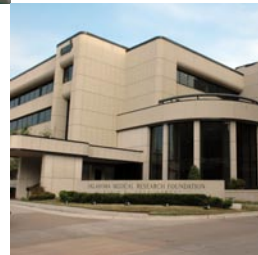


THE ECONOMIC SIGNIFICANCE OF THE OKLAHOMA MEDICAL RESEARCH FOUNDATION

AN ECONOMIC ANALYSIS
PREPARED BY

ROBERT DAUFFENBACH, PH.D.
DIRECTOR, CENTER FOR ECONOMIC
AND MANAGEMENT RESEARCH, MICHAEL
F. PRICE COLLEGE OF BUSINESS,
UNIVERSITY OF OKLAHOMA

LARKIN WARNER, PH.D.
REGENTS PROFESSOR EMERITUS
OF ECONOMICS, OKLAHOMA STATE
UNIVERSITY



EXECUTIVE SUMMARY

The Oklahoma Medical Research Foundation is not only one of the nation's premiere biomedical research institutes, but it is also an important economic force in the state of Oklahoma. By attracting out-of-state funds to Oklahoma like the \$27.7 million it secured in National Institutes of Health grants and contracts in 2004, OMRF contributes significantly to growing the state's economy. An economic analysis of OMRF's financial and payroll data reveals that OMRF has an annual impact of \$46 million on Oklahoma's economy and that it creates an estimated 1,061 jobs in the state.

INTRODUCTION

OMRF is a private, non-profit, biomedical research institute located in Oklahoma City. Founded 60 years ago, OMRF has grown to become one of the premiere biomedical research institutes in the nation. Home to Oklahoma's only Howard Hughes Investigator and Oklahoma's only member of the prestigious National Academy of Sciences, OMRF scientists study the diseases that affect most Americans: heart disease, stroke, Alzheimer's disease, lupus, cancer, diabetes and the diseases of children. OMRF has over 500 worldwide patents, and treatments that have their roots in OMRF are available in pharmacies everywhere.

The economic significance of OMRF is examined from two points of view. First, OMRF's full economic impact on the state of Oklahoma is estimated for employment, labor income, and tax revenues. This approach yields measures of short-term economic significance and is useful in assessing the results of Oklahoma's own financial commitment to OMRF as it generates large inflows of research funding from outside Oklahoma.

The longer-term impacts of OMRF on the status of biomedical research, on opportunities for technology transfer to locally based enterprise, and on Oklahoma's reputation within the scientific and business communities are impressive. This analysis emphasizes the sustained economic significance of OMRF as a major participant in achieving critical mass in bioscience at the Oklahoma Health Center and in the state of Oklahoma.

OMRF HAS AN ANNUAL IMPACT OF \$46 MILLION ON OKLAHOMA'S ECONOMY, AND IT CREATES AN ESTIMATED 1,061 JOBS IN THE STATE.

THE ECONOMIC IMPACT OF OMRF

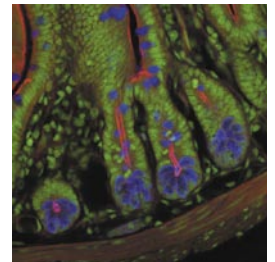
OMRF can be viewed as though it were a business firm producing a product, most of which is sold or "exported" outside the state of Oklahoma. Here the product involves research results with national and international value. Federal agencies and other national organizations provide grants to the skilled researchers at OMRF. The grants generate a flow of financial resources from outside the state just as though a product was being exported by an Oklahoma manufacturing establishment. This flow of receipts from outside the state enables OMRF to hire staff and to acquire the necessary capital equipment and operating resources.

The majority of these funds are from the federal government—particularly from the National Institutes of Health. A moderate amount is from private agencies like the American Cancer Society, and a relatively small share of OMRF's funds are generated by in-state grants. In addition Oklahomans make donations to OMRF. When the funds arrive at OMRF and are spent on personnel and other inputs, secondary or "multiplier" effects impact the state's economy as spending flows are spent and re-spent. The impacts of these spending flows are measured by examining the resulting increases in employment, labor income, and tax revenues.

There are additional bioscience firms located nearby that base their operations on research undertaken at OMRF. Because of the close relationship of these firms with OMRF, they are treated as an integral part of the multiplier analysis along with OMRF.

