AAMC

Tomorrow's Doctors, Tomorrow's Cures®

Economic Impact of AAMC Medical Schools and Teaching Hospitals

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Association of
American Medical Colleges

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Executive Summary

In 2017 the AAMC (Association of American Medical Colleges) retained RTI International to measure the economic impact of medical schools and teaching hospitals represented by the AAMC in 46 individual states, the District of Columbia, and Puerto Rico. This report presents the results of that study, which are based on data from 145 medical schools and 260 teaching hospitals.

According to those data, the medical schools and teaching hospitals represented by the AAMC contributed more than $562 billion in gross domestic product (GDP). This amount translates to about 3.1% of the U.S. GDP, making the economic impact of these medical schools and teaching hospitals comparable in size to other important sectors such as transportation and warehousing, and accommodation and food services.[1] On a per capita basis, these medical schools and teaching hospitals generate approximately $1,750 in economic impact per person.

In addition, AAMC member institutions' education, research, and patient care work supports more than 6.3 million jobs in the United States across multiple industries (Table 1). These jobs are approximately 3.3% of jobs nationwide, paying more than $387 billion in aggregate annual wages, salaries, and benefits—an average of about $61,000 in wages, salaries, and benefits per job.

Medical schools and teaching hospitals that are members of the AAMC also have substantial secondary economic and social impacts on their multicounty regions and within the counties and cities where they have operations. Communities in all regions of the country typically rely on these organizations for job creation, high-quality medical care, medical research and scientific advancements, new business development, and the education of the nation's health care workforce.

A full state-by-state accounting of this data analysis is at aamc.org/EconomicImpact.

Medical schools and teaching hospitals are important contributors to their communities, playing crucial roles in educating tomorrow's doctors and researchers, providing cutting-edge patient care, and conducting groundbreaking research. This analysis shows that they are also vital economic engines, generating employment, wages, and business and community development opportunities.

Table 1. Summary of Economic Impact of AAMC Member Activities in 2015*

CATEGORY	GROSS DOMESTIC PRODUCT (GDP)	LABOR INCOME	JOBS
Teaching Hospitals	$380 billion	$268 billion	4.0 million
Medical Schools	$182 billion	$119 billion	2.3 million
Total	**$562 billion**	**$387 billion**	**6.3 million**

Source: RTI International analysis based on results of a single-region IMPLAN PRO Input-Output Model.
Note: GDP is a measure of the overall size of economic value. Labor income is the value of wage, salaries, and benefits earned.
*RTI analysis of 2015 and 2016 AAMC data, reported in 2017 dollars.

1. The U.S. Bureau of Economic Analysis provides the official GDP by industry statistics for the United States at https://www.bea.gov/industry/gdpbyind_data.htm.

GROUNDBREAKING DISCOVERIES, ECONOMIC IMPACT

More than 50% of the National Institutes of Health (NIH) budget for extramural research is awarded to physicians and scientists at the nation's medical schools and teaching hospitals. Researchers at these institutions receive significant funding from other federal and nonfederal research sponsors. Altogether, research activities at U.S. medical schools and teaching hospitals generate significant economic impact—in 2017, $25.4 billion and 313,604 jobs added to the national economy and $16.6 billion in labor income at AAMC member institutions alone. The innovations and discoveries that result from this research lead to the development of new products and increased employment. In 2016, universities filed more than 16,000 patent applications, and more than 7,000 of them were awarded.[1] Additionally, roughly 1,000 start-ups were formed and 800 new products were created, providing new jobs to local communities. Academic medical centers have substantially contributed to this output.[2]

The institutions behind the two start-ups highlighted here demonstrate the strong commitment to cross-institutional collaboration and research commercialization at medical schools and teaching hospitals.

Inhaled nitric oxide (iNO) therapy is used to treat newborns suffering from pulmonary hypertension. Approximately 1 million patients have been treated with iNO since the 1990s, yet in its current form, this therapy is one of the most expensive treatments in neonatal intensive care units.[3] Third Pole Therapeutics, led by David Zapol, is the San Francisco–based start-up revolutionizing this therapy with a tankless device that produces and cleans the gas on demand through electricity. The discovery of the medical application of iNO started at Massachusetts General Hospital (MGH) in 1990, led by David's father, Warren Zapol, MD.

In partnership with MGH, the Third Pole team has relied on collaboration and funding from several other partners, including the NIH Centers for Accelerated Innovations (NCAI), Boston Biomedical, Boston Children's Hospital, and Johnson & Johnson Innovation.

Third Pole will soon submit its device to the U.S. Food and Drug Administration for approval. This first-generation device will focus on treating newborns with pulmonary hypertension in a hospital setting.[4] Bridging two worlds— therapeutic discoveries and device innovations—Third Pole is improving neonatal treatment therapies through both the way iNO is produced and the way the therapy is delivered.

