Physician Distribution and Physician Shortage Intensity in Ontario

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Au cours des années 1990, en Ontario et dans de nombreuses autres jurisdictions, le point central du débat sur les ressources humaines en médecine s'est déplacé d'un surplus généralisé à une pénurie. Cependant, le problème demeure de l'accès équitable à ces ressources et aux services de santé en général. Pendant cette période, l'effort en matière de politiques gouvernementales a été largement orienté vers ce qui a été perçu comme une "maldistribution" des ressources entre les régions géographiques. Cet article applique l'index Gini, une méthodologie de la concentration des ressources, pour mesurer la maldistribution des ressources médicales en Ontario au cours des années 90. Notre article propose également et met en application, une méthode pour quantifier la pénurie de médecins au moyen d'un index de l'intensité de cette pénurie. Les résultats révèlent qu'en dépit de nombreuses politiques gouvernementales et de programmes destinés à remédier à la maldistribution géographique des ressources humaines dans le domaine médical, la répartition des médecins en Ontario est devenue plus inégale dans les années 90. Cela met en question l'efficacité des politiques gouvernementales quant à la correction de la maldistribution géographique. En outre, il n'y a pas eu de baisse significative de l'intensité de la pénurie générale de médecins au cours des années 90.

During the 1990s, in Ontario and many other jurisdictions, the focus on the physician human resources debate has moved from aggregate surpluses to shortages. However, the problem of equitable access to those resources, and health services in general, has remained. During this period, much government policy effort has been targeted toward the perceived "maldistribution" of resources between geographic regions. This paper applies the Gini index of resource concentration methodology to gauge the maldistribution of physician resources in Ontario during the 1990s. It also proposes, and implements, an approach for quantifying physician shortages through a physician shortage intensity index. The results reveal that despite numerous government policies and programs aimed at alleviating the geographic maldistribution of medical human resources, the distribution of physicians in Ontario has become more uneven during the 1990s. This puts the efficacy of government policies to correct geographic maldistribution into question. Additionally, there has been no meaningful improvement in overall physician shortage intensity during the 1990s.

Introduction and Background

The National Forum on Health undertook an in-depth assessment of Canadians' values related to health care during the mid-1990s. The Forum found that for the public, equality of access to health services and quality of care are the most important and widely supported aspects of the health-care system (The National Forum on Health 1997). Surveys continue to confirm that by and large the public places a high priority on timely access to health services. The accessibility and universality principles of the *Canada Health Act* (the other three being portability, comprehensiveness, and public

administration) are the most supported principles by the public. The geographic distribution of health-care resources is an issue of concern for government and the public as it determines service availability or access. This paper focuses on the geographic distribution, and hence access, of medical services (i.e., physicians) in Ontario.

Large variations, or inequalities, in the geographic distribution of physicians exist in most industrialized countries (OECD 1994). In fact, uneven geographic distribution characterizes most professions, not just medicine. However, it is often argued that this phenomenon raises particularly serious equity problems in the case of physicians, as it results in unequal access to health care. Statements about whether physician maldistribution and shortages are increasing or whether particular governments or policies are effective in correcting maldistribution problems are the basic ingredients of many debates on the topic of equitable access to medical services.

During the past 30 years in Ontario, while the focus on the physician human resources debate has moved from aggregate surpluses to shortages, the problem of equitable access to those resources has remained.[1] During this period, and particularly during the 1990s, much government policy effort has been targeted toward improving the distribution of physician resources between geographic regions. Given the consensus opinion that Ontario is starting to face a worsening shortage of physicians, which is expected to deteriorate further over time, the problem of inequitable physician distribution is expected to attract further policy attention.

Although there is no consensus on what constitutes appropriate distribution of physicians, it may be reasonable to think of a distribution of general/family practitioners that is approximately equal across regions relative to population, as being appropriate. Conversely, it could be viewed as inappropriate for specialists (i.e., neurosurgeons) who require a large population base to sustain a practice, to have approximately equal numbers of physicians per population by region. An "appropriate distribution" of physician human resources is a societal judgement — as such, it can vary across regions, provinces, and countries.

