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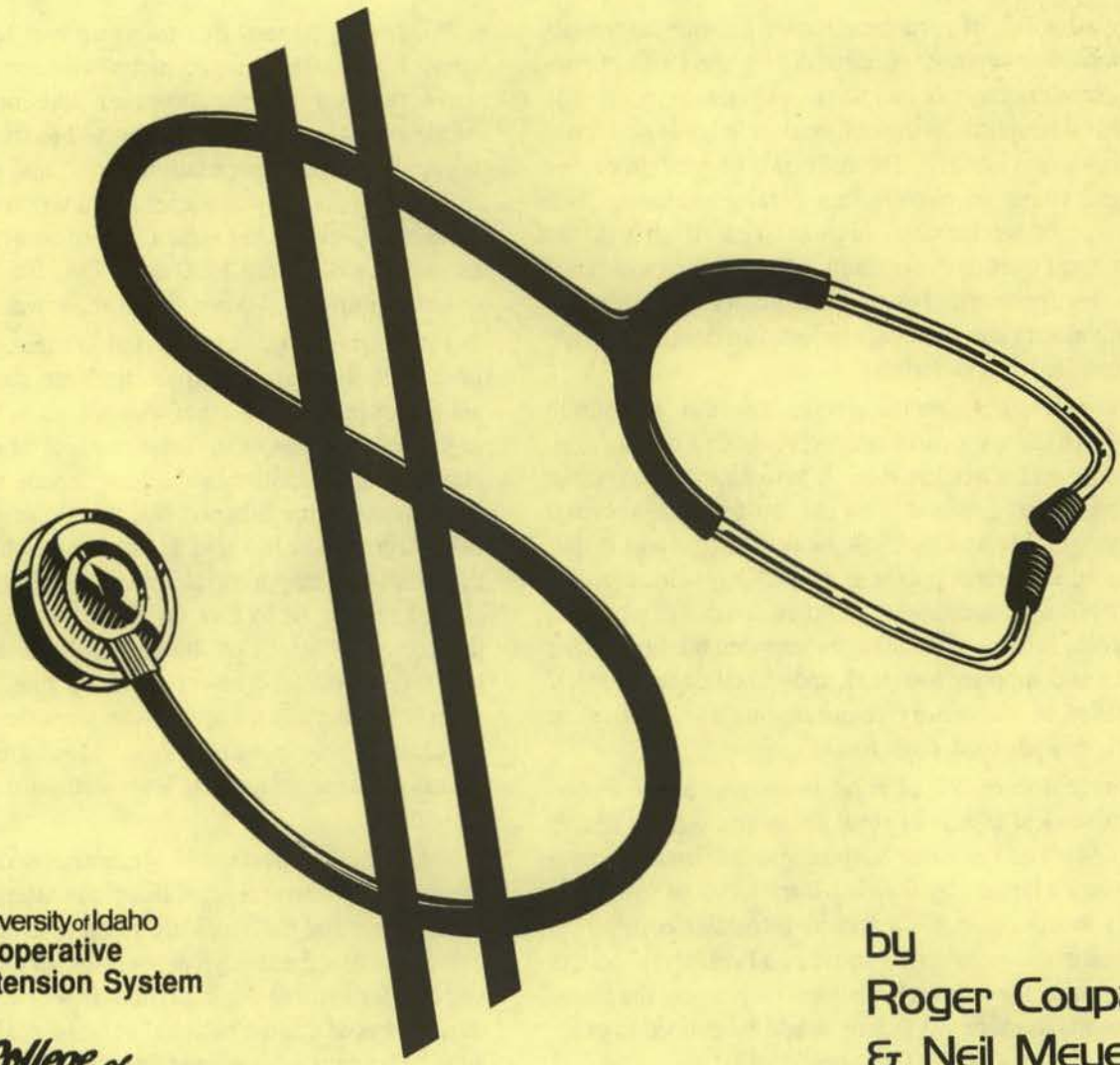
Economic Linkages of Rural Hospitals in the Pacific Northwest



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Cooperative
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Economic Linkages of Rural Hospitals in the Pacific Northwest

Roger Coupal and Neil Meyer

Purpose of study

This bulletin describes hospital resources throughout the Pacific Northwest. It also describes and quantifies the economic linkage between five rural hospitals and their counties' economies. The five hospitals are located throughout the Inland Northwest from western Montana to central Oregon: Dillon, Montana; Orofino, Idaho; Pomeroy, Washington; Enterprise, Oregon; and Burns, Oregon. All are rural counties with the hospital located in the largest community in the county. In all cases, the hospitals are the only source of hospital care in the county.

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Introduction

The availability of rural health care became an important national and regional concern during the 1980s. Community planners have begun to re-evaluate the economic role of rural hospitals in the community's goals and long-term economic viability. The hospital, very often one of the largest single employers in a rural community, is a vital source of moderate to high salaries. It also serves as an integral part of community efforts to provide economic vigor, primarily because the quality of health care and hospital services take part in location decisions made by entrepreneurs and retirees.

Unlike its neighboring businesses however, the public hospital has a complex mission, playing both a public, non-market role and a market role. It provides a marketable service that must contend with market forces associated with demographic and technological changes, and it also provides an important public good. As a result, decision making becomes much more complex. Under this public-private role, information linkages between the healthcare consumer and supplier (hospital, individual doctors, etc.), are impeded by regulatory requirements and conflicting and unclearly defined objectives.

The present dilemma of rural hospitals can be traced to both historical trends in rural areas and federal health policies. Most of the rural hospitals in the United States were financed largely by the Hill-Burton Act of 1946, between its inception in 1948 and its termination in 1973. Policy-makers were worried about rural residents' access to health care, they thought that by increasing the number of hospitals, more physicians would be enticed to practice in rural areas (U.S. Congress 1988).

For the most part, this program was temporarily successful, resulting in some increased accessibility to medical services. Medicine, however, like most other sectors of the economy, has been subjected to the forces of technological change, population shifts, and market concentration. Seventeen years after termination of the program, rural areas are coping with a severe contraction of hospital services. Between 1980 and 1988, 163 hospitals closed down nationwide, 70 percent of them were in rural areas.

The causes of this contraction are numerous, but rural hospitals, like rural communities, are confronted with a set of circumstances that do not exist in most urban metropolitan areas. The demographics of rural areas have changed dramatically in the past decade with a return to the pattern of the 50s and 60s when the general population migration trend was from rural to urban areas. Individuals that stay in rural areas are more likely to be low skilled, older, or to live on fixed incomes. As a result, the economic status of the patient base that rural hospitals face tend to be lower income. The combination of elderly residents and low-income residents means rural populations rely more heavily on Medicare/Medicaid programs and are generally less well insured than urban residents.

The higher proportion of Medicare/Medicaid recipients imposed a burden on rural hospitals after federal policy-makers changed the Medicare reimbursement system from a cost plus to a fixed-payment system. In the fixed-payment system, a payment for a particular set of hospital procedures is based upon a national average cost for that procedure. The cost is then weighted up or down depending

upon the severity of the particular case and adjusted downward for rural residents. This downward adjustment for rural area is the result of supposedly lower wages in rural areas. It did not consider the lost economies caused by lower use rates and higher per unit delivered costs.

A lower reimbursement rate and a higher proportion of Medicare/Medicaid recipients has caused cash flow shortages for many hospitals. (Because Medicare/Medicaid payments are generally lower than hospital costs, urban hospitals shift some of the cost burden to privately insured patients [Fort, Hallagan, and Rosenmann 1989].) These cash flow shortages impact not only the hospital's flexibility in terms of services, but also the availability of qualified staff.

Hospital resources in the Pacific Northwest

Describing hospital resources in a region can be a confusing task, and the results must be interpreted with caution. While most people think of hospitals as places for primary or secondary care for the general population, hospitals vary substantially in their purpose and function. Besides the general care hospitals, there are psychiatric hospitals, children's hospitals, specialty children's hospitals, and others. The Pacific Northwest (Washington, Oregon, Idaho, and Montana) had approximately 318 hospitals in 1987. More than 87 percent of them were general medical and surgical. This report deals with only general medical and surgical hospitals. Data were collected in 1989 and are based on 1987 conditions.

Other than describing the actual building that the hospital occupies, the most common way of measuring hospital resources is by counting the number of beds. Northwest hospital size based upon number of beds ranged in 1987 from 4 to 631, with an average of 3.31 beds per 1,000 population. Counties with less than 2,500 people had 3.92 beds per thousand while metropolitan or urban counties had 2.87 beds per thousand. Idaho had 2.34 beds per 1,000 population across the state and 2.91 beds in completely rural areas.[1]

Hospital occupancy rates in rural counties were substantially below the average for the Northwest. Average occupancy rates for the Northwest were 41.6 percent. Occupancy rates in rural counties were 17 percent in the Northwest and 13 percent in Idaho. Occupancy rates in small urban areas were 28 percent in the Northwest and 23 percent in Idaho.

