

Preliminary Report

The Economic Impact
of
The Porter Medical Center
on the
Addison County Economy



Prepared by:
Richard Heaps and Arthur Woolf
October 2, 2002

Executive Summary

Porter Medical Center is an important part of the Middlebury and Addison County economies. The Medical Center's most important role is that of a health care provider, treating sickness, disease, and accidents, and helping to improve the quality of life of Addison County residents. Porter Medical Center is the major institutional provider of health care in Addison County. It consists of Porter Hospital, Helen Porter Healthcare and Rehabilitation Center, Porter Health Systems and Porter Management Systems.

Porter Medical Center it is also the third largest private employer in Addison County and therefore plays a major role in the local economy. This report provides quantitative estimates of the role Porter Medical Center plays in the local economy by detailing its specific economic impact on jobs, income, and economic opportunities for the residents of Addison County Vermont.

In 2001 Porter Medical Center had an average of 760 employees and directly paid out over \$21.0 million in wages and another \$5.2 million in benefits to all of its employees. Just over two-thirds of its employees are residents of Addison County. Porter Medical Center paid \$15.2 million in wages and an additional \$3.8 million in benefits to the more than 560 of its employees who were residents of Addison County. These employees live in nearly every town in the county. The medical center's mix of employment—full and part time—and its mix of occupations provide a wide range of employment opportunities for Addison County residents and these opportunities help meet the divergent employment needs of the county's population.

The total impact of the Porter Medical Center on employment and earnings in Addison County was estimated through the use of a dynamic input-output model developed specifically for this purpose. While the Porter Medical Center directly employs 670 people at its Middlebury campus, additional employment is created elsewhere in the county through the spending of the medical center and the spending of the medical center's employees. We estimate an additional 325 jobs in Addison County owe their existence to the presence of the medical center. Therefore the total number of jobs in Addison County supported directly or indirectly by the Porter Medical Center equals 995. The total wages, salaries, and other labor income earned from these 995 jobs in Addison County totals \$38.3 million. Addison County residents alone received \$30.6 million of this income. After taxes, this yielded the Addison County residents \$25.3 million of disposable income.

The Porter Medical Center impacts Vermont state government and local Addison County governments by increasing both the demand for governmental services and the revenues to pay for these services. We estimate that Porter Medical Center leads to an increase in expenditures for state and local government services equal to \$2,577,000. At the same time the revenues generated from the economic activity attributable to Porter Medical Center equal \$6,333,000. This generates an overall net benefit to state and local governments of \$3,756,000 per year.

Finally, the broadest measure of economic activity in the Addison County economy is gross county product (GCP). This is the sum of the value of all goods and services produced in the county during a given year. In 2001, Addison County's gross county product was \$621 million (in chained weighted 1992 dollars). The Porter Medical Center accounted for nearly 4.6% of the county's total output.

The value to the local community goes beyond that discussed above. Having a locally based medical institution means that local residents do not have to travel long distances for their own health care, to seek emergency treatment, or to visit friends and family who need hospital services. We estimate that the economic value of time saved to patients and visitors amounts to \$3,864,000 annually.

The Economic Impact of The Porter Medical Center

Table of Contents

I.	Purpose and Scope of this Study	Page 1
II.	A Brief Description of the Porter Medical Center	Page 2
III.	Direct Employment: Number of Jobs, Compensation, and Towns of Residence	Page 3
	A. Employment and Earnings in Addison County	Page 3
	B. Employment and Earnings in Addison County Towns	Page 6
IV.	Total Economic Impact	Page 10
	A. Methodology: A Dynamic Input-Output Model	Page 11
	B. Total Employment, Employment by Industry, and Occupational Distribution	Page 13
	C. Total Income and Compensation	Page 16
	D. State and Local Government Impact	Page 18
	E. Gross County Product	Page 18
V.	Value of Time	Page 19
VI.	Appendix - The Dynamic Input-Output Model	Page 22

I. Purpose and Scope of this Study

Improving the standard of living of Vermont's families is a key concern to all state residents and is repeatedly addressed by Vermont policymakers. A great deal of effort is expended to attract new businesses to the state in order to raise incomes and expand job opportunities. Frequently forgotten is the contribution existing businesses make to our standard of living.

Vermonters are also rightly concerned about the rising cost of health care. But sometimes, policies designed to address the cost of health care have the unanticipated consequence of adversely affecting the quality of health care or affecting jobs, salaries, and opportunities in the health care sector or of imposing hidden costs elsewhere in the economy.

The Porter Medical Center is a health care institution that contributes to both the quality and quantity of health care and to the standard of living of Vermonters living in the area of Vermont served by the Porter Medical Center. The Porter Medical Center, in the process of providing health care to residents, also is a significant component of the Addison County economy.

The purpose of this report is to present an accurate measure of the economic impact of the Porter Medical Center on the Addison County region. This is accomplished by use of the medical center's data on employment, wages, and benefits and by the use of a dynamic input-output model developed specifically for this project.

This study is not about the cost of health care or the health care policies of the state of Vermont or the U.S. government and how they affect the delivery of health care services in Porter Vermont. Nor does it address current or future measures that may affect the health care system in Addison County. It focuses instead only on the economic role of the medical center in the local economy. That economic role is frequently ignored or misunderstood in the debates and discussions over health care policy. This study sheds light on this important issue.

