Canadian Medical Education Journal

Scientific Reports

Fulfilling a social mission: examining practice locations of residency graduates over two decades

Poursuivre une mission sociale : analyse des lieux de pratique des diplômés de programmes de résidence sur deux décennies

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Published ahead of issue: Jul 30, 2025; published: Sept 10, 2025. CMEJ 2025, 16(4) Available at https://doi.org/10.36834/cmej.81307

Abstract

Background: Medical schools play a critical role in shaping the physician workforce. Tracking the practice locations of medical graduates is essential for addressing healthcare disparities and workforce shortages in underserved regions. This study examines the geographic distribution of residency graduates from a Canadian francophone university, aligning their practice locations with the university's social accountability mandate.

Methods: A cross-sectional descriptive study was conducted using data from the Canadian Post-M.D. Education Registry (CAPER) for 2,410 residency graduates (2000-2020) from 35 residency training programs. We analyzed practice locations at two-, five-, and 10-years post-graduation across medical specialties, sex, and geographic region, with a focus on Quebec's administrative health regions.

Results: There were 2,410 graduates from 35 residency training programs. Family medicine accounted for 57.8% of all graduates and 42.2% were from all other specialties. Most graduates (77.7%) practiced in the province of Quebec, with concentrations in the regions of the Eastern Townships (19.4%), Montérégie (14.6%), and Saguenay-Lac-St-Jean (7.6%).

Conclusion: This study demonstrates the important regional impact of the university's role in training family physicians and addressing healthcare needs in Quebec. The findings suggest the importance of tracking to inform evidence-based workforce planning and policy development. Medical schools can leverage such data to align training programs with societal health needs and enhance their contributions to regional healthcare systems.

Résumé

Contexte : Les facultés de médecine jouent un rôle déterminant dans la composition de la main-d'œuvre médicale. Le suivi des lieux de pratique des médecins diplômés est essentiel pour répondre aux iniquités en santé et aux pénuries de personnel dans les régions mal desservies. Cette étude examine la répartition géographique des diplômés de programmes de formation en résidence d'une université francophone canadienne, en mettant en relation leurs lieux de pratique avec le mandat de responsabilité sociale de l'université.

Méthodes : Une étude descriptive transversale a été réalisée à partir des données du Registre canadien de l'éducation post-M.D. (RCEP), portant sur 2 410 diplômés (2000 à 2020) issus de 35 programmes de formation en résidence. Les lieux de pratique ont été analysés deux, cinq et dix ans après la fin de la résidence, selon la spécialité médicale, le sexe et la région géographique, avec une attention particulière portée aux régions sociosanitaires du Québec.

Résultats : Parmi les 2 410 diplômés, 57,8 % provenaient de programmes en médecine de famille et 42,2 % d'autres spécialités. La majorité des diplômés (77,7 %) exerçaient au Québec, principalement dans les régions de l'Estrie (19,4 %), de la Montérégie (14,6 %) et du Saguenay–Lac-Saint-Jean (7,6 %).

Conclusion : Cette étude met en lumière l'impact régional significatif du rôle de l'université dans la formation de médecins de famille et dans la réponse aux besoins de santé au Québec. Les résultats soulignent l'importance du suivi des lieux de pratique pour soutenir une planification des effectifs médicaux fondée sur des données probantes. Les facultés de médecine peuvent s'appuyer sur ces données pour aligner leurs programmes de formation sur les besoins de la société et renforcer leur contribution aux systèmes de santé régionaux.

Introduction

Amid ongoing transformations in healthcare and education systems, understanding physicians' practice choices is vital. This knowledge underpins evidence-based decision-making, important for meeting the healthcare needs of Canadians. However, academic institutions have not consistently leveraged systematic documentation to track their graduates' practice locations and outcomes, especially within the context of social accountability. To fill this gap, we explore where graduates from residency programs choose to practice.

