Local Economic Impact of Sudbury Regional Hospital and Other Health Care Institutions

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Local Economic Impact of Sudbury Regional Hospital and Other Health Care Institutions

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The opinions expressed in the document are those of the authors and do not necessarily reflect the views of the partner organizations in this study.

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EXECUTIVE SUMMARY

A health care institution like a hospital or a nursing home provides a service to a community and thereby contributes to the health and well-being of the residents. But does it do more than that? From an economic perspective, a health care institution is no different than any other business or organization in a community: it hires people and pays them wages, it buys goods and services from local and non-local suppliers, it pays local taxes and it receives income from its "customers". In other words, besides making health services available to the residents, a health care institution has an economic impact on the community in which it is located.

An appreciation of the economic impact of the health care sector would contribute to a better understanding of its role in the overall economic development of the Sudbury region. To this end, the Centre for Rural and Northern Health Research (CRaNHR) at Laurentian University, with the cooperation of l'Hôpital Régional de Sudbury Region Hospital (HRSRH), the physician community, Northeastern Ontario Regional Cancer Centre (NEORCC), Northeast Mental Health Centre (NEMHC), Pioneer Manor, Extendicare Falconbridge, Extendicare York and Garson Manor, conducted a study of the economic impact of these health care institutions in collaboration with Informetrica Limited, an Ottawa-based economic consulting firm. The study was financially supported by FedNor and HRSRH.

Nature of Economic Impact Study

Economic impact studies determine the changes in economic activities that occur as a response to an economic stimulus. Such studies measure the effects of the economic stimuli in the form of incomes, jobs and taxes. The economic stimuli being measured in this study are those generated by the aforementioned publicly-funded health care institutions in the Sudbury region. The income impact reported here is the Gross Domestic Product (GDP) at factor cost generated within the Sudbury region by these health care institutions. Employment impacts reported here are measures of local employment generated by these institutions. Local tax impacts represent revenue received by the local municipality from the property taxes paid by the health care institutions and their employees. This includes the taxes paid by businesses and their employees in the area who serve the local health care institutions, as well as the institutions' employees. In discussing the economic impact of the health care sector, it is useful to distinguish between the direct effects, indirect effects and induced effects.

The direct effects of the health care institutions are those directly attributable to the institutions and their activities, and are represented by the revenues received and the expenditures they make for labour, services and capital inputs.

Indirect effects include new activities in the local economy as a result of spending on goods and services by the health care institutions. However, not all purchases are local. Spending outside the region for the production of health care services is considered a leakage. Indirect effects are reduced if more non-local purchases are made.

Induced effects are new economic activities in the region originating from the spending out of the incomes of those employed by the local health care institutions and by those employed by local businesses that provide goods and services to the health care institutions. Therefore, the induced effects are the spending and re-spending of income derived directly or indirectly from the health care institutions.

Together, the direct, indirect and induced effects make up the total impact of the economic stimulus being measured.

Data and Methodology

This study used mostly secondary data obtained from a variety of sources. Revenue and expenditure data were provided by each of the participating health care institutions. The exceptions to this were Extendicare York, Extendicare Falconbridge and Garson Manor whose expenditure and revenue data were obtained from the Ministry of Health and Long-Term Care. Average OHIP billings by Sudbury physicians were obtained from the Institute for Clinical Evaluative Sciences. Another source of data was a survey of expenditures by Sudbury-region physicians conducted by CRaNHR. Data from other sources were also used.

An income multiplier was used to determine the total spending and re-spending of incomes by the employees of the health care institutions of concern and the local businesses that provided goods and services to these institutions. The multiplier was calculated through the minimum requirements approach. A Canada-wide cost comparison study was done by Informetrica Limited to help determine the values of the income multipliers used for this study. The multipliers used here incorporated consumer spending and population. The income multiplier used for this study was 2.03.

Economic Impact of Sudbury Regional Hospital

Being one of the largest employers in the Sudbury region, HRSRH employed more than 2,700 people in the 1998/1999 fiscal year, or roughly 2,000 full-time-equivalent (FTE) positions. Its total revenue in 1998/1999 was $170,780,000, with the provincial government contributing roughly 80 per cent of this amount. About 60 per cent of the revenue (or about $100,000,000) was spent on employee wages. Since 99 per cent of the hospital employees lived in the Sudbury region, most of the wages paid remained in the region. The net direct and indirect local income impacts from hospital operations were around $135,000,000. The induced local income impact originating from hospital expenditures was estimated to be over $139,000,000.

In terms of employment impact, it was found that the hospital had a direct and indirect employment impact of 3,018 person-years in 1998/99. The induced employment effect was estimated to be 4,699 person-years.

Another aspect of the hospital's economic impact is the income generated by physicians, particularly specialists, who work at the hospital. A survey of Sudbury physicians conducted by

CRaNHR revealed that roughly 10 per cent of the earnings by non-specialist physicians were derived from work at HRSRH, while about 90 per cent of OHIP billings by specialist physicians were derived from hospital-based services. The analysis showed that the local income impact of physicians attributable to their medical practice at HRSRH was $30,150,000 in 1997/1998 and the total local employment impact was 731 person-years of employment.

The economic impacts of HRSRH and physicians with hospital privilege can be combined to determine the total economic impact they had on the Sudbury region, as shown in the following table. Together, they provided a net local income impact of about $305,154,000 in 1998/99. They also contributed about 8,450 person-years of employment to the Sudbury region.

Sudbury Regional Hospital and Physicians with Hospital Privilege	Direct & Indirect Effect	Induced Effect	Total Impact
Net Income Impact (GDP)	$150,322,356	$154,832,026	**$305,154,382**
Net Employment Impact (person-years)	3,248	5,201	**8,449**
Net tax Impact	$5,550,202	$10,739,594	**$16,289,796**

Economic Impact of Other Health Care Institutions

The economic impact of the other major health care institutions (NEORCC, NEHMC and the four long-term care facilities) is summarized as follows.

NEORCC had 178 full-time employees and 55 part-time employees in the 1999/2000 fiscal year. The cancer centre's net income impact on the local economy was $28,095,659 for the 1999/2000 fiscal year, comprising a direct and indirect income impact of $13,840,226 and an induced income impact of $14,255,433. Its net employment impact was about 804 person-years of employment, comprising a direct and indirect employment impact of 324 person-years and an induced employment impact of 480 person-years.

In 2000, Network North was restructured to become NEMHC by merging with other mental health organizations in northeastern Ontario. However, since the data used in this study were for the 1998/99 fiscal year, the following analysis and results are applicable only to the former Network North. This institution employed 215 full-time and 98 part-time employees, or 274 FTE positions, in the 1998/99 fiscal year. It had a total net income impact of $31,347,479, comprising a direct and indirect income impact of $15,442,108 and an induced income impact of $15,905,371. Its local employment impact was 880 person-years, comprising a direct and indirect employment impact of 344 person-years and an induced employment effect of 536 person-years.

Together, the four long-term care facilities (Pioneer Manor, Extendicare Falconbridge, Extendicare York and Garson Manor) had 944 beds in 1998. The net income impact of these four

facilities on the local economy was $47,860,883 and the net employment impact was 1,581 person-years.

The Overall Picture

Altogether, HRSRH, Sudbury-region physicians, NEMHC, NEORCC, Pioneer Manor, Extendicare Falconbridge, Extendicare York and Garson Manor contributed about $493,391,000 to the local economy and generated 13,817 FTE jobs to the economy of the Sudbury region. The results are summarized in the following table.

All Local Health Care Institutions	Direct & Indirect Effect	Induced Effect	Total Impact
Net Income Impact (GDP)	$246,669,445	$246,721,357	**$493,390,802**
Net Employment Impact (person-years)	5,311	8,506	**13,817**
Net Tax Impact	$9,047,469	$16,897,116	**$25,944,585**

This study has demonstrated the substantial impact of several health care institutions and physicians on the economy of the Sudbury region. It should, however, be pointed that the study did not examine the local economic impact of the entire health care sector since other health services such as home care, public health, health science education and research at Laurentian University and other health-related businesses such as medical laboratories, physiotherapy clinics and pharmacies have not been included in the study. The economic impact would have been considerably greater if all components of the health care sector had been included. Also excluded from the analysis was the economic impact of the construction of the new regional hospital in the City of Greater Sudbury since at the time of data collection, the construction work had just begun.

1. INTRODUCTION

1.1 Introduction

Health care institutions such as hospitals, nursing homes or other health care facilities provide health services to a community and thereby contribute to the health and well-being of its residents. But do they do more than that?

From an economic perspective, health care institutions operate in the same way as other businesses or organizations. They hire people and pay them wages, buy goods and services from local and non-local suppliers, pay local taxes and receive income from their "customers". In other words, besides making health services available to residents, health care institutions have an economic impact on the community in which they are located.

This report presents the results of a study on the economic impact of several major health care institutions, as well as physicians, in the Sudbury region.

1.2 Characteristics of Health care Institutions

There are certain characteristics specific to health care institutions. These distinguish them from other businesses or organizations in the community.

In Ontario, for example, health care institutions receive most of their payments from a third-party, the Ministry of Health and Long-Term Care (MOHLTC), rather than directly from patients receiving care. Although funds are raised through taxation from all residents in Ontario, there is no change in that taxation as a result of a hospital being in a local community. Payments received by local health care institutions from the Ministry are similar to payments from the export sales of metal or timber. To put it more simply, funds received by local, publicly-funded health care institutions do not directly originate from the area.

Another way of thinking about health care services is to recognize that a resident will obtain the services somewhere. For example, if services were not available in Sudbury, one would have to travel to another location to receive these services. In neither case would the Sudbury resident directly pay for the service. There may be some out-of-pocket costs for travel to the other location or for an accompanying person. Such costs are likely to be less if the services are available in Sudbury. Thus, with local services the patient may save some out-of-pocket expenses for other uses.

The economic effect of local health services on a community is quite different from the impact of a new restaurant or a new theatre that diverts spending from other providers. There is only a positive impact in these cases if people from outside the region are attracted to the region or if local residents divert their spending from other locations to the local community.

