



## Estimate the Economic Impact of a Rural Primary Care Physician

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### Key Findings

- The total economic impact of a rural primary care physician is greater than the employment and labor income created from just the clinic.
- A rural primary care physician generates economic impacts at the local hospital from the inpatient admissions and outpatient referrals.
- A rural primary care physician practicing in a community with a local hospital creates an estimated 26.3 local jobs and nearly \$1.4 million in income (wages, salaries and benefits) from the clinic and the hospital.

### Background

A primary care provider in rural areas delivers needed medical services. Visits to a primary care service provider are a major part of our health care needs. An estimated 54.6 percent of all physician visits are made to primary care physicians, physician assistants (PA) or nurse practitioners (NP).<sup>1</sup> Availability of adequate primary care services is essential for a strong health care system, but these primary care visits also account for health expenditures in the form of revenues to the medical clinic. A large portion of the revenues create employment opportunities and wages, salaries and benefits for clinical staff, which in turn are returned

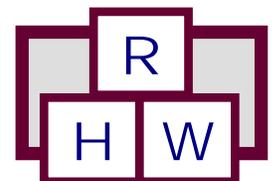
to the local economy as the clinic and employees spend locally. Furthermore, the total economic impact of a primary care service provider is greater than the impact at the clinic when the community has a local hospital. The physician (or PA/NP) contributes to the local hospital through inpatient admissions and outpatient referrals. Not only is the support vital for maintaining sufficient hospital utilization, but the revenue generated at the hospital creates even more jobs and income.

The employment opportunities and the resulting wages, salaries and benefits make the health care system an extremely important part of the local economy. Research from the National Center for Rural Health Works indicates that between 10 and 15 percent of the jobs in many rural communities are in the health care sector.<sup>2</sup> Hospitals often are the second largest employer in rural communities, trailing only local school systems.

Employee spending, along with clinic and hospital spending at local businesses, stimulates additional economic growth or secondary impacts in other parts of the economy. Much of this economic activity generates additional tax revenues that can be used by the local government to fund important community services.

Historically, a physician in an independently-owned clinic was the typical delivery method for rural

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primary care services. More recently, the independent practice model is moving toward a multi-physician practice or an employment model. Fewer primary care physician graduates are starting their own practices and many practicing physicians are opting for employment. The increase of hospital-owned clinics, rural health clinics, urgent care clinics and retail clinics has created new employment opportunities.

In 2014, the survey conducted of 13,575 physicians (approximately 80% of physicians in active care) by Merritt Hawkins (MH) for The Physicians Foundation found that just over 37 percent identified themselves as primary care physicians (family medicine, general internal medicine and pediatrics.), *Note: MH indicate that this percentage was slightly higher than the actual 33 percent of all physicians practicing in a primary care area.* Responses showed slightly more than 70 percent of the primary care physician respondents had no share of ownership in their practice.<sup>3</sup> Results from a 2012 survey by the American Medical Association showed that among physicians in single specialty practice, ownership of the practice by a hospital was most often reported by internal medicine (45.1 percent) and family practice physicians (37.0 percent).<sup>4</sup>

Researchers examined practice organization data provided by family physicians as part of their application for the American Board of Family Medicine's recertification. The data showed the percentage reporting solo practice decreased to 11 percent in 2013 from nearly constant 16 percent from 1998 to 2008.<sup>5</sup>

An examination of newly hired physicians suggests a future shift in the physician workforce. Merritt Hawkins found that in 2014 over 90 percent of newly hired physicians were choosing employment by a hospital, medical group, FQHC, academic medical center or joining other practice settings.

Less than 10 percent were establishing solo practices.<sup>6</sup>

### Purpose of the Study

The objective of this study is to estimate the economic contributions of a rural primary care physician to employment and labor income in the community and surrounding area including the local hospital. The estimates of direct and secondary impacts underestimate the total contribution as the impact is not included from sectors such as pharmacy and nursing homes. The study includes impacts from:

- clinic employment and wages, salaries and benefits (labor income), and
- local hospital employment and wages, salaries and benefits (labor income).