Academic governing bodies and accrediting associations necessitate empirical evidence to establish rigorous standards for evaluating medical programs' effectiveness in contributing to the physician workforce.[1-4] Academic institutions and health professions education programs have a social accountability in addressing health disparities, serving vulnerable populations, and alleviating healthcare workforce shortages in underserved regions.[5-7] For example, they are expected to integrate social accountability into their mission and educational experiences, supported by measurable outcomes.[8,9] Considering this, we turn our focus to graduates' practice locations as a means for institutions to demonstrate their commitment to strengthening the physician workforce.[2,6,10]

Family medicine plays a particularly critical role in addressing primary healthcare needs.[11] Nationally, family medicine represents approximately 50%-53% of the medical workforce.[12] In Quebec, this proportion was slightly higher at 56%, which accounts for approximately 23.9% of the national family medicine workforce.[12] These data provide critical benchmarks to evaluate institutional contributions, in meeting regional and national primary healthcare demands.

This study delves into a critical question: where do graduates from a Canadian francophone university practice after their training? To explore this, the research is situated within the context-inputs-processes-products (CIPP) model, a well-established program evaluation framework that provides a structured lens for examining the impact of academic institutions' social accountability activities.[13-16] The "*Products*" component of the CIPP model focuses on the outcomes of the activities and strategies implemented by academic institutions.[13,14] This includes the metrics that institutions can use to evaluate the fulfillment of their social accountability mandate. Key metrics often include tracking the distribution and retention of graduates, assessing their contributions to health workforce planning, and embarking in ongoing quality assurance processes related to education, research, and service delivery.[17-20] Specifically, our analysis of residency program graduates' practice locations aims to provide empirical evidence to advance our understanding of how medical training programs contribute to the regional healthcare workforce.[4,21]

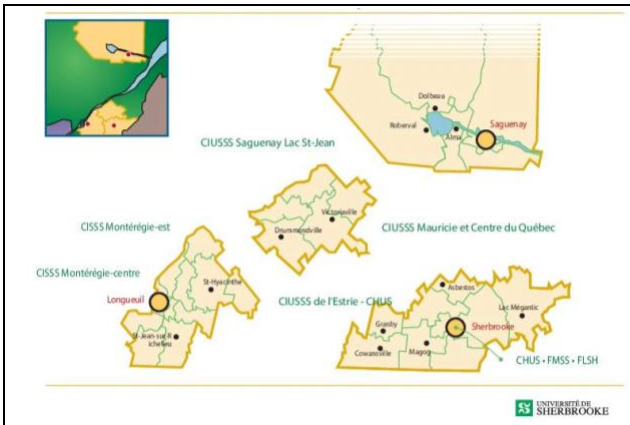
Methods

Setting the context

To enhance healthcare access across Quebec, the government has enacted regional medical workforce plans.[22] These plans set physician recruitment targets for each administrative health region, with the aim of providing equitable medical service distribution. Health regions are geographically defined areas used by provincial and territorial governments to organize and deliver healthcare services.[23] Additionally, Quebec's Ministry of Health and Social Services has established integrated university health networks that assign regions to each of the four medical faculties, including Université de Sherbrooke (UdeS).[24] The UdeS's designated regions cover over a million people across Saguenay-Lac-St-Jean, part of Montérégie, and the Eastern Townships (here forth referred to as Sherbrooke region) constituting about 14% of Quebec's population.[25] UdeS uniquely trains graduates who practice in Francophone New Brunswick (Moncton). See Figure 1 for a map of UdeS's designated regions. The UdeS's Faculty of Medicine and Health Sciences has long prioritized social accountability as a guiding institutional value. In line with this commitment, UdeS implemented distributed medical education programs beginning in 2006, with the establishment of campus sites in Saguenay-Lac-Saint-Jean and Moncton, New Brunswick. The faculty developed these initiatives to address physician shortages in underserved regions and to support healthcare access in areas with minority official language populations. More recently, in 2022, a fourth campus site was opened in Montérégie, a rapidly growing region with increasing healthcare demands. These four campus sites play a central role in the university's strategy to align medical education with regional population health needs.

Study design

We conducted a cross-sectional descriptive study[26-27] to examine the practice locations of graduates who completed their residency training at UdeS between 2000-2020.



