



2010

THE IMPACT OF MEDICAL EDUCATION
ON THE STATE OF NEW YORK

amsny

The Associated Medical Schools of New York (AMSNY) is a consortium of the 15 public and private medical schools in New York State. AMSNY works in partnership with its members to improve health care through education, advocacy and collaboration. AMSNY's focus areas include, but are not limited to: faculty development, diversity/inclusion of medical students and medical school faculty, and development of best practices around medical education, educational informatics, and global health. In addition, AMSNY works with its members to promote research initiatives that aim to improve health care outcomes.

AMSNY members are:

- ❖ Albany Medical College
- ❖ Albert Einstein College of Medicine of Yeshiva University
- ❖ Columbia University College of Physicians & Surgeons
- ❖ Mount Sinai School of Medicine
- ❖ New York College of Osteopathic Medicine
- ❖ New York Medical College
- ❖ New York University School of Medicine
- ❖ Sophie Davis School of Biomedical Education at The City College of New York
- ❖ State University of New York Downstate Medical Center
- ❖ State University of New York Upstate Medical University
- ❖ Stony Brook University Medical Center
- ❖ Touro College of Osteopathic Medicine
- ❖ University at Buffalo State University of New York School of Medicine and Biomedical Sciences
- ❖ University of Rochester School of Medicine and Dentistry
- ❖ Weill Cornell Medical College

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EXECUTIVE SUMMARY

New York is home to 15 medical schools and 82 affiliated teaching hospitals. One in every ten medical schools in the U.S. is located within the State. These institutions are major employers throughout New York and have a significant impact on the State's economy. Millions of New Yorkers rely heavily on the State's medical schools and teaching hospitals for quality medical care, education of health care professionals and research. In addition to countless social benefits, these institutions also provide substantial economic benefits to New York State.

Key Facts about New York's Fifteen Medical Schools and Their Primary Hospital Affiliates

All data from 2008 unless otherwise noted.

- The **total economic impact** of New York's medical schools and their primary hospital affiliates on the State of New York is **more than \$85.6 billion**. \$1 in every \$13 in the New York economy is related to these institutions.
- New York's medical schools and their primary hospital affiliates **support nearly 694,000 full-time equivalent jobs** directly and indirectly throughout the State of New York. 1 in every 11 jobs in New York State is supported by these institutions. Nationally, this number is 1 in 46 jobs.
- Collectively, New York's medical schools and their primary hospital affiliates **generate nearly \$4.2 billion in taxes for the State of New York** through income, sales, corporate income and capital stock/franchise taxes. \$1 in every \$14 in taxes collected by the State is generated by these institutions.
- New York's medical schools and their primary hospital affiliates **generate over \$3.1 billion in tourism** by attracting out-of-state patients, visitors and conference attendees. They also **attract international dollars from outside of the U.S., in the areas of medical research and clinical expertise**.
- Research efforts at New York's medical schools and their primary hospital affiliates **generate \$7.45 billion for the State economy on an annual basis**.
- **For every dollar in Federal and State research funding** invested in New York's medical schools, New York State receives a **return of \$7.50**.

INTRODUCTION

In July 2009, the Associated Medical Schools of New York (AMSNY), a statewide consortium of New York’s public and private medical schools, retained the services of Tripp Umbach, a private research organization, to conduct a study on the economic, research, community and social benefits of the State’s academic medical centers (the fifteen medical schools and their primary hospital affiliates).ⁱ The purpose of this study is to measure and communicate the tremendous, multidimensional value that the academic medical centers bring to the State overall, as well as to the communities in which they are located.

OBJECTIVES

This report measures:

- The direct and indirect economic impact stemming from the spending of New York State’s academic medical centers. They fall within the following categories:
 - Institutional expenditures for capital improvements, goods and services;
 - Spending by staff;
 - Spending by physicians;
 - Spending by medical residents;
 - Spending of medical and other health sciences students;
 - Spending by patients (external to the hospital);
 - Spending by visitors; and
 - Direct, first-round, expenditures re-circulate through the economy in successive rounds of re-spending. The end result is a multiplied economic impact that is a direct result of the academic medical center's presence and their spending patterns. For this statewide study the multiplier used is 2.3. This means that each dollar spent by these individual organizations fuels an additional spending of \$1.30 in the State by other organizations.
- The direct and indirect employment impact generated from operations of New York State’s academic medical centers includes individuals who work directly for these institutions. Indirect employment is the additional jobs created as a result of the institution’s economic impact. Local companies that provide goods and services to an institution increase their number of employees as purchasing increases thus creating an employment multiplier. In this study the employment multiplier used is 1.8.
- The tax revenue impact of New York State’s academic medical centers including income, sales, corporate income and capital stock/franchise taxes.

ECONOMIC IMPACT

Nationwide, academic medical centers contributed over \$500 billion to the U.S. economy in 2008, approximately 3.6% of the total U.S. economy. Nearly 14% of the total economic impact of all American academic medical centers is attributed to the operations of the New York State institutions, as measured by the Association of American Medical Colleges (AAMC).ⁱⁱ

Figure 1: Total Economic Impact (Direct and Indirect) Attributable To Each State's Academic Medical Center Operations as Calculated by the AAMC, 2008, in billionsⁱⁱⁱ



(Figure 1 reflects the economic impact of AAMC-member institutions: the \$69.4 billion impact for New York only includes the twelve NYS allopathic medical schools, and their primary hospital affiliates. AMSNY's economic impact report includes all fifteen NYS medical schools and their primary hospital affiliates.)

New York's academic medical centers had a **combined State economic impact of over \$85.6 billion**, which accounts for 8% of the State's economy. **One in every 13 dollars in the New York economy is related to the operations of these entities.**

This economic impact is comprised of \$37.2 billion in direct business volume impact and a further \$48.4 billion in indirect economic impact accruing to the economy through the multiplier.^{iv}

Figure 2: Total Economic Impact^v of Medical Education on the State of New York, 2008

Total Economic Impact (including multiplier)	\$85.6 billion
Direct Economic Impact	\$37.2 billion
In-State Spending:	
On Capital/Goods and Services	\$21.1 billion
By Staff (non-physicians)	\$9.3 billion
By Physicians	\$2.4 billion
By Students and Residents	\$1.3 billion
By Patients	\$286.9 million
By Patient Visitors	\$416.9 million
By Out-of-State Visitors	\$2.4 billion
Indirect Economic Impact	\$48.4 billion

DIRECT ECONOMIC IMPACT

Capital/goods and services

New York’s academic medical centers generate \$21.1 billion in direct spending on capital improvements, as well as the purchase of goods and services. Spending is generated from capital equipment purchases made with New York State vendors and contractors (an average of spending over the previous five years). Spending is also generated from the purchase of goods, services and supplies from in-state vendors. This includes a broad range of purchases such as laundry services, food and beverage supplies, drugs, medical disposables and computer consulting.

Spending by staff

While the academic medical center’s spending on goods and services is substantial, one of the biggest benefits to the economy comes from their direct payroll. New York State’s academic medical centers have a combined payroll and benefits obligation to staff, including administrators, nurses, aides, etc., of over \$9.3 billion, the majority of which goes to New York residents, who spend the vast majority of their disposable income within the State of New York.

Spending by physicians

As with payroll to staff, pay provided to physicians directly employed by the academic medical centers has a substantial impact on the economy. The total physician payroll generates nearly \$2.4 billion in direct impact through employed physician spending in the State.

Spending by residents, medical and health sciences students

The spending by residents and students for housing, food, supplies, entertainment and other goods and services comprises their direct impact on the New York economy. As institutions of excellence in research, medical and health sciences education, New York's academic medical centers attract many students from outside of the State. Out-of-state medical students, who remain in New York after graduation to complete their residency, represent the best return on investment. In 2008, student and resident spending amounted to nearly \$1.3 billion. It should be noted that it is only these out-of-state students whose impact is included in the study, since they bring with them a fresh influx of dollars to the New York economy.

Spending, outside of the medical school and teaching hospitals, by patients from out-of-state

Spending by patients for medical services is not included in the direct impact. Only the spending by patients outside of the State's academic medical centers is included. On this basis, out-of-state patient spending has an impact of \$286.9 million on New York business volume annually. As noted, actual out-of-state patient spending is substantially higher than this, but is already accounted for in the above cited medical center spending.

Spending by visitors of out-of-state patients

Medical centers are significant visitor destinations. Visitors come to see patients who are friends and family, and when they are from out-of-state, they bring with them new dollars to the New York economy. These visitors inject money into the New York economy with spending on accommodations, gifts, services and other items during their stay. In 2008, out-of-state patient visitors contributed \$416.9 million to the New York economy.

Spending by conferences and meetings visitors

Academic medical centers are important sponsors of meetings, seminars and symposiums in New York State. These events draw significant numbers of out-of-state delegates, who like attendees to other conferences and trade-shows in the State, provide a major boost to the economy through their fresh influx of dollars. In 2008, visitors for meetings and conferences spent \$2.4 billion.

Business Impacts

In addition to the annual, recurring impacts of the previously outlined spending categories, other businesses in the State have invested heavily to support the business volume generated by the academic medical centers. Tripp Umbach's impact model calculates the two principal components of business investments: real estate development and business inventories committed to academic medical center-related business.

New York businesses have invested nearly \$12.7 billion in real estate property developments to support their business with the academic medical centers. Business inventories in the State allocable to academic medical center-related business volume are calculated to be over \$10.6 billion.