Case Western Reserve University and the University of Texas (UT) Southwestern Medical Center research resulted in the biotechnology start-up Rodeo Therapeutics Corporation. Sanford Markowitz, MD, PhD, and Stanton Gerson, MD, from Case Western and Joseph Ready, PhD, from UT Southwestern have developed small-molecule drug therapies that inhibit an enzyme called 15-PGDH and stimulate the body's natural regeneration process.[5] This team has successfully used a 15-PGDH inhibitor in several animal studies to enhance tissue regeneration related to inflammatory bowel disease, post–bone marrow transplant blood cell reconstruction, and liver disease.

Federal funding from NCAI augmented Case Western's and UT Southwestern's institutional support for the research, and, with $5.9 million in Series A financing from Accelerator Corporation and its investors, supported the establishment of Rodeo Therapeutics in July 2017. This investment provides the financial resources necessary to advance the company's development program toward human trials and to support research staff, as well as to hire additional expertise.[6] The Rodeo team's immediate plans are to confirm the compound's translational ability from animal to human subjects in preclinical testing.[7]

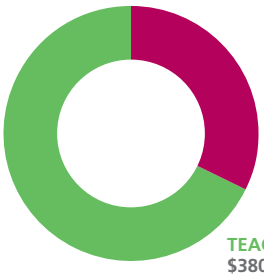
1. Association of University Technology Managers. Driving the Innovation Economy. http://www.autm.net/AUTMMain/media/SurveyReportsPDF/AUTM-FY2016-Infographic-WEB.pdf. Accessed March 7, 2018.
2. Azoulay P, Michigan R, Sampat BN. The anatomy of medical school patenting. N Engl J Med. 2007;357:2049–2056.
3. Third Pole Therapeutics. Investigational Devices. http://www.pole3.com/investigational-devices. Accessed March 7, 2018.
4. Third Pole Therapeutics. http://www.pole3.com/investigational-devices.
5. McGrane C. Regenerative Medicine Startup Rodeo Therapeutics Raises $5.9M for Drugs to Regenerate Tissue. GeekWire. https://www.geekwire.com/2017/regenerative-medicine-startup-rodeo-therapeutics-raises-5-9m-drugs-regenerate-tissue/. July 25, 2017. Accessed March 7, 2018.
6. Schubert D. Accelerator Corporation. Press Release. Accelerator Corporation Announces Series A Financing in Rodeo Therapeutics to Focus on Small-Molecule Regenerative Therapies. http://rodeotherapeutics.com/wp-content/uploads/2017/07/Rodeo-Therapeutics-FINAL-press-release-for-web.pdf. July 25, 2017. Accessed March 7, 2018.
7. RTI Interview. Accelerator Corporation staff member and Sara VanLear, RTI. October 18, 2017.

ECONOMIC IMPACT OF AAMC MEDICAL SCHOOLS AND TEACHING HOSPITALS

AAMC
Tomorrow's Doctors, Tomorrow's Cures®

INCREASE THE SIZE OF THE ECONOMY BY

$562 BILLION



This equates to about 3.1% of U.S. GDP and roughly $1,750 per person.

Jobs

TOTAL	DIRECT	SECONDARY[1]
6.3 MILLION	2.7 MILLION	3.6 MILLION

This is approximately 3.3% of jobs nationwide.

Wages, Salaries, and Benefits

TOTAL	DIRECT	SECONDARY[1]
$387 BILLION	$190 BILLION	$197 BILLION

Average Wages, Salaries, and Benefits

TOTAL	DIRECT	SECONDARY[1]
$61,295 PER JOB	$70,063 PER JOB	$54,710 PER JOB

ADDITIONAL CONTRIBUTIONS FROM AAMC MEDICAL SCHOOLS AND TEACHING HOSPITALS

EDUCATION

U.S. medical schools graduated

19,254

new MDs in 2017.

RESEARCH

Research at medical schools and teaching hospitals added

$25.4 BILLION

to local economies in 2017.

PATIENT CARE

AAMC COTH®[2] teaching hospitals operate

71%

of all accredited Level I trauma centers.[3]

COMMUNITY BENEFIT

The average AAMC COTH hospital spends

$100 MILLION

annually on community benefit.

1. Secondary effects include two additional economic effects. The first is the new business spending as AAMC member institutions buy more goods and services from other local businesses to meet growth. The second is the additional spending brought about by the salaries and benefits associated with job creation.
2. Council of Teaching Hospitals and Health Systems®.
3. American College of Surgeons Level I Trauma Center designations, 2017.

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