



# The Economic Impact of the University of Arkansas for Medical Sciences and Its Affiliate Systems

December 2016

# Table of Contents

---

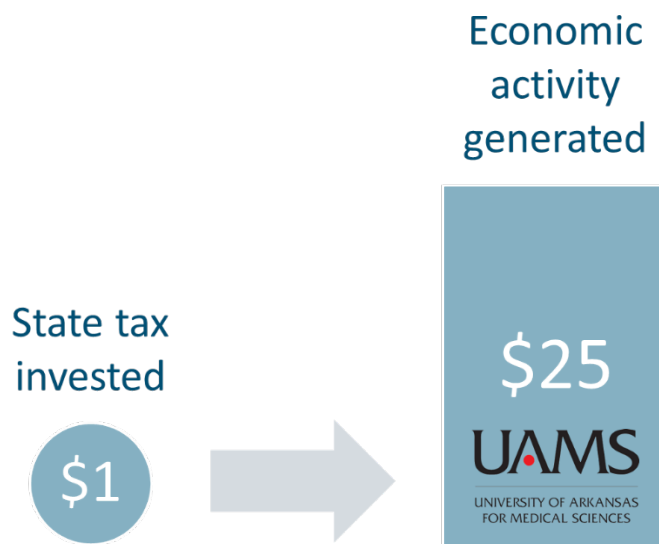
Executive Summary.....	1
About this Study.....	2
University of Arkansas for Medical Sciences .....	3
Economic Impact.....	3
Educational Impact .....	4
Clinical Care Impact.....	8
Research Impact.....	9
Innovation and Commercialization Impact.....	12
UAMS Spinout: HD Nursing.....	14
UAMS Spinout: InterveXion Therapeutics .....	14
Regional Impact .....	16
Recommendations .....	18
Methodology.....	21
Appendix 1: Economic Impact Tables .....	24
Appendix 2: American Medical Association Data Analysis .....	27
Appendix 3: Enrollment Data.....	28

# Executive Summary

---

The University of Arkansas for Medical Sciences (UAMS) is one of the state’s greatest economic engines, generating \$2.65 billion in economic activity statewide. For every dollar of taxpayer money that UAMS receives, \$24.53 of economic activity is supported across the state economy. As the state’s only comprehensive academic medical center, UAMS plays an enormous role in educating the state’s physician workforce, producing nearly half of the state’s practicing physicians. In rural parts of the state, that often face a shortage of doctors, UAMS trains an even higher percentage of the physicians—nearly 60%.<sup>1</sup>

Figure 1 University of Arkansas for Medical Sciences Return on Investment, 2015



Source 1 TEconomy Partners analysis and estimate

UAMS and its Regional Program directly supports 10,022 Arkansas jobs and more than \$24.5 million in state and local tax revenue. This is an increase from 9,435 direct jobs and a similar level of state and local tax revenue (\$24.3 million), since the last time a UAMS impact study was conducted in 2010.<sup>2</sup>

The ability of UAMS to execute its mission effectively and on a statewide scale requires continuing investments in talent and advanced infrastructure. This study finds that while the demands on UAMS have increased significantly over the last five years, state funding for UAMS has declined in real dollar terms.

Given the high rate of economic return that UAMS generates for the state and its large-scale impact on health services education and access to clinical care, **TEconomy Partners recommends the state**

---

<sup>1</sup> TEconomy Partners analysis of American Medical Association data on Arkansas physicians. UAMS graduates represent 2,883 out of 5,924 licensed physicians (48.7%), and 479 out of 820 licensed rural physicians (58.4%).

<sup>2</sup> The decline in state and local tax revenue is due to personal income tax reductions in the State of Arkansas over the 2010-2015 time period.

**identify ways to increase funding for UAMS going forward.** State support for UAMS that is commensurate with the support that neighboring states are investing in their academic medical centers will send a positive message and ensure the institution's long-term viability and competitiveness. This commitment will help UAMS to retain and to attract talent and to continue to provide high-quality education, biomedical research, advanced clinical trials and specialized care not offered anywhere else in the state.

## About this Study

---

The University of Arkansas for Medical Sciences is the state's only comprehensive academic medical center. Its mission is to improve the health, health care, and well-being of Arkansans and of people around the world. As a public, state-supported institution, UAMS periodically commissions a study to assess the University's economic impact and the state's return on investment. The objective of this study is to analyze and present the latest data on economic and functional impacts of the UAMS presence and operations on the statewide economy in terms of follow-on economic activity, jobs and tax revenue.

This 2015 economic impact analysis of the University of Arkansas for Medical Sciences and its affiliate systems updates a previous study undertaken in 2010 using the same methodology.<sup>3</sup> This enables direct comparisons and analysis of trends over time.

This report presents TEconomy Partners analysis of the economic and functional impacts generated by UAMS and its affiliate systems, Arkansas Children's Hospital and the Central Arkansas Veterans Healthcare System. These six primary areas of impact are:

- Economic impact
- Educational/workforce impact
- Clinical care impact
- Regional impact
- Research impact
- Innovation impact

The report is organized by each of these impact categories. A description of the methodology is included at the end of the report, and full tables are included as appendices.

---

<sup>3</sup> Battelle Technology Partnership Practice (2010). *The Impact of the University of Arkansas for Medical Sciences*.

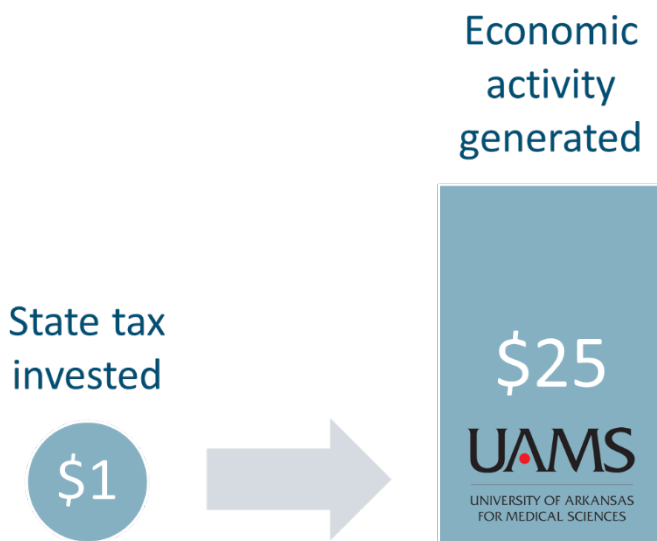
# University of Arkansas for Medical Sciences

---

## Economic Impact

The University of Arkansas for Medical Sciences is one of the state’s greatest economic engines generating \$2.65 billion in economic activity statewide and producing nearly half of the state’s practicing physicians—in rural areas, UAMS has trained 60% of practicing physicians.<sup>4</sup> For every dollar of taxpayer money that UAMS receives, \$24.53 of economic activity is supported across the state economy.

Figure 2 University of Arkansas for Medical Sciences Return on Investment, 2015



Source 2 TEconomy Partners analysis and estimate

UAMS operates on a large scale. **It directly employs 10,022 people, and its operating budget to support its academic mission, clinical care, research, and innovation activities was \$1.285 billion in 2015** up only slightly from \$1.140 billion in 2010, reflecting a compound annual growth rate of 2.4%. Growth in operational expenditures is the result of growth in student enrollment, as well as patients seen over this same five-year period.

The economic impact generated by UAMS and its Regional Program stems from both its direct employment and expenditures, as well as the secondary and tertiary economic activity generated when UAMS procures goods and services from other Arkansan companies and through personal spending by UAMS employees. These employment and expenditure impacts reverberate positively throughout the statewide economy through, what is generally termed, the “multiplier effect.”

---

<sup>4</sup> TEconomy Partners analysis of American Medical Association data on Arkansas physicians. UAMS graduates represent 2,883 out of 5,924 licensed physicians (48.7%), and 479 out of 820 licensed rural physicians (58.4%).

When these secondary and tertiary impacts are taken into account, **UAMS and its Regional Program support 20,107 jobs** across the state and generate **\$336 million in Federal, state and local tax revenue**, up from 18,487 jobs and \$272 million in Federal, state and local taxes in 2010.

Figure 3 Total Statewide Economic Impact of UAMS and its Regional Program, 2010 and 2015

	Output (\$Bn)	Employment	Wages (\$Bn)	Taxes (\$M)
2010	\$2.112	18,487	\$1.068	\$272
2015	\$2.649	20,107	\$1.307	\$336



Source 3 TEconomy Partners analysis and calculation using Arkansas county-level IMPLAN impact models.

