
UNSOM Health Policy Brief

The Contribution of the University of Nevada School of Medicine to the Nevada Economy

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Key Findings

- In 2015, the University of Nevada School of Medicine (UNSOM) employed 2,126 Nevadans with a combined \$118.6 million in payroll and benefits
- Spending by UNSOM employees generated an additional 1,363 jobs and \$55.9 million in payroll and benefits in Nevada
- UNSOM expenditures of \$64.9 million on education, research and clinical operations generated an additional \$53.4 million in economic activity in the state
- The total economic contribution of the School of Medicine to the Nevada economy was \$292.8 million
- Every dollar spent by UNSOM in 2015 produced an additional \$0.596 in economic activity in Nevada that year

Overview

This report, *The Contribution of the University of Nevada School of Medicine to the Nevada Economy*, provides the most current estimate of the statewide and regional economic impacts of the University of Nevada School of Medicine (UNSOM).

UNSOM provides undergraduate and graduate medical education, and undertakes a wide range of biomedical research. UNSOM practice plans offer care to Nevadans in more than 40 medical specialties. The School's physician practice is the largest in Nevada with doctors and surgeons practicing and teaching medicine in Las Vegas, Reno, and rural areas of the state.

The analysis contained in this report reveals that the jobs, payroll, and expenditures made by the School of Medicine generate substantial benefits to the state's economy – contributions typically overlooked in public policy discussions of the role of medical education and training in Nevada.



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Findings

Table 1 summarizes employment, payroll and benefits, and operating expenditures of the University of Nevada School of Medicine (UNSOM) and subtotals for the school’s operations in northern and southern Nevada for the fiscal year ending June 30, 2015 (FY 15). In 2015, the School of Medicine employed 2,126 individuals and spent \$118.6 million on employee payroll and benefits. UNSOM employees include academic and administrative faculty, medical residents, classified staff, and research assistants, as well as clinical and nonclinical staff employed by the UNSOM practice plans. An additional \$64.9 million was spent by UNSOM on goods and services from other Nevada businesses, including utilities, supplies, and contracts.

Table 1: UNSOM Employment, Payroll, and Operating Expenditures – 2015						
UNSOM	Employment		Payroll and Benefits		Expenditures	
	Number of Jobs	Percent	Number (\$)	Percent	Number (\$)	Percent
UNSOM North	1,173	55.2	52,199,714	44.0	31,878,602	49.1
UNSOM South	953	44.8	66,420,410	56.0	33,070,799	50.9
Total	2,126	100.0	118,620,124	100.0	64,890,794	100.0

In this report, data and corresponding estimates are developed for two general areas of the School’s operations: (1) education and research and (2) practice plans. In 2015, 1,173 individuals were employed UNSOM in northern Nevada (55.2% of all UNSOM employees) and 953 individuals were employed in southern Nevada (44.8%).

Table 2 provides information on UNSOM employment by region and type of employment activity. In 2015, the School of Medicine employed 1,464 individuals in education and research and 662 in its practice plans.

Table 2: UNSOM Employment – 2015						
UNSOM	Education and Research		Practice Plans		Total	
	Number of Jobs	Percent	Number of Jobs	Percent	Number of Jobs	Percent
UNSOM North	969	66.2	204	30.8	1,173	55.2
UNSOM South	495	33.8	458	69.2	953	44.8
Total	1,464	100.0	662	100.0	2,126	100.0%

Two-thirds of the 1,464 UNSOM employees in education and research worked in northern Nevada (66.2%). In contrast, an even larger majority of the School’s 662 practice plan employees worked in southern Nevada (69.2%).

Table 3 contains information on UNSOM spending on payroll and benefits by region and type of employment activity. In 2015, UNSOM employees earned \$118.6 million in payroll and benefits – of that total, employees in southern Nevada accounted for \$66.4 million in earnings and those employees in northern Nevada accounted for \$52.2 million in payroll and benefits.