Thus the impact of the health care sector reflects the local supply of a service that would otherwise be provided elsewhere, coupled with the financing of the service being provided through public funds. In assessing economic impact, these differences between the health care sector and other sectors require explicit treatment.

2. PURPOSE AND METHODOLOGY OF THE STUDY

2.1 Purpose of the Study

The present study aims to provide information on the economic impact of several health care institutions and physicians in the Sudbury region and hence contribute to understanding the health care sector's role in local economic development.

To meet this aim, the Centre for Rural and Northern Health Research (CRaNHR) at Laurentian University, with the cooperation of l'Hôpital Régional de Sudbury Region Hospital (HRSRH), the physician community in the Sudbury region, the Northeastern Ontario Regional Cancer Centre (NEORCC), the Northeast Mental Health Centre (NEMHC, formerly Network North), Pioneer Manor, Extendicare Falconbridge, Extendicare York and Garson Manor, conducted a study of the economic impact of these health care institutions in collaboration with Informetrica Limited, an Ottawa-based economic consulting firm. The study was financially supported by FedNor and HRSRH.

This study measures the economic impact of the aforementioned publicly-funded health care institutions. This is an interesting scenario because the revenue used to generate their economic activities is from a non-local source. As mentioned earlier, public health care in Ontario is funded by the taxation of individuals. Sudbury residents would pay these taxes even if there were no local health care institutions. If these institutions did not exist in the local area, Sudbury residents would have to go somewhere else to receive health care. This is considered throughout this study.

Please note that "physicians" will be referred to as an institution throughout this report, while the hospital and the other agencies will be referred to as either an institution or a facility.

2.2 Nature of Economic Impact Study

An economic impact study determines the changes in economic activities that occur as a response to an economic stimulus. This study measures the changes or effects of the stimulus in the form of incomes, jobs and taxes.

The stimulus that gives rise to an economic impact is referred to as a direct effect, also known as a shock. Direct effects are direct changes in economic activity as a response to an economic stimulus. Depending on the stimulus being measured, these effects may be positive or negative. Other changes that occur in economic activity from an economic stimulus are indirect purchases of goods and services and induced income effects. These additional two effects are a result of changed spending patterns caused by the initial economic stimulus. The direct, indirect and induced effects make up the total impact of the economic stimulus being measured. These effects may involve complex calculations, so computer-based economic models are sometimes used to simplify the measurement process.

2.3 Methodology of the Study

Model

This study measures impact with a Local Economic Impact Model, based on the one designed for the Ontario Arts Council by Informetrica Limited. Each institution has a specific economic model designed to incorporate its operations and to calculate its impact on the local economy. The Appendix presents the methodology as used by Informetrica Limited to apply the data provided by CRaNHR and from other sources.

Concepts and Definitions

As with most disciplines, economists use terms to represent ideas or concepts specific to the topic of study. This study measures the total economic impact of the participating health care institutions on the Sudbury region in terms of the income impact, employment impact and local tax impact. These are reported in the final results produced by the economic impact models. The terms or concepts are defined as follows.

Gross Domestic Product: Gross Domestic Product, or GDP, is the measure of the value of an economy's total production. This includes wages and salaries as well as business returns including depreciation, profits and net interest payments. The unit of measurement for GDP is dollars. Model results for the income impact and local tax impact are reported in terms of GDP.

Income Impact: Income impact in this study refers to GDP that occurs or originates in the local area because of the presence of an economic stimulus. In this case, the income impact represents the dollars brought to the Sudbury region and dollars generated because of spending initiated by the health care institutions. The income impact is a measure of local GDP attributable to the operation of these institutions in the Sudbury region.

Employment Impact: Employment impact is a measure of the local employment generated by the economic stimulus. Employment impact in this study is measured as full-time-equivalents (FTEs). In calculating FTEs, the actual number of people and their hours worked are converted into the equivalent number of full-time staff used or required. The units for this measure are person-years of employment. One person-year of employment would constitute 1,800 hours worked per year, or 7.5 hours per day over 240 days of employment.

Local Tax Impact: Local tax impact in this study represents the revenue received by the local municipality from property taxes. These taxes are paid by the health care institutions and their employees, and by those local businesses and their employees who provide goods and services to the health care institutions and the institutions' employees (hereafter referred to as related businesses). Property taxes that are paid by the health care institutions and reimbursed by the provincial government are also included in this value. The reason for this is that the municipal government receives this tax revenue regardless of whether or not the institutions are reimbursed for their outlay from the provincial government.

In discussing the impacts or effects generated by the health care institutions it is useful to distinguish between the direct effects, indirect effects and induced effects. All these effects add up to create the total impact.

Direct Effects: The direct effects are those directly attributable to the institutions and their activities, and are represented by the revenues received and the expenditures made for labour and capital inputs. Both local and non-local sources of facility revenue are considered because some monies received may not have come into the area or remained in the area without the institutions.

To identify which of the revenues brought into the area are attributable to the institutions, the economic activities that occur locally from institutional spending are calculated. This is known as the gross economic contribution of the local health care institutions. The net economic contribution of the health care institutions are then calculated by subtracting from the gross contribution, the economic activities generated by the institutions that are associated with revenues diverted from other uses in the local area.

Spending at the institutions by those visiting or receiving care and those who live outside the region are included with the direct effects. The outlays of non-local visitors and patients of the institutions with suppliers in the local area are known as ancillary expenditures.

Indirect Effects: Indirect effects include new activities in the local economy as a result of spending on goods and services by the institutions, related businesses in the institutions' production chain, as well as those local businesses that provide goods and services to non-local visitors and patients.

However, not all purchases within the institutions' production chain are local. Thus, spending outside the region for the production of services of local health care institutions is considered a leakage. Indirect effects are reduced if more of these purchases are non-local.

Induced Effects: Induced effects are new economic activities in the local area originating from the spending out of the incomes of employees of the local health care institutions and related businesses within the institutions' production chain. Therefore, the induced effects are the spending and re-spending of the incomes of these employees. Non-local expenditures are considered a leakage.

Ancillary expenditures: As explained under Direct Effects, ancillary expenditures are the amount of money spent by those not from the area and who require hospital services or accompany patients. This would include things such as meals, lodging, transportation, etc.

Leakage: As explained under Indirect Effects and Induced Effects, a leakage is spending outside the local region by a local entity. In other words, a leakage occurs when income leaves the local economy to purchase goods and services from non-local businesses that pay wages to their non-local employees. Thus, when a facility purchases goods and services from non-local sources, the impact of the purchase occurs elsewhere and is treated as a leakage. Leakages include taxes paid outside the region and personal savings.

Leakages are measured and accounted for through the use of income multipliers. Since income multipliers are dependent on the size of the community from which residents receive their income, the size of a local area would affect the amount of leakage that occurs in that community.

In our earlier example, in a larger city, there might have been less spending outside the region at each step. This would have increased the income multiplier and translated into more local activities and employment.

Income Multiplier: The income multiplier is used to determine the total spending and re-spending of incomes by employees of the health care institutions and the local businesses that provide goods and services to these institutions. An increase in total local income from consumer spending and re-spending in the area is the multiplier effect.

Consider the following. A local health care facility pays a direct salary of $100,000 to several health professionals to provide a service that was previously performed elsewhere. Ignoring any profit or depreciation, the direct local income effect is $100,000. Let us assume that $20,000 of the income is saved, and $30,000 spent on imports with the balance of $50,000 spent locally on food, shelter, entertainment, etc. For those who receive the $50,000, some part of it will be spent locally as well. Some will be on wages and salaries, while others on goods and services produced locally. For the sake of discussion, let us assume that $20,000 of the $50,000 is spent locally. In turn, some fraction of it will be re-spent locally, say, $5,000. And this process would continue until the ripples become imperceptible. The initial injection of $100,000 leads to additional local incomes of ($50,000 +$20,000 + 5,000 + $1,000 + $200 + $40 + $8 + $1.60 + $0.32 + $0.06), or $76,250, assuming that each subsequent round leads to about 20% being re-spent within the local community.

The local income multiplier in this example is the ratio of the total local income to the direct local impact. In this example, this is $176,250/ $100,000 or 1.7625.

The above is a very simple example and in reality a robust income multiplier would use more information. These values are complex to calculate because they incorporate consumer-spending patterns and are adjusted for the size of the population of the community.

Non-attributable Local Revenues : Non-attributable local revenues are those revenues received by a local business or institution for a good or service that could be spent locally on something else at a different business or institution. This may include funding that originates from the local area. For example, if a local resident buys a ticket to a local play, this outlay may be at the expense of another local purchase such as a musical performance. In this case, there would be no net local impact from the play's ticket purchase because it substitutes for other local spending.

Gross and Net Impacts: The model for each institution in this study produces two types of results, gross impacts and net impacts. The net impacts are reported throughout this report and are adjusted for non-attributable revenues and non-local expenditures. In other words, gross impacts report non-local and local impacts, while net impacts report only local impacts.

Base-case Scenario: Impact studies use base-case scenarios for comparison of effects with and without the economic stimulus. In our case, the question that arises is: *What would happen without these institutions?*

The simple answer to this question is that residents in the Sudbury region would go elsewhere for services. This may seem highly unlikely today, but it allows us to compare the results of the models used here with an alternative situation. Thus, what would be the alternative? There would most likely be infrastructure set up for emergency medical services such as an air ambulance service and possibly paramedic services that would allow for care while en-route to a location

with proper services. When considering the net local impact in this alternative scenario, it would be considerably less than the status quo. This situation is discussed further in Section 4 under Sudbury Regional Hospital.

Information Requirements

In order to calculate the economic impact of the participating health care institutions in the Sudbury region, information regarding these institutions is required.

The ideal data required by the models include each institution's revenue received by source and the percentage of this revenue from local entities. Expenditure data required include monies paid for labour and non-labour components. The percentage or amount of these expenditures received by local residents and businesses is also needed. Information regarding employees of these institutions includes the total number of hours of paid employment and the average local property tax paid per full-time employee. The number of visitors to the facility and the number of visitors from or residing in the local area are also required. Finally, if available, the number of volunteers at the facility is useful. Other data needed include local average wages and population. Average ancillary expenditures are required as well.

