,377	24,038	26,816	31,605	36,635	38,501
[163] MCP Hahnemann U.	41,237	48,790	85,748	95,984	27,516	41,670	32,462	37,945
[164] Loyola U. (Chicago, IL)	33,098	29,365	30,994	34,241	29,001	30,034	37,156	37,607
[165] U. AL, The	23,479	21,806	23,671	23,935	28,909	31,847	33,133	37,130
[166] OH U. all campuses	19,713	18,329	21,008	21,469	21,437	23,767	27,146	36,601
[167] U. MD Baltimore County	11,868	14,304	19,799	18,155	21,854	26,044	29,641	36,323
[168] NM Institute of Mining and Technology	19,584	20,580	21,974	22,791	26,061	23,636	28,392	36,309
[169] St. Louis U. all campuses	22,686	25,099	26,517	26,943	27,817	31,002	32,442	35,444
[170] Howard U.	24,819	28,894	27,873	23,673	23,557	27,254	30,148	35,387
Total, 1st 170 institutions	**20,505,872**	**21,296,683**	**22,560,825**	**23,976,027**	**25,552,998**	**28,004,885**	**30,523,119**	**33,782,977**
[171] SUNY Health Science Ctr. Brooklyn	30,781	30,254	29,727	27,517	28,840	31,626	31,626	34,981
[172] U. MD Biotechnology Institute	18,062	22,933	29,117	31,861	31,172	29,946	32,458	34,440
[173] U. ND all campuses	18,940	28,188	20,899	16,938	16,999	17,343	19,692	33,973
[174] U. Memphis, The	14,642	18,429	21,271	22,486	24,280	27,381	29,445	33,625
[175] U. MO-Rolla	21,220	20,235	20,895	21,740	25,893	25,968	28,799	32,222
[176] Boston C.	13,298	14,504	14,746	17,774	21,726	27,767	30,768	31,754
[177] FL A&M U.	20,797	22,474	25,415	19,066	21,622	21,612	23,865	31,147
[178] Wright State U. all campuses	18,661	17,381	17,291	19,676	23,131	29,092	32,033	30,962
[179] U. NV, Las Vegas	17,268	16,893	15,628	16,912	20,170	24,215	27,008	30,527
[180] MI Technological U.	22,798	23,882	24,140	26,522	28,074	27,204	29,613	30,005
Total, 1st 180 institutions	**20,702,339**	**21,511,856**	**22,779,954**	**24,196,519**	**25,794,905**	**28,267,039**	**30,808,426**	**34,106,613**
[181] Desert Research Institute	22,851	20,100	20,000	21,500	23,376	25,691	29,697	29,465
[182] Old Dominion U.	14,439	17,577	18,583	20,150	23,030	25,058	24,659	29,223
[183] U. PR Medical Sciences Campus	17,354	15,005	15,575	19,830	17,114	21,373	23,913	29,089
[184] Uniformed Services U. of the Health Sciences	39,612	36,851	18,812	20,309	22,898	23,987	23,247	28,630
[185] Eastern VA Medical School	17,823	17,730	19,109	21,672	24,096	23,299	26,250	28,572
[186] U. Akron all campuses	15,589	15,507	17,999	16,326	16,279	19,495	22,266	28,080
[187] CO School of Mines	16,585	19,291	19,221	20,681	21,715	21,795	23,654	26,515

[188] SUNY C. of Environmental Science & Forestry	21,904	21,969	20,540	22,036	25,385	26,663	27,854	26,337
[189] U. TX Dallas	14,027	13,562	14,561	15,211	16,028	15,684	15,684	26,198
[190] CUNY Hunter C.	12,421	15,021	14,037	13,497	15,934	15,047	19,964	25,905
Total, 1st 190 institutions	**20,894,944**	**21,704,469**	**22,958,391**	**24,387,731**	**26,000,760**	**28,485,131**	**31,045,614**	**34,384,627**
[191] U. Southern MS	8,827	9,112	9,078	11,117	16,211	17,706	20,286	25,685
[192] U.S. Air Force Academy	2,838	3,279	3,720	4,163	3,761	4,551	5,323	25,589
[193] Jackson State U.	4,960	5,224	5,135	6,111	8,823	12,027	25,663	25,445
[194] NY Medical C.	18,424	16,372	16,890	19,159	20,436	23,348	24,283	25,222
[195] San Jose State U.	21,005	21,005	21,005	21,005	21,005	21,005	22,709	25,003
[196] U. WI Milwaukee	19,684	19,679	19,995	20,807	21,325	20,010	23,492	24,933
[197] U. Toledo	7,436	8,180	8,729	11,512	11,819	13,694	16,278	24,825
[198] U. MO-Kansas City	11,727	12,597	11,734	12,875	14,331	19,647	18,795	24,060
[199] Loma Linda U.	9,270	10,837	13,396	12,788	18,818	24,369	24,183	23,996
[200] FL Atlantic U.	13,776	10,576	10,521	14,265	17,151	19,535	25,111	23,995
Total, 1st 200 institutions	**21,012,891**	**21,821,330**	**23,078,594**	**24,521,533**	**26,154,440**	**28,661,023**	**31,251,737**	**34,633,380**

1 Johns Hopkins University includes the Applied Physics Laboratory, with $560 million in total R&D expenditures.

2 These data do not include R&D expenditures at university-associated federally funded research and development centers. See tables B-71 and B-72.

– = not available.

e = estimated.

i = imputed.

NOTE: Because of rounding, detail may not add to totals.

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Research and Development Expenditures at Universities and Colleges, Fiscal Year 2002. TABLE 2. Federal obligations for science and engineering research and development and R&D plant to the 100 nonprofit institutions receiving the largest amounts, ranked by total amount received in fiscal year 2002: fiscal years 1995–2002

TABLE 2. FEDERAL OBLIGATIONS FOR SCIENCE AND ENGINEERING RESEARCH AND DEVELOPMENT AND R&D PLANT TO THE 100 NONPROFIT INSTITUTIONS RECEIVING THE LARGEST AMOUNTS, RANKED BY TOTAL AMOUNT RECEIVED IN FISCAL YEAR 2002: FISCAL YEARS 1995—2002

[Dollars in thousands]