The multiplier impact of this process on the Oklahoma economy is divided into (1) the direct effect of initial outlays by OMRF to employees and vendors, (2) the indirect effect of the outlays to vendors as the vendors themselves purchase more from other firms, and the other firms make additional purchases from other firms, and (3) the induced or consumer spending effect as OMRF workers spend their income on goods and services and as that flow of income circulates throughout the state's economy.

These three effects on employment, labor income, and taxes are added together to arrive at an estimate of total impact of OMRF on Oklahoma. It is then possible to reflect on the full leverage that Oklahoma obtains as it provides in-state support



Six decades
of excellence

Bringing tens
of millions of
out-of-state
dollars to
Oklahoma

enabling OMRF to sustain its efforts to obtain grants from outside the state.

The Center for Economic and Management Research in the University of Oklahoma's Michael F. Price College of Business uses the IMPLAN model to compute direct, indirect and induced economic impacts of OMRF operations in the state of Oklahoma. The inputs to the IMPLAN model were supplied by OMRF. The IMPLAN model is widely used for such economic impact assessments and is considered to be the gold standard of such computer model packages. Impacts were analyzed in the categories of employment, labor income and tax receipts, and the results follow.

EMPLOYMENT IMPACT

As a result of OMRF operations, additional jobs beyond those directly employed by OMRF are created in the regional economy, herein defined as the state of Oklahoma. The combined increase in regional consumption, non-payroll operating, and construction expenditures produces an estimated total of 518 additional jobs in the IMPLAN model.

The total employment impact is, thus, estimated by the IMPLAN model to be 1,061 jobs with 543 of these jobs directly associated with OMRF. Dividing this total impact by the directly employed

professionals and staff yields an employment multiplier of 1.95. That is, for each additional OMRF job, on average 0.95 jobs are created. Results by industry are reported in Table 1.

It should, however, be acknowledged that the column headed "Direct" is somewhat of a misnomer. This column reflects jobs created as a result of direct expenditures on consumption by OMRF employees, non-payroll operating and construction expenditures. It does not include the direct employment of OMRF staff. Indirect employment in Table 1 represents jobs created in supplier industries to these three expenditure categories. Induced jobs are those jobs resulting from higher overall consumption spending. Total impact is the summation of direct, indirect, and induced effects.

LABOR INCOME IMPACT

The total augmentation of labor income in the state of Oklahoma in consequence of OMRF operations is estimated to be \$46.18 million, of which \$31.13 million is direct payroll expenditure by OMRF and related firms, yielding a labor

income multiplier of 1.48. That is, for every additional dollar spent by OMRF, labor income rises by an additional 48 cents. Table 2 presents industry detail on labor income impacts.

TAX IMPACT

The IMPLAN model yields a \$12.4 million increase per year in federal, state, and local taxes as a result of OMRF operations. Table 3 reports the detailed results.

SUMMARY IMPACTS

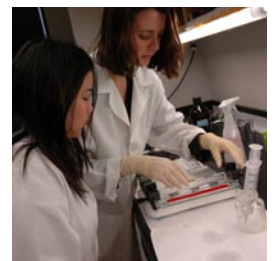
OMRF is an export-oriented enterprise in the state of Oklahoma. It generates revenue, largely from federal grants on an extremely competitive basis, and the decisions on allocation of these funds is external to the state. The results of this study reveal that, on average, every additional OMRF job results in about one additional job in the state of Oklahoma. Thus, the employment multiplier is close to 2.0. Every additional dollar spent on payroll, keeping other operating expenditures in proportion, generates an additional 48 cents in labor income, according to the IMPLAN estimates.

The results also show that because of additional spending, significant increases in total tax payments accrue to state, local and federal governmental entities. In addition to the present significance of OMRF to the Oklahoma economy indicated above, it is important to recognize that OMRF has and is likely to continue to expand its operations in future years.

LEVERAGED RESULTS

The discussion should now turn to leverage, and it uses the basic financial data in the OMRF 2004 Scientific Report to point out that \$30.5 million in competitive research grants are associated with \$7.4 million in private contributions. A very small share of the grants are from the Oklahoma Center for the Advancement of Science and Technology, but the vast majority come from out of state.