Data Acquisition and Manipulation

This study used mostly secondary data obtained by CRaNHR from a variety of sources. Revenue and expenditure data were provided by each of the participating institutions. The exceptions to this were Extendicare Falconbridge, Extendicare York and Garson Manor, whose revenue and expenditure data came from MOHLTC. Some expenditure and revenue data provided by both Extendicare facilities were not suitable for their respective models. However, this information was used for fine-tuning the General Long-Term Care Model (discussed later). Average physician billings paid by OHIP was provided by Dr. Ben Chan of the Institute for Clinical Evaluative Sciences.

The expenditure and revenue data for HRSRH were for the 1998/1999 fiscal year. Data provided by NEMHC were also for the 1998/1999 fiscal year and hence applicable only to the former Network North. (Network North was restructured to form NEMHC in 2000 by merging with other mental health organizations in northeastern Ontario. Because the data used in this study were for 1998/1999, the analysis and results are applicable only to Network North. To avoid misinterpretation, the name of the pre-restructured agency - Network North - is used in the rest of this report.) Data from NEORCC were for the 1999/2000 fiscal year. Long-term care centre data used in this report were for the calendar year of 1998 and physician billing data and numbers used here were for the 1997/1998 fiscal year. Because of the differences in fiscal year, reader discretion is advised when reviewing the combined results from this report. This is not a major factor with the reporting of the results. However, the total combined impact of these facilities should be viewed with these discrepanies in mind.

The quotient of gross wages paid and FTE employment was done for each facility to calculate its average wage. Please note that average employee wage is mainly used to determine employment impacts. This does not affect expenditure estimates or calculations.

The local tax coefficient that represents Sudbury region property taxes per job was estimated to be $1,522. This value was used throughout the study. The average weekly earnings for the

Sudbury region was estimated to be $557. This value originated from the 1996 Census data and was adjusted to 1998 dollars (index of 1.025) for an amount of $571 per week. FTE was calculated consistently throughout the model by dividing each facility's total number of paid hours by 1,800 hours per year, or 7.5 hours over 240 days per year. NEORCC provided the number of FTE staff on March 31, 2000.

The number of hours worked, on average, for physicians came from Statistics Canada.[1] This information was provided by type of physician, which allowed for data by type. The average annual hours worked by a non-specialist physician was found to be 2,285 hours and the average annual hours worked by a specialist physician was found to be 2,306 hours. Specialists and non-specialists were disaggregated because of the differences in gross billings received by each type of physician. Sudbury specialists, on average, received about 60 per cent more gross OHIP billings than did non-specialists during the 1997/1998 fiscal year.

The Canadian Medical Association provided a guideline of 40 per cent for physician overhead expenses as a percentage of total billing. Further study from a variety of published medical sources allowed for a breakdown of average overhead costs.[2]

The percentage of OHIP billings by physicians from work at HRSRH came from the survey of physicians conducted by CRaNHR. From this information, it was determined that roughly 10 per cent of non-specialist physician billings came from hospital-based services, while roughly 90 per cent of total OHIP billings received by specialist physicians came from hospital-based services.

FTE employment for Garson Manor and Extendicare York was estimated from a general long-term care model. Blackburn Lodge provided Informetrica Limited with general guidelines for wages and FTE employment levels for running a retirement residence and a long-term care facility. From this information and data provided by the long-term care facilities and MOHLTC, FTE employment and expenditures at a long-term care facility could be calculated with minimal information. Table 2.1 shows the percentage differences between the actual employment, wage expenditure and current expenditure with the estimated employment, wage expenditure and current expenditure for each long-term care facility used in this study. Data from all four institutions were used to determine the nursing and nursing administration FTE values produced by the general model. The General Long-Term Care Model also calculates impacts like the other models used here, but assumes the current budget is balanced.

[1] Rashid, A. "Earnings of Physicians." *Perspectives: On Labor and Income* (Statistics Canada, Catalogue no. 75-001-XPE) 11, no. 4 (Winter 1999): 27-38.

[2] See Section 6 on Physicians for further details.

Table 2.1

Per Cent Differences Actual Data vs. General Model	FTE Employment	Wage Expenditure	Current Expenditure
Pioneer Manor	0.04%	0.01%	0.04%
Extendicare Falconbridge	0.59%	0.11%	-0.07%
Extendicare York	used estimate	0.11%	-0.29%
Garson Manor	used estimate	0.10%	0.03%

3. COMBINED RESULTS

3.1 Total Economic Impact of Participating Institutions

Results of all participating institutions were combined to determine the total impact they have on the local economy. Altogether, HRSRH, Sudbury region non-specialist and specialist physicians, Network North, NEORCC, Pioneer Manor, Extendicare Falconbridge, Extendicare York and Garson Manor contributed $493,390,802 to the local economy and generated 13,817 FTE positions locally. When considering municipal tax revenue, these institutions provided a net impact of $25,944,585 per year. Table 3.1 shows the combined results.

Table 3.1

All Participating Health Care Facilities	Direct & Indirect Effect	Induced Effect	Total Impact
Net Income Impact (GDP)	$246,669,445	$246,721,357	**$493,390,802**
Net Employment Impact (person-years)	5,311	8,506	**13,817**
Net Tax Impact (property tax)	$9,047,469	$16,897,116	**$25,944,585**

3.2 Revenues and Expenditures

As shown in Table 3.2, combined expenditures of all health care institutions in this study were $276,422,386. The majority of these expenditures were labour expenditures. The table also notes each institution's local expenditures as a proportion of their total expenditures, and each institution's labour expenditures as a percentage of total expenditures. Total local expenditures made by these institutions were $210,979,356 during the 1998 fiscal year.[3]

[3] All NEORCC data are for the 1999/2000 fiscal year. Physician data are for the 1997/1998 fiscal year. HRSRH and Network North data are for the 1998-1999 fiscal year. These numbers are included in the total. Operating expenditures and total employment should not differ greatly from year to year with health care facilities.

Table 3.2

Expenditures*	Expenditures *used in the models*	Per Cent Local	Per Cent Non Local	Per Cent Labour**	Per Cent Non-Labour
HRSRH	**$176,291,520**	75%	25%	73%	27%
NEORCC	**$17,906,986**	76%	24%	73%	27%
Network North	**$20,086,743**	79%	21%	77%	23%
All Local Physicians	**$30,044,249**	65%	35%	***25%	***17%
Pioneer Manor	**$10,645,744**	94%	6%	83%	17%
Garson Manor	**$2,561,353**	91%	9%	74%	26%
Extendicare York	**$10,402,856**	88%	12%	67%	33%
Extendicare Falconbridge	**$8,482,935**	89%	11%	69%	31%
All Facilities	**$276,422,386**				

* See discussion in Section 2.3 for fiscal year specification
** Including benefits
***Assumed physicians spend 25% of total billings on labour, and 17% on non-labour expenses

The income multiplier helped to calculate the total local income impact of $493,390,802 as a result of local spending from these health care institutions. The multiplier was calculated through the minimum requirements approach as described in papers by Edward Ullman & Michael Dacey[4] and Craig Moore.[5] A Canada-wide cost comparison study was performed by Informetrica Limited to help determine the values of the income multipliers used for this study and the Ontario Arts Council study. The multiplier used here incorporated consumer spending and population. Please note that the population of the Sudbury Region used in this study was 160,488.[6] The income multiplier used for this study was 2.03.

3.3 Expenditures and Employment

Labour expenditures, as shown in Table 3.3, make up a significant component of total expenditures. The cases shown below include benefit payments by the institutions for their employees. Physicians' labour expenditures were estimated to be approximately 60 per cent of total overhead costs, or 25 per cent of received OHIP billings.

[4] Ullman, E. and M. Dacey. "The Minimum Requirements Approach to the Urban Economic Base" in Papers and Proceedings of the Regional Science Association, vol. 6, 1960.

[5] Moore, C. "A New Look at the Minimum Requirements Approach to Regional Economic Analysis" in Economic Geography, vol. 51 no. 4, 1975.

[6] This figure came from the 1996 Census.

Table 3.3

Expenditures*	Labour Exp. (% of total) (incl. Benefits)	Facility FTE Empl. person-years	Net Income Impact
HRSRH	73%	2163	**$275,001,163**
NEORCC	73%	191	**$28,095,659**
Network North	77%	274	**$31,347,479**
All Local Physicians	**25%	289	**$111,085,619**
Pioneer Manor	83%	210	**$16,213,842**
Garson Manor	74%	49	**$3,877,002**
Extendicare York	67%	176	**$14,873,268**
Extendicare Falconbridge	69%	144	**$12,896,771**
All Facilities		3495	**$493,390,802**

