

FACTORS INFLUENCING THE LOCATION OF PRACTICE
OF RESIDENTS AND INTERNS IN BRITISH COLUMBIA:
IMPLICATIONS FOR POLICY MAKING

By

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ABSTRACT

Upto the middle of the 1970's most government policies dealing with physician manpower dealt with the problems of increasing the supply of physicians, rather than changing the geographic disparity of physicians between urban and rural areas. In 1983 the British Columbia government introduced legislation (passed in a modified form in 1985) that would restrict certain groups of physicians from obtaining Medical Service Plan billing numbers in certain areas of the province, in an attempt to change the geographic distribution of physicians in this province. Regulation is only one of a number of approaches to altering the distribution of physicians. The purpose of this study is to attempt to recommend other approaches that could be used to alter the geographic distribution of physicians, based on the factors which the residents and interns of British Columbia would consider necessary before they will establish practices in the rural areas of the province.

The literature was examined to determine the present supply and distribution of physicians in the province of British Columbia. It was shown that the metropolitan areas had much higher concentrations of physicians than did the non-metropolitan regions. The literature was then searched to determine what types of policies had been used in an effort to change this geographic disparity and also to determine what factors influence physicians to locate their practices where they do. From this research a questionnaire was developed and mailed to all residents and interns registered in the University of British Columbia medical program in the academic year 1984-85.

A response rate of 31.8% was obtained in this survey. It was found that many physicians were raised in large communities and planned to locate their practices in similar geographic areas to where they were raised. It was also found that the factors which the residents and interns considered to be the most important fell into the "Fixed Determinant" category, that is factors that are personal preferences of the physician. This makes it very difficult to formulate any type of non-regulatory policy to affect the geographic distribution of physicians in British Columbia.

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CHAPTER I

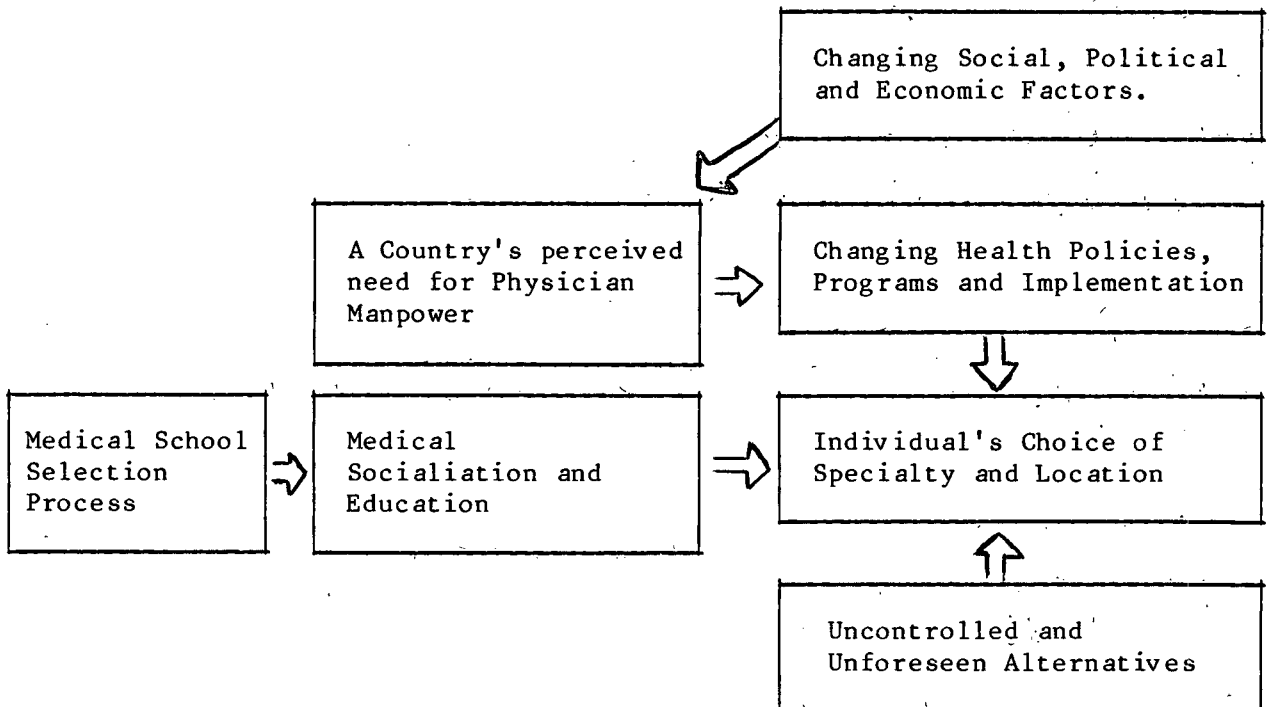
INTRODUCTION

Up to the middle of the 1970's most medical manpower policies in Canada and British Columbia were aimed at increasing the number of physicians practising in these regions. These policies have had a great effect on the number of physicians in Canada and British Columbia, but only in particular areas of the country and the province. The metropolitan or urban areas tend to have higher concentrations of physicians than do the rural areas. This has caused both the federal and provincial governments to change their manpower policies in an attempt to reduce the geographic disparity of physicians between urban and rural areas. In British Columbia, there have only been two policies specifically aimed at changing the geographic distribution of physicians. These are: a differential fee schedule known as the Northern and Isolation Allowance for physicians in remote areas of the province; and the most recent, an attempt to restrict certain specialties from obtaining a Medical Service Plan (MSP) billing number in certain urban areas of the province. An MSP billing number is essential for doctors to bill the medical service plan for the services they provide for their patients.

The evidence tends to point out that these policies have had very little effect on the geographic distribution of physicians and that therefore the urban areas of British Columbia continue to have a disproportionate supply of certain types of physician specialists. The question to be addressed in this thesis is: What types of incentives would have to be offered to physicians before they would be willing to practise in rural and remote areas of the province?

In order to answer this question, the Rosenthal and Frederick model for physician manpower distribution process, presented in Figure 1, will serve as the framework for this thesis.

Figure 1: Model for Physician Manpower Distribution Process



From: Rosenthal, Marilyn; Deborah Frederick. "Physician Maldistribution in Cross Cultural Perspective: United States, United Kingdom and Sweden." in Inquiry. Vol. XXI, No. 2, Summer 1984. pp 60-74.

There are three areas in this model which will not be dealt with in this thesis. These are: i) the medical school selection process; ii) the changing social, political and economic factors of the country or province; and iii) the uncontrolled and unforeseen alternatives.

A country's perceived need for physician manpower will serve as the basis for Chapters II and III. The method and problems associated with determining the requirements and supply of physicians will be presented in Chapter II. The methods to be examined are:

- i) Need-based;
- ii) Demand-based;
- and iii) Utilization-based.

As well several formulae which are used to determine whether an area has a physician shortage or is an underserviced area will be examined and discussed.

In Chapter III the current stock of physicians in Canada and in British Columbia will be examined. This stock will include both the number of general practitioners and specialists currently practising. Physician/population ratios will then be used to examine the distribution of physicians in these regions. The overall Canadian ratio will be compared with that of several other industrialized nations to give an indication of where Canada ranks in the world. The Canadian ratio will then be broken down into general practitioner/population and specialist/population ratios for each of the provinces and territories to give an indication of where British Columbia ranks in Canada. The British Columbia ratios will be further broken down into hospital districts and various specialist groups to give an indication of the variation between urban and rural areas of the province.

The policies which are currently being used to change the geographic distribution of physicians will be examined in Chapter IV. This chapter would

be equivalent to the box labelled "Changing health policies, Programs and Implementation" in the model. The policies under examination will fall into one of three categories:

- i) Regulatory
- ii) Educational
- or iii) Economic.

They will be discussed from within this framework. The policies currently being used in British Columbia will be compared to policies currently in use in other Canadian provinces as well as those in other nations. This chapter will also contain a discussion on the effectiveness of some of these policies.

The individual's choice of specialty and location will be the topic covered in Chapter V. This chapter will look at the factors which have been found to be important in influencing where physicians locate their practices. These factors will be examined as being either Fixed Determinants - those which policies or incentives will have no effect upon, or Manipulable Determinants - those which policies or incentives may be able to effect.

Chapter VI will describe the methodology used in the gathering of data for this thesis. In this chapter the sample will be discussed, as will the questionnaire and its development. The results and a discussion of them will be presented in Chapter VII. The final chapter in this thesis will present recommendations for the basis of future policies which may be used to change the geographic distribution of physicians in British Columbia.

CHAPTER II

METHODS OF MEASURING PHYSICIAN
REQUIREMENTS AND DISTRIBUTION.

Many problems are associated with defining what an adequate supply of physicians would be for a particular region and in doing so, establishing physician requirements. These problems are fundamental to determining whether there exists a "geographical maldistribution" of physicians in a region or between regions. Since there is no uniformly accepted method of measuring either the distribution of physicians or unmet needs (1), this chapter will briefly examine and discuss the three most commonly used methods - i) need-based; ii) demand-based; and iii) utilization-based - of determining physician requirements.(2) This will be followed by a discussion about how the supply of physicians presently practising in a region is determined and will conclude with several definitions of medically underserviced or physician shortage areas.

PHYSICIAN REQUIREMENTS

Need-Based Method

This method of determining the physician requirements for a particular community starts by assessing the current health status of the population and then attempts to determine the number of physicians needed to attain and maintain a good health status. The overall health status of the population is often determined by measuring the frequencies and types of illnesses among various subsets of the population. From this measurement of illness, "expert" opinion determines how much service would be required to treat the illness

present. This service is then converted into manpower requirements.(2-6) (See Appendix A, where Evans' (6) model is presented.)

Lomas, Barer, and Stoddart (2) point out that because of the vagueness of the definition of NEED and the complicated measures required, this method is very seldom used for determining physician requirements. Despite this, these authors state that three approaches to measurement can be taken to determine physician requirements under this method.

The first approach uses epidemiological surveys "to estimate...the extent of the ideal vs. observed health status deficit, and to translate such deficit into health services requirements".(p.48) In order to measure the deficit between ideal and observed health status the following indices must be compiled:

- i) overall health status;(1,7)
- ii) composition of the population - age, sex mix;(1,7)
- iii) infant mortality rates;(7,8)
- iv) incidences and rates of disease;(2)
- and v) environmental and occupational factors which affect health;
(1,9)

Once the observed health status has been measured the number of physicians required to address the disease incidence is calculated. This serves as the base year physician requirement from which future requirements can be derived.

The second need-based approach uses patient-initiated demand for treatment or information as a proxy for need. This type of approach still leaves unmet needs unaccounted for and will incorporate some demand that does not represent need. In order to establish physician requirements estimates would have to be

made on the health services which would be required to satisfy adjusted episodic requests.

The third approach uses present utilization of health services as a proxy for need. This utilization has to be modified to account for unmet needs and over-utilization in order to arrive at accurate requirements. Present utilization, as adjusted for these factors, then can be translated into the base year physician requirement using workload information.

Demand-Based Method

The demand-based method focuses on the demand for physicians' services in a particular region to arrive at the base year requirements. Under this method a distinction must be made between need for and demand for services. Demand has been stated to depend on the underlying health status of the community and will only exist when need is backed up with purchasing power.(5,10) It is based on socio-economic and demographic variables of the population and its willingness to pay for or buy health services.(1,5) Lomas et. al. (2) note that demand is an expression of personal choice, rather than a joint personal/social/professional determination. These authors also state that demand is affected by prevailing prices and individual resource constraints.

In order to determine physician requirements under the demand-based method, present utilization rates can be used as a proxy. If these rates are used, only patient-initiated requests should be considered as demand. Also, some demand may not be expressed in the utilization rates due to physicians' refusal to provide some services. Lomas et. al. (11) cite abortion as such an example of this type of demand. In order to arrive at the base year requirements, the same

steps are taken as described previously under the second approach of the need-based method, except that unmet need is not accounted for.

Another way of determining physician requirements has been developed by Rowley and Baldwin (10). These authors claim that most demand-based approaches to determining physician requirements are either too simplistic or too complicated. Therefore, they developed the Health Services Marketing Formula, (see Appendix A) which attempts to determine the number of physicians that could be supported within a particular region. This is determined by counting the number of potential visits and multiplying this by the average cost of a visit to obtain the total revenues which would be available. The total revenue is divided by the total yearly cost of operating a physician's practice. The total cost takes into account the physician's salary and office overhead expenses. Although this determines the total number of physicians who could be supported in the region, this formula could also be used to determine the number of general practitioners and specialists which could be supported by the area in question. This formula may also be classified as a modified utilization approach to determining physician requirements because it uses both demand-based and utilization-based measurements. The number of patient-initiated visits may approximate demand, but average cost per visit is a utilization determinant.

Utilization-Based Method

This method of determining physician requirements states that the service requirements are whatever is being provided for and utilized by the population in the region.(2) In other words, it assumes that the current supply of physicians in the region is the number that is required to give adequate medical

care to the region's population. This supply also acts as the base year requirement in the calculation of future requirements.

This method focuses on services provided and takes as given the organization of the delivery system.(4, p.34) This method sets as its standards the amount of service which the community expects. It directs attention to manpower utilization rather than health needs. It is also known as the Service Targets Method and is the most often used method in Canada.

Lomas et. al. (2) claim that two problems arise and are not taken into consideration when this method is used. These problems are:

- i) demand or need will not be translated into utilization in the absence of supply; in other words, it does not take account of need where there are no providers.
- and ii) providers can influence the population to use more or less of a particular service.

Other considerations which have to be taken into account when this method is used to determine physician requirements include:

- i) the number of hospital facilities or other health services in the region and their utilization rates;(1,2,11)
- and ii) the difficulty in determining specific specialist/ population ratios because general practitioners may perform some "specialists" duties in remote areas.(2,11)

Once the base year physician requirements are determined, they must be converted to future requirements. Again two approaches can be taken.(2) The first is by considering that no modification to the delivery system will occur. In this approach the only considerations which must be accounted for are: the

changing population in the region in terms of growing numbers and a changing age/sex mix; and other exogenous factors which affect morbidity (eg: environment).

The second approach is to consider modifications to the health care delivery system. Under this approach not only will the demographic features (as above) have to be addressed but the changes in the delivery system will also have to be considered. These changes could include: personnel mix; technology; practice organization and governmental policies.

The preceding section has briefly described the three methods which can be used to determine physician requirements. Because the utilization or supply-based method has been the one most often used in Canada (11), and because the next chapter in this thesis will discuss the current supply of physicians in British Columbia (in terms of actual numbers and physician/population ratios), the next section of this chapter will discuss how the current supply of physicians can be determined.

PHYSICIAN SUPPLY

The utilization-based method presented in the preceding section alluded to physician/population ratios as a variable in determining physician requirements. This ratio is the most widely used method of determining physician requirements and distribution in Canada (11) and it is also the easiest to calculate.

The physician/population ratio relates the number of physicians to the population in the area. The steps outlined by Lomas, Stoddart and Barer (11), for determining the physician/population ratio are listed in Appendix A. Basically, the ratio divides the current supply of physicians in an area by the

population of the same area, to obtain a physician/population ratio. This ratio can then be used to compare one area with another or estimate future physician requirements by multiplying the ratio by the expected future population.(3-5,11)

Although this would seem to be a very easy ratio to calculate, problems arise when the numerator (the current supply of physicians) has to be determined. The ratios which are calculated will depend on who has been defined as a physician and where the data are obtained.(1,2,5,6,11-17) In Canada data can be obtained from the provincial Colleges of Physicians and Surgeons. These data include all Directory Active Physicians or all physicians who have been licensed by the appropriate College to practise in that province.(11,13,15-17) The data obtained from a provincial College will not only include these physicians, but also physicians who are:

- i) practising in another province;
- ii) not practising due to postgraduate commitments;
- iii) involved in research or administration;
- or iv) retired.(11,15-17)

Two problems may arise when provincial college numbers are used to determine physician supply and requirements. First the actual number of physicians involved in clinical areas will be upwardly biased due to the inclusion of all physicians on the colleges' registers. The second problem arises if college totals are used for interprovincial comparisons. The ratios calculated from these totals will be misleading, if the interest is in relative clinical supply because the number of physicians involved in non-clinical activities may vary across provinces.

Other sources of data on the number of physicians practising in Canada can be obtained from the Sales Management Systems (SMS), Revenue Canada, and Federal Government Medicare tapes.(11,13) The SMS data include records on all Active Civilian Physicians. The information is obtained from provincial licensing bodies, provincial medical associations and medical schools. It provides information on the migration of physicians both to and from Canada. It does not reflect level or mix of physician activity nor is allowance made to classify physicians in other than their certified specialties. It also does not provide information on the number of physicians who are abroad, retired, or in the military.(11)

The data obtained from the Federal Government Medicare tapes are converted into physician Full-time-Equivalents (FTE's) depending on the amount of money physicians have received from medicare payments. By using these data three different FTE measurements are generated. The first defines one FTE on the basis of earnings, as any physician who has received \$20,000 or more in medicare payments. Physicians who received less than \$20,000 are counted as partial FTE's proportionately. The second defines an FTE on the basis of statistical adjustments. In the definition an FTE is defined as any physician who billed medicare during each quarter and whose income is greater than 50% of the median income for his specialty.(11) Foulkes (14) argues that income should not be used as the basis for determining FTE's, but that the basis should be workload. He claims that by using incomes the number of FTE's calculated will be misleading. He also claims that this method is inappropriate if "the objective is to plan medical manpower to meet the requirements of prospective patients with due consideration given to all factors including the availability of other

resources...and physicians' preference for hours of work" (p.271). The third FTE definition is calculated by counting all physicians who submitted at least one claim to medicare.

A study carried out by Barer, Wong Fung and Hsu (15) will help to point out how differing estimates of the physician supply for an area can be generated. In the first part of their study, the authors attempted to determine the supply of physicians in British Columbia for the year 1981-82. In order to determine the supply the authors used two different sources, i) the records of the College of Physicians and Surgeons of British Columbia (CPSBC) and ii) records of utilization and payments made by the Medical Services Plan of British Columbia. They used as their definition of a physician "all practitioners registered with the CPSBC and therefore licensed to practise in the province". From the records of the CPSBC, the authors determined that there were 7,094 directory active physicians registered in the province. Only 5,684 resided in British Columbia and this was further reduced to 5,306 when only "non-postgraduate directory active in B.C." and "postgraduate paying directory active in B.C." physicians were counted.

The authors then tried to determine the supply of physicians through the calculation of FTE's based on the physicians' earnings paid through the Medical Services Plan. Various cutoff points and approaches were used in determining specific FTE's. The authors found a range from a low of 3,648 based on the number of physicians earning at least one-half the median earnings in peer type of practice, to a high of 4,857 when an FTE was defined as a physician who received some remuneration from the Medical Services Plan in fiscal year 1981-82. The second half of the study used these FTE's in an attempt to

determine whether or not there was any maldistribution of physician services in the province. The results of this half of the study will be examined in the next section of this chapter.

As has been seen from the above discussion many definitions of physicians are used and also many different FTE's can be calculated from the same data. This makes the designation of an area as being a medically underserviced area very difficult. The following section will examine some of the criteria which have and are being used to designate such areas.

SHORTAGE CRITERIA

There seem to be as many formulae used to designate areas as being medically underserviced or physician shortage areas as there are methods of determining physician requirements and supply. Most of these formulae use a combination of requirement measurements - such as percentage of population aged 65 or over, infant mortality rate, utilization rates and indicators of health status; and supply measurements - such as physician/population ratios, as proxies for the criteria for designating medically underserviced and physician shortage areas. In this section shortage criteria will be examined under each of the Need, Utilization and Demand based methods of determining physician requirements.

Need-Based

All of the formulae allude to the overall health status of the population to be serviced. This is one of the biggest problems with the use of these formulae - trying to determine the overall health status of the population and

therefore the amount of service required in the area. This is usually determined by a panel of "experts".(1,5,7,12) This is often referred to as a professional or optimal standard and it has been claimed that a shortage could be identified in ALL areas by using this type of assessment.(5)

In the United States two different formulae are currently being used to designate medically underserved and manpower shortage areas. Under the Health Maintenance Organization Act of 1973, an Index of Medical Underservice used to designate an area as being medically underserved, is computed as the weighted sum of the following four variables;

- i) the ratio of primary care physicians per 1,000 population;
- ii) the percentage of the population with a household income below the poverty line;
- iii) the infant mortality rate;
- and iv) the percentage of the population aged 65 years and older.

A value below 62 (the average value calculated for all counties in the United States) designates an area as being medically underserved.(8)

The second formula in use in the United States, was created under the Health Professions Educational Assistance Act of 1976.(7) This act defines regions as being health manpower shortage areas based on the following criteria:

- i) the primary care physician/population ratio of the area;
- ii) the infant mortality rate;
- iii) the overall health status of the area;
- iv) the access to health services;

- and v) other indicators of need such as hospital facilities and utilization rates of the facilities.(1,7)

Despite the other criteria mentioned, the primary care physician/population ratio carries the most weight and an area is classified as having a manpower shortage if this ratio is below 1/3,500.(7)

In Great Britain, the RAWP Formula has been developed as a means of assessing and allocating health resources.(1) This formula is similar to the two formulae used in the United States. It takes into account the following indicators when allocating resources to regions of the country:

- i) the composition of the population (age, sex mix);
- ii) the indicators of the health status;
- iii) the utilization rates of health services;
- iv) economic and political factors;
- and v) environmental and occupational factors which affect health.

More recently, in the United States, Hadley (9) has proposed that the economic theory of production be used as the framework for determining whether physician or other health manpower distribution problems exist. He states "that this theory is a representation of how firms combine resources to produce final products in the most efficient manner."(p.1057) In order to apply this theory to health manpower, Hadley states that there must be an acceptable measure of "health", and that health is the final product (function) of a combination of medical care and other factors which affect health and can be described in the following statistical relationship:

$D = f(M, B, H, E)$ where:

D = the health measure or final product;

M = medical care (current stock of health manpower);

B = behavioral factors;

H = heredity factors;

and E = environmental factors.

In theory Hadley claims that by applying his formula an adequate supply of health manpower would be determined by the overall health measure of the region. The lower the health measure, the greater the need for health manpower in that area.

At present none of these methods are used in Canada or British Columbia to identify or designate underserviced or manpower shortage areas. As mentioned previously, Barer, Wong Fung and Hsu (15) in the second half of their study attempted to illustrate that apparent interregional supply disparities were in many instances upward biased by the use of physician location rather than patient location.