II. A Brief Description of the Porter Medical Center

Porter Medical Center is the major institutional provider of health care in Addison County. It is a nonprofit health care system consisting of Porter Hospital, Helen Porter Healthcare and Rehabilitation Center, Porter Health Systems and Porter Management Systems.

Porter Hospital, established in 1925, is a 45 bed accredited community hospital with a staff of over 425 people, including an active medical staff of 60 physicians and a consulting staff of 42 physicians. In 2001 the PMC Auxiliary consisted of more than 250 volunteers who provided more than 22,000 hours of service to Porter Medical Center. Porter Hospital provides inpatient services, including surgical, intensive care, obstetrics, and pediatric care. It also provides emergency room services, a variety of outpatient procedures, laboratory testing services, physical therapy, cardiac rehabilitation, and health promotion services to area residents.

Helen Porter Healthcare and Rehabilitation Center, established originally as the Helen Porter Nursing Home in 1991 and reorganized in 2001, provides a broad spectrum of services including long-term, short-term rehabilitation, respite, hospice and dementia care. HPHRC is a 105 bed institution with a staff of over 175 people.

Porter Health Systems operates the Marble Works Pharmacies in Middlebury and Vergennes and the Vermont Mail Order Pharmacy. In addition, Porter Health Systems is comprised of three operating divisions: The Medicine Chest, Porter Cardio-Pulmonary Associates, and Porter Medical Properties. The Medicine Chest distributes and installs medical equipment needed for continuing care at home. Porter Cardio-Pulmonary Associates provides diagnostic and therapeutic respiratory therapy services. Porter Medical Properties acquires property and participates in ventures that support the overall mission of Porter medical Center. Porter Health Systems has a staff of over 40 people.

Finally, Porter Management Systems is the corporate entity within Porter Medical Center specifically charged with the responsibility of monitoring federal and state legislative activities, as well as developing management strategies to successfully navigate Porter Medical Center through the changing external health care environment. Porter Management Systems has a staff of over 30 people.

III. Direct Employment: Number of Jobs, Compensation, and Towns of Residence

The economic impact of a firm or organization can be measured in many ways. Several measures are based on employment and earnings: the number of people employed, the wages and salaries of the employees, and the benefits of the employees. This section will measure the Porter Medical Center's economic impact based on employment and earnings measures.

A. Employment and Earnings in Addison County

1. Employment in Addison County

With more than 670 jobs, the Porter Medical Center is the third largest employer in Addison County, according to the Vermont Department of Employment and Training.¹ The *Vermont Business Magazine's* rankings show Porter Medical Center is the 26th largest employer in the State of Vermont.²

During calendar year 2001, Porter Medical Center employed a total of 830 people. This includes only employees directly employed by the hospital. Most doctors who practice at the hospital are not technically employees of the hospital. Instead, they use the hospital facilities and bill their patients directly. Therefore, their presence is not reflected in the official hospital employment statistics. On any given day, Porter Medical Center directly employs approximately 670 workers.³

Total employment in Addison County equaled 12,076 in 2001. With an average employment level of 670, Porter Medical Center provides 5.5% of all jobs in the county. That means, one out of every eighteen jobs in Addison County is at Porter Medical Center.

Porter Medical Center is an extremely important source of employment for women in Addison County. In 2001, just over 560 of the 670 employees at Porter Medical Center were females, that

¹ The Vermont Department of Employment and Training *Labor Market Bulletin*, 4th Quarter 2001, shows Middlebury College is the largest employer in Addison County. When all divisions of Porter Medical Center are added together, the DET data show Porter Medical Center and Simmonds Precision (dba B F Goodrich Aerospace) are the next two largest employers. Simmonds Precision public relations office states that they have over 700 employees. Also, the DET data show that Porter Medical Center is one of the top 50 employers in the state. No more specific data is available from the DET.

² See *Vermont Business Magazine*, Book of Lists 2002/2003. Porter Medical Center is listed as the 56th largest employer. However, this is just the employment at Porter Hospital. Including all the 670 employees of Porter Medical Center would rank it 26th in the state of Vermont.

³ The difference between the 670 employees at any point in time and the 830 employees during calendar year 2001 is due to normal job turnover during the year. Over a year's time, some employees terminate their employment with Porter Medical Center and new employees are hired.

is 84% of the total employment. In 2001, Addison County employers provided jobs for 5,759 women. Porter Medical Center accounted for 9.4% of these jobs.

Porter Medical Center is located on the southwestern edge of the Town of Middlebury in Addison County. As a result it is no surprise that employees tend to reside in Middlebury and surrounding communities in Addison County. The only significant exceptions are those who chose to live close by just across the county border in Rutland County and the state line in New York.

Over two-thirds of Porter Medical Center's employees live in Addison County, as shown in Table 1. Under 15% of the employees of Porter Medical Center live in Rutland County, and just 5% of the employees residing elsewhere in Vermont. One in nine of Porter Medical Center's employees live in New York.

The jobs at Porter Medical Center are about evenly split between full time and part time jobs. Full time jobs equaled 42% of the total jobs, part time jobs 40%, and other contractual arrangements equaled 18% of the total (consisting of on-call, per diem, and contracted employees). Part time jobs are a very important part of the job mix in Addison County. They provide an income source to families who desire only part time work or can only work part time. National statistics show that 80% of all part time workers choose to work part time and do not seek full time work.⁴ The value of part time work to Vermonters is often misunderstood. The part time work offered by Porter Medical Center is a crucial part of the Addison County labor market.