Every Canadian province has policies in place aimed at changing (i.e., improving) the geographic distribution of physicians. These policy initiatives typically fall into one of three categories; (i) market-based, (ii) regulatory, or (iii) funding. The market-based approach is based on the assumptions that as larger urban areas become more saturated, there will be a trickle-down of physicians to less populated rural communities. It also captures efforts such as recruitment fairs held by communities in a effort to advertise opportunities for physicians to set up practice in their towns. The regulatory approach consists of regulations/laws, administrative rules, etc. An example would be legal restrictions on practice locations for new physicians ("billing number" limits). Finally, the funding approaches typically consist of non-fee-for-service payments (salary, capitation), financial bonuses (isolation allowance), and differential fees.

There is a myriad of policies in Ontario, with the Underserviced Areas Program (UAP), Specialist Retention Initiative (SRI), and New Entrant Fee Discounts being the best known.[2] The UAP, originally established in 1969, provides incentive grants of $40,000 over four years for a physician to establish a practice in a designated undersupplied area in northern Ontario. Undersupplied communities in southern Ontario are eligible for much smaller grants, or no financial support at all. The UAP incentive grant has not been increased in the past 20 years, resulting in a dramatic decline in its value to physicians and hence in its potential effectiveness.[3]

The SRI was established in 1992. It is designed to encourage specialists to maintain practice in areas of marked undersupply, and to discourage specialists providing rare sub-specialty services from leaving the province, as a result of physician billing/income thresholds.

New entrant fee discounts were introduced in 1996 by the government. Under this initiative, new graduates setting up practice in areas designated as "oversupplied," primarily academic health-science centres in southern Ontario, are paid reduced fees during their first three years in practice. Fees in the first, second, and third years of practice are discounted by 30 percent, 25 percent, and 20 percent respectively. The stated goal of this penalty scheme was to increase the number of physicians in undersupplied northern communities. While there has been no formal evaluation of this program, anecdotal evidence suggests that it was ineffective.[4] While it seems to have prevented new graduates, especially general/family practitioners, from establishing a practice in oversupplied centres such as Toronto, it did not cause those graduates to set up a practice in undersupplied areas in the north. Rather, most proceeded to establish practices in communities surrounding the large oversupplied centres (i.e., "necklace" communities).[5]

Chan (1999), uses data on physician and population numbers for the 1991–97 period and briefly addresses the issue of physician distribution in Ontario. This is the only published empirical study to date which attempts to measure the geographic maldistribution of physicians in Ontario. He looked at the variation in population-physician ratios across geographic districts and time, and used the coefficient of variation to measure the degree of geographic maldistribution. On that basis, Chan concluded that the geographic maldistribution problem in Ontario had worsened during the 1990s.

A recent report on physician human resource issues conducted by McKendry (1999) concluded that Ontario does have a physician distribution problem and that it is becoming more pervasive. He reached this conclusion based on a review of existing government programs, anecdotal reports, and on the Chan (1999) study. However, he provided no new empirical support of this conclusion.

Other reports examining physician human resources have discussed the maldistribution problem — for example, the National Ad Hoc Working Group on Physician Resource Planning (1995) — but none have presented any systematic empirical results to guide policymakers.

Methods and Data

In the United States, empirical investigations into whether the geographic distribution of physicians has deteriorated or improved over time have tended to use the same methodological approach: namely, the Gini index of resource concentration. For example, the Gini index methodology has been employed by Politzer, Cultice and Meltzer (1998), Ricketts, Gesler and Osborne (1994), and McConnel and Tobias (1986). The index has been found to adequately and sensitively measure the degree of difference between two distributions.