They did this by assessing the distribution of physicians in two ways. The first method was based on allocating each practitioner to the Regional Hospital District (RHD) containing his/her office and the second method attempted to allocate "pieces" of each physician to the RHD of his/her serviced patient population. The physician stock used were the specialty specific FTE's calculated in the first part of their study and the RHDs of the patients were based on the payments of the Medical Service Plan. They found that by allocating the physicians to the estimated RHD of their patients changed the distribution of physician services rather dramatically for many types of

practice. That is, the apparent extent of "maldistribution" was found not to be as bad as it originally looked. Many of the specialists who were established in the Greater Vancouver area of the province served as provincial resources.

Other criticisms of these methods of determining physician shortages have included: need is only determined from a professional viewpoint and substitution of services is not taken into account (5,8); the cutoff point at which a shortage is defined is often very arbitrarily chosen (8,9); there are no standards for defining need or the concept of underserviced (5,8); and some of the variables used are not related to health.(8)

Demand-Based

Under the demand-based method of calculating physician requirements, shortages can arise under the following criteria:

- i) Excess Demand - when demand for physician services exceeds supply at the prevailing prices (1,5);
- and ii) Political Shortage - when it is perceived that the public is willing to pay more in taxes for more medical services (1,5,12).

Utilization-Based

As with the other two methods of determining physician requirements, shortage situations can arise when the utilization-based method is used. A shortage may be defined when the physician/population ratio for one area is lower than the mean ratio of similar regions.(5,12) Depending upon the ratio chosen to designate a shortage, there will always be areas which are classified as being underserviced. Two methods for defining what an appropriate ratio

ought to be are: i) a committee of experts reviews the health conditions in the area and sets a standard (3,13); and ii) the ratio chosen is the highest in a particular area and acts as the target which should be met in all other areas.(13)

As has been seen throughout this chapter every method used in the determination of an adequate supply and distribution of physicians has its own set of problems. In the next chapter the current supply of physicians in Canada and British Columbia will be outlined. This supply will then be converted to physician/population ratios to compare British Columbia with the other provinces in Canada. Finally the physician/population ratios for the hospital districts in British Columbia will be compared to point out the distribution patterns of physicians in the province. The rationale for using this method is that it is the one that is most often used in comparing various countries and regions in terms of manpower and therefore these ratios are readily available.

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CHAPTER III THE CURRENT SUPPLY AND DISTRIBUTION OF PHYSICIANS.

Despite the inadequacies inherent with the use of physician/population ratios, these figures "generally serve as a reasonable proxy for the distribution of health services." (1) These figures will therefore be used throughout this thesis to indicate the distribution of physicians in Canada and particularly British Columbia. In this chapter physician/population ratios will be presented to show the distribution of physicians in general starting on a national level and gradually working down towards physician specialist/population ratios for urban and rural areas of British Columbia.

Before the physician/population ratios are examined, the growth of the current stock of physicians and the actual number of physicians practising will be examined. Due to the education policies (which will be discussed in the next chapter) implemented by the various levels of governments in the United States and Canada, the number of practising physicians has increased greatly over the past twenty years. The number of board-certified physicians in the United States nearly tripled between 1960 and 1977 (2) and the enrollment in medical schools more than doubled in the same period. (3,4) It has also been estimated that by 1990, there could be a surplus of 70,000 physicians in the United States. (2) Similar statistics can be found in Canada and British Columbia.

CURRENT PHYSICIAN SUPPLY

Between 1961 and 1983 the number of active civilian physicians practising in Canada (all physicians who are registered with their respective provincial Colleges of Physicians and Surgeons) increased from 18,363 (5) to 41,440. (6)

This is an increase of 125%, while during the same period of time the overall Canadian population only increased by 33%.(6) It has been estimated that if the current supply of physicians continues to increase at the same rate, there will be a surplus of almost 6,000 physicians in the country by the year 2000.(5)

In British Columbia the number of directory active physicians (all physicians registered by the College of Physicians and Surgeons of British Columbia) practising has risen from 4,310 in 1974 to 6,206 in 1984.(7) This represents an increase of 44% over this ten year period. Table I shows the increase in the number of physicians by medical specialty groups between 1974 and 1984.

TABLE I NUMBER OF DIRECTORY ACTIVE PHYSICIANS PRACTISING IN
BRITISH COLUMBIA BY SPECIALTY 1974 AND 1984.

<u>SPECIALTY*</u>	<u>1974(8)</u>	<u>1984(7)</u>	<u>Average Annual Percentage Change</u>
GENERAL PRACTICE	2,129	3,095	4.5
CLINICAL SPECIALTIES	993	1,523	5.3
SURGICAL SPECIALTIES	709	916	2.9
LABORATORY SPECIALTIES	70	142	10.3

*For definition of specialties see Reference 7

Table II compares the increasing number of physicians, by specialty group, practising in metropolitan and non-metropolitan areas of British Columbia in 1974 and 1984. From this table it can be seen that the number of general practitioners has increased by approximately the same percentage over the ten year period. The number of laboratory specialists has dramatically increased more so in the metropolitan areas. The number of clinical and surgical specialists practising in non-metropolitan areas seems to have increased by a

higher percentage than in the metropolitan areas, but as is shown by the physician/population ratios in Appendix B, most of these physicians are practising in the larger non-metropolitan communities.

TABLE II NUMBER OF DIRECTORY ACTIVE PHYSICIANS BY SPECIALTY GROUP
IN METROPOLITAN AND NON-METROPOLITAN REGIONS OF BRITISH COLUMBIA

<u>SPECIALTY</u>	<u>METROPOLITAN</u>		<u>NON-METROPOLITAN</u>	
	<u>1974(8)</u>	<u>1984(7)</u>	<u>1974</u>	<u>1984</u>
ALL PHYSICIANS	2,674	3,798	1,252	1,878
GENERAL PRACTICE	1,272	1,847	857	1,248
CLINICAL SPECIALTIES	818	1,211	175	312
SURGICAL SPECIALTIES	511	632	198	284
LABORATORY SPECIALTIES	50	108	20	34

The number of physicians practising in an area does not easily lend itself to defining a shortage or surplus of physicians in that area. The rest of this chapter will be devoted to presenting physician/population ratios to compare British Columbia with the other provinces in Canada.

PHYSICIAN/POPULATION RATIOS

As of December 1983 the Canadian physician/population ratio was found to be 1/512 when all active civilian physicians, residents and interns were counted.(6) When residents and interns are excluded from the count the national ratio decreases slightly to 1/604. Both of these ratios place Canada among the most "doctored" nations in the world in terms of physician/population ratios. In Table III Canada's physician/population ratio is compared to that of several other industrialized nations.

TABLE III COMPARISON OF NATIONAL PHYSICIAN/POPULATION RATIOS

<u>NATION</u>	<u>RATIO</u>
CANADA	1/603 (9)
UNITED STATES	1/622 (")
WEST GERMANY	1/516 (")
UNITED KINGDOM	1/761 (")
JAPAN	1/868 (")

Although these ratios are from the mid-1970's and different definitions of "physician" may have been used to determine the ratios, they do point out that Canada has one of the highest physician/population ratios among industrialized nations, but they do not give any indication of the distribution of physicians in these nations.(10) These ratios also indicate that even in the mid-1970's Canada, like the other nations was very close to the optimum physician/population ratio of 1/600 as set by the World Health Organization.(1,11)

There is a wide variation in the physician/population ratios throughout Canada when the individual provinces and territories are taken into consideration. Again the figures in Table IV represent all Active Civilian physicians, excluding residents and interns.

TABLE IV PHYSICIAN/POPULATION RATIOS OF THE CANADIAN
PROVINCES AND TERRITORIES 1983(6)

<u>PROVINCE</u>	<u>RATIO</u>
NEWFOUNDLAND	1/733
PRINCE EDWARD ISLAND	1/848
NOVA SCOTIA	1/610
NEW BRUNSWICK	1/831
QUEBEC	1/577
ONTARIO	1/589
MANITOBA	1/605
SASKATCHEWAN	1/733
ALBERTA	1/720
BRITISH COLUMBIA	1/529
YUKON	1/720
NORTHWEST TERRITORIES	1/1,256

The provincial ratios, as seen in Table IV range from a high of 1/529 in British Columbia to a low of 1/1,256 in the Northwest Territories. Most of the other provinces have physician/population ratios of less than 1/750.

Similar distribution patterns are seen in other nations. In the United Kingdom, for example, regional ratios were found to range from 93.5 - 160.3 physicians per 100,000 population.(12) This is equivalent to ratios of 1/624 - 1/1070. In the United States many areas have been classified as underserved because they have physician/population ratios lower than 1/3,500 (13), while other areas have ratios as high as 1/500.(14)

Several studies and reports (1,8,16,17) have shown that even when a province has a high physician/population ratio, there can be great discrepancies between urban and rural areas. Using 1977 data, Rubin (15) points out that across Canada in communities of under 10,000 population, the physician/population ratio was found to be 1/1,158. This ratio rose to 1/630

for communities of between 10,000 to 99,999 population and to 1/528 for communities of over 100,000 population. This situation is found in all provinces and territories in Canada. In his study on medical manpower in Alberta, Angus (16) found that although Alberta had an overall physician/population ratio of 1/691, Edmonton and Calgary both had ratios well above this, while remote areas such as Peace River and Medicine Hat had ratios well below the provincial average. Similar results were found by Roos, Gaumont and Horne (1) in their study of the "surplus" of physicians and their distribution. This study also pointed out that physician/population ratios increased more rapidly in the rural areas than in the urban areas between 1968 and 1974. The authors attribute this to the fact that the population in the rural areas did not increase as fast as that in the urban settings. Northcott (17), who also studied the medical manpower situation in Alberta, found that over the twenty year period from 1956 to 1976, the distribution of physicians between urban and rural areas has not changed greatly and that the urban areas still have higher ratios than the rural areas.

The situation in British Columbia is very similar to that found in Alberta. The physician/population ratios for eight out of the province's twenty-nine regional hospital districts are found in Table V. These ratios are of all directory active physicians in the hospital district. A complete table is presented in Appendix B.

TABLE V PHYSICIAN/POPULATION RATIOS FOR VARIOUS REGIONAL
HOSPITAL DISTRICTS IN BRITISH COLUMBIA 1984(7)

<u>HOSPITAL DISTRICT</u>	<u>RATIO</u>
TOTAL BRITISH COLUMBIA	1/504
<u>TOTAL METROPOLITAN</u>	1/383
CAPITAL (VICTORIA)	1/364
GREATER VANCOUVER	1/386
<u>TOTAL NON-METROPOLITAN</u>	1/747
BULKLEY-NECHAKO	1/1,138
EAST KOOTENAY	1/749
MOUNT WADDINGTON	1/1,330
OKANAGAN-SIMILKAMEEN	1/568
PEACE RIVER-LIARD	1/1,198
THOMPSON-NICOLA	1/637

The hospital districts chosen for Table V include Vancouver and Victoria, the two metropolitan (urban) areas found in the province, as well as a variety of mixed urban-rural districts (based on the size of the largest community in the hospital district) like Thompson-Nicola and Okanagan-Similkameen, and mainly rural districts (again based on the size of the largest community in the hospital district) like Bulkley-Nechako and Mount Waddington.

From the data presented in Table V it is clear that the urban areas of the provinces have much higher concentrations of physicians than do the rural areas. The non-metropolitan ratios range from 1/533 to 1/1,330 with the average being 1/747. This is approximately half of the ratio found in the metropolitan areas and is approximately equal to 2/3 the provincial average of 19.86 per 10,000 (1/504). In the strictly rural districts the ratios average 8.37 per 10,000 (1/1,195) or less than one-half the provincial average. Again these ratios tend

to point out that many areas have a high concentration of physicians while others do not.

These ratios do not indicate the breakdown between general practitioners and specialists in a given region. In Table VI data are presented to indicate the general practitioner and specialist/population ratios for Canada, as well as each province and territory. The physicians included in the ratios in Table VI are all active civilian physicians excluding interns and residents.

TABLE VI GENERAL PRACTITIONER AND SPECIALIST/POPULATION
RATIOS ACROSS CANADA BY PROVINCE 1983(6)

<u>PROVINCE</u>	<u>GENERAL PRACTITIONER</u>	<u>SPECIALISTS</u>
CANADA	1/1,183	1/1,232
NEWFOUNDLAND	1/1,156	1/2,005
PRINCE EDWARD ISLAND	1/1,466	1/2,010
NOVA SCOTIA	1/1,146	1/1,304
NEW BRUNSWICK	1/1,499	1/1,865
QUEBEC	1/1,252	1/1,070
ONTARIO	1/1,163	1/1,193
MANITOBA	1/1,152	1/1,276
SASKATCHEWAN	1/1,161	1/1,988
ALBERTA	1/1,342	1/1,551
BRITISH COLUMBIA	1/986	1/1,142
YUKON	1/864	1/4,320
NORTHWEST TERRITORIES	1/1,633	1/5,444

Although there is a two-fold difference between the lowest and highest general practitioner ratios across the provinces, there is an even wider variation in the specialist ratios. For example the general practitioner ratios range from 1/1,633 to 1/864 and the specialist ratios range from 1/5,444 to 1/1,142. The general practitioner ratio for British Columbia, as noted in the table, is the second highest of all provinces and territories and the specialist

ratio is the highest. This variation increases substantially when the ratios for certain types of specialists are looked at individually. For example the dermatologist/ population ratio in New Brunswick was found to be 1/700,000 versus the national average of 1/71,474 (6) and the pediatrician/population ratio in Prince Edward Island was found to be 1/130,000 versus the national average of 1/16,469.(6) These figures indicate, in other words, that there was one of each of these specialists to serve the entire province. Similar ratios, although not as dramatic, can be found for other types of specialists in the other provinces.(15)

The problems of identifying the areas of the province in which general practitioners and specialists are practising when provincial averages are examined, are the same as taking the national average and trying to infer the distribution of physicians across the country. In order to distinguish what types of specialists are practising and where, a provincial average again must be divided into hospital districts and specific specialties.

In his study of Alberta medical manpower, Angus (16) found a general practitioner/population ratio of 89.3 per 100,000 or 1/1,120 but when he broke this ratio down into urban and rural areas, the ratios were found to be 106.4/100,000 or 1/940 in the urban areas and 62.9/100,000 or 1/1,590 in the rural areas. The ratio determined by Angus may possibly be higher than that found in Table VI due to a difference in the definition of "general practitioner" used in the study. This finding is contradicted to some extent by Northcott (17), who found that when the ratio of general practitioners was looked at by census tract in Alberta, there was almost an equitable distribution between rural and urban areas in 1976. Yet when the ratios were compared by

incorporated cities, towns and villages, there was a high concentration of general practitioners in rural areas.

The two studies do agree on their findings regarding specialists. Angus found that the overall specialist/population ratio to be 55.4/100,000 (1/1,805) for Alberta. When broken down this revealed a ratio of 87.2/100,000 (1/1,147) in urban areas and 6.3/100,000 (1/15,873) in the rural areas. Northcott found a higher concentration of all specialists in the urban areas. He also indicated that there was a threshold population for each group of physicians in his study. He defined threshold as 75% of all towns in a given size category having at least one practising specialist. The threshold populations were: general practitioners, 1,000-1,499 population; general surgeons, 10,000-24,999 population; primary care physicians (family practitioners, internists, pediatricians and obstetricians) and other specialists, over 25,000.

Similar data regarding the distribution of general practitioners and primary care physicians for British Columbia can be found in Table VII. The figures presented in Table VII are the number of non-postgraduate physicians per 10,000 population for selected regional hospital districts. The regional hospital districts in Table VII are the same as those selected for Table V. Again, a more complete table can be found in Appendix B.

TABLE VII NON-POSTGRADUATE PHYSICIANS BY SPECIALTY PER 10,000
POPULATION FOR SELECTED REGIONAL HOSPITAL DISTRICTS (7)

<u>HOSPITAL DISTRICT</u>	<u>G.P.</u>	<u>F.P.</u>	<u>G.S.</u>	<u>I.M.</u>	<u>PED.</u>	<u>OB/GYN*</u>
TOTAL BRITISH COLUMBIA	9.19	1.64	0.91	1.43	0.61	0.54
<u>METROPOLITAN</u>	10.76	1.92	1.02	2.28	0.94	0.76
CAPITAL (VICTORIA)	12.43	1.84	1.18	2.08	0.55	0.63
VANCOUVER	10.41	1.94	0.99	2.32	1.02	0.79
<u>NON-METROPOLITAN</u>	7.55	1.36	0.79	0.54	0.26	0.31
BULKLEY-NECHAKO	6.84	1.22	0.49	0.00	0.00	0.00
EAST KOOTENAY	8.96	0.53	1.41	0.70	0.18	0.18
MOUNT WADDINGTON	6.27	0.63	0.00	0.00	0.00	0.00
OKANAGAN-SIMILKAMEEN	9.23	1.68	1.17	0.84	0.50	0.50
PEACE RIVER-LIARD	5.57	0.66	0.82	0.33	0.00	0.16
THOMPSON-NICOLA	7.20	1.40	1.03	0.84	0.75	0.65

* G.P. = GENERAL PRACTITIONER
G.S. = GENERAL SURGEON
PED. = PEDIATRICIAN

F.P. = FAMILY PRACTITIONER
I.M. = INTERNAL MEDICINE
OB/GYN = OBSTETRICIAN/GYNECOLOGIST

As seen in Table VII, the distribution pattern of specialists in British Columbia is very similar to that in Alberta. The metropolitan areas of British Columbia have a high concentration of all specialties and the specialist/population ratios in these areas are all higher than the provincial averages. The mixed urban-rural hospital districts have specialist/population ratios which are almost equal to the provincial averages, and in most instances the ratios found are higher than the non-metropolitan averages. It can also be seen from the data in Table VII that these districts, like the metropolitan districts, have a complete complement of primary care specialists, as defined by Northcott. The mainly rural districts, all have specialist/population ratios well below the provincial average and in most instances below the non-metropolitan averages.

Also, these districts lack certain of the primary care specialists, most notably pediatricians and obstetricians.

It should be noted here that although there is a wide variation in the specialist/population ratios throughout British Columbia, some of these specialists may require a certain threshold population before moving into a particular area.(17) The demographics of a particular region may also dictate the types of specialists which are required in that region. These two topics are beyond the scope of this thesis and will only be dealt with if they are found to be factors which influence where physicians tend to locate their practices. This will be discussed in Chapter V. In the next chapter the policies which have been and are being used in an attempt to change the geographic distribution of physicians will be examined.

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CHAPTER IV

CURRENT POLICIES DIRECTED AT CHANGING THE
GEOGRAPHIC DISTRIBUTION OF PHYSICIANS.

Ever since 1914, when small communities in rural Saskatchewan offered physicians a public salary to work in their town (1,2), all levels of government in Canada have tried to establish policies and incentives which would entice physicians to practise in rural and remote areas of the country. All policies affecting practice location and geographic distribution fall into one of the following three channels as defined by Evans:(3)

- "(i) Use of state authority to regulate occupations, either directly or indirectly.
- (ii) Provisions of subsidies for educational costs, and the determination of how much and what kind of training capacity will be available.
- and (iii) The structuring of public delivery or reimbursement systems to determine how many of what classes of people shall be hired to provide or reimburse for providing, which kinds of service." (p. 299)

In other words, Evans states that, through the use of occupational regulations; educational subsidies; and reimbursement mechanisms, governments have tried to develop incentives which would induce physicians to establish practices in rural areas.

In this chapter the policies which are presently in place in British Columbia will be discussed within the context of this regulatory, educational and economic framework. They will be compared to those policies currently being used in other nations, and other Canadian provinces.

REGULATORY POLICIES

Through the first channel, that of occupational regulation, Evans (3) states that the boundaries between occupations are established. As well, the "processes of production" (the type of training required) and the legalities of using these skills are laid out. To a limited degree this channel has been used in other countries, and quite successfully, in an attempt to have physicians set up practices in rural areas.

Medical students in Poland were required to complete a mandatory two year period of rural service before they would be granted a medical licence, but the program was disbanded in 1963 when the country had a sufficient supply of rural physicians.(1) This type of program is still carried out in other nations. Norway, for example, requires students to do a six month assistantship to a district doctor before licensure.(1) Mexico has required a period of "social service" in a rural area since 1935, and has recently extended the period from six months to one year. Malaysia and the Soviet Union, also require a certain period of rural practise before students are granted a medical licence.(2)

In Canada, the federal government modified its Manpower and Immigration Act in 1975 by reclassifying physicians into the group of professions which are given zero occupational points on their immigration applications.(4) This effectively barred the immigration of physicians to Canada, except for those situations in which a provincial College of Physicians verifies that a physician is required for a certain posting. In 1982 approximately 140 physicians qualified to enter Canada under this provision.(5)

Those physicians who are allowed to immigrate to Canada may still face licensure restrictions in several provinces. These restrictions may indicate

where these immigrant physicians may practise as well as any further educational training which is required in order to obtain a full medical licence in the province.(1,4-8) Several provinces require that graduates of foreign medical schools do at least one or two years of preregistration training before they become eligible for a medical licence. These provinces include Ontario, Quebec and British Columbia. The College of Physicians and Surgeons of British Columbia has indicated that by 1986, only those graduates from medical schools classified as being in Category I, as defined by the College, will be eligible for licensure in the province.(5) Other restrictions placed on immigrant physicians can include the issuance of only a temporary licence and being restricted to working in underserviced areas. When the immigrant physicians gain their Canadian citizenship, they are usually granted a full licence and can practise anywhere in the province with which the physician has registered. It has been noted that once these physicians have gained either landed immigrant status or citizenship, they tend to move out of the underserviced and rural areas to the more urban centres.(7) The same observation has been made in the United States. Physicians, who have completed two years of practise in an underserviced area in exchange for their military service tend to migrate back to the urban areas.(2,9)

Lately, government regulations, especially in Canada, have become prominent in establishing where physicians are allowed to set up their practises. These regulations (10,11,12) not only indicate where a physician may practise, but also (in Quebec) indicate the amount of reimbursement per service the physician may receive. In Great Britain, where this type of regulation has been used since the early 1950's, the government designates the areas which are considered

"open" for physicians to set up a practice and receive reimbursement under the National Health Service.(1,13) The British government also has control over the availability of training and practice postings for physicians. A similar situation has evolved in Sweden since 1969, when the National Board of Health & Welfare became responsible for postgraduate medical training. In both countries, the governments have limited the number of postgraduate hospital or specialty postings available, while at the same time increasing the number of postgraduate general practitioner postings. This, plus an increase in the status of general practitioners, has been claimed to have greatly reduced the distribution problems of general practitioners in both countries.(13) A more drastic form of regulation is carried out in Tunisia. In this country all newly licensed physicians are completely banned from practising in the capital and largest city in the country.(2)

Several areas in Canada have tried to repel and "ban" physician manpower in overserviced areas by restricting hospital privileges. It has been noted that this has had no demonstrable effect on the distribution of physicians.(8) Similar legislation was proposed in British Columbia in 1983. Under the province's proposed legislation, Bill 24,(11) physicians would be denied a Medical Services Plan (MSP) billing number in an area which had been classified as overserviced. (An MSP billing number is required by a physician in British Columbia in order to bill the medical service commission for the services which are provided to his patients.) Although this bill was never enacted into law, several sections were applied, particularly those sections which enabled the Medical Services Commission to restrict the issuance of billing numbers in certain areas of the province. In early 1985 these sections were challenged in

the courts and found to be unconstitutional in the British Columbia Supreme Court.(14) After this court ruling, the British Columbia government quickly proposed new legislation during its 1985 spring sitting. The government introduced a new bill known as Bill 50. This bill was quickly revoked and replaced with Bill 41. Bill 41 was passed and proclaimed as the Medical Service Amendment Act in May 1985.(12)

Section 8.1 of this act states that any physician applying for an MSP billing number within the first 90 days of the act's passage would be granted one provided they had previously submitted an application form to the commission after September 1, 1983 and had participated in the Medical Services Plan at anytime in the preceding two years. Although now guaranteed a billing number, the physicians could still face certain restrictions laid out in Section 8.2 of the Act. One of these restrictions is that the billing number may only be valid in a specific geographic region of the province. It is too early to determine if this form of regulation will have any effect on the distribution of physicians in British Columbia. It has been claimed that this regulation may have just the opposite effect to what was intended. Physicians who would have located in rural areas for short periods of time may not do so now because they are afraid of not being able to establish a practice in the Vancouver or Victoria areas later in their careers.(15)

EDUCATIONAL POLICIES

Supply Expansion

Evans (3) claims that "the state has a fundamental role in determining the numbers and types of professions that are to be trained through its funding and

subsidy policies." This can be accomplished in the medical context by one of two methods:

- i) by altering the number of positions available in the medical schools,
- and ii) by controlling the numbers and types of postgraduate residency positions that are available.