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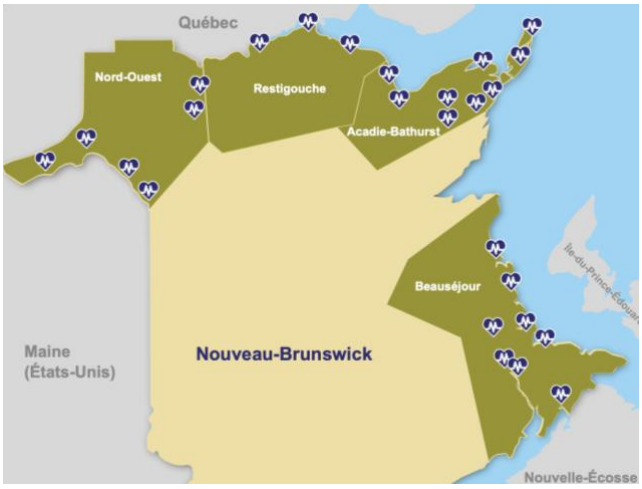

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Figure 1. Geographic maps of Université de Sherbrooke's designated regions

Data collection

We obtained graduate practice location data from the Canadian Post-M.D. Education Registry (CAPER), a national longitudinal database maintained under the auspices of The Association of Faculties of Medicine of Canada and other participating organizations (e.g., Canadian Institute for Health Information, provincial/territorial governments, etc.). CAPER maintains detailed, individual-level files that include socio-demographic data and training histories for all residents and fellows affiliated with Canadian faculties of medicine, thereby offering a robust and nationally recognized data source for assessing postgraduate training outcomes.[28] We requested data grouped into five-year intervals: 2000-2004, 2005-2009, 2010-2014, and 2015-2020 (with the final interval spanning six years). We selected this grouping to identify trends over time while maintaining analytical clarity. The slightly extended final interval accounts for the inclusion of more recent data and ensures a sufficient sample size for meaningful comparison. In collaboration with CAPER, we obtained data for UdeS residency program graduates, including graduation year, field of medical specialty, sex, and most recent practice location. The 2000-2020 timeframe was selected because CAPER tracks graduates' Canadian practice locations at intervals of two-, five-, and 10-years post-graduation. The most recent data, collected in October 2023, included complete practice location information for graduates up to the 2020 cohort. For this cohort, CAPER had captured practice locations at least two years after the completion of residency training.

Data analysis

In our study, we grouped the specialties into five categories based on the classification framework used by the UdeS's Office of Postgraduate Medical Education. This classification reflects how the institution administratively organizes programs and is consistent with how local workforce planning discussions are often approached. The grouping logic we used aligns with standard specialty classification frameworks and commonly accepted categorizations for analyses of this type.[28]

1. Family Medicine: Includes Family Medicine, Emergency Medicine, Care of the Elderly, Enhanced skills in palliative care, and other Family Medicine specializations.
2. Surgery: Encompasses General Surgery, Neurosurgery, Obstetrics/Gynecology, Ophthalmology, Otolaryngology - Head and Neck Surgery, and Orthopedic Surgery.
3. Internal Medicine: Represents Cardiology, Endocrinology and Metabolism, Gastroenterology, General Internal Medicine, Geriatric Medicine, Hematology, Medical Oncology, Nephrology, Respirology, Rheumatology, Medical Biochemistry, Infectiology, and Medical Microbiology.
4. Laboratory Specialties: Comprises Diagnostic Radiology, Nuclear Medicine, and Anatomical Pathology.
5. Other Specialties: Includes Anesthesiology, Public Health and Preventive Medicine, Neurology, Pediatrics, Psychiatry, and Child and Adolescent Psychiatry.

To illustrate the distribution of graduates across various medical specialties, we categorized graduates into two groups:

1. Family Medicine: Includes graduates from Family Medicine and related programs.
2. All other Specialties: Covers all other disciplines not in Family Medicine.

Practice locations were classified according to Statistics Canada's Statistical Area Classification Code (SAC) system[30] and Quebec's administrative health regions.[24] Initially, the analysis focused on practice locations within Quebec and New Brunswick. Subsequently, three health regions in Quebec - Montérégie, Saguenay-Lac-St-Jean, and Sherbrooke - were analyzed in greater detail due to their relevance to UdeS's campus presence and social accountability mandate. This regional classification provides a comprehensive examination into graduate practice distribution and representation within UdeS's administrative health regions.

