

The distribution of regulated physiotherapists in Ontario

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Abstract

Background: Regulated physiotherapists (PTs) in Ontario provide important services for rehabilitation, health and well-being across the continuum of care. The physiotherapy (PT) market contains substantial for-profit (FP) and not-for-profit (NFP) elements in both financing and delivery. Understanding the geographical distribution pattern of PT is important for planning for those services and for other health services with similar FP and NFP features.

The expected distribution of PTs by geographic region depends upon how these resources are viewed. A 'needs-based' distribution would be expected generally to be proportionate to the population. If physiotherapy acts like a specialist service requiring a critical mass, one would instead expect skewing of distribution toward those regions with academic health centres providing highly-specialized services; in that case, PTs should show a similar distribution pattern to specialist physicians. If these services draw patients across boundaries, there should be a lower density in regions immediately surrounding academic centres than in noncontiguous regions. Finally, if PT acts like a market good, one would expect that the distribution would be related to population growth and income, particularly for out-of-hospital services that rely on private financing.

Methodology: To document the distribution of the 4,731 regulated PTs in the College of Physiotherapists of Ontario's publicly-available database in October 2003, we coded for setting (hospital/non-hospital) and location (county). Further, we divided the counties into three categories: those with academic physiotherapy training programs, those contiguous with academic counties, and all other counties. Physician supply figures were obtained from the Ontario Physician Human Resources Data Centre.

Results: The ratio of regulated PTs to population differs across counties, rejecting the hypothesis of equal distribution. In contrast, counties with academic PT training programs have higher densities of regulated PTs than other counties, with the pattern of PT services is correlated with the distribution pattern of general and specialist physicians. However, counties contiguous with academic counties do not have a lower density than other counties. Population growth and median income are not correlated with PT density.

Conclusions: The distribution of PT human resources is complex, with wide variation of densities among counties. The presence of academic PT programs in a county means a higher density of PTs than in all other counties. The lack of correlation between population growth and median income suggests that at this point in time, market forces do not explain the variance although full analysis would require individual-level data. However, since there is evidence of a shift away from the provision of PT services in not-for-profit hospitals, the pattern of PT distribution warrants careful attention to see if market forces do start to be influential, with possible effects on patient access.

Introduction

An understanding of the distribution of physiotherapy (PT) services in Ontario may have implications for future human resource planning for PT and rehabilitation but also for other health services with similar market structures. The PT market has significant participation of not-for-profit (NFP) and for-profit (FP) organizations; a considerable amount of PT is still delivered through private NFP hospitals. Private, quasi-public and public insurers, as well as clients, pay for PT services on different fee schedules. Accordingly, as greater involvement of private financing and delivery in health care occurs, the PT market may provide some important information about patterns of access and cost that emerge from mixed public and private financing and delivery.

Projections have been made about the distribution of physiotherapists (PTs) with an indicated interest in treating people with arthritis (Badley & Glazier, 2004), but no information exists that provides detailed information about access to, and cost of, PT services. Further, Landry (2005) showed a trend of moving PT services out of publicly-funded hospitals to the community. However, aside from these, little is known about the distribution of PTs across Ontario even though they provide important services for Ontarians' rehabilitation and well-being (Landry 2004, Canadian Alliance of Physiotherapy Regulators and the Canadian Physiotherapy Association 2002).

The expected distribution of PTs across Ontario depends upon how these resources are viewed. A 'needs-based' distribution would be generally proportionate to the population. If PT acts like a specialist service requiring a critical mass for viability in a local market, one would expect skewing of distribution of supply toward larger markets with academic health centres which provide highly-specialized services (Newhouse, Williams, Bennett & Schwartz, 1982; Chan, 1999). In that case, PTs should show a similar distribution pattern to specialist physicians. Further, academic centres may have a reach into neighbouring counties to the extent that the neighbouring counties have a lower density than both the academic centres' counties and all non-neighbouring counties (Rosenthal, Zaslavsky & Newhouse, 2003). If PT services act like a market good, one would expect that the distribution would be related to the wealth of a market and its expansion or contraction, particularly for out-of-hospital services that rely on private financing.