The Gini index is constructed by ordering the geographically defined per capita provision (i.e., physician to population ratios) in ascending order and calculating the cumulative proportion of the total number of physicians and the corresponding cumulative proportion of the total population. A plot of this data generates a cumulative curve. With complete equality in distribution (that is, if all communities had exactly the same physician to population ratio) the cumulative curve would coincide with the 45-degree line (i.e., a straight line with slope equal to one). Unequal distributions generate cumulative curves which lie below the 45-degree line. The Gini index is given by twice the area between the 45-degree line and the cumulative curve. Changes in resource distribution will shift the cumulative curve and hence generate a different value for the Gini index. It varies in value between zero, reflecting perfectly uniform or equal distribution, and one, reflecting a concentration of all physicians in a single community. Therefore, observed increases in the Gini index indicate greater inequality or unevenness in the distribution. Analogously, a reduction in the index value points to an improvement in the distribution of physicians across the population (i.e., more

equal distribution). We can use the index to compare degrees of geographic inequality or unevenness for different points in time (i.e., intertemporal changes) and for different workforce groupings and type of provider/physician at any one point in time.

The Gini index is a relative measure of inequality and is unaffected by doubling the number of physicians in each area. The standard deviation is another measure that has been used by some researchers. However, it is an absolute measure and would double if the number of physicians in each area doubled. Similarly, increasing the number of doctors per capita in each area by an equal number so that the absolute differences between areas are preserved would have no impact on the standard deviation. But the relative difference between well and poorly supplied areas would decline and the Gini index would fall. It should be noted that distortions in the index can be caused by variations in the health status of population groups and in the productivity of physicians.[6] However, the higher the level of aggregation the smaller are these distortions.

Let us now turn to the issue of physician shortages. One measure which can be used to assess physician shortages is the physician shortage rate (PSR), the percentage of communities in a given region whose physician-population ratios (MD_P_i) lie below a specified threshold ratio (MD_P_0). However, the PSR does not reflect the amount by which the physician resources of undersupplied communities fall below the threshold level. Let us define the average shortage gap (ASG) as the average percentage shortfall, in the community's physician-population ratio relative to the threshold ratio, in undersupplied communities (i.e., those below the threshold ratio). These two measures have intuitive appeal, but they may not point to the same conclusion. For example, it would be possible to have a region with a low PSR but still have a high ASG. That is, it may have only a handful of undersupplied communities but with very large or severe degrees of undersupply in those communities. Therefore, I propose a composite measure, the physician shortage intensity (PSI) index for any given geographic region/jurisdiction, which is defined as follows:

$$PSI = PSR \times ASG, \tag{1}$$

$$PSR = S/N, \tag{2}$$

$$ASG = (1/S) \times \Sigma_i [(MD\_P_0 - MD\_P_i)/MD\_P_0], \quad i=1, \ldots, S \tag{3}$$

where S is the number of undersupplied communities in the region, and N is the total number of communities in the region.

It is useful to transform equation (1), by expressing it in logarithmic form and by taking the first derivative, into:

$$\Delta \ln(PSI) = \Delta \ln(PSR) + \Delta \ln(ASG) \tag{4}$$

The overall percentage rate of change in physician shortage intensity over time can therefore be expressed as the sum of the percentage changes in the physician shortage rate and shortage gap ratio (among the undersupplied communities). Equation (4) is also useful for decomposing the percentage differences in physician shortage intensity between two regions into percentage differences in the physician shortage rate and shortage gap. Like the Gini index, the PSI is normalized to vary between zero and one, with higher values indicating a worsening situation in terms of physician shortages.

Gini indicies have been calculated for the Ontario physician supply, for 1993 and 1998, for general practitioners/family physicians, specialists, and all physicians. Physician-supplied data at the census subdivision (CSD) level, for a total of 947 CSDs, were obtained from the Ontario Physician Human Resources Data Centre (OPHRDC). Physician data in earlier years were not available in the level of detail required. CSD level population data were obtained from Statistics Canada.[7] The PSI indicies were also calculated using OPHRDC and Statistics Canada data. The geographic units selected for