Annual admissions ranged from less than 100 per hospital to more than 26,000 per hospital with an average of more than 3,700. On a county basis, average admissions per 1,000 population were 89.5. In rural areas, admissions per 1,000 of population (populations of less than 2,500) were 98 percent of the Northwest average. Idaho admissions per 1,000 of population for rural counties were 46 percent of the Northwest average.

Small urban areas across the Northwest (county populations of 2,500 to 20,000) had admissions per 1,000 population of 90.4 and of 58.0 in Idaho.

A method of comparing utilization across counties was developed for this report. First admissions to general medical and surgical hospitals per 1,000 county residents was estimated for all the counties in the Northwest. Each county estimate was then divided by its state's average to calculate a utilization index. An index greater than 1 indicates either that the resident population uses the hospital more often than the average for state residents or that the county's hospital(s) bring in nonresidents.

Seventy-four counties in the Northwest had utilization indexes greater than 1. Of those, 12 percent (9 counties) were rural counties. Almost half of the small urban counties had utilization indexes of 1 or more, implying that the hospitals were either covering their patient base or bringing in outsiders. Twenty-one counties had utilization indexes substantially greater than 1.

An additional caution related to hospital data is that while counties and communities tend to be the common decision-making units, hospital patient bases rarely follow county lines. Consequently the physical structure and utilization rates presented in this report should not be used to compare local viability for existing hospital resources (or lack thereof). Rather they should be used for a general idea of how a particular county stands relative to its neighbors. The reasons for the differences will generally be unique to the particular county and the management policies of the particular hospital. Management policies such as swing bed programs or walk-in ambulatory care will affect the number of beds without affecting the quality of care or possibly improving it.

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[1]County populations are categorized according to a "rural urban continuum code" developed by the USDA (Butler 1990). Unless otherwise noted, rural areas (2,500 population or less), small urban areas (2,500 to 19,999), and large urban areas (20,000 to 250,000) are not adjacent to metropolitan areas. In the Pacific Northwest there are five Standard Metropolitan Statistical Areas (SMSA's).

Community economics

Each hospital has a unique fit into the local economic landscape. However, some generalizations can be made. Although rural communities are often seen as isolated social centers, they are more often than not highly integrated in a regional economy. Small communities are never completely self-sufficient in all goods and services. Rather, they rely on a network of other communities for most of the residents' demand for goods and services.

Economic activity in a community occurs either to serve the local residents (the service sector) or to sell goods and services to individuals outside of the community (the export base). An exporting sector sends goods or services outside the community (or attracts nonresidents into the community to spend dollars) and brings in dollars in exchange. These dollars are distributed as business expenses, wages and salaries, and returns to ownership. Goods and services that cannot be purchased from within the community are purchased in other regions and are called economic leakage. The service sector uses the local demand for goods and services coming from both businesses and consumers to keep dollars circulating in the economy.

Examples of traditional export bases are the agriculture, forestry, mining, and tourism/travel industries. However, almost all the industries in a community have the potential for being export bases to some degree. A hospital can either provide services to local residents or serve as an export base if individuals from outside the county or region use it. (Regional medical centers, children's hospitals, psychiatric hospitals, military hospitals, and to a lesser extent, veterans hospitals are almost exclusively within the export base sectors of a community economy.)

Hospitals generally tend to be one of the single largest employers in the community, behind the local school system and other government agencies. Furthermore, they tend to pay higher wages than other sectors (travel and tourism, for instance). Consequently their dollar impact on local economies can be significant.

Hospitals also tend to be responsible for a large amount of economic leakage. Most of the supplies and specialized services a hospital needs are generally unavailable in small communities. The overall effect is a firm whose local input purchases tends to be lower than those of many other firms but which compensates with higher levels of employees' household-related purchases.

Five case studies of rural hospitals

Methods

The five hospitals in this report are described first in terms of how they compare with other sectors of the county economy as an employer, their ability to generate income, and their ability to generate economic wealth. The hospitals are then described in terms of economic leakage and their backward linkages to the surrounding county.[2]

Backward linkages can be explained in terms of their indirect or inter-industry linkage and their induced or household linkage. An inter-industry linkage occurs when the hospital purchases a good or service from other sectors of the economy. Those purchases can be divided into local purchases and purchases from outside the county. The latter leakage is called economic leakage. To supply a hospital, local firms purchase other inputs locally. This incremental increase plus the direct purchase by the hospital equals the inter-industry linkage.

An induced or household linkage occurs when employees of the hospital and the proportion of employees associated with firms doing business with the hospital purchase goods and services in the community.

Income multipliers, defined as the total dollars of community income generated for each dollar of hospital revenue, ranged in past studies from 1.09 to 1.63 (Christianson and Faulkner 1981). Since hospitals purchase goods and services from all over the state and region, estimated state-level multipliers have been predictably higher than county multipliers, ranging around 2.0 (Tacke and Merke 1988). An Oklahoma study estimated impacts from an employment multiplier of 3.25 (Doeksen and Loewen 1989). (Every hospital employee generated another 2.25 employees in the community in general.) Economic leakage, while not detailed in this report, is still an important number because of the potential for community development programs that address this problem.

The hospitals

This report highlights five hospitals and counties in the rural Pacific Northwest (Fig. 1 and Table 1). Four counties have relatively low hospital occupancy rates compared with the Northwest average (Table 2). Four of the hospitals have the same problem: low occupancy rates coupled with a large neighboring hospital. Wallowa County Hos-

Table 1. Community hospitals studied and their respective locations.

Hospital name	Location	County population 1987
Barrett Memorial	Dillon, Montana	8,500
Clearwater Valley	Orofino, Idaho	10,400
Garfield County	Pomeroy, Washington	2,500
Harney County	Burns, Oregon	7,600
Wallowa Memorial	Enterprise, Oregon	7,500

[2]The economic base analysis methodology used is IMPLAN, an input-output economic model developed by the U.S. Forest Service at Fort Collins, Colorado (USDA 1989).

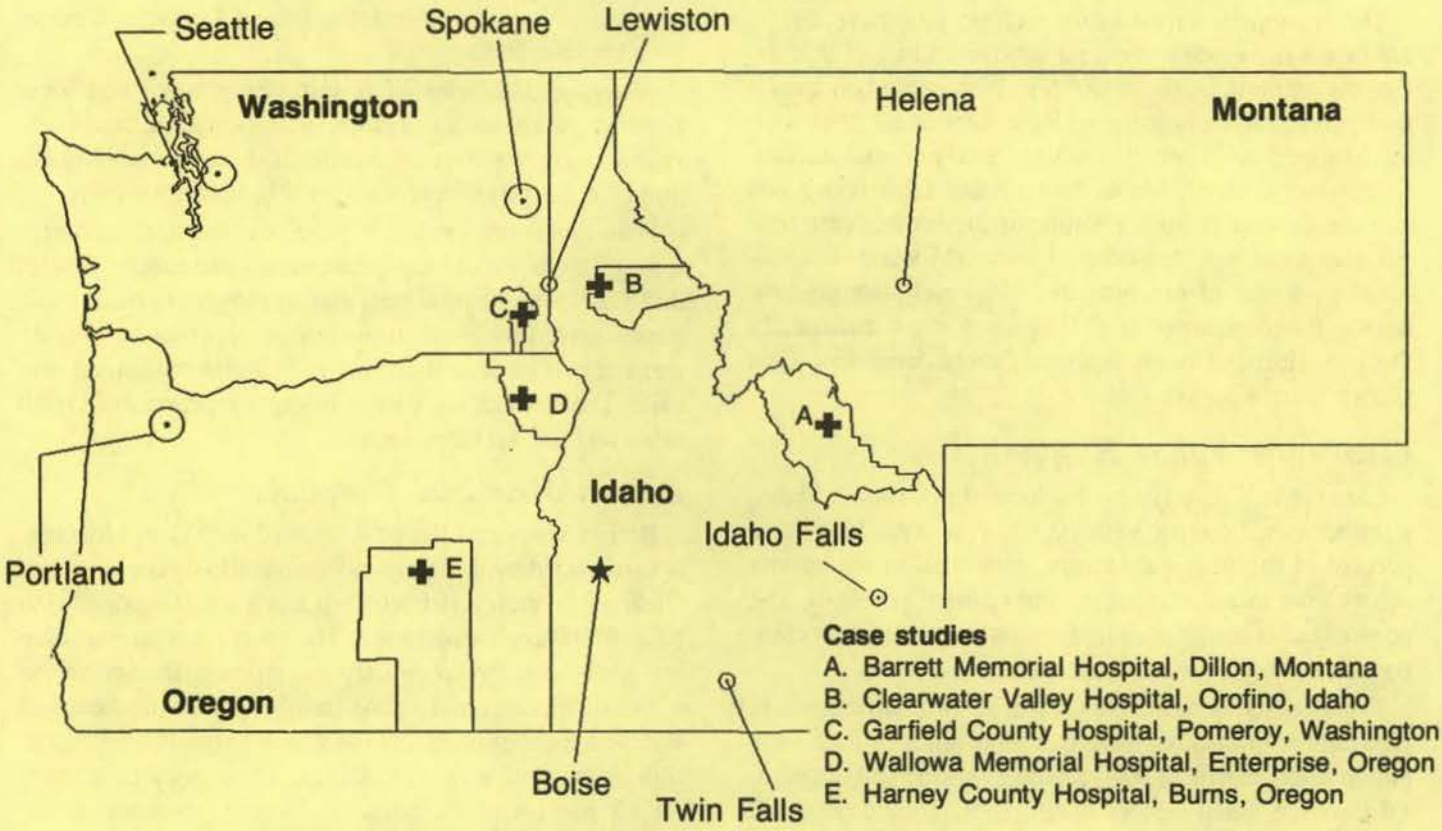


Fig. 1. Case study of hospital locations in the Pacific Northwest.