This type of approach has been classified as the Supply-Side policy (16) or Accumulation programs (8) to encourage physicians to practise in rural areas. The premise behind (i) is that by increasing the supply of physicians in an area, some physicians will eventually migrate into the less attractive areas, which are often the rural and remote areas.(17) Certain examples of this type of policy have already been cited, eg: the control of the number of postings available in Great Britain and Sweden.

Hall (18) in his 1964 Royal Commission on Health Services, implied that before physicians could be distributed to the remoter areas, there would have to be enough of them to service the urban areas. In this report Hall recommended that seven new medical schools would have to be constructed by the mid-1970's, and programs for postgraduate specialties would have to be increased if Canada were to have enough physicians to service its expected population. A provincial report for Ontario also recommended that a sixth medical school be established in that province. This, it stated, was necessary in order that the province could become self sufficient in terms of meeting its increased need for physicians.(19) Upon these recommendations, the Canadian provinces, like many other areas increased the number of medical schools and also increased the

enrollment in existing schools during the late 1960's and early 1970's. British Columbia was an exception and first year medical school enrollment was not increased to 100 students until 1979 and was expected to reach 160 students within the next few years.(20) Current first year intake to the U.B.C. medical school is 130 students per year.(5)

Under the Health Professions Educational Assistance Act of 1963, the United States federal government has provided capitation grants to medical schools to increase their enrollment.(21) As well it has provided construction grants to other postgraduate institutions to build more medical schools.

As previously mentioned, the philosophy behind increasing medical school enrollment was that as the urban areas become "overdoctored", the increasing numbers of physicians would distribute themselves to the more remote areas due to "market conditions". Evidence of this "trickle down theory" (22) due to the "surplus" of physicians is very contradictory in the literature. Schwartz et. al. (23) claim that by 1979, the surplus had influenced the distribution of board-certified physicians to rural areas of the United States because they found that all towns with a population of greater than 2,500 had ready access to a physician. On the other side, Hynes and Givner (16), Schrag (17), and Fruen and Cantwell (24) claim that only the larger towns, of at least 25,000 population, saw any real increase in their physician/population ratios. Even when medical schools were moved into smaller communities, as in Illinois, physicians were still found to be attracted only to those communities which had a population of greater than 25,000.(25)

Due to the increasing numbers of doctors graduating from medical schools, and not much change in the physician distribution pattern, the federal

government in the United States started to decrease the amount of funding it provided to medical schools in 1980.(13) This change in policy will have very little effect until the late 1980's, due to the long periods needed to train physicians. Similar recommendations have also been made in Canada in recent years.

Hall (26) in 1980 stated that even though there are now a sufficient number of physicians in Canada, certain specialties are still in very short supply. He recommended that the deans of medical schools form a manpower study group to look into this. In an attempt to restrict the number of physicians in Ontario, the province has recently decided to cut back the number of postgraduate residency positions available which will be followed by lower undergraduate medical enrollment.(27) Similar recommendations have also been made by the Federal/Provincial Advisory Committee on Health Manpower.(5) This committee has recommended:

- i) that by 1986 the output from Canadian postgraduate training in General Practice be reduced by 125 positions/year with a further reduction of 20% by 1991.
- ii) that by 1994 there be a 20% reduction of output from Canadian postgraduate training to Medical specialties stock.
- iii) that effective 1985 the first year medical enrollment in Canadian medical schools be reduced by 17%,
- and iv) that effective measures be adopted to ensure physicians establish only in areas of demonstrated need for medical services.

Loan Foregiveness Programs

The United States Government also provided scholarships, bursaries and loans to aid medical students fund their education.(9,13,16,17,21,28,29) Under this program, the loans did not have to be repaid by the students if they promised to practise in rural underserviced areas after graduation. This program appears to have had little effect on the distribution of physicians in the United States. Upwards of 45% of the students who have received loans buy their way out of the commitment.(17,29) In 1976 the Health Professions Educational Assistance Act was revised in an attempt to make it harder for students to buy out their loans.(9) One proposed method for solving the geographic maldistribution of physicians in the United States is that medical students who have their education subsidized through loans would only be eligible to receive a temporary medical licence until they fulfilled their obligation of service in an underserviced area.(30) Despite the large increase in the number of physicians graduating from American medical schools, Hall & Whybrow (21) argue that loan forgiveness programs should be maintained at their present levels in that country.

Several Canadian provinces also use loan forgiveness programs in an attempt to encourage physicians to practise in rural areas. These provinces include: Newfoundland, Nova Scotia and New Brunswick (for psychiatry residents), Ontario and Manitoba. Other provinces have established similar bursaries for other health professions as well.(31) Under all of these plans the students who receive loans for their undergraduate tuition must promise to practise in a rural area for an equivalent length of time for which loans were received. If the rural service is not completed, the student is often required to repay the full amount of the loans received plus any accumulated interest. Between 1969

and 1974 (when this program was temporarily suspended) 220 medical students partook in Ontario's loan forgiveness program. Of these students, one-half fulfilled their obligations to practise in the rural regions of the province and 73 of these continued to practise in these areas after their obligations had been fulfilled.(7) Ontario's program was reinstated in 1978.

Again this type of program has been recommended for British Columbia.(20) Under the proposed B.C. plan, students who accepted loans would have to fulfill their obligations of practising in a rural area. Payback of the loans would only be considered under the most extreme circumstances.

Rural Training Programs

Like the Canadian provinces, none of the American states require that their medical students perform any rural service before licensure, but most of them do offer this opportunity to students at some point in their training.(32-34) One American state, Minnesota, has a special rural physician program within its medical curriculum. The purposes of this program are: (i) to encourage medical students to choose primary care careers and practise in rural areas of the state, and (ii) to place special emphasis on the clinical, humanistic, economic and scientific approaches to health care and disease management.(33) The students receive a \$5,000 yearly stipend from the state and are not required to return to a rural area after completion of their medical training. Up to 1976, of the one hundred and sixty-three students who had completed the program, twenty-seven were in practise in rural areas and fifty-eight were in primary care residency programs. In the northeastern states, several medical schools offer primary care residency programs in rural areas.(34) These programs are

readily accepted by the students, many of whom stay to practise in the area after their residency training has been completed. Although some of the rural training programs seem to have been successful in the distribution of physicians to rural areas, most have not. Schrag (17) has proposed one method of solving the physician distribution problem in the United States. This proposal would require a minimum of four years of practise in an underserved area as a condition of admission to medical school and final medical licensure. Schrag also suggests that new licences should only be issued in areas that are classified as underserved.

This type of service has also been recommended as a method of improving the geographic distribution of physicians in British Columbia. Black (20) advocated that all fourth year medical students should complete a minimum eight week summer preceptorship in a rural community and possibly some form of compulsory service after graduation. At the same time, Black stated that the students who participate in the rural training programs should receive higher salaries for this training than they currently receive in an attempt to attract more students to this program.

In British Columbia, besides the increased enrollment at the medical school and the summer preceptorships, no other forms of educational policies have been tried in an attempt to affect the geographic distribution of physicians.

ECONOMIC POLICIES

Economic incentives, such as guaranteed incomes, differential fee schedules, subsidized housing and other facilities, which would fall into Evans' (3) third channel, have been and are being used to distribute physicians to

rural areas. The most widely used form of economic incentive would be a guaranteed net income. This format is used in many nations, as well as several Canadian provinces.

In Norway, the District Doctor Program guarantees that a physician will receive a basic salary for assuming public health responsibilities in the area in which he practises. In conjunction with the basic salary, the physician can also bill the insurance plan for regular clinical services he has performed.(1,17) This program also offers physicians who practise in northern regions of the country other incentives such as: subsidized housing, longer holiday periods and credits towards receiving specialty status if desired.(1) Australia, also uses a salary system for rural physicians. Under the Australian system physicians are paid a salary to see patients during certain hours each day. If a visit is required outside these hours, the physician is allowed to bill the national health insurance plan for his services.(1) Other regions which use salaries to entice physicians to set up practises in very sparsely populated areas include: Scotland, New Zealand and several of the American states.(2)

Although guaranteed incomes are available in some areas of Canada, it has been claimed that the largest economic incentive here, is the Universal Medical Insurance Plan.(7,8) With the introduction of the plan in 1968, it was claimed that physicians who chose to practise in rural areas would not face any economic barriers in terms of not being able to earn a "decent" income, as all physicians would receive the same fee for service regardless of where they practised and payment of these fees was guaranteed by the provincial governments. Despite the Universal Medical Insurance Plan, the distribution of physicians in rural areas

has not greatly changed since 1968, and therefore guaranteed incomes are still offered in several provinces.

The offering of a guaranteed salary for physicians is widely used in various regions of Canada. Ontario, Newfoundland, New Brunswick and Manitoba (6,7,31,32) all use this form of incentive to entice physicians to establish a practice in the rural areas of these provinces. In Newfoundland physicians were offered positions within the Cottage Hospital system, or as District Health Officers and were guaranteed an annual salary of between \$50,800 and \$63,000 to work in remote outposts of the province.(6,31,32) Although this program seems to work in Newfoundland, most of the recruits have been from Great Britain.(8,31) The province used to also pay all costs for the physician to move back to Britain after he had spent two years in the province.(8)

Ontario has had a guaranteed income program for general practitioners since 1969. In 1978 the program was expanded to include specialists willing to set up practices in Northern Ontario. Under Ontario's program, general practitioners who set up a practice in Northern Ontario could be guaranteed an annual income of \$38,000, or an income tax free grant of \$40,000 paid out over four years. Specialists under this program receive a \$20,000 tax free grant paid over three years. The program also aids underserviced areas in southern Ontario, but in these regions the guaranteed income and grants are lower. A general practitioner who sets up a practice in an underserviced region of southern Ontario, is guaranteed either a \$28,000 net income or a grant of \$15,000 paid over four years.(6,7,31,35) Upon the tenth anniversary of the program, 499 physicians had set up practices in rural Ontario communities and as of September

1979, 275 were still practising in these areas.(7,35) There has been a high turnover rate among the specialists who enter the program.(7)

Manitoba has become the latest province to offer physicians a guaranteed income to practise in rural areas. Again, like Ontario, Manitoba offers either a guaranteed income of \$40,000 or an income tax free grant paid over four years.(31,32) Unlike Ontario's plan, once a physician has joined in Manitoba, he has contracted to stay in the rural community for at least one year, after which he may renew his contract.(32) Various communities in Alberta also offer physicians, particularly specialists, guaranteed income levels and other fringe benefits to establish practises in these communities.(32)

Nova Scotia does not have a guaranteed income program, but it does provide income subsidies to physicians practising in rural areas.(31) In Nova Scotia subsidies are only paid to physicians practising in remote areas where they are the sole physician for the region. Such physicians are engaged by the government to practise in the area for a minimum period of twelve months. If the physician leaves the area before his contract has expired, he may be required to repay the government an appropriate portion of the subsidy received.(31) British Columbia also does not have a guaranteed income program, in such terms, but does offer similar income subsidies to its physicians practising in remote areas of the province which amount to a guaranteed income.(31,35)

The subsidies provided in British Columbia depend on the fee-for-service income made by the physician, as well as the size and isolation of the community. The subsidy provided can range up to \$42,000 per year. The full subsidy is provided if the physician's fee-for-service income is below this

level. Above the \$42,000 level, the subsidy is reduced by \$1.00 for every additional \$2.00 income made.(31,35) As of 1982, only two physicians in the province received this subsidy.(31)

Saskatchewan initiated its rural incentive program in 1979. Under this program the government may provide up to one half the costs (to a maximum of \$15,000) needed to open a medical office in a rural community. The physician and community are expected to fund the other half of the costs.(6) For each \$5,000 received under this program, the physician must promise to stay in the community for one year. Originally the program was only open to general practitioners, but in 1980 anaesthetists were also included.(31) Anaesthetists are now eligible to receive a maximum of \$25,000 to defray start up costs. It has been recommended that British Columbia establish a similar income-tax free establishment grant program.(20) This grant would be for a maximum of \$25,000 and the physician would then be contracted to work in the rural area for a period of three years. Also under this recommended program the physician would be required to repay any outstanding part of the grant if the three years of service was not completed.

Another form of economic incentive used in several provinces is that of differential fee schedules between urban and rural areas of the province.(1,6,31,35) This type of program is used in Quebec, Manitoba and British Columbia. Under amendments made to the Quebec Health Insurance Act in 1981, the Quebec government can set differing remuneration rates for physicians and specialists in different regions of the province. The Minister of Health in Quebec has the authority to determine which areas of the province are considered to be "professionally overserviced" and therefore, which regions will receive

which remuneration rates. The rates received by the physicians not only depend on the region, but also on the length of time the physician has practised in the region.(1,10,31) Under the new law, general practitioners and specialists who practise in areas deemed overserviced only receive 70% of the negotiated fees for their first five years of practise. After five years, they receive the full 100% of the negotiated fee. Prior to June 1982 general practitioners who had set up practices in areas deemed underserviced and/or isolated could receive up to 115% of the base fee schedule. After June 1982 these physicians have received 100% of the base fee. Specialists who practised in the same areas could receive up to 120% of the base fees.(31) Manitoba offers physicians who practise north of the 53rd parallel a 10% increase in the basic fee schedule.(6)

Since 1978, physicians in rural and northern British Columbia have been able to earn up to 15% above the regular fee schedule rates through the Northern and Isolation Allowance program.(20,32,35) This allowance is based on a point system. Points are allocated to the community in which the physician has established his practice, on the basis of: the number of physicians in the community, the distance from the nearest major hospital and from Vancouver, the climate and the physician/population for the region in which the community is located. In order to qualify, a physician must live in a community which has at least 31 out of 75 points and he must gross at least \$20,000 per year.(31) In 1982 over 200 physicians were receiving additional payments under this program.(35)

Various other forms of economic incentives have also been tried. For example, in the United States it was thought that if rural areas had hospitals,

this would draw physicians to those regions. Under the Hill Burton Act of 1946 (13,17,30,36) many hospitals were built in small rural communities, but this has failed to attract many physicians into the areas.(17,36) Similar attempts at providing facilities have been tried in Ontario.(7)

In Canada, small communities on the Prairies and the Northwest Territories try to recruit physicians with incentives such as: a guaranteed income level, the provision of a clinic and all other necessary facilities and in some instances subsidized housing.(32,37) Clinics in Prince Edward Island guarantee a minimum income to physicians who are willing to practise there. Once the physician has made over this limit he can bill on a fee-for-service basis.(6) Other attempts at improving physician distribution range from: travelling specialists and a locum tenens pool (7,38), to the provision of air ambulance services.(1,7,35)

Although these programs and incentives have been implemented, their effectiveness has been limited.(7,29,35) Eisenberg & Cantwell (29) point out that certain economic incentives, such as the provision of clinical facilities and guaranteed incomes have not been successful in the United States. Due to this these types of programs have been abandoned completely in some areas. The authors also state that a threshold income level may have to be met before it will be a successful incentive for physicians to practise in rural areas. As previously mentioned, the Ontario income program has been somewhat of a success. Since its inception in 1969, 173 communities had been designated as underserviced and as of January 1983 there were only 28 still on the "active list".(6) It was also noted though that there was a 7% attrition rate among physicians who started in the program in 1981.(31)

Another report states that since the introduction of the Northern and Isolation Allowance in British Columbia there has been a 16% increase in the number of general practitioners ie: from 150 to 174 practising in those communities which were eligible for the allowance. This report also points out that the increase in the number of general practitioners (relative to the population growth) was higher in the hospital districts which had at least one community eligible, than for the rest of the province. However, this report also notes that the increase in the numbers of general practitioners in the communities eligible for the allowance has not significantly changed when compared to the increase in the numbers of general practitioners in these communities for the four year period immediately prior to the introduction of the allowance.(35)

The incentives and programs described thus far fall under the reimbursement schemes for physicians only. Evans (3) also states that under his third channel, governments can decide on other classes of health professionals which can be reimbursed under the provincial health schemes. In many nations of the world nurse practitioners, midwives and other forms of auxiliary health workers carry out many of the medical duties in the rural and remote areas.(2) These personnel, although present in Canada, are not used except in certain circumstances, to alleviate the shortage of physicians in rural areas. In the Northwest Territories, nurse practitioners are employed in remote health stations.(1) Also, in Ontario, the province operates fourteen nursing stations in communities classified as too isolated and too small to support a physician. These nursing stations are visited by a physician at least once a week.(7) Governments should consider hiring more of this type of personnel if they cannot

entice more physicians to practice in rural areas. A recommendation to this effect has been proposed for certain areas in the United States.(39)

SUMMARY

This chapter has described the various policies and incentives which have been and are being used in an attempt to improve the geographic distribution of physicians. These policies have been shown to fall into one of three categories: regulation, education and economic. The few policies used in British Columbia can be summarized as follows:

- | | |
|--------------------|---|
| <u>Regulatory</u> | <ul style="list-style-type: none">i) <u>The Medical Practitioner's Act (40)</u> which dictates who can call themselves physicians and practise medicine in the province.ii) <u>Bill 41 (12)</u>: the sections which allow for the restrictions on physician billing numbers to be valid only in certain regions of the province. |
| <u>Educational</u> | The Supply-Side approach of increasing enrollment at the University of British Columbia medical school, from 80 first year students in the early 1970's to the present first year enrollment of 130 students. |
| <u>Economic</u> | <ul style="list-style-type: none">i) The payment of a Northern and Isolation Living Allowance to physicians in remote areas of the province.ii) The provision of subsidies for those physicians in the most remote areas of the province. |

The use of these policies has not been too effective in distributing physicians around the province, except to the larger communities. In the next chapter of this thesis the factors which tend to influence physicians to locate a practice in a particular area will be examined in an attempt to determine what types of policies would be helpful.

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CHAPTER V

FACTORS WHICH AFFECT THE LOCATION OF PRACTICE.

It has been shown that there is a wide discrepancy in the distribution of physicians between rural and urban areas of British Columbia. The policies and incentives which have been implemented in an attempt to change this distribution pattern were discussed. The effectiveness of several of these policies was commented on and it was shown that most of the policies have not had any effect in changing the distribution of physicians between urban and rural areas. In this chapter the factors which have been found to have an influence on the location of physicians' practices will be examined and discussed within the framework of Fixed and Manipulable Determinants.(1)

Fixed determinants are those factors for which no direct medical manpower policies can be implemented or incentives offered in such a manner as to overcome physicians' decisions regarding the location of their practices if these are the most important factors regarding the decision.(2,3) Factors which fall into this category include: climate and geography; physician's upbringing; socio-economic characteristics of the area; and lifestyle preferences.

Manipulable determinants also tend to influence where physicians have established or plan to establish practices. Manipulable determinants are factors for which policies and incentives can be developed in an attempt to affect the geographic distribution of physicians. These include: negative views of particular area; exposure to rural areas during medical training; professional amenities; loan forgiveness and other monetary incentives.

In their study on the effect of a medical school as an influencing factor on location of practice, Bueching and Glasser (4) commented that two types of

studies have been carried out in this area. The first type, classified as Retrospective studies, ask physicians to specify why they chose the area they are presently practising in. Bueching & Glasser claim that this type of study relies on secondary sources to determine demographic or similar correlates of practice location and that the factors most often identified in this type of study are general characteristics of the social or physical environment of the physicians, rather than motivational characteristics. These social and physical environment factors include:

- (i) the location of residency training;
- (ii) the size of community in which the physician had originally lived;
- and (iii) the size of community in which the spouse had originally lived.

In the second type of study, classified as Prospective studies, medical students are asked to state their preferences for locating a practice in a particular area. The significant factors were motivational and related to the perceived geographic and professional amenities available in the area. They included:

- (i) perceived openness of the medical community;
- (ii) form of practise organization;
- and (iii) desire to maintain family ties.

In 1976, Eisenberg and Cantwell (5) developed a series of hypotheses on the factors which affect physicians' location of practice decisions. They then

reviewed the literature and labelled each paper as being supportive, weakly supportive or contradictory of each hypothesis. Their definitions of each category were:

- (a) Supportive - the literature examined provided strong evidence leading to acceptance of the hypothesis;
- (b) Weakly Supportive - the literature examined provided weak evidence leading to tentative acceptance of the hypothesis;
- and (c) Contradictory - the literature examined provided valid findings which in some cases lead to acceptance and in others to rejection of the hypothesis.

