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PERSPECTIVES

EFFICIENCY AT THE HEART OF THE QUEBEC HEALTH CARE SYSTEM

Yes, family doctors do move to remote areas Here's how

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Our provincial healthcare system promises universal and free access, but the distribution of general practitioners makes access to that healthcare unequal. We know that not having timely access to appropriate care can lead to severe health problems, particularly for those more vulnerable. In 1975, the Quebec government introduced incentives that aimed to influence general practitioners on their choice of where to practice. A CIRANO study (Fortin et al., 2025) reveals that the measures introduced, which tried to draw family doctors away from Montreal toward remote areas, appear to have achieved their desired outcome. This is particularly important given that people living in remote or isolated regions often have higher healthcare needs and live further from hospital centres than the general public.

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Under the provincial healthcare plan, general practitioners receive different rates of remuneration depending on the region in which they practise. In 2024, a GP in Rimouski received 120% of the regular rate if working in a health facility and 115% if working in an office. In isolated regions such as Northern Quebec, the premium was even higher, at 130% of the basic fee for those who work in a facility and 120% for an office. On the other hand, if that same GP practised in Montreal, Quebec City or Sherbrooke, the regular rate (100%) would apply.

Government incentives and penalties for GPs were first introduced in 1975

Having a different compensation depending on the region of practice is not a new concept. This measure was added to a bursary package, first introduced in 1975, for medical students who agreed to settle in regions far from major centres. At the time, there were significant territorial imbalances. Quebec, overall, saw 55 family doctors per 100,000 population, but in remote and isolated regions that number was only 47. In the university regions of Montreal, Quebec City and Estrie, the ratio was a much higher figure: 69 per 100,000 population.

The 1975 bursary program was unable to correct those imbalances, so, in 1981, the government introduced differential compensation by region. It would either increase or decrease pay depending on the region where new doctors spent the first three years of their practice. A progressive structure followed, with a specific rate applied to years 4 to 6, another for years 7 to 19, and then a new rate was set starting at the 20 years of practice. The details of these and subsequent measures are discussed in Touati and Turgeon (2013). Initially tailored to new doctors, the increased rates in remote areas were extended to all general practitioners from 1985 onwards, regardless of their number of years in practice. A 70% reduction in fees for those practising in the university regions, which was introduced in 1981, was eliminated in 2004.

Additional incentives have been added to encourage new doctors to settle in regions where there is a shortage and to encourage those already established to stay. They include relocation, remote living and retention bonuses. Additionally, in 1986 the government introduced contractual-bursaries for the two years of family medicine residency. These contractual-bursaries were linked to an obligation to practise in the regions for two years, as well as a penalty if the agreement was not respected. The measure was abolished a few years later, but remained in place for immigrant doctors, whose mandatory training period would give them the right to practise in Quebec.

In light of the incentives not improving geographic equity, in 1996, the government introduced coercive measures. In 1996, the government has ruled that in university regions the reduction in the number of GPs through attrition would only be partially offset.

In 2004, the ministère de la Santé et des Services sociaux (MSSS), the province's health and social services ministry, and the Fédération des médecins omnipraticiens du Québec (FMOQ), Quebec's federation of family doctors, reached an agreement to introduce regional medical workforce plans, called *Plans régionaux d'effectifs médicaux* (PREM). Under the PREMs, any newly licensed general practitioner hoping to set up a practice would have to first obtain a compliance notice from the Département régional de médecine générale (DRMG), the regional authority for general practice, to work in that

region. If not, he or she would face a harsh penalty, namely a 30% reduction in the fees. A compliance notice can only be delivered if the PREM's target has not been met.

By 2015, the PREMs became more restrictive. Doctors could no longer avoid the 30% penalty by working in a hospital rather than an office or at home, and the penalty would apply to all income that the doctor billed to the province's public health insurance body, the Régie de l'assurance-maladie du Québec (RAMQ). In addition, physicians who obtain a compliance notice have to then make sure that 55% of their billing is for work done within a sub-region rather than the wider health region, as was the case before 2015.