Table 2. Hospital and competitor hospital size and usage, 1987.

Hospital	Beds	Occupancy	Competitor hospital distance		
			Miles	Beds	Occupancy
		(%)			(%)
Barrett Memorial	31	32.3	72	184	75.0
Clearwater Valley	26	38.0	45	139	62.9
Garfield County*	14	—	51	136	46.6
Harney County	44	18.2	90	164	65.2
Wallowa County	76	52.6	60	84	42.7

*This hospital has no real primary care even though the community has two physicians. It does, however, have a thriving nursing home.

pital, the exception, is considering whether to expand services. These statistics indicate a common problem in rural areas: oversupply or migration of demand for hospital services.

However, the statistics oversimplify the problems and opportunities facing these hospitals. Clearwater County, Harney County, and Barrett Memorial hospitals are located on roads that can be treacherous during the winter or are very isolated. None of the communities are bedroom communities that feed solely off the economic activity of larger cities.

Table 3. Basic- and service-sector contributions to personal income, 1987.

Sector	Clearwater County, Idaho	Beaverhead County, Montana	Harney County, Oregon	Wallowa County, Oregon	Garfield County, Washington
Per capital personal income	$8,212	$9,104	$9,061	$9,225	$15,477
	Percentage of total personal income				
Farm	3.1	14.9	17.8	17.4	52.4
Agricultural services, forestry, fisheries	1.6	0.7	1.2	0.6	0.6
Mining	0.0	1.8	3.8	0.3	0.0
Construction	3.8	11.3	7.2	4.3	2.4
Manufacturing	41.9	2.6	17.5	15.0	0.0
Transportation and public utilities	5.8	11.4	7.3	8.5	1.9
Wholesale	1.4	5.5	2.9	3.2	10.2
Retail	7.4	11.2	10.1	12.2	5.3
Finance, insurance, and real estate	1.2	2.3	1.6	2.3	2.1
Services	7.0	12.8	10.5	10.6	5.2
Federal government	12.4	8.7	10.7	7.9	9.2
State and local government	14.3	16.6	16.9	17.8	10.4

Source: U.S. Department of Commerce, Bureau of Economic Analysis, 1987. Regional Economic Information Tape, Washington, D.C.

The economies surrounding each hospital have different mixes of basic sectors and service sectors (Table 3). On one extreme Garfield County, Washington, is heavily dependent upon farming with the farm sector contributing 52.4 percent of county residents' total personal income. Clearwater County, Idaho, had a small farm sector and is more dependent upon manufacturing, in this case timber manufacturing. Beaverhead County, Montana, is dominated by a mix of ranching and local and state governments. Its community of Dillon has a small college. In Oregon, Harney County is slightly more dependent upon timber than Wallowa County.

Clearwater Valley Hospital

Clearwater Valley Hospital is located in Orofino, Idaho, a timber-based county with 10,400 residents. Forty-two percent of the personal income generated in the county comes from manufacturing (timber milling) (Table 4). The economy also has large federal and state government components.

The hospital sector ranks 12th in its contribution to Clearwater County value added, and ninth in its contribution to employment. Government, retail, and the natural resource-based sectors rank higher. The hospital and doctors/dentists sectors combined rank eighth in value added.

As dollars enter the Clearwater County Hospital in the form of revenues from patients, insurance, and government payments, they are distributed to staff and spent on purchases. From each dollar of revenue, 47.2 cents go to wages and salaries, 8.05 cents go to profits and professional fees, and 6.8 cents go to local purchases. More than 48 cents of each revenue dollar leave Clearwater County as economic leakage.

Wages and salaries of hospital employees and local hospital purchases of utilities, transportation, and business services generate 28.3 cents of economic activity beyond the $1.00 of revenue (see Fig. 2 on page 9).

Households account for 75 percent of the total economic linkages to the surrounding community and county. Wages and salaries of hospital staff and employees of other businesses linked by hospital purchases generate another 21 cents of economic activity per each dollar of hospital revenue. The distribution of these linkages is primarily in retail sales and the services sectors.

Barrett Memorial Hospital

Barrett Memorial Hospital, located in Dillon, Montana, is surrounded by a slightly more diversified economy than Clearwater Valley Hospital but has a smaller population base: 8,500 county residents. The county's economic base includes range fed cattle, hay and pasture, transportation with rail services and motor freight, public utilities, and state and local government (of which a significant proportion consists of a small college). These sectors account for 43 percent of the personal income generated in the county. Government is the largest sector (Table 5). The next largest include retail/service, range fed cattle, hay and pasture, and mining. The hospital ranks 19th in its generation of economic wealth (value added), and fifth in employment.

Out of every dollar of hospital revenue, 49 cents are distributed as wages, salaries, and professional fees or retained as profits. Fifty-one cents are used for hospital pur-

Table 4. Clearwater County, Idaho, dominant economic sectors.

Sector	Value-added	% of total	Rank	Employment	% of total	Rank	Employee compensation	% of total	Rank
	($ million)			(persons)			($ million)		
Logging contractors	0.303	22.7	1	553	15.6	2	13.472	23.0	2
Government industry	16.088	18.0	2	1,022	28.8	1	16.088	27.4	1
Federal electric utilities	9.013	10.1	3	104	2.9	7	4.073	6.9	4
Veneer and plywood	8.225	9.2	4	361	10.2	3	6.238	10.6	3
Owner-occupied dwellings	7.337	8.2	5	0	0.0	91	0.000	0.0	90
General retail trade	4.787	5.3	6	288	8.1	4	3.070	5.2	5
Eating and drinking	3.043	3.4	7	206	5.8	5	2.170	3.7	6
Sawmills	2.127	2.4	8	111	3.1	6	1.667	2.8	7
All other manufacturing industries	1.444	1.6	9	0	0.0	92	-0.003	0.0	92
U.S. Postal Service	1.245	1.4	10	53	1.5	8	1.543	2.6	8
Doctors/dentists	1.204	1.3	11	47	1.3	9	0.838	1.4	11
Hospital	**1.110**	**1.2**	**12**	**44**	**1.2**	**11**	**0.948**	**1.6**	**9**
Banking	1.049	1.2	13	39	1.1	14	0.690	1.2	12
Facility maintenance	0.934	1.0	14	22	0.6	19	0.851	1.5	10
Auto repair and service	0.741	0.8	15	19	0.5	21	0.457	0.8	13
Food grains	0.676	0.8	16	45	1.3	10	0.095	0.2	41
Equipment repair	0.621	0.7	17	8	0.2	42	0.193	0.3	23
Motor freight transportation	0.618	0.7	18	33	0.9	16	0.434	0.7	14
Hay and pasture	0.562	0.6	19	15	0.4	26	0.054	0.1	49
Real estate	0.513	0.6	20	11	0.3	34	0.033	0.1	56
Other	7.915			559			5.767		
Total	89.554			3,545			58,678		

Table 5. Beaverhead County, Montana, dominant economic sectors.

Sector	Value-added	% of total	Rank	Employment	% of total	Rank	Employee compensation	% of total	Rank
	($ million)			(persons)			($ million)		
Government industry	13.1065	19.0	1	630	22.6	1	13.1065	31.29	1
Owner-occupied dwellings	6.1711	8.9	2	0	0.0	95	0	0.00	94
Retail trade	5.6325	8.1	3	275	9.9	2	3.6116	8.62	2
Hay and pasture	4.3663	6.3	4	92	3.3	7	0.4206	1.00	20
Range fed cattle	3.9142	5.7	5	255	9.2	3	2.0949	5.00	3
Talc and borate mining	3.1836	4.6	6	59	2.1	11	1.9117	4.56	4
Eating and drinking	2.2072	3.2	7	201	7.2	4	1.5740	3.76	5
Real estate	2.1482	3.1	8	15	0.5	28	0.1362	0.33	34
Sawmills	1.7234	2.5	9	68	2.4	10	1.3507	3.22	7
Banking	1.6998	2.5	10	43	1.6	13	1.1186	2.66	8
Railroad services	1.6677	2.4	11	33	1.2	15	1.3748	3.28	6
Ground minerals	1.5445	2.2	12	59	2.1	12	1.1126	2.66	9
Construction, mineral extraction	1.4961	2.2	13	31	1.1	16	0.9421	2.25	13
All other manufacturing industries	1.4057	2.0	14	0	0.0	97	-0.0026	-0.01	97
Motor freight transportation	1.1276	1.6	15	27	1.0	18	0.7912	1.89	15
Construction — Farm structure	1.0989	1.6	16	28	1.0	17	1.0003	2.39	10
Nursing and protective services	1.0964	1.6	17	73	2.6	9	0.9664	2.31	11
Telephone and telegraph	1.0471	1.5	18	13	0.5	33	0.5009	1.20	19
Hospital	**1.0225**	**1.5**	**19**	**195**	**7.0**	**5**	**0.8580**	**2.05**	**14**
Food grains	0.7999	1.2	20	40	1.5	14	0.1124	0.27	44
Other	12.4456	18.1	—	646	23.2	—	8.9097	21.27	—
Total	68.9048			2,788			41.8906		

chases. The hospital spends 9.4 cents on hospital purchases within the county. The remainder leaves the county as economic leakage.