Among the hypotheses which Eisenberg and Cantwell found to be supported by the literature, in that the hypothesized factors tended to influence physicians to a great extent on where to locate their practices were: the population of the area; the size of the community in which the physician was reared or attended school; and the ability to join a group practice. Physicians were found to locate in areas where there was a large population base, which prompted the authors to claim that there may be a "threshold population" needed to support a physician. Physicians also tended to establish practices in communities similar in size to the ones in which they had been raised. As well, if they were able to join a group practice in a rural area, they were more likely to locate in that area. Another unrelated finding which the authors noted in their review was that physicians who attended "higher quality" or private medical schools tended to practise in urban areas more than physicians who attended other medical schools.

The hypotheses which were found to be weakly supported by the literature were ones based on: the presence of a medical school in an area tending to influence physicians to establish in that region; and the opportunity to have done a preceptorship or other form of training in a rural area. It was also found that physicians tended to locate in areas which had a "high quality of life."

The two hypotheses for which evidence was contradictory were based on the following factors: the presence of hospital facilities and the income potential of the physicians. In other words some physicians were persuaded to locate in rural areas because of potentially high incomes and the presence of hospital facilities, while others were not.

After their review of the literature, Eisenberg and Cantwell listed some of the existing policies and programs used to affect the geographic distribution of physicians in the United States by their incentive mechanisms. Each incentive was then compared to one of the authors' hypotheses. It was found that most of the incentive programs were based on hypotheses for which evidence was found to be contradictory or at best only weakly supportive. The only programs which were completely supported by the literature were those based on the hypothesis that physicians would practise in communities of a similar size to the one in which they were raised. All of these programs encouraged selective admissions to medical school.

Another review article, published by the United States Department of Health Education & Welfare (2), found that the demographic characteristics of an area had the greatest influence on where physicians chose to practise. These factors included: the age and educational status of the population, as well as the

racial mix. In several studies examined in this report, it was determined that general practitioners tended to locate in areas where there was a higher percentage of the population over 65 years. Specialists, on the other hand, tended to locate in areas near medical schools and in areas where the population had a higher educational standard.

Along with the demographic characteristics, this study found social and cultural activities of the region to be important influencing factors. These included the education facilities for children, the social, sporting and cultural amenities in the region and a preference of the spouse to live in a particular area.

Since the publication of these two review articles, many researchers have continued to study the factors influencing location of practice decisions. These studies continue to be both retrospective and prospective and the results are also very similar to those of the review articles. This chapter will now examine these latter studies and their results. The factors to be discussed will be divided into Fixed and Manipulable Determinants.(1)

FIXED DETERMINANTS

Climate and Geography

Hale et. al. (6), in a before-and-after type of study, sent questionnaires to students in a Northeastern U.S. medical school, all of whom were required to participate in a month-long rural preceptorship program. Through the questionnaire the authors were able to divide the students into two groups depending on whether or not the students would have chosen the preceptorship if it had been an elective course. The students were asked to rank

their preferences of specialty of practice, type of practice setting, and locational determinants on a seven point scale. The students were also asked to rank their knowledge of primary care and confidence in their relevant clinical skills.

Among the choices of locational determinants were geographic area, size of community, distance from a medical school, community economic status, income, and recreational opportunities. In both groups the geographic location of the community was the most important factor which determined where the students would like to establish practices. This was closely followed by the population of the community. Income, community economic status, and the political climate in the area were the least important factors for both groups.

Similar findings were made by Steinwald and Steinwald.(7) These authors sent questionnaires to all U.S. medical graduates of 1965 in an attempt to determine whether a period of rural training had had any effect on where physicians tended to locate their practices. They found that only 13.5% of these graduates had taken any training in a rural area, and that only 17.8% of all graduates had decided to locate their practices in rural areas. Again, the most important factor which influenced where the physicians established a practice, both in urban and rural settings, was the climate and geographic features of the region. Coleman (8) also found this to be the most important factor when he analyzed similar data. Woodward and Ferrier (9), after questioning medical students at McMaster University about factors which were important in where they would locate a practice, also determined that the climate and geography of the region were the most important factors.

On the other hand Cooper et. al. (10) found climate to be an insignificant factor in practice location decisions, particularly among primary care physicians (defined as those physicians in general or family practise, internal medicine, pediatrics and obstetrics and gynecology). These authors mailed questionnaires in the spring of 1972 to all recently-graduated primary care physicians in the United States. They examined personal, social, and professional factors, which tend to influence physicians' choice of practice location. As well, they examined the role of the spouse in the decision process. Although climate was found to be an insignificant factor, the geographic features of a rural centre were found to be significant in the decision to locate there, particularly if the rural centre was close to an urban one. This finding is contradicted by Yett and Sloan (11) who found that general practitioners tended to settle in rural areas away from the urban centres and it was the specialists who tended to settle in the more urbanized areas.

Although it has been shown that the climate and geography of an area have an influence on where physicians locate their practices, several authors claim that physicians are only following the general populations' migration patterns to the "sun-belts" and the suburban areas.(8,12)

Upbringing of Physician and Spouse

After the climatic and geographic features of an area, the second most important factor found to influence where physicians establish their practices is that of their upbringing. Yett and Sloan (11) determined where newly-graduated physicians were born, attended medical school, did their postgraduate training, and correlated these variables with the areas in which these

physicians had set up their first practices. They found that physicians tended to establish practices in areas in which they had the strongest contacts. The more events, eg: birth, schooling, residency and internship, which had occurred in a particular area, the more likely it seemed that the physicians would locate in that area or one very similar. As the number of events in a particular region decreased, it was shown that the most recent events had a stronger effect than previous ones. For example, physicians who had completed their schooling and residency in one area, but were born in another, tended to establish practices in the area of their schooling.

In a similar study Aaronson et. al. (13) compared the population of the communities in which physicians had: lived until the age of 18; completed undergraduate studies; completed medical school and residency; participated in a preceptorship; and where their spouse had originally lived; with the population of the communities in which the physicians eventually established a practice. Like Yett and Sloan, these authors found that the likelihood of a physician locating a practice in a particular sized community varied proportionately with the number of events which had occurred in that sized community. Another finding of this study was that the size of community in which the physician lived until the age of 18 had the strongest influence on where the physician located his practice. The size of community in which schooling or preceptorship were completed, appeared only to have a slight influence on the decision of ~~practise~~ practice location.

Bueching and Glasser (4) questioned physicians over a three year period to determine why they had moved into an area surrounding a medical school. They found that the size and urbanization of the area were the most important

reasons, followed by the fact that the area was near the home town of either the physician or spouse.

This finding that physicians tend to locate their practices in towns or cities of similar size to those in which they were brought up has also been substantiated by other authors.(7,12,14-16) When Parker and Sorensen (14) questioned physicians as to why they had moved into rural communities, again most of the responses indicated that the physician had spent some time in a rural area prior to practising there.

Not only is the size of community in which the physician was brought up an important factor, but the size of the community in which the spouse was brought up is also very important. Taylor, Dickman and Kane (15), when questioning medical students on their attitudes towards rural practice, found that students with a rural background tended to favour a rural practice location. The same trend occurred for students with an urban background; they preferred urban practices. These authors also claimed that the background of the spouse, particularly wives, was important. If the wives were from a rural background, then the physicians tended to practise in rural areas.

Stewart and Miller (17) found that spousal background in terms of size of community in which that individual was brought up, was no more influential than the background of the physician. These authors mailed questionnaires to physicians and their wives in New Mexico and Arizona, asking about the size of community in which each was born and had spent the majority of their formative years. In their analysis the authors found that when both physician and wife were from rural areas, there was a slight tendency to locate in a rural area. In the situations of mixed background, in which one spouse was from a rural area

and the other from an urban area, it was found that the physician tended to practise in a metropolitan area. This was particularly true if the physician rather than the spouse was from a metropolitan area.

In their study of women physicians in rural areas, D'Elia and Johnson (18) found that most women physicians who practise in rural communities, do so because they have physician relatives in the same area. Older women physicians practised in the most rural communities; younger female physicians tended to locate their practices in areas surrounding the medical school.

Socio-Economic Factors Characterizing the Area

Along with climate and geography, the demographics of an area tend to influence the choice of practice location. Woolf, Uchill and Jacoby (19) conducted a study to determine why some rural areas were picked more often than others by physicians who participated in the National Health Services Corp (a service under which physicians may repay any scholarships or loans received during medical school by working for a set period of time in rural underserved areas) in the United States. Areas with: a high percentage of white collar employees; higher than average family incomes; and higher levels of education among the population, tended to be the ones chosen most often. Physicians are least likely to locate practices in areas: where there is a high percentage of the population employed in agriculture, which have low per capita incomes, or which have a low education index.(19)

These correlates and other behavioural determinants have also been found important by other authors. Evashwick (20) found that the per capita income in an area, the percentage of the population below the poverty line and educational

levels tended to influence physicians on where to settle. The author found that the areas which had the highest physician/population ratios were those of highest per capita income and population density. Another factor which tended to attract physicians to a particular area was the percentage of the population over 65 years of age.

Bryant (21), as well as Rowley and Baldwin (22) found that centres of high income and retail trade tended to attract physicians more than other areas. Rowley and Baldwin point out that this may be caused by the indebtedness of recently-graduated physicians, who are concerned with finding an area in which there will be enough financial support for their practises. Areas of high per capita income and areas of high urbanization were also found to attract physicians by Clark et. al.(23) This may not be such an important factor in Canada due to the Universal Medical Insurance program.

Lave et. al. (16) comment that the socio-economic characteristics of a region have more of an influence on internists and paediatricians, than on general practitioners. This may be due to differing lifestyle preferences among these groups of physicians.

Lifestyle Preferences

Under this heading can be categorized such factors as: preference for urban or rural living; specialty of practice - which are fixed factors, as well as income potential and organization of working environment (eg: solo vs. group practice) - which may be manipulable factors. Lave et. al. (16) state that a preference for a rural lifestyle tends to dominate physicians who locate their practices in these areas, while the need for professional amenities dominates

among those physicians who locate practices in urban areas. Steinwald and Steinwald (7) also found similar preferences to be factors which influence location of practice, as did Woodward and Ferrier.(9)

Langwell and Werner (24), and Langwell (25) have suggested that the choice of practice location may be important to the physician's expectation of his/her lifetime income. Langwell and Werner (24) attempted to associate the incomes and the number of hours worked for four groups of specialists, with the areas in which the physicians were practising. They found that income levels may be a factor in specialists not moving to rural areas, but that net income was not strongly associated with location choice. They also found that the number of hours worked per year had a strong association with the choice of specialty and location of practice chosen. It was pointed out that physicians who located in urban areas tended to work far fewer hours for the same income. Langwell (25) states that current economic incentives encourage general and family practitioners to practise in urban areas. Again when their incomes are adjusted for the number of hours worked, it was found that those physicians who practise in urban areas work fewer hours. The income potential of a physician in a particular area was another influential factor found by Cooper et. al. (10) in their study. Again due to the different payment schemes these may not be relevant to the decisions of Canadian physicians.

The type of specialty chosen by medical students, which may be influenced by the expected income potential or the type of training received, has been found to be another factor which influences where a physician will establish a practice. Aaronson et. al. (13) found that general and family practitioners tended to settle in the smaller towns in Kentucky. This was also found by Hough

and Marder (26) when they examined where medical students located their practices after completing their training. Primary care physicians were more likely to locate their practices near the area of their schooling, while more highly trained specialists tended to move to larger urban areas. A similar finding was made by D'Elia and Johnson.(18) These authors found that the women physicians who practised in rural areas were mainly primary care physicians.

Recreational Amenities

Several researchers have found that the availability of recreational and cultural facilities in an area has an influence on where physicians tend to locate their medical practices. The need for such amenities could be classified as a lifestyle preference. Hale et. al. (6) and Lave et. al. (16) both found that the wider the variety of sports and other recreational opportunities in an area, the more physicians were drawn to this area. In the Hale study, recreational opportunities ranked as the second most important factor which physicians identified as having had an influence over where they intended to establish a practice.

These were also amongst the most frequently selected factors in the Rand Study as analysed by Coleman.(8) The availability of recreational and sports facilities was the sixth most frequently chosen factor at 56%. The cultural advantages (42%) and social life in the area (34%) were also two other major influential factors found in this study. The scarcity of cultural events was cited by physicians in Parker and Sorensen's study (14) as a reason for not moving to rural areas.

Overall it can be seen that the lifestyle preference and place of upbringing of physicians tend to be very important factors which influence where physicians will locate a practice. Except for selecting more students from rural areas for admission to medical school very few, if any, policies can be developed to influence these "fixed" preferences. This discussion will now turn to those factors which have been classified as the Manipulable Determinants.

MANIPULABLE DETERMINANTS

Negative Views of Rural Areas

Physicians who practise in rural areas usually have a preference for that type of lifestyle and they probably have a positive view of rural areas and rural practice. Taylor et. al. (15) interviewed medical students about rural practice and found that many had negative views about this type of practice. Parker and Sorensen (14) also found negative views to be a major influence for not practising in rural areas. These views were sometimes found to be influenced by family, friends and professors. Some of the negative aspects of rural practice found by these authors were: the hours of practice were too long, there was an inability to get time off for vacations or continuing education, lack of social and cultural facilities in the area, the amount of financial outlay required to set up a practice and the lack of an opportunity for professional growth. Kronhaus (27) found that many physicians left rural areas shortly after starting a practice because of the long hours and insufficient time off. These findings were confirmed by Evashwick.(20) She also states that one way to overcome this would be to build a medical centre which would employ more than one physician.

Rural Preceptorships and Other Training

Another reason sometimes cited for not practising in a rural area is the feeling of unpreparedness of the newly graduated practitioner to cope with all medical emergencies without "sufficient backup".(1) In order to overcome this, many medical schools now include some elective rural training within their curricula.

Evidence on the effect of this training on where physicians tend to establish their practices is very contradictory. Cooper et. al. (10), Yett and Sloan (11) and Taylor et. al. (15) all found that a greater percentage of students were willing to practise in rural areas after they had been exposed to this form of practice in their training. According to Wunderman and Steiber (12), exposure to a rural area through residency or other training significantly influences a physician's inclination to establish a practice in a similar setting. Hough and Marder (26) commented that there was a strong association between having done a residency in a particular state and a physician practising in that state. This was also the finding of Stefana, Pate and Chapman.(28) Aaronson et. al. (13) found that when physicians had done a preceptorship in a small community, there was an increased likelihood that the physician would practise in a small community.

Blumenthal et. al. (29) questioned pre-clinical students participating in a continuous two year rural clerkship program about their future career plans and the size of community in which they planned on locating. In a pre-clerkship questionnaire most of the students completing the first year (first-year students) had indicated they wanted to locate in any city or metropolitan area which had a population of 50,000 or greater. The students who were completing

the second year (second-year students) had indicated that their first choice was a city with a population between 50,000 and 100,000 and their second choice was an urban/suburban community with a population between 25,000 and 50,000.

The attitudes and choices of both the first and second year students had changed by the time they were asked to complete a post or mid-clerkship questionnaire. On this questionnaire the first-year students indicated that their first choice of practice location was now a community with a population of between 15,000 and 24,000 and their second choice was a metropolitan area with a population of over 300,000. Among the second-year students the first and second choices were in the reverse order of the pre-clerkship questionnaire. After completing the clerkship more of the second-year students had indicated that they would like to practise in communities with a population between 15,000 and 24,000. On the other hand fewer of the first-year students chose communities with populations between 5,000 and 15,000 after they had completed one year of the clerkship. None of the second-year students had selected this size of community on either the pre or post-clerkship questionnaire.

Steinwald and Steinwald (7) and Coleman (8), on the other hand, claim that preceptorships do not have much of an influence on whether or not a physician will choose a rural practice location. Steinwald and Steinwald (7) did find, though, that students who were from an urban environment and who had done a rural preceptorship, were more likely to practise in a rural area, than were students from an urban environment who had not done a rural preceptorship.

Professional Amenities

Such factors as the availability of clinical facilities and support staff, the need for continuing education, and contact with a medical school would be classified as professional amenities. All of these have been found to be factors which influence a physician's decision on where to locate his practice.(4,8,10,14,18,20)

When Bueching and Glasser (4) asked physicians why they moved into the area surrounding a medical school, the fourth most important reason was found to be that the physicians anticipated a possible appointment to the medical centre. Cooper et. al. (10) also found that the need to have contact with a medical school was a very important factor which influenced physicians to practise in the urban areas.

Among the factors Steinwald and Steinwald (7) found which tended to influence the location of practice were several that would fall under this professional amenities classifications: the opportunity for regular contact with other physicians; the availability of clinical support staff and facilities; and the opportunity for regular contact with a medical school or centre. The "need" to practise in an area close to a medical school or large hospital was also pointed out by D'Elia and Johnson.(18) These researchers found that most of the younger women physicians who were practising in non-metropolitan areas, all tended to be in close proximity to the largest hospital in the area. It was the older women physicians who were practising in the smallest communities.

In his analysis of the Rand Corporation's data, Coleman (8) found that specialists of all types, tended to locate their practices near a medical centre or graduate teaching institute, while general practitioners tended to locate

further from these facilities. Coleman also found that the second and third most frequent responses as to why physicians located in the area they did were: i) the opportunity for regular contact with other physicians (63%) and ii) the availability of clinical support facilities and personnel (62%). The availability of continuing education was selected by 42% of the questionnaire respondents.

Evashwick (20), in her study of the effect of group practice on the location of practice decisions of physicians, found that in 1960 the distance from a hospital and the actual hospital facilities in a region had very little effect on the distribution of physicians. By 1970 there had been a considerable change and the author found that the hospital bed/population ratio was a very important factor in the decision to locate a practice in a particular region.

The ability to join a group practice has been found by many researchers (4,7,8,10,15,16,20) to be a major influencing factor. This has been found to influence both physicians who plan to locate in urban areas (7) and in rural areas.(2) Evashwick (20) points out that as the percentage of physicians in group practice increases in non-metropolitan areas, these areas tend to attract more physicians.

In the Parker and Sorensen (14) study the reasons physicians gave for not practising in rural areas were: i) the necessity to be near a large medical centre; ii) lack of "house staff" in small hospital; and iii) the lack of opportunity for professional growth and continuing education. On the other hand, two of the reasons physicians gave for moving to rural areas were: i) a good community hospital in the town and ii) the proximity of a medical centre in a larger city.

Loan Forgiveness

One of the major policies and incentives that has been tried in an attempt to redistribute physicians from urban to rural areas is that of providing "free" loans to medical students in exchange for practising in a rural area after graduation. The ability to receive such loans does not seem to be a major factor on where a physician will practise after graduation. Coleman (8) found that only 1.4% of all respondents checked this factor as being an influential one. This percentage rose to 3.6% when only general practitioners' responses were looked at. The ability to receive loans for starting up a practice did not appear to be influential either. Only 4.9% of all respondents found this to be important, yet Parker and Sorensen (14) found that one of the reasons for not practising in a rural area was the high financial outlay required to establish a practice. Similar findings on the importance of loan forgiveness were reported by Cooper et. al. (10)

SUMMARY

Up to this point this thesis has examined the various methods used to determine the requirements and supply of physicians. As well several of the criteria for designating an area as a physician shortage area have been discussed. It was shown that all methods have problems and that no one method is better than another. Because of this and also because they are readily available, physician/population ratios were chosen to identify the distribution of physicians throughout this thesis.

In Chapter III, the growth of the physician supply was examined as was the current supply of physicians in Canada and British Columbia. The current supply

was converted into physician/population ratios to outline the distribution of physicians across Canada (by province and territory) and in British Columbia (by Regional Hospital District). The physician/population ratio for Canada was compared to that of other western industrialized nations. It was shown that Canada had one of the highest physician/population ratios in the world. The Canadian ratio was then broken down into the individual provincial and territorial ratios. When this was done, it was shown that British Columbia had the highest ratio in the country. British Columbia's ratio was then broken down into ratios for several hospital districts in the province and finally into general practitioner and specialist/population ratios for these hospital districts. In all cases it was shown that the more urbanized areas tended to have higher ratios than the more rural areas. The ratios ranged from an overall ratio of 1/369 in the Capital Hospital district to 1/1,330 in the Mount Waddington District. This was compared to the provincial average of 1/504. In terms of general practitioner/population ratios, the range was from 1/686 in the Sunshine Coast District to 1/1,605 in the Peace-River Liard District. The provincial average was 1/923.

In Chapter IV British Columbia's current policies with regards to geographic distribution of physicians were compared to those of the other Canadian provinces and those in other nations. It was shown that very few of the policies which have been implemented have had any effect on the geographic distribution of physicians.

This past chapter has examined those factors which have been found to influence the locational choice of practice. These factors, it was found, could

be divided into Fixed Determinants for which no policies could be developed and Manipulable Determinants for which policies or incentives may be offered.

As was seen in Chapter IV, most of the policies and incentives offered across Canada and particularly in British Columbia are directed solely towards the provision of higher fees or a guaranteed income to physicians who practise in remote areas of the province. This, it was shown in Chapter V is not a highly motivating factor to physicians. As Langwell has pointed out, most physicians feel that they can earn a high enough income and work fewer hours by practising in a large urban centre. This effect was also pointed out in Chapter IV where it was shown that the higher fee schedules for physicians in remote areas of British Columbia have had only a minimal effect in attracting physicians to these areas. This has occurred despite the "supply-side" policy of increasing enrollment at the University of British Columbia medical school.

Other policies that have been implemented and which should, according to the studies, be successful are: the provision of a community medical centre for use by the physician. This clinic, if large enough may encourage two or three physicians to set up a group practice. This would allow the physicians to work fewer hours and also have some professional contact. This type of policy has been tried with some success in small Prairie towns.(30)

Medical students have indicated in some studies that the provision of educational grants or loans in exchange for rural practise was an important factor for selecting a rural practice location. Although this form of incentive has been tried in various areas, its effect has been marginal. The latest regulatory policies introduced in British Columbia and Quebec may have some

effect in getting more physicians to practise in rural areas, but it is too early to tell.

One of the major factors for not establishing a practice in a rural area was found to be the need for professional contact including continuing medical education and other amenities. This has not been dealt with in any form of policy in British Columbia or across Canada.

The area of upbringing of the physician and the area in which medical training was completed were found to be very influential on the physician's decision to locate in a particular area. It was found that the latter events were usually amongst the most influential. It was shown in Chapter IV that areas which have developed rural post-graduate training facilities tended to attract physicians and the physicians stayed in the area after completion. At the moment there are no post-graduate training facilities in rural areas of British Columbia.