REGIONAL ECONOMIC IMPACT BREAKDOWN

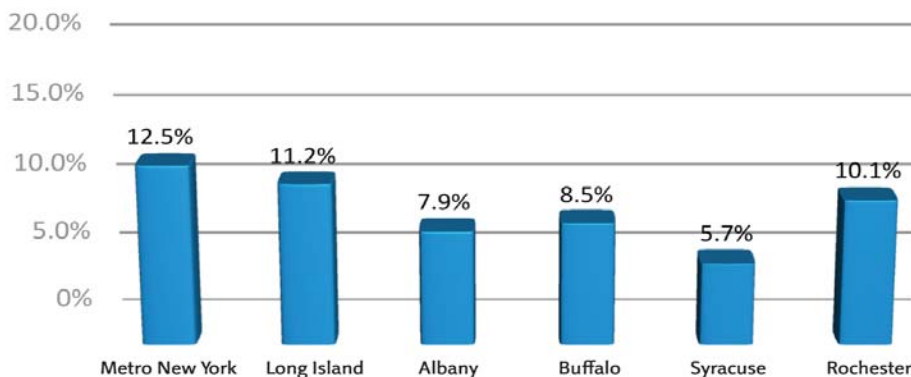
The economic impact of New York State’s academic medical centers is presented in this report at three separate geographic levels: New York State, Downstate Region and Upstate Region^{vi} (See Figure 3).

Figure 3: Economic Impact, 2008
Regional Breakdown



These economic impacts run statewide but are more locally seen and felt in the areas directly surrounding the academic medical centers. At the State level, academic medical centers are responsible for nearly 8% of the economy; however, within some of the local geographies^{vii} the industry supports as much as 12.5 % of the economy, or one in every 8 dollars (see Figure 4).

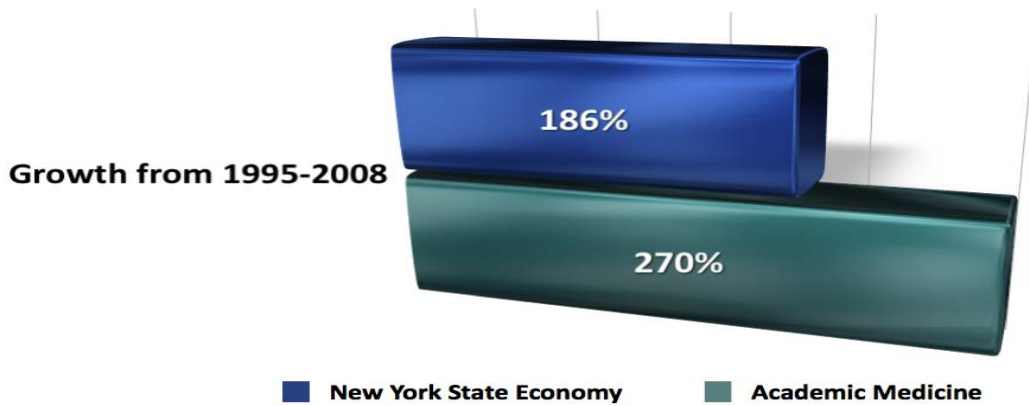
Figure 4: Percentage of The Local Economy Attributable To Academic Medical Centers, 2008



GROWTH OF THE NEW YORK STATE ECONOMY AND ACADEMIC MEDICINE

In 1995, the estimated total economic impact of the New York State academic medical centers was \$32 billion or approximately 5% of the State's economy. Between 1995 and 2008, the economic impact of these institutions grew by 270%, while the overall New York State economy grew by only 186%. Therefore, the impact of New York's academic medical centers has grown faster than the overall New York economy in this fourteen-year period.

Figure 5: Academic Medicine in New York State Outpaces the State's Economy 1995-2008



EMPLOYMENT IMPACT

New York State leads the nation in total employment by academic medical centers. The employment impact is four times greater in New York State than the rest of the nation – with a ratio of **one in every 11 jobs statewide** attributable to academic medical centers. Nationwide,

Between March 2009 and March 2010 more than 29,000 jobs were created statewide in the education and healthcare sectors. New York’s medical schools and teaching hospitals are important anchors of this growing sector of the state’s economy. While 29,000 jobs were added in education and healthcare, the state lost more than 100,000 jobs, including the loss of 30,000 manufacturing jobs, 25,000 construction jobs, and nearly 24,000 jobs in financial services.

this figure is one in every 46 jobs.^{viii} More than half of all new jobs projected by 2016 are expected to be in the education and healthcare sectors. Between 2006 and 2016, this amounts to more than 300,000 jobs in education and healthcare, an industry cluster anchored by New York’s academic medical centers. Investments in these institutions will have significant pay-offs in terms of sustainable quality job creation.^{ix}

In 2008, New York State’s academic medical centers directly employed more than 385,000 New York residents. However, their total impact on statewide and regional employment is far greater. The business volume generated by the academic medical centers creates jobs in a broad range of sectors throughout the State; at hotels, restaurants, construction firms, laundry and cleaning services and professional service companies. These jobs are proportionate to the internal service needs of the academic medical centers and their related populations (staff, physicians, students, etc.). In addition, state and local tax revenues generated by academic medical centers and their business volume create government employment opportunities.

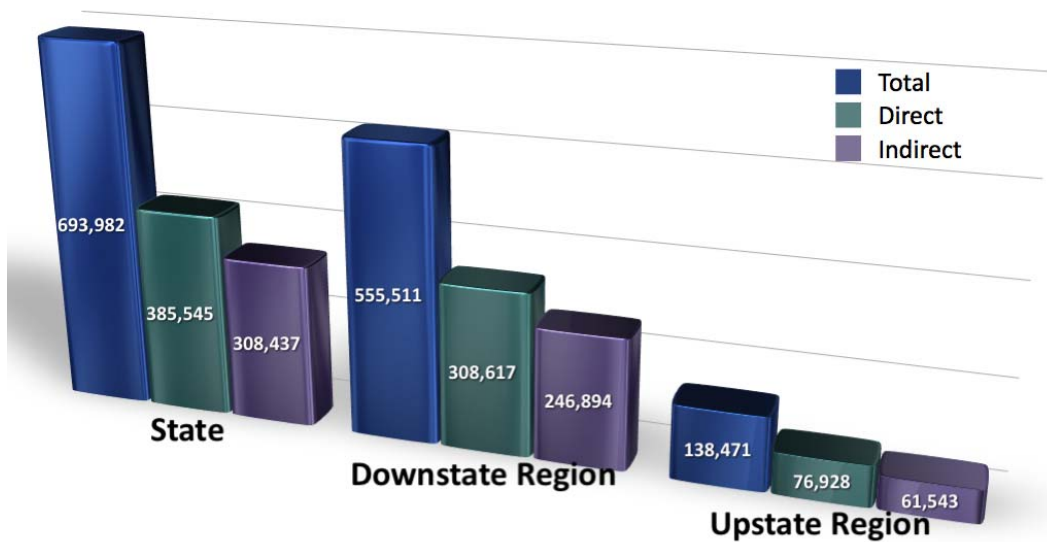
Figure 6: Total Employment (Direct and Indirect), 2008

Total Employment	693,982
Direct Employment at NYS Academic Medical Centers	385,545
Indirect Jobs Supported Statewide	308,437

REGIONAL EMPLOYMENT IMPACT BREAKDOWN

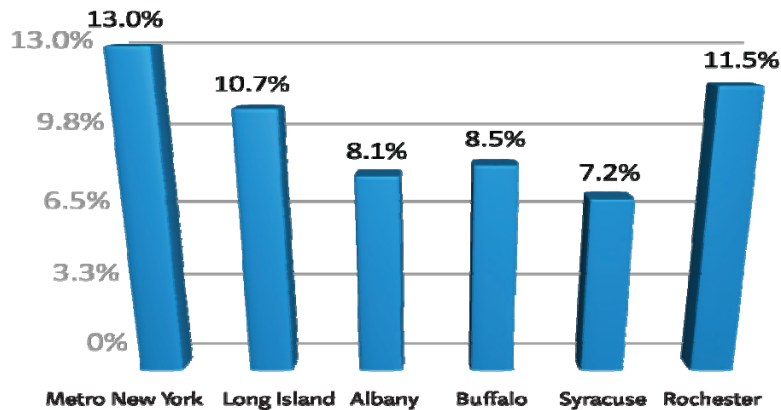
Regionally, New York’s academic medical centers are major employers in their local communities. For every person directly employed at one of the member medical schools or their primary hospital affiliates, approximately one additional FTE is supported within the State’s economy. **Therefore, nearly 694,000 FTEs (direct and indirect) in New York, which includes approximately 556,000 FTEs in the Downstate Region and over 138,000 FTEs in the Upstate Region, are attributable to the operations of New York’s academic medical centers.**

Figure 7: Employment Impact, 2008
Regional Breakdown



The impacts are seen not only at the State level, but more directly at the local level where the concentration of jobs directly attributable to the academic medical centers is strongest. Below is a chart showing the percentage of employment in the areas directly surrounding the medical schools which is attributable to the academic medical centers.

Figure 8: Percentage of The Local Employment Attributable to Academic Medical Centers, 2008



STATE TAX REVENUE

It is a common misperception that medical schools and hospitals do not generate government revenue. While the academic medical centers are not-for-profit institutions that do not pay corporate income taxes or property taxes, New York hospitals' and medical schools' in-state spending and the income derived from out-of-state sources have a significant impact on state tax revenue. With more than **\$4.2 billion in annual New York State tax revenue** generated in 2008, the academic medical centers are critical to state and local governments.