The 58.4 cents of revenues retained within the county generate another 11 cents in economic activity in the county from inter-industry linkages (Fig. 3). Household linkages generate 18 cents of additional economic activity. Retail trade and the service sectors account for more than 80 percent of the hospital's total inter-industry and household linkages to the surrounding county.

Harney County Hospital

Harney County Hospital, located in Burns, Oregon, is in a county economy dominated by timber and ranching and with a population of 7,600. Burns, once noted as having the largest lumber mill in the Northwest, has seen employment at the mill decline steadily since the mid-1970s. The mill has been suffering from out-of-date technology and increasing transportation costs as nearby old-growth timber is logged out. However, a viable value-added wood products sector is hiring and retraining people.

Livestock, timber, and government account for more than 60 percent of personal income in the county (Table 3).

The hospital ranks ninth in its contribution to value added and 10th in its contribution to employment. Government, the timber-based sectors, livestock, retail trade, and real estate rank higher than the hospital (Table 6).

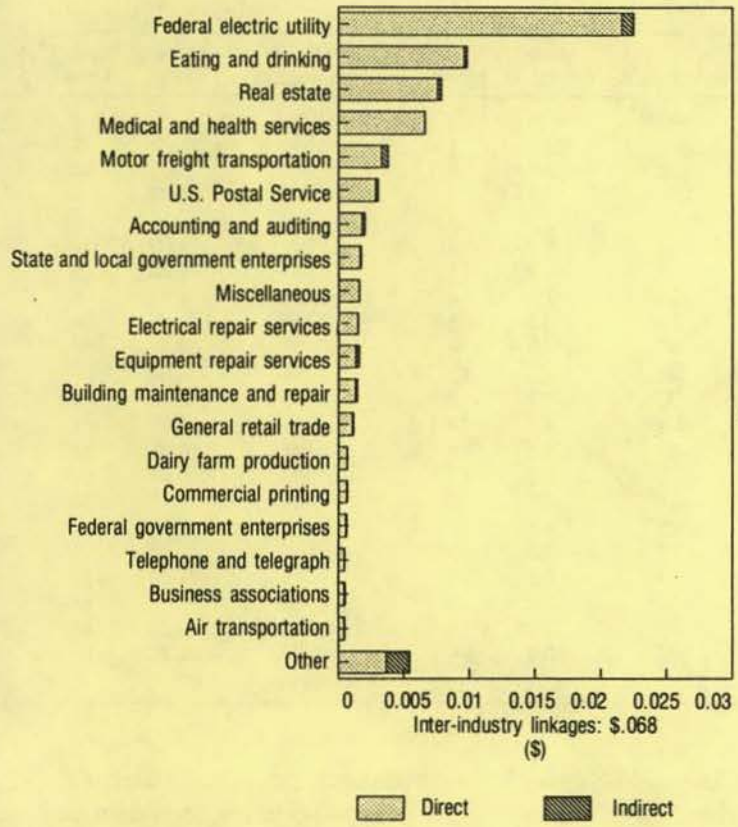
The distribution of hospital revenues is split fairly evenly between wages and salaries and goods and services. Wages and salaries take 47.2 cents of each dollar of revenue. Another 8 cents go to profits and professional fees. This leaves 44.8 cents for hospital purchases. Local purchases amount to 4.2 cents. The rest, 40.6 cents, is economic leakage.

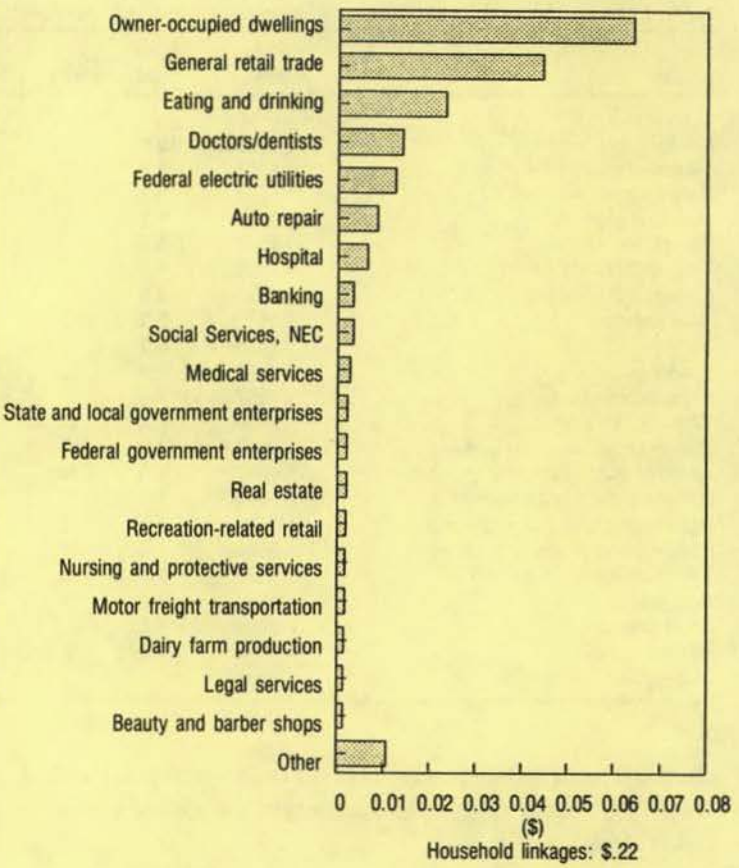
Of the dollars that stay in the community, 6.8 cents are generated through inter-industry linkages. Local hospital purchases link it to real estate, telephone and telegraph, medical services, laundry, and transportation, among others (Fig. 4 on page 10). Households represent over three-fourths of total hospital linkages. As expected, retail trade and consumer services dominate the distribution of the linkage. Among household leakages, the hospital and doctors and dentists rank fourth and fifth, respectively.

Wallowa Memorial Hospital

Wallowa County Hospital, located in Enterprise, Oregon, is surrounded by a county economy diversified with tourism, livestock, lumber, and tourism-related government employment. The county's population base is 7,500. Together, these sectors account for more than 60 percent of the total personal income of the county (Table 3). Though not far from larger communities with regional medical centers (Enterprise is 72 miles from Lewiston, Idaho, and a regional medical center), poor or hazardous road conditions limit the feasibility of residents using other hospitals. The hospital's occupancy rate, highest of the five hospitals studied, reflects this.

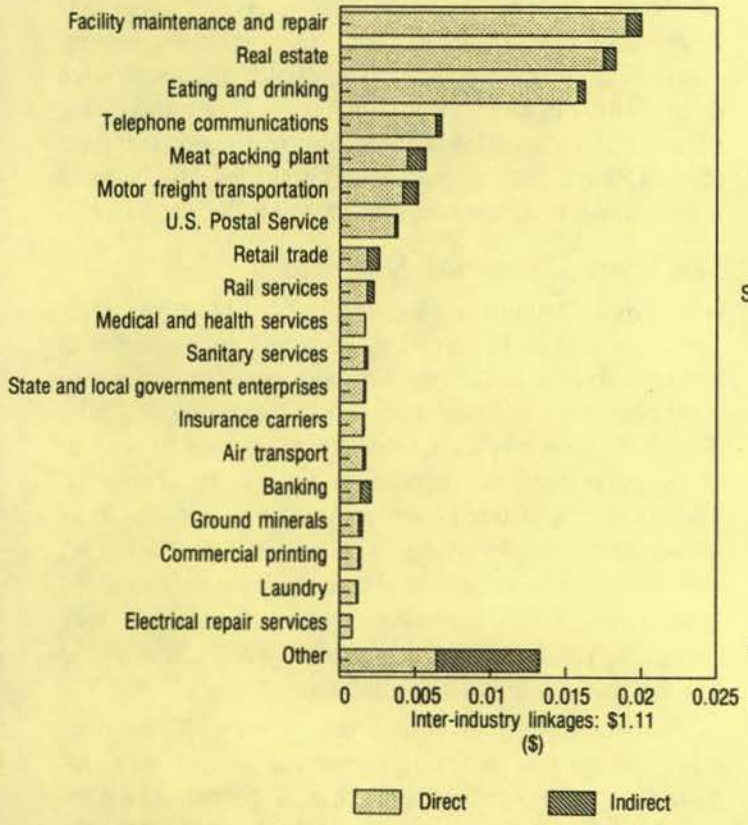
Wallowa County is dominated by natural resource-related economic activity. Government- and tourism-related sectors contribute more than 20 percent of the total value added in the county (Table 7). The hospital ranks 10th in its contribution to value added and ninth in its contribution to employment.