The leverage is particularly great with respect to relatively small donations. The state is currently granting a 50 percent tax credit (up to \$1,000 per person) for donations to an "independent biomedical research institute."



Creating jobs at OMRF and throughout the state

Adding new dollars to Oklahoma's economy

Growing state payrolls

More grant dollars mean more private contributions

THE ECONOMIC SIGNIFICANCE OF OMRF: A LONGER VIEW

The direct impact discussed above establishes OMRF as a significant contributor in the field of biomedical research both within the state of Oklahoma and the nation. These research results not only benefit humankind in general, but they also enhance the likelihood of future technology-based economic development within Oklahoma. It is important to realize that this economic analysis is designed solely

Value that can't be quantified in a spreadsheet

to measure those facets of OMRF operations that reflect on employment, income, and tax receipts. Obviously, the Oklahoma benefits from

the presence of OMRF in each of these important categories of impacts.

We have not measured, and, indeed, cannot measure the impacts of OMRF research on the health of humankind. What, for example, are the economic and general-population wellness impacts of OMRF's research on Alzheimer's? To the extent that OMRF's research contributes even modest advances to the understanding of how this disease functions and how it can be treated, the human capital implications are tremendous. These human capital implications are manifest through extended productive lives, quality of life and reduced expenditures for nursing care.

Obviously, our study can only reflect on the narrow employment, labor income, and tax receipts aspects of OMRF's operations, which is far from the full story. In the highly competitive marketplace of federal research grants, it is quite apparent that OMRF is highly regarded, is rising in reputation, is expanding its market share, and is contributing well to the base of scientific biomedical research. Such factors are the real test of the worth of this institution.

GENERAL ECONOMIC BENEFITS OF BIOMEDICAL RESEARCH

OMRF's motto is "A Cure is Out There." The areas of research in which OMRF specializes involve health conditions whose cure or amelioration can generate massive health cost savings. Examples of

Finding new ways to treat deadly diseases

these areas include cancer, heart disease, Alzheimer's disease, lupus and arthritis.

The benefits of finding a cure cannot be obtained without the application of highly skilled researchers and the most advanced laboratory technology. The

promise of success is at a historic high due to advances in cell and molecular biology.

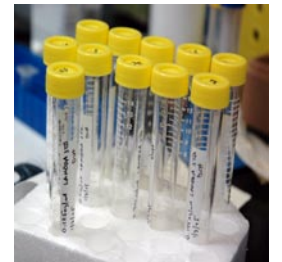
THE HIGH-TECH REPUTATION OF OKLAHOMA

It is now generally agreed that low-skill, repetitive manufacturing processes are increasingly likely to locate abroad rather than within the United States. That proposition is especially true of Oklahoma, where relatively low productivity activities have provided the state's citizens with per capita incomes well below the national norm. Rather, the future will increasingly involve knowledge industries and what is referred to today as "technology-based economic development." State research and development activities are at the very heart of such development.

OMRF is a nationwide leader among independent research institutes. This is illustrated by its competitive performance with respect to National Institutes of Health (NIH) grants. These grants are peer reviewed and involve competition between researchers and research institutions throughout the nation. In 2004, OMRF's 46 principal researchers averaged \$600,000 in NIH funding per person. OMRF's receipt of \$27.7 million in NIH grants placed it 13th from the top among approximately 90 members of the nationwide Association of Independent Research Institutes. Even among all organizations receiving NIH grants, OMRF had a respectable ranking of 149th in the nation. For example, OMRF ranked above well-known academic institutions such as Texas A&M, Arizona State, Iowa State, and Oregon.

From a nationwide perspective, the joint reputation of OMRF and the University of Oklahoma Health Sciences Center (OUHSC) must be emphasized. Biomedical research involves a set of specialized fields—all of which gain from associating with each other. Thus, Oklahoma achieves critical mass or economies of scale and scope by having the two institutions located on the same Oklahoma City campus of the Oklahoma Health Center. Economies of scale result from having significant numbers of researchers and laboratory facilities focusing on specialized issues, while economies of scope reflect the research productivity generated by the interaction of biomedical researchers with different specialties.