Figure 9: State Tax Revenue Generated by Academic Medical Centers, 2008

State Tax Revenue	\$4.2 billion
Individual Income Taxes	\$2.0 billion
Sales Taxes	\$1.5 billion
Corporate Income Taxes	\$349.5 million
Other Tax Revenues	\$313.4 million

Tax revenues are comprised of the following:

Income taxes paid by medical school and teaching hospital staff, employed physicians, independent contractor physicians and medical residents

The State income tax payments of medical center personnel generate \$2.0 billion in revenue for the State of New York.

Sales tax revenues received by the State of New York

As noted above, New York's academic medical centers generate substantial sales for businesses in the State. This spending also generates sales and other consumption tax revenue. In the twelve-month period covered during the study, this amounted to nearly \$1.5 billion.

Corporate net income tax received by the State of New York

The business volume generated by the academic health care industry and its related spending is received as revenue by a broad range of businesses throughout the State. This revenue generates corporate net income tax receipts for the State of New York. During 2008, the academic medical centers generated over \$349.5 million in corporate net income tax for the State.

Other selective business taxes received by the State of New York

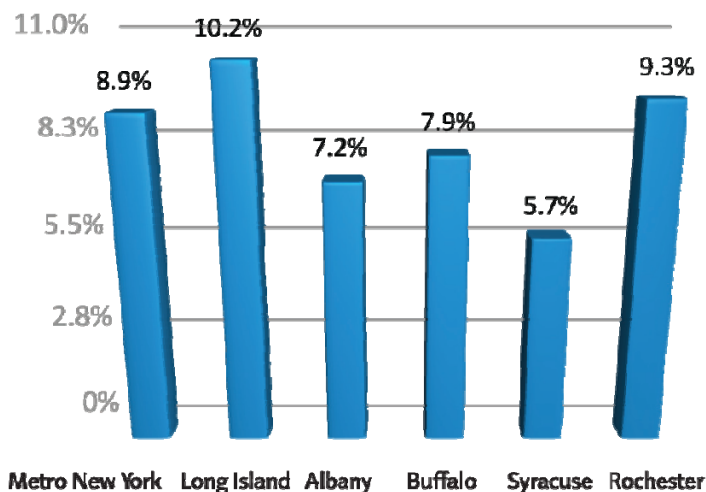
A number of other taxes apply to various business enterprises throughout the State including gross receipts tax, public utility realty tax, insurance premiums tax, motor vehicle tax and financial institutions tax. The business volume generated by the academic health care industry and the many New York businesses it supports generated approximately \$313.4 million in other business taxes during the twelve-month period studied.

REGIONAL TAX REVENUE IMPACT BREAKDOWN

Since these institutions are located throughout the State, communities in every region benefit from the academic healthcare industry. These statewide tax revenue impacts are also more concentrated when viewed at the local level.

The percentage of total tax base in each of the local areas that is attributable to New York's academic medical centers ranges from 5.7% to 10.2%.

Figure 10: Percentage of Local Tax Revenue Attributable to Academic Medical Centers, 2008



BENEFITS OF NEW YORK STATE'S ACADEMIC MEDICAL CENTERS

The New York State medical schools and their primary hospital affiliates recognize that the problems besetting the health care system, such as the availability and affordability of patient care services, are critical. These institutions are doing their part to overcome these healthcare challenges. Through their educational programs, New York's academic medical centers provide valuable patient care to the medically underserved. Through innovative research, the medical schools continue to make dramatic advances in the prevention, diagnosis, and treatment of cancer, heart disease, diabetes and other serious illnesses.

Through collaborative efforts, AMSNY member institutions are committed to:

- ❖ Ensuring that the population of New York receives high quality, accessible, culturally sensitive, cost effective health care;
- ❖ Keeping New York State as a leader in academic medicine by evolving and growing with medical education trends;
- ❖ Increasing the number of under-represented individuals who are academically prepared for, and admitted to, New York's medical schools and whom eventually practice in New York State;
- ❖ Increasing the number of primary care physicians while ensuring a more adequate distribution of primary care resources throughout the State;
- ❖ Searching for new opportunities to expand biomedical and health services research; and
- ❖ Offering New York's citizens the opportunity to benefit from newly developed medicines, procedures and technologies through improved coordination of information and resources.

VALUE OF PATIENT CARE

While the economic impact of institutional expenditures and job creation in New York is substantial, so too are the contributions that academic medicine makes to the care of the uninsured and underinsured. Given the challenging economic times, an increasing number of individuals are uninsured and underinsured. This is a major concern to institutions that are already running on the margins and whose missions are to treat everyone, regardless of their ability to pay. Although academic medical centers comprise less than 6% of the nation's acute care hospitals, estimates show that they provide 45% of uncompensated care in the United States.^x Uncompensated care is a major financial burden on teaching hospitals and integrated academic health organizations.

State budget cuts in hospital support, such as Medicaid, as well as cuts to educational programs, have meant a decrease in services, salary cuts and/or reductions in workforce. In addition, the decline in private philanthropy has added to the need for caution and cutbacks. These cutbacks are unfortunately occurring at a time when the need for uncompensated care funding has been at an all time high, taxing many of these institutions further.

While it is reported that hospitals in New York State provide \$2 billion in uncompensated care annually^{xi}, this does not take into consideration the cost of health fairs or free care clinics run by many medical school students, or the time that students spend volunteering in the local communities. The healthcare outcomes and cost savings as a result of these efforts are not easy to quantify. According to the Association of Academic Health Centers (AAHC), nationally academic health centers, **on average**, provide almost \$44 million in uncompensated patient care each year, and one in seven provides more than \$100 million, acting as a primary public safety net.^{xii} Many of New York's academic medical centers serve as a safety net for their local community.

PROVIDING QUALITY MEDICAL EDUCATION

The New York State medical schools train approximately 11% of the nation's medical students and 15% of its residents. Students have the opportunity to learn from some of the nation's most renowned clinical and research faculty. This depth of teaching excellence attracts the highest quality students, nearly half of whom ultimately remain in New York State to practice medicine. In addition, New York State institutions are known for curriculum innovations and reform, such as the Double Helix method of teaching medical education and advancements in educational informatics. The diversity of students, as well as the curriculum to which they are exposed is a benefit to the well being of the local communities in which they learn and eventually practice.

VALUE OF TRAINING & RETAINING PHYSICIANS

The economic impact of a new practicing physician is estimated to be \$1.5 million annually. With a growing shortage of physicians nationally, the addition of thousands of physicians each year is a true competitive advantage for the New York State economy. Tripp Umbach estimates the impact of New York State medical school graduates, who remain within the State after graduation to practice medicine, represents an additional impact of nearly \$1.4 billion annually.^{xiii}

RESEARCH CONDUCTED AT NEW YORK STATE MEDICAL SCHOOLS

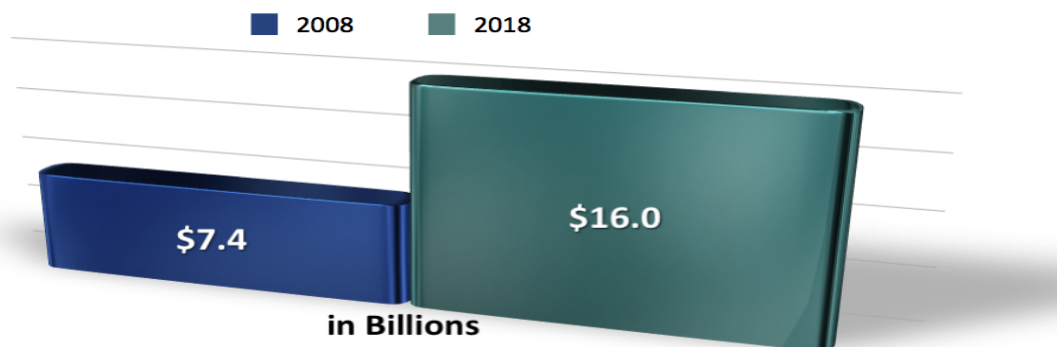
New York State is home to one of the strongest biomedical research communities in the entire world. With fifteen medical schools, their affiliated teaching hospitals and other top quality research institutions, New York scientists are conducting some of the most cutting-edge, exciting research. Since a majority of research funding comes from federal sources, revenue for research activities represents “fresh dollars” to the New York economy. In 2008, New York medical schools received more than \$1 billion in National Institutes of Health (NIH) research grants. This represents approximately 5% of all NIH grant dollars awarded to medical schools.^{xiv}

In 2008, the \$100 million awarded by the Empire State Stem Cell Board (NYSTEM) to New York's medical schools, had an impact to the State of \$230 million.

The fifteen New York State medical schools work independently as well as collaboratively, to maximize their research efforts, capabilities and outcomes. This is accomplished through the shared use of lab space, specialty equipment, and through combining the expertise located throughout the State to generate superior research outcomes. These collaborations fuel New York’s biotechnology, medical technology and biomedical companies, creating benefits for the local economy, the local job market, and the local healthcare industry segment.

It is estimated that the 2008 economic impact of conducting all medical research and developing business spinoffs was more than \$7.4 billion in New York State. This is in addition to the \$85.6 billion in total economic impact related to the operations of New York’s academic medical centers. Tripp Umbach also estimates that Federal and State research dollars collected by AMSNY members in 2008 will result in an additional economic impact of \$16 billion to the New York State economy by 2018.^{xv}

Figure 11: New York State Medical School Research Impacts, 2008 Actual & 2018 Projected



MAKING A DIFFERENCE

Examples of Programs and Services Provided by AMSNY and Member Institutions

Academic medicine is an intricate linkage of education, research and health care missions. Each of the New York State medical schools has a broad and substantial goal of assisting the communities in which they are a part. Additionally, many of the medical students are volunteers in the community and provide services and care that their medical schools do not track. In the next few pages you will see examples of the programs these academic medical centers provide.