Institution and ranking	1995	1996	1997	1998	1999	2000	2001	2002
Total, all institutions	3,147,550	3,052,924	2,866,000	3,098,903	3,460,211	3,766,488	3,715,996	5,276,980
[1] MA General Hospital	111,013	113,314	126,514	147,025	180,205	198,312	219,979	250,440
[2] Mitre Corp.	188,943	206,849	124,732	204,975	219,039	199,910	1,518	226,312
[3] Brigham and Women's Hospital	103,392	99,783	113,350	131,720	144,734	166,145	176,312	207,465
[4] Fred Hutchinson Cancer Research Ctr.	95,104	79,983	27,807	102,305	135,043	143,089	173,490	175,631
[5] Mayo Foundation	61,833	61,050	57,449	66,395	88,236	102,887	117,017	145,499
[6] Henry M. Jackson Foundation	28,350	60,814	55,202	68,619	65,069	49,150	106,792	137,948
[7] Dana-Farber Cancer Institute	46,855	55,984	55,278	63,288	66,768	86,453	96,563	103,973
[8] Beth Israel Deaconess MedicalCtr.	29,046	34,412	56,129	65,234	72,465	83,639	103,331	101,072
[9] Battelle Memorial Institute	79,519	75,487	57,659	46,578	55,150	66,720	36,710	98,854
[10] Whitehead Institute for Biomedical Research	22,609	22,150	24,661	30,303	58,878	84,347	96,126	93,052
Total 1st 10 institutions	766,664	809,826	698,781	926,442	1,085,587	1,180,652	1,127,838	1,540,246
[11] Concurrent Technologies Corp.	70	0	9,301	93,200	108,720	124,918	18,118	85,713
[12] Memorial Sloan-Kettering Cancer Ctr.	50,577	54,631	55,979	55,661	63,812	66,218	72,458	82,930
[13] Association of Universities for Research in Astronomy	61,283	55,489	65,000	70,043	62,304	72,266	74,352	81,871
[14] National Academy of Sciences	78,484	66,372	66,842	49,889	65,839	81,060	68,326	80,493
[15] Universities Space Research	36,354	30,062	73,108	64,348	81,590	79,637	68,710	75,882
[16] SRI International	59,225	61,148	51,336	54,383	49,211	59,301	42,783	65,929
[17] Children's Hospital (Boston, MA)	37,822	42,463	41,544	46,684	47,012	50,522	67,033	65,054
[18] Children's Hospital (Philadelphia, PA)	25,942	26,309	28,872	33,133	37,726	47,203	51,633	60,422
[19] Cleveland Clinic Foundation	22,347	25,293	29,887	29,625	42,358	43,083	53,141	59,189
[20] IIT Research Institute	35,777	34,227	17,311	9,499	11,475	11,140	2,783	58,020
Total 1st 20 institutions	1,174,545	1,205,820	1,137,961	1,432,907	1,655,634	1,816,000	1,647,175	2,255,749
[21] Research Triangle Institute	49,315	43,778	50,179	48,279	54,645	59,894	44,706	55,260
[22] Edison Welding Institute	2,336	3,078	3,123	3,675	3,354	1,289	0	51,765
[23] Salk Institute for Biological Studies	30,897	33,274	35,370	34,916	43,113	43,580	41,151	50,938
[24] Jackson Lab.	17,538	21,370	22,149	24,415	27,907	38,370	50,682	50,497
[25] Children's Hospital Medical Ctr. (Cincinnati, OH)	11,977	16,392	17,715	28,379	28,008	35,018	38,876	48,514
[26] Charles Stark Draper Labs.	264,151	221,275	163,256	31,758	37,093	65,505	41,241	47,726
[27] Rush Presbyterian-St. Luke's Hospital	18,559	22,803	25,481	30,148	30,284	33,978	39,480	45,526
[28] Calspan-U. Buffalo Research Ctr.	30,307	16,624	163	609	200	1,936	18,311	44,896
[29] St. Jude Children's Research Hospital	19,150	23,235	25,197	26,730	33,031	34,007	38,365	44,122
[30] Burnham Institute, The	14,935	18,367	17,842	20,055	25,220	30,811	36,721	43,888

Total 1st 30 institutions	**1,633,710**	**1,626,016**	**1,498,436**	**1,681,871**	**1,938,489**	**2,160,388**	**1,996,708**	**2,738,881**
[31] RAND Corp.	26,791	24,992	21,404	25,815	29,511	36,673	35,429	42,429
[32] Southeastern Universities Research Association	50	150	127	351	739	731	0	42,000
[33] Institute for Genomic Research	0	0	325	15,484	18,845	15,472	17,641	40,049
[34] Joint Oceanographic Institutions Inc.	33,910	33,749	34,118	35,566	36,177	16,411	36,097	37,900
[35] Cancer Therapy & Research Foundation	0	0	0	0	0	0	0	37,198
[36] Health Research Inc.	1,820	1,604	2,671	3,019	3,017	1,968	9,097	37,122
[37] Cold Spring Harbor Lab. of Quantitative Biology	19,433	21,923	23,375	23,822	24,839	28,744	30,368	35,869
[38] Southwest Research Institute	29,451	14,729	36,173	31,727	33,704	29,602	22,033	34,382
[39] New England Medical Ctr. and Hospitals	25,948	24,322	25,358	24,755	24,860	33,942	32,140	32,233
[40] Fox Chase Cancer Ctr.	0	776	530	3,532	687	1,985	10,038	32,145
Total 1st 40 institutions	**1,771,113**	**1,748,261**	**1,642,517**	**1,845,942**	**2,110,868**	**2,325,916**	**2,189,551**	**3,110,208**
[41] City of Hope Medical Ctr.	65	500	65	725	0	4,820	0	30,364
[42] Microelectronics Ctr. NC (MCNC)	9,729	3,293	8,712	7,804	6,346	3,764	328	30,098
[43] Southwest Foundation for Biomedical Research	451	3,920	5	219	0	367	2,672	30,015
[44] American C. of Radiology	7,033	7,746	6,947	7,164	11,231	12,257	21,319	29,521
[45] National Jewish Medical and Research Ctr.	16,870	18,008	21,420	22,939	27,762	24,350	29,615	28,745
[46] National Childhood Cancer Foundation	0	0	0	0	0	0	0	28,580
[47] Boston Medical Ctr.	6,864	8,541	11,907	19,099	20,121	24,555	28,049	28,409
[48] National Surgical Adjuvant Breast and Bowel Project (NSABP) Foundation Inc.	0	0	0	0	0	0	0	27,420
[49] RI Hospital	4,407	6,783	8,891	8,419	11,349	13,404	15,797	25,222
[50] Wistar Institute	13,299	15,900	13,550	15,665	15,745	15,671	19,010	25,147
Total 1st 50 institutions	**1,829,831**	**1,812,952**	**1,714,014**	**1,927,976**	**2,203,422**	**2,425,104**	**2,306,341**	**3,393,729**
[51] Kaiser Foundation Research Institute	11,696	13,685	4,459	10,135	13,557	19,626	20,816	24,790
[52] McLean Hospital	10,401	12,239	11,373	12,875	17,746	18,598	21,863	24,436
[53] Joslin Diabetes Foundation Inc.	10,012	8,946	10,679	17,273	13,674	14,691	21,439	24,342
[54] Midwest Research Institute	5,066	5,249	7,356	4,451	6,368	9,492	5,450	23,389
[55] Northern CA Institution of Research and Ed.	80	363	227	373	530	1,120	1,341	20,774
[56] Harbor-UCLA Research and Ed.Institute	0	0	0	0	299	1,171	2,548	20,532
[57] World Resources Institute	975	738	1,111	31,744	16,154	398	36,749	20,290
[58] Children's Research Institute	0	0	493	640	0	220	453	20,243
[59] National Marrow Donor Program	46,095	19,000	19,006	1,499	3,447	5,893	700	19,760
[60] Barnes-Jewish Hospital	0	0	0	694	126	547	1,485	19,661
Total 1st 60 institutions	**1,914,156**	**1,873,172**	**1,768,718**	**2,007,660**	**2,275,323**	**2,496,860**	**2,419,185**	**3,611,946**