* See discussion above for fiscal year specification

** Assumed physicians spend 25% of total billings on labour

Physician FTE number represents physicians only, not their employees

Italics are estimates from General Long-Term Care Model

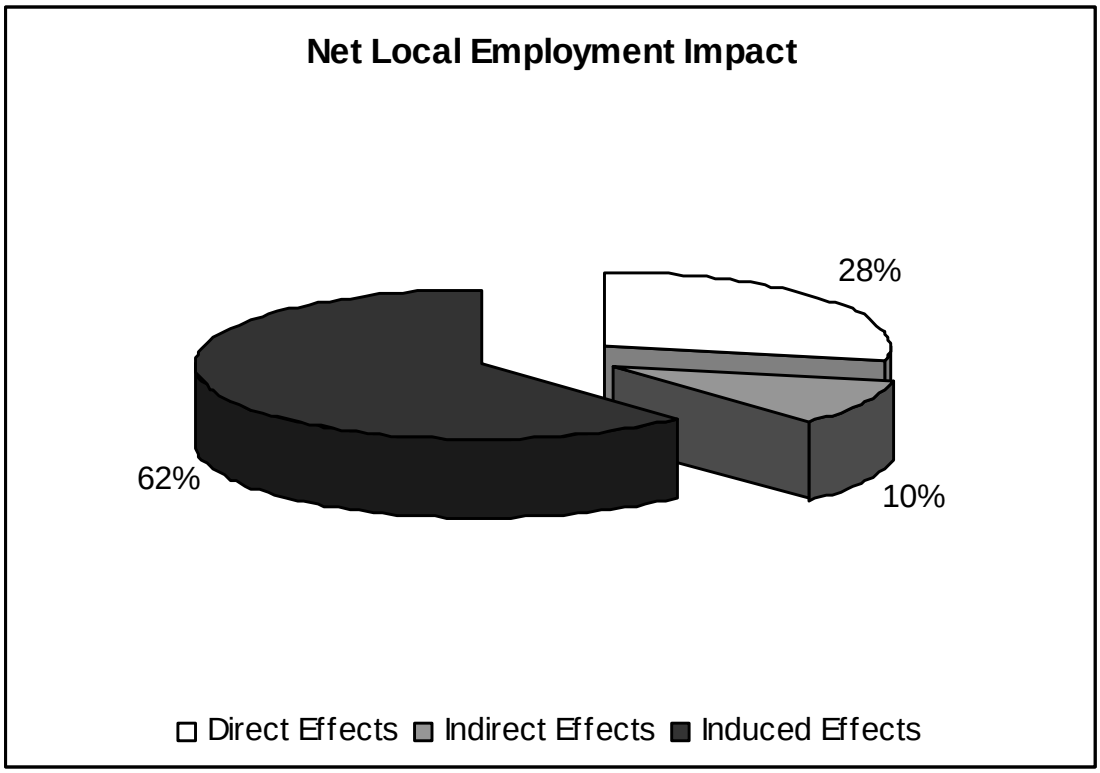
The effects of the net employment impact are shown in Table 3.4.

Table 3.4

	Net Employment Impact			
	Direct Effects	**Indirect Effects**	**Induced Effects**	**Total Impact**
HRSRH	2,163	855	4,699	**7,718**
NEORCC	191	133	480	**804**
Network North	274	71	536	**880**
All Local Physicians*	679	227	1,929	**2,834**
Pioneer Manor	210	39	300	**549**
Garson Manor	49	8	66	**123**
Extendicare York	176	55	275	**507**
Extendicare Falc.	144	38	220	**402**
All Facilities	3,885	1,426	8,506	**13,817**

* Includes employees of physicians

The following chart helps to show the direct, indirect and induced employment effects as a percentage of the total employment impact.



Induced employment at 62 per cent is shown to be a major part of the employment impact generated by these health care institutions. This can be attributed to the spending and re-spending of incomes_received by the institutions' employees and the employees of those businesses that supply goods and services to these health care institutions.

3.4 The Base-Case Scenario

When considering the aforementioned effects against the base-case scenario, or no local health care institutions, several differences would be present. With no local health care institutions, Sudbury residents would have to go elsewhere for health-related services. An air ambulance service may be put in place, but the impact of this option would be much less than the status quo. Those employed by a health care institution would both work and live elsewhere, or would work in the local area with a different occupation. Thus, because there is no economic stimulus from health care institutions in the base case, the net economic impacts of local health care institutions in the base case are minimal. The results from the models used in this study represent the difference between the status quo and the base-case scenario.

Details regarding the economic impact of each institution and the differences between the status quo and the base-case scenario are further discussed in the following sections of this report.

4. SUDBURY REGIONAL HOSPITAL

4.1 Economic Impact of Sudbury Regional Hospital

As a major employer in the region, HRSRH provided a direct employment impact of 2,163 person-years during the 1998/1999 fiscal year. Its net local income impact of $275,001,163 helped to generate 7,718 person-years of employment in the Sudbury region and $11,810,406 in local tax revenue. These impacts are given in Table 4.1.

Table 4.1

Sudbury Regional Hospital	Direct & Indirect Effect	Induced Effect	Total Impact
Net Income Impact (GDP)	$135,468,553	$139,532,610	**$275,001,163**
Net Employment Impact (person-years)	3,018	4,699	**7,718**
Net Tax Impact (property tax)	$4,658,021	$7,152,386	**$11,810,406**

To understand the impact of the local hospital, the base-case scenario of no local hospital, and a case with a different-sized local hospital will be discussed at the end of this section.

Income Impact

Direct and Indirect Effects: HRSRH's total revenues for the 1998/1999 fiscal year were $170,780,000. The provincial government contributed roughly 80 per cent of this amount, or $136,611,691, all of which was a non-local source of revenue. Ancillary revenues were brought to the local area by those from elsewhere who either visited patients in the hospital or travelled with hospital patients. This brought about $6,000,000 into the area in the year.

About 60 per cent of total hospital revenues were spent on employee wages and salaries. This was about $100,000,000 for the 1998/1999 fiscal year. Since 99 per cent of hospital employees lived in the area, most of the wages paid to employees remained in the region. The net direct and indirect income effects from hospital operations were around $135,000,000 in 1998/1999.

Induced Effects: The income multiplier helps to calculate induced local income. Induced effects from hospital operations include the spending and re-spending of incomes that originate from local hospital expenditures. Thus, total income generated from these induced activities will eventually exceed the initial hospital expenditures on salaries and fees. The induced income impact originating from hospital expenditures was $139,532,610.

Consideration of leakage in this case is important because it affects induced local income. For example, HRSRH's employee benefits suppliers are not in Sudbury. Thus, the money paid by the hospital for its employees' benefit package is to a non-local entity. However, the benefits claimed by hospital employees are paid in the local area. The leakage is the difference in money paid by

the hospital to its insurer and the monies received by hospital employees making a benefit claim. There would be no major leakage in this case if the benefit providers were local businesses (i.e., local dentists, physiotherapists, etc.)

Employment Impact

Direct and Indirect Effects: HRSRH is a large facility. It employed more than 2,700 people during the 1998/1999 fiscal year, or roughly 2,000 FTE positions. The direct and indirect employment impact from this facility was found to be 3,018 person-years.

Induced Effects: The induced employment effect was calculated as 4,699 person-years. This employment measure takes into account the induced demand created by the spending of hospital employees as well as employees of businesses that provide goods and services to the hospital.

Volunteer Effects: Unpaid volunteer efforts were measured for HRSRH. The value placed on the work efforts of the hospital's volunteers includes direct employment of 47 person-years and direct income of about $1,300,000. This was calculated using the local average wage of $571 per week. These efforts are not recorded in local economic output nor are they included with local GDP. However, these efforts to help those employed by the facility and its patients ultimately provide a positive effect on hospital operations.

Local Tax Impact

Direct and Indirect Effects: The direct and indirect impact on local taxes was about $4,658,021 during the 1998/1999 fiscal year.

Induced Effects: The net contribution of induced local taxes from hospital operations was $7,152,386 during the 1998/1999 fiscal year.

4.2 Economic Impact of Physicians with Hospital Privilege

Physicians included in this study are specialists and non-specialists. Non-specialist physicians include family physicians and general practitioners, as well as family physicians with additional emergency medicine training. Similar attributions of these two groups include fee-for-service payments received from OHIP and revenues received from procedures performed that are not covered by OHIP. This section discusses both non-specialist and specialist physicians with hospital privilege and the impact their hospital-based work has on the region’s economy. There was also a Physician Impact Model created to incorporate all activities by all physicians, not just those with hospital privilege. The results of the Physician Impact Model will be discussed in Section 6.

Results from the Physicians with Hospital-Privilege Model are shown in Table 4.2. Results indicate that net local income impact attributable to their work at the hospital was $30,153,219 for the 1997/1998 fiscal year, net local employment impact was 731 person-years of employment and net local tax revenue was $4,479,390.

Table 4.2

Physicians with Hospital Privilege	Direct & Indirect Effect	Induced Effect	Total Impact
Net Income Impact (GDP)	$14,853,802	$15,299,416	**$30,153,219**
Net Employment Impact (person-years)	229	502	**731**
Net Tax Impact	$892,182	$3,587,208	**$4,479,390**

4.3 Combined Economic Impact of Sudbury Regional Hospital and Physicians with Hospital Privilege

The economic effects determined for HRSRH and physicians with hospital privilege can be combined to determine the total impact these institutions have on the Sudbury region. Please note physicians' results are for the 1997/1998 fiscal year and HRSRH's results are for the 1998/1999 fiscal year.

The hospital and physicians with hospital privilege provided a net local income impact of $305,154,382 for 1998.[7] They also contributed 8,449 person-years of employment to the Sudbury region. Municipal tax revenue attributable to both the hospital and physicians with hospital privilege was estimated to be $16,289,796. The results are shown in Table 4.3.

Table 4.3

Sudbury Regional Hospital and Physicians with Hospital Privilege	Direct & Indirect Effect	Induced Effect	Total Impact
Net Income Impact (GDP)	$150,322,356	$154,832,026	**$305,154,382**
Net Employment Impact (person-years)	3,248	5,201	**8,449**
Net Tax Impact	$5,550,202	$10,739,594	**$16,289,796**

[7] The results for physicians are for the 1997/1998 fiscal year. HRSRH's results are for the 1998/1999 fiscal year. This fact will not change the magnitude of the impact these institutions have on the Sudbury region.

4.4 Combined Economic Impact of Sudbury Regional Hospital and All Local Physicians

Impact results from the Sudbury Regional Hospital Model were combined with those from the Local Physician Impact Model to be discussed in Section 6. The total net income impact to the Sudbury region by the hospital and all local physicians was estimated to have been $386,086,782 during 1998.[8] HRSRH and Sudbury's physicians also generated a significant amount of employment in the region. The net local employment impact was 10,552 person-years and their net local tax impact was $20,415,163. Table 4.4 shows the results.

Table 4.4

Sudbury Regional Hospital and All Local Physicians	Direct & Indirect Effect	Induced Effect	Total Impact
Net Income Impact (GDP)	$193,810,322	$192,276,460	**$386,086,782**
Net Employment Impact (person-years)	3,924	6,628	**10,552**
Net Tax Impact (property tax)	$6,376,248	$14,038,915	**$20,415,163**

4.5 The No Hospital Case

Without a local hospital, individuals requiring hospital services would have to go elsewhere to receive care. This would increase travel time to a hospital for all local residents and travel expenses may be incurred. Travel expenses may be partially covered for the patients by, for example, the Northern Health Travel Grant Program, but their companions and visitors would likely absorb their own transportation and meal costs.