### Scope of Research

Estimates for this study were based on data from the Department of Health and Human Services, Centers for Medicare and Medicaid Services (CMS), U.S. Department of Labor, Bureau of Labor Statistics (BLS), IMPLAN and previous economic impact studies completed by the National Center for Rural Health Works. (Additional details on the model and IMPLAN data are given in the Appendix.) The clinic staffing mix per physician can vary slightly from a solo physician practice to a multi-physician practice but, interviews conducted with National Health Service Corps (NHSC) staff and employed physicians suggest that rural physician practices from all practice models have similar patient care and referral activities. Data from rural health clinics (RHCs) were collected to represent all types of rural primary care clinics. The CMS 2014 cost reports provided a large data set for 1,261 independent-based rural health clinics.

Hospitals must have support from local primary care service providers to maintain sufficient utilization and financial stability. In addition to

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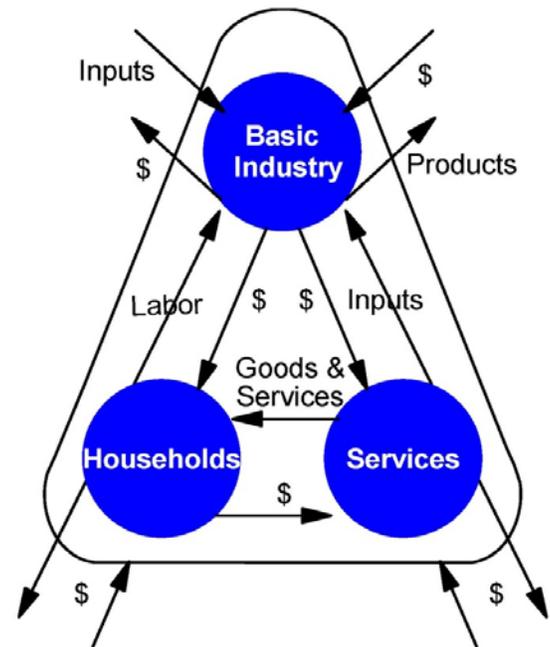
inpatient admissions, primary care physicians and PA/NPs generate significant outpatient activities that contribute to hospital revenues. Hospitals allocate a significant portion of their revenues to employee compensation costs. Therefore, it was assumed that the direct impacts to a hospital could be estimated by allocating hospital employment and compensation to the primary care providers practicing in the hospital medical service area. The economic impact measured in this study results from rural primary care providers that practice in a clinic and utilize the local hospital for services.

### Approach

The methodology will estimate the economic impact from the clinic and hospital per physician. Due to differences in regulations among states, the patient activity for PAs/NPs varies significantly. For this study, PAs/NPs were assumed as one-half of a primary care physician. The direct impacts include the employees and labor income at the clinic and the proportionate share of the hospital employees and their labor income. The secondary impacts are calculated with an input-output model and data from IMPLAN. **Figure 1** illustrates a community economic system. The primary care clinic generates jobs and labor income from its revenues. Additional jobs and labor income are created at the hospital through inpatient admissions and outpatient referrals. In turn, secondary impacts are created as the clinic and the hospital and the individuals working for the clinic/hospital purchase goods and services within the local economy.

**Figure 1** illustrates that a change in any one segment of a community's economy will cause reverberations throughout the entire economic system of the community. A multiplier from an input-output model can measure the effect created by an increase or decrease in economic activity. The multiplier not only measures the economic activity from the physician clinic and hospital employees

but also includes the economic activity from additional business spending and household spending.



Community Economic System  
Figure 1

The model calculates multipliers for employment (in terms of full- and part-time jobs) and labor income (in terms of wages, salaries and benefits.) The model generates multipliers that are medical service area-specific due to differences in locally-available goods and services across different states, counties, or zip codes.

### Direct Impacts of a Rural Primary Care Physician

#### *Estimating the Direct Impacts of the Clinic*

Data in **Table 1** present the direct impacts of the clinic in terms of employment and labor income. Average income for providers (physician, PAs and NPs) was determined from total compensation and full-time equivalent employment (FTE) from the cost reports. The total clinic employment impact including a physician was estimated to be five jobs.

