Nevada Office of Rural Health
Center for Education and Health Services Outreach
University of Nevada School of Medicine

The Impact of the State of Nevada Western Interstate Commission for Higher Education (WICHE) on the Nevada Economy – 1998 to 2007

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The Impact of the State of Nevada Western Interstate Commission for Higher Education (WICHE) on the Nevada Economy – 1998 to 2007

Highlights

- 271 WICHE professionals work throughout Nevada
- Impact of WICHE professionals' jobs in Nevada is 410
- WICHE professionals' payroll estimate is $27,105,500
- Total payroll impact of WICHE professionals is $37,620,143

- 217 WICHE professionals (80.1%) work in urban Nevada
- Impact of WICHE professionals' jobs in urban Nevada is 328
- Impact of WICHE professionals' payroll in urban Nevada is $30,160,195

- 54 WICHE professionals (19.9%) work in rural and frontier Nevada
- Impact of WICHE professionals' jobs in rural and frontier Nevada is 82
- Impact of WICHE professionals' payroll in rural and frontier Nevada is $7,459,948

Study Results

The State of Nevada Western Interstate Commission for Higher Education (WICHE) supports students, primarily residents of Nevada, pursuing health care professional occupations through financial assistance at in-state or out-of-state institutions. When the students complete their professional education, tuition loans are forgiven in return for working in Nevada. There is an additional loan forgiveness program offered when students work in underserved communities in Nevada from two to four years. WICHE supported and trained professionals work in dentistry, mental health, nursing, optometry, pharmacy, physical therapy, physician assistant, and veterinary medicine. The importance of the WICHE professionals to the state of Nevada extends beyond their professional services.

The Impact of the State of Nevada Western Interstate Commission for Higher Education (WICHE) on the Nevada Economy – 1998 to 2007 documents the economic contribution of WICHE professionals to the state's economy. The report provides estimates of the direct and indirect impact of these professional services on payroll and employment throughout Nevada. The analysis presented in this report reveals that these WICHE professionals contribute considerably to the Nevada economy - a contribution typically overlooked in public policy discussions of health care cost containment, access to care, and community benefits.

The WICHE professionals have a source of income in their own right as they play a role in local and regional communities through the generation of additional employment and income in a wide range of other businesses. This role contributes to the tax base at the state and local levels. The combination of an overall increasing population base and a rapidly growing elderly population in Nevada suggests that there will be a steady growth in demand for health care services and thus continued growth for health care professionals.

Table 1: Employment and Payroll of WICHE Professionals Currently Practicing in Nevada Who Received WICHE Support from 1998 to 2007 – 2008

Profession	WICHE-Supported Employment and Payroll in Nevada – 2008		
	Employment	Average Salary	Estimated Total Payroll
Dentistry	54	168,418	9,094,572
Mental Health	16	50,086	801,376
Nursing	81	69,160	5,601,960
Optometry	20	110,510	2,210,200
Pharmacy	22	102,294	2,250,468
Physical Therapy	31	83,013	2,573,403
Physician Assistants	20	85,966	1,719,320
Veterinary Medicine	27	105,713	2,854,251
Total	271	100,020	27,105,550

Source: Western Interstate Commission for Higher Education (2008) and Nevada Department of Education, Training and Rehabilitation (2008).

Table 1 illustrates the impact of the WICHE professionals statewide. There are 271 currently working WICHE Professionals who received WICHE support during their training between 1998 and 2007. The average salary is $100,020. The total payroll is estimated by using the State of Nevada Department of Education, Training, and Rehabilitation wage survey for each profession. These professionals generate additional jobs and payroll through their impact on a wide range of other businesses totaling 410 jobs and $37,620,143 in annual payroll. By profession, dentistry has the most economic impact and nursing the second highest impact with the most jobs.

In 2008, WICHE professionals are employed in thirteen counties in Nevada. Table 2 illustrates the regional distribution with 80.1% of the professionals in the state's three urban counties and 19.9% in ten of fourteen rural counties. The rural 19.9% is greater than the rural distribution by licensure which traditionally is around ten percent. This proportion holds true for all WICHE professions except pharmacy, which is in urban areas only. In particular, almost half of the mental health WICHE professionals are in the rural and frontier counties.