Direct and Indirect Effects

The local community would not receive expenditures from a major employer that is funded by non-local sources. For the 1998/1999 fiscal year, local expenditures by HRSRH were in excess of $132,000,000. Since hospitals normally employ a significant number of people, there would be a loss of roughly 2,000 direct FTE positions in the case of HRSRH. This would also cause lower local labour demand due to the loss of indirect and induced employment attributed to hospital operations. Lower local employment levels would also contribute to lower municipal revenues.

Induced Effects

[8] The results for physicians are for the 1997/1998 fiscal year. HRSRH's results are for the 1998/1999 fiscal year. This fact will not change the magnitude of the impact these institutions have on the Sudbury region.

The hospital's induced effects on the local economy originate from the spending and re-spending of incomes by its employees and the employees of its suppliers of goods and services. This induced spending may be at local gas stations, grocery stores and other services. Thus, without a local hospital, the induced local effects originating from these employees would not be present.

Physician Effects

The economic impact of the local physicians would decrease without a hospital. Since they would not able to provide hospital-based services, they would either have to leave or start a local practice. Physicians would likely meet the demand for procedures that can be performed within a surgical suite. Other operations would have to be done elsewhere. Local physicians may also be more prone to sharing a clinical practice. Without the presence of a hospital, they are likely to see a reduction in their total billings and net income. The impact they have on the local economy from their medical practice at the hospital has been discussed in Section 4.2 above.

4.6 The Case of a Different-Sized Hospital

Direct and Indirect Effects

The marginal effect of increasing the number of beds and ensuing changes must be determined when considering a different-sized hospital. This includes employment within the facility and the local area.

Increased capacity and services provided by an increase in hospital size would result in a greater local impact of the facility. The size of this impact would depend on the returns to scale. Factors affecting these returns include the cost of adding another bed or procedure, local labour force capacity and service sector capacity. It is expected that a 10 per cent increase in the capacity of the hospital can be achieved with less than a 10 per cent increase in total costs. These effects would imply an economic impact equal to the increase in resources, but less than the increase of hospital capacity.

Induced Effects

Induced labour demand attributable to the local hospital would increase with an increase in the hospital's labour expenditure. This increase in labour demand within the induced sector has positive implications for the entire local economy, which includes higher economic output, employment levels and tax revenue.

Other Comments

It should be noted that the impacts of changes within hospitals are complex and asymmetric. Marginal returns are not equal with each type of change. More revenue may be retained by a hospital if they add beds rather than increase the number of operating rooms at one point in time, with the opposite result at another point in time. Therefore, adding or subtracting ten beds may have different direct and indirect effects. Focusing on these details is beyond the scope of the present study.

5. OTHER MAJOR HEALTH CARE INSTITUTIONS

5.1 Pioneer Manor

Pioneer Manor is a long-term care facility located in the City of Greater Sudbury. During 1998, it had 342 beds available for residents for a total of 124,830 resident-days. Employment was 127 full-time people, with an additional 148,500 paid hours for part-time and temporary staff. The municipal government contributed $2.47 per resident per day to Pioneer Manor for a total in excess of $300,000 for 1998.

The facility's total net income impact on the local economy was $16,213,842 during 1998. The direct and indirect income impact Pioneer Manor had on the local economy was $7,987,114 and the induced local income impact was $8,226,728. Its total net employment impact of 549 person-years consisted of 249 person-years of direct and indirect employment and 300 person-years of induced employment. The $835,704 in local tax revenue consisted of a net direct and indirect local tax impact of $378,863, and an induced local tax impact of $456,840. The gross ancillary spending by people visiting residents at this facility was estimated to be $17,425. This was based on an estimated 200 non-local visitors to residents of the facility. Table 5.1 shows the results.

Table 5.1

Pioneer Manor 342 beds	Direct & Indirect Effect	Induced Effect	Total Impact
Net Income Impact (GDP)	$7,987,114	$8,226,728	**$16,213,842**
Net Employment Impact (person-years)	249	300	**549**
Net Tax Impact (property tax)	$378,863	$456,840	**$835,704**

Data

The number of visitors from outside the Sudbury region was estimated to have been 200 persons. Volunteer contributions were not calculated for Pioneer Manor. Revenue and expenditure information came from Pioneer Manor's "1998 Long-Term Care Facility Annual Report" for MOHLTC. Expenditure information for this facility came from Sections "C" through "F" in the report. All data reported within these sections were used for the model. The revenue information used for Pioneer Manor came from lines M009 and M011 in Section "M".

Summary

Pioneer Manor, a municipal-run facility, does not appear to pay local property tax. Therefore, its local tax impact is from tax paid by its employees and those from the local area who provide goods and services to the facility, its employees and patrons.

The direct and indirect income impact per bed per year was $23,354, while the induced income impact per bed per year was $24,055. The total income impact per bed was $47,409. Cost per bed per day was $85 and revenue per bed per day was $85. Direct and indirect employment per bed was 0.73 person-years and induced employment per bed was 0.88 person-years. Total employment per bed was 1.61 person-years. In terms of direct employment, the facility provided 0.6 person-years per bed.

The above calculations were based on 342 beds available at the facility, current expenditures of $10,645,744 for cost per bed per day, and revenues of $10,632,995 for revenue per bed per day. The direct employment per bed per day was calculated from the FTE employment at the facility of 209.5 person-years. All other calculations were based on model results.

5.2 Extendicare Falconbridge

During 1998, Extendicare Falconbridge had 234 beds available for 85,410 resident-days. Over the year, the facility provided 259,428 paid hours of employment, or 144 person-years of employment. This included 199,276 paid on-site-hours, or 111 person-years of employment, for direct nursing and personal care.

The facility's total net income impact on the local economy was $12,896,771 during 1998. The direct and indirect income impact Extendicare Falconbridge had on the local economy was $6,353,089 and the induced local income impact was $6,543,682. Its total net employment impact of 402 person-years consisted of 182 person-years of direct and indirect employment and 220 person-years of induced employment. The $867,304 in local tax revenue consisted of a net direct and indirect local tax impact of $531,878, and an induced local tax impact of $335,426. Table 5.2 shows these results. The facility paid $255,173 in municipal property tax. This was included in the direct and indirect local tax impact. The provincial municipal tax subsidy for 1998 was $41,528.

The contribution of volunteers at Extendicare Falconbridge was calculated. The value of their employment was 2.78 person-years, representing $76,194 of non-compensated income. The gross ancillary spending by those visiting residents of the facility was estimated to be $17,425. This number was based on an estimated 200 visitors from outside the local area.

Table 5.2

Extendicare Falconbridge 234 beds	**Direct & Indirect Effect**	**Induced Effect**	**Total Impact**
Net Income Impact (GDP)	$6,353,089	$6,543,682	**$12,896,771**
Net Employment Impact (person-years)	182	220	**402**
Net Tax Impact (property tax)	$531,878	$335,426	**$867,304**

Data

The number of visitors from outside the Sudbury region was estimated to have been 200 persons. Revenue and expenditure information came from Extendicare Falconbridge's "1998 Long-Term Care Facility Annual Report" for MOHLTC. Expenditure information for this facility came from Sections "C" through "F" in the report. Depreciation (line F104) was not included with the current expenditures because it is a non-cash item. The revenue information used for Extendicare Falconbridge came from lines M009 and M011 in Section "M". Tax subsidy information was taken from line I012 in Section "I" of the annual report. The volunteer and employment data (total paid hours) were provided by the facility.

Summary

The direct and indirect income impact per bed per year was $27,150, while the induced income impact per bed per year was $27,964. The total income impact per bed was $55,114. Cost per bed per day was $99 while revenue per bed per day was $95. Direct and indirect employment per bed was 0.78 person-years and induced employment per bed was 0.94 person-years. Total employment per bed was 1.72 person-years. In terms of direct employment, the facility provided 0.6 person-years per bed.

The above calculations were based on 234 beds available at the facility, current expenditures of $8,482,935 for cost per bed per day, and revenues of $8,091,301 for revenue per bed per day. The direct employment per bed per day was calculated from the FTE employment at the facility of 144 person-years. All other calculations were based on model results.

5.3 Extendicare York

During 1998, 288 beds for 105,120 resident-days were available at Extendicare York. Paid on-site-hours for direct nursing and personal care in 1998 was 225,508, or 125 person-years. The direct employment from the General Long-Term Care Model for 1998 was estimated to have been 176 person-years of employment.

The facility's total net income impact on the local economy was $14,873,268 during 1998. The direct and indirect income impact Extendicare York had on the local economy was $7,326,733 and the induced local income impact was $7,546,535. Its total net employment impact of 507 person-years consisted of 231 person-years of direct and indirect employment and 275 person-years of induced employment. The $1,035,094 in local tax revenue consisted of a net direct and indirect local tax impact of $616,025 and an induced local tax impact of $419,068. Table 5.3 shows these results. The facility paid $264,192 in municipal property tax. This was included in the direct and indirect local tax impact. The provincial municipal tax subsidy for 1998 was $44,131. The gross ancillary spending by those visiting residents of the facility was estimated to be $17,425. This number was based on an estimated 200 visitors from outside the local area.

Table 5.3

Extendicare York 288 beds	Direct & Indirect Effect	Induced Effect	Total Impact
Net Income Impact (GDP)	$7,326,733	$7,546,535	**$14,873,268**
Net Employment Impact (person-years)	231	275	**507**
Net Tax Impact (property tax)	$616,025	$419,068	**$1,035,094**

Data

As with Extendicare Falconbridge, the number of visitors from outside the Sudbury region was estimated to have been 200 persons. Revenue and expenditure information came from Extendicare York's "1998 Long-Term Care Facility Annual Report" for MOHLTC. Expenditure information for this facility came from Sections "C" through "F" in the report. Depreciation (line F104) was not included with the current expenditures because it is a non-cash item. The revenue information used for Extendicare York came from lines M009 and M011 in Section "M". Tax subsidy information was taken from line I012 in Section "I" of the annual report. Information concerning the facility's volunteers was not provided.