Looking more broadly across UAMS and its affiliate systems, Arkansas Children’s Hospital and Central Arkansas Veterans Health System, the economic impact is even larger. UAMS and its affiliate systems support 34,577 jobs across the state and generate \$554 million in Federal, state and local tax revenue, up from 34,350 jobs and \$477 million in Federal, state and local taxes in 2010.

Figure 4 Total Statewide Economic Impact of UAMS, ACH and CAVHS, 2010 and 2015

	Output (\$Bn)	Employment	Wages (\$Bn)	Taxes (\$M)
2010	\$3.915	34,350	\$1.844	\$477
2015	\$4.534	34,577	\$2.088	\$554



Source 4 TEconomy Partners analysis and calculation using Arkansas county-level IMPLAN impact models.

## Educational Impact

UAMS educates Arkansas' current and future health care professionals. **It is the state's only comprehensive academic health center**, with colleges of Medicine, Nursing, Health Professions, Pharmacy, Public Health, and a Graduate School. UAMS has 3,262 students, 789 medical residents, 29 pharmacy residents, and two dental residents, which is significant in a state with a total population of 3 million people. Overall enrollment has been relatively stable over the past five years, ranging from 3,200 to 3,300 students, whereas enrollment was consistently at or below 3,000 students before 2009.<sup>5</sup>

**Total enrollment has grown nearly 20% since 2007**, with significant growth in the College of Nursing (which grew by 80%). Although total enrollment has been largely stable since 2010, enrollment by college can fluctuate significantly from year-to-year depending on the number of applicants, the quality of applicants, and other factors. The table below shows presents enrollment data for the most recent five-year period (2012-2016) and compared to ten years ago (2007).

Table 1 UAMS Enrollment by College, Last Five Years (2012-2016) and Compared to Ten Years Ago (2007)

College	2007	2012	2013	2014	2015	2016	% Growth, 2007-2016
College of Nursing	489	862	804	864	1,002	879	80%
College of Health Professions	608	675	707	682	653	752	24%
College of Medicine	593	641	671	669	672	690	16%
College of Pharmacy	393	479	478	477	468	473	20%
Graduate School	486	325	363	375	346	257	-47%
College of Public Health	191	207	208	204	205	211	10%
<b>Total</b>	<b>2,760</b>	<b>3,189</b>	<b>3,231</b>	<b>3,271</b>	<b>3,346</b>	<b>3,262</b>	<b>18%</b>

Source 5 University of Arkansas for Medical Sciences

- College of Nursing:** The UAMS College of Nursing is the largest college by enrollment, with 879 students enrolled in 2016. The college offers six programs which confer the following degrees: Bachelor of Science in Nursing, Master's in Nursing Science, Doctor of Nursing Practice, and the Doctor of Philosophy (PhD) in Nursing. UAMS offers the only PhD in Nursing degree program in the state, which produces graduates qualified to teach, conduct research, and serve as leaders in nursing and health care.
- College of Health Professions:** Allied health professionals constitute about 60-65% of the health care workforce. The College of Health Professions had 752 students enrolled in 2016. The college offers certificates and degrees across all degree levels in 17 different areas, including Audiology and Speech Pathology, Dietetics and Nutrition, Emergency Medical Services, Health Information Management, Genetic Counseling, Imaging and Radiation Sciences, Laboratory Sciences, and Respiratory and Surgical Technology. The college recently began offering programs for Physician Assistant and Physical Therapy certifications and is developing an Occupational Therapy program.

<sup>5</sup> Complete time-series enrollment data included in the appendix.

- **College of Medicine:** The College of Medicine had 690 students enrolled in 2016, as well as 651 medical residents (and another 144 medical residents in the Regional Programs. The College contains 29 departments including Internal Medicine, Family Medicine, Pediatrics, Anesthesiology, Surgery, Orthopedic surgery, Psychiatry, Emergency Medicine, etc. In addition to education and clinical care, the college emphasizes research in cancer, neuroscience, aging, drug addiction, and other fields. For residencies, the College of Medicine is able to leverage its relationship with both Arkansas Children’s Hospital and Central Arkansas Veterans Health System in addition to its Regional Programs.
- **College of Pharmacy:** The College of Pharmacy was the fourth largest college, with enrollment of 473 students in 2016. Pharmacy students are supported by 400 pharmacy preceptors, i.e., pharmacists who serve as practitioner educators to provide mentoring and supervision during experiential internships. It is one of only ten colleges in the country offering a Nuclear Pharmacy Specialty Track that trains pharmacists to be able to dispense radiopharmaceuticals for medical imaging or therapy. The college operates the Arkansas Poison Control Center and the Arkansas Drug Information Center through educational outreach and an emergency hotline for poison exposures.
- **Graduate School:** The Graduate School offers Masters of Science and PhDs in programs such as Bioinformatics, Clinical Nutrition, Interdisciplinary Biomedical Sciences, Nursing Science, Pharmaceutical Sciences, Pharmaceutical Evaluation and Policy, etc. The School had enrollment of 257 students in 2016.
- **College of Public Health:** The College of Public Health is the sixth and newest academic unit at UAMS established with funding from Arkansas’ share of the tobacco Master Settlement Agreement. The College enrolled 211 students in 2016. The Dean’s message highlights three core contributions that the College brings to Arkansas and to the UAMS campus: (1) a primary focus on improving the quality of life for entire communities; (2) a heavy emphasis on health promotion and disease prevention as a cost-effective way to maintain health and quality of life; and (3) a commitment to the policy development and information-gathering that is necessary to develop sound policy and environmental changes to promote health and well-being.<sup>6</sup>

**The total number of graduates has increased by 40% from 649 to 925 since 2000, and by 11% since 2010.** The overall graduation rate for all colleges is 73%, but the College of Pharmacy (95%) and the College of Medicine (91%) graduate an exceptionally high proportion of their students.<sup>7</sup> Figure 5 shows the total number of undergraduates and graduates produced by UAMS since 2000.

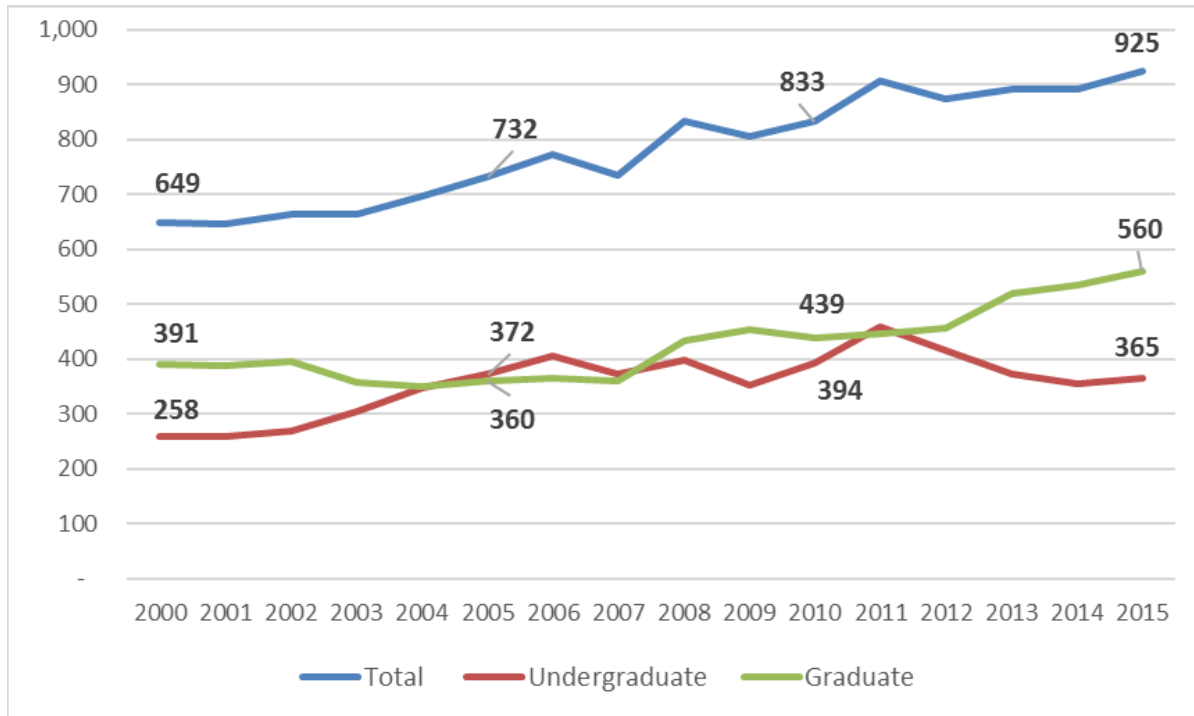
---

<sup>6</sup> UAMS College of Public Health. Message from the Dean. <http://publichealth.uams.edu/about-coph/message-from-the-dean/> Accessed Nov. 17, 2016.

