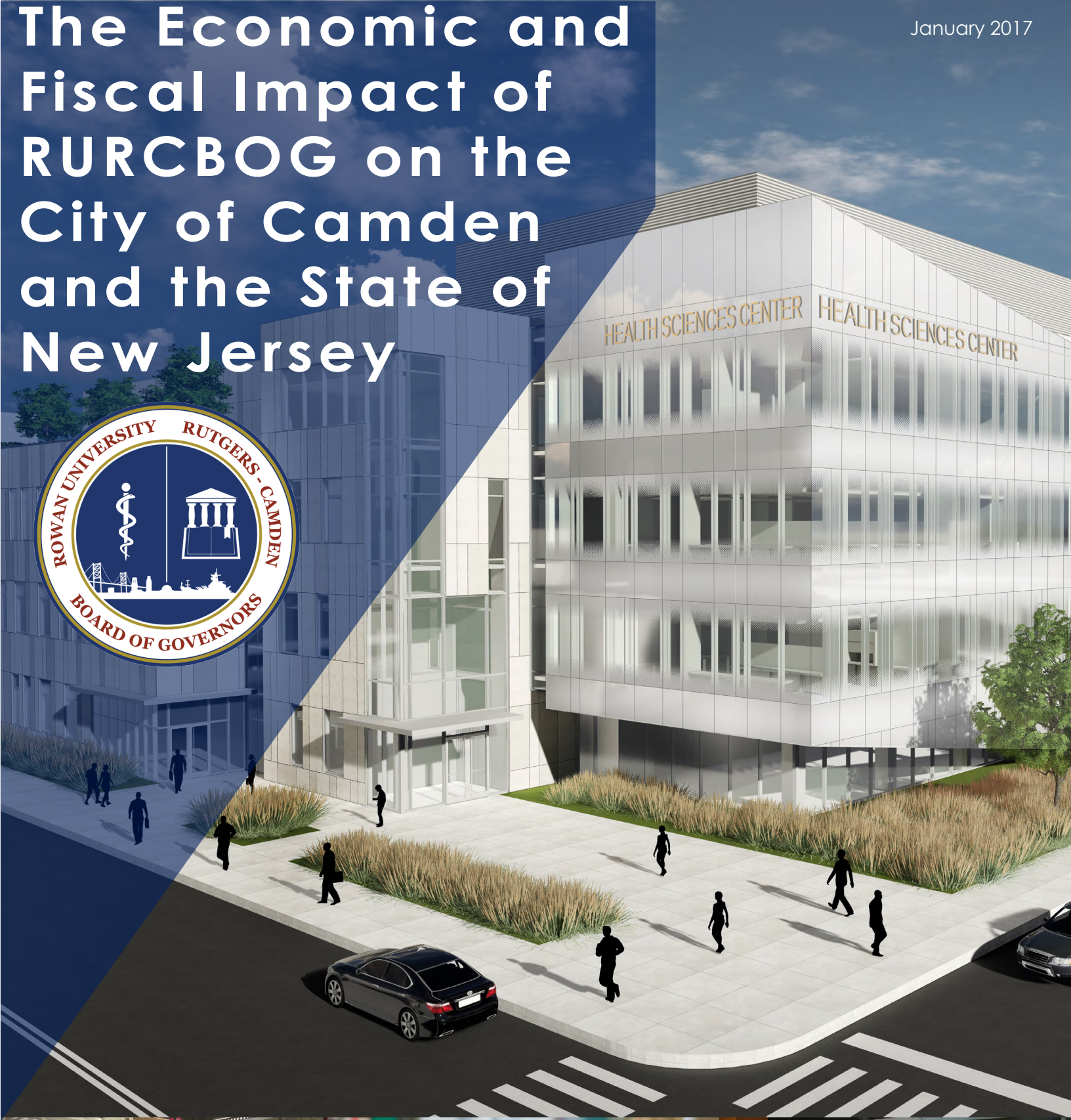
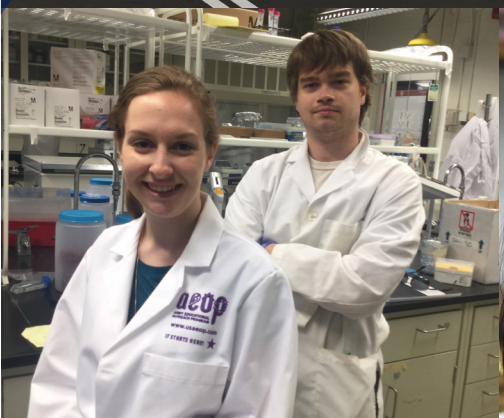
# The Economic and Fiscal Impact of RURCBOG on the City of Camden and the State of New Jersey

January 2017







## INTRODUCTION

The Rowan University/Rutgers-Camden Board of Governors (RURCBOG) is an innovative partnership between two world-class institutions that will create meaningful shared research and provide unique education and training opportunities. The programs operating out of its campus will serve as a significant economic engine for the State of New Jersey, and produce numerous benefits for the City of Camden.