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The clinic staff may include a part-time lab technician and some rural clinics might have additional labor income from physician supervision.

**Table 1**  
**Estimated Direct Impacts on Employment and Labor Income from a Primary Care Clinic, 2014**

	Employment	Labor Income
Physician	1	\$203,538
Nurse	1	\$54,013
Clinic Staff <sup>1</sup>	3	\$149,598
Staff Benefits	—	\$42,349
<b>Total</b>	<b>5</b>	<b>\$449,498</b>

<sup>1</sup>Office staff includes administrative, lab techs and physician supervision  
Source: n.p. 2014 Healthcare Cost Report Information System (HCRIS) Dataset, Centers for Medicare & Medicaid Services, Web. June, 2014; n.p. 2014 National Occupational Employment and Wage Estimates. U.S. Department of Labor, Bureau of Labor Statistics, Web. May 2014.

The CMS cost reports provide total compensation for nursing and office staff but do not include employment. Therefore, income estimates for nursing and office staff were obtained from the BLS 2014 Wage and Salary Estimates.

The national average income was \$68,095 for a registered nurse and \$39,930 for licensed practical and vocational nurses for an estimated total average income for nurses of \$54,013. Incomes could be slightly less in rural areas but rural specific data are unavailable. Total estimated direct labor income from the clinic was \$449,498.

### *Estimating the Direct Impacts at the Hospital*

The direct impacts that a rural primary care physician has at the hospital are reflected in **Table 2**. Hospitals are an integral part of the local health care sector. As previously mentioned, the community hospital is a major source of jobs and labor income in the local medical service area. Hospitals require inpatient admissions and outpatient referrals from physicians.

Hospital and physician data surveyed from 102 individual critical access hospitals in 19 states were integrated with compensation data from IMPLAN to determine employment and labor income. Hospital compensation was allocated equally to the number of physicians practicing in the medical service area. Data from this sample were then averaged to estimate the direct impacts of each physician to the local hospital. The estimated employment generated at the hospital is 14.5 employees per physician.

**Table 2**  
**2014 Employment and Labor Income at the Local Hospital Generated by a Rural Primary Care Physician**

Employment	14.5
Labor Income	\$716,793

Source: n.p. 2014 Healthcare Cost Report Information System (HCRIS) Dataset, Centers for Medicare & Medicaid Services, Web. June 2014.

The estimated average labor income per hospital employee was \$49,434, resulting in \$716,793 total labor income at the hospital from a rural primary care physician's patient referral activity. These data are based on a full-capacity clinic practice, providing the maximum impact on the local hospital.

It is important to note, that it may take new providers three to five years before the practice is at full capacity and can generate a full impact on the community. Actual impacts on the hospital may be affected by their available capacity.

### **Total Impacts of a Rural Primary Care Physician**

As stated earlier, the direct employment and labor income will further benefit the community by generating secondary jobs and labor income throughout the local economy. Data in **Table 3** present the total impacts per physician from the physician clinic and the hospital visits attributed to the primary care physician. For this analysis, the

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RHC employment and income multipliers available from Rural Health Works were averaged from 414 rural clinic counties in 17 states. The available hospital multipliers were averaged from 115 rural hospital counties in 16 states.

**Table 3**  
**2014 Total Employment and Labor Income Impact of a Rural Primary Care Physician at Physician Clinic and Hospital<sup>1</sup>**

	Employment	Multiplier	Total
Clinic	5.0	1.33	6.6
Hospital	<u>14.5</u>	1.36	<u>19.7</u>
<b>Total</b>	<b>19.5</b>		<b>26.3</b>
	Income	Multiplier	Total
Clinic	\$449,498	1.18	\$530,408
Hospital	<u>\$716,793</u>	1.20	<u>\$860,152</u>
<b>Total</b>	<b>\$1,166,291</b>		<b>\$1,390,560</b>

<sup>1</sup>Income includes wages, salaries and benefits.  
Source: IMPLAN database, IMPLAN (www.implan.com.)