Our objective was to conduct a preliminary review of the distribution of PTs across Ontario. First we wanted to identify the basic distribution pattern. Next we wanted to see whether the presence of medical schools and entry-level or postgraduate programs in PT affects the distribution of PT services, and whether the pattern of PT services is similar to either general or specialist physicians. Third, we wanted to examine the relationship between wealth and growth of communities and the distribution of PT human resources.

Methods

It is not possible to get a complete data set from any one payer providing the range and location of deliverers of PT services in Ontario or the level of service PTs provide or to whom. The only existing source for a comprehensive list of providers is the College of Physiotherapists of Ontario (CPO), which has the statutory mandate to regulate the practice of physiotherapy in Ontario. However, it is important to note that the CPO

regulates only the practice of those practitioners who wish to market themselves as physiotherapists. There is no law that prohibits the provision of PT services in Ontario by unregulated practitioners; they are simply prohibited from calling themselves “physiotherapists”. Consequently, though use of data from the CPO will give an insight into the *physiotherapist* market in Ontario, there quite possibly is a broader range of practitioners filling gaps or niches, or supplementing the regulated supply of services in the province, in a broader *physiotherapy* market.

On its website, the College of Physiotherapists of Ontario maintains a comprehensive listing of physiotherapists in active practice, including the address of their primary, secondary and other workplaces. The information is derived from the mandatory annual registration filing by all regulated physiotherapists to keep their licensing current. The list of 4,731 active physiotherapists on the website on October 4, 2003, was coded for workplace county, based on reported workplace postal codes. For the purposes of our study, “county” was defined as including the several ‘upper tier municipality’ configurations in Ontario, for example, cities, districts, regional municipalities, united counties and counties. We have used 49 upper tier municipalities that constitute Statistics Canada Census Divisions.

We divided the counties into three categories: those with academic physiotherapy training programs in them (“academic counties”), those contiguous with academic counties (“contiguous counties”), and “all other counties.”¹

We coded PTs indicating a hospital workplace as working in that hospital unless there was information that showed that the provision of services within these institutions was by a FP provider on a contracted-out basis. In this latter case as for all other PTs indicating workplaces outside hospitals, we coded them as having “non-hospital” workplaces.

The publicly-available CPO database does not contain information about the hours that each PT works, including the proportion of time each spends in multiple workplaces. Accordingly, for the purposes of this initial study, we assumed that each PT worked full time. Of the 4,731 physiotherapists on the CPO website database, 4,110 (86.9%) reported only one workplace address. When a PT reported more than one workplace, his or her availability for active work in two settings was arbitrarily established as 50% in each, as 33.33% where there were three settings, and so on. We recognize that the active employment pattern most certainly does not conform to these arbitrary assignments, but this is a reasonable first estimate of the potential call on physiotherapists’ time and effort for the purposes of this study.

The numbers of physicians, both specialist and general, for each county, were drawn from a report of data from the Ontario Physician Human Resources Data Centre’s Active Physician Registry, December 31, 2003 (Ontario Physician Human Resource Data Centre, 2004). The population of each county was obtained from 2004 Statistics Canada post-censal estimates for 2003; population change data for the period 1996 to 2001 and

county-level median income data were drawn from Statistics Canada 2001 Community Profiles for the relevant Census Divisions.

A density measure (number of active health professionals per 10,000 population) was calculated for each county for both PTs and specialist and general physicians.

Results

The all-Ontario all-PT density is 3.86 active PTs per 10,000 residents. Fifteen counties have densities at or above this level and 34 have lower densities. Hospital PTs constitute 43.1% of the total of all PTs. The all-Ontario hospital PT density is 1.68 PTs per 10,000 residents, with 15 counties above and 34 below this density. The non-hospital PT density across Ontario is 2.18, with 17 counties above this level and 32 below.