Summary

The direct and indirect income impact per bed per year was $25,440, while the induced income impact per bed per year was $26,203. The total income impact per bed was $51,643. Cost per bed per day was $99 and revenue per bed per day was $94. Direct and indirect estimated employment per bed was 0.8 person-years and induced employment per bed was 0.95 person-years. Total estimated employment per bed was 1.76 person-years. In terms of direct estimated employment, the facility provided 0.6 person-years per bed.

The above calculations were based on 288 beds available at the facility, current expenditures of $10,402,856 for cost per bed per day, and revenues of $9,834,073 for revenue per bed per day. The direct employment per bed per day was calculated from the estimated FTE employment at the facility of 176 person-years. All other calculations were based on model results.

5.4 Garson Manor

A total of 80 beds were available at Garson Manor during 1998 for a maximum of 29,200 resident-days. The number of paid on-site-hours for direct nursing and personal care was 53,993 for a total of 30 person-years of employment. The direct employment from the General Long-Term Care Model estimated Garson Manor's total employment to have been 49 person-years during 1998.

The facility's total net income impact on the local economy was $3,877,002 during 1998. The direct and indirect income impact Garson Manor had on the local economy was $1,909,853 and the induced local income impact was $1,967,149. Its total net employment impact of 123 person-

years consisted of 57 person-years of direct and indirect employment and 66 person-years of induced employment. The $228,341 in local tax revenue consisted of a net direct and indirect local tax impact of $127,506, and an induced local tax impact of $100,835. Table 5.4 shows these results. The facility paid $40,399 in municipal property tax. This was included in the direct and indirect local tax impact. The gross ancillary spending by those visiting residents of the facility was estimated to be $8,713. This number was based on an estimated 100 visitors from outside the local area.

Table 5.4

Garson Manor 80 beds	Direct & Indirect Effect	Induced Effect	Total Impact
Net Income Impact (GDP)	$1,909,856	$1,967,149	**$3,877,002**
Net Employment Impact (person-years)	57	66	**123**
Net Tax Impact (property tax)	$127,506	$100,835	**$228,341**

Data

The number of visitors from outside the Sudbury region was estimated to have been 100 persons. Revenue and expenditure information came from Garson Manor's "1998 Long-Term Care Facility Annual Report" for MOHLTC. Expenditure information for this facility came from Sections "C" through "F" in the report. Amortization (line F103) was not included with the current expenditures because it is a non-cash item. The revenue information used for Garson Manor came from lines M009 and M011 in Section "M". Information concerning the facility's volunteers was not provided.

Summary

The direct and indirect income impact per bed per year was $23,873, while the induced income impact per bed per year was $24,589. The total income impact per bed was $48,463. Cost per bed per day was $87, while revenue per bed per day was $89. Direct and indirect estimated employment per bed was 0.71 person-years and induced estimated employment per bed was 0.83 person-years. Total estimated employment per bed was 1.54 person-years. In terms of direct estimated employment, the facility provided 0.6 person-years per bed.

The above calculations were based on 80 beds available at the facility, current expenditures of $2,561,353 for cost per bed per day, and revenues of $2,603,531 for revenue per bed per day. The direct employment per bed per day was calculated from the estimated FTE employment at the facility of 49 person-years. All other calculations were based on model results.

5.5 Summary of Long-Term Care Facilities

The four long-term care facilities discussed above provided the City of Greater Sudbury with 944 beds during 1998. All results from the models could be added to determine the net economic

impact of all long-term care facilities discussed in this study. The net income impact of the facilities on the local economy was $47,860,883 and the net employment impact was 1,581 person-years. Total municipal revenue attributable to the activities of these facilities was calculated as $2,966,442. Table 5.5 is a summary of the combined results.

Table 5.5

Sudbury LTC Facilities	Direct & Indirect Effect	Induced Effect	Total Impact
Net Income Impact (GDP)	$23,576,789	$24,284,093	**$47,860,883**
Net Employment Impact (person-years)	719	862	**1,581**
Net Tax Impact (property tax)	$1,654,272	$1,312,170	**$2,966,442**

5.6 Northeastern Ontario Regional Cancer Centre

NEORCC is located in the City of Greater Sudbury and borders the main campus of HRSRH. During the 1999/2000 fiscal year, the cancer centre had 178 full-time employees and 55 part-time employees. This resulted in 191 FTE positions at the facility during the 1999/2000 fiscal year. The main source of revenue for the cancer centre for the year was the provincial government which provided about 90 per cent of the facility's total revenue. Table 5.6 shows revenue by source.

Table 5.6

NEORCC : Revenue by source	**Amount**	**% of total**
Provincial Government		
- Ministry of Health and Long Term Care	$13,743,508	88%
-Northern Ontario Heritage Fund Corp.	$243,000	2%
Research		
- Northeastern Cancer Research Foundation	$644,705	4%
- MRC, NSERC Grants	$197,568	1%
- Pharmaceutical and Other Companies	$436,989	3%
Services	$387,795	2%
Total Revenue	**$15,653,565**	**100%**

The cancer centre's net income impact on the local economy was $28,095,659 for the 1999/2000 fiscal year. Its net employment impact was roughly 804 person-years of employment and its local tax impact was $1,223,387. Table 5.7 shows these results.

Table 5.7

NEORCC	**Direct & Indirect Effect**	**Induced Effect**	**Total Impact**
Net Income Impact (GDP)	$13,840,226	$14,255,433	**$28,095,659**
Net Employment Impact (person-years)	324	480	**804**
Net Tax Impact (property tax)	$492,659	$730,728	**$1,223,387**

Income Impact

The direct and indirect income impact NEORCC had on the local economy was $13,840,226 and the induced income impact was $14,255,433. Ancillary revenues brought to the area attributable to the cancer centre were calculated to have been $206,208. This value included the expenditures of the cancer centre's patients and visitors to the facility. Also included with the ancillary revenues was an estimated one non-local companion per non-local patient visit. About 30 per cent of the cancer centre's 2,035 patient visits came from local residents; while 70 per cent came from those who lived outside the Sudbury region. Of the 115 visitors to the centre, 66 per cent of them, or 76, were from the Sudbury region.

Employment Impact

The direct and indirect employment impact on the local economy was estimated to have been 324 person-years. Induced employment was estimated to have been 480 person-years.

Tax Impact

The facility does not appear to directly pay local property tax. This tax might have been paid indirectly by the facility through their rent to HRSRH.

The direct and indirect local tax impact was calculated as $492,659 and the induced local tax impact was $730,728.

5.7 Network North

Prior to 2000, Sudbury's regional mental health centre was Network North. Most of this facility's 3,000 patients were from the area. Similar to the other health care facilities discussed here, more than 90 per cent of its funding originates from the provincial government. Table 5.8 shows revenue by source for the 1998/1999 fiscal year.

Table 5.8

Network North: Revenue by source	**Amount**	**% of total**
Provincial Government	$18,547,737	93%
Federal Government	$478,433	2%
Services	$388,886	2%
Private Contributions	$431,653	2%
Investment income	$86,273	0%
Total Revenue	**$19,932,982**	**00%**

During the 1998/1999 fiscal year the facility had a net income impact of $31,347,479. Its net employment impact was 880 person-years and the net local tax impact was $1,339,593. Table 5.9 shows the results.

Table 5.9

Network North	Direct & Indirect Effect	Induced Effect	Total Impact
Net Income Impact (GDP)	$15,442,108	$15,905,371	**$31,347,479**
Net Employment Impact (person-years)	344	536	**880**
Net Tax Impact (property tax)	$524,290	$815,303	**$1,339,593**

Income Impact

The direct and indirect income impact on the local economy was $15,442,108 and the induced income impact was $15,905,371.

Employment Impact

Network North employed 215 full-time and 98 part-time employees, or 274 FTE positions. The direct and indirect employment impact was 344 person-years and the induced employment impact was 536 person-years.

Tax Impact

Network North's local tax impact is from tax paid by its employees and those from the local area who supply goods and services to the facility, its employees and patrons. The direct and indirect local tax effect was calculated as $524,290 and the induced tax impact was calculated as $815,303.

6. PHYSICIANS

During the 1997/1998 fiscal year, Sudbury had 282 physicians. Of these, 123 were non-specialists and 159 were specialists.[9] There were 239 physicians with hospital privilege at HRSRH during the 1997/1998 fiscal year. Of these, 70 non-specialists had hospital privilege and 159 specialists had hospital privilege. With this information and data from the physician survey, it was possible to determine the amount of revenues received by physicians attributable to their medical practice at the hospital. These results have been reported in Section 4 as part of the HRSRH results. Section 6 looks at the economic impact of all revenues received by all local physicians.

The net income impact of all local physicians on the Sudbury economy for the 1997/1998 fiscal year was estimated to have been $111,085,619. The net physician employment impact was 2,834 person-years and their net local tax impact was $8,604,757. Table 6.1 shows the results.

Table 6.1

Physicians and their Employees	Direct & Indirect Effect	Induced Effect	Total Impact
Net Income Impact (GDP)	$58,341,769	$52,743,850	**$111,085,619**
Net Employment Impact (person-years)	906	1,929	**2,834**
Net Tax Impact (property tax)	$1,718,228	$6,886,530	**$8,604,757**

6.1 Model

Physicians were disaggregated into non-specialists and specialists. Specialists and non-specialists were disaggregated because of the differences in gross billings received by each type of physician. Sudbury specialists, on average, received about 60 per cent more gross OHIP billings than did non-specialists during the 1997/1998 fiscal year. As a small business, physicians' economic impact is similar to that of other facilities in this study. They have people who work for them, they buy supplies and services and they pay taxes. These factors all contribute to direct, indirect and induced economic impacts. Also similar to the other institutions discussed here, a large portion of physician revenues is provided by a non-local source, OHIP. Physicians' take-home pay was considered along with their overhead expenditures to find the local induced income, employment and tax impacts.