<sup>7</sup> Dr. Dan Rahn (2016). UAMS State of the University Address. Delivered February 23, 2016.



Figure 5 UAMS Undergraduate and Graduate Level Graduates, 2000-2015



Source 6 University of Arkansas for Medical Sciences

Along the continuum of undergraduate and graduate education that UAMS provides is the University’s broad range of residency programs. Newly graduated medical doctors are required to do three-plus years of experiential graduate medical education through residency programs. In addition to medical residencies, UAMS offers nursing, pharmacy, physical therapy, dental, etc., residencies. The residency program has been highly instrumental in the state’s ability to retain its medical school and other graduates. In fact, **the state’s retention of medical school graduates is the second highest in the nation**, with 200 completed medical residencies in 2015 and 100 of these choosing to stay in state to practice.<sup>8</sup>

TEconomy analyzed American Medical Association (AMA) data on licensed physicians and medical school graduates to assess the role of UAMS in educating Arkansas physicians.<sup>9</sup> According to AMA data, 3,540 Arkansas-born residents have graduated from medical school, and **93.8% of them graduated from UAMS**. TEconomy found that UAMS has produced:

- 48.7% of Arkansas’ licensed physicians (2,883 physicians)
- 59.3% of Arkansas’ licensed family practice physicians (781 physicians)
- 48.1% of Arkansas’ licensed female physicians (753 physicians)
- 58.4% of Arkansas’ licensed rural physicians (479 physicians).

UAMS also leverages its student body to perform volunteer work which serves to enhance their training through patient-care experiences, but also provides an important public good to members of the community without access to care. More than 700 students contributed 20,000-plus volunteer hours in

<sup>8</sup> Ibid.

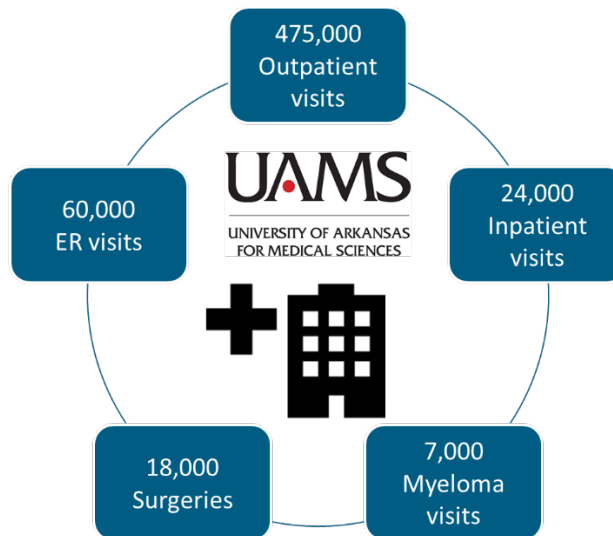
<sup>9</sup> See Appendix 2

2015, the majority of which supported the 12<sup>th</sup> Street Health & Wellness Center, a student-run clinic providing free services to members of the community. The clinic provides health screenings and health management services primarily focused on preventative care of chronic health conditions. Students and faculty from across all six colleges participate in the clinic, bringing together interdisciplinary skill sets. Additionally, UAMS students volunteer at a variety of campus and community events.

## Clinical Care Impact

The UAMS Hospital, and clinics located in the outpatient center and institutes, are the clinical arm of UAMS and employ more than 3,000 full-time staff. The medical staff includes more than 900 clinical physicians from the College of Medicine. **In 2016, UAMS physicians provided care during approximately 475,000 outpatient visits on the UAMS Hospital Campus alone, and 173,000 outpatient visits provided through its regional centers.** Over the last three years, there has been over a **20% increase in patient care volume**, with outpatient visits and surgical visits increasing 25% and 30% respectively.<sup>10</sup>

Figure 6 UAMS Clinical Care Statistics, 2016



Source 7 University of Arkansas for Medical Sciences

**UAMS is the only Level 1 trauma center in the state.** It has the only high-risk pregnancy program in Arkansas, and the UAMS Neonatal Intensive Care Unit has one of the highest survival rates in the United States. Other signature specialties include organ transplants, bone marrow transplants, and ALS treatment (Lou Gehrig’s disease). The Myeloma Institute at UAMS is one of the largest, most comprehensive centers in the world for research and treatment of multiple myeloma, the second most common form of blood cancer. Of special note is that **UAMS provides specialized care that other private and public hospitals in the state cannot provide or are unwilling to provide because of cost.** UAMS seven institutes of excellence include:

<sup>10</sup> UAMS Integrated Clinical Enterprise (2016). Key Indicators, FY2014-FY2016.

- **Donald W. Reynolds Institute on Aging:** Addresses the needs of an aging generation through primary medical care, research on aging and age-related diseases and educational programs.
- **Jackson T. Stephens Spine & Neurosciences Institute:** Encompasses treatment, rehabilitation and care services for the spine, head and neck.
- **Harvey & Bernice Jones Eye Institute:** Provides general eye exams to diagnosis and treatment for a specific eye disease or trauma.
- **Myeloma Institute:** The world's foremost research and treatment center for multiple myeloma, a cancer of the blood's plasma cells
- **Psychiatric Research Institute:** Provides comprehensive psychiatric treatment and performs groundbreaking mental health research.
- **Winthrop P. Rockefeller Cancer Institute:** Arkansas' only academic cancer center, uses a team approach to treatment that addresses the wide range of needs of the patient and family.
- **Translational Research Institute:** Focuses on transforming the pace, effectiveness, and quality of translational research among UAMS and partner institutions.

In 2015, UAMS became one of the first academic health centers to adopt a new system of care aimed at improving patient care and experience, improving health, and decreasing cost. This system is known as the Integrated Clinical Enterprise, and it reorganizes UAMS patient care into 15 patient-centered, interdisciplinary service lines that cross academic departments. These 15 services lines are: women's services, behavioral health, primary care, cancer, multiple myeloma, neurosciences, surgical specialties, medical specialties, musculoskeletal, emergency medicine, imaging, pathology, interventional care, pharmacy, and therapeutics and nursing. A related goal of the Integrated Clinical Enterprise is to also improve UAMS education by exposing students to working with individuals in multiple specialties and health care professions to provide team-based clinical care. "This means those team members are communicating with each other and the patient instead of communicating through the patient."<sup>11</sup>

## Research Impact

A core UAMS mission is to advance knowledge in the understanding and treatment of human health and disease. Consequently, research and clinical studies are an important part of UAMS activities. UAMS performed **\$50.6 million of federally-sponsored research in 2015** supported by the National Institutes of Health, NASA, the U.S. Department of Defense, and others.<sup>12</sup> UAMS has experienced an uptick in NIH research funding since 2015 with some sizeable awards. For example, in September 2016, UAMS was awarded a seven-year, \$42 million grant by NIH to oversee a 17-site Pediatric Clinical Trial Network. This collaboration with NIH supports the formation of the Arkansas Center for Advancing Pediatric Therapeutics, enabling a diverse group of children to participate in clinical trials that will be administered by some of the top pediatric drug experts in the U.S. at UAMS and the Arkansas Children's Research Institute.<sup>13</sup>

<sup>11</sup> Boulden, Ben (2016). "The Integrated Clinical Enterprise," *UAMS Journal*, June 24, 2016.

<sup>12</sup> National Science Foundation (2016). Higher Education Research and Development Survey.

<sup>13</sup> "Arkansas Wins Millions for Child Health Study" (2016). *Arkansasmatters.com*, September 21, 2016.

<http://www.arkansasmatters.com/news/local-news/child-health-study-awards-millions-to-arkansas/553562895>

UAMS also recently won competitive bioinformatics research awards that build upon the university's newly established Department of Biomedical Informatics led by Dr. Fred Pryor, who came to UAMS from the Washington University School of Medicine in St. Louis. The department focuses on developing computational tools to assess and manage medical and public health information for patient care and research programs. Examples of two \$1.3 million grants that were recently awarded to UAMS by NIH and the Patient-Centered Outcomes Research Institute (PCORI) include: (1) Accuracy of Data Used in Patient Outcomes Research PCORI award and (2) Training for Research Careers in Big Data Science NIH award.

UAMS is further involved in strategic research collaboration efforts with the Arkansas Research Alliance, the FDA's National Center for Toxicology Research in Jefferson County, and four other Arkansas research universities. These research collaborations currently focus on: (1) advancing regulatory science to ensure the health and safety of products, e.g., those that incorporate nanomaterials, and (2) applying bioinformatics tools to advance precision medicine, e.g., better diagnostics and more effective treatments.<sup>14</sup>

TEconomy's analysis of the broader UAMS research portfolio identified four research areas in which UAMS had over 250 publications in peer-reviewed journals from 2010-2015: oncology, pediatrics, surgery, and pharmacology. The table below presents the top 10 research areas that accounted for 175-plus publications or more of UAMS's nearly **4,000 peer-reviewed publications from 2010-2015**.