Work on RURCBOG's first building, the Joint Health Sciences Center (JHSC), is already underway in Camden, thanks to a $50 million investment made by the Christie Administration. The size of the original building footprint has been expanded to include an additional $20 million investment from the Christie Administration to help Camden County College and Rowan University expanion of their research and simulation facilities. The state-of-the-art simulation facilities will focus on the unique needs of allied health and medical students.



***"The Board's (RURCBOG) mission is to bring the vision of an integrated "Eds and Meds" corridor to fruition."***

-Hon. Jack Collins, Chairman of RURCBOG

The JHSC will be the first facility in the State of New Jersey to co-locate two four-year institutions, a medical school and a county college all with the goal of providing a continuum of education training opportunities to accommodate a growing demand for allied health and medical education.

This report is the second in a series commissioned by RURCBOG to articulate the potential economic gains of its efforts at both a local and statewide level. The initial report outlined the importance of "Eds and Meds" as an economic engine for the City of Camden and the State of New Jersey. This second report estimates the magnitude of this impact on the City and State economies and on their tax bases, and describes why this impact matters for the City and State's overall economic competitiveness.

## METHODOLOGY

This series of reports delves deeply into the extent and composition of RURCBOG's economic impact and broader social benefits within the City of Camden and the State of New Jersey.

This analysis relies on standard economic and fiscal impact techniques to translate RURCBOG's direct footprint into the overall output, employment, labor income, and tax revenue impacts on the local & state economies. Econsult Solutions, Inc. used IMPLAN, an industry standard input output modeling software program, to generate economic and fiscal impact estimates. Impact totals represent RURCBOG's direct operating and capital expenditures, plus two spillover impacts generated by them. First, some proportion of RURCBOG's direct expenditures that goes to the purchase of goods and services is circulated back into an economy when those goods and services are purchased from local vendors. This represents the "indirect effect," and reflects that local purchases of goods and services support local vendors, who in turn require additional purchasing with their own set of vendors. Second, the salaries RURCBOG pays gets circulated back into an economy when its employees spend their earnings on various goods and services. This represents the "induced effect," and reflects that some of those goods and services will be purchased from local vendors, further stimulating a local economy. In addition to the input-output modeling, this report examines the impacts of other joint health sciences efforts to demonstrate that the approach taken by RURCBOG has successfully enhanced research efforts, educational experiences, and economic benefits of university partnerships.

# PHASE I CONSTRUCTION
# JOINT HEALTH SCIENCES CENTER

Phase I of RURCBOG's health science campus includes the construction of a 95,000 gsf JHSC, which is set to open in the Spring of 2019. The JHSC's design is based on the Mesh Economy model, which co-locates students from different academic disciplines in order to share laboratories, equipment, and classrooms. This exposes students to a broader field and depth of educational rigor, and encourages the connection of talents, goods and services. In addition to research, education and training spaces, the JHSC has shared multi-purposes rooms and "soft spaces," including a cafe and an outdoor seating area, in order to encourage the sort of social interaction between non-directly related building occupants that is critical to creating an innovative environment.

The JHSC has multiple users, including Rutgers-Camden, Rowan University and the Cooper Medical School at Rowan University, Camden County College and RURCBOG administrators. The JHSC itself is segmented into two different structures to ensure compliance with different funding stream mandates. However, to the users of the facility, the segmentation will be imperceptible.

65,000 gsf of the JHSC is going to be occupied by Rutgers-Camden, Rowan University and RURCBOG. This space will house research, multi-purpose rooms and offices focused exclusively on Biomedical research. The goal is to develop a significant research footprint in Camden by fostering collaboration between Rowan University and Rutgers-Camden. Ultimately, the objective is to develop a unified research agenda that will help both the institutions advance their stated objective to become meaningful contributors to the states research presence.







***"We are breaking new ground...for the first time in New Jersey one facility will co-locate important functions of two four-year institutions, a medical school and a county college all with the goal of providing a continuum of research, education and training opportunities in the health space."***

-Kris Kolluri, Esq., Chief Executive Officer of RURCBOG

# PHASE I, PART II
# HEALTHCARE SIMULATION CENTER

**30,000** gsf of the annex will be occupied by Camden County College and Rowan University (Cooper Medical School at Rowan University). The space is going to house allied health education and training programs, research labs and simulation facilities. The objective is to provide immersive simulation based learning to medical students and those enrolled in a variety of allied health programs. Simulation methods include low tech simulators, standardized patients, screen based computer simulators, complex task trainers, and realistic patient simulations. These methods enable students, clinical trainees, and faculty to simulate healthcare procedures in the exam, patient, operating, and exam rooms. Using high fidelity manikins, students and trainees can practice more than forty procedures, including ultrasound, anesthesia, laparoscopic surgery, and arthroscopy.