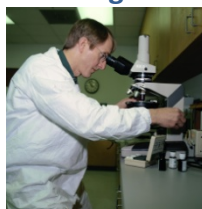
RESEARCH

Ruth L. and David S. Gottesman Institute for Stem Cell Biology and Regenerative Medicine Research Albert Einstein College of Medicine of Yeshiva University

In 2007, Albert Einstein College of Medicine crafted a Strategic Research Plan to guide its scientific growth and expansion over the next 10 years. Stem cell research was identified as a priority focus for further investment and expansion. Einstein established the Gottesman Institute for Stem Cell Biology and Regenerative Medicine Research to enable cross-cutting opportunities that can bring the promise of stem cells to fruition. The Gottesman Institute builds upon Einstein's strengths in human embryonic stem cell research and adult stem cells in the blood, brain, and liver, as well as on research in heart stem cells to treat cardiovascular disease, fat stem cells in diabetes, and immune stem cells in HIV/AIDS.

In recent years, Einstein investigators have made several important contributions to stem cell research, including: a) establishing the basis for liver-directed cell and gene therapy that can treat inherited disorders in children; b) inducing the differentiation of human embryonic stem cells to efficiently generate large numbers of red blood cells to treat anemia; and c) engineering liver stem cells to make insulin with the goal of curing Type 1 diabetes.

The Judith P. Sulzberger, M.D. Columbia Genome Center Columbia University College of Physicians and Surgeons



The Columbia Genome Center is an interdisciplinary center, whose goal is to expedite the adaptation of novel genomics technologies to enable breakthrough discoveries in biological and biomedical science. The Genome Center is an NIH-designated Molecular Libraries Screening Center and an active participant in postgraduate mentoring and training. This Genome Center works to identify both novel targets for drug development and lead compounds that target them.

With the help of robotics, the Center's laboratory has the capacity to perform and interpret up to 100,000 separate tests in a single day, allowing researchers to carry out multiple full-screening campaigns annually. In these campaigns, large chemical libraries are screened against both biochemical and cellular models of disease and cellular processes. Due to its interdisciplinary nature, the Center includes faculty from both the Medical Center and the Morningside campus of Columbia University, with appointments ranging from Chemical Engineering to Medicine.

The Center of Excellence on Addiction New York University School of Medicine

The Center of Excellence on Addiction at the NYU Langone Medical Center (NYULMC) brings



together approximately one hundred basic and clinical investigators from NYULMC, NYU's Washington Square Campus, NYU affiliates at the Nathan S. Kline Institute for Psychiatric Research, the Brookhaven National Laboratory and the New

York Academy of Medicine.

The primary goals of the Center are to foster multidisciplinary translational research, and in collaboration with community partners, to translate scientific advances swiftly into new ways to prevent, diagnose and treat addictive disorders and improve public health. Center expertise spans the translational spectrum from basic neuroscience to clinical neuroscience, animal and human neuroimaging, pharmacological and behavioral clinical trials, implementation in community-based and general healthcare settings, and public and population health. The Center builds upon vast clinical programs and patient populations at Bellevue Hospital Center, the VA New York Harbor Healthcare System and community-based treatment programs of the New York Node of the NIDA Clinical Trials Network; partnerships with NY City and State agencies; and a half dozen professional, doctoral, and post-doctoral clinical and research training programs focused on addictive disorders.

Research Innovations in Biophysical Stimuli Stony Brook University Medical Center


Stony Brook University Medical Center researchers are working on promising studies involving biophysical stimuli (such as mechanical vibration). The approach may have applications in obesity prevention. Mice that stand for brief stints on a high-frequency, low-magnitude vibrating platform appear to be



leaner than those that do not receive the treatment. The mice had nearly 30 percent less torso fat than the control mice. The study results are striking and the method used may someday lead to a non-strenuous, drug-free method for control of obesity.

Biophysical stimuli also bring hope in treating osteoporosis by causing bone mass to regenerate bone mass. The Stony Brook University Medical Center research program has served as the core of a world-class research group specializing in bone morphology with commercial applications in the diagnosis and treatment of osteoporosis, the identification of novel genes related to fracture healing, and the use of low-level stimulation to accelerate healing. The healing therapy may prove valuable in treating diabetic wounds.

This research has been funded by NIH, NSF, NASA, the Coulter Foundation, the Whitaker Foundation, industry and a variety of other sponsors. Research conducted in Stony Brook's Biomedical Engineering Department has led to the formation of six new companies, and the faculty have secured more than 35 issued patents, with 15 patents pending and 30 active invention disclosures.



Henri Begleiter Neurodynamics Laboratory SUNY Downstate Medical Center

In the Henri Begleiter Neurodynamics Laboratory there is a great deal of emphasis placed on the role of dynamic properties of oscillations in the human brain to increase knowledge of information processing. These electroencephalographic (EEG) oscillations have a superb time resolution, and are especially effective for studying the temporal interactions of brain processes involved in neural networks.

Over the years the Henri Begleiter Neurodynamics Laboratory has studied electrophysiological features that are involved in brain processing in response to various information processing tasks. They have identified electrophysiological features that are aberrant in alcoholics and individuals at risk for alcoholism that precede alcohol abuse and can be taken as markers of risk. These events consist of an amalgam of oscillations at various frequencies. Due to the fact that these oscillations are highly heritable, researchers are attempting to identify genes responsible for the production of those fundamental brain oscillations.

The research being conducted seeks to understand cognitive functions and dysfunctions of the human brain in relation to alcoholism, as well as evaluate the predisposition towards alcoholism using indices of information processing in high-risk individuals. This groundbreaking research is also looking to understand the genetic underpinning of alcoholism.

Center of Excellence in Biotechnology and Life Science (CoE) University at Buffalo State University of New York School of Medicine and Biomedical Sciences

The New York State Center of Excellence in Bioinformatics & Life Sciences was created in Buffalo, New York in 2002 as part of more than \$200 million dollars in investment from state, federal, industry and philanthropic sources to create a hub of life sciences expertise and innovation in Upstate New York. The CoE brings a strong foundation in life sciences research and discovery to its mission and collaborative efforts with industry, government and researchers around the world to improve the health and well-being of the population.

The mission of the CoE is to study the mechanistic processes involved in human disease with the goal of developing diagnostics tools and therapeutic interventions, preventative treatment and other disease management devices and processes to improve the health and well-being of the population. This scientific mission is balanced by its responsibility to act as a facilitator of economic development in Upstate New York via partnerships with government, academia and industry.

The rich history of discovery among scientists at CoE research institutions include:

- BAC Libraries for Sequencing the Human Genome
- Platinum Coil for Inoperable Cranial Aneurysms
- Prostate-Specific Antigen (PSA) Test
- Surfactant Replacement Therapy for Neonatal Respiratory Distress
- Photodynamic Therapy for Cancer
- Beta-Interferon Therapy for Multiple Sclerosis
- Nicotine Replacement Therapy
- Sickle Cell Screening Test
- High-Throughput Crystallization Method
- Timed-Release Insulin Therapy

Clinical and Translational Science Institute (CTSI)

University of Rochester School of Medicine and Dentistry



The University of Rochester Clinical and Translational Science Institute (CTSI) is a national leader in the expanding field of clinical and translational research. The University was one of the first institutions to receive this \$40 million award from the National

Institutes of Health to help accelerate scientific discoveries into new ways to understand, treat, prevent, and cure diseases.

The goals of the CTSI include: increased funds for pilot projects and faculty training; enhanced services for data management, computer simulation, biostatistics, epidemiology, research ethics, and community involvement; new graduate programs in clinical and translational science; and the formation of a network of hospitals and biomedical research institutions in Upstate New York whose members will collaborate on projects and share resources. The CTSI provides a platform that serves both scientists and pharmaceutical/biotech companies to advance their research in an institutional climate that is designed to support their needs and objectives.

The CTSI enhances the application of biomedical discoveries to the prevention of illness, the development of new techniques for early diagnosis, the identification of risk factors for disease and its progression that can be used for early intervention, and the development of treatments that extend and improve the quality of life of patients. Through these efforts, new preventive interventions, diagnostic procedures and treatments will be available to patients and communities faster than ever before.

Ansary Stem Cell Institute Weill Cornell Medical College



The Ansary Stem Cell Institute brings together a premier team of scientists to focus on stem cells, which are primitive, unspecialized cells with the capacity to form all types of cells, tissues, and organs in the body. The Ansary Institute takes a collaborative approach to

stem cell research by bringing together scientists from varied areas of biomedical research. The Institute was established in 2004 with a generous gift from Mr. Hushang Ansary. Since then, the Institute has garnered approximately \$26-million in external funding, including support from the Starr Foundation Tri-Institutional Stem Cell Initiative and the Empire State Stem Cell Board (NYSTEM).

Ansary Institute researchers have made groundbreaking discoveries that show significant promise for the future of regenerative medicine (marshalling the body's own resources to restore itself), the treatment of cardiovascular disease, and more. Recent notable Ansary Institute discoveries include: defining clear steps toward the eventual clinical applicability of stem cells: identifying cells in adult mouse testes that can be converted to stem cells that in turn generate cardiac, vascular, and neuronal cell types; expanding blood-producing stem cell cultures, whereas previous best efforts would result in a colony of stem cells dying after a few days; and generating endothelial cells (the basic building blocks of the circulatory system) from human embryonic stem cells. The Ansary Institute intends to lead the way in stem cell science to relieve human suffering.

PATIENT CARE

Alzheimer's Center of Albany Med Albany Medical College

The Alzheimer's Center of Albany Med offers comprehensive care to patients and caregivers living with memory problems, Alzheimer's disease and other neurodegenerative diseases.