Table 2 UAMS Key Research Areas Based on Total Peer-Reviewed Publications, 2010-2015

Web of Science Discipline Category	# of UAMS publications	% of total UAMS publications	Concentration relative to U.S. average
Oncology	287	7.29%	1.22
Pediatrics	285	7.24%	2.43
Surgery	267	6.78%	1.14
Pharmacology Pharmacy	256	6.50%	1.49
Biochemistry Molecular Biology	236	5.99%	0.70
Cardiac Cardiovascular systems	213	5.41%	1.64
Neurosciences	206	5.23%	0.77
Endocrinology Metabolism	194	4.93%	1.87
Psychiatry	179	4.55%	1.64
Public Environmental Occupational health	175	4.44%	1.21
Immunology	175	4.44%	1.00

Source 8 TEconomy Partners analysis of Thomson Reuters Web of Science publication data.

Since different fields have inherently different levels of publication context, TEconomy also examined publications relative to the overall publishing dynamics of the field nationally. A UAMS concentration metric over 1.0 indicates that UAMS peer-reviewed publications are more highly concentrated in a

<sup>14</sup> Arkansas Research Alliance (2015). *Research Matters 2014-2015*, pp.3-4.

biomedical field than the national average. A concentration metric of 1.2 indicates a true specialization in the field of research. **UAMS has research specializations, relative to the publication concentration nationally, in otorhinolaryngology (ears, nose and throat), pediatrics, hematology, endocrinology, psychiatry, cardiovascular systems, and pharmacology.**

Table 3 UAMS Research Specializations Based on Concentration Metric for Peer-Reviewed Publications, 2010-2015

Web of Science Discipline Category	# of UAMS publications	% of total UAMS publications	Concentration relative to U.S. average
Otorhinolaryngology (Ears, Nose, Throat)	122	3.10%	3.25
Pediatrics	285	7.24%	2.43
Hematology	150	3.81%	1.95
Endocrinology Metabolism	194	4.93%	1.87
Psychiatry	179	4.55%	1.64
Cardiac Cardiovascular Systems	213	5.41%	1.64
Pharmacology Pharmacy	256	6.50%	1.49
Medicine Research Experimental	135	3.43%	1.23
Oncology	287	7.29%	1.22
Public Environmental Occupational Health	175	4.44%	1.21

Source 9 TEconomy Partners analysis of Thomson Reuters Web of Science publication data.

TEconomy’s analysis of the broader UAMS research portfolio identified four research areas in which UAMS had over 250 publications in peer-reviewed journals from 2010-2015: oncology, pediatrics, surgery, and pharmacology. UAMS researchers published at least 120 journal articles in peer-reviewed journals in the research areas shown in the “word cloud” below from 2010-2015 (See Figure 7). The volume of publications is indicated by the relative size of the text for each research area. Research areas are also color coded to indicate whether publications are more highly concentrated at UAMS than for the entire field nationally. Blue research areas are areas of high specialization as determined by a concentration metric of 1.2 or greater. Research areas in gray are prominent in the research environment at UAMS but not areas of specialization relative to the entire field.

Figure 7 UAMS Research Specializations Based on Publications in Peer-Reviewed Journals



Source 10 TEconomy Partners analysis of Thomson Reuters Web of Science data.

UAMS also works with leading biomedical companies on industry-sponsored research projects. In 2015, UAMS performed nearly \$1.2 million of industry-sponsored R&D.<sup>15</sup> Recent partners include Medtronic, Boston Scientific Corp, DePuy Synthes, Mitochon Pharmaceuticals and Quantum Pharmaceuticals.

Finally, UAMS is involved in a number of clinical studies related to the development of new therapeutics to treat a range of cancers, and other diseases. **From 2010-2015, UAMS led 97 clinical trials, was a key collaborator on 25 clinical trials, and was a site for 141 clinical trials.**<sup>16</sup> Clinical trials are an important mechanism for bringing cutting-edge therapies to patients for whom more conventional treatments have been unsuccessful. They are also the cornerstone of the U.S. drug development and approval process by which new drugs and devices demonstrate human safety and treatment efficacy.

## Innovation and Commercialization Impact

Innovation, the introduction of a new product or service to the marketplace, is an important source of revenue growth for existing companies, as well as new startup creation. The intersection of research and clinical practice drives innovation in the biomedical industry. In some instances, advances in science and technology spur innovation, e.g., therapeutics and diagnostics, while in others the innovation arises from the application of existing technologies to solve important, unmet patient needs.

A benefit of academic medical centers, like UAMS, is that they bring together researchers with clinicians around the goal of improving patient care and patient outcomes. UAMS researchers, doctors and nurses have invented technologies and commercializable solutions, some of which have been licensed to

<sup>15</sup> National Science Foundation (2016). 2015 Higher Education Research and Development Survey.

<sup>16</sup> TEconomy analysis of the ClinicalTrials.gov database.

existing companies and others that have been licensed to startups to commercialize. The UAMS technology transfer office, BioVentures, provides guidance and support to UAMS researchers and staff on intellectual property protection and on licensing and commercialization decisions.

Two case studies of UAMS technologies being commercialized through startups are presented in the boxes below. HD Nursing is a company founded by two UAMS nurses who developed a protocol to reduce hospital falls by over 50%. InterVexion Therapeutics, a company founded by two UAMS researchers and two other collaborating scientists at other institutions, are developing a therapeutic that prevents methamphetamine molecules from crossing the blood-brain barrier to the brain where it produces the “high.”

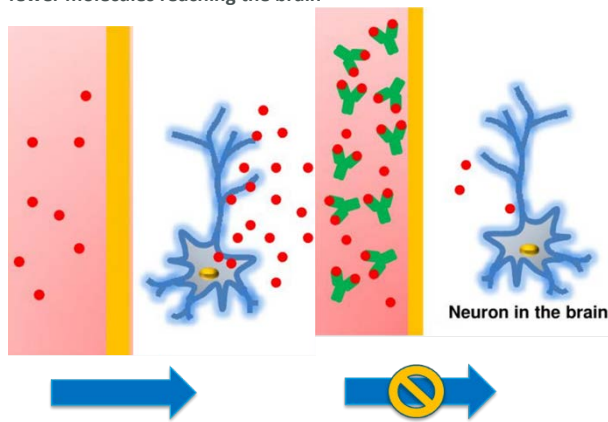
## UAMS Spinout: InterveXion Therapeutics

InterveXion is a biopharmaceutical company founded in 2004 with the goal of effectively treating substance abuse disorders. The proprietary therapeutics in the company's current portfolio were developed by UAMS researchers and licensed to InterveXion, which was founded by two UAMS researchers and two other scientists, to commercialize the technology.

It is estimated that 54 million people worldwide are addicted to methamphetamines. InterveXion is developing anti-methamphetamine antibodies and a vaccine that are intended to prevent methamphetamine molecules from moving from the blood stream across the blood-brain barrier to the brain, where the molecules produce the addictive "high."

Figure 8

LEFT: Meth molecules moving freely across blood-brain barrier;  
RIGHT: Meth molecules sequestered by monoclonal antibodies—  
fewer molecules reaching the brain



To date, the company has received over \$19 million in competitive grant funding from the National Institute for Drug Abuse and has just completed Phase IA clinical trials. The company occupies office and laboratory space in the UAMS BioVentures building on the UAMS campus.

## UAMS Spinout: HD Nursing

Injuries resulting from falls is big problem across the continuum of care in the U.S., particularly for elderly adults. The Center for Disease Control estimates that every 20 minutes an elderly adult dies from a fall and many more are injured. Over 11,000 of these fall-related deaths occur in U.S. hospitals, and total costs to the healthcare system from injury-related falls are estimated to be \$47 billion. However, hospitals have not had a scientifically validated protocol for predicting which patients are at greatest risk for falling, or for preventing falls and injury.



In response to this need, Dr. Amy Hester, Director of Nursing Research and Innovation at UAMS, and Dees Davis, a Clinical Nursing Manager at UAMS, developed the Hester-Davis Scale, a highly effective tool designed to easily identify patients most likely to fall and to provide interventions that health care providers can implement to prevent falls and injuries.

