

APPENDIX

Testimony of William F. Owen, Jr., M.D., President, University of Medicine and Dentistry, October 1, 2010, New Brunswick, NJ

Good afternoon Assemblywoman Lampitt and other members of the Assembly's Life Sciences Task Force. Welcome to the University of Medicine and Dentistry of New Jersey's New Brunswick Campus. We are deeply honored that you've selected our own Cancer Institute of NJ for your first hearing. For readily understandable reasons, we are living in a period of diminishing state revenues -- so less funds are available for investment in higher education, especially for the publicly funded, state flagship universities like UMDNJ. For public flagship universities, the coin of the realm is coin. And what are the sources of coin? The revenue sources for health universities like UMDNJ are:

1. Tuition and fees, which vary among the eight individual UMDNJ schools. Typically, tuition is greatest for the medical and dental schools and least for the school of health-related professions. Roughly, tuition aligns with the lifetime earning potential of that particular profession.
2. Faculty-generated revenue. This is money from the faculty's clinical practices that are shared back with the University.
3. Facility-generated revenue. Partner institutions pay for clinical services provided by the faculty.
4. Development or philanthropic \$
5. Federal appropriations
6. State appropriations
7. Appropriations for innovation, e.g. fees paid to the university for the rights to use faculty's inventions, financial interest in faculty's inventions, revenue from companies started by faculty (especially attractive are equity interests), and grants and contracts.

UMDNJ's FY11 budget is ~\$1.7 BB with most of the revenue coming from activities associated with clinical care, state appropriations, and grants -- in that order. As is the case for most flagship public universities, state appropriations available to offset recurrent operating expenses have declined over the last 5 years. From 2007-2011, UMDNJ's state appropriations decreased from \$273 to \$206 MM. Against a \$1.7 BB budget, this seems a small amount, but recall that much of our revenue is restricted. For example, a dollar paid the university by the Federal DHHS for a research initiative cannot be spent on operational needs like staff salaries, which are ~75% of our recurrent expense base. So, appropriations against our operational budget decreased by almost 10% for 2011 alone. Such substantial declines in the revenue for a flagship public university are understandable in view the expectation that you will balance competing public needs. I recognize that many of NJ's most critical needs have little capacity to revenue enhance and/or revenue diversify like a university. Therefore, some would say we're a victim of own success. The relative absence of elasticity in funding for these other state obligations makes higher education an easier target for cuts. However, it is incorrectly perceived that flagship state universities like UMDNJ can always compensate for declining state revenues by raising tuition to higher levels, that UMDNJ's doctors, dentists, and nurses can see more patients, that UMDNJ can charge our affiliates more money for our faculty services, that UMDNJ can raise more money from its donors, and that UMDNJ can conduct more research, collect more "overhead" dollars, and discover and sell access to more inventions. This just isn't so: tuition increases cannot be sustained ad infinitum, and they increase student indebtedness and decrease their