In conjunction with a state-of-the-art research program, this multidisciplinary approach provides accurate diagnostic assessment, treatment of both cognitive and behavioral symptoms, long-term care and clinical research opportunities.



Components of the Center include: the *Aging and Memory Clinic*, dedicated to the study of normal brain aging and understanding the importance of early detection, diagnosis and treatment; the

Alzheimer's Disease Treatment Center for comprehensive diagnostic assessment, consultation and ongoing care; the *Neurosciences Advanced Imaging Research Center*, created for the pursuit and discovery of effective treatments in partnership with General Electric - with the ultimate goal of disease prevention; and the *Ann B. Goldberg Alzheimer's Resource Program* which offers a wide range of services for patients, caregivers, health professionals and the community including lectures, community forums, a resource room, and professional educational programs.

Children's Evaluation and Rehabilitation Center (CERC)

Albert Einstein College of Medicine of Yeshiva University



The Children's Evaluation and Rehabilitation Center (CERC) at the Albert Einstein College of Medicine provides a broad spectrum of clinical services for infants, children, and adolescents and, despite its name,

adults, with problems that include physical, developmental, language and learning disabilities.

One of the largest centers of its kind in the United States, CERC is a voluntary, nonsectarian agency whose services are essential components of the care available in New York City and New York State to all children with developmental disabilities. CERC's professional staff provides over 58,000 diagnostic, therapeutic and related services to about 8,000 children and their families annually, while training close to 1,000 professionals each year.

CERC is a major component of the Rose F. Kennedy University Center for Excellence in Developmental Disabilities Education, Research and Service (UCEDD), one of 67 designated regional centers that are federally funded to conduct interdisciplinary training, provide exemplary clinical services, furnish technical assistance, carry out research in the field of mental retardation and developmental disabilities, and create a bridge between universities and the community through outreach and dissemination activities, and by direct consumer involvement.

The Brookdale Department of Geriatrics and Adult Development **Mount Sinai School of Medicine**

The Brookdale Department of Geriatrics and Adult Development was established in 1982 as the first Department of Geriatrics in an



American medical school. In conjunction with the Geriatric Research Education and Clinical Center (GRECC) program at the Bronx VAMC, expert clinical care

is provided for the most frail and complex patients. Clinical research is conducted on aging, with an emphasis on medical decision-making, ethics, palliative medicine, and neurobiology. Geriatrics medicine is taught to medical students, house staff, attending physicians, and other health professionals.

In 1998, the Department was designated a Center of Excellence (CoE) in Geriatrics by the John A. Hartford Foundation. This award provided the department with the ability to offer additional specialized training to select third-year fellows to increase their opportunities of having a successful academic career. This award also helps physicians, fellows, and junior faculty overcome obstacles and obtain the necessary skills for becoming more competent geriatric educators and successful academic leaders.

Fertility Preservation **New York Medical College**

Fertility Preservation at NYMC is a program of innovative treatments, techniques and strategies to help patients cope with the rigors of cancer treatment. A woman's fertility is preserved by the freezing of eggs, embryos or ovarian tissues, and then returned to her body when chemotherapy and radiation are complete and the patient decides to conceive. Candidates are not only women of childbearing age who have breast or other cancers, but also young girls with leukemia or solid tumors whose parents want to keep their ability to have children later in life safe.

New York City Poison Control Center **New York University School of Medicine**

Operated and hosted by New York University (NYU), the New York City Poison Control Center (NYCPCC) was established in 1955 by the New York City Department of Health. As one of the first poison control centers in the country, it was instrumental in establishing methods whereby poisoning information could be offered as a service to health professionals and to the public. The NYCPCC primarily serves the



New York City metropolitan area. In 1955, the center received 2,908 calls; in 1973, 37,000

calls; in 1979, 57,285; and the volume currently exceeds 70,000 calls/year. Approximately 65-70% of the calls are from the public, with the remainder from health care providers. Approximately one-third of the calls are from outside the New York City area.

Point of Distribution (POD)

New York College of Osteopathic Medicine

The Point of Distribution (POD) is a disaster response and health education service run by the Department of Emergency Medicine at the New York College of Osteopathic Medicine (NYCOM) in conjunction with the Department of Health in Nassau County. The POD is designed to respond to natural disasters, health crises and other local tragedies. NYCOM and New York Institute for Technology are the only institutions in a POD on Long Island. They focus on three main areas of assistance:

1. Disaster response - POD provides the community with emergency vaccines as well as other significant health care needs.
2. Community outreach - The program offers health fairs where the goal is education and raising awareness of the community on healthcare issues.
3. Medical Reserve Core - The Department of Health in Nassau County coordinates all medical professionals in the county as an emergency response team. This program is currently coordinated along with the Medical Response Core by students and faculty at NYCOM and NYIT to gain certification as volunteers.



HIV Center for Women and Children SUNY Downstate Medical Center

The HIV Center for Women and Children was established in 1993 to coordinate all HIV-related programs at SUNY Downstate and all collaborating area health care institutions. The



HIV Center hosts a variety of programs providing patient care such as the STAR Health Center which provides primary care and support services for HIV+ adults, the Family-Centered Care Program which provides case management services for HIV men and women as well as their dependent children, the Treatment Adherence Services Program which is designed to strengthen HIV treatment adherence, the Free Rapid HIV Testing Program, Inpatient Services and many more. These programs, along with an array of others aimed at behavioral health, outreach and education are just some of the programs that make this center an asset to the members of the local community.

MEDICAL EDUCATION

Service Agreement for a Medically Underserved Area

Sophie Davis School of Biomedical Education at The City College of New York

The Sophie Davis School of Biomedical Education is a unique 7-year combined BS-MD program with a social mission. Many of the physicians who train in this program are under-represented minorities (URM) and many end up practicing primary care in underserved communities. One of the challenges that has been identified at Sophie Davis is that some of the young people who are needed the most in the ranks of the medical profession, those from low-income families which are African-American and Latino, are often those who attend high schools with limited resources, challenges and expectations. Sophie Davis works to admit approximately 55% URM, and about 45% of their graduates are URM. All students in this program must sign a post-graduate service commitment agreement promising to provide full term medical services as a primary care physician for two years in a designated primary care physician shortage area in New York State. Upon completing their training, graduates fulfill their commitment by working full-time in a hospital, clinic, or private practice in a designated area. For many program graduates, this experience marks the beginning of a long-term dedication to service as a primary care physician in an underserved community.

Training Clinical Investigators

Stony Brook University Medical Center

Stony Brook University Medical Center doctors are spearheading an initiative to train health professionals from various disciplines, such as medicine, nursing, physical therapy and dentistry, in the principles of clinical research. The program trains these professionals to carry out clinical research that can help translate the findings of basic science to improvements in human health. The program is supported by a National Institutes of Health (NIH) grant in recognition of the critical need to increase the pipeline of clinical investigators.

Students enrolled in this program attain competency in improving the understanding of mechanisms in human disease and designing research studies to assess new therapeutic strategies and improved diagnostic capabilities. Important components of the curriculum also include training health care researchers in the ethical and responsible conduct of research and in engaging the community in research efforts.



East Harlem Tutorial Program Touro College of Osteopathic Medicine

As a part of their mission, the Touro College of Osteopathic Medicine functions as an integral part of the New York City/Harlem community, and works with the community, local schools, and other colleges and universities to promote the study of medicine, encourage continuing development, increase educational opportunities and deliver osteopathic medical services in a variety of community settings.

One of the grass roots efforts that this school has participated in since opening is the East Harlem Tutorial Program. This program operates within a youth development framework, built upon the premise that learning happens best in caring, engaging environments. Recognizing the uniqueness of the talents, interests and learning styles of each of the enrollees, the program fosters their interaction with parents and teachers through programs tailored to individual academic, creative and developmental needs.



Rural Medical Education SUNY Upstate Medical University

The Rural Medical Education Program, or RMED, offers medical students at SUNY Upstate Medical University a unique clinical education experience. RMED places third-year medical students in rural or small communities for nine consecutive months to live, work and learn under the supervision of family physicians and other specialists. Students are matched to teaching sites based on their preferences and academic interests. RMED students assist in surgeries, conduct and read CT scans with radiologists and help women deliver their babies, assisting in some of the medically underserved areas and bringing services to the community residents.

The Tri-Institutional MD-PhD Program Weill Cornell Medical College

The Tri-Institutional MD-PhD Program is training physician-scientists who will become the next generation of leaders in biomedical research. Weill Cornell Medical College, the Rockefeller University, and the Sloan-Kettering Institute combine to form one of the few inter-institutional collaborations dedicated to joint MD and PhD training.

Since its inception in 1972, the eminent clinical and research faculties of the three institutions have been providing a stimulating environment for both basic research and medical training. With over 280 participating faculty members, and an organization that fosters student freedom and independence, the Program offers unparalleled opportunities for individualized research training. Graduates of the Program are prepared to lead tomorrow's biomedical research efforts and to carry the knowledge acquired from basic research to the bedside.