University regions are: Montreal, Capitale-Nationale and Estrie

Peripheral regions are: Chaudière-Appalaches, Laval, Lanaudière, Laurentides and Montérégie

Intermediary regions are: Saguenay-Lac-Saint-Jean, Mauricie-Centre-du-Québec and Outaouais

Remote regions are: Bas-Saint-Laurent, Abitibi-Témiscamingue, Côte-Nord and Gaspésie-Îles-de-la-Madeleine

Isolated regions are: Nord-du-Québec, Nunavik and Terres-cries-de-la-Baie-James

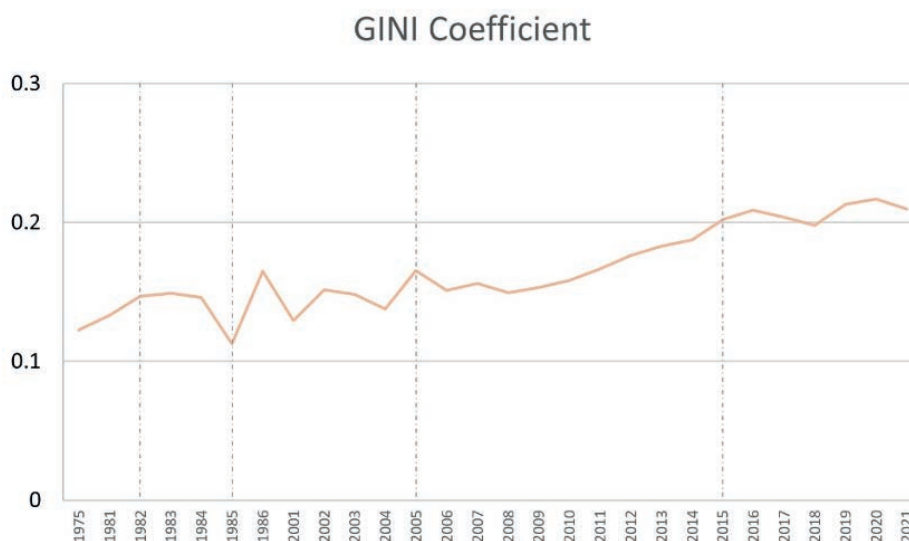
Geographic disparities increased between 1975 and 2021...

At the provincial level, the number of GPs rose from 55 doctors per 100,000 population in 1975 to 132 doctors per 100,000 population in 2021, an increase of 140%. This result may seem surprising, given that one person in four, or around 2.1 million people, does not have a family doctor, with the situation not improving (INESSS, 2024). This can be explained by a number of factors, including the high proportion of hours that GPs spend in emergency departments, a reduction in the number of hours that male GPs work in a year and the higher number of women in the profession who, on average, work fewer hours than their male counterparts.

The regional distribution of GPs has changed significantly over that period. Indicators of inequality in this distribution, such as the Gini index, can be used to illustrate these changes. The Gini index takes a value between 0 and 1, where 0 reflects perfect equality in the geographical distribution of doctors and 1 reflects perfect inequality, which means that 100,000 residents have access to all family doctors in Quebec and all other residents have no access to any family doctor. The years 1975 to 2003 had periods of highs and lows with regard to inequalities in the geographical distribution of family doctors, but the numbers remained fairly stable. However, from 2005 onwards, the inequality has again trended upward, particularly around 2015. Since then, the Gini index has stabilized, showing a slight increase heading into 2021.

... and this is a good thing

Increases in regional inequalities can be partly attributed to the smaller increase in the number of family doctors per 100,000 population in the university regions, compared to those in the peripheral, intermediate, remote and isolated regions. In university regions, the number of family doctors per 100,000 population rose from 69 in 1975 to 146 in 2021 (an increase of 111%), a relatively small increase compared to the other regions. The numbers in peripheral regions rose from 44 to 109 (an increase of 147%), in intermediate regions from 45 to 132 (an increase of 193%) and in remote and isolated regions from 47 to 191 (an increase of 306%). This turnaround can be attributed in part to higher demographic growth in these regions. It may also be the result of government measures. This is what we are seeking to determine in our study.