probability of retention in needed medical specialties and geographies; payment for healthcare services is decreasing, and market place competition for patients is increasing; donors' portfolios have lost 35% of their value... their owners cannot be as philanthropic as they were; and research appropriations are down. We will come back to inventions and monetizing our intellectual assets for which essential barriers exist in NJ. Many publicly funded universities are having increasing difficulty balancing expectations and needs. Expectations are that we will accept more in-state than out of state students (the latter pay much less for the same educational programs). We are expected to meet our medico-social mission of caring for all comers independent of their financial state. And that we will prioritize developing a state-wide social asset over mercantile interests. These expectations are especially true if the flagship university is effectively the only show in town -- like UMDNJ's dental school, medical schools, NCI-designated comprehensive cancer center, and school of public health. Peer universities around the country have met these challenges by reducing their recurrent expense base, diminishing the quality of their instructional programs, striving to privatize, and/or exploring new revenue sources. UMDNJ has cut its recurrent expense base so much that the quality of instructional programs are threatened. As for "privatization" in this circumstance, we are not using this descriptor in the typical lexicon of the public sector of New Jersey. In the situation described herein, "privatizing" describes increasing the number of out of state students at the expense of lower tuition paying in-state students, and by managing our finances more aggressively, as well as prioritizing our missions based on margins rather than the ability to provide or develop a social product. I underscore that we do not want to raise tuition, compromise our program quality, exclude in-state students, or follow the dollar over the person. Rather we want... we must revenue enhance and diversify. We need innovative ways for our institutions of higher education in NJ to monetize the products of higher education. We want to be an educational work horse that can run with the race horses. We want and you should demand that UMDNJ adhere to the missions of training the next generation of health providers from NJ and be egalitarian to those to whom we provide care in NJ. But this audacious vision requires coin. Although you are here today to begin to identify approaches to enhance NJ's knowledge-based economy, it is with a selfish and self-serving intent that I am here for my University and those it serves. On this background, I encourage you to be stalwart in your attention to the life sciences as an unfulfilled avenue for economic growth. So why a health-based model for economic development? First, Americans are addicted to health care: health-related expenditures in the US account for ~17% of our GDP. Over a trillion dollars a year is reproducibly expended somewhere on something to do with health in America. Why shouldn't NJ help spend some of that money? Second, demand for health sector employment remains high. As manufacturing positions in the US decline, they are being replaced to an equivalent and perhaps even accelerating extent by jobs in the health industries that typically pay more per hour for a given educational level than those in the service or manufacturing sector. Third, employment in the health sector is a natural progression from training for a job... to training for a profession. For example, a high school graduate can be trained in one year to be employed as a dental assistant in a trade program at UMDNJ; after another 2-3 years, that person can be trained as a dental hygienist also at UMDNJ. And they can go on further to pursue a terminal degree in dentistry -- of course at NJ Dental School. Healthcare is one of the few professions where one can almost seamlessly progress from trade training to professional training as a pipeline. Fourth, NJ has a mature high performing, academic health university. Despite rumors of an irrevocably tarnished reputation for UMDNJ, they just aren't true. Although Oscar Wilde said it's better to be spoken

of badly than not spoken of at all, when was the last time you read a titillating story about malfeasance at UMDNJ? Health universities like UMDNJ are a repository for terrific ideas and a brain trust for inventions that can be monetized. And most new health discoveries are made in universities, not within the pharmaceutical or device industry. Let's not forget that we've extraordinary access to pharmaceutical partners in NJ to bring value and human benefit to these ideas. I similarly hope that this panel will dedicate energy to better understanding the correctable barriers to monetizing our university's intellectual energies. I contend that it is not by happenstance that NC, MA, MI, WI, WA, CA, MD, and IL so readily outperform NJ in this sector. I think that you will find that the answers to those questions align as much with the need for a more audacious, performance-based vision for higher education in NJ as much as the need for increased resources. Last, as your work proceeds, I personally extend an open invitation to the Task Force to avail yourselves of any of the intellectual resources and expertise of our talented faculty and staff. Thank you again for spending time at UMDNJ and for your kind patience with my musings.

Invited testimony of Denise V. Rodgers, MD
Executive Vice President for Academic and Clinical Affairs
University of Medicine and Dentistry of New Jersey
To the Assembly Task Force on Life Sciences
Held at The Cancer Institute of New Jersey
UMDNJ-Robert Wood Johnson Medical School
October 1, 2010

Madam Chair and members of the Assembly Life Sciences Task Force, my name is Dr. Denise V. Rodgers. I am the Executive Vice President for Academic and Clinical Affairs at UMDNJ. In my position I provide oversight to the eight schools and two clinical units at the University. As a large statewide institution many people are unaware of the depth and breadth of educational programs in the life sciences at UMDNJ. The university is composed of three medical schools, New Jersey Medical School in Newark, Robert Wood Johnson Medical School here in New Brunswick, and the School of Osteopathic Medicine in Stratford. New Jersey Dental School is the state's only dental school and it is based in Newark. We also have a School of Public Health, a School of Health Related Professions, and a School of Nursing. You will hear more about our eighth school, the Graduate School of Biomedical Sciences later this afternoon. At UMDNJ we educate approximately 6,000 students each year. The two clinical units of UMDNJ are University Hospital in Newark and UBHC, University Behavioral Health Care, which has a number of sites throughout the state.