County	Number	Percent
Addison	563	67.8%
Rutland	122	14.7%
Chittenden	31	3.7%
Other Vermont	15	1.8%
New York	97	11.7%
Other states	2	0.2%
Total	830	100%

2. Earnings in Addison County

⁴ For example, in *The Employment Situation: July 2002*, the Bureau of Labor Statistics reported only 20.4% of all part time workers worked part time because either they could only find part time work or business conditions for their employers were too slow to support full time work. The vast majority of the part time workers, 79.6%, worked part time for non-economic reasons. No comparable statistics exist at the state level.

Jobs provide earnings to employees in the form of wages and salaries and benefits such as health insurance and retirement plans. By each of these measures, Porter Medical Center is a key part of the Addison County labor market. In 2001, Porter Medical Center's total payroll was \$20,966,796. Addison County employees of Porter Medical Center were paid \$15,226,898 in wages that year, 72.6% of the total. (See Table 2 below). All Addison County employers paid \$398 million in wages in 2001. Porter Medical Center accounted for \$15 million of the county's payroll. That means that \$3.80 of every \$100 of wages earned in Addison County were earned at Porter Medical Center.

Place	Wages	Benefits	Compensation	Total
Addison County	\$15,226,898	\$3,811,293	\$19,038,190	67.8%
Rutland County	\$943,828	\$236,240	\$1,180,069	3.7%
Chittenden County	\$2,454,912	\$614,465	\$3,069,377	14.7%
Other Vermont	\$546,703	\$136,840	\$683,542	1.8%
New York	\$1,692,931	\$423,741	\$2,116,671	11.7%
Other state	\$101,524	\$25,411	\$126,935	0.2%
Total	\$20,966,796	\$5,247,989	\$26,214,785	100.0%

Employees today receive an increasing share of their employment compensation in the form of benefits instead of wages. Porter Medical Center offers its employees a very attractive benefits plan. Salaried and hourly employees (both full, and to a reduced extent, part time), receive the following benefits:

- Subsidized medical insurance for the employees and their dependents
- Subsidized dental insurance for the employees and their dependents
- Employer paid contributions to Social Security and Medicare
- Life insurance
- Accident and disability insurance
- A defined benefit pension plan
- Voluntary individual tax sheltered accounts (403b or 401k)
- Paid time off (with an extended illness plan)
- Tuition reimbursement
- Various employee discounts

In fiscal year 2001, the cost of these employee benefits to Porter Medical Center (not including the value of paid time off) equaled 25.03% of wages and salaries. That is, employee earnings at Porter Medical Center included \$5,247,989 of payments in the form of employee benefits.

B. Employment and Earnings in Addison County Towns

Total employment in the Town of Middlebury equaled 7,471 in 2001. With an average employment level of 670, Porter Medical Center provides 9.0% of all jobs in the county. That means one out of every eleven jobs in Middlebury is at Porter Medical Center. Total wages paid by Middlebury employers in 2001 equaled \$225.6 million. Porter Medical Center's payroll equaled 9.3% of this total. The medical center is the second largest employer in the town.

The Town of Middlebury is home to 192 employees of Porter Medical Center, the single largest number of employees of any town in the region. In 2000 the population of Middlebury was 8,183 people living in 2,657 households. This implies about one of every fourteen households in Middlebury is supported at least in part by wages and benefits earned at Porter Medical Center.

Many Porter Medical Center employees live in all of the towns within an easy commute of the medical center campus. Bristol is home to 61 employees who received about \$1.4 million in wages in 2001. New Haven is home to 35 employees who received over \$1.0 million in wages.

The hospital also provides a variety of jobs at different skill and wage levels. Table 3 also shows the average hourly wages of workers. Wages are based on skills, length of time the worker has been employed, as well as many other factors. The average wage paid at Porter Medical Center on a town by town basis ranges from \$13.62 per hour for employees living in Leicester to a high of \$27.31 per hour for employees who reside in Ferrisburgh.

Brandon is the only Rutland County town with a significant number of residents who work at Porter Medical Center. Brandon is home to 61 employees who received wages totaling more than \$1.3 million in 2001.

Table 3
Porter Medical Center Employees and Wages in Addison County Towns

Town	Employees	Total Wages	Average Hourly Wage
Addison	22	\$382,576	\$14.08
Bridport	30	\$568,148	\$14.22
Bristol	61	\$1,397,097	\$18.09
Cornwall	20	\$577,201	\$23.44
Ferrisburgh	18	\$666,223	\$27.31
Leicester	11	\$172,729	\$13.62
Middlebury	192	\$6,101,986	\$22.83
New Haven	35	\$1,032,460	\$20.32
Orwell	27	\$610,891	\$14.32
Salisbury	30	\$805,537	\$16.55
Shoreham	21	\$512,021	\$18.78
Vergennes	38	\$934,845	\$16.33
Weybridge	15	\$315,306	\$16.41
Whiting	16	\$437,122	\$22.05
Other Addison County	77	\$712,756	\$19.44