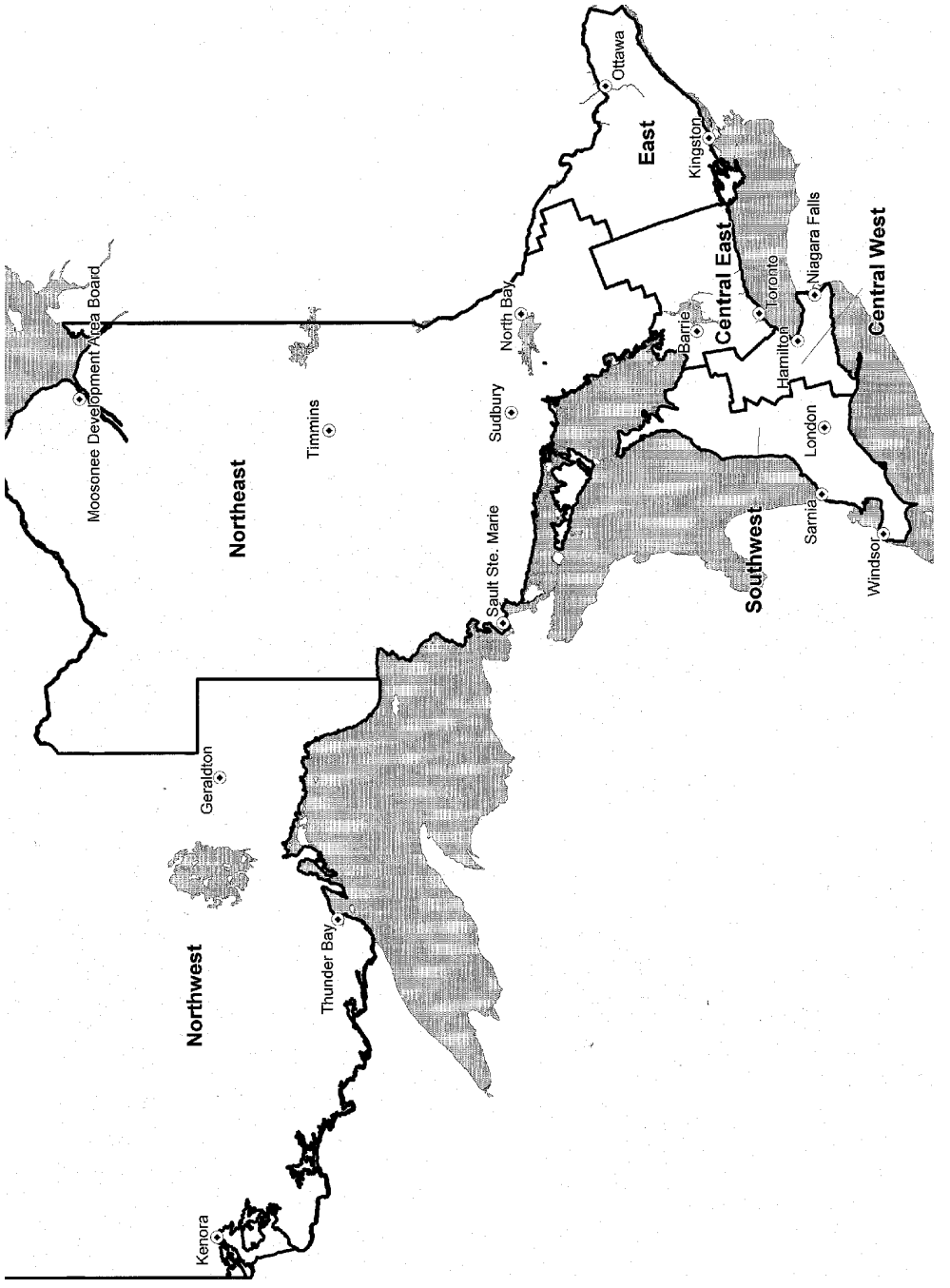

Northwest
Northeast
East
Central East
Central West
Southwest
Kenora
Thunder Bay
Geraldton
Moosonee Development Area Board
Timmins
Sault Ste. Marie
Sudbury
North Bay
Ottawa
Kingston
Barrie
Toronto
Hamilton
Niagara Falls
London
Sarnia
Windsor

FIGURE 1

computation of the Gini and PSI indices in this analysis are the six geographic planning regions used by the Ontario Ministry of Health and Long-Term Care. The planning regions are as follows: Northeast(NE), Northwest(NW), East(E), Southwest(SW), Central West(CW), and Central East(CE). Refer to Figure 1.