Hester and Davis founded the company, HD Nursing, in 2012 based on the proprietary falls prevention protocol developed at UAMS. The company has a strategic partnership with Epic, the electronic medical records company, and is deploying the HD Falls Prevention Program to hospital systems throughout the U.S. The company recently raised a \$3 million Series A round of venture capital to support its rapid growth.<sup>1</sup>



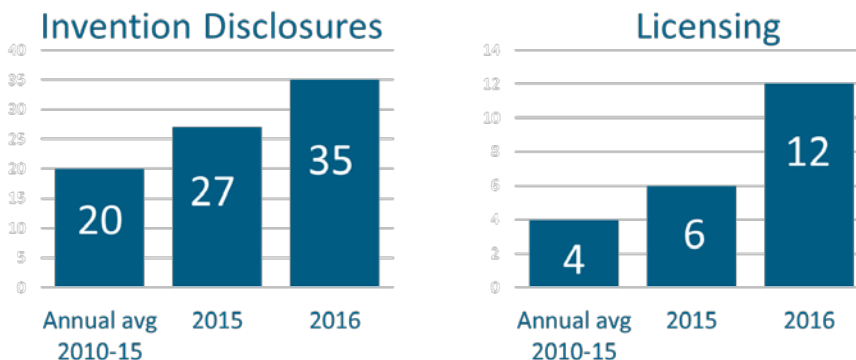
Figure 9 UAMS Spin-out Companies Impact Metrics



Source 11 UAMS BioVentures

As shown in Figure 9, **28 companies have spun out of UAMS which are still active today.** To date, **these startups have attracted \$114 million in total follow-on investment, generated \$94 million in sales, and employ 279 Arkansans with wages above the state average.**<sup>17</sup> In terms of future commercialization pipeline, UAMS invention disclosures are increasing significantly as is licensing activity.

Figure 10 UAMS Technology Transfer Statistics



Source 12 BioVentures

Beyond its role in getting new technologies to market and supporting the growth of startup Arkansas biomedical and healthtech companies based on these technologies, the UAMS commitment to innovation contributes to the education of health care professionals. Why? Because entrepreneurship programs train individuals to look for important problems, to work collaboratively across disciplines to find novel solutions, and to get these solutions to the patients.

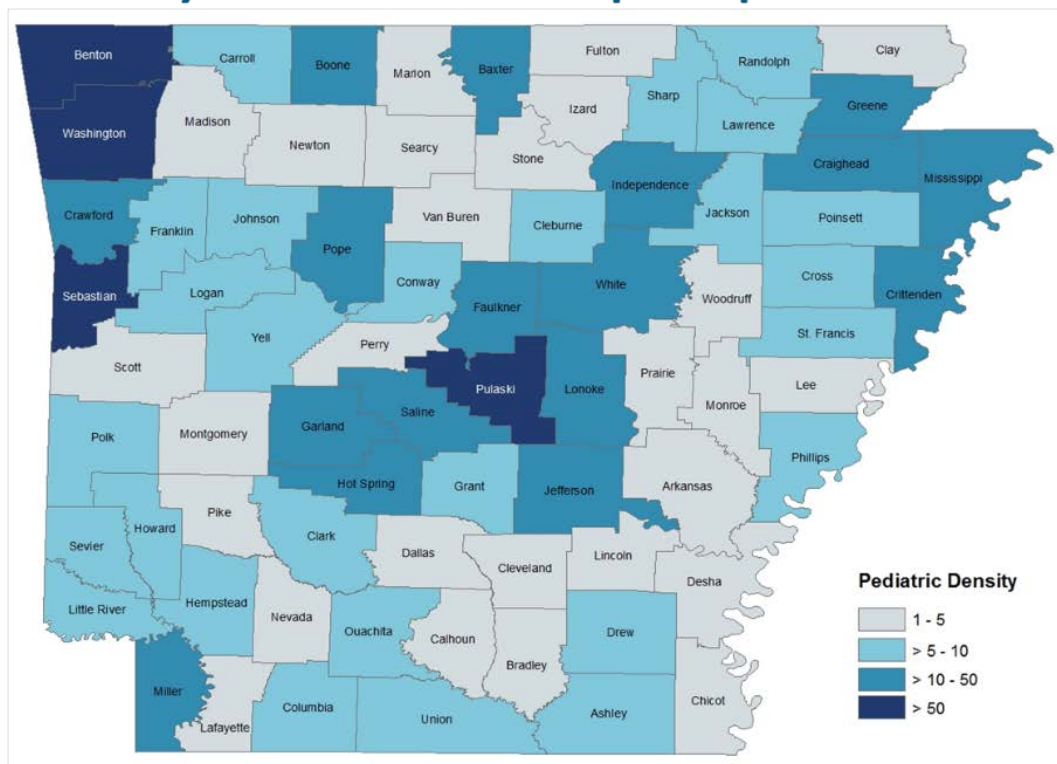
<sup>17</sup> UAMS BioVentures. Spinout Economic Impact Metrics.

## Regional Impact

Arkansas is a state with many rural counties—some of which have very low population density (measured by the number of residents per square mile). It is especially difficult to recruit doctors to open private practices in these counties. However, access to quality health care and the recruitment of primary care physicians to these counties is important to both the quality of life and economic development of these counties, just as it is to rapidly growing parts of the state.

The UAMS Regional Programs play a critical role in the training and retention of health care professionals statewide through its eight teaching centers in Fayetteville/Springdale, Fort Smith, Jonesboro, Pine Bluff, Texarkana, Magnolia, Helena-West Helena, and Batesville. These UAMS centers and the local hospitals with which they partner provide not only medical and residency training, but also nursing, pharmacy, and allied health professionals training.

## Will a family physician establish a private practice in a county with < 5 children per square mile?



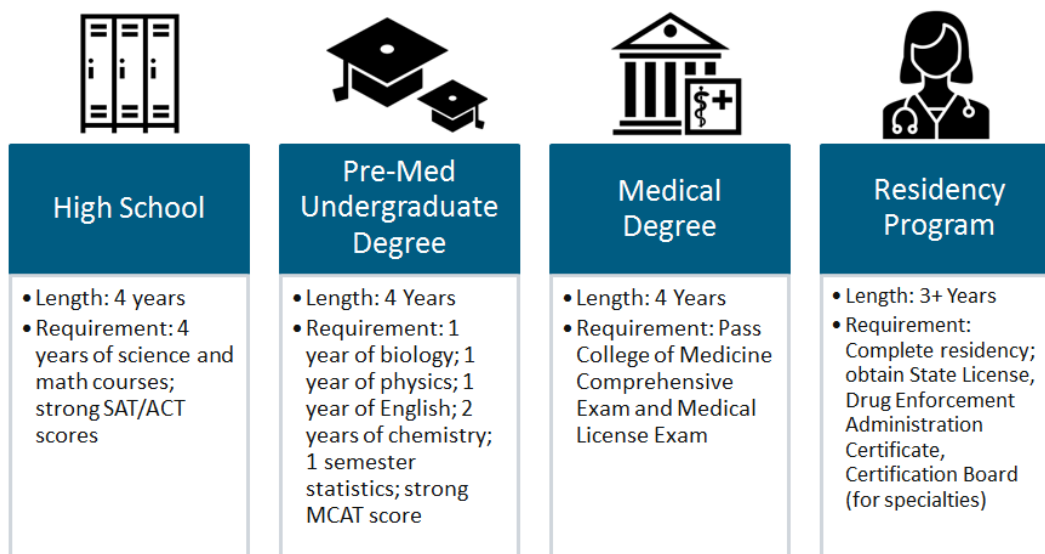
Source 13 Arkansas Children's Hospital analysis of U.S. Census data.

Supporting Arkansas' medical applicant and retention pipeline is a formidable task and one of the primary objectives of the UAMS Regional Programs. UAMS currently has 174 first-year medical school slots available each year, but finding enough qualified Arkansas graduates is a challenge. The number of non-Arkansas medical school applicants increased five-fold from 432 applicants in 2005 to 2,075 applicants in 2015. However, **the number of Arkansas medical school applicants has declined from a**

high of 432 applicants in 1996 to a low of 262 applicants in 2005. There were 338 in-state applicants in 2015.<sup>18</sup>

Nationally, the average medical school acceptance rate is 39.3%.<sup>19</sup> If UAMS had a similarly competitive acceptance rate for in-state students, then there would need to be approximately 443 in-state applicants each year for the 174 first-year slots. To try to positively impact the number of Arkansas students applying to medical school and other health professions, **the UAMS Regional Program engaged over 4,800 Arkansas high school and college students in structured, hands-on programs**, as well as college advising, mentoring, and community service opportunities. The figure below shows the rigorous coursework, requirements, and time commitment involved in pursuing a career in medicine. To ensure that Arkansas high school and college students are aware of these requirements and exposed to practical experiences to see if they are drawn to careers in medicine and related health professions, UAMS is investing significant resources in outreach to strengthen Arkansas’ pipeline.