Space will also be allocated for Rowan School of Osteopathic Medicine to open a satellite facility to leverage the work already being done at the Center for Successful Aging and to attract new partnership and research opportunities.

### AN INNOVATIVE LEADER IN THE REGION

The use of high-fidelity manikin- based simulation (HFMBS), the most complex form of biomedical simulation, will make the Joint Health Sciences campus a leader for health care training in the region. The high fidelity simulators in manikins mimic a wide range of human functions, including breath, heart tones, and pulse and they display blood pressure, EKG, arterial and pulmonary artery wave forms, and anesthetic gases. In simulations, the manikins exhibit the behaviors and symptoms of a medical procedure. When tests and procedures are performed on the manikins, trainees are provided with virtual feedback on the impact of their work. Students are able to strengthen their skills in a realistic clinical setting.



***"The Joint Health Sciences Center is an investment with lasting economic benefits for Camden and New Jersey."***

-Louis Bezich, Vice Chairman of RURCBOG

# ONE-TIME UPFRONT IMPACTS FROM CONSTRUCTION

An important way that RURCBOG will contribute to the City and State economy is through its capital investments. The capital investments required to construct both the Joint Health Sciences Center and the Healthcare Simulation Center will represent a significant amount of construction activity, which supports construction-related jobs, creates demand for various goods and services, and generates statewide tax revenues.[i]

The construction is expected to extend over a two-year period. Through various funding sources, RURCBOG will make approximately $70 million in capital investments for the construction of the JHSC.

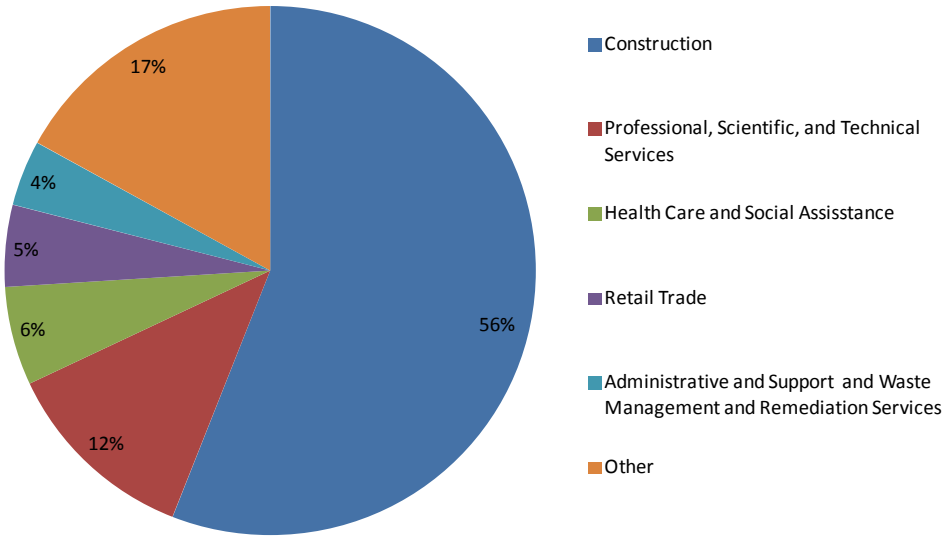
Within the City of Camden, the construction of both phases will generate approximately $72 million in economic impact over the course of the three-year construction period. Additionally, 580 jobs across various industries will be supported with $39 million in labor income. Statewide, the construction will generate $122 million in economic impact by the time the projects are completed. Additionally, the projects will support approximately 840 jobs across various industries with $56 million in labor income.

These capital activities are a significant revenue generator for state and local government through income, sales, and business taxes paid to New Jersey. In aggregate over the three-year construction period, the construction will generate $3 million in revenue for the State of New Jersey, 50 percent of which is generated by the State's Personal Income Tax. Of the approximate $70 Million in construction costs, $66 Million will stimulate economic impacts, both locally and statewide. The portion not included in the model was the cost of land acquisition as that purchase is simply a transfer of assets and therefore does not circulate through the economy, as is typically with construction-related costs.

## Economic and Fiscal Impacts of Construction on the City of Camden and the State of New Jersey

| | City of Camden | State of New Jersey |
|---|---|---|
| Direct Output ($M) | $66 | $66 |
| Indirect & Induced Output ($M) | $6 | $56 |
| Total Output ($M) | $72 | $122 |
| Total Employment (FTE) | 580 | 840 |
| Total Labor Income ($M) | $39 | $56 |
| Total Taxes ($M) | | $3 |

## Job Impact of Construction on The State of New Jersey




***"The Joint Health Sciences Center will provide the people of Camden immediate employment opportunities, but most importantly afford education and training pathways to become meaningful economic participants in the health care sector over the long-term."***