Results

Table 1 summarizes the demographic and practice-related characteristics (frequency and percentages) of Canadian medical graduates from the UdeS's residency program between 2000 and 2020 (N = 2,410). The number of graduates varied by cohort group, with the largest cohort group (38.7%) completing their residencies between 2015-2020 and the smallest cohort group (14.1%) completing their residency training between 2000-2004. Female graduates represented approximately two-thirds (65.5%) of all graduates, with male graduates making up the remaining 34.5%. The average age at entry into professional practice was 29 years, ranging from 27.9 to 30.1 years.

More than half (57.8%) of all graduates pursued family medicine, including enhanced skills specializations. Among other fields, 13.9% specialized in other medical specialties including, anesthesiology, public health and preventive medicine, neurology, pediatrics, psychiatry, or child and adolescent psychiatry. Internal medicine and subspecialities accounted for 12.5% of graduates, while surgical specialties represented 9.5%, and of graduates, laboratory specialties comprised 6.2%.

Geographically, more than three-quarters (77.7%) of graduates remained in Quebec to practice after completing their residency. Of those practicing outside Quebec, 12.8% were in New Brunswick, and 2.8% practiced in other provinces. The practice locations of 6.7% of graduates were either unknown or outside of Canada.

Among graduates practicing in Quebec, the Sherbrooke region had the highest concentration, with 19.4% of graduates, followed by Montérégie (14.6%) and Saguenay-Lac-Saint-Jean (7.6%). The remaining 36.1% of graduates practiced in other Quebec health regions.

Table 1. Descriptive Statistics of Canadian Medical Graduates from Université de Sherbrooke Residency Program, Quebec, Canada (2000-2020)

Variables	No. (%) out of 2,410 graduates	Mean (S.D)	Range of possible scores
Graduating Cohorts Years			
2000-2004	339 (14.1)		
2005-2009	479 (19.9)		
2010-2014	660 (27.4)		
2015-2020	932 (38.7)		
Sex			
Male	832 (34.5)		
Female	1,578 (65.5)		
Medical Specialty			
Family Medicine & Enhanced Skills	1,394 (57.8)		
Internal Medicine & Subspecialties	302 (12.5)		
Surgery	229 (9.5)		
Laboratory Specialties	149 (6.2)		
Other Medical Specialties	336 (13.9)		
Age when entered professional practice		29.0 (4.7)	27.9-30.1
Provincial Practice Location			
Quebec	1,873 (77.7)		
New Brunswick	308 (12.8)		
Other Province	68 (2.8)		
Unknown	161 (6.7)		
Regional Practice Location			
Saguenay-Lac-Saint-Jean	184 (7.6)		
Sherbrooke region	468 (19.4)		
Montérégie	352 (14.6)		
Other Quebec regions	869 (36.1)		

Cohort characteristics and specialty distribution

Table 2 provides an overview of the distribution of Canadian graduates from the UdeS residency program between 2000 and 2020, categorized by cohort year, sex, and medical specialty.

Overall, female graduates consistently outnumber their male counterparts across all cohort groups, representing between 62.5% and 69.5% of all graduates. Family medicine and enhanced skills specializations were the most selected specialty, representing over half of all graduates (ranging from 56.1% to 59.3 across cohorts). Internal medicine & subspecialties increased across cohorts, from 9.1% in 2000-2004 to 13.5% in 2015-2020. In contrast, surgery specialities declined slightly, from 11.2% in 2000-2004 to 7.8% in 2015-2020. Laboratory specialties increased slightly from 5.3% to 6.4%, while other medical

specialties decreased from 15.9% in 2000-2004 to 12.9% in 2015-2020.

Table 2. Number and percentage of Canadian graduates from Université de Sherbrooke Residency Program by cohort, sex, and medical specialty (2000-2020)