As a health sciences university our mission is to train students from a wide variety of disciplines in the biomedical sciences. A significant number of our graduates provide direct patient care or other healthcare services. Others are engaged in basic science or clinical research, while some of our graduates work in administrative or policy making roles. In our School of Health Related Professions we have educational programs that range from high school to PhD granting courses of study. All eight of our schools provide doctoral level training in one form or another. As part of that training we hope to spark student interest in biomedical research.

There have been a number of studies directed at determining the requirements/priorities for a competent biomedical sciences workforce. The most successful researchers in life sciences fields are those that have a strong science or math background but also possess problem solving, critical thinking and team-building skills which allow them to spread their talents across all aspects of the organization. This is something that years ago we didn't recognize as much as we do today. Moreover, given the global nature of the research industry, cultural competence and the ability to interact and communicate with diverse populations has also become a key workforce need.

Hv

I think another thing that is critical to developing a powerful life sciences workforce is collaboration among academics and industry, not at the end of the training period, when we are trying to place our graduates, but in the development of curricula that will make them attractive to and successful in the life sciences industry. Historically, universities have had a tendency to design, develop and peddle their wares to industry – this is true in both research and education – without necessarily consulting with industry regarding their needs. In recent years, that has begun to change, and I believe that the key to developing a strong New Jersey workforce is to refine and enhance those collaborations, perhaps even formalize them, as we move forward.

Let me tell you about a few programs we have developed at UMDNJ to help address this issue:

1. **MS in Clinical Trials** – SHRP - directed at college grads to train them in various aspects of clinical trials, regulatory issues, trial design, informatics, patient recruitments, scientific writing, and cultural competence.
2. **MS Clinical Translational Sciences** – directed at Ph.D., MD, PharmD, DDS holders - designed to train future team leaders in clinical and translational science research. Graduates of the program will utilize the knowledge obtained to design and oversee programs, facilitate and manage collaborations, and lead research teams in clinical and translational research.
3. **MS in Molecular Pathology** - In formal association with Medical Diagnostics Laboratories LLC (MDL) and HUMIGEN LLC, the Institute for Genetic Immunology (both of Hamilton, New Jersey), the Graduate School of Biomedical Sciences at the School of Osteopathic Medicine in Stratford, New Jersey is offering a graduate program entitled “Master of Science in Molecular Pathology and Immunology”. The program is designed to prepare students for careers in diagnostic, immunology, molecular biology and pathology laboratories.
4. **Certificate in Recruitment Sciences** - To develop and validate strategies for clinical trial subject recruitment and retention. This 15 credit (5 courses) online program provides students with a solid understanding of the new discipline – Patient Recruitment Science – and prepares them to apply these strategies to reduce drug cycle time.
5. **MS in Health Sciences – Clinical Laboratory Sciences Track (MSHS-CLS)**
The MSHS-CLS program is a 30 credit, fully online master's degree offering from the Department of Interdisciplinary Studies (IDST) in collaboration with the UMDNJ-SHRP Department of Clinical Laboratory Sciences. The MSHS-CLS Program only accepts BS-prepared clinical laboratory professionals who are certified or licensed to practice Clinical Laboratory Science in the United States .

The purpose of the degree program is to help such professionals to; 1) enhance their current knowledge and skills in the clinical laboratory sciences to meet the challenges of a changing profession and health care system; 2) develop a more sophisticated approach to accessing, evaluating, synthesizing, and communicating health-related information; and 3) become a more effective contributor, and assume a greater leadership role in the clinical laboratory profession.