-Hon. Dana Redd, Mayor of Camden and Member of RURCBOG

# ONGOING IMPACTS FROM ANNUAL OPERATIONS

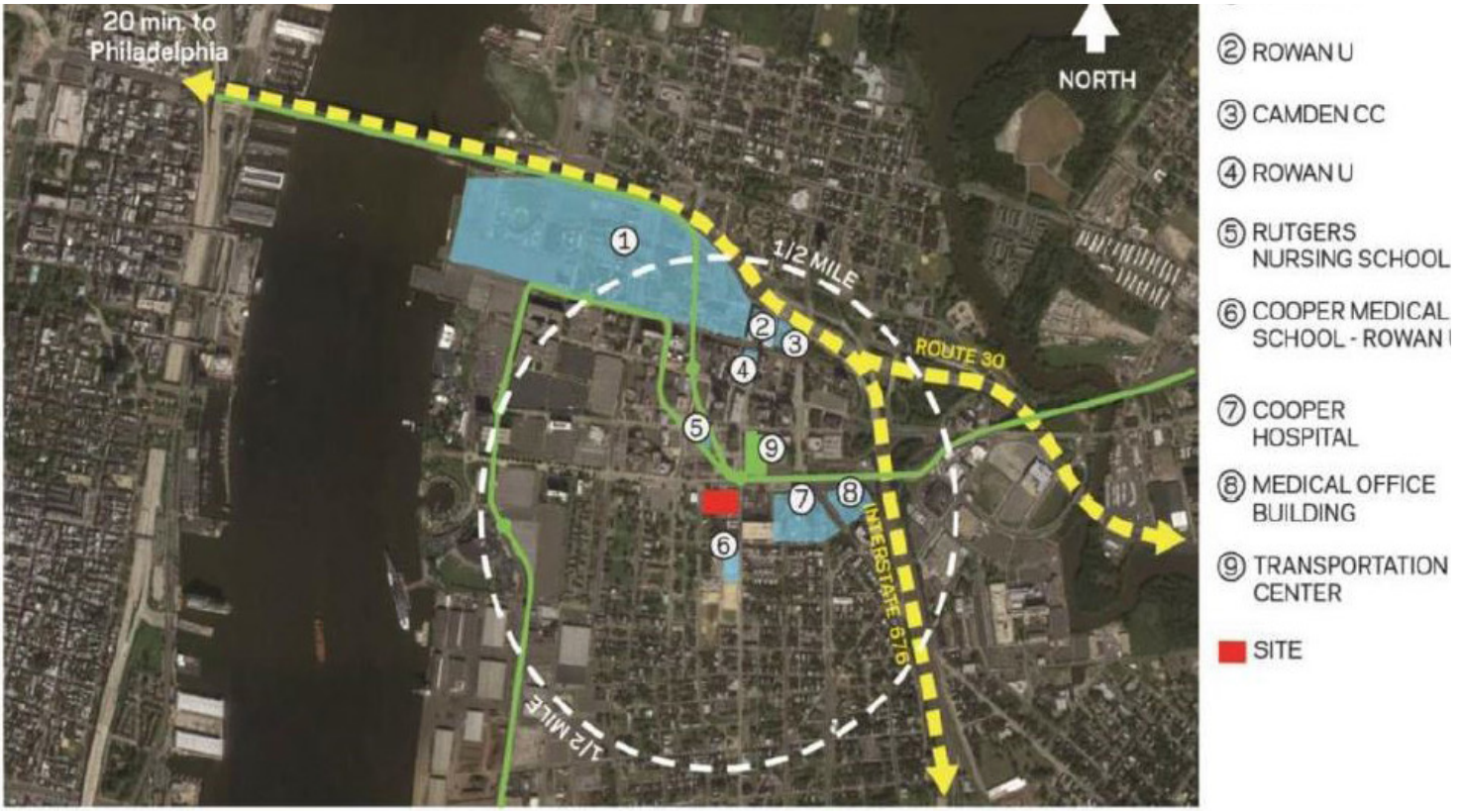
The Joint Health Sciences campus will impact the Camden and New Jersey economies annually through employment, procurement, and the provision of educational, medical, and legal services. The campus's two buildings will employ a number of educators, doctors, and additional staff. The initial faculty and staff at the campus will be relocated from Rutgers-Camden and Rowan University, but through the high growth rate in the health sciences will drive increasing enrollments and research, therefore creating a demand for net new jobs at the RURCBOG buildings.

For instance, the campus will hire outside contractors for security, housekeeping, landscaping and snow removal, HVAC service, elevator service, fire alarm and security system, and electrical and emergency generator. Other operations expenditures include uniforms, tools and safety equipment, supplies and consumables, utilities, insurance, and maintenance services.

Another positive impact from the Joint Health Science Campus includes programmatic and educational opportunities that would not exist otherwise. Through its operations, the biomedical and biomechanical clinical simulation laboratories will provide space for innovative work in a range of health sciences fields. The utilized Healthcare Simulation Center will enhance the skills of students enrolled at health sciences programs at Rowan University, Rutgers-Camden, and Camden County College.