[61] Children's Hospital (Pittsburgh, PA)	8,215	8,278	8,522	5,006	10,368	9,384	17,901	19,517
[62] OK Medical Research Foundation	7,799	8,568	8,073	7,432	13,499	13,180	17,508	19,307
[63] Schepens Eye Research Institute	7,610	8,550	7,810	8,507	9,501	14,639	15,109	18,467
[64] Environmental Careers Organization	2,882	2,620	114	0	4,012	4,490	3,827	18,180
[65] Cedars-Sinai Medical Ctr.	7,710	9,135	9,749	10,617	12,958	14,322	15,408	18,163
[66] Southern Research Institute	19,071	21,905	19,432	21,659	14,647	23,259	27,368	18,124
[67] Jay David Gladstone Foundation	6,504	8,936	8,675	9,642	13,235	15,604	19,419	17,882
[68] National Development and Research Institute	0	170	335	1,101	1,362	1,921	2,595	17,649
[69] Montefiore Hospital and Medical Ctr.	13,274	13,099	9,917	11,278	15,128	16,763	18,291	16,920
[70] Carnegie Institution Washington (Washington, DC)	7,697	6,840	9,404	8,069	11,510	12,657	12,649	16,664
Total 1st 70 institutions	**1,994,918**	**1,961,273**	**1,850,749**	**2,090,971**	**2,381,543**	**2,623,079**	**2,569,260**	**3,792,819**
[71] Frontier Science and Technology Research	7,103	8,842	8,772	9,493	11,278	13,288	13,860	16,373
[72] Children's Hospital (Los Angeles, CA)	8,428	8,649	7,766	10,244	11,865	12,887	16,585	16,097
[73] OR Research Institute	7,695	8,422	8,937	9,580	11,699	12,748	14,759	15,850
[74] American National Red Cross	193	2,203	638	528	2,634	468	2,548	15,811
[75] U.S. Civilian R&D Foundation for the Independent States	0	2,046	1,031	2,160	5,138	18,738	15,344	15,643
[76] Children's Hospital & Medical Ctr. of Northern CA	2,619	2,755	2,160	2,668	3,605	10,422	12,539	15,477
[77] Marine Biological Lab.	6,460	3,039	8,940	3,927	5,342	5,607	7,206	14,911
[78] OH Aerospace Institute	7,556	8,438	4,328	6,834	10,263	12,699	12,843	14,910
[79] National Opinion Research Ctr.	2,870	4,603	5,964	4,855	5,573	14,372	14,608	14,269
[80] Inc. Research Institutions for Seismology	9,512	3,844	12,330	11,177	12,365	11,703	13,285	13,941
Total 1st 80 institutions	**2,047,354**	**2,014,114**	**1,911,615**	**2,152,437**	**2,461,305**	**2,736,011**	**2,692,837**	**3,946,101**
[81] Institute for Cancer Prevention	0	0	0	0	0	0	0	13,657
[82] Institute for Cancer Research	7,648	7,594	9,173	8,822	8,756	9,694	11,878	13,374
[83] Magee Women's Hospital	4,314	5,568	7,081	8,157	7,230	7,182	6,344	13,325
[84] Kennedy Research Institute Inc.	1,160	410	533	574	354	307	569	13,201
[85] St. Luke's-Roosevelt Institute for Health Sciences	6,599	7,502	8,374	8,362	12,835	15,137	14,405	12,955
[86] North Shore U. Hospital	4,009	4,809	7,263	7,136	8,753	357	4,253	12,946
[87] MA Eye and Ear Infirmary	8,312	8,649	7,908	7,496	8,055	8,855	11,057	12,867
[88] Veterans Medical Research Foundation	0	0	0	0	0	0	441	12,560
[89] Sidney Kimmel Cancer Ctr.	0	777	190	0	0	91	288	11,948

[90] Pacific Institute for Research and Evaluation (Bethesda, MD)	6,882	4,348	5,699	5,227	4,637	7,690	9,846	11,669
Total 1st 90 institutions	**2,086,278**	**2,053,771**	**1,957,836**	**2,198,211**	**2,511,925**	**2,785,324**	**2,751,918**	**4,074,603**
[91] Miriam Hospital	2,973	4,298	3,622	5,242	10,980	14,830	15,431	11,652
[92] Family Health International	8,467	7,540	13,097	14,524	19,396	17,588	24,064	11,624
[93] American Institutes for Research (Pittsburgh, PA)	764	73	584	11	255	1,011	824	11,604
[94] WV Research Corp.	2,061	100	8,281	5,540	3,471	4,295	4,571	11,516
[95] Long Island Jewish-Hillside Medical Ctr.	5,702	6,581	5,384	4,959	6,851	350	400	11,319
[96] American C. of Obstetricians and Gynecologists	0	0	0	0	0	0	0	10,971
[97] National Foundation for Brain Functional Imaging	0	0	0	0	9,617	9,660	10,544	10,662
[98] La Jolla Institute for Allergies and Immunology	0	0	0	0	0	0	0	10,373
[99] SC Research Authority	49,948	27,762	6,782	2,479	7,053	1,188	11,967	10,332
[100] Johns Hopkins Bayview Medical Ctr.	6,475	7,750	10,793	11,889	9,516	14,681	12,608	10,313
Total 1st 100 institutions	**2,162,668**	**2,107,875**	**2,006,379**	**2,242,855**	**2,579,064**	**2,848,927**	**2,832,327**	**4,184,969**

SOURCE: National Science Foundation/Division of Science Resources Statistics, Survey of Federal Science and Engineering Support to Universities, Colleges, and Nonprofit Institutions, Fiscal Year 2002.