Table 3: UNSOM Spending on Payroll and Benefits – 2015						
UNSOM	Education and Research		Practice Plans		Total	
	Number \$	Percent	Number \$	Percent	Number \$	Percent
UNSOM North	45,681,454	48.1	6,518,260	27.6	52,199,714	44.0
UNSOM South	49,323,643	51.9	17,096,767	72.4	66,420,410	56.0
Total	95,005,097	100.0	23,615,027	100.0	118,620,124	100.0

Table 4 provides information on UNSOM operating expenditures by region and type of employment activity. In 2015, UNSOM spent \$64.9 million on operating expenditures: \$36.0 million on operating expenses associated with medical education and research and \$28.9 million on operating expenditures associated with its practice plans.

Table 4: UNSOM Spending on Operating Expenditures – 2015						
UNSOM	Education and Research		Practice Plans		Total	
	Number \$	Percent	Number \$	Percent	Number \$	Percent
UNSOM North	26,190,825	72.8	5,687,777	19.7	31,878,602	49.1
UNSOM South	9,784,985	27.2	23,227,206	80.3	33,012,191	50.9
Total	35,975,811	100.0	28,914,983	100.0	64,890,794	100.0

Table 5 summarizes total UNSOM spending on payroll, benefits, and operating expenditures detailed in the previous two tables. In 2015, UNSOM spent \$131.0 million on education and research with a majority of that spending taking place in northern Nevada (54.9%). During the same year UNSOM spent \$52.5 million in its practice plans, with the vast majority of that spending taking place in southern Nevada (76.8%). Statewide, UNSOM spent a grand total of \$183.5 million on payroll, benefits, and operating activities in 2015.

Table 5: UNSOM Total Spending – 2015						
UNSOM	Education and Research		Practice Plans		Total	
	Number	Percent	Number	Percent	Number	Percent
UNSOM North	71,872,279	54.9	12,206,037	23.2	84,078,316	45.8
UNSOM South	59,108,629	45.1	40,323,973	76.8	99,432,602	54.2
Total	130,980,908	100.0	52,530,010	100.0	183,510,918	100.0

Tables 6 through 8 provide estimates of the economic contribution of the University of Nevada School Medicine utilizing data contained in the previous tables and economic impact multipliers developed by the IMPLAN Group, LLC for the three geographic regions in each table: northern Nevada, southern Nevada, and the statewide or entire Nevada economy. An important method of assessing the impact of businesses and industry sectors on local economies is through the estimation of multiplier effects.

Multiplier or “ripple” effects are a simplified and compact way of representing the effects of business and employee expenditures – for example, spending by the University of Nevada School of Medicine – on state and regional economies, such as northern Nevada and southern Nevada. The multiplier is interpreted as the impact of a one-unit change in sales, employment, or income that results in a corresponding total impact on sales, employment, or income in the larger economy. In essence, the multiplier represents the recycling of dollars and income in a specified geographic unit, such as Clark County or the State of Nevada. This recycling creates new job opportunities and additional wages for residents and business establishments in that geographic unit. An appendix to this report contains additional information on multiplier effects.

Table 6 provides estimates of the economic contribution of the University of Nevada School of Medicine to the northern Nevada economy. In 2015, UNSOM education, research, and practice plans in northern Nevada generated an estimated \$52.2 million in payroll and benefits and employed 1,173 northern Nevadans. When the jobs created by other businesses in northern Nevada, as a result of UNSOM operations, are included in the analysis, UNSOM was responsible for an additional 711 jobs and an estimated total employment impact of 1,884 jobs. Likewise, when the income created by other businesses as a result of UNSOM education, research, and clinical operating activities is included in the analysis, UNSOM was responsible for an additional \$25.4 million in payroll and benefits in other businesses and an estimated total payroll impact of \$77.6 million.