***"We are committed to the development of the Eds and Meds corridor in Camden...it is central to the region's economic strategy."***

-Dr. Robert Barchi, President, Rutgers University



# THE IMPORTANCE OF INNOVATION TO THE LOCAL AND STATE ECONOMY

As essential as the magnitude of the economic and fiscal impact of RURCBOG's operating expenditures and capital investments is to the economic vitality of the City and State, it is perhaps more significant how that impact is achieved. The high-end educational and research activities that make up RURCBOG's operations are extremely important for the broader economic competitiveness of the City and State for three reasons. First, innovation is the key to a region's economic future in today's modern knowledge economy. The concentration of research activity in and around RURCBOG strengthens the City and State's position as an innovation hub. Second, RURCBOG produces highly skilled workers in strategically important industries and occupations, adding to the City and State's competitiveness as a knowledge hub while strengthening local and state tax bases. Finally, the number of high skilled workers will be concentrated at the RURCBOG campus building, strengthening the business attraction efforts.

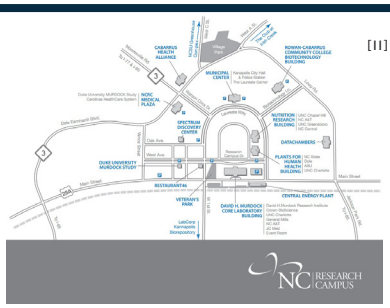
***"The capital investments being made by RURCBOG is designed to broaden the economic footprint of the "Eds and Meds" corridor and build the foundation for opportunity and growth."***

-Chad M. Bruner, Member of RURCBOG

## INNOVATION RESEARCH AT RURCBOG

The past 50 years have seen a dramatic shift in how and where high-end innovation activity occurs. Where once it was housed entirely within individual entities and separated in suburban research parks, innovation activity now flourishes in dense urban settings with high concentrations of educational and medical institutions. The concentration of research activity in and around RURCBOG therefore bolsters the profile of the City and State as an innovation hub of choice, from which collaborative ecosystems are developing that boast strong linkages between institutions, corporations, and start-ups. In the constant competition for innovation assets – human capital, research activity, and venture funding – these concentrations of institutions position regions to birth, retain, and attract more such activity. Hence, even more important than the direct economic footprint represented by RURCBOG's presence in the City and State is the magnet it represents for intellectual capital, innovation work, and seed money.

### North Carolina Research Collaboration




In North Carolina, Duke and UNC have started a joint effort of targeted research funding that supports innovative, collaborative research teams that have lead investigators from both universities. Through the jointly-funded effort, Duke and UNC have support programs of novel clinical and population testing that are intended to improve health policy, health outcomes, or the health of populations. By encouraging collaboratives across universities and across faculties, the program is intended to develop innovative solutions to health problems. These inter-institutional initiatives are an important characteristics of the kinds of innovation districts that attract talent, funding, research activity, and commercialization efforts today. The innovative health sciences research carried out through the Duke-UNC partnerships is akin to what will be done at the RURCBOG campus.

# THE IMPORTANCE OF INNOVATION TO THE LOCAL AND STATE ECONOMY

## RURCBOG AS A HUB FOR INNOVATION

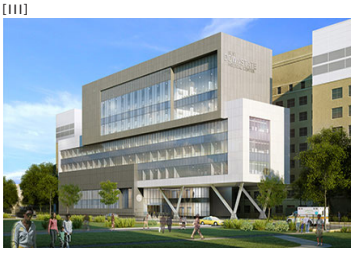
Innovation activity, like the Healthcare Simulation Center, seeks out high concentrations of knowledge workers, to ensure educational outcomes RURCBOG is producing also aid the City and State's competitive positioning and business attraction efforts. Indeed, RURCBOG's educational focuses have been carefully prioritized to yield workers trained in the very high-skilled fields that will define future knowledge hubs. Talent generation thus positions the City and State to draw in more corporate and start-up activity. It also produces well-paying employment opportunities for local and state residents, yielding additional disposable income to be spent within the City and State and producing additional tax revenues for these jurisdictions.

## ACADEMICS & SKILLS TRAINING AT RURCBOG

The Joint Health Sciences Center and the Healthcare Simulation Center will provide the instructional space for students to be taught the latest techniques in the health sciences using biomedical and biomechanical clinical labs, simulation rooms, and leading equipment. Students who enroll in programs located on the RURCBOG campus will enter the job market with skills and training from a regional leader in the health sciences. Students will also transition into collaborative workplace environments having been co-located and co-taught with students from across the health sciences, exposing them to a broader range and depth of educational rigor.