Overhead expenditures were estimated as a percentage of OHIP billings and then used to determine gross physician income. It was assumed that all physicians who did not work solely at

[9] The Institute for Clinical Evaluative Sciences provided the numbers of physicians in Sudbury and their aggregate OHIP billings.

the hospital had overhead expenses. A variety of sources were used to estimate overhead expenditures, including the Canadian Medical Association, the College of Family Physicians of Canada, the American Academy of Family Physicians and Statistics Canada.

It was found that overhead expenditures changed by specialty. Non-specialists spent a higher proportion of their gross billings (40 pre cent) on overhead expenses when compared with specialists (>30 per cent). This could be attributed to the differences in average gross billings. Specialists, on average, received about 60 per cent more in gross billings. This information concerning overhead expenses was from survey data, and apparently only the costs of physically running a practice were included. The differences in costs between physicians by type, for items such as malpractice insurance and licensing fees did not appear to be included in these values. For the purposes of this study, an estimate of physicians' gross take-home pay is required. Thus, it is considered reasonable to take a value of about 60 per cent of total gross billings received as the physicians' gross take-home pay. Further explanation of physician expenses and costs is beyond the scope of this study. Table 6.2 shows physician overhead expenditures as a percentage of OHIP billings.

Table 6.2

Physician Overhead Expenditures	**Insurance Billing Per Cent**
Labour Expenditure	
-Average Annual Expense	25%
Non-Labour Expenditure	
-Goods and Services	5%
-Equipment and Supplies	4%
-Building	8%
Total Overhead Expenditures	**42%**

6.2 Marginal Effects of Additional Local Physicians

The economic impact of additional physicians in the Sudbury region was also considered. This may be required in the case of a supply constraint, where the adequate provision of services depends on the number of service providers.

One probable reason for adding a physician is to substitute for work otherwise done by another physician. The impact in this case would be incremental and less than the cases discussed below. This situation is beyond the scope of this study, but would make for an interesting case study. Another probable reason for adding a physician is to offer services not otherwise provided. In this case, the net impact on the region would be generated from their gross billings. Three cases are used to discuss this situation.

Case one measures the addition of one specialist physician; case two measures the addition of one non-specialist physician; while case three measures the addition of one specialist and one non-specialist physician. An assumption made in all three cases is that the average OHIP billings received after a physician is added remain the same. In reality, there would be a point where the addition of a physician results in less revenue received from OHIP, on average, by other local physicians. Consideration of this possibility is beyond the scope of this study. Due to no change in inputs other than the number of physicians, the marginal returns in the three cases discussed here are positive.

Adding a Specialist Physician

In case one, the effects from the addition of one specialist physician (160) versus the status quo (159) are shown. The net income impact generated by this scenario was calculated to be $461,380 for the 1997/1998 fiscal year. This effect includes the income received, on average, by the specialist physician and his/her spending on local labour and supplies. This effect also includes the spending of the physician's take-home pay.

The net employment impact generated from one additional specialist physician, provided revenues remain the same as the status quo, was found to be 12 FTE employees. This includes the physician, his/her employees and the employees of those businesses that provide goods and services to the physician as a business and as a consumer. This also includes induced employment generated from the spending of income by the employees of the physicians.

Finally, the net local tax impact generated by another specialist physician was estimated to be $36,061. This represents the revenue received by the municipal government because of the addition of one specialist physician.

Table 6.3 shows these effects in greater detail.

Table 6.3

Physicians and their Employees Difference, Case 1 less Status Quo	**Direct & Indirect Effect**	**Induced Effect**	**Total Impact**
Net Income Impact (GDP)	$242,315	$219,065	**$461,380**
Net Employment Impact (person-years)	4	8	**12**
Net Tax Impact (property tax)	$6,571	$29,490	**$36,061**

Adding a Non-Specialist Physician

For case two, the addition of one non-specialist physician generated a net income impact of $289,641 and a net employment impact of 8 person-years of employment. The net local tax impact was $22,038. Table 6.4 shows these results in greater detail.

Table 6.4

Physicians and their Employees Difference, Case 2 less Status Quo	Direct & Indirect Effect	Induced Effect	Total Impact
Net Income Impact (GDP)	$152,118	$137,522	**$289,641**
Net Employment Impact (person-years)	3	5	**8**
Net Tax Impact (property tax)	$5,178	$16,860	**$22,038**

Adding a Specialist and a Non-Specialist Physician

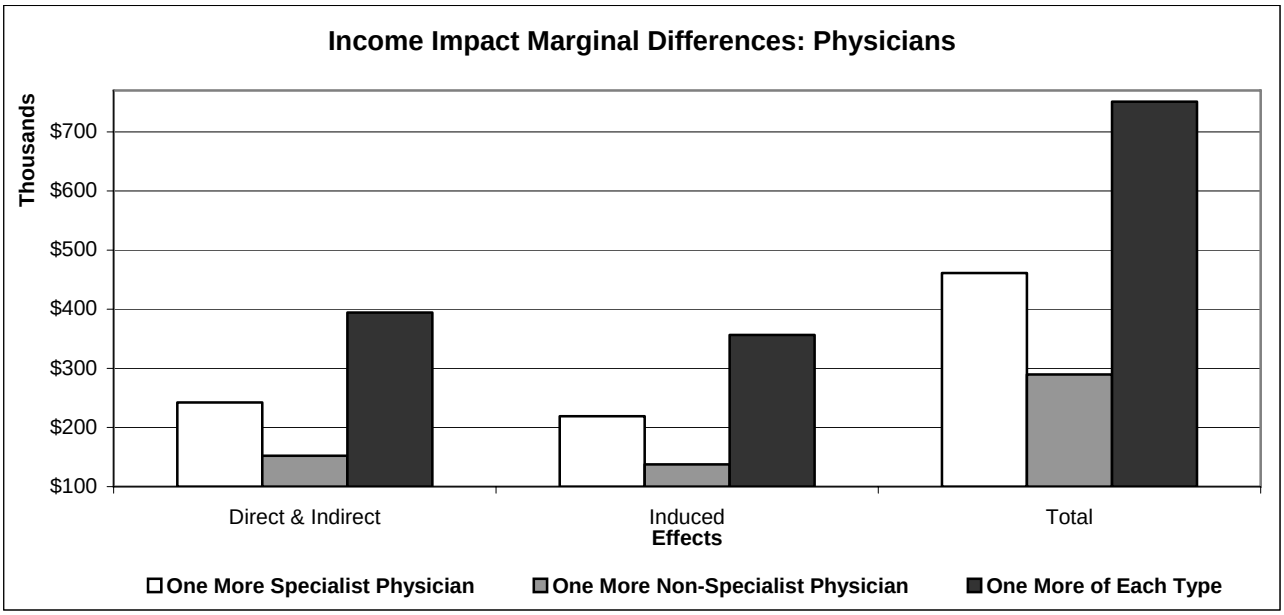
For case three, with the addition of both a specialist and a non-specialist physician, the net income impact was $751,021 and the net employment impact was 19 person-years of employment. The net local tax impact was $58,099. The results are shown in Table 6.5.

Table 6.5

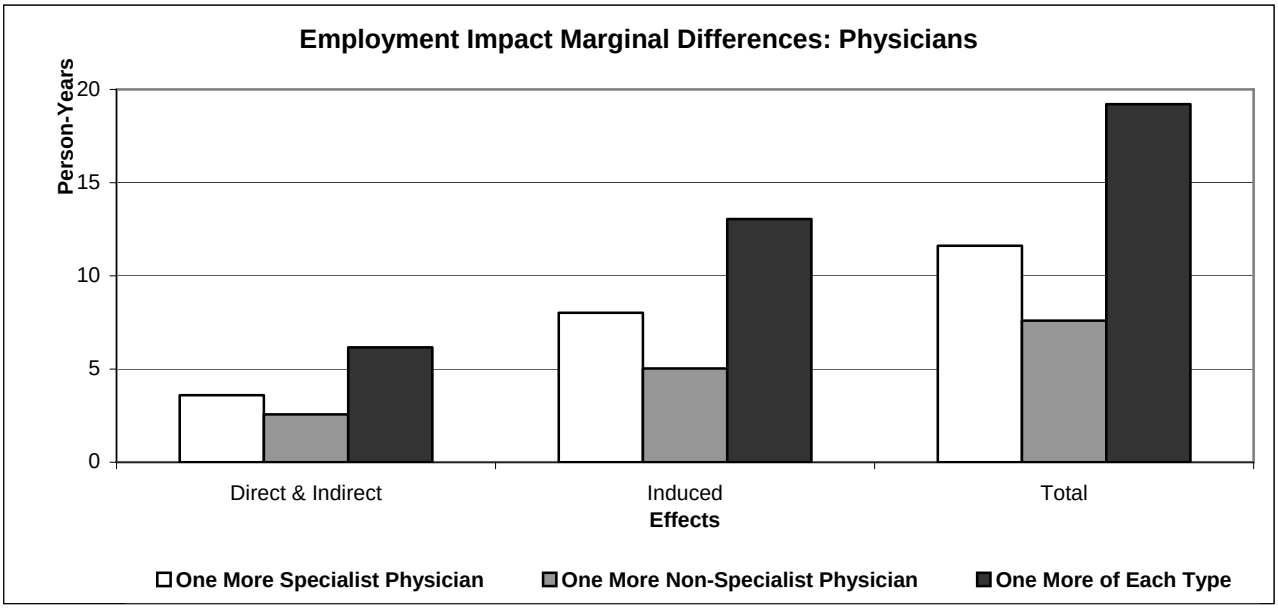
Physicians and their Employees Difference, Case 3 less Status Quo	Direct & Indirect Effect	Induced Effect	Total Impact
Net Income Impact (GDP)	$394,433	$356,587	**$751,021**
Net Employment Impact (person-years)	6	13	**19**
Net Tax Impact (property tax)	$11,749	$46,350	**$58,099**

The following charts provide a visual representation of the above results.