Geographical inequality index for family doctors in Quebec

Source: Authors' calculations based on CIHI and ISQ data

Note: The index is based on the ratio of the number of family doctors per 100,000 inhabitants.

Access to unpublished data on about *all* new family doctors who began practising between 1975 and 2021

A number of factors can influence where a doctor chooses to practice: Being close to the doctor's personal network or the institution where they earned their degree, near the best hospitals, having a high per capita number of specialists and nurses and a better-educated population, a place where people speak the same mother tongue as the doctor or offers an interesting cultural life will all help make a place feel more attractive. Regions with better employment opportunities for spouses and better schools may also fare better at attracting doctors who are deciding on where to practise (Bolduc *et al.*, 1996; Holmes, 2005; Kulka and McWeeny, 2019; Costa *et al.*, 2024).

We have managed to access an unpublished set of highly detailed data containing information on *all* new family doctors who began practising between 1975 and 2021 in Quebec. These are general practitioners certified by the College of Family Physicians of Canada (CFPC). The microdata on the 18,290 new family doctors over the entire period come from the Canadian Institute for Health Information (CIHI) and does not include semi-retirees, physicians on parental leave and residents.

We also have information on the personal characteristics of each physician: university where they graduated as a family physician and year of graduation; year and location of where they first practiced, as well as where and when they subsequently practiced; gender; age (in 5-year cohorts); mother tongue; and the country where they obtained their degree (if outside Canada). We obtained data for each of the 18 health regions on regional characteristics that are relevant to the physician's decision-making: the number of general practitioners per 100,000 population and the number of specialists per 100,000 population, the number of residents, the median income for that region, as well as regional trend variables that may have led the new physician to choose one region over another.

Detailed information on existing measures in each of Quebec's 18 health regions each year

We were interested in the causal effect of three measures: differential compensation by region, family medicine bursaries, including contractual bursaries, and PREMs (the regional medical workforce plans). Detailed data from the MSSS and the Collège des médecins du Québec, the province's professional order of physicians, allowed us to gather key information for each of the three measures in all of Quebec's 18 health regions.

The **differential compensation by region** derives from RAMQ regulations, which apply to the regions where the doctor has set up for their first year of practice. The compensation is essentially the average fee for medical procedures in each region, taken as a net dollar figure, using the doctor's marginal income tax rate.

Where applicable, the **bursary** (or non-working income) is calculated as the maximum amount of money the doctor is entitled to as a student or resident if he or she agrees to practise in a remote or isolated region during a given year. This amount includes a relocation bonus. Non-working income takes into account the progressivity of the income tax system but does not factor in the physician's savings or other savings, since we have no information on that.

Finally, the effect of the **PREMs** is captured by a series of post-2004 indicators, the year in which this measure was introduced. It is important to note that, with the PREMs, any new family doctor wishing to change health regions must obtain a compliance notice to practise there. Each indicator is specific to the region where the practice is located and is defined in relation to the region of Montreal, with Montreal as the reference region. The goal with that is to take into account the average impact of the PREMs, from 2004 onwards, on the probability of new doctors choosing their place of practice rather than in Montreal. Other series of indicators are constructed for the pre-2015 and post-2015 periods, 2015 being the year in which the PREMs were made more restrictive.

Empirical strategy

To estimate the impacts of the incentives, we estimated a mixed logit model, which assumes that, under various constraints, physicians will maximize their well-being when choosing a region where they will be setting up their practice (Bolduc *et al.*, 1996). The optimal location depends on the region’s attributes—incentives and coercive measures as they apply to the region, regional fixed effects, number of physicians per 100,000 population, trend variables—as well as the characteristics of the physician—distance of the region from the university of graduation, gender, age, mother tongue and whether or not the physician has a degree from outside Quebec. The mixed logit model also takes into account the fact that doctors’ preferences may vary according to unobservable characteristics.