## SUNY DOWNSTATE SIMULATION CENTER

[III]



The SUNY Downstate Center for Healthcare Simulation is a pioneer in immersive and simulation based learning. Using the high-fidelity manikins that will be located on RURCBOG's campus, the SUNY Downstate Center provides interdisciplinary training for students from all healthcare professions. Through this collaboration, students foster professional excellence and teamwork, and learn how to reduce errors through better communication between different medical perspectives. The Center's collaborative approach uses leading edge technologies in medical education to support research and development. The innovative nature of this work attracts and concentrates highly-skilled jobs for pioneering medical practitioners and researchers in the Center, resulting in better outcomes for all involved.

## OREGON ACADEMIC COLLABORATION

Located in Portland, Oregon, the Collaborative Life Sciences Building (CLSB) brings together students from three universities: Oregon Health and Science University, Oregon State University, and Portland State University. The CLSB is focused on enriching the academic training of students from across the life and health sciences disciplines by teaching them alongside one another. Students utilize classrooms, lecture halls, laboratories, and research centers in inter-professional education courses. The integration of students in different programs encourages both formal research collaborations and spontaneous interactions amongst disciplines, and therefore prepares them for the kinds of career tracks that are growing in today's knowledge economy.

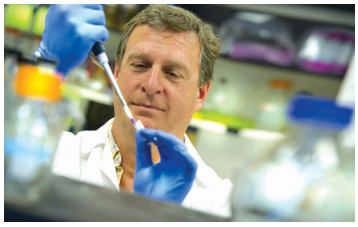
[IV]



# CURRENT RESEARCH EFFORTS

## COLLABORATIVE DIABETES RESEARCH PROJECT

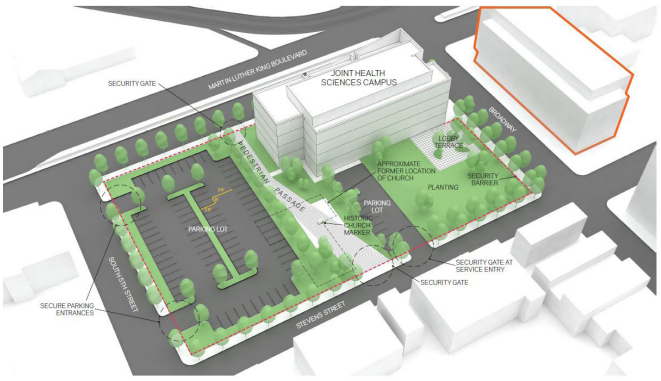
The collaborative Treatments for Diabetes project, led by a team of researchers from Rutgers University and Rowan University is aimed at developing new treatment options for diabetes. Two types of treatment innovations are being tested: 1) Compounds which have been synthesized to directly interact with a mechanism causing diabetes and 2) molecules derived from African plants which are used in traditional medicine to treat and, in some cases, to virtually cure the disease.



## FOCUS ON AGING RESEARCH

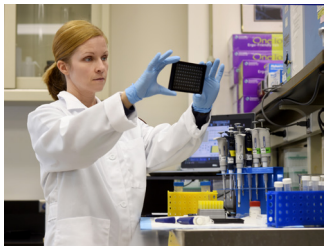
The center will build on the foundation of the Stratford, NJ-based center and serve older individuals and their families. It will focus on decreasing the unique health disparities facing an aging minority population, while also fostering the growth of future healthcare system leaders and healthcare providers through innovative training and certification programs. The center aims to build public engagement models to serve as best practices across the country.






## NEURAL/ENDOCRINE SYSTEMS

Dr. Grace Bannigan and collaborators are researching the structure and function of ion channels. These channels are the major active sites of anesthetics and neurosteriods, and critical in the transmission of neuronal electrochemical signals. The research project also includes theoretical analyses by Drs. Dawei Hong, Michael Palis, and William Saidel who are working to determine how nervous systems can exploit biological noise to facilitate detection of signals in the auditory system by stochastic resonance and to synchronize uncoupled olfactory bulb neurons.



### The Delaware Valley Personalized Medicine Project

The objective of the Delaware Valley Personalized Medicine Project, led by Dr. Michael Christmas, is to gain a better understanding of the genome-informed medical practice and the ethical, legal, and responsible aspects of its implementation. The project will include patient volunteers, physicians, scientists, ethicists and information technology experts. Working together, the team will profile patient genomes in order to discover presently unknown gene variants that elevate a patient's risk of cancer and heart disease, understand why patients often respond quite differently to treatments, and explore how the resulting information can design solutions.

# HIGH-SKILLED JOBS FOR THE GRADUATES OF RURCBOG PROGRAMS

"I just want to be successful... It's hard out here. It's a blessing to be my age and doing what I'm doing."