	2000-2004 (*n* = 339)	2005-2009 (*n* = 479)	2010-2014 (*n* = 660)	2015-2020 (*n* = 932)
Sex				
Male	117 (34.5)	164 (32.4)	201 (30.5)	350 (37.5)
Female	222 (65.5)	315 (65.8)	459 (69.5)	582 (62.5)
Medical Specialty				
Family Medicine & Enhanced Skills	198 (58.4)	273 (57.0)	370 (56.1)	553 (59.3)
Internal Medicine & Subspecialties	31 (9.1)	58 (12.1)	87 (13.2)	126 (13.5)
Surgery	38 (11.2)	55 (11.5)	63 (9.5)	73 (7.8)
Laboratory Specialties	18 (5.3)	27 (5.6)	44 (6.7)	60 (6.4)
Other Specialties	54 (15.9)	66 (13.8)	96 (14.5)	120 (12.9)
Medical Specialty by Sex				
Family Medicine				
Male	56 (28.3)	77 (28.2)	93 (25.1)	175 (31.6)
Female	142 (71.7)	196 (71.8)	277 (74.9)	378 (68.4)
Internal Medicine & Subspecialties				
Male	11 (35.5)	24 (41.4)	30 (34.5)	67 (53.2)
Female	20 (64.5)	34 (58.6)	57 (65.5)	59 (46.8)
Surgery				
Male	20 (52.6)	28 (50.9)	28 (44.4)	25 (34.2)
Female	18 (47.4)	27 (49.1)	35 (55.6)	48 (65.8)
Laboratory Specialties				
Male	12 (66.7)	18 (66.7)	19 (43.2)	36 (60.0)
Female	6 (33.3)	9 (33.3)	25 (56.8)	24 (40.0)
Other Medical Specialties				
Male	18 (33.3)	17 (25.8)	31 (32.3)	47 (39.2)
Female	36 (66.7)	49 (74.2)	65 (67.7)	73 (60.8)

Females represented most family medicine graduates across all cohorts, but male representation increased from 25.1% in 2010-2014 to 31.6% in 2015-2020. Similarly, male representation in internal medicine & subspecialties increased in the 2015-2020 cohort, reaching 53.2%. Surgical specialties experienced the opposite, with female graduates outnumber males in 2015-2020 cohort (65.8%, up from 47.4% in 2000-2004). Laboratory specialties remained male-dominant but showed variability, while other medical specialties remained female-dominated, despite an increase in male participation to 39.2% in 2015-2020 cohort.

Provincial practice locations at two-, five-, and 10-years post-training

Table 3 outlines the provincial practice locations of Canadian medical graduates from UdeS across cohorts, at two-, five-, and 10-years post-graduation. The data are categorized by medical specialty (Family Medicine and Enhanced Skills vs. All Other Medical Specialties) and province (Quebec, New Brunswick, and Other; encompassing practice locations in other provinces as well as unknown or outside Canada).

Quebec remained as the predominant practice location for graduates across all cohorts and medical specialties. Recent cohorts showed an increasing proportion of graduates choosing to practice in Quebec, with 84.2% of the 2015-2020 cohort practicing in the province two years post-training. The preference for Quebec remains strong five- and 10 years post-graduation, with 87.9% of medical specialists from the 2010-2014 cohort practicing in Quebec at the 10-year mark.

New Brunswick was the second most common practice location for UdeS gradates, particularly among those in family medicine. However, the proportion of graduates practicing in New Brunswick has declined across cohorts. For instance, Family Medicine graduates practicing in New Brunswick decreased from 20.7% in the 2000-2004 cohort to 13.6% in the 2015-2020 cohort two years post-training.

Few graduates choose to practice outside Quebec and New Brunswick, with less than 5% of all graduates practicing in other provinces or unknown or out-of-country locations.

Table 3. Provincial Practice Location of Canadian Graduates from Université de Sherbrooke Residency Program at 2-, 5-, and 10-Year into Professional Practice by Cohort and Medical Specialty (Family Medicine & Enhanced Skills vs. All Other Medical Specialties) (2000-2020)