Six micro-econometric models were estimated, which differ according to the statistical restrictions imposed on the post-2004 and post-2015 regional indicator variables. We present here the results of the least restrictive model, which allows all the coefficients of the post-2004 and post-2015 regional indicator variables to be non-zero and does not impose any equality constraints between the coefficients of remote and isolated regions. This is a model with five fixed effects for the groupings of regions: university regions excluding Montreal, peripheral regions, intermediate regions, remote regions and isolated regions, with Montreal as the reference region. Given the random nature of our model, we obtain a vector of the probability of settling in one or other of the regions.

The measures to attract family doctors to the regions appear to have worked

The goal of the measures put in place by the Quebec government was to attract new family doctors to remote and isolated regions. We do see that the

proportion of new doctors practising in university regions fell considerably between 1975 and 2021, from 54% to 34%. This decline was most striking after 2004, the year in which PREMs were introduced. From 2015 onwards, the year in which the PREMs became more restrictive, another significant decline in the proportion of new family doctors in university regions occurred.

	University regions	Peripheral regions	Intermediary regions	Remote regions	Isolated regions	Remote and Isolated regions
1975	53.98	25.34	12.32	7.87	0.50	8.37
1985	47.76	26.31	12.69	11.75	1.49	13.25
1995	50.95	19.39	13.31	15.21	1.14	16.35
2005	46.64	22.69	17.65	11.34	1.68	13.03
2015	33.82	35.27	15.46	13.04	2.42	15.46
2021	33.77	36.55	15.96	12.43	1.30	13.73

Annual distribution of new family doctors in Quebec (as a percentage)

Source: Authors’ calculations based on CIHI and ISQ data.

These are only descriptive statistics. It is important that one not attribute the changes observed in the distribution of new family doctors simply to the introduction of the PREMs—or to other measures for that matter. Further in-depth statistical analyses are needed. The results of these analyses are presented in the following two tables.

When we isolate the impact of each of the measures and take control variables into account, we find that the measures implemented did help attract new family doctors to regions outside Montreal. If we look at the impact of the differential compensation by region, the

elasticities calculated at the sample average are positive and significant at the 5% level for all regions. The elasticity increases with distance but decreases in isolated regions. In university regions, the elasticity of different pay is 0.190 and reaches 0.393 in remote regions. This means that in university regions, a 10% increase in the marginal fee for medical procedures, based on the principle of differential compensation by region, increases the probability of moving there by 1.90%. Conversely, a 10% increase in the marginal fee in a remote region increases the probability of a doctor practising there by 3.93%.

	Differential compensation by region		Bursaries	
	Elasticity at the sample average	p-value	Elasticity at the sample average	p-value
University	0.190	p<0.05	0.026	p<0.01
Peripheral	0.296	p<0.05	0.040	p<0.01
Intermediary	0.373	p<0.05	0.039	p<0.01
Remote	0.393	p<0.05	1.047	p<0.01
Isolated	0.153	p<0.05	0.358	p<0.01

Estimated effects of differential compensation and bursaries on the probability of practising in the region

Source: Data from CIHI, MSSS and Collège des médecins du Québec

Let us consider two examples of how we can interpret these results. As mentioned earlier, under the current parameters, GPs practising in a remote region—Rimouski, for example—receives 120% of the basic public health insurance fee if working in a health facility. If the rate increased to 150% rather than 120% (equivalent to a 25% increase in the marginal rate), then the probability of them setting up practice in a remote region would increase by 9.8% (0.25×0.393), based on our elasticity estimates. Knowing that 12.43% of doctors settled in remote regions in 2021, a 150% increase in remote regions would increase the proportion of new doctors in remote regions from 12.43% to 13.70%, or from 67 to 74 new doctors. Elasticity is weakest for isolated regions: a 10% increase in the marginal rate in an isolated region increases the probability that a doctor will set up practice in one of these regions by only 1.53%. The impact is too small to attract new doctors.