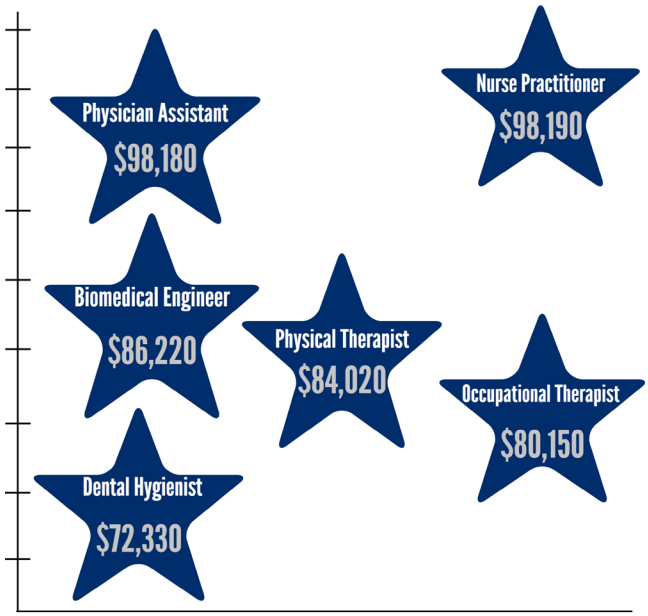
– Kalyk Russ, Medical Assistant Training Program Class of 2015.




***"RURCBOG is focused on education and training programs that will meet demands of the health care sector today and in the future."***

- Michellene Davis, Member of the RURCBOG

**Median Salaries in Health Sciences Professions**




### Nurse practitioners

are focused on preventative care, promoting health and wellness. Due to shift in healthcare towards holistic, self-management by patients and driven by cost considerations, the demand for nurse practitioners is expected to increase. Between 2014 and 2024, nurse practitioner employment in the United States is anticipated to grow by 31 percent. At the Healthcare Simulation Center, nurse practitioner students will gain skills in patient exams to identify potential problems that can be addressed through preventative care.

### Physician assistants

serve on medical teams, examining, diagnosing, and treating patients. They also assist in surgeries, perform procedures, and guide patients through medical treatments. At the Healthcare Simulation Center, physician assistant students will be able to use a range of trainers including vascular access-central lines, pediatric intubation, advanced catheterization, and nasogastric tube and tracheostomy care. Physician assistant graduates will enter a field that is anticipated to grow by 31 percent between 2014 and 2024.

### Patient navigators

help families manage complex healthcare systems. Their specific responsibilities will vary depending on the needs of the family, but the overall scope of goals includes: connecting the family to resources and educational materials; answering questions about treatment and care; filling in gaps in the care team; maintaining an ongoing dialogue between the family and the Healthcare Providers's; helping caregivers make the right decisions; and providing logistical help in scheduling, coordinating, and managing engagements with the healthcare system.

### Occupational therapists

support patients for the job of living, helping them to participate in everyday activities including school interventions for children with disabilities, helping people regain skills following an injury, and providing support for older adults when they face physical and cognitive changes. Occupation therapy students will be able to use the Simulation Center to gain skills in Doron Precision Rehab & Assessment Systems, aged simulation, and changes in patient's joints and ligaments. Occupational therapists jobs are projected to grow by 29 percent in New Jersey between 2014 and 2024, and by 27 percent in the US.

# RETURN ON INVESTMENT

It is appropriate to examine a state's capital outlays from a "return on investment" standpoint, since those outlays represent investments by that state's taxpayers for which a commensurate and sufficient return should be expected. The conclusion that can be drawn from these analyses is that the State's investments in RURCBOG has yielded a meaningful financial return. This is represented not just in the immediate and direct economic impacts they have produced, but also in the ways they have positioned the State for future economic competitiveness.

The $70+ million invested in the first two buildings have produced significant economic stimulus, putting construction workers to work and creating multiplier effects that support employment and generate tax revenues throughout the City and State. Ongoing, these buildings will enable growth in Rowan's and Rutgers-Camden's operating footprint, further producing spillover impacts for the City and State.

But more important than the magnitude and distribution of this economic activity is what it means for the City's and State's future competitiveness. Where and how innovation occurs has shifted dramatically over the past 50 years, from set-apart corporate labs in suburban settings to distributed ecosystems in urban districts. Research universities are hugely important anchors in such innovation hubs, serving as draws for talent and funding and in turn producing highly credentialed students and cutting-edge discoveries.

Collaborating across academic institutions and with the private and public sectors, RURCBOG will prove to be an essential catalyst to the creation of the highly skilled workforce and commercialized technologies that will enable the City and State to thrive in today's innovation-driven economy. These gains will reach the State as a whole, and have particular benefit for the city in which RURCBOG is located.