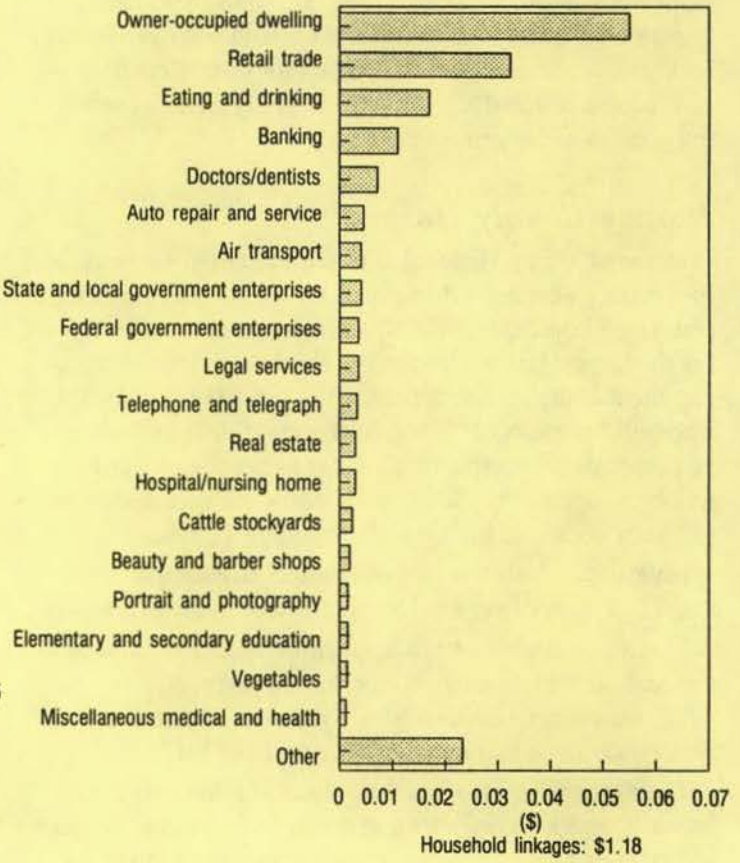




Source: USDA 1989.

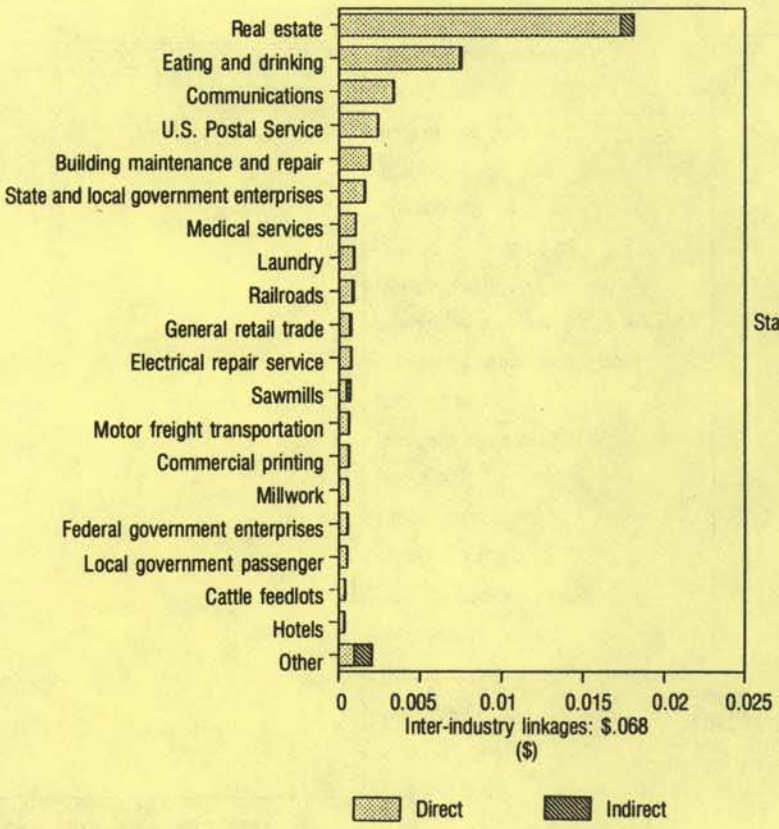
Fig. 2. Clearwater Valley Hospital economic linkages.

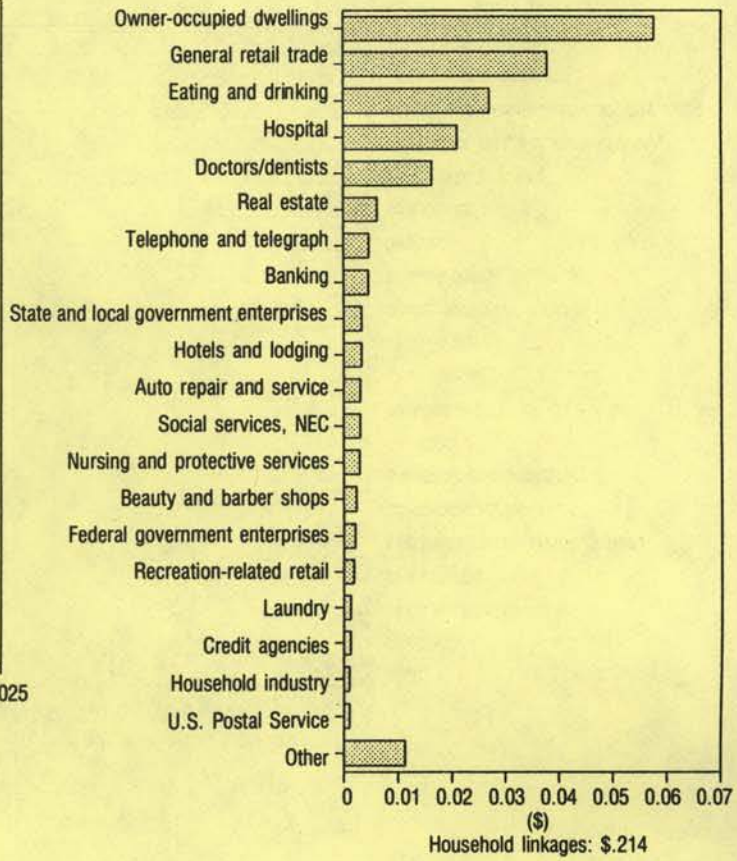




Source: USDA 1989.

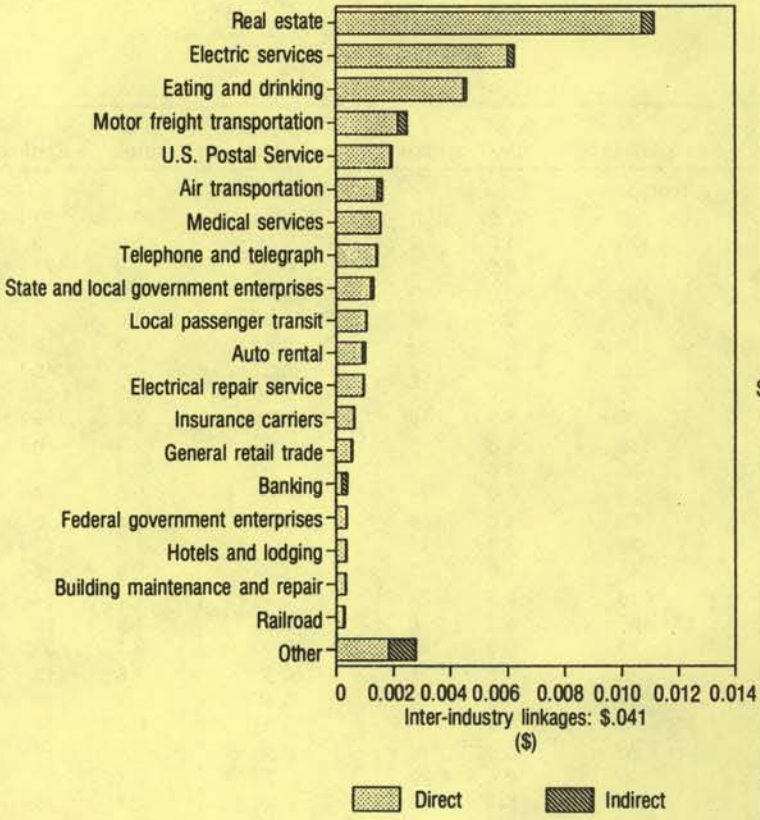
Fig. 3. Barrett Memorial Hospital economic linkages.

