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EXECUTIVE SUMMARY

How NIH-Funded Research Benefits Rural States

The importance of strong, sustainable annual funding for the National Institutes of Health (NIH) is known to states with major biomedical R&D hubs like California, Massachusetts, North Carolina and Texas. In these states there is a clear link between the NIH-funded research that occurs there and the state's economy and job creation.

But what about states where such a link might be less apparent? What is the impact in states that tend to be more rural than urban and that aren't among the top recipients of NIH research funding?

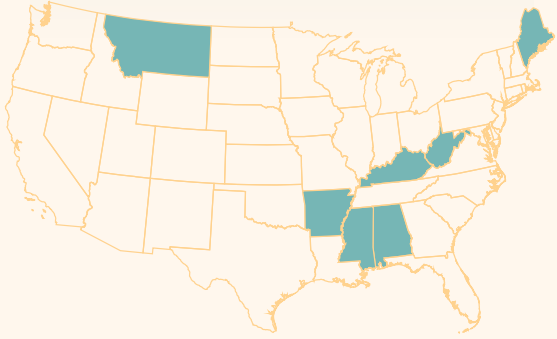
This report finds that in these states, NIH research funding has — in relative terms — a similarly significant impact. Beyond the immediate medical research and jobs directly supported, the infusion of NIH research funding **generates sales** for in-state businesses, **supports good-paying jobs, contributes to the state's tax base** and **boosts an industry sector with annual wage rates significantly above the average for total employment in the state**. In fact, NIH funding plays a positive role in helping all states **attract new workers** and build up the quality of their labor forces. And, it plays an important role in **attracting research and biomedical-focused businesses and nurturing "innovation clusters."**

Additionally, **any health benefits arising from NIH-funded medical research will have a substantially greater fiscal impact on small, rural states** where public health spending often represents a greater proportion of the state's budget.

It is clear, that by increasing the overall amount of money available for NIH research, congressional efforts over recent years have had a significant, beneficial impact on smaller, rural states. Across the states assessed, average growth of NIH dollars awarded, and intrastate jobs created as a result of those awards, increased faster than the average for the rest of the states.

RURAL STATE BENEFITS OF NIH-FUNDED RESEARCH

- Provides health benefits
- Generates in-state sales
- Contributes to tax base
- Supports good-paying jobs
- Boosts labor force
- Promotes innovation clusters



The Executive Summary accompanies *"The Economic & Fiscal Impact on Select States of NIH-funded Medical Research"* prepared for United Medical Research in September 2018 by economist Charles S. Lawton, Ph.D., of York, Maine.

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NIH'S ROLE IN SUSTAINING THE U.S. ECONOMY

The ultimate purpose of NIH-funded research is, of course, to improve health. NIH funds researchers in every state who are working to address some of our most urgent and chronic health problems, offering hope to people the world-over affected by disease. This work, however, has a secondary benefit: it contributes to economic activity and employment across the nation. In FY 2017, research funding from the NIH to all 50 states and the District of Columbia supported more than 400,000 jobs and nearly $69 billion in economic activity. In 20 states, the NIH funding received supported more than 5,000 jobs and produced more than $1 billion in new economic activity.

In states that are top recipients of NIH research dollars, it is generally understood that, in addition to helping them become medical research powerhouses, NIH funding is an important driver of state and regional economic growth. **Yet, NIH research funding benefits every state, and its impact might be more consequential where least expected. This report takes a deeper look at NIH research funding and the economies in seven rural states.**

In 20 States

NIH-Funded Research Supports

>$1 Billion in Economic Activity

>5,000 Jobs

California • Colorado • Connecticut
Florida • Georgia • Illinois
Maryland • Massachusetts • Michigan
Minnesota • Missouri • New York
North Carolina • Ohio • Pennsylvania
Tennessee • Texas • Virginia
Washington • Wisconsin

Specifically, the report looks at:

- The link between NIH research funding and **capital expenditures** and the impact on economic activity and jobs
- The **fiscal impacts** on state and local governments of NIH research funding
- The impact of NIH research funding on **human capital** and its role in the labor market
- **Public health spending** in each state
- The **distribution of NIH research funding** in each state

The seven states selected for analysis are more rural, less populous, have smaller economies and receive less NIH research funding than the rest of the United States. They also represent a broad geographic distribution of the nation's rural territory.