Table 4
Wages, Benefits, and Total Compensation Paid to Porter Medical Center Employees Living in Addison County Towns in 2001

Town	Wages	Benefits	Total Compensation
Addison	\$382,576	\$95,759	\$478,335
Bridport	\$568,148	\$142,207	\$710,355
Bristol	\$1,397,097	\$349,693	\$1,746,791
Cornwall	\$577,201	\$144,473	\$721,674
Ferrisburgh	\$666,223	\$166,756	\$832,978
Leicester	\$172,729	\$43,234	\$215,963
Middlebury	\$6,101,986	\$1,527,327	\$7,629,313
New Haven	\$1,032,460	\$258,425	\$1,290,884
Orwell	\$610,891	\$152,906	\$763,797
Salisbury	\$805,537	\$201,626	\$1,007,163
Shoreham	\$512,021	\$128,159	\$640,180
Vergennes	\$934,845	\$233,992	\$1,168,837
Weybridge	\$315,306	\$78,921	\$394,227
Whiting	\$437,122	\$109,412	\$546,534
Other Addison County	\$712,756	\$178,403	\$891,159
Note: Brandon	\$1,262,269	\$315,946	\$1,578,215

All of the tables above do not include the wage or employment impact of the private physician practices which are located on the Porter Medical Center campus but are not owned by the hospital. There are ten such practices with twenty physicians located on the campus. The typical physician's practice in Vermont has between one and four employees with an average payroll of \$99,300 (not including all the physician's income).⁵ This implies that these ten private physician practices have a payroll of just under \$1.0 million for 25 employees.

As discussed above, Porter Medical Center provides benefits to its employees equal to 25.03% of wages. On a town by town basis, the total compensation earned by Porter Medical Center employees is as given in table 4 below. Total compensation paid to Middlebury residents is \$7.6 million in Middlebury and over \$1.0 million in Bristol, New Haven, Salisbury, and Vergennes.

It is our opinion that these practices would not be located in Addison County if it were not for the presence of a hospital in the region. Rather in the absence of Porter Hospital, these practices would be located at the nearest hospital in Chittenden or Rutland Counties. Thus, the full impact of Porter Medical Center on Addison County should include these practices.

IV. Total Economic Impact

The most obvious economic impact of a facility such as the Porter Medical Center is measured by the employment at the facility and the compensation paid directly to the facility's staff. As shown in the previous sections of this report, the impact measured this way is substantial witnessed by the fact that Porter Medical Center is the largest private employer in Addison County. However, the economic impact expands beyond the confines of the Porter Medical Center itself.

First, several surgeons, internists, radiologists, and other specialists locate their offices on the Porter Medical Center campus or nearby in Middlebury as a necessary part of their practice. This is evidenced by the medical facilities located in the Physicians Building or in the modular offices located the Porter Medical Center campus. These facilities house the offices of nearly ten private physician practices who maintain offices with additional paid staff. These facilities would have a much reduced presence in the community in the absence of Porter Medical Center.

Second, the employees of Porter Medical Center spend a substantial share of their wages and salaries at Addison County retail outlets and restaurants. The employees use the services of Addison County accountants, dentists, and other professionals. In addition, employees pay area construction firms to build, expand, and remodel their homes. All of this spending recycles the wages and salaries earned at Porter Medical Center through the

⁵ This is based on data from the U.S. Census, *County Business Patterns: 2000* for Vermont.

local economy, creating additional jobs and incomes for Addison County residents. Given that the Medical Center directly accounts for 3.8% of all wages paid in Addison County, this indirect impact on the economy is substantial.

Third, the Porter Medical Center makes a very important contribution to the state and local economy in tax revenues. Because the majority of the Medical Center's property is exempt from local property taxation, an unfortunate misunderstanding is sometimes expressed that the Medical Center does not contribute to the support of state and local government and schools. The spending of the employees of the Medical Center and the indirect economic activity discussed above generates substantial tax revenues for state and local government.

The measurement of the indirect economic activity and tax revenues generated by Porter Medical Center needs to be carefully undertaken. Northern Economic Consulting, Inc. believes this is best made by a sophisticated computer model that captures the interrelationships within the different sectors of the economy of Addison County as well as the interplay between economic changes and demographic changes. This model is discussed below.

A. Methodology: A Dynamic Input-Output Model

To fully measure the economic impacts of the Porter Medical Center the use of a dynamic input-output model is the best approach. Northern Economic Consulting, Inc. had such a model of the regional economy constructed specifically for this study. This model allowed NEC to estimate the employment, income, demographic and other impacts of the proposed development in a manner which captured the full interrelationships in the Vermont economy. A detailed discussion of the model is presented in Appendix A.

For purposes of this analysis we define the region to consist of Addison County, Vermont. Data sources for model construction effectively limit models to no finer analysis than at the county level. Though the impact of the Porter Medical Center extends beyond Addison County, the impact outside Addison County is generally small compared to the direct impact on the county. Addison County represents the core of the market for the Medical Center and houses 68 percent of all Porter Medical Center employees. Therefore, a model consisting of just Addison County will capture the economic impact of the Medical Center that is enjoyed by Addison County residents.