TABLE 3. CENTER FOR THE STUDY OF EDUCATIONAL POLICY: ANNUAL COMPILATION DATA

State rankings on FY05 state tax appropriations for higher education per capita and per $1000 of personal income

States	FY05 Appropriations (in $1,000s)	Appropriations per $1,000 in Personal Income*	Rank	Appropriations per Capita**	Rank
		$		$	
Alabama	1,211,830	9.83	11	267.50	11
Alaska	233,381	10.37	7	356.07	3
Arizona	913,928	5.76	37	159.11	44
Arkansas	683,976	9.77	12	248.48	17
California	9,091,424	7.30	19	253.29	14
Colorado	591,511	3.59	48	128.55	48
Connecticut	768,999	4.86	46	219.49	22
Delaware	203,478	7.14	23	245.05	18
Florida	3,121,315	5.81	36	179.42	39
Georgia	1,903,446	7.12	24	215.58	27
Hawaii	409,727	10.12	8	324.45	4
Idaho	322,565	8.80	14	231.52	19
Illinois	2,654,340	6.08	32	208.78	31
Indiana	1,417,481	7.65	18	227.25	21
Iowa	742,812	8.46	16	251.42	15
Kansas	715,830	8.58	15	261.68	13
Kentucky	1,119,608	9.93	10	270.05	10
Louisiana	1,266,958	10.38	6	280.56	8
Maine	239,662	6.07	33	181.94	38
Maryland	1,164,258	5.36	41	209.47	30
Massachusetts	880,555	3.34	49	137.23	47
Michigan	1,977,258	6.15	30	195.52	34
Minnesota	1,273,328	7.05	25	249.63	16
Mississippi	790,136	11.20	3	272.18	9
Missouri	861,421	4.99	43	149.69	46
Montana	152,582	6.14	31	164.62	40
Nebraska	505,555	9.29	13	289.35	7
Nevada	506,746	6.70	27	217.04	25
New Hampshire	115,258	2.47	50	88.69	50
New Jersey	1,894,815	5.26	42	217.82	23
New Mexico	677,935	13.42	1	356.19	2
New York	4,048,921	5.54	39	210.58	28
North Carolina	2,628,507	10.55	5	307.74	6
North Dakota	200,430	10.57	4	315.95	5
Ohio	2,103,892	5.95	34	183.60	37
Oklahoma	761,779	7.84	17	216.20	26
Oregon	586,552	5.48	40	163.18	41
Pennsylvania	2,012,046	4.94	44	162.18	42
Rhode Island	174,255	4.89	45	161.25	43
South Carolina	667,431	5.90	35	158.99	45
South Dakota	162,306	7.16	22	210.55	29
Tennessee	1,088,687	6.23	29	184.49	36
Texas	4,882,239	7.23	21	217.08	24
Utah	625,593	10.08	9	261.86	12
Vermont	79,023	4.01	47	127.17	49

Virginia	1,488,962	5.68	38	199.60	33
Washington	1,427,598	6.72	26	230.12	20
West Virginia	339,407	7.27	20	186.96	35
Wisconsin	1,103,602	6.34	28	200.33	32
Wyoming	211,924	12.45	2	418.38	1
Totals	63,005,272	6.59		214.96	

*Personal income data are for the 2nd quarter of 2004. They are preliminary estimates retrieved from the Bureau of Economic Analysis, U.S. Department of Commerce, on December 4, 2004, from *http://www.bea.doc.gov/bea/newsrelarchive/2004/spi0904.xls*

**Population data are July 2004 estimates retrieved from the U.S. Census Bureau on December 27, 2004, from *http://www.census.gov/popest/states/tables/NST-EST2004-01.xls*

TABLE 4. CENTER FOR THE STUDY OF EDUCATIONAL POLICY: ANNUAL COMPILATION OF DATA

State rankings on FY04 tax appropriations (state + local) for higher education, per capita and per $1,000 of personal income

States FY04 Appropriations (State* + Local**)
($1,000s) FY 04 Appropriations per Capita***FY04 Appropriations per $1,000 in Personal Income****

		$	Rank	$	Rank
Alabama	1,166,110	258.92	16	9.93	14
Alaska	217,965	336.22	3	10.14	13
Arizona	1,327,065	237.86	23	8.90	18
Arkansas	674,300	247.20	20	10.25	10
California	10,574,656	298.19	9	8.98	17
Colorado	635,157	139.67	47	4.07	48
Connecticut	748,226	214.58	33	4.99	46
Delaware	190,289	232.58	25	7.01	29
Florida	2,808,468	165.21	45	5.54	42
Georgia	1,876,628	216.29	31	7.43	27
Hawaii	398,836	319.39	5	10.42	8
Idaho	322,328	235.79	24	9.28	16
Illinois	3,312,800	261.90	15	7.92	23
Indiana	1,360,318	219.42	30	7.68	25
Iowa	779,639	265.01	14	9.39	15
Kansas	835,604	306.67	8	10.47	7
Kentucky	1,104,797	268.27	12	10.25	11
Louisiana	1,208,995	269.04	11	10.38	9
Maine	233,695	178.50	40	6.24	38
Maryland	1,355,356	245.88	21	6.61	33
Massachusetts	828,405	129.03	48	3.29	49
Michigan	2,462,293	244.22	22	7.89	24
Minnesota	1,287,455	254.23	19	7.51	26
Mississippi	840,328	291.52	10	12.59	3
Missouri	949,986	166.10	43	5.75	40
Montana	154,131	167.87	42	6.52	35
Nebraska	561,895	323.40	4	10.67	6
Nevada	482,655	215.26	32	6.94	30
New Hampshire	112,446	87.26	50	2.54	50
New Jersey	1,926,764	222.94	27	5.61	41
New Mexico	706,715	376.20	2	14.90	1
New York	4,289,436	223.26	26	6.19	39
North Carolina	2,607,009	309.58	7	11.08	5
North Dakota	200,430	316.44	6	11.13	4
Ohio	2,194,049	191.83	37	6.44	37
Oklahoma	770,098	219.62	29	8.29	21
Oregon	690,515	193.73	36	6.79	31
Pennsylvania	2,045,043	165.31	44	5.25	44
Rhode Island	172,062	159.90	46	5.06	45
South Carolina	698,219	168.30	41	6.49	36
South Dakota	153,281	200.39	34	7.10	28
Tennessee	1,088,681	186.25	38	6.58	34
Texas	5,639,327	255.13	18	8.81	19
Utah	603,196	256.45	17	10.21	12

Vermont	77,153	124.57	49	4.12	47
Virginia	1,358,445	184.44	39	5.50	43
Washington	1,360,709	221.93	28	6.68	32
West Virginia	353,169	194.97	35	7.94	22
Wisconsin	1,453,396	265.49	13	8.70	20
Wyoming	219,343	436.84	1	13.73	2

*Source: Grapevine, revised FY04 data reported by states in survey for FY05

**Source: State Higher Education Executive Officers (SHEEO), State Higher Eduation Finance Project. Used with permission.