The clinic employment multiplier of 1.33 estimates that if one job is created by the primary care clinic, then an additional 0.33 jobs are created in other businesses due to the clinic and employee spending. Using the employment and labor income data from **Tables 1 and 2**, an estimate of total labor income and employment created from the primary care clinic and hospital can be made. The total employment impact per physician from the clinic is 6.6 jobs. The same methodology used for the hospital yields 19.7 jobs for a total employment impact of 26.3 jobs. The direct labor income estimates result in total labor income impact of \$1,390,560.

### Summary

The importance of a local primary care provider and the medical contribution that he or she makes to the community are revealed through improvements in residents' health and higher quality of life indicators. However, the economic contribution is not typically quantified. This report documents the economic importance of a rural primary care physician. A rural primary care physician practicing in a community with a local hospital creates approximately 26.3 local jobs and nearly \$1.4 million in labor income (wages, salaries and benefits). The estimate is low as this study measures only the impacts from the clinic and hospital and does not include impacts from pharmacy, nursing home, etc. The impact is created through clinic employment, inpatient admissions, outpatient referrals and the multiplier effect of these activities. The rural primary care physician's economic contributions are important to a community.

### Template to Measure the Annual Economic Impact of a Rural Primary Care Physician

The research results provide a template to assist local leaders interested in estimating the economic impact of a rural primary care physician practice. Local data should be utilized to derive the most realistic estimates for the local community. If local data are unavailable, the national estimates from the previous tables can be used. All assumptions should be closely examined by local decision-makers to verify that they reflect local conditions.

The first step is to estimate the direct employment and labor income from the clinic and the hospital. After the direct impacts have been determined, the total impacts including secondary impacts can be estimated. Specific county or zip code multipliers are available through IMPLAN and can be

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generated and utilized to make the results community specific.

The State Offices of Rural Health, County/State Extension Offices, state hospital associations and other state agencies are possible resources for technical assistance with county-specific multipliers. If local data are unavailable, the national rural clinic multipliers provided are the average of 414 rural clinic counties located in 17 states. The hospital multipliers were averaged from 115 rural hospital counties in 16 states. All assumptions should be closely examined by local decision-makers to verify that they reflect local conditions.

### TEMPLATE

#### Estimating the Total Employment and Labor Income Impacts of a Rural Primary Care Practice

	Direct Employment	Multiplier	Total Impact
Clinic	_____	1.33	_____
Hospital	_____	1.36	_____
<b>Total</b>	_____		_____
	Direct Income	Multiplier	Total Impact
Clinic	\$ _____	1.18	\$ _____
Hospital	\$ _____	1.20	\$ _____
<b>Total</b>	\$ _____		\$ _____

### References

- <sup>1</sup>n.p. *National Ambulatory Medical Care Survey, 2012 Summary Tables*. U.S. Department of Health and Human Services, Centers for Disease Control and Prevention, National Center of Health Statistics. Web. July, 2016.
- <sup>2</sup>Doeksen G.A., Cordes S., Shaffer R., (1992). *Health care's contribution to rural economic development*. Unpublished manuscript. Rockville, MD: Office of Rural Health Policy, DHHS, and Health Resources and Services Administration.
- <sup>3</sup> The Physicians Foundation. (2014). *A survey of Americans physicians: practice plans and perspectives*. Charlotte, NC: n.p
- <sup>4</sup>Kane, C.K., Emmons, D.W. (2013). *New data on physician practice arrangements: private practice remains strong despite shifts toward hospital employment*. Chicago, IL: American Medical Association
- <sup>5</sup>Peterson, L.E., Baxley, E., Jaen, C. R., and Phillips, R.L., (2015). Fewer family physicians are in solo practices. *Journal of the American Board of Family Medicine*, Volume 28 no.1, 1402 – 1417. doi: 10.3122/jabfm.2015.01.140217.
- <sup>6</sup>Merritt Hawkins, (2014). *2014 review of physician and advanced practitioner recruiting incentives*. Irving, TX: AMN Healthcare Company.