The dynamic input-output model measures the total impact of the Porter Medical Center on Addison County. The total impact is a multiple of the direct impact.⁶ Estimates of the multiplier for hospitals can be attained from various sources. The multiplier contained

⁶ For example, the analysis in this section of the report will show that even as direct employment in the county at the Porter Medical Center is 670 employees, a total of 995 jobs are created in the county due to the presence of Porter Medical Center. Therefore, the employment multiplier of Porter Medical Center is said to be 1.49 (995/670). That is, the existence of 670 jobs at Porter Medical Center creates 325 more jobs elsewhere in the county for a total of 995 jobs.

within the dynamic input-output model used in this analysis is smaller and more realistic than those frequently used in other models and available from other sources for two major reasons.

- First, our approach recognizes that some of the benefit of the Porter Medical Center, like any other employer in Middlebury, will accrue to individuals and businesses located outside the county. Chittenden County remains the retail shopping center of

northwest Vermont and, therefore, some of the salaries and wages of Porter Medical Center employees will be spent in Chittenden County and generate jobs in Chittenden County. Economic impacts of the Medical Center on the entire western region of Vermont, or the entire state, will be higher than those estimated here.

- Second, the dynamic input-output model recognizes that if the Medical Center was not located in Middlebury, some other employer would have come to the area to offset part of the loss of jobs. In any local market, employers compete for workers. Removing the Porter Medical Center from the market makes it a little easier for existing Addison County employers to expand and for prospective new employers to locate in the county.⁷

This report now presents estimates of the impact of the Porter Medical Center on employment, income, and tax revenues in Addison County derived from the input-output model.

⁷ A good example of this is seen in Plattsburgh, NY, after the closing of the Plattsburgh air force base. The loss of this major employer was a significant negative economic shock to the local economy. However, it opened up opportunities for other business that the local economic development authorities have been exploiting.

B. Total Employment, Employment by Industry, and Occupational Distribution

One of the most visible impacts of the Porter Medical Center on the Addison County economy is shown by the number of non-medical center jobs that owe their existence to the medical center. Table 5 below gives a breakdown of jobs created in Addison County by the multiplier process, that is, due to the presence of the Medical Center.

The largest employment impact is, of course, the employment directly at the Porter Medical Center. Employment today is 670. However, through the multiplier process additional jobs have been created in services, retail trade, construction, state and local government, and finance and real estate. These sectors of the economy primarily serve the local market.

Table 5
Impact of Porter Medical Center on Addison County Employment by Industry

	Number of Jobs
1. Jobs at Porter Medical Center	670
2. Additional Jobs by Industry_____	
... Services (except at the Porter Medical Center)	125
... Retail Trade	84
... Construction	80
... State and Local Government	13
... Finance and real estate	12
... Other	11
-----	-----
Subtotal additional jobs	325
	===
3. Total Jobs created by Porter Medical Center	995

- Services include medical services (outside of the hospital), business services professionals, other professional services, and non-profit organizations. The additional 125 jobs equal about 1.6% of the county's total services jobs.
- Retailing includes restaurants, food stores, other merchandise retailers, and gas stations. The additional 84 jobs equal 2.6% of the county's retail jobs.
- There are 80 jobs in the construction industry in Addison County because of the presence of Porter Medical Center. This is 5.5% of the county's construction jobs.
- Twelve of the thirteen government jobs created by the presence of Porter Medical Center are at the local government level. The other one is a state government job located in the county.
- There are 12 jobs in finance and real estate in Addison County because of the presence of Porter Medical Center. This is 1.2% of the county's finance and real estate jobs.

The major industries of Addison County that are least affected by the Porter Medical Center are those that service national and international markets. In fact, the presence of the Medical Center actually depresses manufacturing employment due to its positive impact on wage rates in the county. The impact is small, with only 4 jobs lost on a base of nearly 2,200 manufacturing jobs in the county.

The jobs in Addison County created by the presence of the Porter Medical Center perform an important function for the overall economy. These jobs are at shops and businesses that serve the local community. Without these businesses, prices would likely be higher and the choice of goods could be more limited.

Please note again that this study measures the impact of the Porter Medical Center only on the Addison County economy. The impact of the Medical Center extends beyond the county. Residents of Addison County spend a significant share of their incomes outside of the county, with a particularly large draw from Chittenden County. About one-third of Porter Medical Center employees live outside Addison County. Therefore, the Medical Center creates even more jobs than measured here and has a larger impact on the Vermont economy than measured here. However, the purpose of this study is to measure the impact within just Addison County and we confine the analysis to that geographic area.

The impact of the Medical Center on the Addison County economy can also be measured by the types of jobs created. That is, 10 jobs in retail may include 2 executive and administrative jobs (the manager and assistant manager), 1 technical job (the bookkeeper/payroll), 1 marketing job, (in advertising), 5 service jobs (salespersons), and 1 laborer job (the janitor).

Consider the employment impacts by occupation of the Porter Medical Center as shown in Table 6 below.

Occupation	Total Jobs Created
Executive/Administrative	69
Professional Specialty	236
Technical	119
Marketing/Sales	42
Administrative support	177
Medical and other service occupations	243
Construction/Trades	37
Mechanics/Repair	17
Helpers/Laborers	18
Other	37
-----	-----
Total	995

Employment created by the Porter Medical Center is spread over a wide range of occupations. As the table shows, 305 of the jobs are in the executive, administrative, and professional specialty occupations. Administrative support jobs total 177 and service occupations (heavily weighted toward medical services) total 243. In addition, 37 jobs in the skilled construction sector have been created in Addison County due to the presence of the Medical Center.