Again, NIH grants are illustrative, with OUHSC receiving \$47.1 million in 2004 and ranking 104th overall in the nation. Most of OMRF's key researchers are either full or adjunct faculty members at OUHSC.



Building a knowledge-based economy

Along with OUHSC, OMRF is at the research and development center of an even greater critical mass of activity at the Oklahoma Health Center. This 300-acre facility is the site of 28 medically related activities including major hospitals, and organizations in such special fields as allergy, blood, and eye problems. This means further economies of scale and scope and an enhanced state reputation in medical and biomedical research fields.

Since the mid-to-late 1990s, this critical mass at the Oklahoma Health Center has joined together with the improvement of the central core of Oklahoma City based on the program of MAPS (Metropolitan Area Projects) and other infrastructure investment along with the development of Bricktown's entertainment activities. The result has been an environment that is proving attractive to young research scientists and others in advanced technology fields.

OMRF AND BUSINESS DEVELOPMENT

The Oklahoma Health Center also includes the site of the 27-acre Presbyterian Health Foundation Research Park. This nationally known biotech research park is founded upon a roughly \$70 million infrastructure investment by the Presbyterian Health Foundation. In early 2006 the park contained

21 private biomedical and related business firms. Through technology transfer and with entrepreneurship, research results at OMRF are translated into the actual operations of for-profit businesses. Two of these firms illustrate another actual and potential long-term economic impact of OMRF.

InterGenetics, Inc.

Genetics research and development at OMRF developed a broad genetic predictive test for the risk of developing breast cancer. Technology was transferred from OMRF to a newly created corporation, InterGenetics. A trademark, OncoVue, was obtained for the test. The firm is exploring similar applications to predict heart disease, diabetes and other forms of cancer.

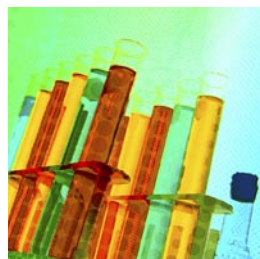
Zapaq, Inc.

Co-founded by researchers at OMRF and the University of Illinois, this company is focused on developing and marketing a compound to delay and, perhaps, even halt the progression of Alzheimer's disease.

The sort of business development illustrated by InterGenetics and Zapaq illustrates the vertical integration of stimuli to the economy of Oklahoma—capitalizing on the injection of money from outside the state to finance OMRF's research and development, to the creation of a biotech research park by an Oklahoma foundation, to the application of research results in the creation of exportable biomedical services and products. All of this started with, and has been sustained by, Oklahoma-based financial support of OMRF.

THE BOTTOM LINE

Any attempt to gauge OMRF's value to the state using conventional economic analysis will inevitably fall short. Yet even in straightforward economic terms, the numbers are substantial: OMRF's impact on Oklahoma's economy is estimated to be 1,061 jobs, almost doubling OMRF's direct employment of scientific and support staff, and OMRF generates \$46 million in income per year.



Technology transfer: spinning off biotech companies



Table 1. Employment Impact

Industry	Direct	Indirect	Induced	Total
Ag, forestry, fish & hunting	1	4	2	7
Mining	0	1	0	1
Utilities	1	1	1	3
Construction	72	3	1	76
Manufacturing	9	6	3	18
Wholesale trade	8	4	4	16
Transportation & warehousing	5	6	2	13
Retail trade	49	7	23	79
Information	3	2	1	6
Finance & insurance	8	7	5	20
Real estate & rental	14	7	5	26
Professional- scientific & tech services	16	14	4	34
Management of companies	0	2	1	3
Administrative & waste services	27	15	4	46
Educational services	4	0	2	6
Health & social services	40	0	21	61
Arts- entertainment & recreation	6	1	3	10
Accommodation & food services	31	4	14	49
Other services	24	4	12	40
Government & non NAICs	2	1	1	4
Total	320	89	109	518
			Firm Emp	543
			Total	1,061
			Multiplier	1.95

Source: Center for Economic and Management Research, Price College of Business and IMPLAN