6. **Biomedical Informatics** - Computing systems and technologies have become increasingly essential for modern practice of medicine, pharmaceutical and clinical research, efficient and effective management of health care, and health professions education. To address an increasing demand for well-trained researchers, educators, and managers in the expanding field of biomedical informatics, and a growing critical need for informatics training, the Department of Health Informatics offers a comprehensive curriculum leading to Ph.D. in Biomedical Informatics, M.S. in Biomedical Informatics, and a post-baccalaureate level Certificate in Health Care Informatics

This morning I have attempted to give you a flavor of our industry enhancing programs as part of my remarks today. It goes without saying that we also train students to work to develop cures for the diseases that plague us and other interventions that will extend and enhance the quality of life for the residents of New Jersey and throughout the country. Thank you.

I am Dr. Kathleen Scotto, Vice President of Research and Interim Dean of the Graduate School of Biomedical Sciences at UMDNJ. I am also a faculty member at Robert Wood Johnson Medical School and have a research laboratory here at CINJ. I am honored to have the opportunity to speak with you at the first meeting of the Assembly Task Force on the Life Sciences and discuss the role that research universities have in nucleating and supporting life science clusters.

The life or biosciences are broadly defined as a diverse group of industries and activities that have a common link— to discover and apply knowledge of the way in which plants, animals, and humans function.

We are in an increasingly competitive global environment with limiting resources. The life sciences entities around the world are facing complex challenges in the development and commercialization of new health care, food production, environmental protection and biodefense products, technologies, and services. Having said that, New Jersey is still positioned to be a powerhouse for development and commercialization of life science products – 1) we have a vast life sciences industry, and 2) we have world-renowned research universities with expertise in education and discovery in the life sciences and 3) our colleges and universities also have great strength in fields that support the life sciences – business, law, economics, technology, and these form the platform for training and deploying a deep knowledge-based workforce.

UMDNJ, as the largest public academic health center in the nation, is wholly focused on the biomedical (human) sciences, so I will focus my comments on this area, which makes up the bulk of the life sciences industry in the state. But much of what I will discuss applies to other sectors of the life sciences industry as well.

I'd like to address two questions. How does biomedical research, specifically research carried out in an academic environment, positively impact the state's economy? and What can we do as a state to enhance our life sciences industry and position New Jersey to be a world leader in this arena in the next decade?

So first the impact of biomedical research on the economy, which is multilayered. I will start with what the majority of us consider most often –health and quality of life. The impact of the life sciences enterprise on public health is well known, exemplified by substantial reductions in mortality from such threats as heart disease, infectious disease, and cancer. Without biomedical research, there would be no critical advances in the diagnosis, prevention and treatment of disease. That is irrefutable. **60% of all basic biomedical research in this country is performed in colleges and universities, and academic health centers like ours.** This research forms the basis for the development of new interventions and treatments by the pharmaceutical, biotechnology and medical device industry. These new treatments are then tested in clinical trials prior to commercialization. This is another step where universities, specifically academic health centers such as UMDNJ, play a major role. Right now, UMDNJ has ~ 500 active clinical trials, some supported by federal grants, most supported by industry sponsors. We are testing new treatments for diseases ranging from cancer, to heart disease, infectious disease and neurological disorders. We are analyzing new medical devices, new prevention regimens. We are going into the community to evaluate the impact of lifestyle on disease, the comparative effectiveness of different interventions. The results of our studies are part of what is used to determine whether novel treatments and interventions should be commercialized. In recognition of the importance of a strong clinical research infrastructure to New Jersey industry, we have recently established an academic clinical research organization to make it easier to conduct and

participate in clinical research at UMDNJ--for the research sponsors, our patients, and also for the researchers themselves--by removing barriers to progress and replacing them with seamless, transparent processes. This is just one example of how universities can respond to the needs of industry – you will be hearing several more as the testimonies continue.

In addition to supporting industry in the state, biomedical research leads to improvements in healthcare – you will hear some examples in later testimonies. And improving healthcare has a clear impact on state economy. To quote just one statistic: reducing cancer deaths by just 1 percent would provide a \$500 billion benefit to the economy in productivity gains and lower healthcare costs [“The Value of Health and Longevity” Journal of Political Economy, 2006]

Another way that research universities support New Jersey’s economy is by bringing “new money” into the state from federal and private agencies. As an example, last year the top New Jersey Universities brought in about \$250 million in research funding just from the National Institutes of Health (NIH), which is the major federal funder of biomedical research. Again, that is new money that comes into the state from an external source. NIH estimates that every dollar in federal research spending generates about \$2.20 in total economic activity and, on average, each grant supports 7 jobs. Just to give you an idea, UMDNJ alone has over 300 NIH grants and received approximately \$145M in NIH support last year. We are just one of New Jersey’s universities and NIH is just one of many federal agencies that support our research and the research of our academic colleagues.