Are PTs distributed proportionate to the population?

The absolute number of PTs in a county is related to population. The most-populated county, Toronto, had the most active PTs, 1,258 for its 2,612,576 residents, and the least-populated county, Manitoulin, had the smallest number of active PTs, 2, for its 13,242 residents. But there is considerable variation among counties when the PT density (number of PTs per 10,000 population) is considered. Table 1 describes the data that emerged from the county-by-county analysis.

TABLE 1 – Characteristics of the county-by-county distribution of PTs

	Mean	Standard deviation	Minimum	Maximum
All-PT density	3.26	1.33	0.85	7.00
Hospital PT density	1.50	0.80	0.43	4.26
Non-hospital density	1.76	0.90	0	3.70

The range of densities of PTs across the counties illustrates clearly that the distribution of PTs across the province is not uniformly proportionate to population. Accordingly, we reject the hypothesis that the PTs are distributed proportionate to population at the county level.

The effect of academic centres

Six counties stand out with the greatest density of active PTs per 10,000 residents: Frontenac (7.00), Ottawa (6.28), Middlesex (5.46), Thunder Bay (5.30), Hamilton (5.28) and Toronto (4.81). Of these, only Thunder Bay does not have a medical school and an academic centre with an entry-level or postgraduate program in PT, but Hamilton's McMaster University's "northern stream" PT program in collaboration with Lakehead University allows McMaster PT students to have their clinical education placements in the Thunder Bay area.

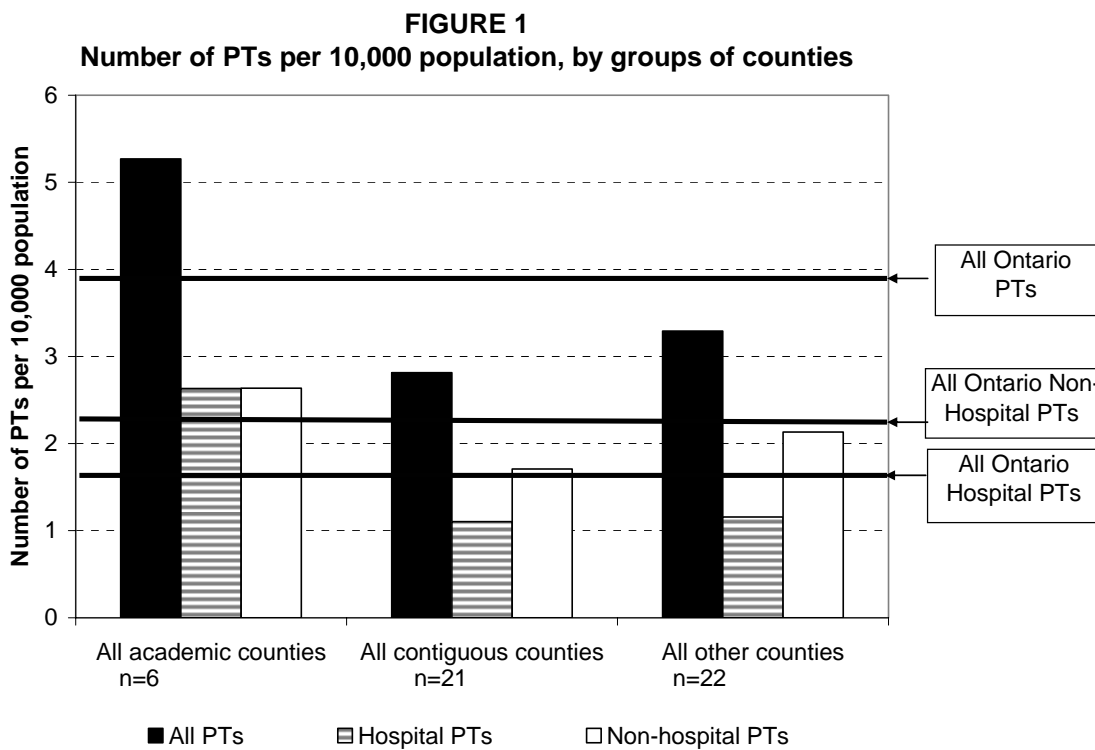
If the populations and all-PT counts in these six counties with medical schools and/or academic PT programs are consolidated, they together have a density of 5.27 PTs per

10,000 population, serving a population of 4,686,760. By way of contrast, consolidating all the other counties results in a density of 2.99 PTs per 10,000 population, serving a population of 7,569,885.