Now this thesis will move on to examine what factors might influence the residents and interns in British Columbia to move to the more rural areas of the province. From the results of this study an attempt will be made to make recommendations on the types of policies or incentives which could be introduced in British Columbia to change the geographic distribution of physicians.

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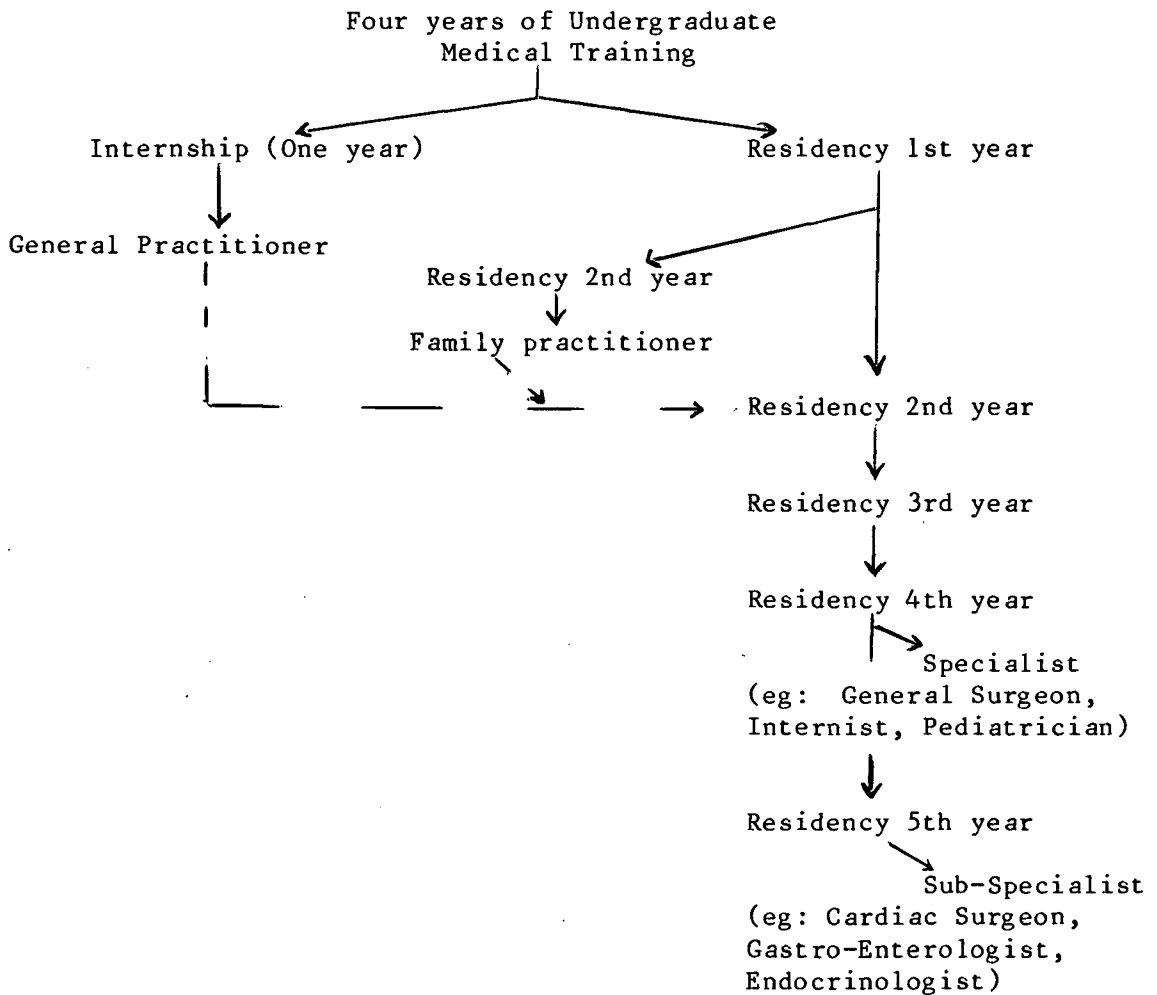
CHAPTER VI

METHODOLOGY

The question being addressed in this thesis is: What policies or incentives will have to be implemented in British Columbia in order to have more physicians establish their practises in the rural areas of the province? In order to address this question, it was decided to do a descriptive, prospective type of study. This study is descriptive in that it has examined and described the reasons physicians have given for locating their practises where they do and also the policies which have been tried in other jurisdictions to change the geographic distribution of physicians. Ideas from both of these areas were incorporated into the questionnaire which was developed and mailed to the participants of this study. This study is prospective in the sense that it is questioning the residents and interns, registered in the University of British Columbia medical program, as to where they plan on establishing their practices and why. This may be contrasted with a retrospective approach of questioning practitioners after the fact as to their reasons for establishing a practice where they did.

The residents and interns were chosen because, as can be seen from Figure 2, it is this group of medical students who are the closest to obtaining their medical licences and therefore having to make the decision as to where to establish their practices.

Figure 2. The "Avenues" of Postgraduate Medical Training in British Columbia



This figure shows the usual progression from medical school through the internship and residency programs. The dotted lines in the figure indicate the route general and family practitioners would take if they decided to further their training at some point in the future.

SAMPLE

A list of all residents registered in British Columbia's only medical program at the University of British Columbia was obtained from the office of the dean (N=417). Within this group there were 25 physicians in the second year family practice residency program and 392 physicians in other residency programs. A questionnaire was mailed to all but two of the residents (N=415). Questionnaires were not mailed to these two physicians because the Office of the Dean had no address listed for them.

It was pointed out earlier in this thesis that one reason physicians may not establish practices in rural areas is the need for a threshold population, particularly for the most highly-trained specialists. Because physicians could not be distinguished by specialty of training, from the information provided by the Dean's office, the questionnaires were mailed to all persons listed, rather than just those physicians in primary care residencies (family practice, general surgery, internal medicine, pediatrics, and obstetrics and gynecology).

The questionnaire was also distributed to all 89 interns registered with the College of Physicians and Surgeons in British Columbia. These physicians were located in three hospitals in Vancouver: St. Paul's, Lions Gate and Royal Columbian, as well as the Royal Jubilee and Victoria General Hospital in Victoria. At these hospitals the questionnaires were distributed through the Office of Medical Education because the hospitals would only release how many interns were practising in the hospitals, and would not release the names. Again a self-addressed stamped envelope was provided for the interns to return the questionnaires.

THE QUESTIONNAIRE

Development

The questionnaire developed for this study (see Appendix C) consisted of sixteen questions divided into four sections. This questionnaire was similar to the one used by the Rand Corporation (1) in its 1965 study. Several modifications had to be made to the Rand questionnaire in order to make it valid for a study in Canada. Several questions regarding the payment for services were deleted from the questionnaire. Other factors not included on the questionnaire used in this study were: the climate and geographic features of a region and the influence of a spouse. The wording of the Rand questionnaire was also modified as appropriate for a prospective study.

Pre-testing of two versions of the questionnaire was carried out with the co-operation of the 25 family practise residents. This group of physicians was selected because they were all together at a research conference in Vancouver in mid-March 1985. Equal numbers of two versions of the questionnaire were handed out randomly to the participants in the pre-test. The purpose of the pre-test was to determine whether there was any ambiguity in the questions being asked and at the same time determine which of the two versions would be used in the final study.

The major difference in the two versions of the questionnaire was in question 7. One version was identical to the questionnaire in Appendix C. In the second version one of the factors included in question 6 was a guaranteed net income of \$100,000. At the end of question 6 the participants were told to answer question 7 ONLY if they had selected the income factor. If they had not selected this factor they were told to answer question 8 instead. Question 7,

then asked the participants to indicate if they would practise in a rural area for a lower guaranteed net income plus any of the other factors they had not previously selected. They were asked to indicate the income required plus the additional factors. Question 8 asked the participants to state the level of income needed before they would consider practising in a rural area.

Based on the responses of the pre-test (17 out of 25), of those physicians who answered the monetary question, more answered the version included in the final questionnaire. The residents included in the pre-test were all mailed a copy of the final questionnaire and asked to complete it again.

Variables

One set of independent variables included in this study was the demographics, background and education of the participants. This was collected through the questions in the third section of the questionnaire. This information included such items as:

- i) the age and sex of the physician;
- ii) the marital status of the physician and whether the physician had any children;
- iii) the geographic area and size of community in which the physician was raised;
- iv) whether the physician was doing an internship or residency and, if the latter, in which specialty;
- and v) whether the physician had graduated from the University of British Columbia medical program and whether s/he had received any rural training.

A second set of independent variables included in this study was the factors which physicians may consider necessary in order to establish medical practices in rural and remote areas. These included such factors as:

- i) adequate medical facilities;
- ii) adequate educational facilities;
- iii) access to consultants;
- and iv) a minimum income.

The complete list is shown in the questionnaire in Appendix C.

The dependent variables measured in the study included where physicians they planned to and would most like to establish their medical practises, and in which size of community this would be. This information was collected by dividing the province into twelve different geographic areas and also including "Outside of British Columbia" as a choice, and by allowing the physicians to choose from three sizes of community:

- i) a town of under 15,000. This was meant to represent a rural community, in which not all of the primary care physicians would normally be found.
- ii) a city of between 15,000 - 50,000. This represented a community in which most of the primary care physicians may be present as well as some other specialists.
- and iii) a city of over 50,000. This represented a major urban centre in which all primary care physicians and most of the other specialists and facilities would be present.

In British Columbia this group of communities would include the five centres of Vancouver, Victoria, Nanaimo, Kamloops, Kelowna, and Prince George and the area generally known as the Lower Mainland.

Structure

The first section of the questionnaire asked the physicians to indicate in which of the geographic areas and community sizes they planned to establish their medical practices under the current policy of billing number restrictions in the province. The third question asked the physicians to indicate whether or not they would practise in a rural area for five years if after that time they could practise in the area of their choice. The five year time span was chosen to differentiate between a short and long term commitment to rural practice. After the physicians had answered these three questions they were asked to ASSUME that there were no restrictions on where they could obtain a Medical Services Plan billing number in the province and to answer the questions on area and size of community in which they would most like to establish their practices.

Two questions were asked of the physicians in the second section of the questionnaire. The first question asked the subjects to select, from a list of fourteen factors, WHICH, taken independently, (ie: BY ITSELF) would complete the following sentence; "I would consider practising in a rural area for five years if: _____." This was intended to establish those factors which, alone, would be sufficient to attract a physician to a rural area.

The list of factors included both Fixed and Manipulable factors. Among the Fixed factors were:

- i) opportunity for spouse to obtain employment;
- ii) cultural and recreational facilities in the region;
- iii) educational facilities for children;
- iv) the ability to join an established practice;
- and v) the ability to have a set vacation period and time off for continuing medical education conferences.

Among the Manipulable factors included in the questionnaire were:

- i) the provision of a medical centre by the community for the use of the physician;
- ii) regular contact with the University medical school;
- and iii) working in a rural area in exchange for loans received while completing medical training.

The physicians were also given the opportunity to add any other factors which might encourage them to consider practising in a rural area. Also included in the list of factors was the opportunity to indicate that, alone, none of these factors would complete the sentence. The offering of a guaranteed income level is another manipulable factor and one that has often been integrated into policies. This was not asked as one of the factors in the above list, but was included in the questionnaire as a separate question.

The second question in this section of the questionnaire asked the physicians to consider ONLY those factors which they had NOT chosen in the previous question. That is, among those factors that, alone, would not be sufficient, they were asked to indicate the minimum combination of factors for

which they would consider practising in a rural area, if in addition they were guaranteed a minimum net income. The income levels selected for the questionnaire ranged from \$30,000 to \$150,000 or more. The \$30,000 level was chosen because as a net income this would be close to the guaranteed salary of \$38,000 offered by the Ontario government, and the \$40,000 income offered by Manitoba. It is also slightly below the level at which subsidies are offered in British Columbia.

A \$50,000 net income would be equivalent to the annual salaries offered by the Cottage Hospital program in Newfoundland. This level would also be equivalent to the current income plus subsidy offered to physicians who work in the remotest areas of British Columbia at the present time.

Although no province offered a guaranteed income of more than \$50,000 several small communities and clinics have offered in excess of this amount.(2) The \$100,000 and \$150,000 or more levels were included in an attempt to determine how much of a monetary incentive alone would be required to entice physicians to practise in rural areas.

The final section of the questionnaire allowed the physicians to add any comments they had on the subject under investigation.

Expectation of Findings

Despite the current restriction of billing numbers in the Greater Vancouver, Lower Mainland and Greater Victoria areas in effect when the questionnaire was distributed, the literature led us to expect that most of the physicians in this study would still wish to practise in these large urban areas. Because of this many of them were expected not to be willing to spend

five years in a rural area prior to establishing a permanent practice. It was also expected that those physicians who have been raised in rural areas would be the ones who choose to practise in rural areas.

As to the factors which, alone, would be sufficient to physicians to practise in rural areas the literature again led us to expect that the amount and type of rural training would be very important. That is, those who have had some rural training and feel that this training has been sufficient for them to feel confident in practising in a rural area without immediate specialist backup would prefer to practise in a rural area. It was expected that the married physicians would want their spouses to be able to find gainful employment in the area in which a practice is established. It was also expected that the leisure activities in the area would be very important to physicians.

As to the monetary issue one might anticipate that at the \$30,000 level all of the factors not previously chosen would indicate the minimum set of conditions for which a physician would consider a rural practice. As the income levels rose, one might expect to find that the minimum set of conditions would decrease. Past research leaves some doubt as to the importance of income alone.

Administration

All of the questionnaires to the residents were mailed out together in late March 1985. Distribution of the questionnaires to the interns was done in late April 1985. The reason for the delay was that it was not discovered that the interns were not on the original mailing list obtained from the Dean of Medicine's office until this time. A self-addressed stamped envelope was

included with each questionnaire distributed. The physicians were asked to complete the questionnaire and return it in the envelope within a week. The survey was done completely anonymously as no codes were added to the questionnaire prior to being mailed. This did not allow the researcher to identify the respondents, nor did it allow any specific follow-up mailings. All questionnaires returned by the end of June 1985 are included in the analysis of results.

Coding

As the questionnaires were returned each was coded by the author. If more than one answer was given for each question, only the first was included in the analysis. The coded results were entered into the main computer at the University of British Columbia according to SPSS:X specifications.(3) Once all of the responses had been coded and entered a frequency distribution was run on all variables. From this output several of the variables were recoded for further analysis.

The variables which were recoded included: the area in which the physician planned and would most like to establish a practise and the area in which the physician was raised. These areas were recoded from the original thirteen areas to three:

- i) Greater Vancouver;
- ii) The rest of British Columbia;
- and iii) Outside of British Columbia.

A fourth region, that of "other areas with communities of over 50,000 population", was considered but rejected because this left too few respondents in the area relabelled "Rest of British Columbia" to carry out the analysis. The other areas which would have fallen into this category included: Lower Mainland, Greater Victoria, Central Vancouver Island, North Okanagan and Prince George.

The other variables recoded were: the age of the physician and the specialty in which the physician was doing his/her residency. Again both of these variables were recoded into three categories:

Age became: i) lowest age through 29
 ii) 30 through 35
 and iii) 36 through the highest age.

Specialty became: i) General Practitioner
 ii) Primary Care Residents
 and iii) Other Residents.

Statistical Analysis

A chi-square (X^2) test was performed on all cross-tabulated tables. This test is applied to the tables to test the significance of differences in proportions and therefore to determine whether or not a relationship exists between the variables in the table.(4)

In calculating the X^2 statistic, two sets of frequencies are compared, the observed and the expected values. The expected values are calculated on the basis of the observed total frequencies for the rows and columns in the table. The X^2 statistic is calculated by summarizing the differences between the

observed and expected values for each cell in the table. The following formula is used in the calculation of the statistic:

$$X^2 = \sum \frac{(O - E)^2}{E} \quad \text{where: } O = \text{observed values} \\ \text{and } E = \text{expected values}$$

The degrees of freedom are calculated by using the following formula:

$$(R - 1) \times (C - 1) \quad \text{where: } R = \text{number of rows in the table} \\ \text{and } C = \text{number of columns in the table}$$

Under the SPSS:X system missing values (Not Stated in the tables) can be added to the tables but they are not used in the calculation of the X^2 statistic nor in the degrees of freedom.(3)

For this thesis a significance factor (p) of 0.05 was chosen as the point at which to accept or reject the hypothesis under examination. At this level the X^2 value would have to exceed 5.991 for tables with 2 degrees of freedom and 9.488 for those tables with 4 degrees of freedom if the hypothesis is to be rejected.

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Chapter VII

RESULTS AND DISCUSSIONS

This chapter examines and discusses the responses to the questionnaires. First the response rate will be examined; this will be followed by a discussion of the frequency of the responses; then cross-tabulations will be examined and discussed.

Response Rate

A total of 504 questionnaires were distributed, 415 to the residents and 89 to the interns practising in British Columbia. Ten of the questionnaires mailed to the residents were returned due to being wrongly addressed. This left a sample of 494 questionnaires. From this sample 162 persons returned their questionnaires, for an overall response rate of 32.8%. Of the 162 returned questionnaires, five were returned either blank or with just a few comments and were therefore excluded from the study. The 157 usable questionnaires equated to a response rate of 31.8%.

The response rates for the residents and interns were not significantly different. One hundred and twenty-two completed questionnaires were returned from the 405 residents, a 30.1% response rate. The response rate among the interns was found to be 36% with 32 out of the 89 questionnaires being returned.

Frequency of Responses

The breakdown of responses between male and female was 68.2% male and 31.2% female. One respondent did not answer this question. The list of names

obtained from the Dean of Medicine's office only contained the initials and surnames of the physicians; therefore it was not possible to distinguish the sex of the physicians prior to mailing the questionnaire. Based on data in the University of British Columbia 1985/86 Calendar (1), the response rates of male and female physicians would appear to be representative of the sex ratio of residents. The calendar states that in 1984 there were 251 male and 105 female residents registered in the University of British Columbia medical program.

Ninety-three (59.2%) of the respondents were married, with one non-response. Only 27 (17.2%) of those who responded indicated that they had any children; again one respondent did not answer.

The age of the respondents ranged from 23 to 47 years, with the average being 29.6 years and the mode 30 years. Three persons did not answer this question. The average age of the interns was found to be 27.3 years and the average of the residents was found to be 30.4 years. Several of the older respondents mentioned that they had practised as general practitioners in small rural communities for several years prior to returning to medical school to complete a residency program. A few indicated that they would not be returning to rural communities after completing their residencies due to the lack of professional contact in these areas.

The responses to the questions regarding the areas in which the physicians were raised and whether or not the physician was a graduate of the University of British Columbia (UBC), pointed out that many physicians come to Vancouver to complete their residency requirements. Over one-half (56.1%) of the respondents indicated they were raised in an area outside of British Columbia, while 60.5% indicated that they were not graduates of UBC. Of the 69 respondents who were

raised in British Columbia, 47 (68.1%) were from the Greater Vancouver and Lower Mainland regions of the province, eight were from the Greater Victoria region, 10 were from the Okanagan and Kootenay regions and there was one each from the Cariboo and Prince Rupert - North Coast regions. One person did not answer this question.

With the large number of respondents from within the Lower Mainland (including Greater Vancouver) and Greater Victoria regions, it is not surprising to find that 72.6% of all respondents were raised in communities with a population of greater than 50,000. Only 16.6% of the respondents indicated that they were raised in communities with a population of less than 15,000. The final 10% indicated that they were from communities with populations of between 15,000 and 50,000. Again one person did not answer this question.

The physicians who completed the questionnaire could be divided into more than 20 specialties. Of the 32 interns who responded, only 11 (33%) indicated that they were not intending to continue with a residency program at this time. They were grouped as general practitioners and comprised 7.3% of the total respondents. The interns who indicated that they would be going into a residency program after completion of their internship were included in the specialty group they had indicated. Table VIII shows the breakdown of specialists by type, frequency and percentage of total respondents.

Table VIII BREAKDOWN OF RESPONDENTS BY INDICATED SPECIALTY

<u>SPECIALTY</u>	<u>FREQUENCY/157</u>	<u>PERCENTAGE</u>
General Practitioner	11	7.3
Family Practitioner	13	8.7
Medicine (all types)	25	16.6
Surgeon (general)	8	5.3
Obstetrician/Gynecologist	7	4.7
Pediatrician	9	6.0
Anaesthetist	16	10.7
Radiologist	10	6.7
Plastic Surgeon	4	2.7
Endocrinologist	1	0.7
Cardiac Surgeon	3	2.0
Dermatologist	3	2.0
Psychiatrist	11	7.3
Ophthalmologist	3	2.0
Pathologist	6	4.0
Orthopedic Surgeon	6	4.0
Neurologist	4	2.7
Other	10	6.7
No Response	7	4.2

When this list is divided into primary care physicians (the top five groups of specialists) and secondary specialists (all others), it is shown that 73 of the 157 respondents (48.7%) were involved in primary care training. These could establish practices in smaller communities without too much difficulty with regards to needing specialized equipment or other support.

The final question asked the physicians to indicate whether or not they had done any rural training during their medical studies. The responses to this question showed that slightly less than one-half (47.1%) of the respondents had had any rural training.

Despite the policy of billing number restrictions which was in effect when the questionnaire was initially mailed out to the physicians, and also, despite

the fact that many of the physicians were raised outside of British Columbia, 64.7% of all respondents indicated that they planned to establish medical practices in the Greater Vancouver and Lower Mainland regions of the province. This was as expected. Seventeen percent of the respondents indicated that they planned to establish practices outside of the province, yet only four of these persons indicated that they were returning to an area near their "home". The area titled "Outside of British Columbia" represented the second most popular choice. The third most popular choices were the Greater Victoria and Central Vancouver Island Regions, with a response of 10.7% each. The other respondents (7.8%) indicated that they planned to establish their practices in the other areas of the province. The areas labeled "North of Prince George" and "Prince Rupert - North Coast" were the only two areas not selected. Seven physicians did not answer this question, and they gave several reasons for not doing so. Two persons indicated that they were only in the middle of their residency program, and had not made any plans as to where they would establish their practices. The other non-respondents indicated that this question was no longer valid due to a British Columbia Supreme Court ruling which declared the refusal by the government to issue billing numbers to physicians in the area of their choice to be unconstitutional.(2) This may be one reason why so many of the respondents planned to establish in the Greater Vancouver area because they could qualify to receive a billing number in the area of their choice.