Table 6: UNSOM Contributions to the Northern Nevada Economy – 2015				
UNSOM North – Education and Research Impacts				
Contribution Type	Direct Effect	Indirect Effect	Total Effect	IMPLAN Multiplier
Employment	969	587	1,556	1.6059
Payroll & Benefits \$	45,681,454	22,255,182	67,936,636	1.4872
Operating Expenses \$	26,190,825	20,268,608	46,459,433	1.7739
UNSOM North Practice Plans				
Contribution Type	Direct Effect	Indirect Effect	Total Effect	IMPLAN Multiplier
Employment	204	124	328	1.5090
Payroll & Benefits \$	6,518,260	3,175,579	9,693,839	4.5205
Operating Expenses \$	5,687,777	4,401,668	10,089,445	1.7739
UNSOM North Total				
Contribution Type	Direct Effect	Indirect Effect	Total Effect	IMPLAN Multiplier
Employment	1,173	711	1,884	1.6059
Payroll & Benefits \$	52,199,714	25,430,761	77,630,475	1.4872
Operating Expenses \$	31,878,602	24,670,276	56,548,879	1.7739
Total Economic Contributions in Northern Nevada: \$134,179,353				

Table 7 provides estimates of the economic contribution of the University of Nevada School of Medicine to the southern Nevada economy. In 2015, UNSOM education, research, and practice plans in southern Nevada generated an estimated \$66.4 million in payroll and benefits and employed 953 southern Nevadans. When the jobs created by other businesses in southern Nevada, as a result of UNSOM operations, are included in the analysis, UNSOM was responsible for an additional 633 jobs and an estimated total employment impact of 1,586 jobs. Likewise, when the income created by other businesses in southern Nevada as a result of UNSOM education, research, and clinical operating activities is included in the analysis, UNSOM was responsible for an additional \$31.9 million in payroll and benefits in other businesses and an estimated total payroll impact of \$98.3 million. Combined, UNSOM spending on payroll and benefits, as well as the School’s operational expenditures on goods and services from other businesses in southern Nevada generated \$159.3 million in total economic activity.

Table 7: UNSOM Contributions to the Southern Nevada Economy – 2015				
UNSOM South – Education and Research Impacts				
Contribution Type	Direct Effect	Indirect Effect	Total Effect	IMPLAN Multiplier
Employment	495	329	824	1.6638
Payroll & Benefits \$	49,323,643	23,663,807	72,987,450	1.4798
Operating Expenses \$	9,784,985	8,313,265	18,098,250	1.8496
UNSOM South – Practice Plans Impacts				
Contribution Type	Direct Effect	Indirect Effect	Total Effect	IMPLAN Multiplier
Employment	458	304	762	1.6638
Payroll & Benefits \$	17,096,767	8,202,448	25,299,215	1.4798
Operating Expenses \$	23,227,206	19,733,695	42,960,901	1.8496
UNSOM South – Total Impacts				
Contribution Type	Direct Effect	Indirect Effect	Total Effect	IMPLAN Multiplier
Employment	953	633	1,586	1.6638
Payroll & Benefits \$	66,420,410	31,866,255	98,286,665	1.4798
Operating Expenses \$	33,012,191	28,046,960	61,059,151	1.8496
Total Economic Contributions in Southern Nevada: \$159,345,816				

Table 8 provides estimates of the economic contribution of the University of Nevada School of Medicine to the entire State of Nevada. In 2015, UNSOM education, research, and practice plans in Nevada statewide totals were an estimated \$118.6 million in payroll and benefits and employed 2,126 Nevadans.

Table 8: UNSOM Contributions to the Nevada Economy – 2015				
UNSOM North and South Education and Research				
Contribution Type	Direct Effect	Indirect Effect	Total Effect	IMPLAN Multiplier
Employment	1,464	938	2,402	1.6409
Labor Income \$	95,005,097	44,781,983	139,787,080	1.4714
Operating Expenses \$	35,975,811	29,594,565	65,570,376	1.8226
UNSOM North and South Practice Plans				
Contribution Type	Direct Effect	Indirect Effect	Total Effect	IMPLAN Multiplier
Employment	662	424	1,086	1.6409
Labor Income \$	23,615,027	11,131,274	34,746,301	1.4714
Operating Expenses \$	28,914,983	23,786,159	52,701,142	1.8226
UNSOM Statewide Total				
Contribution Type	Direct Effect	Indirect Effect	Total Effect	IMPLAN Multiplier
Employment	2,126	1,363	3,489	1.6409
Labor Income \$	118,620,124	55,913,256	174,533,380	1.4714
Operating Expenses \$	64,890,794	53,380,724	118,271,518	1.8226
Grand Total Statewide Economic Contributions in Nevada: \$292,804,898				