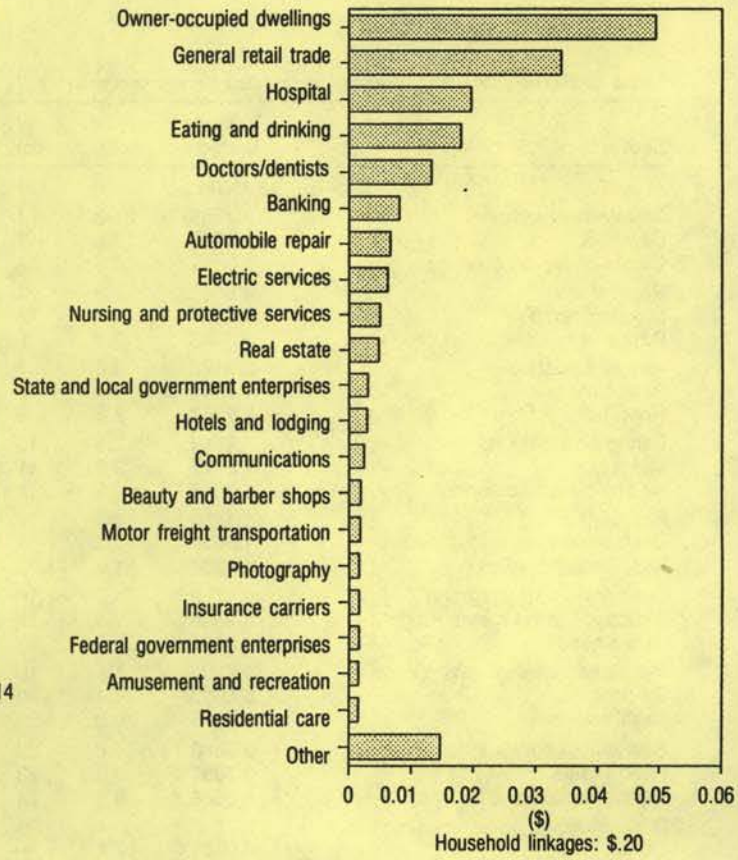




Source: USDA 1989.

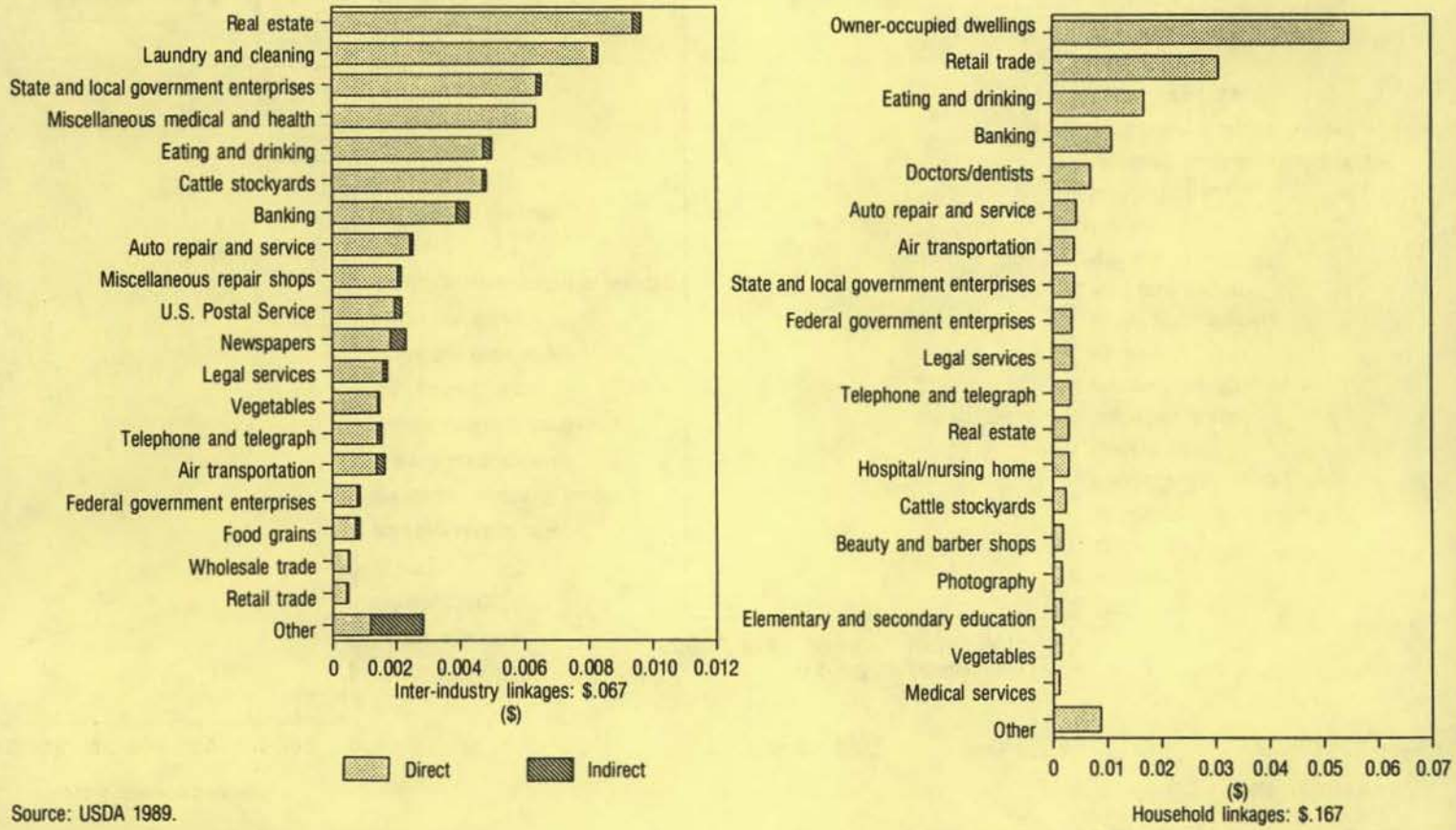
Fig. 4. Harney County Hospital economic linkages.





Source: USDA 1989.

Fig. 5. Wallowa Memorial Hospital economic linkages.



Source: USDA 1989.

Fig. 6. Garfield County Hospital economic linkages.

Table 6. Harney County, Oregon, dominant economic sectors.

Sector	Value-added	% of total	Rank	Employment	% of total	Rank	Employee compensation	% of total	Rank
	($ million)			(persons)			($ million)		
Government industry	13.7565	21.3	1	785	27.9	1	13.75	32.6	1
Sawmills	11.4885	17.8	2	329	11.7	2	9.00	21.3	2
Owner-occupied dwellings	5.3812	8.3	3	0	0.0	72	0.00	0.0	72
Retail trade	4.6343	7.2	4	281	10.0	3	2.97	7.0	3
Logging camps	2.9548	4.6	5	21	0.7	19	1.96	4.6	4
Range-fed cattle	2.3647	3.7	6	196	6.9	4	1.26	3.0	5
Hay and pasture	2.3172	3.6	7	62	2.2	9	0.22	0.5	19
Real estate	1.9628	3.0	8	25	0.9	17	0.15	0.3	29
Hospital	**1.5057**	**2.3**	**9**	**60**	**2.1**	**10**	**0.96**	**2.3**	**9**
Eating and drinking	1.3516	2.1	10	159	5.6	5	0.97	2.3	8
Millwork	1.2973	2.0	11	85	3.0	8	1.00	2.4	7
All other manufacturing industries	1.2662	2.0	12	0	0.0	74	0.00	0.0	74
Railroads	1.1450	1.8	13	29	1.0	14	0.94	2.2	10
Doctors/dentists	1.0659	1.7	14	35	1.3	13	0.74	1.8	12
U.S. Postal Service	1.0007	1.6	15	43	1.5	11	1.22	2.9	6
Telephone and telegraph	0.9758	1.5	16	16	0.6	23	0.46	1.1	14
Structural wood members	0.9696	1.5	17	150	5.3	6	0.75	1.8	11
Grass seed	0.8491	1.3	18	15	0.5	26	0.05	0.1	50
Industrial building construction	0.7293	1.1	19	18	0.6	21	0.66	1.6	13
Banking	0.6997	1.1	20	27	1.0	15	0.46	1.1	15
Legal services	0.6037	0.9	21	13	0.5	30	0.34	0.8	16
Residential construction	0.3980	0.6	22	26	0.9	16	0.33	0.8	17
Feed grains	0.3057	0.5	23	19	0.7	20	0.04	0.1	53
Paving mixtures	0.2985	0.5	24	7	0.3	38	0.16	0.4	25
State and local government enterprises	0.2866	0.4	25	16	0.6	24	0.16	0.4	24
Other	4.9082	7.6	—	397	14.1	—	3.58	8.5	—
Total	64.5200			2,815			42.18		

Table 7. Wallowa County, Oregon, dominant economic sectors.