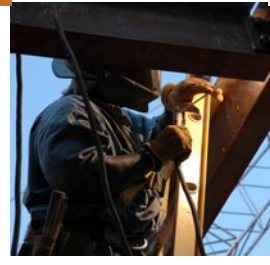
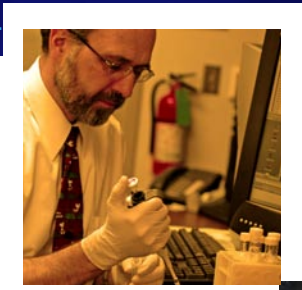
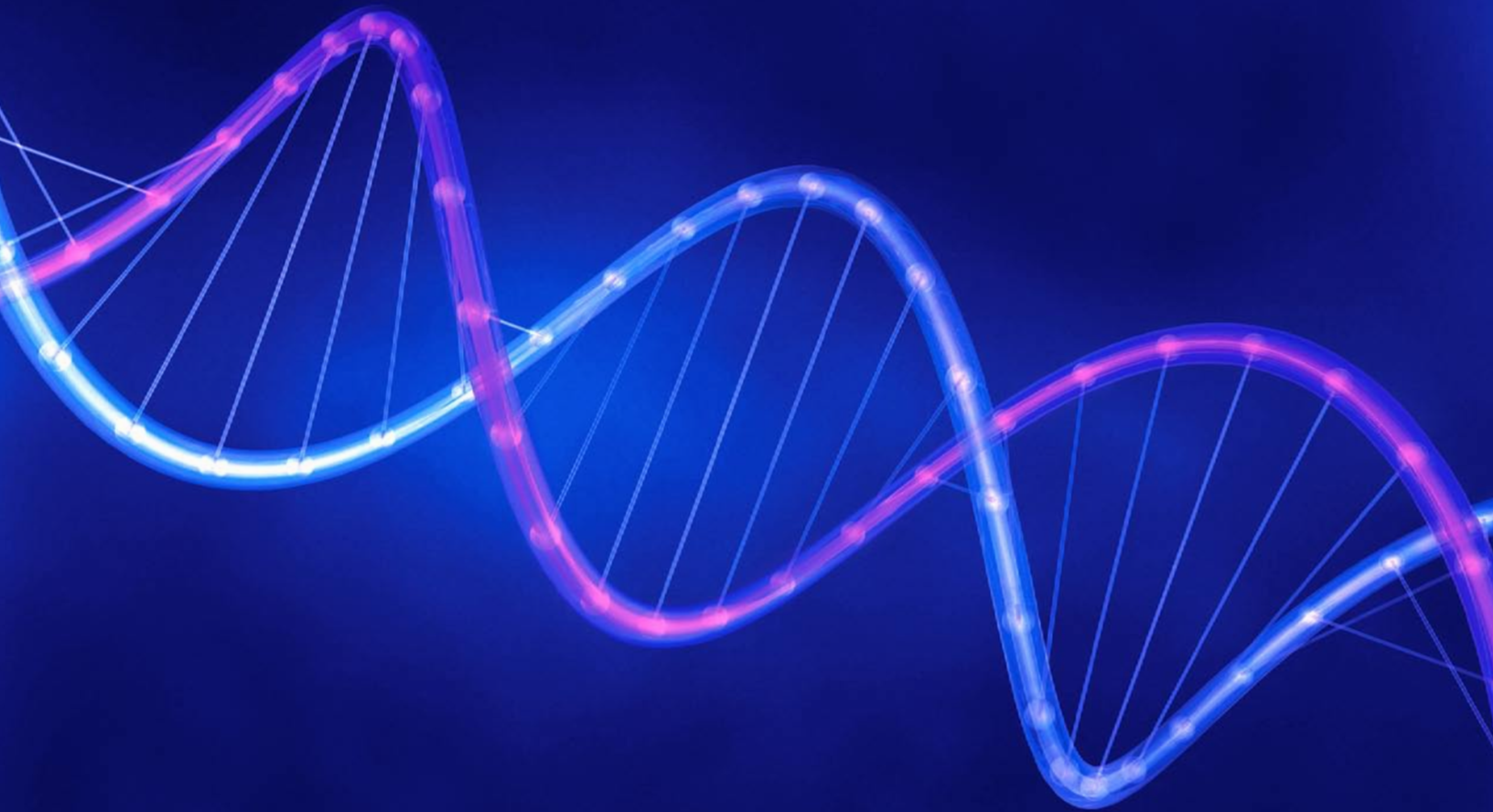
Table 2. Labor Income Impact (dollars)