MAKING THE HEALTH CARE PROFESSION MORE DIVERSE

The AMSNY Diversity Programs enroll an array of students throughout the educational continuum from urban and rural areas in New York State. The goal of these pipeline programs is to expose students to careers in healthcare and medicine, an opportunity that a majority of the participants would not have due to cultural and financial barriers. In order to outreach to a broader demographic, the programs each have their own unique structure:

The AMSNY Science and Technology Entry Programs (STEP), funded by the New York State Education Department, are rigorous academic enrichment programs for underrepresented, economically and/or educationally disadvantaged students. Since 1986, AMSNY STEP programs have targeted students interested in science, technology and health-related professions. The goal of the AMSNY STEP is to facilitate students' entry to and graduation from college and health professions schools. Since the program's inception, AMSNY STEP has provided academic enrichment to a total of 5,161 students. AMSNY STEP is the only statewide program and is conducted at 10 of the 15 New York State medical schools. Each of the schools develops its own unique STEP program which includes the following components:

- Exposure to the medical school environment and curriculum
- Career presentations from various health-profession fields
- Internships
- Participation in clinical and laboratory field experiences
- College counseling
- Personal counseling
- Academic/study skills, including Regent's and SAT review
- Oral and written research projects
- Self-esteem
- Values and ethics exploration
- Multicultural development
- Social awareness development
- Field trips
- Parents Advisory Council (PAC)
- Commemoration: awards, scholarship & other successes

The Post Baccalaureate Program at the University at Buffalo State University of New York School of Medicine & Biomedical Sciences, funded by the New York State Department of Health, provides academic enrichment to college students who have applied to a medical school and completed the interview process, but failed to meet the full academic/MCAT requirements for that institution. The program is based on the premise that there is a pool of students with the intellectual capability to complete medical school, but who have been academically compromised for a variety of reasons, including: inadequate education, poverty and low personal and societal expectations. Students are referred to this program by the medical school at which they interviewed and must devote one year to the Post Baccalaureate program.

Based on their previous academic experience, courses are tailored to meet each student's specific needs. After completion of the one-year program, students who have achieved a B or better in every class and improved their MCAT scores are guaranteed admission into the medical school that sponsored them. 92% of participants in the Post Baccalaureate Program matriculate into medical school; 85% of those students successfully complete medical school.

The Learning Resource Center at the Sophie Davis School of Biomedical Education provides academic services to medical students, specifically underrepresented students whose pre-collegiate education has not sufficiently prepared them to deal with the rigors of college and biomedical curriculum. The program's primary focus is to train and prepare minority students to pursue careers in the medical field. The Learning Resource Center serves students through academic assessments, academic counseling/workshops, course workshops and tutoring. 96% of Sophie Davis' African American students and 95% of their Latino students have received MD degrees.

The Pathways to Careers in Medicine & Research Program at the City College of New York (CCNY) places undergraduate students with faculty mentors who have received competitive grant awards for basic sciences research. The students become part of the mentor's research teams and thus learn early in their careers the protocols and procedures necessary to perform state-of-the-art research. These students continue their educational experiences through advanced degrees in basic sciences and medicine.

The Physician Career Enhancement Program at Staten Island University is aimed at high school students interested in pursuing an education and career in health sciences and consists of enhanced Princeton Review courses, clinical shadowing with medical residents and an introduction to research. Participants also undergo communication workshops, college preparation interviews and courses to enhance writing skills.

Pipeline programs such as the AMSNY Diversity Programs are crucial to increasing health outcomes in underserved areas. AMSNY has the added benefit of being able to reach out to all 15 medical schools in New York. By investing in the diversification of medical students, New York State will be able to improve the physician workforce and access to health care.

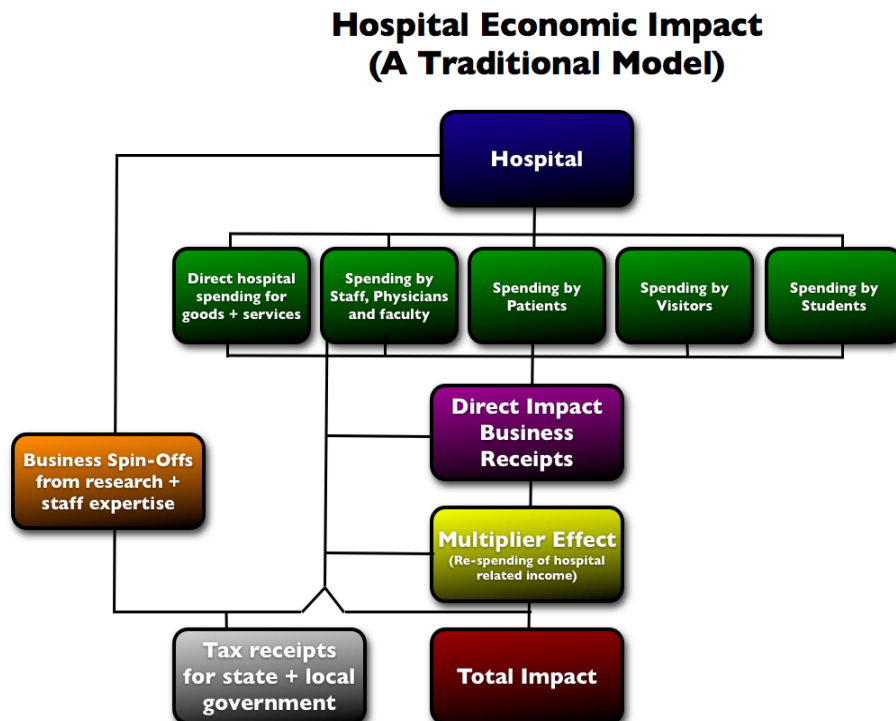
APPENDICES

APPENDIX A: METHODOLOGY

Tripp Umbach has performed more than 200 economic impact studies for both academic institutions and large health care systems, including the Mayo Clinic Rochester, UPMC Health System, COBTH and North Mississippi Health System. The methodology generally employed in these studies was originally derived from a set of research tools and techniques developed for the American Council on Education (ACE).^{xvi} The ACE-based methodology employs linear cash flow modeling to track the flow of institution-originated funds through a delineated spatial area. While this methodology is generally well suited to evaluate a hospital's impact on its local service area, it tends to be too limiting for a project with the complexity of medical schools with an integrated system.

Based on previous national economic impact studies of academic medical centers, including studies performed for the Association of American Medical Colleges (AAMC), as well as for academic medical centers in the states of Ohio, Pennsylvania South Carolina and Virginia, Tripp Umbach recommended that the traditional model of economic impact for hospitals (see Figure 12), based on the ACE model, be modified for the purposes of this research.

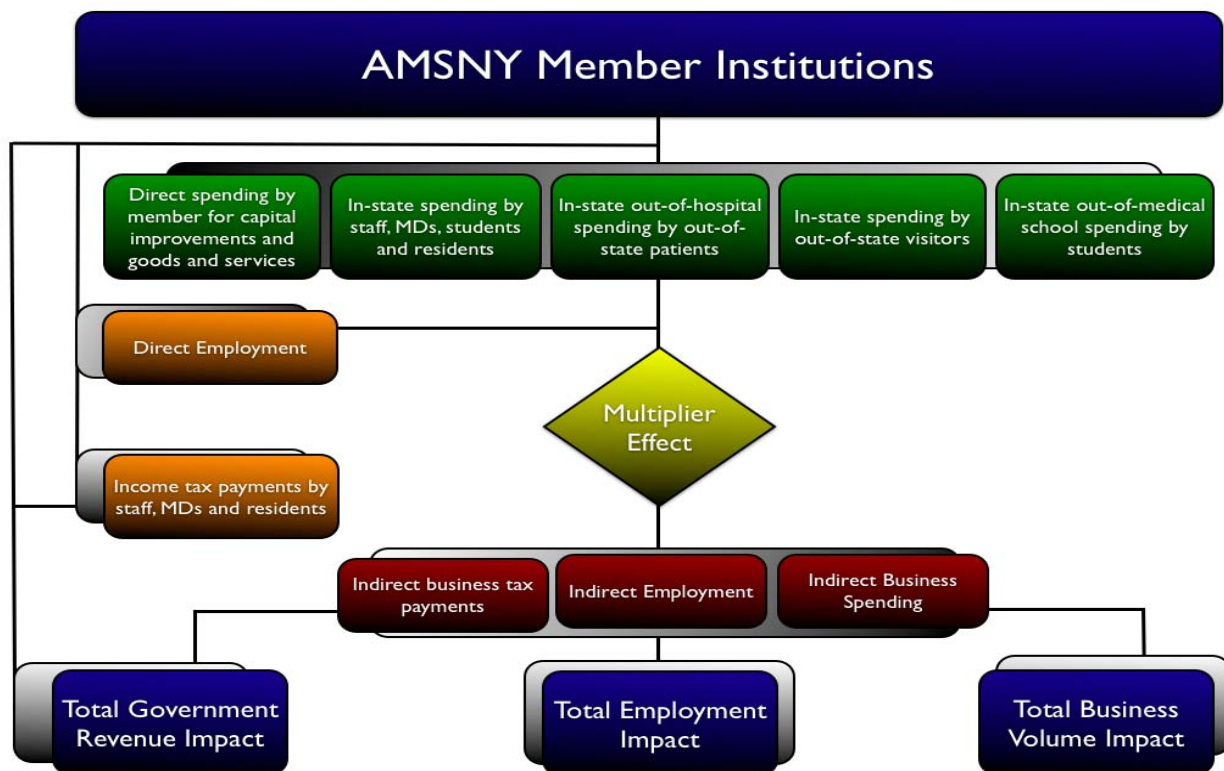
Figure 12: Traditional Model



The "traditional" model of hospital economic impact provides a good measure of the impact of hospital expenditures and their flow within an economy. However; the model does not account for the origination of hospital revenues, and thus counts the spending of revenues received by the hospital from in-state sources. In other words, the traditional model counts some of the spending of dollars that already existed in the New York economy.