	2000-2004			2005-2009			2010-2014			2015-2020	
	2-Yrs	5-Yrs	10-Yrs	2-Yrs	5-Yrs	10-Yrs	2-Yrs	5-Yrs	10-Yrs**	2-Yrs	5-Yrs*
Province											
Quebec	261 (77.0)	255 (75.2)	253 (74.6)	352 (73.5)	348 (72.7)	371 (77.5)	475 (72.0)	534 (80.9)	296 (80.0)	785 (84.2)	385 (82.8)
New Brunswick	54 (15.9)	57 (16.8)	57 (16.8)	73 (15.2)	75 (15.7)	69 (14.4)	78 (11.8)	71 (10.8)	48 (13.0)	103 (11.1)	57 (12.3)
Other/Unknown	24 (7.1)	27 (8.0)	29 (8.6)	54 (11.3)	56 (11.7)	39 (8.1)	107 (16.2)	55 (8.3)	26 (7.0)	44 (4.7)	23 (4.9)
Provincial Total	**339 (100.0)**	**339 (100.0)**	**339 (100.0)**	**479 (100.0)**	**479 (100.0)**	**479 (100.0)**	**660 (100.0)**	**660 (100.0)**	**370 (100.0)**	**932 (100.0)**	**465 (100.0)**
Family Medicine											
Quebec	148 (74.7)	146 (73.7)	140 (70.7)	197 (72.2)	191 (70.0)	198 (72.5)	258 (69.7)	277 (74.9)	151 (73.7)	454 (82.1)	216 (82.1)
New Brunswick	38 (19.2)	41 (20.7)	43 (21.7)	55 (20.1)	56 (20.5)	53 (19.4)	64 (17.3)	60 (16.2)	39 (19.0)	75 (13.6)	36 (13.7)
Other/Unknown	12 (6.1)	11 (5.6)	15 (7.6)	21 (7.7)	26 (9.5)	22 (8.1)	48 (13.0)	33 (8.9)	15 (7.3)	24 (4.3)	11 (4.2)
Family Medicine Total	**198 (100.0)**	**198 (100.0)**	**198 (100.0)**	**273 (100.0)**	**273 (100.0)**	**273 (100.0)**	**370 (100.0)**	**370 (100.0)**	**205 (100.0)**	**553 (100.0)**	**263 (100.0)**
All Other Medical Specialties											
Quebec	113 (80.1)	109 (77.3)	113 (80.1)	155 (75.2)	157 (76.2)	173 (84.0)	217 (74.8)	257 (88.6)	145 (87.9)	331 (87.3)	169 (87.6)
New Brunswick	16 (11.3)	16 (11.3)	14 (9.9)	18 (8.7)	19 (9.2)	16 (7.8)	14 (4.8)	11 (3.8)	9 (5.5)	28 (7.4)	12 (6.2)
Other/Unknown	12 (8.5)	16 (11.3)	14 (9.9)	33 (16.0)	30 (14.6)	17 (8.3)	59 (20.3)	22 (7.6)	11 (6.7)	20 (5.4)	12 (6.2)
All Other Medical Specialties Total	**141 (100.0)**	**141 (100.0)**	**141 (100.0)**	**206 (100.0)**	**206 (100.0)**	**206 (100.0)**	**290 (100.0)**	**290 (100.0)**	**165 (100.0)**	**379 (100.0)**	**193 (100.0)**

*Note: *Practice location 5-years post-training was unavailable for graduates from 2018-2020 **Practice location 10-years post-training was unavailable for graduates from 2013-2020*

Provincial trends by medical specialty

Family Medicine graduates increasingly choose Quebec as their practice location. For example, 82.1% of family medicine graduates from the 2015-2020 cohort practiced in Quebec two years post-training, compared to 74.7% in the 2000-2004 cohort. Conversely, the proportion practicing in New Brunswick has declined over time, highlighting a shift in practice location preferences.

Graduates in other medical specialties also demonstrated a strong preference for Quebec, with 87.3% of the 2015-2020 cohort practicing in the province two years post-training. This trend persists at five- and 10 years post-graduation, indicating consistent practice patterns. The proportion of graduates in other medical specialties choosing New Brunswick is smaller and has remained relatively stable.

Regional Practice Location 2-, 5-, 10-Years Post-Training

Table 4 presents a detailed view of regional practice locations of Canadian graduates from UdeS residency graduates over 20 years, categorized by cohort group and medical specialty. The data examine where graduates practice at two-, five-, and 10 years post-training, focusing on UdeS's Quebec's health regions and New Brunswick.

Other Quebec health regions accounted for the largest proportion of graduates across cohort groups and time points. For instance, 38.4% of all graduates in the 2015-2020 cohort practiced in other Quebec regions two years post-training. At five years post-training, the proportion remained steady, with 35.8% of the 2010-2014 cohort practicing in these regions.