TABLE 1: RURAL STATES SELECTED FOR ANALYSIS

STATE	NIH AWARDS 2017 $M	RANK (OUT OF 51)	GDP 2017 $M	POPULATION 2017	POPULATION RANK (OUT OF 51)	PERCENT RURAL	RURAL RANK (OUT OF 51)
Alabama	$298	21st	$210,954	4,874,747	24th	41	9th
Arkansas	$57	38th	$124,918	3,004,279	32nd	44	6th
Kentucky	$188	27th	$202,507	4,454,189	26th	42	8th
Maine	$89	39th	$61,404	1,335,907	42nd	61	1st
Mississippi	$53	40th	$111,707	2,984,100	34th	51	4th
Montana	$36	43rd	$48,098	1,050,493	44th	44	5th
West Virginia	$28	45th	$76,794	1,815,857	38th	51	3rd

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METHODOLOGY

The starting point for this report is the national economic impact analysis, ***"NIH's Role in Sustaining the U.S. Economy,"*** produced annually by United for Medical Research (UMR). The most recent analysis, covering FY2017, was released in February 2018.

Using the RIMS II model developed by the U.S. Department of Commerce, Bureau of Economic Analysis (BEA), the UMR analyses provide quantitative estimates of the indirect economic impacts flowing from NIH research spending in the 50 states plus D.C. as it becomes:

- Sales revenue for upstream vendors providing materials and services required for the operation of research institutions; and
- Downstream spending by the employees of the research institutions and of their vendors.

These indirect impacts are referred to as the additional "intrastate jobs" and "economic activity" occurring in each state resulting from NIH research spending. This report used the intrastate jobs and economic activity data produced for fiscal years 2015-2017.

This report additionally estimates the capital expenditure spending (capex) that can be reasonably attributed to the inflow of NIH research funding in each state to generate a more comprehensive estimate of intrastate economic activity and jobs.

ABOUT UMR

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United for Medical Research is a coalition of leading scientific research institutions and industries, and patient and health advocates that have joined together to seek steady increases in funding for the National Institutes of Health.

Learn more at www.unitedformedicalresearch.com. For examples of the amazing things that NIH research is making possible, visit www.amazingthingspodcast.com.

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KEY FINDINGS

NIH research funding is a driver of economic activity and job creation in rural states, also contributing to state and local tax revenues.

- ☑ NIH research funding contributed meaningfully to all seven states in the form of economic activity and jobs — an average of $205 million and 1,392 jobs in 2017 according to UMR's annual economic analysis. **Each dollar of NIH spending in these states generated an average $1.8 dollars of total economic impact.**

- ☑ Factoring capital expenditures required by research operations into the equation, the state averages jump by over $40 million and nearly 300 jobs for a **total average state impact in 2017 of $245 million and 1,671 jobs.**

- ☑ This economic activity in turn generates significant revenues for state and local governments — **an average of $22 million per state in 2017 for applicable taxes and fees paid by businesses and employees.**

IN 2017...

EVERY RESEARCH DOLLAR

$1.8 economic IMPACT

TOTAL AVERAGE STATE IMPACT

$245 million

1,671 jobs

now HIRING

$22 million per state

IN TAXES & FEES PAID BY BUSINESSES

TABLE 2: ECONOMIC ACTIVITY & STATE REVENUES GENERATED, 2017 IN MILLION DOLLARS

STATE	OPERATIONAL-RELATED			CAPEX-RELATED		TOTAL IMPACT		
	NIH AWARDS	INTRASTATE ECONOMIC ACTIVITY	INTRA-STATE JOBS	INTRASTATE ECONOMIC ACTIVITY	INTRA-STATE JOBS	INTRASTATE ECONOMIC ACTIVITY	INTRA-STATE JOBS	STATE & LOCAL TAXES & FEES
Alabama	$298	$591	3,854	$118	771	$710	4,625	$54
Arkansas	$57	$101	726	$20	145	$121	871	$12
Kentucky	$188	$364	2,437	$73	487	$437	2,924	$38
Maine	$89	$169	1,248	$34	250	$202	1,498	$24
Mississippi	$53	$94	670	$19	134	$113	804	$12
Montana	$36	$64	487	$13	97	$76	585	$7
West Virginia	$28	$48	323	$10	65	$58	388	$6
7-State Avg.	**$107**	**$205**	**1,392**	**$41**	**278**	**$245**	**1,671**	**$22**
7-State Total	**$750**	**$1,432**	**9,745**	**$286**	**1,949**	**$1,718**	**11,694**	**$153**