The Tripp Umbach research team believes it is important to highlight the economic impact of the institutions that are attributable to funds brought into the state from out-of-state sources. The application of this "fresh dollar" model provides a first-line measure of the initial direct expansion in the state economy caused by the academic medical centers. The final model concept evolved into a hybrid model including a fresh-dollar approach feeding into a traditional model which tracks hospital in-state spending. The final model used for this research (see Figure 13) measures funds brought into the state together with the ultimate flow of these funds through the New York economy and the effect on economic expansion, job growth and enterprise development. The final methodology closely matches the impact study methodology recommended for individual medical schools by the Association of American Medical Colleges (AAMC).

Figure 13: New York State Academic Medical Centers Economic Impact Model



Multiplier/ Indirect Effect

All of these direct expenditures are re-circulated in the economy when recipients of the first round of income “re-spend” a portion of their income with other businesses and individuals. This re-spending is often termed the “multiplier” or “indirect” effect. Tripp Umbach’s research has determined a medical school/teaching hospital’s state business volume multiplier effect of 2.3. For every dollar directly spent by a medical school or teaching hospital, an additional \$1.30 is indirectly generated for a total impact of \$2.30. The methodology used for this study measures the effect of both direct and indirect business volume, employment, and government revenue generated by New York’s 15 medical schools and their primary hospital affiliates.

Data Collection

Tripp Umbach researchers worked closely with representatives from participating medical schools to collect the data required to conduct the study. The following data were required to perform this research:

1. Academic Medical Center Data

The medical schools supplied specific data for their institutions as requested by Tripp Umbach.^{xvii} Data supplied by the fifteen medical schools included but was not limited to:

- ❖ receipts from out-of-state patients
- ❖ numbers of visiting doctors and faculty
- ❖ research funding levels and sources of funds
- ❖ number of students from out-of-state
- ❖ in-state alumni retention
- ❖ geographic distribution of hospital spending (in-state vs. out-of-state)

2. Tripp Umbach Impact Study Data

Tripp Umbach supplied additional information as required to supplement the data supplied by the 15 New York State medical schools. Tripp Umbach used secondary research and its own national databases with the Association of American Medical Colleges (AAMC) and the American Hospital Association (AHA) to generate business volume and employment statistics at the state level, visitor spending, employee and physician spending patterns, and government revenue. Tripp Umbach also developed appropriate business and employment multipliers.

APPENDIX B: DEFINITION OF TERMS

Primary Hospital Affiliates/Teaching Hospitals	<p>In this study, primary hospital affiliates include hospitals located in the State of New York that are owned by or closely affiliated with a New York State medical school; this includes hospitals that generally provide clerkship experience in two or more of the major services: internal medicine; surgery; pediatrics; and obstetrics-gynecology. An institution responsible for most of the teaching in a single specialty, such as psychiatry or pediatrics, may also be considered a major affiliate. A major teaching institution may or may not be used for medical school residencies. For a listing of the hospitals included see Appendix D.</p>
Academic Medical Centers	<p>In this report, academic medical centers refer to medical schools and their primary hospital affiliates.</p>
Total Economic Impact	<p>The total economic impact of an institution includes both the direct impact and the indirect impact generated in the economy. Direct impact includes items such as institutional spending, employee spending, and spending by visitors to the institution. Indirect impact, also known as the multiplier effect, includes the re-spending of dollars within the economy.</p>
Total Business Volume	<p>The total sales receipts generated in a given geographic area (state of New York). Business volume includes wholesale, retail and service sector spending as well as value added in the manufacturing process.</p>
Multiplier Effect	<p>The multiplier effect is the additional economic impact created as a result of the institution's direct economic impact. Local companies sell their goods and services to an institution which creates the multiplier effect.</p>
Direct Tax Payments	<p>Direct tax payments made by an institution to a unit of government.</p>
Indirect Tax Payments	<p>Government revenue that is collected by governmental units in addition to those paid directly by an institution, including taxes paid directly by employees of the institution, visitors to the institution, and vendors who sell products to the institution.</p>
Direct Employment	<p>The number of employees measured in Full-Time Equivalents (FTEs) who work directly for the institution.</p>
Indirect Employment	<p>Indirect employment are the additional jobs created as a result of the institution's economic impact. Local companies that provide goods and services to an institution increase their number of employees as purchasing increases thus creating an employment multiplier.</p>

APPENDIX C: DATA SOURCES AND ASSUMPTIONS

Input	Data Source /Assumption
Total economic impact business volume multiplier	Standard state multiplier as recommended by the American Council on Education
Capital account expenditures	AAMC database used for hospital expenditures; Tripp Umbach national average rate used for medical school expenditures based on the hospital and medical school budget.
Spending on goods, services and supplies (non-capital account and non-payroll expenditures)	Tripp Umbach national average rate used for medical school and hospital expenditures based on hospital and medical school budgets.
Proportion of staff renting housing	Tripp Umbach national average
Percent of staff residing in the state	Tripp Umbach national average
Number of staff	AAMC database used for hospital staffing; Tripp Umbach national average rate used for medical school staffing.
Average expenditure by a staff member for rental housing	Tripp Umbach national average
Proportion of the staff residing in the state	Tripp Umbach national average
Proportion of total non-housing expenditures that an individual is likely to make in the state	Tripp Umbach national average
Total institution-related income of staff	AAMC database used for hospital expenditures; Tripp Umbach national average rate used for medical school expenditures.
Proportion of a consumer's total expenditures spent on non-housing items	Tripp Umbach national average
Proportion of the staff not residing in the state	Tripp Umbach national average
Average expenditures in the state by each staff person not residing in the state	Tripp Umbach national average
Proportion of physician employees residing in the state	Tripp Umbach national average
Proportion of physician employees renting housing	Tripp Umbach national average
Number of physician employees	AAMC database
Average expenditure by a physician employee for rental housing	Tripp Umbach national average
Average income of physician employee	Tripp Umbach national average
Average expenditures in the state by each physician employee not residing in the state	Tripp Umbach national average

Proportion of independent contractor physicians residing in the state	Tripp Umbach national average
Proportion of independent contractor physicians renting housing	Tripp Umbach national average
Number of independent contractor physicians	AAMC database
Average expenditure by an independent contractor for rental housing	Tripp Umbach national average
Proportion of total non-housing expenditures that an individual is likely to make in the state	Tripp Umbach national average
Average amount paid by hospitals to hospital independent contractor physicians	AAMC database
Average expenditures in the state by each independent contractor not residing in the state	Tripp Umbach national average
Total number of admissions/discharges	AAMC database
Percent of admissions/discharges by out- of-state patients	Tripp Umbach national average
Total number of outpatient visits	AAMC database
Percent of outpatient visits by out-of-state patients	Tripp Umbach national average
Average expenditures in the state, excluding expenditures at hospital, by out-of-state patients	Tripp Umbach national average
Number of out-of-state visitors per patient	Tripp Umbach national average
Average spending per visitor per day in state	Tripp Umbach national average
Average length of stay by visitor (days)	Tripp Umbach national average
Number of out-of-state visits to hospital by conference attendees	Tripp Umbach national average
Average number of days in state hotels and motels by conference attendees	Tripp Umbach national average
Average cost per night for a hotel/motel room in state	Tripp Umbach national average
Average daily expenditures by conference attendees exclusive of lodging	Tripp Umbach national average
Average number of visitors to each staff member	Tripp Umbach national average
Average length of stay (days) for visitors to staff	Tripp Umbach national average
Daily expenditures in the state by each visitor to hospital staff	Tripp Umbach national average
Number of enrollees (students)	AAMC database
Average number of visitors per enrollee	Tripp Umbach national average
Average length of stay (days) for visitors to students	Tripp Umbach national average
Daily expenditures in the state by each visitor to students	Tripp Umbach national average
Total number of medical residents	AAMC database
Average number of out-of-state visitors to each resident	Tripp Umbach national average
Average length of stay (days) for visitors to medical residents	Tripp Umbach national average
Daily expenditures in the state by each visitor to residents	Tripp Umbach national average
Average number of visitors per physician	Tripp Umbach national average
Average length of stay (days) for visitors to physician employees	Tripp Umbach national average
Daily expenditures in the state by each visitor to physician employees	Tripp Umbach national average

Number of visits to hospital independent contractor physicians	Tripp Umbach national average
Average length of stay (days) for visitors to physician independent contractors	Tripp Umbach national average
Daily expenditures in the state by each visitor to independent contractor physicians	Tripp Umbach national average
Proportion of medical school enrollees from in the state	AAMC database
Proportion of students living in medical-hospital housing	Tripp Umbach national average
Average non-housing expenditures made in the state by medical students	Tripp Umbach national average
Proportion of students living off campus	Tripp Umbach national average
Average cost of off-campus rent	Tripp Umbach national average
Proportion of medical residents renting housing in the state	Tripp Umbach national average
Average expenditure by a medical resident for rental housing	Tripp Umbach national average
Proportion of medical residents residing in the state	Tripp Umbach national average
Average income of a medical resident allocable to the medical school/hospital	AAMC database
Average expenditures in the state by each medical resident not residing in the state	Tripp Umbach national average
State business volume	Census data
Sales and gross receipt taxes received by the state	State Comprehensive Annual Financial Report
Individual income taxes received by the state	State Comprehensive Annual Financial Report
Corporate net income taxes received by the state	State Comprehensive Annual Financial Report
Other taxes received by the state	State Comprehensive Annual Financial Report

*Tripp Umbach's national averages are derived from surveys conducted at medical colleges and teaching hospitals. The New York State osteopathic schools (New York College Osteopathic Medicine and Touro College of Osteopathic Medicine) as well as Sophie Davis School of Biomedical Education at the City College of New York provided original data to Tripp Umbach due to the fact that their schools are not members of the Association of American Medical Colleges (AAMC) and therefore were not included in the AAMC database.