Table 2: Regional Distribution by Profession – 2008

Profession	WICHE Workforce Distribution by Region in Nevada – 2008			
	Urban Counties		Rural & Frontier Counties	
	Number	Percent	Number	Percent
Dentistry	40	74.1	14	25.9
Mental Health	9	56.3	7	43.8
Nursing	65	80.2	16	19.8
Optometry	17	85.0	3	15.0
Pharmacy	22	100.0	0	0.0
Physician Assistants	16	80.0	4	20.0
Physical Therapy	25	80.6	6	19.4
Veterinary Medicine	23	85.2	4	14.8
Total	217	80.1	54	19.9

Source: Western Interstate Commission for Higher Education (2008).

The most important economic impact of the 217 WICHE professionals in the urban areas is in direct jobs, salaries, and wages of the professionals. However, their purchasing power ripples through the state's economy. These professionals earn wages and salaries above the norm for Nevadans – when these professionals purchase housing, food and clothing, cars and appliances, and services, they spur local and regional economic development in numerous ways. Finally, the taxes paid by direct and secondary employment in Nevada support schools, community colleges and universities, local police and fire departments, cultural and arts programs, and a wide range of public services and amenities, such as community centers, parks, and recreational facilities.

The following three tables illustrate the regional economic impact of the WICHE professionals by type of profession. Secondary economic benefits – the jobs and payroll generated in other business establishments – are measured by multipliers using an input-output model and IMPLAN data, a model that is widely used by economists and other academics in the United States. The Appendix to this report contains a description of IMPLAN and economic impact analysis methodology, including an explanation of multiplier effects, and the model and data used to derive multipliers used in this report. The remainder of the report provides an analysis of the employment and income impact of WICHE professionals in Nevada by region.

Table 3: Employment Impact of WICHE Professionals in Urban Counties of Nevada Who Received WICHE Support from 1998 to 2007

Profession	Employment Impact of WICHE Program – 2008 (Number of Jobs)			
	Direct	Employment Multiplier	Secondary	Total
Dentistry	40	1.67	27	67
Mental Health	9	1.65	6	15
Nursing	65	1.16	10	75
Optometry	17	1.65	11	28
Pharmacy	22	1.65	15	36
Physician Assistants	16	1.67	11	27
Physical Therapy	25	1.65	16	41
Veterinary Medicine	23	1.67	16	39
Urban – Total	217	–	111	328

Source: Western Interstate Commission for Higher Education (2008).

Table 3 provides the employment impact of WICHE professionals by profession in urban counties of the state. In 2008, 271 WICHE professionals are employed statewide in Nevada, of which 217 are employed in urban counties and 54 are employed in rural and frontier counties in Nevada. Applying IMPLAN employment multipliers by profession, an additional 139 jobs in other Nevada businesses through normal operating activities are generated during 2008. Table 3 also shows that 111 jobs are created in urban counties. Dentistry has the largest secondary impact of jobs, (27), with the remaining professions clustered around an impact between 10 to 16 jobs.

Table 4 shows the regional breakdown emphasizing rural and frontier counties in that 54 WICHE professionals created an additional 28 jobs. Dentistry has the largest secondary impact of jobs, (9), with the remaining professions clustered around an impact of between 2 to 5 jobs.

Table 4: Employment Impact of WICHE Professionals in Rural and Frontier Counties of Nevada Who Received WICHE Support Between 1998 and 2007

Profession	Employment Impact of WICHE Program – 2008 (Number of Jobs)			
	Direct	Employment Multiplier	Secondary	Total
Dentistry	14	1.67	9	23
Mental Health	7	1.65	5	12
Nursing	16	1.16	3	20
Optometry	3	1.65	2	5
Pharmacy	0	1.65	0	0
Physician Assistants	4	1.67	3	7
Physical Therapy	6	1.65	4	10
Veterinary Medicine	4	1.67	3	7
Rural & Frontier – Total	54	–	28	82

Source: Western Interstate Commission for Higher Education (2008) and Minnesota IMPLAN Group (2007). Note: Totals reflect rounding differences.

An interesting contrast between Table 3 and 4 concern the WICHE mental health professionals, who have the lowest economic impact in urban areas; however, these professionals have the second highest jobs impact in the rural and frontier counties.

Table 5 provides estimates of the income and payroll impact of WICHE professionals in Nevada. The payroll impact of the 410 WICHE professionals totals $37,620,143 in other Nevada businesses through normal operating activities. Beyond the direct payroll generated by the professionals, the 217 urban jobs generated an additional $8,465,983 and the 54 rural and frontier jobs generated an additional $2,048,610 in other Nevada businesses through normal operating activities.