The Sherbrooke region consistently attracted a large proportion of all graduates. In the 2015-2020 cohort, 17.5% of all graduates practiced in Sherbrooke region two years post-training. For family medicine, the region accounted for 16.3% of the 2015-2020 cohort, with proportions remaining relatively stable across practice time points.

Montérégie region emerged as a growing practice location, particularly in recent cohorts. The proportion of graduates practicing in Montérégie two years post-training increased from 9.7% in the 2010-2014 cohort to 20.2% in the 2015-2020 cohort. This growth was greater among family medicine graduates, where Montérégie accounted for 21.7% of the 2015-2020 cohort. For other medical specialties, the region grew from 8.3% in 2010-2014 to 17.9% in 2015-2020.

The Saguenay region consistently accounted for 6.5% to 8.8% of graduates' practice locations across cohorts and medical specialties. While the overall proportions were smaller than other regions, the region's importance persists, especially for family medicine graduates.

New Brunswick remains a secondary practice location, particularly for family medicine graduates. However, the proportion of graduates practicing in New Brunswick declined across cohorts, from 20.7% in the 2000-2004 cohort to 13.6% in the 2015-2020 cohort two years post-training.

Table 4. Regional Practice Location of Canadian Graduates from Université de Sherbrooke Residency Program at 2-, 5-, and 10-Year Intervals by Cohort and Medical Specialty (Family Medicine & Enhanced Skills vs. All Other Medical Specialties) (2000-2020)

	2000-2004			2005-2009			2010-2014			2015-2020	
	2-Yrs	5-Yrs	10-Yrs	2-Yrs	5-Yrs	10-Yrs	2-Yrs	5-Yrs	10-Yrs*	2-Yrs	5-Yrs**
Regional Practice Location											
Saguenay	24 (7.1)	22 (6.5)	23 (6.8)	31 (6.5)	28 (5.8)	31 (6.5)	53 (8.0)	67 (10.2)	39 (10.5)	76 (8.2)	41 (8.8)
Sherbrooke region	65 (19.2)	53 (15.6)	49 (14.5)	112 (23.4)	87 (18.2)	102 (21.3)	128 (19.4)	141 (21.4)	89 (24.1)	163 (17.5)	74 (15.9)
Montérégie	51 (15.0)	57 (16.8)	51 (15.0)	49 (10.2)	43 (9.0)	51 (10.6)	64 (9.7)	90 (13.6)	44 (11.9)	188 (20.2)	103 (22.2)
Other Quebec regions	121 (35.7)	123 (36.3)	130 (38.3)	160 (33.4)	190 (39.7)	187 (39.0)	230 (34.8)	236 (35.8)	124 (33.5)	358 (38.4)	167 (35.9)
New Brunswick	54 (15.9)	57 (16.8)	57 (16.8)	73 (15.2)	75 (15.7)	69 (14.4)	78 (11.8)	71 (10.8)	48 (13.0)	103 (11.1)	57 (12.3)
Other/Unknown	24 (7.1)	27 (8.0)	29 (8.6)	54 (11.3)	56 (11.7)	39 (8.1)	107 (16.2)	55 (8.3)	26 (7.0)	44 (4.7)	23 (4.9)
Regional Total	**339 (100.0)**	**339 (100.0)**	**339 (100.0)**	**479 (100.0)**	**479 (100.0)**	**479 (100.0)**	**660 (100.0)**	**660 (100.0)**	**370 (100.0)**	**932 (100.0)**	**465 (100.0)**
Family Medicine											
Saguenay	21 (10.6)	20 (10.1)	19 (9.6)	25 (9.2)	21 (11.0)	24 (8.8)	43 (11.6)	51 (18.4)	30 (14.6)	48 (8.7)	28 (13.0)
Sherbrooke region	30 (15.2)	28 (14.1)	24 (12.1)	48 (17.6)	39 (20.4)	45 (16.5)	44 (11.9)	55 (19.9)	33 (16.1)	90 (16.3)	39 (18.1)
Montérégie	31 (15.7)	34 (17.2)	30 (15.2)	32 (11.7)	25 (13.1)	32 (11.7)	40 (10.8)	50 (18.1)	26 (12.7)	120 (21.7)	60 (27.8)
Other Quebec regions	66 (33.3)	64 (32.3)	67 (33.8)	92 (33.7)	106 (55.5)	97 (35.5)	131 (35.4)	121 (43.7)	62 (30.2)	196 (35.4)	89 (41.2)
New Brunswick	38 (19.2)	41 (20.7)	43 (21.7)	55 (20.1)	56 (20.5)	53 (19.4)	64 (17.3)	60 (16.2)	39 (19.0)	75 (13.6)	36 (13.7)
Other/Unknown	12 (6.1)	11 (5.6)	15 (7.6)	21 (7.7)	26 (9.5)	22 (8.1)	48 (13.0)	33 (8.9)	15 (7.3)	24 (4.3)	11 (4.2)
Family Medicine Total	**198 (100.0)**	**198 (100.0)**	**198 (100.0)**	**273 (100.0)**	**273 (100.0)**	**273 (100.0)**	**370 (100.0)**	**370 (100.0)**	**205 (100.0)**	**553 (100.0)**	**263 (100.0)**
All Other Medical Specialties											
Saguenay	3 (2.1)	2 (1.4)	4 (2.8)	6 (2.9)	7 (3.4)	7 (3.4)	10 (3.4)	16 (5.5)	9 (5.5)	28 (7.4)	13 (6.4)
Sherbrooke region	35 (24.8)	25 (17.7)	25 (17.7)	64 (31.1)	48 (23.3)	57 (27.7)	84 (29.0)	86 (29.7)	56 (33.9)	73 (19.3)	35 (17.3)
Montérégie	20 (14.2)	23 (16.3)	21 (14.9)	17 (8.3)	18 (8.7)	19 (9.2)	24 (8.3)	40 (13.8)	18 (10.9)	68 (17.9)	43 (21.3)
Other Quebec regions	55 (39.0)	59 (41.8)	63 (44.7)	68 (33.0)	84 (40.8)	90 (43.7)	99 (34.1)	115 (39.7)	62 (37.6)	162 (42.7)	78 (38.6)
New Brunswick	16 (11.3)	16 (11.3)	14 (9.9)	18 (8.7)	19 (9.2)	16 (7.8)	14 (4.8)	11 (3.8)	9 (5.5)	28 (7.4)	21 (10.4)
Other/Unknown	12 (8.5)	16 11.3)	14 (9.9)	33 (16.0)	32 (15.5)	17 (8.3)	59 (20.3)	22 (7.6)	11 (6.7)	20 (5.3)	12 (5.9)
All Other Specialists Total	**141 (100.0)**	**141 (100.0)**	**141 (100.0)**	**206 (100.0)**	**206 (100.0)**	**206 (100.0)**	**290 (100.0)**	**290 (100.0)**	**165 (100.0)**	**379 (100.0)**	**202 (100.0)**