***Population data are July 2003 estimates retrieved from the U.S. Census Bureau on December 27, 2004, from *http://www.census.gov/popest/states/tables/NST-EST2004-01.xls*

****Personal income data are for the 2nd quarter of 2003, retrieved from the Bureau of Economic Analysis, U.S. Department of Commerce, on December 4, 2004, from *http://www.bea.doc.gov/bea/newsrelarchive/2004/spi0904.xls*

TABLE 5. NIH AWARDS TO MEDICAL SCHOOLS BY RANK FISCAL YEAR 2003

Source: link_dsa.pub2003, jf040303_medical_school_rankings_fy2003.sql

			Total Awards	Research Grants		Training Grants		Fellowships		Other Awards		R&D Contract	
Rank / Medical School	City	State	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount	Number	Amount
1 JOHNS HOPKINS UNIVERSITY SCH OF MEDICINE	BALTIMORE	MARYLAND	967	$414,225,650	856	$371,244,640	51	$18,883,088	35	$1,574,368	5	$774,128	20	$21,749,426
2 WASHINGTON UNIVERSITY SCH OF MEDICINE	ST. LOUIS	MISSOURI	775	$368,355,293	691	$341,702,460	41	$13,974,964	37	$1,588,699	1	$266,382	5	$10,822,788
3 UNIV OF PENNSYLVANIA SCH OF MEDICINE	PHILADELPHIA	PENNSYLVANIA	938	$359,944,311	811	$331,165,125	69	$21,008,753	52	$2,172,887	3	$4,606,377	3	$991,169
4 UNIV OF CALIFORNIA SAN FRAN SCH OF MED	SAN FRANCISCO	CALIFORNIA	785	$350,786,145	675	$305,890,184	38	$12,722,117	61	$2,688,469	2	$560,315	9	$28,925,060
5 DUKE UNIVERSITY SCHOOL OF MEDICINE	DURHAM	NORTH CAROLINA	661	$305,405,308	584	$271,877,809	32	$10,674,550	36	$1,515,677	2	$12,044,790	7	$9,292,482
6 UNIVERSITY OF WASHINGTON SCH OF MEDICINE	SEATTLE	WASHINGTON	692	$290,097,322	616	$266,524,625	40	$15,241,303	28	$1,201,441	3	$5,225,441	5	$1,904,512
7 DAVID GEFFEN SCHOOL OF MEDICINE AT UCLA	LOS ANGELES	CALIFORNIA	629	$264,873,857	566	$247,471,696	29	$7,886,484	23	$753,049	1	$88,665	10	$8,673,963
8 YALE UNIVERSITY SCH OF MEDICINE	NEW HAVEN	CONNECTICUT	703	$261,706,751	615	$236,996,674	45	$15,853,647	36	$1,457,958	6	$4,051,036	1	$3,347,436
9 UNIV OF PITTSBURGH SCH OF MEDICINE	PITTSBURGH	PENNSYLVANIA	646	$258,276,361	592	$227,703,969	29	$6,714,143	14	$644,829	2	$17,945,152	9	$5,268,268
10 BAYLOR COLLEGE OF MEDICINE	HOUSTON	TEXAS	561	$246,410,097	488	$222,205,006	33	$7,584,428	29	$1,222,278	3	$397,278	8	$15,001,107
11 UNIVERSITY OF MICHIGAN MEDICAL SCHOOL	ANN ARBOR	MICHIGAN	629	$241,388,940	548	$216,969,254	44	$13,666,783	28	$1,229,844	3	$4,256,890	6	$5,266,169
12 STANFORD UNIVERSITY SCH OF MEDICINE	STANFORD	CALIFORNIA	583	$235,522,176	500	$214,966,069	32	$14,448,607	47	$2,040,464	2	$208,000	2	$3,859,036
13 BOSTON UNIVERSITY SCHOOL OF MEDICINE	BOSTON	MASSACHUSETTS	255	$232,179,841	226	$97,942,051	16	$5,661,018	11	$446,720	2	$128,130,052	0	$0
14 COLUMBIA U COL OF PHYSICIANS & SURGEONS	NEW YORK	NEW YORK	546	$220,316,305	486	$199,261,122	37	$12,244,020	15	$650,547	3	$4,082,576	5	$4,078,040
15 UNIV OF CALIFORNIA SAN DIEGO SCH OF MED	LA JOLLA	CALIFORNIA	440	$219,646,784	387	$198,583,224	26	$7,128,790	18	$665,140	1	$3,369,600	8	$9,900,030
16 UNIVERSITY OF ALABAMA SCH OF MEDICINE	BIRMINGHAM	ALABAMA	459	$208,229,354	410	$159,169,432	19	$4,829,432	4	$138,030	4	$20,190,790	22	$23,901,670
17 VANDERBILT UNIVERSITY SCH OF MEDICINE	NASHVILLE	TENNESSEE	521	$205,896,115	457	$188,634,437	37	$12,388,895	24	$844,784	1	$3,000,000	2	$1,027,999
18 CASE WESTERN RESERVE UNIV SCH OF MED	CLEVELAND	OHIO	530	$203,512,407	497	$183,123,959	22	$6,011,249	3	$128,398	2	$792,825	6	$13,455,976
19 UNIV OF TX MED BR/MED SCH AT GALVESTON	GALVESTON	TEXAS	243	$202,863,845	216	$76,952,533	8	$1,428,050	11	$280,081	3	$110,940,673	5	$13,262,508
20 UNIVERSITY OF NORTH CAROLINA SCH OF MED	CHAPEL HILL	NORTH CAROLINA	486	$199,091,797	428	$174,300,048	31	$7,691,472	22	$883,076	1	$1,455,718	4	$14,761,48
21 UNIVERSITY OF TEXAS SW MED CTR/DALLAS	DALLAS	TEXAS	409	$173,839,840	364	$152,430,428	17	$5,509,888	23	$943,262	1	$65,737	4	$14,890,525
22 UNIV OF COLORADO HLTH SCI CTR SCH OF MED	AURORA	COLORADO	460	$165,148,917	390	$154,913,439	30	$7,076,324	37	$1,470,726	0	$0	3	$1,688,428
23 EMORY UNIVERSITY SCHOOL OF MEDICINE	ATLANTA	GEORGIA	458	$158,120,873	400	$149,337,231	15	$3,965,720	39	$1,598,552	1	$592,424	3	$2,626,946
24 MOUNT SINAI SCHOOL OF MEDICINE OF NYU	NEW YORK	NEW YORK	384	$155,959,314	349	$146,615,860	17	$4,049,561	14	$501,620	3	$1,763,283	1	$3,028,990
25 UNIV OF CHICAGO PRITZKER SCH OF MEDICINE	CHICAGO	ILLINOIS	376	$153,751,372	338	$137,973,565	21	$9,953,495	12	$581,627	1	$75,500	4	$5,167,185
26 ALBERT EINSTEIN COL OF MED YESHIVA UNIV	NEW YORK	NEW YORK	363	$152,065,317	335	$144,269,711	13	$5,617,190	13	$607,867	1	$254,553	1	$1,315,996
27 HARVARD MEDICAL SCHOOL	BOSTON	MASSACHUSETTS	373	$150,678,474	276	$136,176,104	29	$10,885,948	65	$2,657,308	3	$959,114	0	$0
28 UNIVERSITY OF IOWA COLLEGE OF MEDICINE	IOWA CITY	IOWA	355	$148,583,646	308	$124,699,057	18	$5,291,989	17	$592,531	4	$3,142,532	8	$14,857,537
29 UNIVERSITY OF WISCONSIN MEDICAL SCHOOL	MADISON	WISCONSIN	339	$141,802,315	301	$120,952,739	20	$7,040,816	12	$447,465	1	$7,000,000	5	$6,361,295
30 UNIV OF ROCHESTER SCH MED & DENT	ROCHESTER	NEW YORK	383	$134,861,948	340	$121,705,304	23	$6,025,845	14	$583,490	2	$2,921,532	4	$3,625,777
31 UNIVERSITY OF MINNESOTA MEDICAL SCHOOL	MINNEAPOLIS	MINNESOTA	374	$129,716,550	337	$122,787,635	21	$4,650,254	13	$515,302	0	$0	3	$1,763,359
32 OREGON HLTH SCIS UNIV SCH OF MEDICINE	PORTLAND	OREGON	398	$125,983,398	351	$120,780,091	14	$3,819,799	32	$1,360,408	1	$23,100	0	$0