Table 5: The Distribution of Payroll Generated by WICHE Professionals in Nevada – 2008

Profession	Payroll Impact of WICHE Program – 2008 (Dollars)			
	Direct	Payroll Multiplier	Secondary	Total
Dentistry	9,094,572	1.34	3,092,154	12,186,726
Mental Health	801,376	1.47	376,647	1,178,023
Nursing	5,601,960	1.39	2,184,764	7,786,724
Optometry	2,210,200	1.47	1,038,794	3,248,994
Pharmacy	2,250,468	1.47	1,057,720	3,308,188
Physical Therapy	2,573,403	1.47	1,209,499	3,782,902
Physician Assistants	1,719,320	1.34	584,569	2,303,889
Veterinary Medicine	2,854,251	1.34	970,445	3,824,696
Rural & Frontier – Subtotal	5,411,338	–	2,048,610	7,459,948
Urban – Subtotal	21,694,212	–	8,465,983	30,160,195
Nevada – Total	27,105,550	–	10,514,593	37,620,143

Source: Nevada Department of Employment, Training and Rehabilitation (2008), Western Interstate Commission for Higher Education (2008), and Minnesota IMPLAN Group (2007).

Interestingly, dentistry still generates the most economic impact; however, the larger numbers of nursing WICHE professionals generate the second largest economic impact in other Nevada businesses through normal operating activities. Almost one in four WICHE professionals is in nursing.

Conclusion

In conclusion, WICHE professionals provide important health care services, improve quality of life in a myriad of direct and indirect ways, and help Nevada attract and retain businesses and jobs. The payroll of the WICHE professionals in Nevada is relative high when compared to other jobs and are not easily outsourced. As a result, WICHE professionals play an important and key role in making Nevada an attractive a place to settle, locate a business, or retire. Economic planning and development agencies frequently seek high-tech, manufacturing, and service industries that will create new, well-paying jobs. Across the state, the WICHE programs and professionals provide a steady source of jobs and job growth, even during economic downturns, and should not be overlooked as an economic engine in its own right.

This report – *The Impact of the State of Nevada Western Interstate Commission for Higher Education (WICHE) on the Nevada Economy – 1998 to 2007* – was undertaken by Tabor Griswold and John Packham at the University of Nevada School of Medicine. Utilizing an economic impact model developed specifically for the health care industry, the report examines the direct economic contribution of WICHE professionals as well as the secondary effect of their activity. Utilizing data sources prepared by the federal government, input-output tables have been developed by Tom Harris and Betsy Fadali of the University of Nevada, Reno to examine and model the economic impact of employment and expenditures on a region's economy. The estimated impact of the WICHE professionals on jobs and income in other businesses utilize employment and income multipliers specifically derived for Nevada.

Appendix: Economic Impact Analysis Methodology

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 6 with examples from the hospital industry. The *direct multiplier effect* is based on an industry's initial economic impact on the region's economy. For example, if a hospital has annual expenditures of $5 million on goods and services to support hospital 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 hospital purchases of 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.

Table 6: Illustration of Economic Impact Multipliers

Type of Multiplier	Direct	Indirect	Induced
Output Multiplier	Hospital Expenditures	Hospital Supplier Expenditures	Local retail and service expenditures related to hospital spending
Employment Multiplier	Hospital jobs	Hospital supplier jobs	Local retail and service jobs related to hospital employee spending
Income Multiplier	Hospital employee income	Hospital supplier employee income	Local retail and service income related employee spending

The direct, indirect, and induced multiplier effects can be classified as output, employment and income multipliers. An output multiplier of 2.0 indicates that if one dollar is spent by the

hospital, 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 jobs are created in other sectors due to business and household spending. Likewise, an income multiplier of 2.0 indicates that for every dollar of income created in the health sector, an additional dollar of income 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. 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, the 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 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.

Five different sets of multipliers are estimated by IMPLAN, corresponding to five measures of regional economic activity: (1) total industry output, (2) personal income, (3) total income, (4) value added, and (5) employment. Three 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 hospital or the closing of a hospital. The focus business changes its purchases and inputs as a result of the direct impacts. This produces indirect impacts in other business sectors. 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. To measure the total impact, a Type II multiplier is used. The Type II 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). IMPLAN also estimates a modified Type II multiplier that also includes the direct, indirect, and induced effects. The Type III multiplier further modifies the induced effect to include spending patterns of households based on a breakdown of households by nine different income groups.

Additional information on the data, methodology, and software requirements of I/O modeling and IMPLAN analysis can be found in guides developed by Doeksen, et al. (1997), Alward, et al., (1989), and the Minnesota IMPLAN Group (MIG) (2000).

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