C. Total Income and Compensation

Employment only measures one aspect of the economic impact of the Porter Medical Center on the Addison County economy. It is the income derived from this employment that supports families and generates the spending that supports local business and pays local taxes. We provide an estimate of the total income generated for residents of Addison County by Porter Medical Center in Table 7 below. This does not include the income generated by the medical center for those who live outside Addison County.

Total income includes not only wages and salaries, but also the income from self-employment (stimulated by the presence of the Medical Center), dividend, interest, and income from government transfers. All of these income sources combine to form the spending base in Addison County.

Table 7
Impact of Porter Medical Center on Addison County Income in 2001

Income Category	\$ Millions
Wage and salary distributions	\$31.3
Proprietor and other labor income	\$7.0
Equals: Earnings by place of work	\$38.3
Less: Social Security contributions	\$2.7
Plus: Residence adjustment	- \$4.9
Dividends, interest, and rent	\$0.9
Transfer payments	-\$1.0
Equals: Personal income	\$30.6
	Less taxes \$5.3
Equals: Disposable personal income	\$25.3

As shown in Table 7, the majority of income earned in Addison County that can be attributed to the presence of the Porter Medical Center comes in the form of wages and salaries. Wages and salaries total \$31.3 million. This represents 7.8% of all wage and salary income generated in Addison County. Income generated from the self-employed (counting only those businesses that exist because of the Medical Center) equals another \$7.0 million. Therefore, total wage, salary, and other labor income generated in Addison County from the Medical Center equals \$38.3 million.

Based on this figure we can calculate the total income that accrues to only Addison County residents. First, we subtract Social Security contributions. Then we subtract the wages and salaries earned in Addison County by residents of other counties, add in dividend, interest, and rent earnings, and add in government transfer payments. This yields a personal income total of \$30.6, the sum of all income that accrues to Addison County residents.

Not all of this income is available to Addison County families to spend. Government taxes are subtracted from personal income to calculate disposable personal income. Taxes equal \$5.3 million. Therefore, the total disposable income available to Addison County households as a result of the presence of Porter Medical Center in Middlebury equals \$25.3 million.

The wage and salary impact of \$25.3 million discussed above is due to two impacts of the Medical Center on the Addison County economy. The largest impact comes from the wages paid at the jobs generated by the Medical Center. The second impact comes from the fact that the Medical Center is a large employer in the region and, therefore, raises the average annual wage in all industries in Addison County. The wage impact is given in Table 8.

Industry	Dollars
Durable manufacturing	\$237
Nondurable manufacturing	\$206
Construction	\$208
Transportation & Public Utilities	\$141
Banks, Insurance & Real Estate	\$118
Retail Trade	\$84
Wholesale Trade	\$149
Services	\$1,717

For example, annual wages of all workers in durable manufacturing in Addison County are estimated to be \$237 higher per year because of the presence of the Medical Center in Middlebury. Construction annual wages are estimated to be \$208 higher per year.

The wage impact in the services sector is huge and should be just considered illustrative of a large impact and not a precise estimate.

D. State and Local Government Impact

The Porter Medical Center impacts Vermont state government and local Addison County governments by increasing both the demand for governmental services and the revenues to pay for these services. We estimate that the Medical Center creates an indirect demand for state and local government services of \$2,577,000. However, the revenues generated from the economic activity attributable to the Medical Center created \$6,333,000 in state and local tax revenues. This generates an overall net benefit to state and local governments of \$3,756,000 per year.

The Porter Medical Center is a tax-exempt institution. This can lead to the simplistic conclusion that the Medical Center is a net financial drain on state and local government. This analysis has shown this is not true. Rather, the income earned by employees of the Medical Center, the income earned by employees created through the multiplier effect at businesses which owe at least part of their activity to the presence of the Medical Center, and the spending of this income generates well more than sufficient governmental revenues to cover the additional governmental costs that the presence of Medical Center imposes.

E. Gross County Product

The broadest measure of economic activity in the United States economy is GDP, gross domestic product. This is the sum of the value of all goods and services produced in the U.S. during a given year.

A similar measure of output can be calculated for any region. In this case, the gross county product for Addison County can be calculated. In 2001, gross county product in Addison County totaled \$621 million in chain weighted 1992 dollars. The Porter

Medical Center accounted for nearly 4.6% of the county's total output.

V. Value of Time

A local hospital provides quantifiable economic benefits to local residents. One of those benefits is that patients can undergo diagnosis and treatment without a long drive to a medical center in Burlington or Rutland. Because the Porter Medical Center is able to offer medical services to Addison County residents rather than the residents having to drive for an hour to either Fletcher Allen Health Center or Rutland Regional Medical Center, Addison County residents are better off.

We can calculate the dollar value of the time saved by having a nearby medical center. First we look at the savings to patients themselves. In fiscal year 2001, 1,766 acute patients were admitted to Porter Medical Center and the hospital recorded nearly 50,000 outpatients using its services. Therefore, a total of 51,755 people used the hospital. If all of those patients had to travel to Burlington or Rutland, they would have spent a total of 103,510 hours driving to and from those locations. We estimate the average value of time for these patients at \$12,000 per hour, based on Vermont Department of Employment and Training estimates of average annual wages for Addison County. Therefore, the time saved for these patients amounts to \$1,242,210. (See Table 9).