33 UNIVERSITY OF VIRGINIA SCH OF MEDICINE	CHARLOTTESVILLE	VIRGINIA	372	$122,366,241	326	$115,632,172	18	$5,074,570	23	$816,940	4	$563,433	1	$279,126
34 UNIV OF SOUTHERN CALIFORNIA SCH OF MED	LOS ANGELES	CALIFORNIA	189	$121,517,056	178	$113,610,713	5	$1,014,197	4	$150,335	0	$0	2	$6,741,811
35 NEW YORK UNIVERSITY SCH OF MEDICINE	NEW YORK	NEW YORK	311	$119,586,827	275	$111,982,170	18	$5,568,411	11	$513,282	3	$1,098,500	4	$424,464
36 WAKE FOREST UNIVERSITY SCH OF MEDICINE	WINSTON-SALEM	NORTH CAROLINA	256	$114,768,125	225	$97,099,183	12	$2,828,675	9	$413,490	1	$115,773	9	$14,311,004
37 UNIVERSITY OF MARYLAND SCH OF MEDICINE	BALTIMORE	MARYLAND	306	$113,640,525	264	$96,897,179	17	$3,238,400	12	$431,681	4	$5,331,017	9	$7,742,248
38 NORTHWESTERN UNIVERSITY MEDICAL SCHOOL	EVANSTON	ILLINOIS	306	$107,595,287	268	$98,156,127	14	$3,938,702	20	$720,938	1	$2,651,250	3	$2,128,270
39 CORNELL UNIVERSITY MEDICAL COLLEGE	NEW YORK	NEW YORK	269	$107,247,354	239	$97,907,969	15	$4,358,926	9	$368,153	5	$1,548,724	1	$3,063,582
40 INDIANA UNIVERSITY SCH OF MEDICINE	BLOOMINGTON	INDIANA	272	$97,313,510	250	$92,304,966	13	$2,789,074	4	$187,692	1	$716,871	4	$1,314,907
41 UNIVERSITY OF MASSACHUSETTS MEDICAL SCH	WORCESTER	MASSACHUSETTS	282	$95,111,542	260	$88,923,470	6	$1,215,271	12	$489,145	0	$0	4	$4,483,656
42 MEDICAL COLLEGE OF WISCONSIN	MILWAUKEE	WISCONSIN	223	$94,291,783	207	$86,863,109	9	$1,537,310	4	$152,265	1	$13,052	2	$5,726,047
43 UNIVERSITY OF CINCINNATI COL OF MEDICINE	CINCINNATI	OHIO	243	$93,456,264	219	$87,724,496	12	$3,371,593	7	$314,476	1	$399,892	4	$1,645,807
44 UNIVERSITY OF UTAH COL OF MEDICINE	SALT LAKE CITY	UTAH	238	$91,487,190	210	$84,769,606	7	$2,298,824	16	$650,081	1	$142,158	4	$3,626,521
45 UNIVERSITY OF MIAMI SCH OF MEDICINE	CORAL GABLES	FLORIDA	224	$83,898,747	205	$78,870,632	6	$1,234,828	5	$116,616	4	$1,129,720	4	$2,546,951
46 JEFFERSON MEDICAL COLLEGE OF TJU	PHILADELPHIA	PENNSYLVANIA	230	$80,459,292	214	$77,255,344	10	$2,249,548	5	$223,795	0	$0	1	$730,605
47 UNIVERSITY OF ILLINOIS COL OF MEDICINE	CHICAGO	ILLINOIS	237	$80,307,120	224	$77,787,113	5	$1,586,799	6	$266,871	0	$0	2	$666,337
48 MED UNIV OF SOUTH CAROLINA COL OF MED	CHARLESTON	SOUTH CAROLINA	227	$78,119,762	204	$72,477,828	12	$2,105,878	7	$227,317	2	$3,093,739	2	$215,000
49 DARTMOUTH MEDICAL SCHOOL	HANOVER	NEW HAMPSHIRE	169	$75,394,970	152	$71,094,813	8	$2,205,928	6	$276,674	3	$1,817,555	0	$0
50 U OF TX HLTH SCI CTR SAN ANTONIO MED SCH	SAN ANTONIO	TEXAS	200	$74,157,028	184	$70,048,709	5	$1,142,470	6	$253,091	1	$400,000	4	$2,312,758
51 WAYNE STATE UNIVERSITY SCH OF MEDICINE	DETROIT	MICHIGAN	191	$72,245,647	178	$53,704,875	4	$725,238	4	$125,128	1	$2,467,800	4	$15,222,606
52 UNIV OF CALIFORNIA DAVIS COL OF MED	DAVIS	CALIFORNIA	206	$70,488,397	188	$67,285,966	3	$643,537	12	$444,365	1	$151,000	2	$1,963,529
53 OHIO STATE UNIVERSITY COL OF MEDICINE	COLUMBUS	OHIO	180	$68,258,858	171	$63,887,579	4	$1,079,911	2	$96,284	0	$0	3	$3,195,084
54 UNIV OF CALIFORNIA IRVINE CAL COL OF MED	IRVINE	CALIFORNIA	192	$68,085,494	166	$61,179,387	9	$1,568,038	10	$486,588	1	$648,667	6	$4,202,814
55 UNIVERSITY OF ARIZONA COL OF MEDICINE	TUCSON	ARIZONA	167	$66,148,463	152	$62,802,304	7	$1,661,891	5	$198,218	1	$117,200	2	$1,368,850
56 NEW JERSEY MEDICAL SCHOOL	NEWARK	NEW JERSEY	104	$64,922,163	94	$37,462,855	2	$247,802	2	$69,882	3	$21,455,791	3	$5,685,833
57 UNIVERSITY OF VERMONT COL OF MEDICINE	BURLINGTON	VERMONT	152	$62,138,169	141	$59,402,775	7	$1,818,496	3	$68,530	0	$0	1	$848,368
58 U OF TEXAS HLTH SCI CTR HOUSTON MED SCH	HOUSTON	TEXAS	176	$61,504,289	153	$58,262,497	9	$1,153,289	11	$325,896	0	$0	3	$1,762,607
59 UNIVERSITY OF FLORIDA COL OF MEDICINE	GAINESVILLE	FLORIDA	196	$60,948,137	179	$58,122,792	9	$1,595,821	7	$239,026	0	$0	1	$990,498
60 MEDICAL COLLEGE OF VIRGINIA	RICHMOND	VIRGINIA	177	$59,815,521	151	$52,895,351	9	$1,668,540	13	$473,098	0	$0	4	$4,778,532
61 UNIVERSITY OF TENNESSEE COL OF MEDICINE	MEMPHIS	TENNESSEE	142	$59,532,242	132	$42,834,718	3	$401,322	3	$149,328	1	$13,767,463	3	$2,379,411
62 UNIVERSITY OF KENTUCKY COL OF MEDICINE	LEXINGTON	KENTUCKY	187	$59,363,927	172	$57,432,282	8	$1,641,876	5	$161,588	1	$72,518	1	$55,663
63 GEORGETOWN UNIVERSITY SCHOOL OF MEDICINE	WASHINGTON	DIST OF COL	169	$57,870,782	141	$51,772,465	8	$1,666,073	14	$375,291	1	$190,336	5	$3,866,617
64 UNIV OF MED & DENT OF N J/ R W J MED SCH	PISCATAWAY	NEW JERSEY	162	$54,282,161	152	$53,505,490	4	$607,484	6	$169,187	0	$0	0	$0
65 UNIV OF CONNECTICUT HLTH CTR SCH OF MED	FARMINGTON	CONNECTICUT	164	$52,320,119	147	$51,189,268	5	$686,920	12	$443,931	0	$0	0	$0
66 TUFTS UNIVERSITY SCH OF MEDICINE	BOSTON	MASSACHUSETTS	147	$48,084,170	131	$43,620,493	10	$2,443,238	5	$194,455	1	$1,825,984	0	$0
67 BROWN UNIVERSITY MEDICAL SCHOOL	PROVIDENCE	RHODE ISLAND	123	$45,076,158	97	$40,552,010	9	$1,940,407	14	$525,288	0	$0	3	$2,058,453
68 UNIV OF ARKANSAS FOR MEDICAL SCIENCES	LITTLE ROCK	ARKANSAS	107	$40,234,231	102	$39,780,459	2	$271,988	2	$67,976	1	$113,808	0	$0