Figure 11 Path to Becoming a Practicing Physician: Requirements at Each Stage of Education



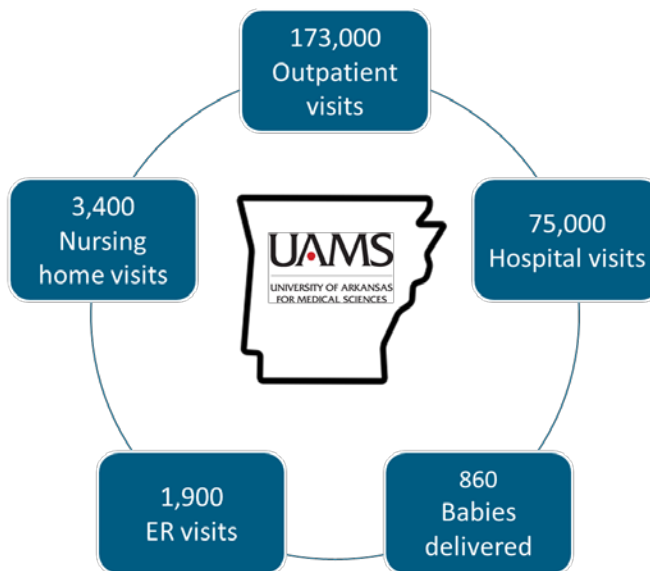
Source 14 TEconomy Partners

In addition to ensuring a strong pipeline of qualified medical school applicants in the state, **the UAMS Regional Program provided training for nearly 150 medical residents and 525 health professional students**. As part of its residency and training program, the faculty, residents and staff at the eight Regional Program centers saw over 170,000 patients, delivered over 850 babies, and conducted over 3,400 nursing home visits as shown in Figure 12.

<sup>18</sup> University of Arkansas for Medical Sciences (2016). UAMS Regional Programs Annual Report 2015-2016, p.9.

<sup>19</sup> Association of American Medical Colleges (2016), U.S. Medical School Applicants and Matriculation by School, State of Legal Residence, and Sex, 2015-16, <https://www.aamc.org/download/321442/data/factstablea1.pdf>

Figure 12 UAMS Regional Programs Clinical Services, 2015-2016



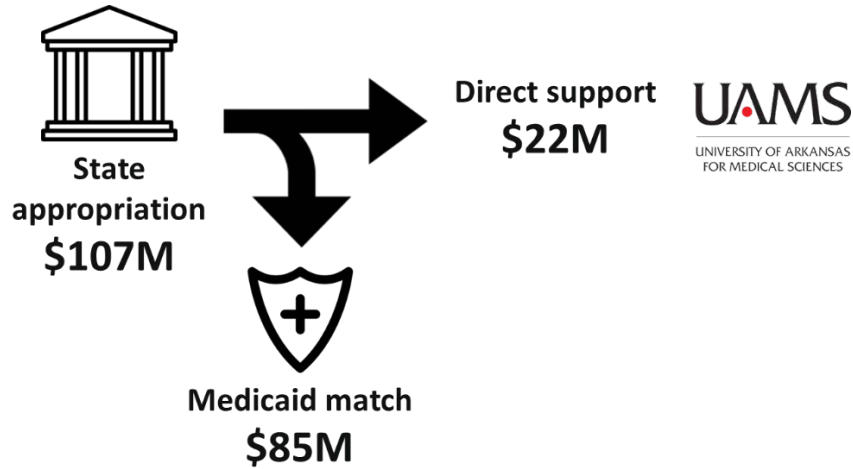
Source 15 University of Arkansas for Medical Sciences

## Recommendations

The ability of UAMS to execute its mission effectively and on a statewide scale requires continuing investments in talent and advanced infrastructure. This study finds that while the demands on UAMS have increased significantly over the last five years, state funding for UAMS has declined in real dollar terms over the last five years.

UAMS received a \$107 million state appropriation in 2015, which is down from \$114 million in 2010. Moreover, in 2015, UAMS was required to use \$85 million of this \$107 million appropriation to support the federal Medicaid matching requirement. This is an unusual practice to bundle the state's Medicaid appropriation with the higher education appropriation for an academic medical center. The net result is that the Medicaid matching requirement left only \$22 million of direct state support for UAMS (see Figure 13).

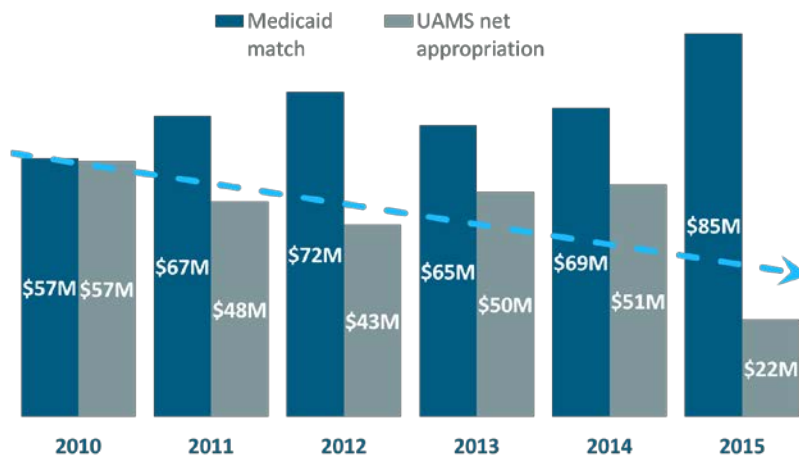
Figure 13 Breakdown of \$107 million state appropriation for UAMS in 2015



Source 16 University of Arkansas for Medical Sciences

Figure 14 shows the total state appropriation for UAMS broken down into the Medicaid match requirement and the net amount of support remaining after the Medicaid match that can be used by UAMS to support its education, research, tech transfer, and clinical service missions. The figure shows that the Medicaid match requirement has been increasing as a share of the total higher education appropriation over time, while **the net appropriation that supports UAMS has been declining** over the last five years—from \$57 million in 2010 to only \$22 million in 2015. Again, it is important to note that other states do not bundle their federal Medicaid match with the higher education appropriation.

Figure 14 State Higher Education Appropriation for UAMS Broken Down by Federal Medicaid Match Requirement and Remaining (Net) Appropriation for UAMS Direct Support



Source 17 University of Arkansas for Medical Sciences

Unlike private hospital systems and private osteopathic colleges of medicine that make strategic decisions about what services to offer and what programs and tuition to charge based on demand and profitability, the mission of UAMS and its affiliate systems is different. UAMS and its affiliate systems operate on a “service-to-the-state” and “service-to-its-citizens” basis. They work to educate the next generation of health care professionals and to address evident market failures in the provision of specialized care and equal access to care across the state. **It is because of this public mission that other states make large-scale investments in their public academic medical centers**, and the same holds true in Arkansas just with a significantly reduced and decreasing level of state support.

Given the high rate of economic return that UAMS generates for the state and its large-scale impact on access to education and access to clinical care, **TEconomy Partners recommends the state identify ways to increase funding for UAMS going forward**. State support for UAMS that is commensurate with the support that other states are investing in their academic medical centers will send a positive message helping UAMS to retain and to attract talent and to continue to provide both high-quality education and specialized care not offered anywhere else in the state, while sustaining its research and innovation benefits for Arkansas.

## Methodology

---

Economic impact analysis measures the interrelationships among different economic sectors stemming from the economic activity of a target firm or industry sector. In this case, TEconomy measured the impact of the operations of UAMS and its affiliate systems on the statewide economy in 2015.

TEconomy's analysis uses an economic input-output (I/O) model to represent these interrelationships. I/O data show the extent of the flow of goods and services between companies in related (e.g., industry supply chain) and unrelated, but enabling industries (e.g., professional services, such as accounting, graphic design, legal, catering, etc.). The data also show the effect of personal consumption activities by workers.

In general, imports of goods and services from outside the region will result in less economic activity. Similarly, higher wage industry sectors will generate more economic activity (through larger personal consumption) than lower wage industry sectors, e.g., new construction has a larger short term economic impact than new retail activity if the goods sold are largely manufactured outside the region.

The modeling of these trade flows enables the estimation of impacts of one target company or industry sector on other industry sectors. The model consists of three types of impacts:

- **Direct effects:** the direct employment and other economic activity generated by a firm or industry sector's operations and expenditures;
- **Indirect effects:** the economic activity generated for supplier firms by the target firm or industry sector, and
- **Induced effects:** the additional economic activity generated by the spending of these supplier firms and employees in the overall economy.