When the jobs created by other businesses in Nevada as a result of UNSOM educational, research, and clinical operating activities are included in the analysis, UNSOM was responsible for an additional 1,363 jobs for an estimated total employment impact of 3,489 jobs in Nevada. Likewise, when the income created by other businesses in Nevada as a result of UNSOM operations is included in the analysis, UNSOM was responsible for an additional \$55.9 million in

payroll and benefits in other businesses generating an estimated payroll impact of \$174.5 million in 2015. Combined, UNSOM spending on payroll and benefits, as well as the School's operational expenditures on goods and services from other businesses across Nevada resulted in an estimated \$292.8 million in total economic activity in Nevada in 2015.

Discussion

The estimates contained in this brief provide a snapshot of the University of Nevada School of Medicine's current contributions to the state's economy. However, these estimates do not capture every economic contribution of the School, such as the impact of construction and other major capital improvements undertaken by the School of Medicine. Nor does the report capture the economic value of a healthier population and an economically more productive workforce in Nevada – improvements that are, to no small degree, a result of research undertaken at the School of Medicine as well as the medical care provided by physicians who have received their undergraduate and graduate medical education from the University of Nevada School of Medicine over the past four decades.

In summary, the University of Nevada School of Medicine has been responsible for substantial economic contributions in both northern and southern regions of Nevada. In 2015, for every dollar spent by UNSOM on payroll, benefits, and operations in southern Nevada, another \$0.603 in economic activity was generated in southern Nevada. Similarly, for every dollar spent by UNSOM on payroll, benefits, and operations in northern Nevada, another \$0.596 in economic activity was generated in northern Nevada. In 2015, University of Nevada School of Medicine spending on employee salaries and business operations resulted in a total impact of \$292.8 million in economic activity in Nevada. In other words, for every dollar spent by UNSOM on payroll, benefits, and operations statewide, another \$0.596 in economic activity was generated in other businesses across the state. As policymakers consider the medical education and health care priorities for Nevada, they should bear in mind the importance of the University of Nevada School of Medicine to the state's economy.

Appendix

The Multiplier Effect

An important method of assessing the impact of businesses and industry sectors on local economies is through the estimation of multiplier effects. Multiplier effects are a simplified and compact way of representing the effects of business and employee expenditures on the local economy. The multiplier is interpreted as the impact of a one-unit change in sales, employment, or income that results in a corresponding total impact on sales, employment, or income in the larger economy. In essence, the multiplier represents the recycling of dollars and income in a specified geographic unit, such as Clark County or the State of Nevada. This recycling creates new job opportunities and additional wages for residents and business establishments.

There are three types of multiplier effects based on the type of economic impact analysis undertaken: direct, indirect, and induced. These types are illustrated in Table A with examples from the hospital industry. The *direct multiplier effect* is based on an industry’s initial economic impact on the region’s economy.

Table A: Illustration of Economic Impact Multipliers			
Type of Multiplier	Direct	Indirect	Induced
Employment Multiplier	UNSOM jobs	UNSOM supplier jobs	Local retail and service jobs related to UNSOM employee spending
Income Multiplier	UNSOM employee payroll and benefits	UNSOM supplier employee payroll and benefits	Local retail and service income related employee spending
Output Multiplier	UNSOM expenditures	UNSOM Supplier Expenditures	Local retail and service expenditures related to UNSOM spending

For example, if a medical school has annual expenditures of \$5 million on goods and services to support medical school operating activities, then this figure becomes the direct economic impact on the community.