When the responses were recoded for analysis, it was found that 42 (84%) of those physicians who were put in the category "Rest of British Columbia" planned on establishing their medical practices in other areas of the province which had communities of over 50,000. This left only 8 (5% of the total respondents)

physicians who planned on establishing practices in communities with populations under 50,000.

Cross-tabulations of Dependent and Independent Variables

In this section the results of the cross-tabulations performed on the responses to the questionnaire will be discussed. All the data will be presented in tabular form and the chi-square (X^2) statistic will be presented at the bottom of each table. Except where indicated the bracketed figures in the tables represent column percentages.

Tables IX a-c test the hypotheses that there is no difference across sex, marital and age groups as to where physicians plan to establish their practices. As seen by the X^2 results, none of these hypotheses can be rejected. There was a strong preference across all groups to establish a practice in the Greater Vancouver area.

In Table IXa it can be seen that a slightly higher percentage of female physicians plan to establish practices in Greater Vancouver, and that the same percentage of male and female physicians plan to establish outside the province. Very little difference is noticed as to where the single and married physicians planned on establishing their practices. In Table IXc the only major difference is for physicians aged 36 and older. Almost two-thirds (61.5%) of this group planned on practising in Greater Vancouver and only 7.7% planned on establishing practices outside the province. Many physicians in this age group indicated that they were returning to university to complete a residency program after several years practising in smaller communities.

Table IXa

AREA IN WHICH A PHYSICIAN PLANS TO ESTABLISH
A PRACTICE BY THE SEX OF THE PHYSICIAN

<u>AREA PLAN</u>	<u>SEX</u>		TOTAL
	MALE	FEMALE	
GREATER VANCOUVER	49 (44.9)	25 (51)	74
REST OF B.C.	37 (34.6)	13 (26.5)	50
OUTSIDE B.C.	18 (16.8)	8 (16.3)	26
NOT STATED	4	3	7
TOTAL	108	49	157
$\chi^2 = 1.981$ Degrees of Freedom = 2 $p < 0.7393$			

Table IXb

AREA IN WHICH A PHYSICIAN PLANS TO ESTABLISH
A PRACTICE BY MARITAL STATUS

<u>AREA PLAN</u>	<u>MARITAL STATUS</u>		TOTAL
	SINGLE	MARRIED	
GREATER VANCOUVER	31 (49.2)	42 (45.2)	73
REST OF B.C.	20 (31.7)	30 (32.3)	50
OUTSIDE B.C.	9 (14.3)	17 (18.3)	26
NOT STATED	3	4	7
TOTAL	63	93	156
$\chi^2 = 0.493$ Degrees of Freedom = 2 $p < 0.7813$			

Table IXc AREA IN WHICH A PHYSICIAN PLANS TO ESTABLISH
A PRACTICE BY AGE

		<u>AGE</u>				
		23 - 29	30 - 35	36+	NOT STATED	TOTAL
<u>AREA</u>	GREATER VANCOUVER	36 (45)	28 (45.9)	8 (61.5)	2	74
<u>PLAN</u>	REST OF B.C.	28 (35)	19 (31.1)	3 (23.1)	0	50
	OUTSIDE B.C.	13 (16.3)	11 (18)	1 (7.7)	1	26
	NOT STATED	3	3	1	---	7
	TOTAL	80	61	13	3	157
$\chi^2 = 2.285$ Degrees of Freedom = 4 $p < 0.6835$						

In Table X the hypothesis being tested is that there is no difference between where physicians plan to establish their medical practices and where they were raised. Other studies (previously cited) have found that the area in which a physician was raised is a very important and influential factor on the physician's decision on where to locate a medical practice. Based on the chi-square (χ^2) test performed on the data presented in Table X, it would appear that this relationship is also true of the interns and residents surveyed in this study, and therefore the hypothesis must be rejected.

Table X points out that the majority of residents and interns who were raised in British Columbia, plan to practise in or near the area in which they were raised. For example, 66.6% of those who were raised in Greater Vancouver plan to practise there and 51.7% of those raised in the "Rest of B.C." plan to return.

Despite the billing number restrictions, most (75%) of the physicians who were raised outside of the province planned to establish practices in the province and 60% of these physicians plan to practise in Greater Vancouver. This was an unexpected finding.

Table X AREA IN WHICH A PHYSICIAN PLANS TO ESTABLISH A PRACTICE
BY AREA IN WHICH PHYSICIAN WAS RAISED

		AREA RAISED		OUTSIDE B.C.	NOT STATED	TOTAL
		GREATER VANCOUVER	REST OF B.C.			
<u>AREA PLAN</u>	GREATER VANCOUVER	26 (66.6)	10 (34.5)	38 (43.2)	---	74
	REST OF B.C.	10 (26.3)	15 (51.7)	25 (28.4)	---	50
	OUTSIDE B.C.	2 (5.3)	2 (6.9)	22 (25.0)	---	26
	NOT STATED	1	2	3	1	7
	TOTAL	39	29	88	1	157
$\chi^2 = 17.706$ Degrees of Freedom = 4 $p < 0.0070$						

The χ^2 calculated for Table XI, indicated that the hypothesis: where physicians plan to practise is not a function of their type of post-graduate training, would have to be rejected. This table shows that residents plan to practise in Greater Vancouver more than the interns; interns are more willing to practise in other areas of the province. It also shows that if residents cannot practise in the Greater Vancouver area, approximately equal proportions plan on practising outside the province as to smaller communities in B.C.

Table XI

AREA IN WHICH A PHYSICIAN PLANS TO ESTABLISH
A PRACTICE BY TYPE OF TRAINING

<u>AREA PLAN</u>	<u>TYPE OF TRAINING</u>		NOT STATED	TOTAL
	INTERNSHIP	RESIDENCY		
GREATER VANCOUVER	9 (28.1)	63 (52.1)	1	73
REST OF B.C.	18 (56.3)	30 (24.8)	---	48
OUTSIDE B.C.	3 (9.4)	23 (19.0)	---	26
NOT STATED	2	5	---	7
TOTAL	32	121	1	154
X ² = 13.666 Degrees of Freedom = 2 p < 0.0084				

Based on the X² calculated for Table XII, the hypothesis: there is no difference as to where physicians planned on establishing their practices based on their type of specialty, could not be rejected. Table XII shows that as physicians become more specialized there is a tendency to establish practices in larger communities. This can be seen with the drop in the percentage of physicians planning to practice in the "Rest of B.C." and the increase in the percentage planning to practice in Greater Vancouver. Again in Table XII it can be seen that as physicians become more specialized increasing proportions of those not planning to practice in Greater Vancouver would rather establish outside the province.

Table XII AREA IN WHICH PHYSICIAN PLANS TO ESTABLISH
A PRACTICE BY SPECIALTY

<u>AREA</u> <u>PLAN</u>	<u>SPECIALTY</u>				TOTAL
	GREATER VANCOUVER	GENERAL PRACTITIONER	PRIMARY CARE SPECIALISTS	SECONDARY CARE SPECIALISTS	
	GREATER VANCOUVER	4 (36.4)	25 (40.3)	42 (54.9)	71
	REST OF B.C.	6 (54.5)	22 (35.5)	19 (24.7)	47
	OUTSIDE B.C.	1 (9.1)	12 (19.4)	12 (15.6)	25
	NOT STATED	---	3	4	7
	TOTAL	11	62	77	150
	$\chi^2 = 5.661$ Degrees of Freedom = 4 $p < 0.226$				

These results are not unexpected since secondary care specialists would require specialized facilities in order to practise their specialty. This equipment would only be available in the major centres. Also the need for a large population base, which was another concern raised by the respondents, would indicate that most would settle in the Greater Vancouver area.

The data presented in Table XII are slightly misleading in terms of where the primary care specialists plan to establish their practices. This table indicates that roughly the same percentage of primary care specialists chose either Greater Vancouver or the rest of British Columbia when in fact quite a few of those who indicated the area entitled "Rest of B.C." actually chose either the Greater Victoria or Central Vancouver Island regions. Both of these regions have a major city with a population of over 50,000. This, once again,

suggests that physicians plan to establish their practices in large communities similar to those in which they were raised. Table XIII tests the hypothesis: the size of community in which a physician plans to establish a medical practice does not vary with physician specialty. The calculated X^2 indicates that this hypothesis would be rejected. This was not an unexpected finding.

Table XIII SIZE OF COMMUNITY IN WHICH A PHYSICIAN PLANS TO ESTABLISH A PRACTICE BY SPECIALTY

<u>SIZE PLAN</u>		<u>SPECIALTY</u>			TOTAL
		GENERAL PRACTITIONER	PRIMARY CARE SPECIALISTS	SECONDARY CARE SPECIALISTS	
	UNDER 15,000	1 (9.1)	2 (3.3)	---	3
	15,000- 50,000	3 (27.3)	15 (24.6)	6 (8.0)	24
	OVER 50,000	7 (63.6)	44 (72.1)	69 (92.0)	120
	TOTAL	11	61	75	147
	$X^2 = 13.3097$	Degrees of Freedom = 4			$p < 0.0099$

The preference to establish in the Greater Vancouver and Lower Mainland regions of British Columbia becomes more evident when the physicians were asked to indicate the area in which they would most like to establish a practice if there were no billing number restrictions. Seventy-five percent of all respondents would most like to establish in Greater Vancouver and the Lower Mainland. This is up from the 65% who planned on practising in these areas. "Outside British Columbia" still had the second highest response rate even when

the billing number restriction had been removed and physicians were able to choose the area in which they would like to establish a practice, but the number was only one-half of those who planned on practising outside the province. Greater Victoria was the third most popular choice with a response rate of 8.3%. After these four areas, there were only 13 physicians (8.3%) who indicated they would most like to practise in other areas of the province. Only the Prince Rupert-North Coast region was not chosen in this question.

Similar results to those just described in Tables IXa - XII were obtained when hypotheses concerning the area physicians would most like (as opposed to plan) to locate a practice were tested against with the same independent variables. These results can be seen in Tables XIVa - XVIII. The results indicated that only one hypothesis was rejected, that of: there is no difference in the area physicians would most like to establish a practice based on the area in which they were raised as shown in Table XV. None of the physicians who were raised in British Columbia indicated that they would most like to establish a practice outside the province. In all instances, though, fewer physicians indicated that they would practise outside the province if they were free to choose the area in which they would most like to practise. This again emphasizes the point that physicians will establish their medical practices in areas similar to those in which they were raised. These results also tend to point out that in the presence of the billing number restrictions physicians would rather practise outside the province if they cannot establish practices in the areas they would most like.

When asked about the size of community in which they planned to establish their practices, 80.3% indicated that it would be in a community with a

Table XIVa AREA IN WHICH A PHYSICIAN WOULD MOST LIKE TO
ESTABLISH A PRACTICE BY SEX OF PHYSICIAN

<u>AREA</u> <u>MOST</u>		<u>SEX</u>		TOTAL
		MALE	FEMALE	
	GREATER VANCOUVER	63 (58.8)	30 (61.2)	93
	REST OF B.C.	36 (33.6)	14 (28.6)	50
	OUTSIDE B.C.	9 (8.4)	4 (8.2)	13
	NOT STATED	---	1	1
	TOTAL	107	49	157
$\chi^2 = 1.005$ Degrees of Freedom = 2 $p < 0.909$				

Table XIVb AREA IN WHICH A PHYSICIAN WOULD MOST LIKE TO
ESTABLISH A PRACTICE BY MARITAL STATUS

<u>AREA</u> <u>MOST</u>		<u>MARITAL STATUS</u>		TOTAL
		SINGLE	MARRIED	
	GREATER VANCOUVER	40 (63.5)	52 (55.9)	92
	REST OF B.C.	20 (31.7)	30 (32.3)	50
	OUTSIDE B.C.	3 (4.8)	10 (10.8)	13
	NOT STATED	---	1	1
	TOTAL	63	93	157
$\chi^2 = 1.978$ Degrees of Freedom = 2 $p < 0.372$				

Table XIVc

AREA IN WHICH A PHYSICIAN WOULD MOST LIKE TO
ESTABLISH A PRACTICE BY AGE

		<u>AGE</u>				
		23-29	30-35	36+	NOT STATED	TOTAL
<u>AREA</u> <u>MOST</u>	GREATER VANCOUVER	49 (61.3)	34 (55.7)	9 (69.2)	1	93
	REST OF B.C.	26 (32.5)	21 (34.4)	3 (23.1)	---	50
	OUTSIDE B.C.	5 (6.3)	5 (8.2)	1 (2.7)	2	13
	NOT STATED	---	1	---		1
	TOTAL	80	61	13	3	157
X ² = 3.697		Degrees of Freedom = 4				p < 0.449

Table XV

AREA IN WHICH A PHYSICIAN WOULD MOST LIKE TO
ESTABLISH A PRACTICE BY AREA RAISED

		AREA RAISED				
		GREATER VANCOUVER	REST OF B.C.	OUTSIDE B.C.	NOT STATED	TOTAL
<u>AREA MOST</u>	GREATER VANCOUVER	30 (76.9)	12 (41.4)	51 (58.6)	---	93
	REST OF B.C.	9 (23.1)	17 (58.9)	23 (26.1)	1	50
	OUTSIDE B.C.	---	---	13 (14.8)	---	13
	TOTAL	39	29	88	1	157
X ² = 22.317		Degrees of Freedom = 4		p < 0.0011		

Table XVI AREA IN WHICH A PHYSICIAN WOULD MOST LIKE TO
ESTABLISH A PRACTICE BY TYPE OF TRAINING

<u>AREA</u> <u>MOST</u>	<u>TYPE OF TRAINING</u>			TOTAL
	INTERNSHIP	RESIDENCY	NOT STATED	
GREATER VANCOUVER	14 (43.8)	76 (62.8)	1	91
REST OF B.C.	17 (53.1)	33 (27.3)	---	50
OUTSIDE B.C.	1 (3.1)	11 (9.1)	---	12
NOT STATED	---	1	---	1
TOTAL	32	121	1	154
X = 8.567 Degrees of Freedom = 2 p < 0.0729				

Table XVII AREA IN WHICH A PHYSICIAN WOULD MOST LIKE TO
ESTABLISH A PRACTICE BY SPECIALTY

<u>AREA</u> <u>MOST</u>	<u>SPECIALTY</u>			TOTAL
	GENERAL PRACTITIONER	PRIMARY CARE SPECIALISTS	SECONDARY CARE SPECIALISTS	
GREATER VANCOUVER	5 (45.5)	33 (53.2)	51 (66.2)	89
REST OF B.C.	5 (45.5)	22 (35.5)	22 (28.6)	49
OUTSIDE B.C.	1 (9.1)	6 (9.7)	4 (5.2)	11
NOT STATED	---	1	---	1
TOTAL	11	62	72	150
X ² = 3.436 Degrees of Freedom = 4 p < 0.488				

population of over 50,000. Twenty-four (15.3%) physicians indicated a preference for a community of between 15,000 and 50,000. Only 4 physicians cited a preference for communities of under 15,000. Table XVIII tests the hypothesis: the size of community in which physicians plan to establish a practice is not a function of the size of community in which they were raised. As can be seen from the X^2 value, this hypothesis cannot be rejected.

Table XVIII

SIZE OF COMMUNITY IN WHICH A PHYSICIAN PLANS TO
ESTABLISH A PRACTICE BY SIZE OF COMMUNITY IN WHICH
THE PHYSICIAN WAS RAISED

		<u>SIZE RAISED</u>			TOTAL
		UNDER 15,000	15,000- 50,000	OVER 50,000	
<u>SIZE PLAN</u>	UNDER 15,000	1 (3.8)	---	3 (2.7)	4
	15,000- 50,000	5 (19.2)	4 (25)	15 (13.4)	24
	OVER 50,000	20 (76.9)	12 (75)	93 (83.8)	125
	TOTAL	26	16	111	153
$X^2 = 2.219$		Degrees of Freedom = 4			$p < 0.6955$

This table points out that irrespective of the size of community in which the physician was raised, most prefer to live in larger communities. Part of this may be due to the fact that all or most of their training is done in larger communities which have the most specialized medical equipment.

The four physicians who indicated that they planned on establishing practices in communities of under 15,000 were all males who were under the age

of 35. They were divided equally according to their marital status, area in which they were raised, (two in British Columbia but outside the Greater Vancouver-Lower Mainland regions and two from outside British Columbia). Only one was raised in a community of under 15,000 while the other three were all from communities of over 50,000.

All of the physicians who gave their ages as over 36 indicated they planned on establishing medical practices in communities with populations greater than 50,000. Of the 37 respondents who cited Greater Vancouver as the area in which they were raised, all but four indicated they planned on establishing practices in cities of similar size to Vancouver (ie: over 50,000 population). The other four cited communities with populations between 15,000 and 50,000.

When asked to indicate the size of community in which they would most like to establish a medical practice, if there were no billing number restrictions in effect, only two physicians chose communities of under 15,000. Fewer respondents also chose communities in the 15,000 to 50,000 range when asked to indicate the size of community in which they would most like to (as opposed to plan) establish their medical practices.

Other differences which appeared between the size of community in which a physician planned, and would most like to establish a medical practice were:

- i) the number of male physicians who would most like to practise in large communities increased.
- ii) no single physicians would most like to practise in a community of under 15,000, as opposed to 2 who planned on practising in this size of community.
- and iii) no physicians between the ages of 23-29 would most like to practise in communities of under 15,000, as opposed to 3 who planned to.

In Tables XIX and XX, the same hypotheses that were tested in Tables X and XVIII were retested, except that in Tables XIX and XX rural training has been controlled for. The bracketed figures in Tables XIX and XX represent row rather than column percentages.

From Table XIX it can be seen that rural training made very little difference in where physicians planned on locating their practices. Except for those physicians who were raised outside British Columbia, most physicians planned on establishing practices near the area in which they were raised. Most physicians raised outside of the province planned on locating practices in the province.

Although the numbers of physicians involved is small, one interesting and unexpected finding is seen in Table XX. A higher percentage of those physicians who did not receive any rural training plan on locating practices in communities with populations of between 15,000 and 50,000. Again, despite whether or not the physicians did any rural training during their education, most physicians planned on locating in communities with populations of greater than 50,000.

Fifty-six (35.7%) of the physicians who responded, indicated that they would practise in a rural area for a period of five years if after that time they could obtain a billing number in the area of their choice. Several of the physicians who answered no to this question said that five years was too long a period of time to have to spend in a small community. Another responded that he would only be getting his practice established after five years and it would not be worth resettling therefore he would not consider this option. At the time the questionnaire was distributed it was not known if physicians who had billing numbers could transfer them to the Greater Vancouver area. This may have led to

Table XIX

AREA IN WHICH PHYSICIANS PLAN TO ESTABLISH/
THEIR MEDICAL PRACTICES BY THE AREA IN WHICH THE
PHYSICIANS WERE RAISED, CONTROLLING FOR RURAL TRAINING

		<u>AREA PLAN</u>			TOTAL
	<u>AREA</u> <u>RAISED</u>	GREATER VANCOUVER	REST OF B.C.	OUTSIDE B.C.	
YES	GREATER VANCOUVER	15 (75)	4 (20)	1 (5)	20
	REST OF B.C.	6 (42.8)	7 (50)	1 (7.1)	14
	OUTSIDE B.C.	18 (47.4)	10 (26.3)	10 (26.3)	38
	TOTAL	39 (54.2)	21 (29.2)	12 (16.6)	72
$\chi^2 = 9.541$		Degrees of Freedom = 4			$p < 0.0489$

RURAL
 TRAINING

NO	GREATER VANCOUVER	10 (58.8)	6 (35.3)	1 (5.9)	17
	REST OF B.C.	4 (30.7)	8 (61.5)	1 (7.6)	13
	OUTSIDE B.C.	20 (42.6)	15 (31.9)	12 (25.5)	47
	TOTAL	34 (41.9)	29 (35.8)	14 (17.3)	77
$\chi^2 = 8.686$		Degrees of Freedom = 4			$p < 0.192$

Table XX

SIZE OF COMMUNITY IN WHICH PHYSICIANS PLAN TO
ESTABLISH THEIR MEDICAL PRACTICES BY THE SIZE OF
COMMUNITY IN WHICH THE PHYSICIANS WERE RAISED,
CONTROLLING FOR RURAL TRAINING

		<u>SIZE PLAN</u>			
<u>SIZE RAISED</u>		<u>UNDER 15,000</u>	<u>15,000- 50,000</u>	<u>OVER 50,000</u>	<u>TOTAL</u>
YES	<u>UNDER 15,000</u>	1 (7.2)	3 (21.4)	10 (71.4)	14
	<u>15,000- 50,000</u>	---	1 (16.7)	5 (83.3)	6
	<u>OVER 50,000</u>	2 (3.8)	6 (11.5)	44 (84.6)	52
	<u>TOTAL</u>	3 (4.2)	10 (13.9)	59 (81.9)	72
	$\chi^2 = 1.6092$ Degrees of Freedom = 4 $p < 0.25$				
<hr/>					
RURAL TRAINING					
NO	<u>UNDER 15,000</u>	---	2 (16.7)	10 (83.3)	12
	<u>15,000- 50,000</u>	---	3 (30.0)	7 (70.0)	10
	<u>OVER 50,000</u>	1 (1.7)	9 (15.3)	49 (83.0)	59
	<u>TOTAL</u>	1 (1.2)	14 (17.3)	66 (81.5)	81
	$\chi^2 = 1.636$ Degrees of Freedom = 4 $p < 0.123$				

the low response rate of this question. This would tend to indicate that without some form of regulation, such as Bill 41, very few physicians will consider practise in a rural community.

Determinants of Choice of Rural Practice

The second section of the questionnaire asked the physicians to select those factors which, alone, would be sufficient for them to practise in rural areas. Table XXI outlines the overall response rates to these conditions. The factors in Table XXI are listed from most to least often selected and not in the order they appeared on the questionnaire.