The sum of these three effects is referred to as the **total impact**. TEconomy estimated the total economic impact of UAMS and its affiliate systems using regional I/O models available from IMPLAN, one of the most widely used and respected I/O systems. IMPLAN provides a software system for impact analysis and highly detailed data tables representing 536 economic sectors at the national, state, and county levels.<sup>20</sup>

TEconomy collected and analyzed the necessary input data for use with the IMPLAN system and developed impact estimates for the UAMS operational components including: Main Campus (Little Rock MSA), Northwest Campus Region (Benton, Madison, Washington, Boone, Carroll, and Newton Counties), and Regional Programs (consisting of seven multi-county regions that include every county in Arkansas except Pulaski County and the Northwest Campus Region).

---

<sup>20</sup> IMPLAN provides the ability to combine county data into models that represent a specific geographic area, such as a multi-county service region or a metropolitan statistical area (MSA).

## Operational Inputs: UAMS Employment and Expenditures

For each of the UAMS operational components examined, three operational inputs drive the economic interactions within the impact models: **employment** (conservatively and more precisely captured as FTE employment), **total compensation** (including wages, benefits, and other compensation), and **expenditures**. Considering the charitable care activities and the research and education functions (that receive some levels of internal support), “expenditures” are used as a truer measure of total output as opposed to revenue.<sup>21</sup> The table below details the operational inputs for employment and total compensation.

Table 4 UAMS Employment and Compensation, FY2015

Employees	Main Campus	Northwest Campus	Regional Programs	Total UAMS System
<b>Total Headcount (Full- &amp; Part-Time Employees)</b>	10,119	289	529	10,937
<b>Full-Time Equivalent Employees (FTEs)</b>	9,262	224	536	10,022
<b>Total Employee Compensation (Salary and Benefits, \$M)</b>	\$824.2	\$17.8	\$36.6	\$878.6

Source 18 University of Arkansas for Medical Sciences (2016), FY2015 Employment and Compensation Data.

TEconomy used the employment and expenditure data to perform more discrete modeling of the UAMS impacts. This discrete modeling allows for the unique structure and operations of UAMS to be modeled more appropriately as integrated “sectors” within the IMPLAN models.<sup>22</sup> The following sectors are used to estimate the economic impacts of UAMS operations:

- **Clinical care:** The patient care and health systems aspect of UAMS is modeled as hospitals, clinics, physicians’ offices, medical/diagnostics labs, and outpatient services;
- **Research:** The basic, applied and clinical research function of UAMS is modeled as scientific R&D services; and
- **Higher Education:** The academic function of UAMS modeled is as colleges, universities, and professional schools.
- **Core/administrative:** In keeping with TEconomy’s sector-based modeling approach, employment and expenditures within this core/admin function are shared and applied to the patient care, research, and higher education sectors based on their respective sizes.
- **Construction:** Expenditures are modeled as direct output effects with all other values captured as indirect or induced effects, as appropriate.<sup>23</sup>
- **Capitalized Equipment and Software:** Expenditures are modeled as the total purchase value, as opposed to the annual capital expense, to generate the correct supplier stimulus in the Arkansas

<sup>21</sup> Economic output is driven by expenses in terms of direct impact, but reported as revenue when measuring indirect and induced impacts.

<sup>22</sup> This sector-based impact modeling is also known as analysis-by-parts modeling.

<sup>23</sup> In the previous impact study, due to limitations of the IMPLAN model, construction expenditures were modeled separately. Due to sector enhancements to the current version of IMPLAN, these impacts can be incorporated in the overall operational impacts.



economy. These expenditures are included, as part of the total expenditures for the above four categories.

The tables below provide the employment and expenditure data used to model each UAMS operational component.

Table 5 UAMS Expenditures by Function and Location, FY2015 (\$Millions)

Function	Main Campus	Northwest Campus	Regional Programs	Total UAMS System
Clinical Care	\$750.4	\$11.8	\$6.4	\$768.6
Research	\$111.4	\$1.1	\$0.2	\$112.6
Education	\$142.2	\$6.3	\$26.3	\$174.9
Core/Admin	\$208.2	\$6.1	\$14.8	\$229.1
Construction	\$9.6	\$0.5	\$11.5	\$21.7
Capitalized Equipment & Software (Total Purchased Value)	\$22.3	\$0.1	\$0.1	\$22.4
<b>Total Expenditures</b>	<b>\$1,244.0</b>	<b>\$26.0</b>	<b>\$59.3</b>	<b>\$1,329.2</b>

Source 19 University of Arkansas for Medical Sciences (2016), FY2015 Expenditure Data

Note 1 For modeling purposes, Core/Admin expenditures are shared among the various functions based upon their direct expenditure information. Facility construction is captured as a direct output effect, but as indirect and induced effects for the remaining impacts.

Table 6 UAMS FTE Employment by Function and Location, FY2015

Function	Main Campus	Northwest Campus	Regional Programs	Total UAMS System
Clinical Care	5,303	109	65	5,477
Research	820	6	0	826
Education	1,381	59	309	1,749
Core/Admin	1,758	50	162	1,970
<b>Total FTE Employment</b>	<b>9,262</b>	<b>224</b>	<b>536</b>	<b>10,022</b>

Source 20 University of Arkansas for Medical Sciences (2016), FY2015 Employment Data

Note 2 For impact modeling purposes, Core/Admin employment is shared among the other three functions based upon FTE numbers.

## Appendix 1: Economic Impact Tables

For each operational component, TEconomy’s data analysis and calculations provide estimates of the following types of economic impacts, or effects:

- **Direct-effect** values driving the model—based upon the employment, compensation, and expenditure data provided by UAMS and its affiliate systems, ACH and CAVHS;
- Estimated **indirect** and **induced effects** capturing the secondary and tertiary effects of UAMS employment and expenditures on the regional economy;
- **Total effect**, which is the sum of the direct, indirect and induced effects; and
- The **impact multiplier** for each of the three model drivers: employment, labor income, and output. The multiplier captures the total number of jobs or dollars created in the regional economy for every one job or dollar of direct effect. For example, an employment multiplier of 1.90 would indicate for every 1 direct UAMS job an additional 0.90 indirect and induced jobs are created in the region’s economy from the employment and expenditures of UAMS.

The following tables below presents these different types of impact effects for six model results: employment, labor income (personal and proprietor income), value added, economic output, state and local tax revenue, and federal tax revenue (including employer and employee contributions to Social Security and Medicare). The value for total effects is often referred to as the **total economic impact**.

The following seven tables provide the complete results of TEconomy’s economic impact estimation for: (1) the combined operations of UAMS and its two affiliate systems, ACH and CAVHS; (2) the UAMS system, including the Main and Northwest Campuses and Regional Program Centers; (3) the UAMS Main campus; (4) the UAMS Northwest Campus; (5) the UAMS Regional Programs; (6) Arkansas Children’s Hospital; and (7) Central Arkansas Veterans Health System. All dollar figures are in millions of 2015 dollars.

Table 7 Economic Impact of UAMS and Its Affiliate Systems, ACH and CAVHS, Combined, FY2015 (\$M)

Impact Type	Employment	Labor Income	Value Added	Output	State/Local Tax Revenue	Federal Tax Revenue
<b>Direct Effect</b>	17,877	\$1,379.8	\$1,535.1	\$2,352.3	\$38.6	\$252.7
<b>Indirect Effect</b>	6,633	\$298.7	\$534.6	\$883.9	\$37.4	\$52.9
<b>Induced Effect</b>	10,068	\$409.8	\$766.7	\$1,297.7	\$71.0	\$101.2
<b>Total Impacts</b>	34,577	\$2,088.2	\$2,836.3	\$4,534.0	\$146.9	\$406.7
<b>Multiplier</b>	1.93	1.51	1.85	1.93		

Source 21 TEconomy Partners analysis and calculations using IMPLAN and UAMS, ACH and CAVHS data.

Table 8 Economic Impact of UAMS System (Main and Northwest Campuses and Regional Program Centers), FY2015 (\$M)

Impact Type	Employment	Labor Income	Value Added	Output	State/Local Tax Revenue	Federal Tax Revenue
Direct Effect	10,022	\$878.9	\$972.0	\$1,329.2	\$24.5	\$161.0
Indirect Effect	3,820	\$169.6	\$309.4	\$513.7	\$21.2	\$22.6
Induced Effect	6,265	\$254.1	\$475.8	\$806.0	\$44.2	\$62.7
<b>Total Impacts</b>	<b>20,107</b>	<b>\$1,302.6</b>	<b>\$1,757.2</b>	<b>\$2,648.9</b>	<b>\$89.9</b>	<b>\$246.3</b>
<b>Multiplier</b>	<b>2.01</b>	<b>1.48</b>	<b>1.81</b>	<b>1.99</b>		

Source 22 TEconomy Partners analysis using Arkansas county-level IMPLAN impact models and UAMS data.