### A Review of Input-Output Analysis

Input-output (I/O) (Miernyk, 1965) was designed to analyze the transactions among the industries in an economy. These models are largely based on the work of Wassily Leontief (1936). 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, etc. By simultaneously accounting for structural interaction between sectors and industries, I/O analysis gives expression to the general economic equilibrium system. The analysis utilizes assumptions based on linear and fixed coefficients and limited substitutions among inputs and outputs. The analysis also assumes that average and marginal I/O coefficients are equal.

Nonetheless, the framework has been widely accepted and used. I/O analysis is useful when carefully executed and interpreted in defining the structure of an area, the interdependencies among industries, and forecasting economic outcomes.

The I/O model coefficients describe the structural interdependence of an economy. From the coefficients, various predictive devices can be computed, which can be useful in analyzing economic changes in a state, an area or a county. Multipliers indicate the relationship between some observed change in the economy and the total change in economic activity created throughout the economy.

The basis of IMPLAN was developed by the U. S. Forest Service to construct input/output accounts and models. The complexity of this type of modeling had hindered practitioners from constructing models specific to a community requesting an analysis. The University of Minnesota utilized the U.S. Forest Service model to further develop the methodology and expand the data sources to form the model known as IMPLAN. The

founders of IMPLAN, Scott Lindall and Doug Olson, joined the University of Minnesota in 1984 and, as an outgrowth of their work with the University of Minnesota, entered into a technology transfer agreement with the University of Minnesota that allowed them to form Minnesota IMPLAN Group, Inc. (MIG).

Minnesota IMPLAN Group, Inc. was purchased by IMPLAN and relocated to:

IMPLAN  
16905 Northcross Drive Suite 120  
Huntersville, NC 28078

Support hours are 8 am – 7 pm Eastern Time and can be reached by email at [info@implan.com](mailto:info@implan.com) or by phone at 800-507-9426.

### IMPLAN Software and Data

At first, IMPLAN focused on database development and provided data that could be used in the Forest Service version of the software. In 1995, IMPLAN took on the task of writing a new version of the IMPLAN software from scratch that extended the previous Forest Service version by creating an entirely new modeling system – an extension of input-output accounts and resulting Social Accounting Matrices (SAM) multipliers. Version 2 of the new IMPLAN software became available in May of 1999. The latest development of the software is now available, IMPLAN Version 3 Software System, the new economic impact assessment software system.

With IMPLAN Version 3 software, the packaging of products has changed. Version 3 utilizes 2007 or later data. When data are ordered, the data cost plus shipping are the only costs. Version 3.0 software and the new IMPLAN appliance are included in the cost of the data. There are no additional fees to upgrade to IMPLAN Version 3.0. Data files are licensed to an individual user. Version 2 is no longer compatible with 2008 and later data sets.

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Version 3 allows the user to do much more detailed analyses. Users can continue to create detailed economic impact estimates. Version 3.0 takes the analysis further, providing a new method for estimating regional imports and exports is being implemented - a trade model. IMPLAN can construct a model for any state, region, area, county, or zip code area in the United States by using available national, state, county, and zip code level data. Impact analysis can be performed once a regional input/output model is constructed.

### IMPLAN Multipliers

Five different sets of multipliers are estimated by IMPLAN, corresponding to five measures of regional economic activity. These are: total industry output, personal income, total income, value added, and employment. 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 closing of a hospital. The focus business changes its purchases of 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 households. Subsequently, the households alter their consumption accordingly. 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 (or Type SAM) 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 divided by direct).

### IMPLAN References

Alward G, Sivertz E, Olson D, Wagnor J, Serf D, Lindall, S. 1989. "Micro IMPLAN Software Manual." Stillwater, MN, University of Minnesota Press.

Doeksen GA, Johnson T, 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.

Miernyk WH. 1965. "The Element of Input-Output Analysis." New York, NY; Random House.

Minnesota IMPLAN Group, Inc. 2010 "MIG Inc Version 3.0 User's Guide."