The *indirect multiplier effect* is based on industry-to-industry transactions only. For example, indirect effects would include medical school purchases of educational and medical supplies, local laundry services, food, and other contracted services. Finally, the *induced multiplier effect* includes both the industry-to-industry transactions and household purchases, including employee spending. The total economic impact is thus defined as the direct plus indirect and induced economic impacts.

The direct, indirect, and induced multiplier effects can be classified as output (expenditures), employment and income (payroll and benefits) multipliers. An output multiplier of 2.0 indicates that if one dollar is spent by the medical school, an additional dollar is spent in other sectors due to business and household spending. An employment multiplier of 2.0 indicates that if one job is created in the health care sector, 1.0 additional job was created in other sectors due to business and household spending. Likewise, an income (payroll and benefits) multiplier of 2.0 indicates that for every dollar of income (payroll and benefits) created in the health sector, an additional dollar of income (payroll and benefits) is created in other sectors due inter-industry spending by health businesses and employees.

Model and Data Used to Estimate Multipliers

The economic impacts presented in this report are measured by multipliers using an input-output model and data from IMPLAN, a model that is widely used by economists and other academics in the United States. A computer spreadsheet that uses state IMPLAN multipliers was originally developed to enable community development specialists to measure the secondary benefits of the health sector on state, regional, or county economies. The complete methodology is presented in *Measuring the Economic Importance of the Health Sector on a Local Economy: A Brief Literature Review and Procedures to Measure Local Impacts* (Doeksen, et al. 1997).

Input-output (I/O) analysis is designed to analyze the transactions among industries in an economy (Miernyk 1965). These models are largely based on the work of Wassily Leontief during the 1930s. Detailed I/O analysis captures the indirect and induced interrelated circular behavior of the economy. For example, an increase in the demand for health services requires more equipment, more labor, and more supplies, which, in turn, requires more labor to produce the supplies, and so on. By simultaneously accounting for structural interaction between sectors and industries, I/O analysis gives expression to the general economic equilibrium systems.

The analysis utilizes assumptions based on linear and fixed coefficients and limited substitutions among inputs and outputs (I/O). The analysis assumes that average and marginal I/O coefficients are equal. Nonetheless, the framework has been widely accepted and used by economists and policymakers. I/O analysis is useful when carefully executed and interpreted in defining the structure of a region, interdependencies among industries, and forecasting economic outcomes. The I/O model coefficients describe the structural interdependencies of an economy. From the coefficients, various predictive devices (multipliers) can be computed, which can be useful in analyzing economic changes in a state, region, or county. Multipliers indicate the relationship between some observed change in the economy and the total change in economic activity created through the economy.

Typically, the complexity of I/O modeling has hindered practitioners from constructing models specific to a community requesting an analysis. Too often, inappropriate multipliers have been used to estimate local economic impacts. In contrast, IMPLAN can construct a model for any state, region, county, or zip code area in the United States by using available state, region, county, or zip code data. Impact analysis can be performed once a regional I/O model is constructed.

Four main sets of multipliers are estimated by IMPLAN, corresponding to four measures of regional economic activity: (1) total industry output, (2) labor income, (3) value added, and (4) employment. Multipliers for four components of value added can also be estimated. Two types of multipliers are generated. Type I multipliers measure the impact in terms of direct and indirect effects. Direct impacts are the changes in the activities of the focus industry or firm, such as the construction of a medical school or the closing of a medical school campus. For construction expenditures, the construction sector exerts the impact received from medical school expenditures, in areas such as local purchase of cement, electricity supplies, and local labor. The focus business changes its purchases and inputs as a result of the direct impacts. This produces indirect impacts in other business sectors. Indirect impacts are the additional expenditures made by local economic sectors after the direct effects. The event occurs when a firm such as the medical school buys accounting services from a local accountant that buys paper for analysis which increases the economic activity of the local office supplier and the local office supplier may buy extra accounting time to keep records of the expanded purchases.