Results

Distribution of Physicians

An aggregation of CSDs into ten categories ranging from the smallest to the most populated CSDs in Ontario is shown in Table 1. We note that the majority of communities in Ontario have relatively small populations, 2,500 persons or less. There are only nine communities with populations exceeding 250,000. Table 1 also presents the physician to population ratio (i.e., number of physicians/10,000 population) for GP/FPs and specialists for each of the ten broad population categories. We observe that the distribution of both GP/FPs and specialists greatly favours larger more urban areas. This is particularly true for specialists. Relative to specialists, the distribution of GP-population ratios across population categories is much more equal than the specialist-population ratios. The ratio values range from 4.2 to 10.8 and from 0.3 to 16 for GP/FPs and specialists respectively.

The Gini index values, for the province overall and for each planning region, are presented in Table 2. Since Gini indicies are calculated for all physicians in a category, as opposed to a sample, the magnitude and direction (increase or decrease) of differences between them are considered significant.

Intertemporal comparisons of the Gini indicies indicate that the distribution of physicians (GP/FPs and specialists combined) in Ontario has become more unequal (i.e., higher Gini index) between 1993 and 1998. Overall, there is a notably greater inequality in the distribution of specialists than in GP/FPs (Gini=0.427 versus 0.309). This inequality (i.e., geographic or spatial concentration) has worsened over the period of study. It is interesting to note that the maldistribution of physicians has continued to

Table 1
Ontario Physician to Population Ratios by CSD Population Categories, 1998

Category	*Population*	*Number of CSDs*	*GP/FPs per 10,000 pop*	*Specialists per 10,000 pop*
1	1,000 or less	313	4.18	0.30
2	1,001 - 2,500	243	5.14	0.68
3	2,501 - 5,000	154	5.70	0.78
4	5,001 - 7,500	64	6.50	1.13
5	7,501 - 10,000	35	5.10	1.27
6	10,001 - 25,000	77	7.67	3.55
7	25,001 - 50,000	17	7.11	5.39
8	50,001 - 100,000	19	8.86	9.00
9	100,001 - 250,000	16	7.89	7.20
10	250,001 or more	9	10.77	15.95
All Ontario	11,414,388	947	8.62	9.13

Source: OPHRDC, Statistics Canada, and calculations by author.

TABLE 2
Gini Indexes by Geographic Region and Specialty Group

Region/Specialty Group	*1993 Gini Index*	*1998 Gini Index*	*Percent Change*
All Ontario			
All Physicians	0.368554	0.374750	1.68
GP/FPs	0.309242	0.310606	0.44
Specialists	0.426977	0.435320	1.95
East Region			
All Physicians	0.489974	0.485207	-0.97
GP/FPs	0.426445	0.428872	0.57
Specialists	0.545361	0.533212	-2.23
Central East Region			
All Physicians	0.345072	0.354688	2.79
GP/FPs	0.257704	0.255670	-0.79
Specialists	0.427486	0.446298	4.40
Central West Region			
All Physicians	0.219111	0.233385	6.50
GP/FPs	0.176283	0.182377	3.46
Specialists	0.264720	0.283626	7.14
Southwest Region			
All Physicians	0.375142	0.388502	3.56
GP/FPs	0.376891	0.387142	2.72
Specialists	0.373439	0.389672	4.35
Northeast Region			
All Physicians	0.343324	0.370356	7.87
GP/FPs	0.375536	0.385517	2.66
Specialists	0.293577	0.346932	18.17
Northwest Region			
All Physicians	0.319057	0.314764	-1.35
GP/FPs	0.416361	0.419543	0.76
Specialists	0.146691	0.140413	-4.28

Source: OPHRDC, Statistics Canada, and calculations by author.

persist even during a period of rising overall physician supply. The total number of physicians in Ontario increased by 7.7 percent between 1993 and 1998, while the population increased by 6.8 percent.