Number of Patients	51,755
Total Driving Time	103,510
Total Value to Patients	\$1,242,210

Many people are driven to the hospital by someone other than themselves. Therefore, there are also savings that accrue to people other than the patient. We estimate that three quarters of the patients using the hospital are driven to the hospital, which means that nearly 39,000 people have to take time off from work or other endeavors to drive someone to the hospital. These drivers would spend more than 77,000 hours driving these patients to Burlington or Rutland if Porter was not in Middlebury. By using the same

analysis as we did in the previous calculation, we conclude that the time saved by drivers is worth \$931,584. (See Table 10).

Table 10
Value of Time Saved to Drivers in FY2001

Number of Drivers	38,816
Total Driving Time	77,632
Total Value to Drivers	\$931,584

Finally, this extra driving for inpatient and outpatient procedures entails direct and indirect costs for the car. Driving the extra 34 miles to Burlington or Rutland means that patients would spend \$1,087,761 on gas, maintenance, and depreciation on their cars. (See Table 11).

Table 11
Savings on Auto Expenses

Number of Trips	49,989
Car Cost per Trip	\$21.76
Total Auto Expense	\$1,087,761

Patients at any hospital, especially inpatients, often have family and friends as visitors. If there was no hospital in Middlebury, these visitors would also have to travel to Burlington or Rutland for their visits. These visitors would also incur additional travel time and auto expenses. These would be real costs to the visitors. We estimate that the average patient receives three visitors per day, which means that there are a total 19,278 visitors each year. If these visitors had to travel to Burlington or Rutland, they would spend more than 38,000 additional hours driving back and forth to visit their friends or relatives. Valuing their time at \$12.00 per hour means their additional travel time would amount to \$462,672. They would also incur 6,426 additional trips (assuming each car carried three visitors) and spend an additional \$140,000 in auto expenses. Therefore, the total savings to visitors by having a local hospital equals \$602,502.

Number of Visitors	19,278
Additional Travel Hours	<u>38,557</u>
Total Value of Visitor Time	\$462,672
Number of Trips	6,426
Car Cost per Trip	<u>\$21.76</u>
Total Auto Expense	\$139,830
Total Visitor Savings	\$602,502

When we add up all of these savings, we conclude that the monetary value of having a local hospital in Middlebury amounts to a total of \$3,864,057 in benefits to patients and their visitors as itemized in Table 13. This includes the value of the time they save by not having to drive a long distance to another hospital and the savings in maintenance and depreciation on their cars from not having to make those trips.

Patients and Drivers	
Time	\$2,173,794
Auto	\$1,087,761
Visitors	
Time	\$462,672
Auto	\$139,830
Total	\$3,864,057

VI. Appendix - The Dynamic Input-Output Model

The central technique that NEC employed to measure the economic impact is through the use of a dynamic input-output model of the relevant portion of Vermont's economy. The use of such a model represents the state-of-the-art technique for measuring the economic impacts of large institutions or private businesses. The input-output model of Addison County's economy was developed specifically for this project at the direction of Northern Economic Consulting, Inc. by Regional Economic Models, Inc. (REMI) of Amherst, Massachusetts.

The REMI model was first developed in 1980 and has been improved and modified since then in response to advances in econometric theory and computing efficiency. The REMI model is a well-established and widely used model of economic behavior at the county, regional, and state level. It incorporates a wide array of baseline geographic information, including detailed information on the age and sex composition of the labor force, detailed wage and productivity levels, industrial sectoral composition and profitability, prices, and a variety of other data.

The REMI model has been used by researchers to measure the economic impacts of institutions as diverse as the Tufts University School of Veterinary Medicine on the Massachusetts economy and the Mystic Seaport expansion on the Connecticut economy. In Vermont Northern Economic Consulting has used the REMI model to measure the economic impacts of the expansion of Fletcher Allen Health Care and the proposed sale of Vermont Yankee Nuclear Power Station in Vernon. The REMI model is widely used by the State of Vermont in the Public Service Department, the Joint Fiscal Office, and the Vermont Economic Progress Council.

By use of this model NEC was able to measure the economic and demographic impact of the proposed facility's operation on incomes, employment, and population in the county.

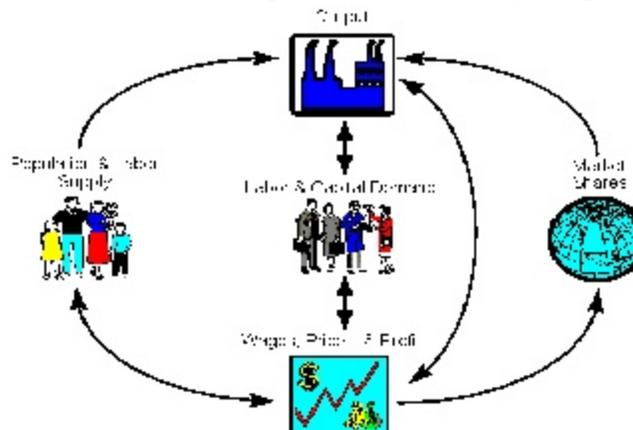
REMI Policy Insight™ is a structural model, meaning that it clearly includes cause-and-effect relationships. The model is based on two key underlying assumptions from mainstream economic theory: households maximize utility and producers maximize profits. Since these assumptions make sense to most people, lay people as well as trained economists can understand the model.