Table 9 Economic Impact of UAMS Main Campus, Little Rock, FY2015 (\$M)

Impact Type	Employment	Labor Income	Value Added	Output	State/Local Tax Revenue	Federal Tax Revenue
Direct Effect	9,262	\$824.2	\$910.6	\$1,244.0	\$23.1	\$150.8
Indirect Effect	3,550	\$160.0	\$292.4	\$488.6	\$19.9	\$20.4
Induced Effect	5,944	\$243.2	\$454.7	\$768.6	\$41.9	\$60.0
<b>Total Impacts</b>	<b>18,756</b>	<b>\$1,227.5</b>	<b>\$1,657.6</b>	<b>\$2,501.1</b>	<b>\$84.9</b>	<b>\$231.2</b>
<b>Multiplier</b>	<b>2.03</b>	<b>1.49</b>	<b>1.82</b>	<b>2.01</b>		

Source 23 TEconomy Partners analysis using Arkansas county-level IMPLAN models and UAMS data.

Table 10 Economic Impact of UAMS Northwest Campus, Fayetteville, FY2015 (\$M)

Impact Type	Employment	Labor Income	Value Added	Output	State/Local Tax Revenue	Federal Tax Revenue
Direct Effect	224	\$17.8	\$19.6	\$26.0	\$0.5	\$3.1
Indirect Effect	74	\$2.9	\$5.5	\$9.3	\$0.4	\$0.7
Induced Effect	112	\$4.1	\$7.8	\$13.4	\$0.8	\$1.0
<b>Total Impacts</b>	<b>410</b>	<b>\$24.9</b>	<b>\$32.9</b>	<b>\$48.6</b>	<b>\$1.7</b>	<b>\$4.8</b>
<b>Multiplier</b>	<b>1.83</b>	<b>1.40</b>	<b>1.68</b>	<b>1.87</b>		

Source 24 TEconomy Partners analysis using Arkansas county-level IMPLAN models and UAMS data.

Table 11 Economic Impact of UAMS Regional Programs, FY2015 (\$M)

Impact Type	Employment	Labor Income	Value Added	Output	State/Local Tax Revenue	Federal Tax Revenue
Direct Effect	536	\$36.9	\$41.8	\$59.3	\$1.0	\$7.0
Indirect Effect	196	\$6.7	\$11.6	\$15.8	\$0.9	\$1.5
Induced Effect	209	\$6.7	\$13.3	\$24.0	\$1.5	\$1.7
<b>Total Impacts</b>	<b>941</b>	<b>\$50.2</b>	<b>\$66.7</b>	<b>\$99.2</b>	<b>\$3.4</b>	<b>\$10.3</b>
<b>Multiplier</b>	<b>1.76</b>	<b>1.36</b>	<b>1.59</b>	<b>1.67</b>		

Source 25 TEconomy Partners analysis using Arkansas county-level IMPLAN models and UAMS data.

Table 12 Economic Impact of Arkansas Children's Hospital, Little Rock, FY2015 (\$M)

Impact Type	Employment	Labor Income	Value Added	Output	State/Local Tax Revenue	Federal Tax Revenue
<b>Direct Effect</b>	4,003	\$281.7	\$313.9	\$534.8	\$7.9	\$51.6
<b>Indirect Effect</b>	1,531	\$70.9	\$122.2	\$194.9	\$8.6	\$16.4
<b>Induced Effect</b>	2,129	\$87.1	\$162.8	\$275.2	\$15.0	\$21.5
<b>Total Impacts</b>	<b>7,663</b>	<b>\$439.7</b>	<b>\$598.9</b>	<b>\$1,005.0</b>	<b>\$31.5</b>	<b>\$89.5</b>
<b>Multiplier</b>	1.91	1.56	1.91	1.88	-	-

Source 26 TEconomy Partners analysis using Arkansas county-level IMPLAN models and UAMS and ACH data. Results include both ACH and UAMS physician and house staff employment.

Table 13 Economic Impact of Central Arkansas Veterans Health System, Little Rock, FY2015 (\$M)

Impact Type	Employment	Labor Income	Value Added	Output	State/Local Tax Revenue	Federal Tax Revenue
<b>Direct Effect</b>	4,474	\$300.6	\$337.0	\$591.0	\$8.4	\$55.0
<b>Indirect Effect</b>	1,551	\$70.4	\$124.5	\$212.2	\$9.2	\$16.8
<b>Induced Effect</b>	2,241	\$91.7	\$171.4	\$289.7	\$15.8	\$22.6
<b>Total Impacts</b>	<b>8,265</b>	<b>\$462.7</b>	<b>\$632.9</b>	<b>\$1,092.9</b>	<b>\$33.4</b>	<b>\$94.4</b>
<b>Multiplier</b>	1.85	1.54	1.88	1.85		

Source 27 TEconomy Partners analysis using Arkansas county-level IMPLAN models and UAMS and ACH data. Results include both CAVHS and UAMS house staff employment.

## Appendix 2: American Medical Association Data Analysis

---

To provide a better understanding of UAMS's educational impact on the number of practicing physicians in the state, TEconomy Partners analyzed a unique data file from the American Medical Association (AMA).<sup>24</sup> The data includes data records for the following:

1. Licensed physicians practicing in the state of Arkansas;
2. Medical school graduates of UAMS with a current medical license (or currently reported as being in residency); and
3. All U.S. licensed physicians born in Arkansas.

This file consists of 9,285 records in total. The actual totals across each of these three categories will be impacted by both the currency and completeness of these data.

The following key findings are presented based on TEconomy's analysis of the AMA data:

- **Arkansas Physicians.** There are currently 6,845 physicians in Arkansas. Of these, 5,924 are licensed physicians. Non-licensed physicians include medical school graduates in residency (pre-licensure), retirees who have not renewed their medical license, and other non-practicing physicians.
- **UAMS Graduates.** UAMS medical school graduates account for 5,088 licensed physicians in the U.S., and 48.7% of all licensed physicians in Arkansas (2,883 out of 5,924 licensed physicians).
- An additional 576 UAMS graduates are currently in residency programs at various hospitals throughout the state. Combining licensed and pre-licensure physicians, these 3,459 doctors account for 50.5% of the State of Arkansas' total physician base.
- **Arkansas-Born Medical School Graduates.** There are 3,540 Arkansas-born residents who have graduated from medical school. An overwhelming number of these individuals, 93.8%, graduated from UAMS (3,320 out of 3,540 Arkansas-born medical school graduates).
- In total, 58.6% of UAMS medical school graduates were born in Arkansas.
- **Family Practice Physicians.** There are currently 1,454 family practice physicians in Arkansas, 1,316 of whom are currently licensed. UAMS-trained family practice physicians account for 56.7% of all Arkansas family practice physicians (824 out of 1,454) and 59.3% of licensed family practice physicians (781 out of 1,316).
- **Female Physicians in Arkansas.** There are currently 1,952 female physicians in Arkansas, 1,565 of whom are currently licensed. UAMS-trained female physicians account for 45.9% of all female physicians in Arkansas (895 out of 1,952) and 48.1% of the licensed female physicians (753 out of 1,565).
- **Physicians in Rural Arkansas.** There are 851 physicians whose mailing address is within a rural Arkansas county, 820 of whom are currently licensed. UAMS trained 58.0% of physicians practicing in rural areas (494 of 851) and 58.4% of the licensed physicians in rural areas (479 of 820). No determination can be made as to what extent physicians who have an AMA address of record in a rural area, yet practice in an urban area.

---

<sup>24</sup> These AMA data were obtained from Medical Marketing Service, Inc., the AMA's third-party data provider.

## Appendix 3: Enrollment Data

---

Table 14 UAMS Unduplicated Student Headcount

College/Academic Year	AY2007	AY2008	AY2009	AY2010	AY2011	AY2012	AY2013	AY2014	AY2015	AY2016
<b>College of Nursing</b>	489	786	890	955	920	862	804	864	1,002	879
<b>College of Health Professions</b>	608	602	641	714	678	675	707	682	653	752
<b>College of Medicine</b>	593	604	607	613	622	641	671	669	672	690
<b>College of Pharmacy</b>	393	430	463	483	483	479	478	477	468	473
<b>Graduate School</b>	486	326	290	312	313	325	363	375	346	257
<b>College of Public Health</b>	191	189	172	175	193	207	208	204	205	211
<b>TOTAL</b>	<b>2,760</b>	<b>2,937</b>	<b>3,063</b>	<b>3,252</b>	<b>3,209</b>	<b>3,231</b>	<b>3,231</b>	<b>3,271</b>	<b>3,346</b>	<b>3,262</b>

Source 28 University of Arkansas for Medical Sciences