The relatively greater maldistribution (i.e., concentration) of specialists, relative to GP/FPs, is not surprising. Nothing affects the location decision of physicians more than specialty. The more highly specialized the physician, the less likely he or she will settle in a smaller or rural area. As a consequence, the growth of specialization is a major contributor to the geographic maldistribution of physicians. The decision of specialists to settle in larger communities/cities is neither random nor capricious: specialists require a large population

base, sophisticated technologies and laboratories, and specialty colleagues to be able to pursue their expertise. The average GP/FP may serve 1,500 to 2,000 people, the typical neurosurgeon requires a population base of about 100,000 people to achieve professional and economic equilibrium. When specialists are in oversupply, only at the margin will they migrate to smaller communities, and there is a population threshold below which it is not feasible for them to continue to pursue their activities. The wider practice breadth of GP/FPs permits greater flexibility in terms of locating to smaller areas.

While the absolute differences in Gini index values during the period first appear to be rather marginal, the relative change (a more important measure of distributional change) is, in most cases, fairly substantial. The increase in the index over the period for all physicians in the Northeast region from 0.343 to 0.370 and from 0.219 to 0.233 in the Central West region indicates distributional deteriorations (i.e., greater inequality) of 7.9 percent and 6.5 percent, respectively.

The Central West region of the province has the most even or equal distribution of GP/FPs, while the East region has the highest degree of concentration or inequality. A review of the Gini index values for specialists reveals, somewhat surprisingly, that the Northwest region has the most equitable distribution (Gini=0.147) while the East region once again contains the most concentration or inequality (Gini=0.545). These observations hold true for both 1993 and 1998. Four of the six planning regions in Ontario have experienced a deterioration in the distribution of physicians. By far the most significant deteriorations have occurred in the Northwest region where the concentration has increased by almost 8 percent overall, and by over 18 percent for specialists. Some improvements, driven by a more even distribution of specialists, were observed in the East and Northwest regions.

With the exception of the Central East region, which showed a small improvement, the distribution of GP/FPs has become more uneven or concentrated in all parts of Ontario. The evidence suggests that the various government policies aimed at addressing physician maldistribution, some of which were listed earlier, were not successful in reducing relative inequality over the period of study.

Physician Shortage Intensity

The results of applying the PSI methodology for GP/FPs are presented in Table 3. We assumed a threshold level GP-population ratio (MD_P_0) equal to 75 percent of the provincial average GP-population ratio (i.e., 25 percent lower than the provincial average).[8] Hence, communities with ratios below this value (i.e., 6.55 GPs per 10,000 population in 1993 and 6.47 GPs per 10,000 population in 1998) are deemed as undersupplied in terms of primary care physicians. The 25 percent gap or deviation from some benchmark, such as the provincial average, is the commonly accepted by both the government and the medical profession, measure in Ontario. It has been used in a number of programs, including new entrant fee discounts and the SRI program.

Referring to Table 3, we observe that the highest PSI index values are in the Northern regions. These regions have both a high incidence of communities with physician shortages and relatively severe shortage gaps. The lowest PSI values are recorded in the Central West part of the province.

Overall, there has been no appreciable change, neither an improvement nor worsening, in shortage intensity from 1993 to 1998 in Ontario. However, there has been significant change in some regions. The Central West region has experienced an increase in shortage intensity by about 6 percent. The increase was solely driven by a rise in the average shortage gap. In other words, the incidence of communities with a physician shortage remained constant (i.e., $\Delta \ln (PSR) = 0.0000$) between 1993 and 1998 while the average severity or degree of the shortages increased. During the same period, there was a noticeable improvement in the East region.