Furthermore, the density of hospital PTs is fairly consistent across these counties, though higher in Frontenac: Frontenac (4.26), Ottawa (2.58), Middlesex (2.86), Thunder Bay (2.57), Hamilton (2.48), and Toronto (2.55). This suggests that similar approaches to PT staffing in hospitals in these counties have been made.

It appears that the hypothesis that there is a relationship of the location of PT academic training centres in a county and a higher density of PTs is supported.

To investigate the hypothesis that counties adjacent to counties with academic centres would have lower density than all counties, we considered the PT density in each of these groups. The results are shown in Figure 1; bars have been added to indicate the provincial, “all-Ontario”, averages.



Clearly, the counties with academic centres are relatively well served by PTs. The density of all PTs in the contiguous and other counties is lower than the academic counties. The same holds for non-hospital PTs. From these data, it appears that hospital PTs are slightly less prevalent in contiguous counties (1.10 PTs per 10,000 population) than all other counties (1.16), but much less prevalent than in the academic counties taken together (2.63).

We then tested the strength of the differences among the three types of counties using a one-way ANOVA with one between-subjects factor. The results are in Table 2. Using Tukey’s HSD test, we found that there was a statistically significant difference between all-PT densities in the academic counties on the one hand and both the contiguous counties and other counties on the other hand ($p < 0.0001$). However, there were no significant differences between the PT densities in the contiguous counties and the other counties. The results held for both hospital and non-hospital PT densities.

Table 2 – ANOVA results

	All-PT density	Hospital PT density	Non- hospital PT density
Academic counties	5.69	2.89	2.80
Contiguous counties	2.93	1.38	1.69
Other counties	2.92	1.24	1.54
R ²	0.47	0.44	0.20
F	20.65	17.94	5.66
P	<.0001	<.0001	0.01

With these results, we rejected the hypothesis that there would be lower density in the contiguous counties than in other counties.

Potential lessons from the distribution of other health professionals

We next compared PT densities to the densities of general (Figure 2) and specialist (Figure 3) physicians.