Table XXI FREQUENCY AND PERCENT SELECTION OF FACTORS
BY ALL RESPONDENTS

FACTOR	FREQUENCY	PERCENT
NONE	53	33.8
ADEQUATE LEISURE ACTIVITIES	53	33.8
ADEQUATE HOSPITAL FACILITIES	49	31.2
SET VACATION PERIOD	41	26.1
EMPLOYMENT FOR SPOUSE	40	25.5
UNIVERSITY CONTACT	32	20.4
ADEQUATE EDUCATION FACILITIES		
FOR CHILDREN	31	19.7
OTHER	28	17.8
ADEQUATE MEDICAL TRAINING	26	16.6
ACCESS TO CONSULTANTS	22	14.0
FINANCIAL ASSISTANCE IN		
EXCHANGE FOR RURAL PRACTICE	16	10.2
ABILITY TO JOIN ESTABLISHED		
PRACTICE	15	9.6
BELONG TO LOCUM POOL	14	8.9
MEDICAL CENTRE PROVIDED	14	8.9

As can be seen from the above table, four out of the top seven responses can be classified as Fixed Determinants for which no policies can be developed

to affect the decision of a physician on where to locate a medical practice. These are: adequate leisure activities; set vacation period; employment for spouse and adequate education facilities for children. Policies could be developed to ensure that there were good hospital facilities and that the physicians could have contact with the university medical school, as well as the governmental formation of a locums pool to allow physicians in rural areas to have more time off for vacations or medical conventions. Among the later six responses only two factors could be classified as Fixed Determinants, those of feeling adequately trained to practise in a rural area and the ability to join an established practice.

The response rates for each factor across sex, marital status and specialty group are given in Table XXII and XXIII. The factors are listed in the same order as presented in Table XXI.

The responses between male and female physicians were very similar, except that twice as many male physicians indicated that education facilities for their children was an important consideration in where they planned to locate their practice. Also twice as many men were willing to accept financial assistance during their formal medical education in exchange for practising in a rural area for a set period of time. The same pattern was seen between single and married physicians, as well in the different age groups. That is the younger physicians were more willing to accept the educational grants or loans for practising in rural communities. This was not an unexpected finding. Physicians in the 36 and over age category did not select this factor at all, but there were not many physicians in this group.

Table XXII

FREQUENCY AND PERCENTAGE SELECTION OF FACTORS
BY SEX, MARITAL STATUS AND AGE OF PHYSICIAN

<u>Factor</u>	<u>Sex</u>		<u>Marital Status</u>		<u>Age</u>		
	<u>Male</u>	<u>Female</u>	<u>Single</u>	<u>Married</u>	<u>23-29</u>	<u>30-35</u>	<u>36+</u>
None	36 (33.6)	16 (32.7)	18 (28.6)	34 (36.6)	21 (26.3)	25 (41.0)	7 (53.8)
Leisure Activities Adequate	40 (37.4)	13 (26.5)	24 (38.1)	29 (31.2)	31 (38.8)	19 (31.1)	3 (23.1)
Adequate Hospital Facilities	35 (32.7)	14 (28.6)	25 (39.7)	24 (25.8)	29 (36.2)	17 (27.9)	2 (15.4)
Set Vacation Period	30 (28.0)	11 (22.4)	16 (25.4)	25 (26.9)	26 (32.5)	12 (19.7)	2 (15.4)
Employment for Spouse	25 (23.4)	15 (30.6)	10 (15.9)	30 (32.3)	22 (27.5)	14 (23.0)	3 (23.1)
Contact with University Medical School	22 (20.6)	10 (20.4)	18 (28.6)	14 (15.1)	19 (23.8)	11 (18.0)	2 (15.4)
Education Facilities for Children	26 (24.3)	5 (10.2)	10 (15.9)	21 (22.6)	21 (26.3)	8 (13.1)	1 (7.7)
Other	20 (18.7)	8 (16.3)	6 (9.5)	22 (23.7)	13 (16.3)	14 (23.0)	---
Medical Training Adequate	20 (18.7)	6 (12.2)	14 (22.2)	12 (12.9)	20 (25.0)	5 (8.2)	---
Access to Consultants	15 (14.0)	7 (14.3)	10 (15.9)	12 (12.9)	14 (17.5)	7 (11.5)	1 (7.7)
Financial Assistance in Exchange for Rural Practise	13 (12.1)	3 (6.1)	9 (14.3)	7 (7.5)	11 (13.8)	4 (6.6)	---
Ability to Join an Established Practice	11 (10.3)	4 (8.2)	8 (12.7)	7 (7.5)	10 (12.5)	5 (8.2)	---
Ability to Belong to a Locums Pool	10 (9.3)	4 (8.2)	9 (14.3)	5 (5.4)	11 (13.8)	2 (3.3)	1 (7.7)
Medical Centre Provided	11 (10.3)	3 (6.1)	8 (12.7)	6 (6.5)	10 (12.5)	3 (4.9)	---

Table XXIII

FREQUENCY AND PERCENTAGE SELECTION OF FACTORS
BY SPECIALTY OF PHYSICIAN

<u>Factor</u>	<u>Specialty</u>		
	<u>General Practitioner</u>	<u>Primary Care Specialists</u>	<u>Secondary Care Specialists</u>
None	4 (36.4)	20 (32.3)	27 (35.1)
Leisure Activities Adequate	2 (18.2)	28 (45.2)	20 (26.0)
Adequate Hospital Facilities	4 (36.4)	22 (35.5)	20 (26.0)
Set Vacation Period	3 (27.3)	22 (35.5)	15 (19.5)
Employment for Spouse	1 (9.1)	21 (33.9)	15 (19.5)
Contact with University Medical School	1 (9.1)	13 (21.0)	17 (22.1)
Education Facilities for Children	---	17 (27.4)	13 (16.9)
Other	---	8 (12.9)	18 (23.4)
Medical Training Adequate	2 (18.2)	14 (22.6)	8 (10.4)
Access to Consultants	1 (9.1)	15 (24.2)	5 (6.5)
Financial Assistance in Exchange for Rural Practise	2 (18.2)	8 (12.9)	5 (6.5)
Ability to Join an Established Practice	1 (9.1)	8 (12.9)	4 (5.2)
Ability to Belong to a Locums Pool	4 (36.4)	3 (4.8)	7 (9.1)
Medical Centre Provided	---	8 (12.4)	5 (6.5)

Differences in response rates across age groups were very evident. Over one-half (53.8%) of those physicians 36 years of age and older indicated that no one factor alone would be enough for them to practise in a rural area. This compared to approximately one-quarter (26%) of those aged 23-29. It was also noticed that older physicians chose fewer factors overall. Those in the 36+ age group did not select five of the factors on the questionnaire. These were: other, adequate medical training, financial assistance in exchange for rural practise, ability to join an established practice and having a medical centre provided.

The younger physicians considered their experience to be an important factor in their decision on where to locate their practices. This is pointed out by the 25% selection response to the factor regarding the adequacy of their medical training and the 36% response rate to the factor regarding adequate hospital facilities. This group also cited leisure activities and the need for holidays and educational leave as being more important than the older physicians.

The responses of the 36+ age group tend to be consistent with the "Other" comments this group added at the end of the questionnaire. As mentioned previously many in this age group indicated that they had practised in small rural communities and they had no intentions of returning. This is seen in the high response rate given the factor labelled "NONE".

Several major differences among response rates of the various groups of specialists can be seen in Table XXIII. The major differences between the general practitioners and specialists were that:

- i) general practitioners did not select the factors of educational facilities, the provisions of a medical centre, nor did they provide any other factors.
- ii) general practitioners did not consider spousal employment to be as important a factor to practising in a rural area as did the primary and secondary care specialists.
- and iii) general practitioners were more willing to belong to a locums pool and work for short periods of time in rural areas, and they were slightly more willing to accept financial assistance in exchange for working in rural areas for a set period of time.

As seen in Table XXIII, primary care specialists tended to select those factors which were classified as Fixed Determinants more than the other physicians. The factor most often selected was found to be adequate leisure activities. This was followed by a set vacation period and employment for spouse. Adequate hospital facilities and access to consultants were also important factors to this group of physicians. Primary care specialists were the least likely to want to belong to a locums pool despite the fact that they required a set vacation period and additional educational leave.

The responses of the secondary care specialists were similar to those of the primary care specialists in that the most often selected factors were Fixed Determinants. One interesting finding among these two groups was that over one-third of the primary care specialists (35.5%) and one-quarter of the secondary care specialists (26%) indicated that if there were adequate hospital facilities in rural areas, they would consider practising in these regions.

Not surprising is the finding that primary and secondary care specialists consider contact with the university medical school to be an important factor,

and that general practitioners do not consider this an important factor. This finding has been found in several other surveys. This may be due to the fact that medicine, particularly in the secondary fields, is rapidly changing and therefore these physicians want to stay current as to the latest therapies and procedures.

The provision of non-repayable educational grants and loans to medical students in exchange for practising in a rural community for a certain period of time has been recommended as a method of getting more physicians to practise in rural British Columbia. As was seen previously in this thesis, this type of policy has been tried in other areas without too much success. The response to this factor in this survey would tend to indicate that it would not be too successful in British Columbia at this time. It might be offered to students who are from rural areas in an attempt to increase the percentage of students from these areas entering medical school. As was shown earlier in Table X it is these students who most often return to small communities to establish their practices.

Another often cited influential factor in the physician's decision to locate in a small rural community is the ability to join an established practice and therefore be able to share the "on call" duties and have some professional company. This response was cited six times amongst the "OTHER" factors, yet the factor itself was always cited amongst the lowest few factors, which alone, would be sufficient.

Although the factor of having a set vacation period ranked as one of the top five selections in all groups, not many physicians were willing to belong to a locum pool which would allow for such a possibility. This might be caused by

the large number of physicians presently practising in the Greater Vancouver area and the ease of obtaining locum positions in this region. Many physicians may be doing this until they can obtain their own MSP Billing number in the Vancouver area.

Among the "OTHER" factors that were given by the respondents, the most often cited factor was that the area in which the physician establishes a medical practise would have to be able to provide a large population base. The reason for this response given by some physicians was that only in large population bases will there be enough work and differing cases to keep a physician busy. This type of response is not surprising in that most physicians had already indicated their preference for establishing in a community with a population of over 50,000. The second most often cited Other factor was that there be other specialists or physicians in the area to share duties and for professional company. This was the response given by six of the respondents. The next two most common responses were a financial incentive or a guaranteed income; and a combination of the other factors listed. Each of these responses were given three times. The remaining "OTHER" factors were given by only one physician and included:

- i) inability to get a job in Vancouver;
- ii) practise in a rural area was a stated requirement prior to acceptance to medical school;
- iii) option of relocating at convenience;
- iv) financial support for research;
- and v) one physician indicated that if he were married he would work in a rural area.

Some of these ideas reappeared in the final section of the questionnaire when the physicians were asked to add their own comments. At this time 19 physicians who responded indicated that a large population base was needed for physicians to maintain their skills due to the large variety of cases that could be found in such a community. The lack of an "interesting" peer group and research facilities in rural areas were the second and third most commonly found comments with six and four responses respectively. Only three physicians indicated that they feared not being able to get back to Vancouver if they practised in a rural area for even a short period of time. Three other physicians indicated that a mandatory period of practise in a rural area without the immediate backup of specialists should be included in the medical curriculum, and another three indicated that the differential fee schedules between rural and urban areas of the province should be increased in order to attract more physicians to rural areas.

Despite the mention of financial incentives and guaranteed incomes and the proposal to increase the fee differential, only 112 (72%) of the respondents answered the question regarding the guaranteed income that would be required before a physician would consider a rural practice. From those who did answer the question, the overwhelming response was for a guaranteed income of \$150,000 or more in addition to a set minimum of other factors. This guaranteed income level accounted for 45/112 (40.2%) of the responses. Among all respondents this only represented 28.7%. A guaranteed net income level of \$100,000 drew 38 responses, while \$30,000 drew 16 and \$50,000 was cited 13 times.

Several comments were listed on the questionnaires of those who did not answer this question. Several indicated that the question was complicated and

they did not understand it, and another nine physicians indicated that money was not a major factor in deciding where to practise. Four physicians said they would NOT work in a rural area for any amount of money.

As expected, the frequency with which income plus other factors was indicated increased as income level rose. Table XXIV shows the overall response to this question. In the table the guaranteed incomes are combined with the minimum set of factors which would also be needed. Results of a guaranteed net income, ALONE, are shown in Table XXV.

Table XXIV RESPONSE RATE OF GUARANTEED NET INCOME PLUS
SET OF MINIMUM CONDITIONS

<u>GUARANTEED INCOME LEVEL</u>	<u>FREQUENCY</u>
\$ 30,000	16 (10.2)
\$ 50,000	13 (8.3)
\$100,000	38 (24.2)
\$150,000	45 (28.7)

Table XXV RESPONSE RATE OF GUARANTEED NET INCOME ALONE

<u>GUARANTEED INCOME LEVEL</u>	<u>FREQUENCY</u>
\$ 30,000	2 (1.3)
\$ 50,000	3 (1.9)
\$100,000	8 (5.1)
\$150,000	25 (15.9)

The factors on the questionnaire were divided into medical and personal factors for the purpose of determining what type of combination of factors physicians required in addition to a guaranteed net income. Medical factors included: adequate hospital facilities, access to consultants, ability to join an established practice, and the provision of a medical centre. The personal

factors included: ability for the spouse to find employment, adequate education facilities for the children, adequate leisure activities and a set vacation time. In all cases a combination of medical and personal factors was most often selected. The least often selected set of conditions was found to be a guaranteed net income plus personal factors alone.

Tables XXVI and XVII provide the response rates of the lowest guaranteed income plus other factors for which a physicians would be willing to establish a practice in rural area by the sex, marital status, age and specialty of the physician. Tables XXVIII and XXIX show the response rates of the lowest guaranteed income ALONE by the same variables. For Tables XXVI - XXIX the sample size for each group of physicians answering the monetary questions is given in Table XXVI (eg: Male n=79). The bracketed figures represent the percentage of the sample who responded to the question.

The expected finding that as the guaranteed income level rose, more physicians would be willing to practise in rural areas was clearly found. As seen in Tables XXVI - XXIX the response rates increased as the income levels rose.

As seen in Table XXVI, there is a dramatic shift in the response rates between \$50,000 and \$100,000 in all cases except in the over 36 age category. The percentage of physicians willing to practise in rural areas for a minimum guaranteed income of \$100,000 plus a combination of other factors was roughly the same across all groups.

Twice the proportion of female as male physicians were found to be willing to practise in rural areas for a minimum guaranteed income of \$30,000 plus a

Table XXVI

FREQUENCY OF SELECTION OF GUARANTEED INCOME LEVEL
PLUS OTHER FACTORS BY SEX, MARITAL STATUS AND AGE OF PHYSICIAN

<u>INCOME LEVEL</u>	<u>SEX</u>		<u>MARITAL STATUS</u>		<u>AGE</u>		
	Male (N=79)	Female (N=33)	Single (N=44)	Married (N=68)	23-29 (N=60)	30-35 (N=45)	36+ (N=7)
\$ 30,000	8 (10.1)	7 (21.2)	4 (9.1)	12 (17.6)	7 (11.7)	6 (13.3)	2 (28.6)
\$ 50,000	10 (12.7)	3 (9.1)	5 (11.4)	7 (10.3)	5 (8.3)	6 (13.3)	2 (28.6)
\$100,000	27 (34.2)	11 (33.3)	14 (31.8)	24 (35.3)	20 (33.3)	16 (35.6)	2 (28.6)
\$150,000	33 (41.8)	12 (36.4)	20 (45.5)	25 (36.8)	27 (45.0)	17 (37.8)	1 (14.3)

Table XXVII

FREQUENCY OF SELECTION OF GUARANTEED INCOME LEVEL
PLUS OTHER FACTORS BY SPECIALTY OF PHYSICIAN

<u>INCOME LEVEL</u>	<u>SPECIALTY OF PHYSICIAN</u>		
	General Practitioner (N=10)	Primary Care Specialists (N=46)	Secondary Care Specialists (N=51)
\$ 30,000	1 (11.1)	7 (15.2)	6 (11.1)
\$ 50,000	2 (22.2)	10 (21.7)	1 (1.9)
\$100,000	3 (33.3)	10 (21.7)	23 (42.6)
\$150,000	3 (33.3)	19 (41.3)	24 (44.4)

Table XXVIII

FREQUENCY OF SELECTION OF GUARANTEED INCOME LEVEL ALONE
BY SEX, MARITAL STATUS AND AGE OF PHYSICIAN

<u>INCOME LEVEL</u>	<u>SEX</u>		<u>MARITAL STATUS</u>		<u>AGE</u>		
	Male	Female	Single	Married	23-29	30-35	36+
\$ 30,000	2 (2.6)	---	1 (2.3)	1 (1.5)	2 (3.4)	---	---
\$ 50,000	3 (3.8)	---	1 (2.3)	2 (3.0)	2 (3.4)	1 (2.2)	---
\$100,000	6 (8.0)	2 (5.9)	4 (9.1)	3 (4.6)	5 (8.5)	3 (6.7)	---
\$150,000	16 (20.8)	8 (23.5)	12 (27.3)	12 (17.9)	13 (22.0)	12 (26.1)	---

Table XXIX

FREQUENCY OF SELECTION OF GUARANTEED INCOME LEVEL ALONE
BY SPECIALTY OF PHYSICIAN

<u>INCOME LEVEL</u>	<u>SPECIALTY OF PHYSICIAN</u>		
	General Practitioner	Primary Care Specialists	Secondary Care Specialists
\$ 30,000	---	2 (4.4)	---
\$ 50,000	---	3 (6.5)	---
\$100,000	1 (10.0)	6 (14.0)	1 (1.9)
\$150,000	4 (40.0)	10 (22.7)	11 (20.8)

combination of other factors. The same result was seen between single and married physicians.

The response rate among the physicians aged 36 and over is particularly interesting. The response rate only changed at the \$150,000 income level. This may indicate that to this group of physicians money is a less influential factor as to where to establish a practice. This is brought out even more clearly when the data in Table XXVIII are examined for this age group. In Table XXVIII it is seen that no amount of money ALONE was enough of an incentive for this group of physicians to be willing to practise in rural areas.

Table XXVI points out that secondary care specialists would demand a much higher guaranteed income level than any other group of physicians. This is clearly pointed out in Table XXIX when a guaranteed income ALONE is examined. In this table it can be seen that almost all secondary care specialists indicated that they would only practise in rural areas for a guaranteed income ALONE of \$150,000 or over. General practitioners showed the same type of response pattern when income ALONE was examined, yet this group of physicians most often indicated that an income of \$100,000 plus other factors would be sufficient incentive to establish in a rural area. If some of those other factors were of the Manipulable type, policies could be developed in this area to persuade physicians to establish in rural areas.

The responses of female physicians as shown in Table XXVIII are also very interesting. This table shows that if a guaranteed income were the only incentive, female physicians would only consider incomes of \$100,000 or greater. In the other groups of physicians seen in Tables XXVI - XXIX, the response rates

slowly increase as the income level raises. When income ALONE is compared a dramatic shift in response rates is seen between \$100,000 and \$150,000.

One interesting phenomenon that was noticed across all groups was that despite the amount of guaranteed income offered, more physicians chose the income plus a combination of medical factors alone, than income plus personal factors alone. This may indicate that physicians may forego personal factors, which may not be available in rural areas, for a net guaranteed income plus a combination of medical factors. It should be noted that the combination of medical and personal factors plus the income level was the most often cited response in all groups. This is an area in which certain policies could be developed in an attempt to get more physicians to practise in rural areas. Although the physicians did indicate the exact combination of factors each would require, it was not possible to analyse each response individually to determine the most often cited combinations.

Of the 27 physicians who indicated they had children, only six (22%) cited adequate educational facilities as the only factor needed in a rural area before they would establish a practice there. This factor received the same response as the factor regarding the ability of the physician's spouse to find employment in the area and was the fourth most frequent response among this group. Like all other groups the responses of "none" and "adequate leisure activities" were the two most often cited. Unlike the other groups of physicians, those with children most often selected a guaranteed net income plus personal factors alone. This was particularly noticeable in the \$30,000 and \$50,000 income levels.

Overall, this survey has shown that amongst the current residents and interns practising in British Columbia most plan and would most like to establish practices in the Greater Vancouver area. Most of these physicians consider Fixed Determinants more important than Manipulable determinants when deciding on where to establish practices. This would make it very difficult for any non-regulatory policy to have any effect on the geographic distribution of physicians in British Columbia at this time.

The uncertainty surrounding the restriction of billing numbers which was occurring at the time of this survey may have led to some of the results which have been reported here. This issue has really not been clarified at this time either, except that all physicians who had applied for billing numbers prior to and during the period of restriction will receive a number in the area of their choice. This still leaves the British Columbia government free to restrict other physicians from practising in areas that it considers to be "over-doctored". In this type of "atmosphere" it is unlikely that the attitudes of the residents and interns will change in the near future. Therefore, those areas which have high physician/population ratios may continue to do so if the interns and residents decide to do locums in the large urban areas until such time as they receive their own billing numbers. Based on the results of this survey, several conclusions and recommendations can be made. These are laid out in the final chapter of this thesis.

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CHAPTER VIII

CONCLUSIONS AND RECOMMENDATIONS

Analysis of responses to the questionnaire fielded as part of this project revealed a number of interesting and important findings. This chapter will discuss these and make several recommendations from which policies may be developed in an effort to alleviate the "geographic maldistribution" of physicians in British Columbia. These recommendations will fall into the three categories - Regulatory, Educational and Economic - as previously discussed in this thesis. Prior to these recommendations being made, a comment will be made on the Fixed and Manipulable determinants which were found to be important to the residents and interns registered in the University of British Columbia medical school.

It was found in this survey that Fixed Determinants such as: adequate leisure activities, employment possibilities for the physician's spouse, adequate educational facilities for the physician's children and a set vacation period, were considered as necessities to many physicians if they were to establish in rural communities. As has been mentioned, it is very difficult to develop any non-regulatory policy which would meet these needs. Therefore it can be recommended that leaders from communities which are in need of physician services should conduct a recruitment drive. This would provide the physicians with exposure to the area in terms of the types of facilities - leisure, sporting, and educational that are available in the smaller communities. This type of recruitment is carried out by smaller communities on the Prairies and has proved to be successful in many cases.(1)

The manipulable determinants such as: the provision of a medical centre; financial assistance, and access to consultants for which policies can be developed were found not to be as important to the residents and interns. Adequate hospital facilities in the community, another manipulable determinant was found to be important to all groups of physicians. Monetary incentives are another form of manipulable determinant. Except at levels of \$150,000 or more, these were not alone found to be very important to physicians.

Despite the fact that manipulable determinants were found not to be very influential factors in the physician's decision on where to establish a practice, several recommendations can be made from the findings of this survey. These recommendations will be made in the framework of regulatory, educational and economic incentives.