The regional elasticities of non-working income, including bursaries and accounting for the progressivity of income taxes, are also positive for all regions and significant at 1%. The elasticity is lowest in university regions (0.026) and highest in remote regions (1.047). Our estimates suggest that a 10% increase in bursaries in remote regions would have the effect of increasing by 10.08% the probability that a new family physician would practise in one of these regions. The same 10% increase in grants in isolated regions would have the effect of increasing by 3.58% the probability of a new family physician practising in one of these regions.

How should these results be interpreted? To put it in context, a physician practising in a remote region can receive \$20,000 a year for two years of clinical rotations and two years of internships, for a four-year total bursary of \$80,000. In 2021, there were 67 new general practitioners in remote regions. Knowing that a 10%

increase in non-working income increases the probability of practising in a remote region by 10.05%, it would have cost \$81,137 annually, or \$1,137 more than the initial \$80,000 bursary, to attract a new GP to practise there for four years.

The last table presents our estimation results concerning the impact of the PREMs, reported as semi-elasticities calculated at the sample average. The 2004 introduction of PREMs resulted in an 85% increase in the probability of a new family doctor practising in peripheral regions rather than Montreal. The probability of practising in intermediate regions rather than Montreal increased by 65.9%. On the other hand, the 2004 PREMs had the effect

of reducing by 18.4% the probability of a new family doctor practising in isolated regions.

The more restrictive PREMs in force after 2015 had the effect of increasing by 5% the probability that a new doctor would practise in university regions other than Montreal. The impact on peripheral and intermediate regions is considerable: the post-2015 PREMs have had the effect of increasing by 63.7% the probability that a new doctor will practise in peripheral regions and by 112% the probability that a new doctor will practise in intermediate regions. On the other hand, the impact on remote and isolated regions has been negative.

	post-2004 PREM		post-2015 PREM	
	Semi-elasticity at the sample average	p-value	Semi-elasticity at the sample average	p-value
<i>University other than Montreal</i>	0.000	p>0.10	0.052	p<0.05
<i>Peripheral</i>	0.850	p<0.01	0.637	p<0.01
<i>Intermediary</i>	0.659	p<0.01	1.119	p<0.01
<i>Remote</i>	0.181	p>0.10	-0.074	p>0.10
<i>Isolated</i>	-0.184	p<0.01	-0.094	p<0.05

Estimated effects of PREMs on the probability of practising in the region

Source: Data from CIHI, MSSS and Collège des médecins du Québec

The effects of other factors likely to influence a doctor's choice of a region of practice are qualitatively as expected. The further the region is from the doctor's training faculty, the less likely he or she will be to practise in that region. The establishment of off-site campuses in the regions could therefore be a major factor in attracting doctors. Furthermore, a high number of doctors per 100,000 population in a region increases the likelihood that a new family doctor will decide to set up practice there. New family doctors who have trained

outside Quebec have a strong tendency to practise in Montreal rather than elsewhere in Quebec. This is also the case for new non-French-speaking family doctors. Young family doctors are more likely to practise outside of Montreal, particularly in remote and isolated areas. Male family doctors are more likely than their female counterparts to practise in intermediate and remote regions. The increased proportion of women in medical schools could thus have an impact on the effectiveness of the incentives.

Attracting family doctors to the regions is possible. But beware of unintended consequences

The measures implemented by the government have made it possible to attract new family doctors to regions outside of Montreal. However, they are only a means to an end in terms of improving health outcomes for the population. It is important for future studies to assess the measures' impacts on access to health services and

health outcomes. Examining the cost effectiveness of these measures is also important. We may also see some undesirable effects. Certain measures that impose constraints on GPs wishing to practise in university regions could make family medicine less attractive than other specialties, or encourage new doctors to go into private practice. Also, given the financial advantages that practising in remote areas offers, it could encourage those doctors to reduce their working hours. It will be important to document these phenomena and take them into account when developing future policies.

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