**$122 Million**

in economic impact within State of New Jersey

***"Camden's growth arc will largely be dependent on the contributions of Eds and Meds institutions...we are all in."***

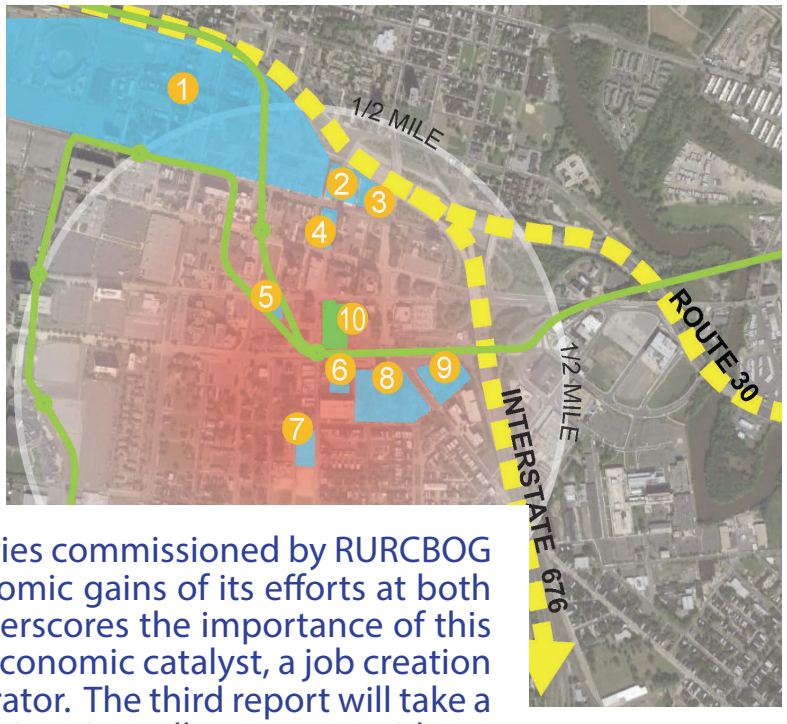
-Dr. Ali Houshmand, President, Rowan University

**$3 Million**

tax revenue gain for the State of New Jersey, some of which will be shared back down to the City of Camden

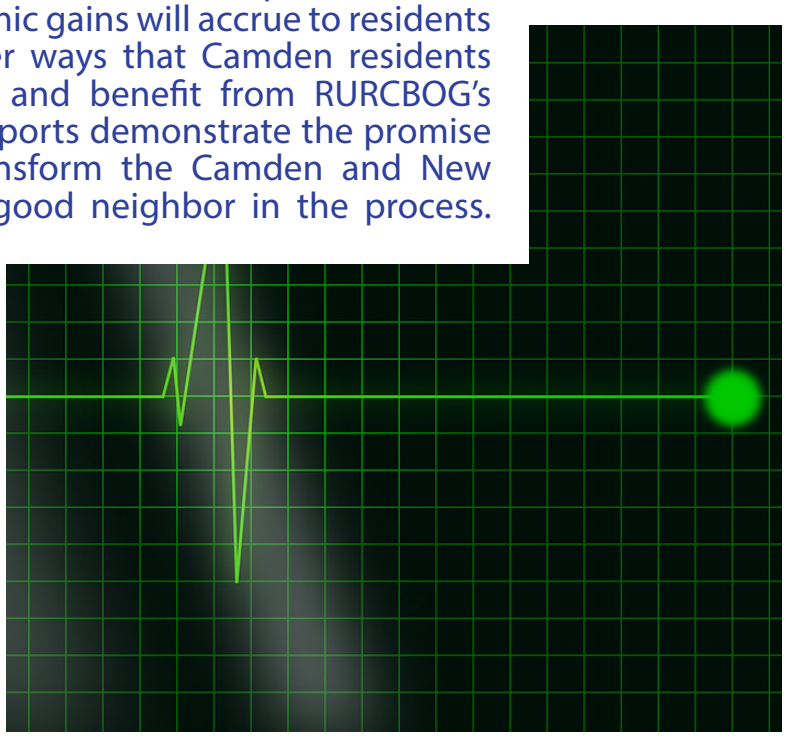
# BENEFITS OF RURCBOG FOR CAMDEN AND NEW JERSEY






This report is the second in a series commissioned by RURCBOG to articulate the potential economic gains of its efforts at both a local and statewide level, underscores the importance of this innovative collaboration as an economic catalyst, a job creation engine, and a tax revenue generator. The third report will take a closer look at how these economic gains will accrue to residents of Camden and what are other ways that Camden residents will be able to participate in and benefit from RURCBOG's presence. Collectively, these reports demonstrate the promise of RURCBOG to positively transform the Camden and New Jersey economy and to be a good neighbor in the process.





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Mr. Kris Kolluri
Chief Executive Officer

# ENDNOTES

i. Because Camden is located within the State of new Jersey, the economic impacts to New Jersey include those impacts to the City of Camden. However, the fiscal impacts are paid directly to the New Jersey State government and later shared down the City of Camden.

ii. Map of the North Carolina Research Campus taken from https://transforming-science.com

iii. Rendering of the SUNY Downstate Medical Center taken from http://www.downstate.edu

iv. Rendering of the Collaborative Life Sciences Building (CLSB) taken from https://www.pdx.edu

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