In addition to bringing money, these grants bring prestige. One such grant, the NIH Director's New Innovator Award program was recently established by NIH to specifically support unusually creative new investigators with highly innovative research ideas at an early stage of their career. Each year, only a handful of these awards are given to promising young scientists around the country. In the past two years, New Jersey faculty have received five of these awards – two at Princeton, two at UMDNJ and one at Rutgers. This is only one example of the recognition that our faculty receive. If we look at states with successful life sciences sectors, it is clear that one of the clear attractions for industry is strong academic thought leaders.

In addition to feeding the industry pipeline by licensing their new discoveries, New Jersey university research has also been successfully leveraged into new spin-off companies, many of which have already demonstrated success. You will hear more about these successes from my colleagues here, and from our sister institutions later in the hearing.

But what is still lacking, at a national level, are the specific strategies to link academic and industry partners to assure a seamless translation of basic research to biomedical development efforts through clinical research, so that basic research discoveries can be efficiently and effectively turned into real world treatments. With a state-wide network of university research campuses, affiliate hospital and healthcare entities and the leaders in the pharmaceutical industry, New Jersey is poised to develop a model that meets and surpasses what exists in states like Massachusetts, New York, California, and Washington.

So how can we accomplish this? We can begin by learning from the successes (and failures) in other states. What is clear is that in the states with successful life science clusters there is a recognition that these clusters must include renowned research universities, highly regarded teaching hospitals, strong technology, University spin-out companies, and other startups—all interacting in a network—to attract and retain larger life sciences companies. Underpinning all this interconnected activity is an evolving need for a support network that encompasses entrepreneurs, including angel and venture capitalists, as well as providers of professional services that support the life sciences industry.

And now, some concrete suggestions:

1. We need a NJ state comprehensive economic development strategy (CEDS) specifically targeting the development and retention of life science/pharmaceutical initiatives as critical to the future economic health of the state. There are a number of states that have developed these strategies and we should adapt some of the more successful aspects, such as the Third Frontier Program in Ohio, to our own state-wide strategic plan.
2. Establish a NJ Center for Entrepreneurship and Innovation – a public /private partnership that would establish and disseminate best practices in technology transfer to academia and businesses. Tap the research universities for primary source of intellectual capital, establish curriculum, offer services.
3. Coordinate efforts to match entrepreneurs with investors, similar to the First Science Innovation initiative in Delaware
4. This could also provide a forum for key stakeholders in academics, industry and the state to discuss/facilitate successful public/private partnerships including:
 - identifying key therapeutic and diagnostic research areas where basic and clinical research collaboration is possible
 - promoting master agreements for basic and clinical research collaborations
 - collaborating in discovery of new uses for legacy drugs that may be going off patent or that did not initially make it through FDA approval
 - networking/providing infrastructure support for academic/industry collaborations to attract federal dollars in cutting-edge research areas.
 - Developing joint training programs between academics and industry
5. Provide more aggressive support of early stage biotechnology, including service for small start-ups (modeled like the Keystone Innovation Zones)
6. Create a research fund to provide a match to non-state dollars for major research activities that align with commercialization strategies

I realize that some of these recommendations come with a substantial price tag. But I don't think their importance, or our commitment to them, should be diminished by our current fiscal crisis. We all recognize that resource limitations will affect the speed with which these recommendations can be implemented, but I think it is critical to set the course now and begin to move towards the future that we want for New Jersey, stepping up the pace as more resources become available.