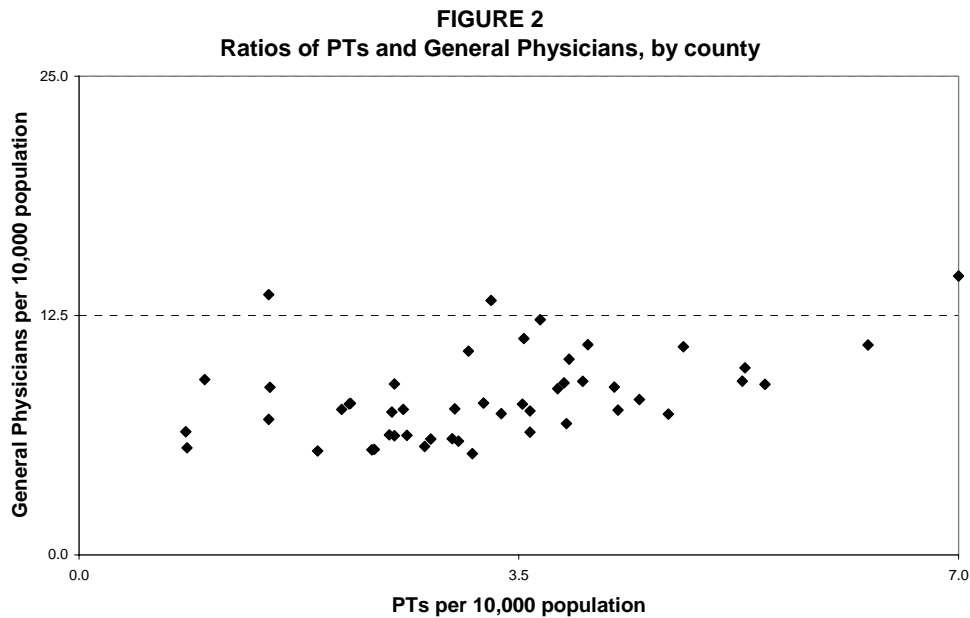
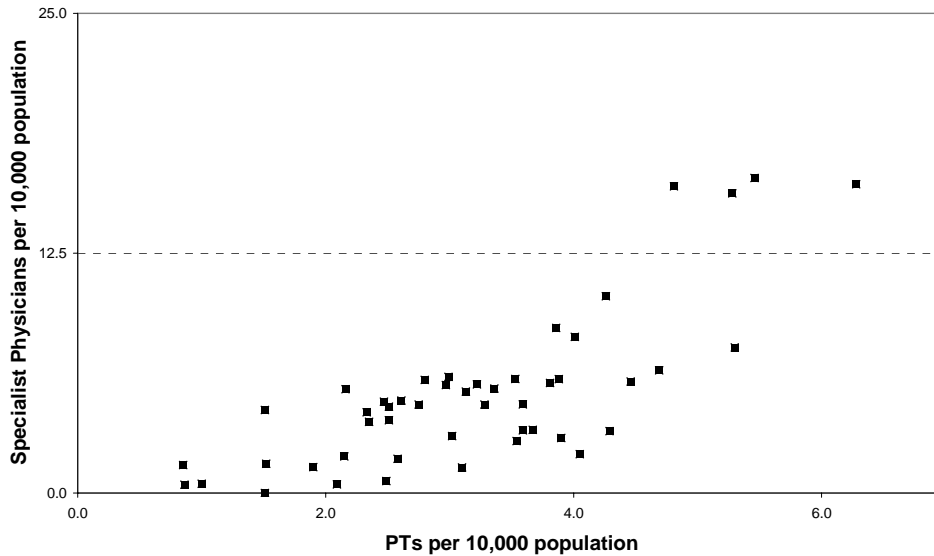


FIGURE 3
Ratios of PTs and Specialist Physicians, by county



We also computed Pearson correlation coefficients between density of physicians and of PTs. All-PT density is moderately correlated with density of general physicians ($r=0.45$, $p=0.0011$) and strongly correlated with specialist physicians ($r=0.81$, $p<.0001$). Breaking this down, the findings result from correlations between hospital PT density with general physician density ($r=0.64$, $p<.0001$) and with specialist physician density ($r=0.62$, $p<.0001$) and non-hospital PT density with specialist physicians ($r=0.65$, $p<.0001$). In contrast, there is no correlation of non-hospital PT density with general physician density ($r=0.1$, $p=0.4741$). This suggests that the PT distribution pattern, whether in hospitals or out of them, most closely resembles specialist physicians.

We concluded that though generally there was significant correlation between physician density (especially specialists) and PT density, there are factors in the case of PTs' location decisions other than those that influence physicians' location decisions. PT largely acts like a specialty service.

Population change and wealth

We then investigated the role that population change over the period 1996-2001 and wealth (as measured by median income) might play in influencing supply of PT services, county by county.

If market forces were determining PTs' location decisions, one could expect that the greater the population increase in a county-level market in a five-year period slightly before the date we measured density (October 2003), the more likely PTs outside the private not-for-profit hospitals would enter it before the hospitals responded to the opportunities inherent in market growth. Similarly, one could expect that non-hospital, for-profit PT entrepreneurs would be less likely to enter a shrinking market. One would also expect that the higher the median income in a county was, the greater presence there

would be of PTs in non-hospital, for-profit settings, able to charge patients (or their insurers) for the cost of treatment.