Why look at capex? In addition to operational spending, all NIH-funded institutions make regular expenditures for capital assets — buildings, equipment, vehicles and sophisticated software. This capital expenditure spending (capex) flows to local architects, engineers, contractors, building supply vendors, equipment and software installation experts and scores of other local businesses. While capex spending tends to fluctuate greatly from year to year depending on the age of buildings and equipment and institutional financing priorities, a three- or four-year moving average of capex spending can provide a more reliable estimate of the in-state economic impacts.

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KEY FINDINGS (CONTINUED)

Rural state economies benefitted from increases to the NIH budget between 2015–2017.

- ☑ Research funding awarded to the seven states increased from 2015 to 2017 (no doubt enabled by congressional action in 2016 and 2017 that resulted in the first substantial increases to the overall NIH budget in more than a decade). **Over this period, the average increase in both NIH dollars awarded and the intrastate jobs created as a result of those awards was greater across the seven states (21%) than the average across the remaining states (15%).**

- ☑ The seven states assessed are significantly poorer on average than the rest of the United States. **Had Congress not acted to increase overall NIH funding and had research funding not increased to these seven states from 2015 to 2017 and stayed flat instead, the resulting loss per state would have been $28 million and 196 jobs on average.** Further handicapping the ability of these states to improve their economic performance and resulting in them lagging even further behind other states.

- ☑ Further, this lost economic activity would have translated into **an average $2.6 million revenue loss to state and local governments.**

2015–2017

21% increase
IN NIH DOLLARS & INTRASTATE JOBS

POTENTIAL LOSS OF
$28 million & 196 jobs
AVERTED

POTENTIAL
$2.6 million revenue loss
AVERTED

TABLE 3: NET SALES, JOBS & FISCAL LOSSES WITHOUT NIH FUNDING, 2015–2017

STATE	LOST INTRASTATE ECONOMIC ACTIVITY, $M			INTRASTATE JOB LOSS			FISCAL LOSS, $M	
	2017	2015	DIFFERENCE	2017	2015	DIFFERENCE	LOST ECONOMIC ACTIVITY	LOST STATE & LOCAL REVENUE
Alabama	$710	$667	-$43	4,625	4,345	-280	-$43	-$3.3
Arkansas	$121	$84	-$38	871	600	-271	-$38	-$3.7
Kentucky	$437	$374	-$64	2,924	2,498	-426	-$64	-$5.6
Maine	$202	$190	-$12	1,498	1,410	-88	-$12	-$1.4
Mississippi	$113	$101	-$12	804	721	-83	-$12	-$1.2
Montana	$76	$61	-$16	585	464	-121	-$16	-$1.4
West Virginia	$58	$43	-$15	388	288	-100	-$15	-$1.6
7-State Avg.	**$245**	**$217**	**-$28**	**1,671**	**1,475**	**-196**	**-$28**	**-$2.6**
7-State Total	**$1,718**	**$1,520**	**-$199**	**11,694**	**10,325**	**-1,369**	**-$199**	**-$18**

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KEY FINDINGS (CONTINUED)

NIH-funded research supports good paying jobs, helping to boost the labor forces in rural states; it can also help attract young, skilled workers to a state, which is important in states that skew older.

- ☑ NIH-funded jobs are contributing to a significant improvement in the labor forces of the seven states. **In 2017, average annual pay in the scientific R&D sector was nearly double the averages for total employment in each state.** The average pay ratio ranged from 1.3 in West Virginia to 2.4 in Alabama, averaging 1.9 across all seven states.

- ☑ **The ratio of average pay for workers under 25 exhibited a similar pattern, averaging 1.8 across the seven states.** The ability to attract young, skilled workers and to enhance a state's stock of human capital is of significant importance to the future of rural states, especially those facing growing demographic unsustainability.

IN 2017...