Industry	Direct	Indirect	Induced	Total
Ag, forestry, fish & hunting	26,530	59,242	33,301	119,073
Mining	7,368	57,125	19,360	83,853
Utilities	138,067	53,859	54,458	246,384
Construction	2,254,609	82,782	25,038	2,362,429
Manufacturing	541,947	335,543	169,869	1,047,359
Wholesale trade	383,382	187,397	174,831	745,610
Transportation & warehousing	207,523	233,837	95,977	537,337
Retail trade	1,115,764	164,907	517,674	1,798,345
Information	164,039	121,522	70,336	355,897
Finance & insurance	318,555	237,774	189,904	746,233
Real estate & rental	266,852	136,972	90,823	494,647
Professional- scientific & tech services	703,626	629,473	175,464	1,508,563
Management of companies	16,638	98,685	30,518	145,841
Administrative & waste services	534,900	310,695	83,268	928,863
Educational services	82,637	3,174	45,586	131,397
Health & social services	1,435,547	7,351	728,053	2,170,951
Arts- entertainment & recreation	78,146	10,499	39,098	127,743
Accommodation & food services	404,126	53,318	179,334	636,778
Other services	415,661	88,385	193,318	697,364
Government & non NAICs	96,212	32,243	41,190	169,645
Total	9,192,129	2,904,783	2,957,400	15,054,312
			Firm Labor	31,129,000
			Total	46,183,312
			Multiplier	1.48361052

Table 3. Tax Impact (dollars)

	Employee Compensation	Proprietary Income	Household Expenditures	Enterprises Corporations	Indirect Business Tax	Total
Corporate Profits Tax	0	0	0	491,495		491,495
Indirect Bus Tax: Custom Duty	0	0	0	0	85,461	85,461
Indirect Bus Tax: Excise Taxes	0	0	0	0	272,757	272,757
Indirect Bus Tax: Fed NonTaxes	0	0	0	0	92,650	92,650
Personal Tax: Estate and Gift Tax	0	0	0	0	0	0
Personal Tax: Income Tax	0	0	4,360,089	0	0	4,360,089
Personal Tax: NonTaxes (Fines- Fees	0	0	0	0	0	0
Social Ins Tax- Employee Contribution	1,781,739	317,112	0	0	0	2,098,851
Social Ins Tax- Employer Contribution	1,842,018	0	0	0	0	1,842,018
Total	3,623,757	317,112	4,360,089	491,495	450,868	9,243,321
Corporate Profits Tax	0	0	0	32,259		32,259
Dividends	0	0	0	179,776		179,776
Indirect Bus Tax: Motor Vehicle Lic	0	0	0	0	85,819	85,819
Indirect Bus Tax: Other Taxes	0	0	0	0	214,644	214,644
Indirect Bus Tax: S/L NonTaxes	0	0	0	0	159,293	159,293
Indirect Bus Tax: Sales Tax	0	0	0	0	1,096,957	1,096,957
Indirect Bus Tax: Severance Tax	0	0	0	0	235,583	235,583
Personal Tax: Estate and Gift Tax	0	0	0	0	0	0
Personal Tax: Income Tax	0	0	790,670	0	0	790,670
Personal Tax: Motor Vehicle License	0	0	136,898	0	0	136,898
Personal Tax: NonTaxes (Fines- Fees	0	0	99,869	0	0	99,869
Personal Tax: Other Tax (Fish/Hunt)	0	0	16,627	0	0	16,627
Personal Tax: Property Taxes	0	0	0	0	0	0
Social Ins Tax- Employee Contribution	30,215	0	0	0	0	30,215
Social Ins Tax- Employer Contribution	98,014	0	0	0	0	98,014
Total	128,229	0	1,044,064	212,035	1,792,296	3,176,624
Total	3,751,986	317,112	5,404,153	703,530	2,243,164	12,419,945

Source: Center for Economic and Management Research, Price College of Business and IMPLAN



**FOR FURTHER
INFORMATION CONTACT:**

**OKLAHOMA MEDICAL
RESEARCH FOUNDATION
825 NORTHEAST 13TH STREET
OKLAHOMA CITY, OK 73104
405-271-6673
800-522-0211**