APPENDIX D: NEW YORK MEDICAL SCHOOLS AND PRIMARY HOSPITAL AFFILIATES

Albany Medical College

Albany Medical Center Hospital
Glens Falls Hospital
Mary Imogene Bassett Hospital*
Saratoga Hospital
St. Peter's Health Care Services

Albert Einstein College of Medicine of Yeshiva University

Beth Israel Medical Center
Bronx Lebanon Hospital Center*
Jacobi Medical Center
Long Island Jewish Medical Center
Montefiore Medical Center
North Central Bronx

Columbia University College of Physicians & Surgeons

Harlem Hospital Center
Mary Imogene Bassett Hospital*
New York-Presbyterian Hospital The University Hospital of Columbia and Cornell*
New York State Psychiatric Institute
St. Luke's-Roosevelt Hospital Center

Mount Sinai School of Medicine

The Bronx Veterans Administration Medical Center
Elmhurst Hospital Center
The Jewish Home and Hospital for the Aged
Mount Sinai Hospital
North General Hospital
Queens Hospital Center

New York College of Osteopathic Medicine

Benedictine Hospital
Brookdale University Hospital
Coney Island Hospital*
Ellis Hospital
Good Samaritan Medical Center
Jamaica Hospital Medical Center
Long Beach Medical Center
Lutheran Medical Center
Maimonides Medical Center*
Nassau University Medical Center
North Shore University Hospital-Plainview
Parker Jewish Institute for Health Care
Peconic Bay Medical Center
Peninsula Hospital Center
Sisters of Charity Hospital
South Nassau Communities Hospital
Southampton Hospital
St. Barnabas Hospital
Wilson Memorial Regional Medical Center
Wyckoff Heights Medical Center

New York Medical College

Metropolitan Hospital Center
Montefiore Medical Center, North Division
New York Eye and Ear Infirmary
Saint Vincent Catholic Medical Centers
Westchester Medical Center

New York University School of Medicine

Bellevue Hospital Center
Manhattan Campus of the VA NY Harbor Healthcare System
NYU Hospitals: Tisch Hospital, Rusk Institute of Rehabilitation, and the Hospital for Joint Diseases
Woodhull Medical & Mental Health Center

Sophie Davis School of Biomedical Education at City College of New York

Has no clinical programs

State University of New York Downstate Medical Center

Coney Island Hospital*
Kings County Hospital Center
Long Island College Hospital
Maimonides Medical Center*
State University of New York Downstate Medical Center/University Hospital of Brooklyn
Staten Island University Hospital*

State University of New York Upstate Medical University

United Health Services Hospitals
University Hospital, State University of New York Upstate Medical University

Stony Brook University Medical Center

Stony Brook University Hospital
Winthrop-University Hospital

Touro College of Osteopathic Medicine

Bronx Lebanon Hospital Center*
Staten Island University Hospital*

University at Buffalo State University of New York School of Medicine and Biomedical Sciences

Erie County Medical Center
Kaleida Health/Buffalo General Hospital
Millard Fillmore Gates Circle Hospital
Millard Fillmore Suburban Hospital
Roswell Park Cancer Institute
Veterans Administration Medical Center
Women's and Children's Hospital of Buffalo

University of Rochester School of Medicine and Dentistry

F.F. Thompson Hospital
Highland Hospital
Park Ridge Hospital
Rochester General Hospital
St. Mary's Hospital
Strong Memorial Hospital

Weill Cornell Medical College

Brooklyn Hospital Center
Hospital for Special Surgery
Lincoln Medical and Mental Health Center
Memorial Sloan Kettering Cancer Center
New York-Presbyterian Hospital – The University Hospital of Columbia and Cornell*
NYHMC of Queens

*Indicates a primary teaching hospital that is affiliated with more than one medical school. The impact of the hospital is included once in the analysis (business volume, employment and tax analysis).

APPENDIX E: END NOTES

ⁱ Primary hospital affiliates in this study include hospitals located in the State of New York that are owned by or closely affiliated with a New York State medical school. These hospitals generally provide clerkship experience in two or more of the following major services: internal medicine; surgery; pediatrics and obstetrics-gynecology. An institution responsible for most of the teaching in a single specialty, such as psychiatry or pediatrics, may also be considered a major affiliate. A major teaching hospital may or may not be used for medical school residencies.

ⁱⁱ Tripp Umbach, *The Economic Impact of AAMC-Member Medical Schools and Teaching Hospitals*, 2008.

ⁱⁱⁱ Figure 1 shows the total economic impact of New York's 12 allopathic medical schools that are members of the Association of American Medical Colleges (AAMC). Their figure of \$69.4 billion does not account for New York College of Osteopathic Medicine, Touro College of Osteopathic Medicine and Sophie Davis School of Biomedical Education at the City College of New York which are included in AMSNY's economic impact figure of \$85.6 billion.

^{iv} Tripp Umbach uses a state business volume multiplier of 2.3, which is recommended by the American Council on Education (ACE). This multiplier is used to calculate the indirect impact, or the re-spending that takes place in the State due to the initial round of academic medical center spending within the State.

^v The total impact is the combination of both the direct impact as well as the indirect impact. Direct impact includes items such as institutional spending, employee spending, and spending by visitors to the institution. The indirect impact, also known as the multiplier effect, includes the re-spending of the direct impact dollars within the local economy.

^{vi} For the purposes of this report the upstate medical schools are defined as Albany Medical College, SUNY Upstate Medical University, University at Buffalo State University of New York School of Medicine and Biomedical Sciences, and University of Rochester School of Medicine and Dentistry. Additionally, for the purposes of this report the downstate medical schools are defined as Albert Einstein College of Medicine of Yeshiva University, Columbia University College of Physicians & Surgeons, Mount Sinai School of Medicine, New York College of Osteopathic Medicine, New York Medical College, New York University School of Medicine, Sophie Davis School of Biomedical Education at The City College of New York, SUNY Downstate Medical Center, Stony Brook University Medical Center, Touro College of Osteopathic Medicine, and Weill Cornell Medical College.

^{vii} For the purposes of this report, Long Island local area consists of Nassau County and Suffolk County; New York Metro area consist of Bronx County, Kings County, New York County, Queens County, Rockland County, Richmond County and Westchester County; Rochester local area consists of Genesee County, Livingston County, Monroe County, Ontario County, and Wayne County; Buffalo local area consists of Cattaraugus County, Erie County, Niagara County, and Wyoming County; Syracuse local area consists of Madison County, Onondaga County, and Oswego County; Albany local area consists of Albany County, Columbia County, Greene County, Montgomery County, Rensselaer County, Saratoga County, Schenectady County, and Schoharie County.

^{viii} AAMC Economic Impact Study, 2008.

^{ix} Information derived from the New York State Department of Labor Statistics:
<http://www.labor.ny.gov/stats/index.shtm>

^x Robert Dickler, Senior Vice President of Health Care Affairs of the Association of American Medical Colleges (AAMC), 2001. <http://www.physiciansnews.com/cover/201wp.html>

^{xi} HANYS Says Community Benefit and Uncompensated Care Justify Hospital Tax-Exemption - HANYS News October 14, 2009 – HANYS <http://www.hanys.org/news/index.cfm?storyid=1234>

^{xii} Academic Health Centers: Creating the Knowledge Economy, AAHC, April 2009,
http://www.aahcdc.org/policy/reddot/FG_AHC_Creating_the_Knowledge_Economy_04-09.pdf

^{xiii} This number is derived from the assumption that over 2,100 students graduate annually (based on numbers in the database from the AAMC for each of the New York State medical schools) from the various medical schools in the state of New York and that New York State has a 45% retention rate, (based upon Tripp Umbach’s previous research as a valid assumption for the State of New York).

^{xiv} US Department of Health & Human Services,
<http://report.nih.gov/award/trends/AggregateData.cfm?Year=2008>.

^{xv} Tripp Umbach used economic impact models measuring commercialization of research, initially developed in 2001 for the Mayo Clinic and University of Minnesota.

^{xvi} Caffrey, John and Isaacs, Herbert, "Estimating the Impact of a College or University on the Local Economy," American Council on Education, 1971.

^{xvii} Data for the majority of the teaching hospital were supplied by Tripp Umbach's national database and databases used to complete national studies for the Association of American Medical Colleges.

Incorporated in 1967, the Associated Medical Schools of New York (AMSNY) is comprised of the fifteen public and private medical schools in New York State—connecting the people, knowledge and resources of New York State medical schools. The deans of AMSNY member institutions comprise its Board of Trustees. They provide vision and leadership, ensuring the State’s preeminence in the fields of medical research, medical education and patient care.

AMSNY facilitates educational opportunities for medical students, residents, faculty and those students wishing to follow a career in medicine. It coordinates an intensive statewide effort to increase equitable representation in medical education and access to healthcare for the economically disadvantaged.

The knowledge and expertise of AMSNY member institutions have influenced healthcare policy by educating federal, state and local leaders. AMSNY has advocated for access to healthcare for all people, AIDS patient care responsibility, animal research, biomedical research and palliative care education.



STUDY COMPLETED BY:



Tripp Umbach is recognized nationally as the leading provider of economic impact analysis for academic health centers, having completed national studies for the Association of American Medical Colleges since 1995. In addition to New York, Tripp Umbach has completed statewide economic impact studies for all of the medical colleges and their hospital affiliates in Pennsylvania, Ohio, Minnesota, Wisconsin, Virginia, Massachusetts, Arizona, and South Carolina. Tripp Umbach has completed economic impact studies for more than 100 leading healthcare organizations and for several state governmental agencies over the past eighteen years.