REGULATORY

It was shown that despite the policy to restrict billing numbers in certain regions of British Columbia, which was in effect when the questionnaire was distributed, most physicians planned to establish their practices in these areas. It was also found that under this policy many physicians planned on establishing practices outside of the province, rather than in other areas of British Columbia. If it is the government's policy to reduce the number of physicians practising in the province, then this type of restrictive policy would seem to be effective. On the other hand, if the government was trying to alleviate the geographic maldistribution of physicians, then these results suggest that this type of policy will not be effective. It is too early to determine whether Bill 41 has had any effect on physicians' decisions as to

where to locate their practices. In order to affect the distribution of physicians the government may have to change its regulatory policies in such a manner as to make rural practise mandatory prior to complete licensure.

EDUCATIONAL

It was also shown in Table X that there is a strong relationship between where physicians were raised and where they plan to locate their medical practices. From this finding it could be recommended that candidates from rural areas and small communities be allocated a certain number of openings in the first year enrollment of medical students at the University of British Columbia.

A previous report (2) recommended that rural training become a mandatory part of the medical curriculum in British Columbia. Mandatory rural training would allow medical students the chance to gain some valuable experience in small communities. Adequate medical training was cited by 25% of the younger physicians and 22% of the primary care physicians as the factor which, by itself, would be sufficient incentive for them to establish in rural areas. The rural training would build up the confidence of the physicians and at the same time provide an opportunity for them to observe the leisure, educational and other facilities that are available in such communities situated away from the large urban centres.

Despite the fact that rural training did not have much of an effect on where physicians, in this study, planned to locate their practices, it could be again recommended that physicians receive some rural training while at medical school.

Contact with the university medical school was cited as an important factor by roughly 20% of the primary and secondary care specialists. This may be overcome by the provision of continuing medical education courses in the smaller communities of the province.

Again despite the fact that very few physicians indicated the desire to belong to a locums pool, the formation of such a pool of physicians would allow those physicians working in remote areas a greater opportunity to attend courses/seminars held in the Greater Vancouver area or elsewhere.

ECONOMIC

Loan Forgiveness

Very few physicians in any category selected the factor regarding the ability to receive financial assistance while attending medical school in exchange for working in a rural area for a set period of time. Although this type of recommendation has previously been made (2), it would appear that it would not have much of an effect. It may be considered to help those students who are from rural areas get through their medical training if financial need was found to be a factor for these students not applying to medical school.

Guaranteed Incomes

This survey pointed out that a guaranteed income, except at the \$150,000 or greater level, was not, alone, an important factor in a physician's decision on where to locate his practice. At this level it would be uneconomical to guarantee such an income to physicians to have them establish in rural areas.

At the \$50,000 to \$100,000 level it was found that many physicians considered a combination of a guaranteed income plus the provision of certain medical factors to be necessary. The medical factors included: access to consultants, adequate hospital facilities, provision of a medical centre and the ability to join an established practice. All of these factors, except the ability to join an established practice, are areas in which incentives can be offered. For example: smaller communities could build and equip a small medical centre to be used by physicians who practise in the community. This would also allow the possibility to join an established practice and share the "on call" duties, which were a concern of many physicians. The provision of such facilities and a guaranteed net income in the range of \$50,000 to \$100,000 may persuade more physicians to establish practices in rural areas of British Columbia.

Although certain incentives could be offered to physicians in an effort to have more of them establish in rural and remote areas of the province of British Columbia, the uncertainty of the billing number policy in effect at the time this survey was conducted may have played a significant part in the responses of the residents and interns surveyed. Possibly, now that this issue has been resolved in the courts and the legislation changed the responses may differ if such a survey was conducted now. Therefore, in order to determine the effect of the new legislation a retrospective study should be carried out. This would re-question the residents and interns once they had established practices as to where and why they located in the area they did.

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APPENDIX A

METHODS OF DETERMINING PHYSICIAN REQUIREMENTS AND SUPPLY.

- I. NEED-BASED METHOD
- II. DEMAND-BASED METHOD
- III. UTILIZATION-BASED METHOD

NEED-BASED METHOD

An "Activity Analysis" Planning Framework.

$$\text{RESOURCES REQUIRED (in terms of minutes)} = \text{POPULATION MATRIX} \times \text{EPIDEMIOLOGY MATRIX} \times \text{TECHNOLOGY MATRIX}$$

where: POPULATION = the matrix of population groups distinguished by their differing characteristics related to health care needs.

EPIDEMIOLOGY = the matrix which converts population numbers to quantities of different services needed.

TECHNOLOGY = the matrix which converts the number of units of resources into units of services.

MANPOWER REQUIRED = RESOURCES REQUIRED : Amount of Time
(as Calculated Above) Required to Perform
Each Service Required.

From: Evans, R.G. Strained Mercy: The Economics of Canadian Health Care.
Butterworths & Co. Ltd. Toronto, 1984. pp 304-307.

HEALTH SERVICES MARKETING FORMULA - A DEMAND-BASED METHOD

STEP I

Determine Geographical and Demographical limits of area.

STEP II

Determine Potential Physician Visits
(per person; per age group)

STEP III

Potential Physician Visits	-	Outflow of Patients to Other Areas	x	Average Gross Revenue Per Visit	=	Total Average Gross Revenue
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STEP IV

Total Average Gross Revenue	x	Estimated % of Uncollectables	=	Total Uncollectables
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STEP V

Total Average Gross Revenue	-	Total Uncollectables	=	Total Estimated Revenues
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STEP VI

Total Estimated Revenues	\div	Cost of Single Physician's Practice	=	Number of Physicians Who can be Supported by the Population.
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From: Rowley, Beverley & DeWitt Baldwin. "Assessing Rural Community Resources for Health Care: The Use of Health Services Catchment Area Economic Marketing Studies." in Social Science & Medicine. Vol. 18 No. 6, 1984. pp 525-529.

UTILIZATION-BASED METHOD

STEP I

Estimate current supply - number of physicians or number of services provided (Absolute numbers). Convert these numbers to Full-Time-Equivalents (FTE's) based on productivity.

STEP II

Estimate current requirements by adjusting supply figure for any gaps - by delphi methods or using vacant advertised positions as a proxy.

STEP III

Convert the resulting requirement complement into a physician/population ratio.

STEP IV

Extrapolate the ratio into future requirements.

From: Lomas, Jonathan; Greg Stoddart; & Morris Barer. "Supply Projections As Planning: A Critical Review of Forecasting Net Physician Requirements in Canada." in Social Science & Medicine. Vol. 20 No. 4, 1985. p 412.

APPENDIX B

NON-POSTGRADUATE PHYSICIAN/POPULATION RATIOS IN
BRITISH COLUMBIA BY HOSPITAL DISTRICT (1984).

I. Overall Ratios

II. Ratio by Specialty

NON-POSTGRADUATE PHYSICIAN/POPULATION RATIOS IN
BRITISH COLUMBIA BY HOSPITAL DISTRICT (1984).

<u>HOSPITAL DISTRICT</u>	<u>RATIO</u>
<u>NON-METROPOLITAN SUBTOTAL</u>	1/747
Alberni-Clayoquat	1/1,008
Bulkley-Nechako	1/1,138
Cariboo	1/928
Central Coast	1/533
Central Fraser Valley	1/791
Central Kootenay	1/836
Central Okanagan	1/604
Columbia-Shuswap	1/968
Comox-Strathcona	1/706
Cowichan Valley	1/701
Dewdney-Alouette	1/842
East Kootenay	1/749
Fraser-Cheam	1/755
Fraser-Fort George	1/813
Kitimat-Stikine	1/960
Kootenay-Boundary	1/541
Mount Waddington	1/1,330
Nanaimo	1/605
North Okanagan	1/678
Okanagan-Similkameen	1/568
Peace River-Liard	1/1,198
Powell River	1/576
Skeena-Queen Charlotte	1/704
Squamish-Lillooet	1/949
Stikine	1/700
Sunshine Coast	1/564
Thompson-Nicola	1/637
<u>METROPOLITAN SUBTOTAL</u>	1/383
Capital	1/369
Vancouver	1/386
<u>TOTAL</u>	1/504

Non-Postgraduate Physicians in British Columbia
per 10,000 Population by Regional Hospital District by MSC Specialty

September 1984

Regional Hospital District	General Practice	Family Practice	General Practice Subtotal	Anaesthesia	Community Medicine	Dermatology	General Surgery	Internal Medicine	Medical Microbiology
Non-Metropolitan - Subtotal	7.55	1.38	8.90	0.38	0.09	0.08	0.79	0.54	0.01
1 Alberni-Clayoquot	6.61	0.90	7.52	0.30	0.0	0.0	0.90	0.30	0.0
2 Bulkley-Nechako	6.84	1.22	8.06	0.24	0.0	0.0	0.49	0.0	0.0
4 Cariboo	6.82	1.11	7.93	0.0	0.16	0.0	0.95	0.32	0.0
5 Central Coast	12.52	6.26	18.77	0.0	0.0	0.0	0.0	0.0	0.0
6 Central Fraser Valley	6.68	1.35	8.03	0.48	0.0	0.08	0.64	0.56	0.0
7 Central Kootenay	8.22	1.68	9.91	0.19	0.19	0.0	0.56	0.37	0.0
8 Central Okanagan	6.44	2.00	8.43	0.78	0.11	0.11	0.78	1.22	0.0
9 Columbia-Shuswap	7.05	1.41	8.46	0.0	0.0	0.0	0.47	0.23	0.0
10 Comox-Strathcona	8.99	0.68	9.67	0.41	0.27	0.0	0.68	0.54	0.0
11 Cowichan Valley	8.67	0.90	9.57	0.36	0.0	0.18	0.36	0.72	0.0
12 Dewdney-Alouette	7.86	1.70	9.56	0.31	0.15	0.0	0.46	0.15	0.0
13 East Kootenay	8.96	0.53	9.49	0.18	0.0	0.0	1.41	0.70	0.0
14 Fraser-Cheam	7.81	1.36	9.17	0.17	0.0	0.0	0.51	0.34	0.0
15 Fraser-Fort George	6.20	1.37	7.57	0.42	0.0	0.11	0.84	0.32	0.0
17 Kitimat-Stikine	6.20	1.55	7.76	0.22	0.0	0.0	0.66	0.22	0.0
18 Kootenay Boundary	11.93	0.60	12.53	0.30	0.30	0.0	1.19	1.49	0.0
19 Mount Waddington	6.27	0.63	6.89	0.0	0.63	0.0	0.0	0.0	0.0
20 Nanaimo	7.90	1.34	9.23	0.73	0.12	0.24	0.61	0.61	0.0
21 North Okanagan	5.90	2.26	8.16	0.52	0.17	0.17	1.04	0.87	0.17
22 Okanagan-Similkameen	9.23	1.68	10.90	0.34	0.0	0.17	1.17	0.84	0.0
23 Peace River-Liard	5.57	0.66	6.23	0.0	0.0	0.0	0.82	0.33	0.0
24 Powell River	10.71	1.02	11.74	0.0	0.51	0.0	1.53	0.51	0.0
25 Skeena-Queen Charlotte	9.07	1.97	11.04	0.0	0.0	0.0	1.58	0.39	0.0
26 Squamish-Lillooet	8.54	1.00	9.54	0.50	0.0	0.0	0.50	0.0	0.0
27 Stikine	14.29	0.0	14.29	0.0	0.0	0.0	0.0	0.0	0.0
28 Sunshine Coast	10.77	3.80	14.57	0.0	0.0	0.0	1.27	0.0	0.0
29 Thompson-Nicola	7.20	1.40	8.60	0.65	0.09	0.0	1.03	0.84	0.09
Metropolitan - Subtotal	10.78	1.92	12.89	1.42	0.14	0.28	1.02	2.28	0.08
3 Capital	12.43	1.84	14.27	1.65	0.24	0.24	1.18	2.08	0.0
16 Greater Vancouver	10.41	1.94	12.35	1.37	0.12	0.27	0.99	2.32	0.09
TOTAL	9.19	1.64	10.83	0.90	0.11	0.18	0.91	1.43	0.05

Source: University of British Columbia. Rollcall Update 84. Division of Health Services Research and Development, Vancouver, B.C. April 1985.

Non-Postgraduate Physicians' in British Columbia
per 10,000 Population by Regional Hospital District by MSC Specialty
September 1984

Regional Hospital District		Neurology	Neuro- psychiatry	Neurosurgery	Nuclear Medicine	Obstetrics & Gynaecology	Ophthalmology	Orthopaedic Surgery	Otolaryngology	Paediatrics
Non-Metropolitan - Subtotal		0.04	0.01	0.02	0.0	0.31	0.30	0.24	0.14	0.28
1	Alberni-Clayoquot	0.0	0.0	0.0	0.0	0.30	0.0	0.0	0.0	0.0
2	Bulkley-Nechako	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
4	Cariboo	0.0	0.0	0.0	0.0	0.16	0.0	0.0	0.0	0.16
5	Central Coast	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Central Fraser Valley	0.0	0.0	0.0	0.0	0.16	0.48	0.24	0.24	0.24
7	Central Kootenay	0.0	0.0	0.0	0.0	0.0	0.0	0.19	0.0	0.19
8	Central Okanagan	0.22	0.0	0.11	0.0	0.44	0.55	0.44	0.22	0.44
9	Columbia-Shuswap	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.23	0.23
10	Comox-Strathcona	0.0	0.0	0.0	0.0	0.41	0.14	0.41	0.27	0.14
11	Cowichan Valley	0.0	0.0	0.0	0.0	0.54	0.36	0.36	0.18	0.36
12	Dewdney-Alouette	0.0	0.0	0.0	0.0	0.0	0.15	0.31	0.0	0.0
13	East Kootenay	0.0	0.0	0.0	0.0	0.18	0.18	0.0	0.18	0.18
14	Fraser-Cheam	0.0	0.0	0.0	0.0	0.34	0.34	0.0	0.17	0.17
15	Fraser-Fort George	0.11	0.0	0.0	0.0	0.42	0.42	0.32	0.21	0.21
17	Kitimat-Stikine	0.0	0.0	0.0	0.0	0.22	0.0	0.22	0.0	0.22
18	Kootenay Boundary	0.0	0.0	0.0	0.0	0.30	0.30	0.30	0.0	0.60
19	Mount Waddington	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
20	Nanaimo	0.12	0.0	0.0	0.0	0.73	0.85	0.61	0.24	0.36
21	North Okanagan	0.0	0.0	0.0	0.0	0.35	0.69	0.35	0.17	0.35
22	Okanagan-Similkameen	0.17	0.0	0.0	0.0	0.50	0.50	0.34	0.17	0.50
23	Peace River-Liard	0.0	0.0	0.0	0.0	0.16	0.0	0.16	0.0	0.0
24	Powell River	0.0	0.0	0.0	0.0	0.51	0.51	0.0	0.0	0.51
25	Skeena-Queen Charlotte	0.0	0.0	0.0	0.0	0.39	0.39	0.0	0.0	0.0
26	Squamish-Lillooet	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
27	Stikine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
28	Sunshine Coast	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
29	Thompson-Nicola	0.0	0.09	0.19	0.0	0.65	0.28	0.37	0.19	0.75
Metropolitan - Subtotal		0.30	0.01	0.15	0.03	0.78	0.74	0.60	0.35	0.94
3	Capital	0.24	0.0	0.16	0.0	0.63	0.90	0.59	0.35	0.55
16	Greater Vancouver	0.32	0.01	0.15	0.04	0.79	0.70	0.61	0.35	1.02
TOTAL		0.17	0.01	0.09	0.02	0.54	0.52	0.43	0.24	0.61

Non-Postgraduate Physicians' In British Columbia
per 10,000 Population by Regional Hospital District by MSC Specialty
September 1984

Regional Hospital District	Pathology'	Physical Medicine	Plastic Surgery	Psychiatry	Radiology'	Thoracic Surgery'	Urology	Specialty Subtotal	Total
Non-Metropolitan - Subtotal	0.23	0.03	0.07	0.34	0.51	0.02	0.13	4.49	13.39
1 Alberni-Clayoquot	0.30	0.0	0.0	0.0	0.30	0.0	0.0	2.40	9.92
2 Bulkley-Nechako	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.73	8.79
4 Cariboo	0.0	0.0	0.0	0.0	1.11	0.0	0.0	2.85	10.78
5 Central Coast	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.77
6 Central Fraser Valley	0.24	0.0	0.0	0.56	0.56	0.0	0.16	4.61	12.64
7 Central Kootenay	0.0	0.0	0.0	0.0	0.19	0.0	0.19	2.06	11.96
8 Central Okanagan	0.33	0.33	0.22	0.78	0.55	0.22	0.22	8.10	16.54
9 Columbia-Shuswap	0.0	0.0	0.0	0.47	0.23	0.0	0.0	1.88	10.33
10 Comox-Strathcona	0.14	0.0	0.0	0.27	0.68	0.0	0.14	4.49	14.17
11 Cowichan Valley	0.18	0.0	0.0	0.72	0.36	0.0	0.0	4.70	14.27
12 Dewdney-Alouette	0.15	0.0	0.0	0.31	0.31	0.0	0.0	2.31	11.87
13 East Kootenay	0.0	0.0	0.0	0.0	0.88	0.0	0.0	3.86	13.35
14 Fraser-Chem	0.51	0.0	0.17	0.51	0.51	0.17	0.17	4.07	13.24
15 Fraser-Fort George	0.53	0.0	0.11	0.0	0.53	0.0	0.21	4.73	12.30
17 Kitimat-Stikine	0.44	0.0	0.0	0.0	0.22	0.0	0.22	2.66	10.42
18 Kootenay Boundary	0.30	0.0	0.30	0.30	0.30	0.0	0.0	5.97	18.49
19 Mount Waddington	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.63	7.52
20 Nanaimo	0.24	0.0	0.24	0.61	0.73	0.0	0.24	7.29	16.52
21 North Okanagan	0.35	0.0	0.0	0.52	0.69	0.0	0.17	6.60	14.75
22 Okanagan-Similkameen	0.34	0.0	0.17	0.50	0.67	0.0	0.34	6.71	17.61
23 Peace River-Liard	0.0	0.0	0.0	0.16	0.49	0.0	0.0	2.13	8.35
24 Powell River	0.0	0.0	0.0	1.02	0.51	0.0	0.0	5.61	17.35
25 Skeena-Queen Charlotte	0.0	0.0	0.0	0.0	0.39	0.0	0.0	3.16	14.20
26 Squamish-Lillooet	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.00	10.54
27 Stikine	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.29
28 Sunshine Coast	0.0	0.0	0.0	0.63	0.63	0.0	0.63	3.17	17.74
29 Thompson-Nicola	0.47	0.09	0.19	0.37	0.56	0.0	0.19	7.11	15.71
Metropolitan - Subtotal	0.87	0.13	0.21	1.74	1.08	0.18	0.32	13.40	28.09
3 Capital	0.59	0.16	0.20	1.37	1.18	0.20	0.35	12.82	27.09
16 Greater Vancouver	0.68	0.12	0.22	1.82	1.04	0.17	0.32	13.53	25.88
TOTAL	0.45	0.08	0.14	1.05	0.79	0.10	0.23	9.03	19.88

APPENDIX C

STUDY QUESTIONNAIRE

6. Again ASSUMING that there are NO restrictions on where you can practise in British Columbia, please circle the letter beside EACH statement which, BY ITSELF, would complete the following sentence for you:

"I would practise in a rural area for at least five years if: _____."

- a) I were able to join an established practice.
- b) I had ready access to consultants.
- c) I were assured of a set yearly vacation period, plus additional time off for continuing medical education workshops.
- d) I found the educational facilities were adequate for my children.
- e) My spouse could find suitable employment in the area.
- f) I found adequate hospital facilities and support staff available in the area.
- g) I could get financial assistance for my medical education in exchange for practising in a rural area.
- h) I could belong to a locums pool and would therefore only have to work in a rural area for a short period of time.
- i) I found the leisure and/or cultural activities in the area were adequate.
- j) I felt my medical training had equipped me to handle any and all types of emergencies which I could encounter.
- k) I had regular contact with the University medical school.
- l) The community supplied a medical centre for my use.
- m) Other. Please specify: _____
- n) None of the above.

7. When answering this question, consider ONLY THOSE STATEMENTS WHICH YOU DID NOT CIRCLE in Question 6. Please indicate (by letter) the minimum combination of factors for which you would consider a rural practice IF in addition you were guaranteed a minimum net (after expenses) income. Please follow the example given below.

Example:	<u>Guaranteed Income</u>	plus	<u>Minimum Conditions</u>
	\$30,000	plus	b,d,e,g,l
	\$50,000	plus	d,e,l
	\$100,000	plus	l
	\$150,000	plus	-----

EG: with a guaranteed net income of \$30,000, it would also require conditions b,d,e,g,l before I would practise in a rural area. For \$50,000 it would also take conditions d,e,l. For \$100,000 it would also take condition l. I would practise in a rural for \$150,000 alone.

<u>Guaranteed Income</u>	<u>PLUS</u>	<u>Minimum Conditions</u>
\$30,000	plus	_____
\$50,000	plus	_____
\$100,000	plus	_____
\$150,000 or more.	plus	_____

Please check the appropriate answers:

8. Sex: ☐ Male ☐ Female
9. Marital Status: ☐ Single ☐ Married or living with partner.

10. Do you have any children? ☐ Yes ☐ No

11. Your age: _____

12. What area were you brought up in?

- | | |
|--|--|
| <input type="checkbox"/> Greater Vancouver | <input type="checkbox"/> Kootenays |
| <input type="checkbox"/> Lower Mainland | <input type="checkbox"/> Caribou |
| <input type="checkbox"/> Greater Victoria | <input type="checkbox"/> Prince George Region |
| <input type="checkbox"/> Central Vancouver Island | <input type="checkbox"/> Prince Rupert - North Coast |
| <input type="checkbox"/> Northern Vancouver Island | <input type="checkbox"/> North of Prince George |
| <input type="checkbox"/> North Okanagan | <input type="checkbox"/> Outside of British Columbia |
| <input type="checkbox"/> South Okanagan | |

13. What size community were you brought up in?

- ☐ A town of under 15,000 (rural area)
☐ A city of between 15,000 - 50,000
☐ A city of over 50,000

14. Are you completing: ☐ A General Practitioner's Internship

If so do you plan to specialize? ☐ Yes Please specify _____

☐ No

☐ A Residency. Please specify specialty: _____

15. Are you a graduate of the U.B.C. Medical Program? ☐ Yes

☐ No

16. Have you done any of your training in a rural area? ☐ Yes

☐ No

Please add any other comments you may have.

Thank you for your time and co-operation in completing this questionnaire.