I'd like to leave you with one thought. In 2007, a major national benchmarking report on the economic importance of the life sciences industry was commissioned. In referring to the importance of a strong life sciences enterprise to economic growth and development, they stated:

"The New York-Philadelphia corridor is particularly important, with a dominant biopharmaceutical sub-sector." The New York-Philadelphia Corridor? While I will admit that geography is not my forte, I'm thinking that a large part of that is New Jersey. Yet in a 68 page article New Jersey was mentioned once, in one short sentence. We need to change this. We have the industry strength, we have major research universities, we have the nation's largest public academic health center, we have major science and technology teaching institutions and of critical importance, we have the support of the state. We have in place all the life sciences components needed to grow New Jersey's economy,

create high-paying jobs and discover new ways to diagnose, treat and prevent disease. We need to focus our strengths, enhance our dialogue and channel our creativity so that future reports will recognize New Jersey as the benchmark for a successful life science cluster.

David Perlin Prepared Remarks

My name is David Perlin and I am Executive Director of the Public Health Research Institute (PHRI) and the new University of Medicine and Dentistry of New Jersey (UMDNJ) Regional Biocontainment Laboratory. The PHRI is a 69-year old biomedical research institute that specializes in infectious diseases research. We have 21 laboratories with approximately 146 full and part-time employees. PHRI has funding from the National Institute of Health (NIH), private foundations, pharma and biotech sectors, and income from licensing of intellectual property. In 2002, PHRI moved from its historic home in New York City to be a lead tenant at the International Center for Public Health, the flagship building in Newark's Science Park. In 2006, PHRI was acquired by UMDNJ and established as a center of the UMDNJ-New Jersey Medical School.

PHRI's decision to relocate to Newark's UMDNJ campus was based on commitments by the State of New Jersey to build a first class resource to conduct infectious diseases research, and to engage us in helping to design the facility to meet our specific needs. There was also a pledge from UMDNJ to invest in infectious diseases research to help us develop a center of excellence on campus. Furthermore, there was a commitment from neighboring institutions, like NJIT, Science Park and NJEDA to attract private sector small companies by establishing a biotech incubator and to lure other high technology sector companies.

Eight years later, the investment has paid off as the Newark campus has indeed become a center of excellence in infectious diseases research and is widely known as one of the best programs for tuberculosis research in the world. In the past 10 years, PHRI alone has attracted \$70 m for TB research. PHRI's yearly research revenue has grown from \$11.5 million in 2006 to greater than \$15 million last year, at a time when most institutions had shrinking grant revenues. PHRI has hired 4 new principal investigator laboratories working on HIV and opportunistic infections. PHRI runs the UMDNJ Regional Biocontainment Laboratory; one of 13 NIH designated national centers for pathogen research. We have helped establish Newark as one of the fastest growing areas for infectious diseases research with outstanding scientists and resources. This is a critical point as we look to attract private sector businesses to our area.

PHRI's specialty is the translation of laboratory discovery into practical applications that benefit patients including new therapeutics, vaccines and diagnostics. We work with large and medium pharma, biotechs and numerous hospitals. PHRI interfaces between the private and public sectors, which has been a valuable asset in attracting businesses to New Jersey.

I have served on advisory boards for business development in Newark and often host companies considering relocating to New Jersey. I have worked with the New Jersey Economic Development Authority (NJEDA), the Newark Innovation Zone and the Office of International Trade and Protocol, as part of the NJ Commerce, Economic Growth and Tourism Commission. We have hosted companies considering relocating to New Jersey. Typically, we tour them through our advanced facilities and described the overall scientific excellence present on campus, as well as discussing our collaborative interactions with a wide range of companies. In this context, we recently helped recruit CGC Genetics from Portugal and Daewoong Pharma from South Korea.

In my view, what companies are looking for is superior facilities and academic excellence. They want an environment that is creative and successful, and they want to be able to leverage existing infrastructure. One without the other does not work. When PHRI was coming to Newark, building excellence was the key. Now, our most significant challenge is maintaining this excellence and not allowing competing States to hire away top performers. Strategic investment in quality, people and resources, will set New Jersey apart from other states, and lead to business relocation and development in the life sciences.