TABLE 3
Regional Decomposition of PSI Index

		PSI Index	*Decomposition of Level*			*Decomposition of Change*	
		(PSI)	*PSR*	*ASG*	*Δ ln(PSI)*	*Δ ln(PSR)*	*Δ ln(ASG)*
Ont.	1993	0.6283	0.7077	0.8878			
	1998	0.6268	0.7034	0.8911	- 0.0023	- 0.0061	0.0037
CE	1993	0.4788	0.6404	0.7478			
	1998	0.4884	0.6228	0.7842	0.0198	***- 0.0278***	***0.0476***
CW	1993	0.3925	0.5921	0.6630			
	1998	0.4167	0.5921	0.7038	***0.0597***	0.0000	***0.0597***
SW	1993	0.5955	0.6758	0.8811			
	1998	0.5937	0.6758	0.8785	- 0.0030	0.0000	- 0.0030
E	1993	0.6033	0.6750	0.8938			
	1998	0.5772	0.6500	0.8880	***- 0.0442***	***- 0.0377***	- 0.0065
NW	1993	0.8399	0.8413	0.9983			
	1998	0.8363	0.8492	0.9848	- 0.0042	0.0094	- 0.0136
NE	1993	0.7312	0.7739	0.9448			
	1998	0.7400	0.7839	0.9440	0.0121	0.0129	- 0.0008

Source: OPHRDC, Statistics Canada, and calculations by author.

The PSI index in the East region declined by about 4.4 percent. In this case the decline was driven primarily by a 3.8 percent decrease in the number of communities with a physician shortage (i.e., Δ ln (PSR) = -0.0377). There was also a slight decline in the average shortage gap in the East region. The Central East region experienced a 2 percent increase in the PSI index, the recorded 2.8 percent decline in the PSR was more than offset by the 4.8 percent increase (i.e., deterioration) in the ASG. Therefore, while the number of communities with a physician shortage declined, the severity or size of the shortages in these communities increased.

It is interesting to note that there was a deterioration in both the distribution and shortage intensity of physicians in the Central West region. However, this region had the lowest degree of maldistribution and shortage intensity to start with.

SUMMARY AND CONCLUDING REMARKS

The geographic distribution of physicians is the result of market forces and government intervention. Government interference in the establishment of practices on the part of independent physicians as described earlier is a recent development and has apparently had little meaningful impact on physician distribution or shortages thus far. Also, it appears that expansion in the supply of physicians did not do very much to remedy the situation either.

The Gini and PSI index-based analysis presented in this paper does not resolve questions concerning the optimal distribution of physician resources, nor the adequacy of total physician supply. Nevertheless, the analysis does suggest that provincial government policy initiatives

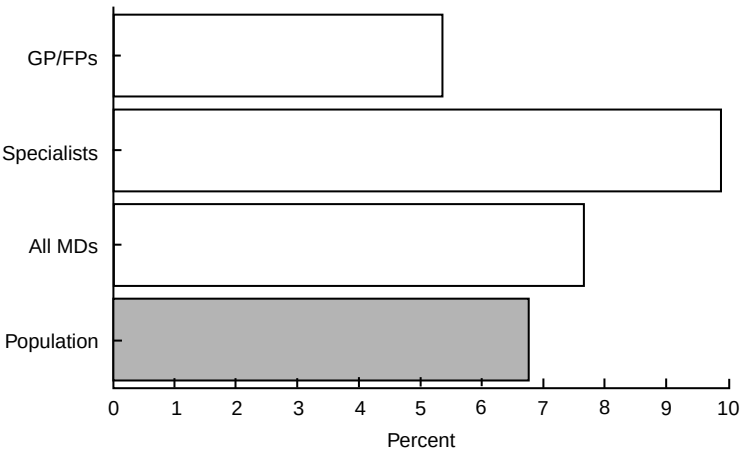
relating to medical workforce issues, specifically those aimed at addressing geographic maldistribution, have not been particularly effective. This is consistent with the findings presented by Chan (1999) and anecdotal evidence. Ontario is not alone in this respect as noted by Barer, Wood and Schneider who, after reviewing the international experience, stated that "the relatively ineffective record of this panoply of policies in reducing the geographic disparity of primary and secondary medical services, is sobering" (1999, p. 1). However, some may argue that while it may be true that the situation has not improved, without the plethora of government policies things would have been much worse.[9]

The results suggest that overall physician growth did not produce dividends for its geographic distribution or shortage intensity. Similarly, the results provide little support for the supply-side hypothesis posited by some that predicts increased uniformity in distribution with growth in physician supply exceeding population growth. Growth in physician supply and population are depicted in Figure 2. Combining this data with the overall Gini index results presented in Table 2, we find the opposite of what would be predicted by the supply hypothesis. This is particularly true for specialists where supply growth far exceeded population growth and where we nevertheless observe the largest deterioration in distribution.