In the model, businesses produce goods to sell to other firms, consumers, investors, governments and purchasers outside the region. The output is produced using labor, capital, fuel, and intermediate inputs. The demand for labor, capital and fuel per unit of output depends on their relative costs, since an increase in the price of any one of these inputs leads to substitution away from that input to other inputs. The supply of labor in the model depends on the number of people in the population and the proportion of those people who participate in the labor force. Economic migration affects the population size. People will move into an area if the real after-tax wage rates or the likelihood of being employed increases in a region.

Supply and demand for labor in the model determine the wage rates. These wage rates, along with other prices and productivity, determine the cost of doing business for every industry in the model. An increase in the cost of doing business causes either an increase in prices or a cut in profits, depending on the market for the product. In either case, an increase in costs would decrease the share of the local and U.S. market supplied by local firms. This market share combined with the demand described above determines the amount of local output. Of course, the model has many other feedbacks. For example, changes in wages and employment impact income and consumption, while economic expansion changes investment and population growth impacts government spending.

Figure 2-1 is a pictorial representation of REMI Policy Insight. The Output block shows a business that sells to all the sectors of final demand as well as to other industries. The Labor and Capital Demand block shows how labor and capital requirements depend both on output and their relative costs. Population and Labor Supply contribute to demand and to wage determination. Economic migrants in turn respond to wages and other labor market conditions. Supply and demand interact in the Wage, Price and Profit block. Prices and profits determine market shares. Output depends on market shares and the components of demand.

Figure 2-1 REMI Policy Insight™ overview



The REMI model brings together all of the above elements to determine the value of each of the variables in the model for each year in the baseline forecast. The model includes all the inter-industry interactions that are included in input-output models in the Output block, but goes well beyond an input-output model by including the linkages among all of the other blocks shown in Figure 2-1.

In order to broaden the model in this way, it was necessary to estimate key relationships. This was accomplished by using extensive data sets covering all areas in the country. These large data sets and two decades of research effort have enabled REMI to simultaneously maintain a theoretically sound model structure and build a model based on all the relevant data available.

The model has strong dynamic properties, which means that it forecasts not only what will happen but when it will happen. This results in long-term predictions that have general equilibrium properties. This means that the long-term properties of general equilibrium models are preserved while maintaining accurate year-by-year predictions and estimating key equations using primary data sources.

Figure 2-2 shows the policy simulation process for a scenario called Policy X. The effects of a scenario are determined by comparing the baseline REMI forecast with an alternative forecast that incorporates the assumptions for the scenario. The baseline REMI forecast uses recent data and thousands of equations to

generate projected economic activity for a particular region. The policy variables in the model are set equal to their baseline value (typically zero for additive variables and one for multiplicative variables) when solving for the baseline forecast. To show the effects of a given scenario, these policy variables are given values that represent the direct effects of the scenario. The alternative forecast is generated using these policy variable inputs. Figure 2-2 shows how this process would work for a policy change called Policy X.

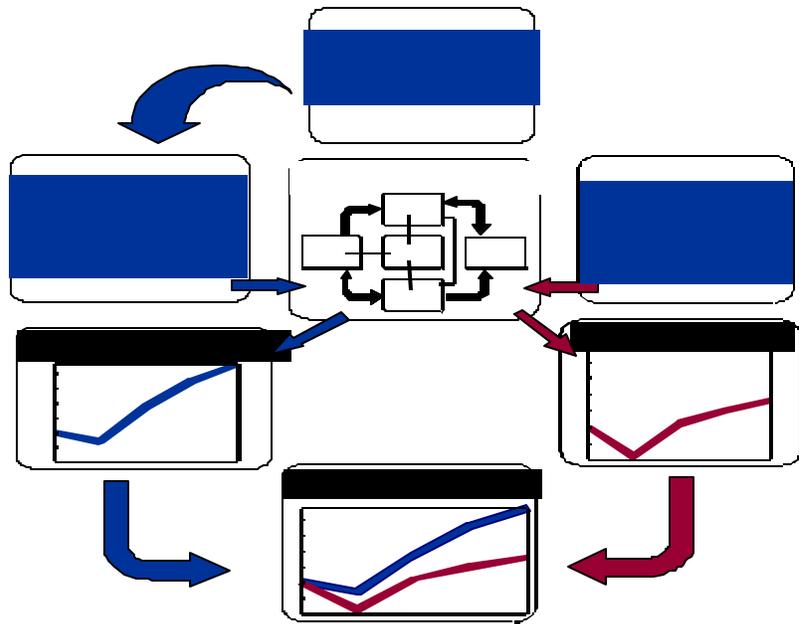


Figure 2-2 Policy X scenario

Regional Economic Models, Inc. (REMI) is the nation's leading provider of economic forecasting and policy analysis software. The REMI Policy Insight model is used by over half of state governments, and numerous consulting firms, cities, and universities. Established in 1980, REMI has published model developments in the *American Economic Review*, the *Review of Economics and Statistics*, and other highly regarded publications.