69 SUNY STONY BROOK HLTH SCI CTR SCH OF MED	STONY BROOK	NEW YORK	119	$40,223,195	111	$37,775,247	4	$1,259,921	2	$74,915	1	$372,606	1	$740,506
70 PENNSYLVANIA STATE UNIV COL OF MEDICINE	HERSHEY	PENNSYLVANIA	139	$40,068,882	121	$38,854,135	3	$508,751	14	$484,983	0	$0	1	$221,013
71 UNIVERSITY OF NEW MEXICO SCH OF MEDICINE	ALBUQUERQUE	NEW MEXICO	94	$39,297,418	86	$32,518,731	3	$290,257	0	$0	3	$4,128,342	2	$2,360,088
72 UNIVERSITY OF OKLAHOMA COL OF MEDICINE	OKLAHOMA CITY	OKLAHOMA	100	$37,492,406	93	$32,677,282	3	$267,038	1	$48,148	2	$4,149,938	1	$350,000
73 UNIVERSITY OF LOUISVILLE SCH OF MEDICINE	LOUISVILLE	KENTUCKY	120	$37,418,005	110	$36,846,720	2	$87,576	7	$283,709	1	$200,000	0	$0
74 UNIVERSITY OF KANSAS SCH OF MEDICINE	KANSAS CITY	KANSAS	95	$36,537,298	86	$34,881,217	3	$539,167	3	$99,243	1	$73,973	2	$943,698
75 ST LOUIS UNIVERSITY SCH OF MEDICINE	ST. LOUIS	MISSOURI	84	$33,183,875	79	$23,852,540	1	$202,545	1	$62,910	0	$0	3	$9,065,880
76 MEDICAL COLLEGE OF GEORGIA SCH OF MED	AUGUSTA	GEORGIA	100	$31,201,673	96	$30,793,819	1	$312,590	3	$95,264	0	$0	0	$0
77 UNIV OF NEBRASKA COLLEGE OF MEDICINE	OMAHA	NEBRASKA	88	$31,120,384	80	$30,310,394	3	$619,685	5	$190,305	0	$0	0	$0
78 SUNY AT BUFFALO SCHOOL OF MEDICINE	BUFFALO	NEW YORK	102	$29,074,548	93	$27,533,121	3	$372,052	3	$108,840	2	$200,000	1	$860,535
79 TULANE UNIVERSITY SCH OF MEDICINE	NEW ORLEANS	LOUISIANA	82	$27,581,863	74	$27,170,302	1	$166,745	7	$244,816	0	$0	0	$0
80 TEMPLE UNIVERSITY SCH OF MEDICINE	PHILADELPHIA	PENNSYLVANIA	85	$27,460,992	80	$26,319,707	4	$1,113,331	1	$27,954	0	$0	0	$0
81 MOREHOUSE SCHOOL OF MEDICINE	ATLANTA	GEORGIA	40	$26,885,147	38	$26,567,858	1	$285,580	1	$31,709	0	$0	0	$0
82 UNIVERSITY OF SOUTH FLORIDA COL OF MED	TAMPA	FLORIDA	81	$26,835,599	80	$26,808,786	0	$0	1	$26,813	0	$0	0	$0
83 MEHARRY MEDICAL COLLEGE SCH OF MEDICINE	NASHVILLE	TENNESSEE	49	$26,206,904	32	$22,074,677	5	$782,623	10	$299,604	2	$3,050,000	0	$0
84 LSU SCHOOL OF MEDICINE IN NEW ORLEANS	NEW ORLEANS	LOUISIANA	87	$26,019,126	83	$25,498,255	1	$379,883	3	$140,988	0	$0	0	$0
85 UNIVERSITY OF PUERTO RICO SCH OF MED	SAN JUAN	PUERTO RICO	25	$24,448,445	23	$24,384,303	0	$0	2	$64,142	0	$0	0	$0
86 LOYOLA UNIV CHICAGO STRITCH SCH OF MED	CHICAGO	ILLINOIS	90	$23,576,152	79	$22,242,657	3	$467,516	7	$252,628	1	$613,351	0	$0
87 CHARLES R. DREW UNIVERSITY OF MED & SCI	LOS ANGELES	CALIFORNIA	29	$23,555,562	28	$19,555,562	0	$0	0	$0	1	$4,000,000	0	$0
88 SUNY HLTH SCIS CTR BROOKLYN COL OF MED	NEW YORK	NEW YORK	51	$23,476,898	50	$23,039,464	0	$0	0	$0	1	$437,434	0	$0
89 NEW YORK MEDICAL COLLEGE	VALHALLA	NEW YORK	57	$20,883,615	57	$20,883,615	0	$0	0	$0	0	$0	0	$0
90 UPSTATE MEDICAL UNIV COLLEGE OF MEDICINE	SYRACUSE	NEW YORK	59	$18,946,331	58	$18,695,207	0	$0	0	$0	0	$0	1	$251,124
91 HOWARD UNIVERSITY COLLEGE OF MEDICINE	WASHINGTON	DIST OF COL	29	$17,714,758	23	$15,569,681	3	$277,783	1	$31,841	0	$0	2	$1,835,453
92 GEORGE WASHINGTON UNIV SCH OF MEDICINE	WASHINGTON	DIST OF COL	57	$17,314,641	51	$15,991,193	1	$189,483	3	$98,232	0	$0	2	$1,035,733
93 UNIV OF MISSISSIPPI SCH OF MEDICINE	JACKSON	MISSISSIPPI	44	$16,000,413	40	$13,708,836	0	$0	2	$74,694	0	$0	2	$2,216,883
94 UNIV OF MISSOURI COLUMBIA SCH OF MED	COLUMBIA	MISSOURI	54	$15,498,777	48	$14,393,576	4	$1,055,328	2	$49,873	0	$0	0	$0
95 TEXAS A & M UNIV COL OF MEDICINE	COLLEGE STATION	TEXAS	58	$14,325,338	52	$14,010,983	2	$161,903	4	$152,452	0	$0	0	$0
96 LSU SCHOOL OF MEDICINE IN SHREVEPORT	SHREVEPORT	LOUISIANA	44	$13,280,909	42	$13,188,069	0	$0	2	$92,840	0	$0	0	$0
97 UNIVERSITY OF NEVADA SCH OF MEDICINE	RENO	NEVADA	31	$13,070,233	30	$12,325,546	0	$0	0	$0	0	$0	1	$744,687
98 MEDICAL COLLEGE OF OHIO AT TOLEDO	TOLEDO	OHIO	48	$12,557,440	42	$11,600,941	1	$210,363	2	$66,491	0	$0	3	$679,645
99 LOMA LINDA UNIVERSITY SCH OF MEDICINE	LOMA LINDA	CALIFORNIA	23	$12,520,273	22	$12,417,515	1	$102,758	0	$0	0	$0	0	$0
100 ALBANY MEDICAL COLLEGE OF UNION UNIV	ALBANY	NEW YORK	48	$12,114,887	43	$11,261,464	3	$777,668	2	$75,755	0	$0	0	$0
101 UNIVERSITY OF SOUTH ALABAMA SCH OF MED	MOBILE	ALABAMA	35	$11,508,369	33	$11,407,279	0	$0	1	$56,308	1	$44,782	0	$0
102 WEST VIRGINIA UNIVERSITY SCH OF MEDICINE	MORGANTOWN	WEST VIRGINIA	32	$11,346,033	30	$11,176,967	1	$120,918	1	$48,148	0	$0	0	$0
103 UNIV OF HAWAII JOHN A BURNS SCH OF MED	HONOLULU	HAWAII	23	$11,342,729	22	$11,198,241	0	$0	0	$0	1	$144,488	0	$0
104 MICHIGAN STATE U COL OF HUMAN MEDICINE	EAST LANSING	MICHIGAN	33	$10,401,790	30	$10,311,788	0	$0	3	$90,002	0	$0	0	$0