Sector	Value-added	% of total	Rank	Employment	% of total	Rank	Employee compensation	% of total	Rank
	($ million)			(persons)			($ million)		
Government industry	11.677	18.0	1	700	22.9	1	11.677	36.1	1
Owner-occupied dwellings	6.421	9.9	2	0	0.0	87	0.000	0.0	86
Recreation-related retail	4.891	7.6	3	484	15.8	2	0.082	0.3	43
General retail trade	4.620	7.1	4	253	8.3	3	2.962	9.2	3
Logging contractors	4.194	6.5	5	170	5.6	4	2.025	6.3	4
Sawmills	3.933	6.1	6	134	4.4	5	2.979	9.2	2
Electrical services	2.891	4.5	7	28	0.9	18	0.762	2.4	9
Vegetables	2.780	4.3	8	113	3.7	7	0.581	1.8	10
Hay and pasture	2.417	3.7	9	65	2.1	12	0.233	0.7	22
Hospital	**1.497**	**2.3**	**10**	**89**	**2.9**	**9**	**0.849**	**2.6**	**6**
Range-fed cattle	1.453	2.2	11	120	3.9	6	0.777	2.4	8
Food grains	1.301	2.0	12	84	2.7	10	0.183	0.6	27
All other manufacturing industries	1.274	2.0	13	0	0.0	88	−0.002	0.0	88
Real estate	1.229	1.9	14	15	0.5	28	0.078	0.2	45
Banking	1.193	1.8	15	41	1.3	15	0.785	2.4	7
Grass seed	0.886	1.4	16	16	0.5	26	0.053	0.2	53
Doctors/dentists	0.815	1.3	17	23	0.8	21	0.567	1.8	12
Eating and drinking	0.805	1.2	18	95	3.1	8	0.574	1.8	11
U.S. Postal Service	0.688	1.1	19	30	1.0	16	0.852	2.6	5
Motor freight transportation	0.531	0.8	20	28	0.9	17	0.373	1.2	13
Miscellaneous crops	0.441	0.7	21	13	0.4	31	0.062	0.2	50
Nursing care	0.434	0.7	22	49	1.6	13	0.307	1.0	15
Auto repair	0.423	0.7	23	10	0.3	34	0.261	0.8	19
Residential construction	0.417	0.6	24	27	0.9	19	0.345	1.1	14
Telephone and telegraph	0.387	0.6	25	6	0.2	44	0.185	0.6	26
Hotels and lodging	0.375	0.6	26	42	1.4	14	0.252	0.8	21
Other	6.752	10.4	—	423	13.8	—	4.509	14.0	—
Total	64.725			3,056			32.310		

Table 8. Garfield County, Washington, dominant economic sectors.

Sector	Value-added	% of total	Rank	Employment	% of total	Rank	Employee compensation	% of total	Rank
	($ million)			(persons)			($ million)		
Food grains	8.511	38.3	1	571	40.8	1	1.967	11.7	2
Government industry	4.402	19.8	2	280	20.0	2	4.402	43.1	1
Owner-occupied dwellings	1.507	6.8	3	0	0.0	55	0.000	0.0	56
General retail trade	0.854	3.8	4	55	3.9	5	0.548	5.4	5
Hospital/nursing	**0.821**	**3.7**	**5**	**80**	**5.7**	**4**	**0.694**	**6.8**	**3**
All other manufacturing industries	0.685	3.1	6	0	0.0	57	−0.001	0.0	57
Real estate	0.459	2.1	7	4	0.3	30	0.029	0.3	32
Hay and pasture	0.450	2.0	8	13	0.9	11	0.043	0.4	25
U.S. Postal Service	0.448	2.0	9	15	1.1	8	0.555	5.4	4
Farm sector construction	0.409	1.8	10	14	1.0	9	0.373	3.7	6
Banking	0.362	1.6	11	13	0.9	10	0.238	2.3	7
Miscellaneous repair shops	0.355	1.6	12	8	0.5	14	0.134	1.3	12
General wholesale trade	0.280	1.3	13	159	11.3	3	0.173	1.7	9
Eating and drinking	0.253	1.1	14	46	3.2	6	0.181	1.8	8
Newspapers	0.205	0.9	15	8	0.5	16	0.162	1.6	10
Cattle feedlots	0.185	0.8	16	16	1.1	7	0.099	1.0	14
Commercial construction	0.174	0.8	17	5	0.4	20	0.159	1.6	11
Vegetables	0.166	0.7	18	7	0.5	18	0.035	0.3	28
Telephone and telegraph	0.157	0.7	19	4	0.3	29	0.075	0.7	18
Doctors/dentists	0.156	0.7	20	4	0.3	25	0.109	1.1	13
Other	1.407	6.3	—	102	7.2	—	1.009	9.9	—
Total	22.246			1,401			10.212		

The hospital retains a higher proportion of each dollar of revenue than the other hospitals primarily because it makes a profit. Its spends about the same proportion of its revenue on wages and salaries as the other hospitals. Total hospital purchases, especially local purchases, are a lesser proportion than in the other examples.

Each dollar of revenue that stays in the county generates another 4.1 cents of economic activity through local inter-industry purchases (Fig. 5 on page 10). Real estate, electric services, eating and drinking, and transportation services dominate the distribution. Linked household spending contributes another 20 cents. Contributions to owner equity (owner-occupied dwellings), retail trade and services, and the health sector dominate the induced linkage.

Garfield County Hospital

Garfield County Hospital, located in Pomeroy, Washington, lies in a highly agricultural county with the smallest population base (2,500). More than half of the personal income generated in the county comes from farming (Table 3). Unlike the other hospitals studied, the hospital in Pomeroy is financially connected to a nursing home. Other than nursing home patients, the hospital has received no primary care patients since 1982. The physicians in the county do not refer any patients to the hospital. The hospital's objective is to find ways to return to its role as the primary care provider for the county.

The dominant sectors of the economy describe a community highly dependent upon farming. Agriculture is 38.3 percent of value added and 40 percent personal income. The service sector and the government sectors primarily service agriculture. The hospital/nursing home ranks fifth in its contribution to value added and fourth in its contribution to employment (Table 8).

Hospital revenues are distributed in much the same way as in all other hospitals studied. Wages and salaries account for 41.4 cents of each dollar of revenue, and professional fees take another 8 cents. This leaves 51 cents for hospital purchases of supplies and services. Six cents out of every dollar of revenue are spent locally.

Every dollar of revenue generates another 23.4 cents of economic activity in the county (Fig. 6 on page 11). Local purchases by the hospital generate 6.7 cents through inter-industry activity. Real estate, laundry services, state and local government enterprises, and miscellaneous medical and health services are the major purchases. Household linkages total 16.7 cents. Contributions to owner equity and retail trade and service dominate the household linkage.

Summary and policy implications

In all five counties examined in this study, the hospital is one of the largest employers. Only the sectors that make up the dominant economic base of each county and the retail trade sector are larger. When one includes the associated health sectors of doctors and dentists and nursing care, the importance of the health care sector is amplified.

The inter-industry linkage of the hospital is very small, usually less then 10 cents out of each dollar of revenue. Hospitals are a source of large economic leakage so multipliers tend to be lower than for other sectors of the economy. While this cannot be helped due to the kind of purchases hospitals make, there may be opportunities for potential local suppliers to capture some of those dollars.

The household linkage is the most important part of the total hospital linkage. It links the hospital through households to retail trade and service sectors. In most cases these sectors are the largest sources of employment in a community.

Policy implications

As hospitals and counties evaluate their alternatives, they should realize that local jobs, linkages, and income recapture are important considerations. Income recapture is payments for health insurance policies or taxes that leave the county. When medical care services are provided locally and paid for by insurance or government programs, the county "recaptures" that income and in turn provides jobs locally.

The medical sector is an important source of jobs and income in all five communities studied. Without the hospital, those jobs would be lost and the county would become a less desirable place to live because of fewer services. In addition income paid out through income taxes and health insurance premiums would leave the county permanently.

If federal payment rules cannot be revised to reflect lower occupancy rates and higher per-paying-patient capital costs, then subsidies may be necessary to preserve the local health-care delivery system and community jobs. This type of analysis helps quantify the level of subsidy that could be applied while still leaving the community better off. Rural counties need to make tough decisions about their hospitals and local health care delivery systems.

Finally, given the importance of the health sector, it is in the community's interest to participate in local public decision making to determine the future course of the local hospital or health resources.

Appendix — A summary of estimated community multipliers

Economic multipliers are an important result of any economic-base analysis. The greater the multiplier, the greater the local linkage. A multiplier is defined as the change in income or employment in the economy per dollar of sales, income, or employment in a particular sector. However, the change that the number implies should be interpreted with caution. This is a long-term adjustment and occurs only if all other conditions stay the same. Neither the rate of adjustment nor demographic changes are taken into consideration.

Furthermore, a multiplier is not a measure of economic viability. Sectors having low multipliers can still contribute significantly to economic wealth in a region. More importantly, they may also be important sources of future jobs and income. A high linkage may have the opposite characteristics. An example is the retail sector, which, while tending to have high employment multipliers, also provides low pay.

The multipliers presented in the following tables are county-based multipliers. They express only intra-county linkages. Three classes of multipliers are presented below: Type I multipliers, Type III multipliers, and response coefficients. Type I multipliers reflect only the linkages from an industry's local purchases. Type III multipliers incorporate household spending from a particular industry's employees and associated supplier sectors. Response coefficients are similar to the other multipliers except that they relate all changes in value added or employment across the economy that result from a change in sales or output in a particular sector.