AVERAGE ANNUAL PAY IN
scientific R&D sector
2x greater

AVERAGE PAY FOR WORKERS
under 25 in scientific R&D sector
1.8x greater

TABLE 4: LABOR FORCE IMPACT OF NIH FUNDING, 2017

STATE	AVERAGE PAY			AVERAGE PAY FOR AGE <25			EMPLOYMENT GROWTH FOR AGE <25	
	R&D	ALL SECTORS	RATIO	R&D	ALL SECTORS	RATIO	R&D	ALL SECTORS
Alabama	$86,290	$36,115	2.4	$33,525	$12,409	2.7	50%	9%
Arkansas	$60,641	$35,752	1.7	$19,834	$13,062	1.5	-8%	8%
Kentucky	$84,521	$37,488	2.3	$25,407	$12,989	2.0	19%	8%
Maine	$57,212	$38,532	1.5	$23,960	$12,985	1.8	5%	4%
Mississippi	$52,240	$31,737	1.6	$14,182	$11,478	1.2	5%	8%
Montana	$75,552	$34,014	2.2	$26,436	$12,679	2.1	0%	5%
West Virginia	$45,698	$36,085	1.3	$14,206	$13,604	1.0	-16%	-5%
7-State Avg.	**$66,022**	**$35,675**	**1.9**	**$22,507**	**$12,744**	**1.8**	**8%**	**5%**

Source: Bureau of the Census

R&D refers to NAICS Code Scientific Research and Development Services. This is not directly related to NIH-funded institutions, but rather to the industry sector code used by employers on the payroll reports. Average pay refers to total wages paid divided by total employees reported in a period. Average pay, therefore, covers all employees – full-time, part-time, permanent and temporary – that held a job during a given quarter.

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KEY FINDINGS (CONTINUED)

Rural state budgets stand to benefit from health benefits arising from NIH-funded research — regardless of where that research is conducted.

- ☑ In the seven states examined, enrollees in publicly funded healthcare programs (Medicare and Medicaid) account for a far higher share of the state population, and the cost of benefits they receive amount to an even higher share of their states' GDP compared to other states.

- ☑ With the exception of Montana, **these seven states rank among the highest in the nation for prevalence of chronic diseases**, including cardiovascular disease and diabetes, and deaths from cancer and Alzheimer's disease. West Virginia, Maine and Kentucky also experience very high rates of death from opioid overdoses.

- ☑ **As a result, any health benefits arising from NIH-funded medical research will have a substantially greater fiscal impact on these rural states than the average state.**

IN THE 7 STATES

HIGHER RATES OF ENROLLEES IN
Medicare & Medicaid

AMONG HIGHEST PREVALENCE OF
chronic diseases

HEALTH BENEFITS OF RESEARCH TO HAVE
greater fiscal impact

TABLE 5: STATE RANK BY PREVALENCE OF CHRONIC DISEASE & HEALTH CONDITIONS

STATE	DIABETES	CARDIOVASCULAR DISEASE	OBESITY	CANCER DEATHS	ALZHEIMER'S DEATHS	OPIOID OVERDOSE DEATHS
Alabama	3	6	5	11	8	39
Arkansas	9	4	7	6	4	44
Kentucky	5	3	8	1	19	10
Maine	23	9	33	16	15	8
Mississippi	2	5	2	3	9	42
Montana	46	34	46	34	42	50
West Virginia	1	1	1	2	16	1

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KEY FINDINGS (CONTINUED)

The benefits of NIH-funded research flow throughout rural states and can play an important role in attracting research and biomedical-focused businesses and nurturing "innovation clusters."

- ☑ The large bulk of NIH research funding in these seven states is highly concentrated among a very small handful (two or three) of organizations — generally the state's major public university, medical center or other research institution. However, **because of the generally small size of these states' economies, the economic impact is felt more broadly than just in the areas near the recipient institutions.**

- ☑ The states display a large variation in the number of smaller award recipients — **a fact that may be important in evaluating the importance of NIH funds in seeding a growing cluster of biomedical enterprises in these states.**

NIH FUNDING BENEFITS

ECONOMIC IMPACT
felt far beyond
UNIVERSITIES, MEDICAL CENTERS, RESEARCH INSTITUTIONS

POTENTIAL TO ATTRACT
biomedical enterprises
AND GROW
innovation clusters