However, the total impact of a change in the economy consists of direct, indirect, and induced changes. Both the direct and indirect impacts change the flow of dollars to the state, region, or county's households. Subsequently, the households alter their consumption. The effect of the changes in household consumption on businesses in a community is referred to as an induced effect. For example, as people receive their paychecks, they purchase goods and services such as restaurant sales. This causes expansion in restaurants which filters through the economy. Induced impacts are those from expanded local household activity.

To measure the total impact, a Type II multiplier assumes all expanded household activity will remain in the study area. From journey to work data, the impact is a larger area due to employee movement. The Social Accounting Matrix (SAM) multiplier is used to address the leakage of household income from workers working in the study area but living outside the study area. The Type SAM multiplier compares direct, indirect, and induced effects with the direct effects generated by a change in final demand (the sum of direct, indirect, and induced effects divided by direct effects). The default SAM multiplier internalizes household income and expenditures. This calculation produces a lower induced effect yet is more in line with the flow

of employment in and out of the study area. The SAM multiplier may also be modified in special cases to internalize other final demand categories such as state government spending.

Minnesota IMPLAN Group, Inc. (MIG)

Dr. Wilbur Maki at the University of Minnesota utilized the input/output model and database work from the U. S. Forest Service's Land Management Planning Unit in Fort Collins to further develop the methodology and to expand the data sources. Scott Lindall and Doug Olson joined the University of Minnesota in 1984 and worked with Maki and the model. As an outgrowth of their work with the University of Minnesota, Lindall and Olson entered into a technology transfer agreement with the University of Minnesota that allowed them to form MIG. At first, MIG focused on database development and provided data that could be used in the Forest Service version of the software. In 1995, MIG took on the task of writing a new version of the IMPLAN software from scratch. This new version extended the previous Forest Service version by creating an entirely new modeling system that included creating Social Accounting Matrices (SAMs) – an extension of input-output accounts, and resulting SAM multipliers. Version 2 of the new IMPLAN software became available in May of 1999. For more information about Minnesota IMPLAN Group, Inc., please contact Scott Lindall or Doug Olson by phone at 651-439-4421 or by email at info@implan.com or review their website at www.implan.com.

Sources

Employment, payroll, and operating expenses data was supplied by the University of Nevada School of Medicine budget office.

Alward, G., Sivertz, E., Olson, D., Wagner, J., Serf, D., and Lindall, S. (1989). *Micro IMPLAN Software Manual*. Stillwater, MN. University of Minnesota Press.

Doeksen, G. A., Johnson, T., and Willoughby, C. (1997). *Measuring the Economic Importance of the Health Sector on a Local Economy: A Brief Literature Review and Procedures to Measure Local Impacts*. Southern Rural Development Center. SRDC Pub. No. 202. 1997.

Miernyk, W.H. (1965). *The Element of Input-Output Analysis*. New York, NY; Random House.

Minnesota IMPLAN Group, Inc. *User's Guide, Analysis Guide, Data Guide: IMPLAN Professional Version 2.0 Social Accounting & Impact Analysis Software, 2nd Edition*, June 2000.

About this Report

This policy brief – *The Contribution of the University of Nevada School of Medicine on the Nevada Economy* (March 2016) was prepared for the University of Nevada School of Medicine by John Packham and Tabor Griswold from the UNSOM Office of Statewide Initiatives and Tom Harris from the Center for Economic Development at the University of Nevada, Reno. Over the past decade, these two offices have provided local and state leaders with the information and assistance needed to make the best possible decisions about the role of hospitals, the health sector, and medical education in economic development. For additional information on this report, please contact Dr. Packham at (775) 784-1235 or jpackham@medicine.nevada.edu. A complete list of the reports and publications produced by the Office of Statewide Initiatives at the University of Nevada School of Medicine can be found at <http://www.medicine.nevada.edu/statewide/reports>.

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