We calculated Pearson correlation coefficients, and found no significant correlations between either population change or income and all-PT density and non-hospital PT densities (see Table 3).

TABLE 3 – Correlation of PT densities and county population change and median income

	All-PT Density	p	Non- hospital PT density	P
County population change 1993-2003	-0.05	0.7505	0.15	0.2894
County median income 2003	0.23	0.1129	0.34	0.0164

Consequently, we rejected the hypothesis that the distribution of PTs was being affected by county-level market forces.

Conclusions

Of our three major hypotheses, the one that is supported empirically is the relationship between academic centres and a higher density of PTs. This is similar to patterns observed in relation to other health professionals. However, we did not find that contiguous counties had a lower density than other counties. With respect to the relationship of PT density and physician density, we found moderate correlations, and so the reasons underlying the geographical distribution of physicians (especially specialists) are likely have some relevance to the understanding of the distribution of PTs.

We did not find that PT was distributed proportionately with population. Nor did we find any general correlation between PT density and either county population growth or median income. This appears to suggest that the general distribution of PTs has not been driven to date by market-related factors. However, the existing distribution pattern may have strongly influenced by the substantial proportion of employment of PTs by publicly-financed hospitals. The public financing of these hospitals would tend to neutralize any possible effect of differential population growth or income on overall PT supply across counties.

However, Landry (2005) reported that there is a trend toward less public financing of PT in not-for-profit hospitals and more private financing in for-profit clinics. If this trend continues, population growth and wealth of counties may affect location decisions for for-profit clinics in the future as they have for-profit health care operations in other jurisdictions (Norton & Staiger, 1994). The pattern of PT distribution warrants careful attention to see if market forces do start to be influential, with possible effects on patient access.

Next steps

In addition to assessing the changing mix of public and private financing and delivery on the distribution of PTs, there are additional considerations for future work that are highlighted by this initial effort to document the distribution pattern of PTs across Ontario.

1. This study disregards the potential contribution of the unregulated part of the PT market to supply. In some low-density counties, for example, the demand for PT services may be being met in part by unregulated providers.
2. Demand-side variations among counties, including differences in disease and illness rates and health status, may explain in part the distribution of PTs.
3. Median income may not be a good measure of wealth, especially when some good portion of PT treatment is paid by health insurance. Insurance coverage measures, to the extent they may be available, may be more appropriate.
4. The production of the PT supply in each county may vary. For example, in one county, there may be a greater emphasis on paediatric care or sports medicine than in another, with sub-populations in each county facing different density issues.
5. Before examining issues of patient access to services, it is necessary to consider individual-level data.

We have a survey underway in 12 Ontario counties of PT organizations (including clinics, hospitals and industrial settings employing regulated physiotherapists and unregulated therapists) to clarify their ownership structure, the services they offer, their client mix (including the mix of payers for the services to clients) and the skill mix of their employees. This further data, combined with additional county-level demographic information, is expected to offer more insight into the distribution of therapists providing PT services across Ontario.

End Notes

¹ The allocation of the counties to the three groups was as follows:

Academic counties: Ottawa, Frontenac, Toronto, Hamilton, Middlesex, Thunder Bay

Contiguous counties: Brant, Halton, Niagara (Hamilton); Lanark, Prescott and Russell, Renfrew, Stormont, Glengarry, Dundas (Ottawa); Leeds and Grenville, Lennox and Addington (Frontenac); Algoma, Kenora, Rainy River (Thunder Bay); Durham, Peel, York (Toronto); Chatham-Kent, Elgin, Huron, Lambton, Oxford, Perth (Middlesex).

Other counties: Bruce, Cochrane, Dufferin, Essex, Greater Sudbury, Grey, Haldimand-Norfolk, Haliburton, Hastings, Kawartha, Manitoulin, Muskoka, Nipissing, Northumberland, Parry Sound, Peterborough, Prince Edward, Simcoe, Sudbury District, Timiskaming, Waterloo, Wellington

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