Definitions

Employment — Like value added multipliers and response coefficients, employment multipliers either relate a particular sector's employment to total economy-wide employment or a particular sector's output to total economy-wide employment. Employment is measured in terms of number of jobs, making no distinction between full- and part-time (which is the standard format for the Bureau of Economic Analysis of the U.S. Department of Commerce). Employment response coefficients estimate the total employment linked per million dollars of the sector's output.

Employment multipliers — Translates the jobs in the economy for each $1 million of final demand.

Output Type I multiplier — Is the ratio of the sum of direct and indirect effects to the direct effect. They are stated per dollar of output.

Output Type III multiplier — Is the ratio of the sum of the direct, indirect, and induced effects to the direct effects. They are stated per dollar of output.

Other definitions

Output — The amount of economic activity linked to a dollar of economic activity in the sector of concern.

Value added — In the case of the traditional value added multipliers, each dollar increase of economic wealth (defined above as the sum of wages and salaries, returns to ownership, and indirect business taxes) as related to overall economic wealth across the economy.

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Table A1. Average multipliers for general industry sectors.

Sector	Dollar of output produced in the general economy per dollar of sectoral output, Clearwater County, Idaho			
	Type I	Type III	Value added total	Employment total
	Per $ change in input		Per $ final demand change	No. of jobs per million dollars final demand
Agriculture	1.242	1.420	0.447	23.611
Mining	—	—	—	—
Construction	1.201	1.389	0.613	25.088
Timber	1.443	1.709	0.659	35.380
Manufacturing	1.204	1.484	0.628	37.336
Transportation, communications, public utilities	1.111	1.366	0.773	33.981
Retail, wholesale	1.112	2.527	1.657	188.515
Finance, insurance, real estate	1.165	1.481	0.939	42.157
Services	1.111	1.517	0.895	54.000
Health	1.113	1.403	0.797	38.666
Hospital	1.074	1.283	0.722	27.834

Table A2. Average multipliers for general industry sectors.

Sector	Dollar of output produced in the general economy per dollar of sectoral output, Beaverhead County, Montana			
	Type I	Type III	Value added total	Employment total
	Per $ change in input		Per $ final demand change	No. of jobs per million dollars final demand
Agriculture	1.317	1.531	0.540	22.572
Mining	1.083	1.234	0.654	15.938
Construction	1.128	1.274	0.571	15.300
Timber	1.227	1.393	0.588	17.543
Manufacturing	1.380	1.568	0.565	19.791
Transportation, communications, public utilities	1.164	1.354	0.788	19.946
Retail, wholesale	1.139	3.550	2.361	253.754
Finance, insurance, real estate	1.185	1.488	0.953	31.790
Services	1.140	1.683	1.010	57.095
Health	1.092	1.427	0.856	35.203
Hospital	1.112	1.547	0.807	45.675

Table A3. Average multipliers for general industry sectors.

Sector	Dollar of output produced in the general economy per dollar of sectoral output, Harney County, Oregon			
	Type I	Type III	Value added total	Employment total
	Per $ change in input		Per $ final demand change	No. of jobs per million dollars final demand
Agriculture	1.318	1.472	0.411	21.798
Mining	—	—	—	—
Construction	1.105	1.295	0.540	26.800
Logging, sawmill	1.285	1.434	0.403	21.046
Manufacturing	1.062	1.203	0.530	19.993
Transportation, communications, public utilities	1.052	1.204	0.754	21.467
Retail, wholesale	1.058	2.368	1.606	185.053
Finance, insurance, real estate	1.082	1.274	0.889	27.106
Services	1.066	1.374	0.842	43.586
Health	1.069	1.363	0.820	41.598
Hospital	1.046	1.284	0.851	33.665

Table A4. Average multipliers for general industry sectors.

Sector	Dollar of output produced in the general economy per dollar of sectoral output, Wallowa County, Oregon			
	Type I	Type III	Value added total	Employment total
	Per $ change in input		Per $ final demand change	No. of jobs per million dollars final demand
Agriculture	1.274	1.446	0.574	33.382
Mining	—	—	—	—
Construction	1.131	1.941	1.125	156.648
Logging, sawmill	1.412	1.488	0.350	14.859
Manufacturing	1.225	1.346	0.528	23.415
Transportation, communications, public utilities	1.077	1.231	0.752	29.821
Retail, wholesale	1.084	2.252	1.735	225.993
Finance, insurance, real estate	1.145	1.313	0.875	32.515
Services	1.075	1.322	0.859	47.850
Health	1.073	1.356	0.919	54.826
Hospital	1.041	1.341	1.009	58.061

Table A5. Average multipliers for general industry sectors.

Sector	Dollar of output produced in the general economy per dollar of sectoral output, Garfield County, Washington			
	Type I	Type III	Value added total	Employment total
	Per $ change in input		Per $ final demand change	No. of jobs per million dollars final demand
Agriculture	1.149	1.294	0.504	30.300
Mining	—	—	—	—
Construction	1.050	1.349	0.608	62.517
Timber	—	—	—	—
Manufacturing	1.098	1.231	0.526	27.788
Transportation, communications, public utilities	1.051	1.139	0.683	18.413
Retail, wholesale	1.082	2.231	1.484	240.087
Finance, insurance, real estate	1.083	1.174	0.818	19.092
Services	1.063	1.285	0.763	46.568
Health	1.068	1.344	0.682	57.685
Hospital	1.071	1.659	0.702	122.986

Table A6. A comparison of Type I and III output multipliers for the five counties.

	Dollar of output produced in the general economy per dollar of sectoral output by county				
	Clearwater, Idaho	Beaverhead, Montana	Harney, Oregon	Wallowa, Oregon	Garfield, Washington
Type I					
Agriculture	1.242	1.317	1.318	1.274	1.149
Mining	—	1.083	—	—	—
Construction	1.201	1.128	1.105	1.131	1.050
Timber	1.443	1.227	1.285	1.412	—
Manufacturing	1.204	1.380	1.062	1.225	1.098
Transportation, communications, public utilities	1.111	1.164	1.052	1.077	1.051
Retail, wholesale	1.112	1.139	1.058	1.084	1.082
Finance, insurance, real estate	1.165	1.185	1.082	1.145	1.083
Services	1.111	1.140	1.066	1.075	1.063
Health	1.113	1.092	1.069	1.073	1.068
Hospital	1.074	1.112	1.046	1.041	1.071
Type III					
Agriculture	1.420	1.531	1.472	1.446	1.294
Mining	—	1.234	—	—	—
Construction	1.389	1.274	1.295	1.941	1.349
Timber	1.709	1.393	1.434	1.488	—
Manufacturing	1.484	1.568	1.203	1.346	1.231
Transportation, communications, public utilities	1.366	1.354	1.204	1.231	1.139
Retail, wholesale	2.527	3.550	2.368	2.252	2.231
Finance, insurance, real estate	1.481	1.488	1.274	1.313	1.174
Services	1.517	1.683	1.374	1.322	1.285
Health	1.403	1.427	1.363	1.356	1.344
Hospital	1.283	1.547	1.284	1.341	1.659

Table A7. A comparison of value added response coefficients for the five counties.

	Dollar change in total value added per dollar change in sectoral output by county				
	Clearwater, Idaho	Beaverhead, Montana	Harney, Oregon	Wallowa, Oregon	Garfield, Washington
Agriculture	0.447	0.540	0.411	0.574	0.504
Mining	—	0.654	—	—	—
Construction	0.613	0.571	0.540	1.125	0.608
Timber	0.659	0.588	0.403	0.350	—
Manufacturing	0.628	0.565	0.530	0.528	0.526
Transportation, communications, public utilities	0.773	0.788	0.754	0.752	0.683
Retail, wholesale	1.657	2.361	1.606	1.735	1.484
Finance, insurance, real estate	0.939	0.953	0.889	0.875	0.818
Services	0.895	1.010	0.842	0.859	0.763
Health	0.797	0.856	0.820	0.919	0.682
Hospital	0.722	0.807	0.851	1.009	0.702

Table A8. A comparison of employment response coefficients for the five counties.

	Total jobs linked to million dollars of sectoral output by county				
	Clearwater, Idaho	Beaverhead, Montana	Harney, Oregon	Wallowa, Oregon	Garfield, Washington
Agriculture	23.611	22.572	21.798	33.382	30.300
Mining	—	15.938	—	—	—
Construction	25.088	15.300	26.800	156.648	62.517
Timber	35.380	17.543	21.046	14.859	—
Manufacturing	37.336	19.791	19.993	23.415	27.788
Transportation, communications, public utilities	33.981	19.946	21.467	29.821	18.413
Retail, wholesale	188.515	253.754	185.053	225.993	240.087
Finance, insurance, real estate	42.157	31.790	27.106	32.515	19.092
Services	54.000	57.095	43.586	47.850	46.568
Health	38.666	35.203	41.598	54.826	57.685
Hospital	27.834	45.675	33.665	58.061	122.986

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