The assessment and tracking of the distributional equality of physician supply and shortages via the application of summary measures such as the Gini and PSI indicies can assist policymakers in ensuring equitable access to medical services. In particular, we can attempt to answer the following questions:

One, is the ideal of equal (and equitable) treatment of all citizens, wherever they may live, being met in terms of access to these medical services (i.e., physicians)? Equitable access to these medical services is a public policy objective that is in line with the fundamental notions of universal medical insurance. While there is little agreement among health policy researchers on how to measure equity in the health sector, some have used equality of access as an operable definition of equity (Waters 2000). An

FIGURE 2
Ontario Physician Supply and Population Growth, 1993-1998 (Percentage Change)



indicator that has been used to measure equality in the distribution of access to health care is the Gini index.

Two, by what benchmarks should one assess the success or failure of provincial policies and programs in reducing the maldistribution of medical resources and physician shortages? What measures should be used? Measures such as the Gini index and the PSI permit policymakers to monitor, evaluate, and assess whether their physician distribution initiatives are achieving their intended objectives in relatively simple measurable terms.

Notes

The views expressed in this paper are strictly those of the author. No official endorsement by the Ontario Medical Association is intended or should be inferred. The author is grateful to Darrel Weinkauf, Douglas Hyatt, and two anonymous referees for providing helpful comments.

[1]The problem is often characterized as "geographic maldistribution of physicians," "inequitable access to primary care services," or "undersupplied areas."

[2]Also during the 1990s in Ontario there has been an expansion of non-fee-for-service payment schemes, such as Health Service Organization and Community Sponsored Contracts, which provide payment to physicians through capitation or salary. In fact, Ontario supports almost 30 incentive and education programs aimed at improving physician maldistribution and shortages.

[3]As noted by Kralj (1999), a grant of $10,000 in 1979 was equivalent to a 17 percent premium to average GP/FP OHIP billings (i.e., gross income). Today, this premium has been eroded to less than 6 percent. Analogously, accounting for inflation alone, the real value of $10,000 in 1979 has dropped to about $4,300.

[4]This view has been confirmed by the latest negotiated agreement between the Ontario Medical Association and the Ontario Ministry of Health and Long-Term Care, ratified in May 2000, which eliminated new entrant fee discounts effective 1 January 2000.

[5]This policy initiative has also been cited as a factor in encouraging the emigration of new graduates outside the province. Contributing to the brain drain of highly skilled professionals is a costly side-effect of a policy not achieving its set goals.

[6]This is a limitation of using physician-to-population ratios, since they implicitly assume that individuals are homogeneous and they fail to account for variation in demand/need and productivity across patients and physicians respectively. For a good discussion of issues related to the use of physician-to-population ratios (i.e., headcounts of patients and physicians) as well as the full-time equivalent (FTE) alternative measure the reader is referred to the National Ad Hoc Working Group on Physician Resource Planning (1995).

[7]It should be noted that CSD boundaries are not constructed specifically for use in health-care planning, CSDs often vary substantially in their shape, geographic area, and population density. As such, CSDs with the same physician-population ratio may have different access to medical services due to differences in these other characteristics.

[8]A threshold level 30 percent lower than the provincial average was also used. However, the results did not vary significantly from those using the 25 percent gap.

[9]The absence of a trend toward remediation of the baseline inequality does not necessarily mean the policies were ineffective. The policies may well have been effective in maintaining the baseline geographic distribution if the free-actor preferences of physicians over the time period were to concentrate further.

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