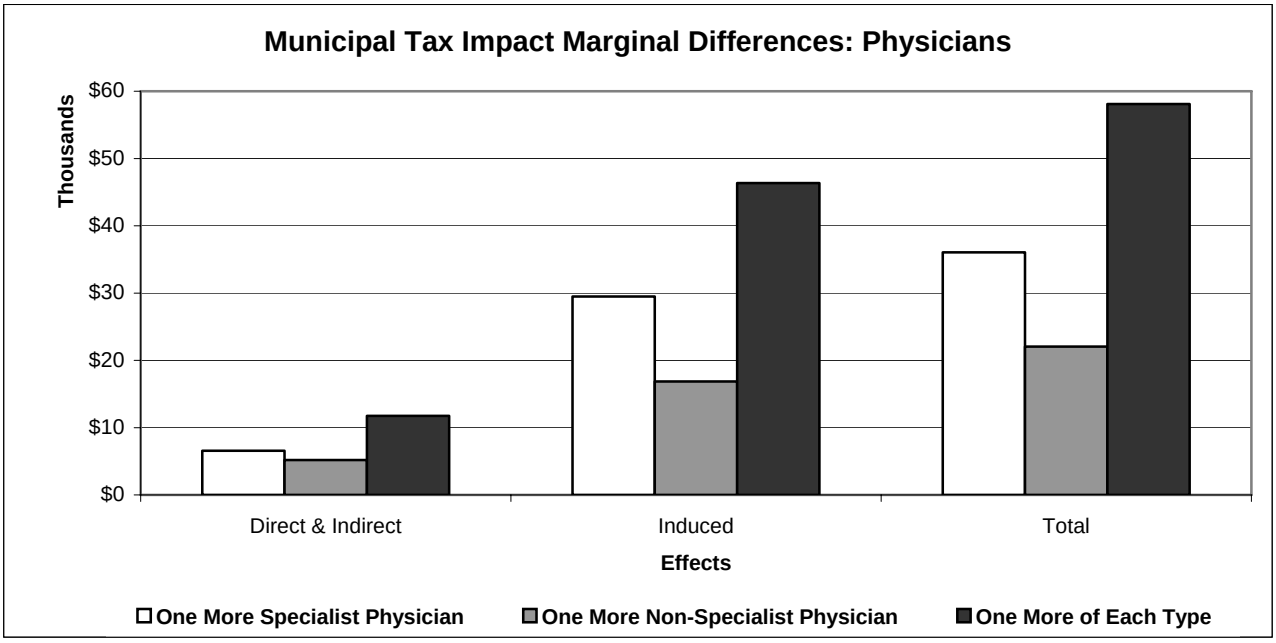
The differences in the income impacts of an additional physician, by type, when compared to the status quo are shown below.



The differences in the employment impacts of an additional physician, by type, versus the status quo are shown below.



Finally, the differences in the local tax impacts of an additional physician, by type, versus the status quo are shown below. Through employment at HRSRH and in the local area, the physicians bring significant employment and spending into the local area.



7. CONCLUSION

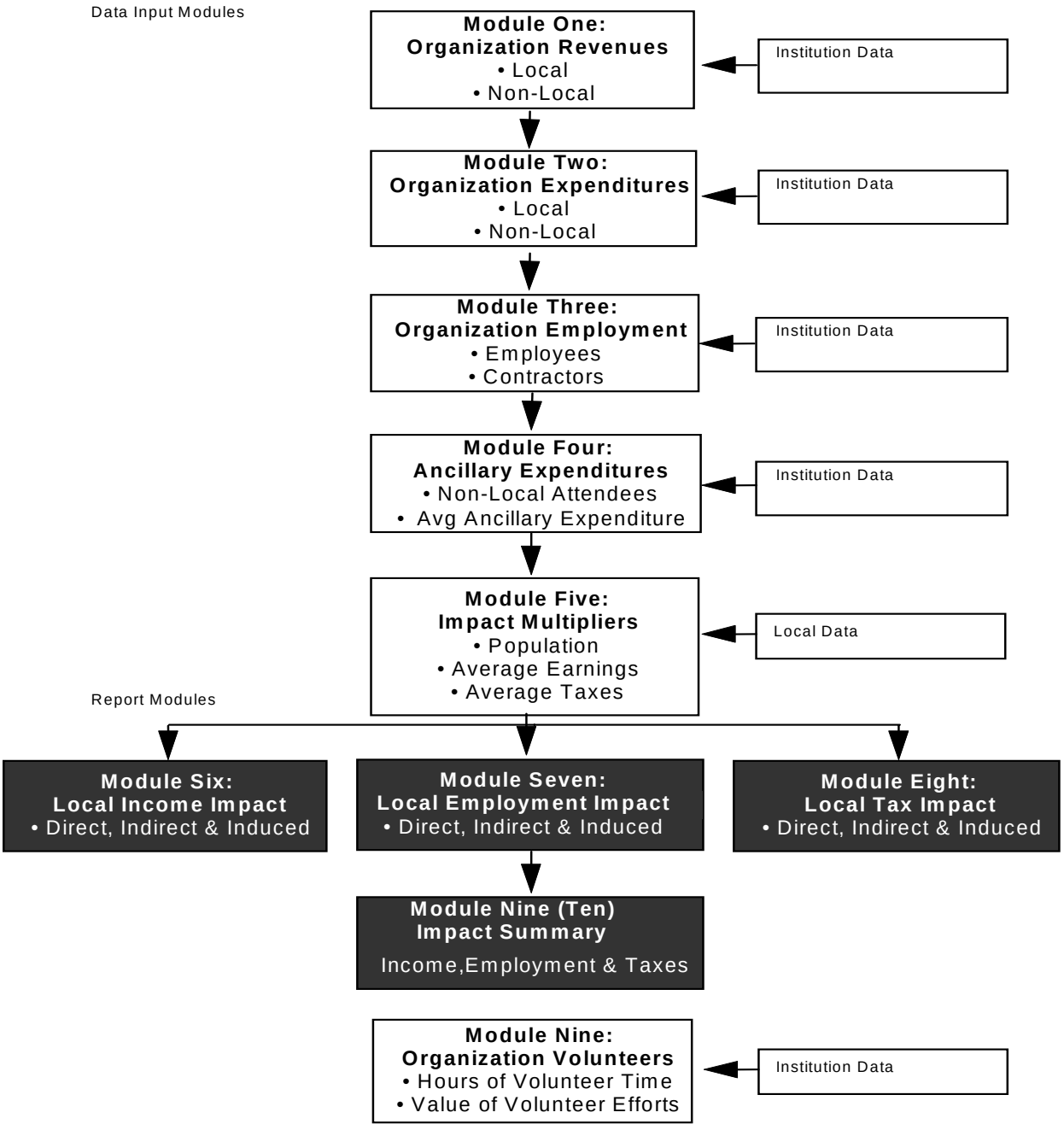
This study has demonstrated the substantial impact of several health care institutions on the economy of the Sudbury region. The health care facilities, as well as the physicians who practise in Sudbury, allow the region's residents to receive care locally, rather than travel elsewhere for diagnosis and treatment. The health care sector in Sudbury is funded mainly by a non-local source, the provincial government. This allows the institutions to have a greater net economic impact than if they were funded in their entirety by local resources. Without these institutions, or with reduced services provided by them, less income and employment would be generated in the Sudbury region.

An appreciation of the economic impact of the health care sector would contribute to a better understanding of its role in the overall economic development of the Sudbury region. It may also help in targeting areas for further local development or affect decision-making on how local revenues are spent. These are dimensions beyond the scope of this study, but should be pursued in the future.

A limitation concerning the scope of this study should also be noted. This study did not examine the local economic impact of the entire health care sector in the Sudbury region. Other health services such as home care, public health, health science education and research at Laurentian University and other health-related businesses such as medical laboratories, physiotherapy clinics and pharmacies have not been included in the analysis. The economic impact would have been considerably greater if all components of the health care sector had been included in the study. Also excluded from the analysis was the economic impact of the construction of the new regional hospital in the City of Greater Sudbury since at the time of data collection, the construction work had just begun.

APPENDIX: COMPONENTS OF THE MODELS

Figure A1: Overview of Local Economic Impact Model



The models used in this study follow a structure similar to the outline discussed below. The physician model is slightly different from the health care facilities' models and was discussed in Section V. Each model is broken down into nine or ten modules. Those facilities with ten modules have one specifically designed to place economic value on the efforts made by their volunteers. The volunteer module in these cases is number nine, while the summary report of the model's results is number ten. For those facilities with no volunteer module, module number nine is their summary report.

Module one calculates the non-attributable local revenue received by each facility. This measure is used later for calculating the gross and net economic impact of the facilities in Sudbury.

Module two looks at the facility's current expenditures and determines its local expenditures. These expenditures are used in module six to help determine the income impact.

Module three calculates the number of person-years of employment provided by the facility.

Module four discusses ancillary expenditure. This determines the amount of "new" money brought to Sudbury because of non-local patients/residents of the health care facilities and their visitors. This includes those from away who come to Sudbury to visit friends and family members at the health care facility.

Module five develops the employment coefficients used throughout the remainder of the model. These coefficients are used to determine the employment impacts of the local health care facilities. The local tax coefficient is used to determine the amount of municipal tax received by the local government attributable to the existence of the health care institutions discussed in this study. The local tax coefficient is simply the amount of municipal property tax paid by individuals.

Module six deals with the local income impact of the organization and is measured in terms of Gross Domestic Product. This module calculates the income impact from spending on labour, non-labour and local ancillary expenditures.

Module seven determines the local employment impact, reported in terms of person-years. It applies the employment coefficients and uses spending on labour, non-labour and local ancillary expenditures to calculate the combined direct, indirect and induced impacts.

Module eight provides a calculation of the local tax impact. This calculation applies the local tax coefficient to the employment impact calculated in module seven. Municipal property taxes paid by the institutions are included as part of their direct tax impact. As in modules six and seven, the results are reported in terms of the facility's gross contribution and net economic impact to the local economy.

Module nine, where applicable, represents the facility's volunteer contributions. The economic value in terms of income and employment of the unrewarded work effort provided by the volunteers at some of the facilities were calculated. However, many volunteer hours of health care provided by family members and friends of those who attend these facilities were not measured.

Module ten is the summary report of the facility's impact on the local economy.

The detailed Local Economic Impact Model and other appendices have not been included in this report in order to conserve space, but may be made available upon request from Informetrica Limited.

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