105 WRIGHT STATE UNIVERSITY SCH OF MEDICINE	DAYTON	OHIO	27	$9,506,564	22	$9,183,983	1	$85,324	1	$46,420	3	$190,837	0	$0
106 UNIV OF SOUTH DAKOTA SCH OF MEDICINE	VERMILLION	SOUTH DAKOTA	13	$8,604,680	13	$8,604,680	0	$0	0	$0	0	$0	0	$0
107 UNIV OF NORTH DAKOTA SCH OF MEDICINE	GRAND FORKS	NORTH DAKOTA	22	$8,252,132	19	$8,181,616	0	$0	2	$51,566	1	$18,950	0	$0
108 ROSALIND FRANKLIN UNIV OF MEDICINE & SCI	NORTH CHICAGO	ILLINOIS	31	$7,020,010	28	$6,910,305	0	$0	3	$109,705	0	$0	0	$0
109 PONCE SCHOOL OF MEDICINE	PONCE	PUERTO RICO	11	$6,624,829	7	$6,517,256	0	$0	4	$107,573	0	$0	0	$0
110 CREIGHTON UNIVERSITY SCHOOL OF MEDICINE	OMAHA	NEBRASKA	25	$5,678,506	23	$5,441,967	1	$39,645	0	$0	0	$0	1	$196,894
111 TEXAS TECH UNIV HLTH SCIS CTR SCH OF MED	LUBBOCK	TEXAS	26	$4,918,939	23	$4,790,790	1	$1	1	$48,148	0	$0	1	$80,000
112 SOUTHERN ILLINOIS UNIV SPNG SCH OF MED	SPRINGFIELD	ILLINOIS	17	$4,256,856	17	$4,256,856	0	$0	0	$0	0	$0	0	$0
113 UNIV OF MISSOURI KANSAS CITY SCH OF MED	KANSAS CITY	MISSOURI	20	$4,165,917	19	$4,125,776	0	$0	0	$0	0	$0	1	$40,141
114 EASTERN VIRGINIA MEDICAL SCHOOL	NORFOLK	VIRGINIA	21	$4,158,288	19	$3,908,490	0	$0	0	$0	0	$0	2	$249,798
115 EAST TENNESSEE ST UNIV QUILLEN MED COL	JOHNSON CITY	TENNESSEE	16	$3,534,857	16	$3,534,857	0	$0	0	$0	0	$0	0	$0
116 CENTRAL U OF THE CARIBE SCH MED OF CAYEY	BAYAMON	PUERTO RICO	3	$3,388,624	3	$3,388,624	0	$0	0	$0	0	$0	0	$0
117 EAST CAROLINA UNIVERSITY SCH OF MED	GREENVILLE	NORTH CAROLINA	16	$3,228,184	15	$3,181,764	0	$0	1	$46,420	0	$0	0	$0
118 UNIV OF SOUTH CAROLINA SCH OF MEDICINE	COLUMBIA	SOUTH CAROLINA	16	$3,025,400	14	$2,961,355	0	$0	2	$64,045	0	$0	0	$0
119 MARSHALL UNIVERSITY SCHOOL OF MEDICINE	HUNTINGTON	WEST VIRGINIA	5	$2,902,280	5	$2,902,280	0	$0	0	$0	0	$0	0	$0
120 NORTHEASTERN OHIO UNIVS COLLEGE OF MED	ROOTSTOWN	OHIO	9	$2,350,697	9	$2,350,697	0	$0	0	$0	0	$0	0	$0
121 MERCER UNIVERSITY SCHOOL OF MEDICINE	MACON	GEORGIA	8	$1,697,770	7	$1,651,350	0	$0	1	$46,420	0	$0	0	$0
			26,838	$10,825,083,615	23,893	$9,610,162,970	1,281	$370,186,331	1,230	$49,067,702	133	$416,641,415	301	$379,025,197

GREATER KANSAS CITY
COMMUNITY FOUNDATION

EXPANDING CHARITABLE HORIZONS

Greater Kansas City Community Foundation
1055 Broadway, Suite 130
Kansas City, Missouri 64105

For additional information on the Greater Kansas City Community Foundation call 816-842-0944 or visit our Web site at www.GKCCF.org