*Note: *Practice location 5-years entering professional practice is unavailable for graduates from 2018-2020*
***Practice location 10-years entering professional practice is unavailable for graduates from 2013-2020*

Regional trends by medical specialty

Family medicine graduates demonstrated broad geographic distribution across Quebec health regions, with substantial representation in the Sherbrooke region, Montérégie, and other Quebec regions. Notably, Montérégie's proportion increased, reaching 21.7% of family medicine graduates two years post-training in the 2015-2020 cohort. Conversely, the proportion practicing in New Brunswick decreased over time, suggesting changing preferences or opportunities for family medicine graduates.

Graduates in other medical specialties were largely concentrated in the Sherbrooke region and other Quebec regions. However, Montérégie observed an increase in representation, accounting for 17.9% of graduates two years post-training in the 2015-2020 cohort, up from 8.3% in the 2010-2014 cohort. Saguenay maintained a smaller but steady share of graduates in these specialties.

Across cohorts, the proportion of graduates practicing in Quebec increased, particularly in the Montérégie and Sherbrooke regions. Additionally, the number of graduates practicing in New Brunswick and unknown or out-of-country locations decreased over time. For example, family medicine graduates with other province, unknown, or out-of-country practice locations dropped from 5.6% in the 2005-2009 cohort to 2.0% in the 2015-2020 cohort.

Discussion

The aim of this study was to examine the geographic distribution of residency graduates from a Canadian francophone university by analyzing the practice location of its residency graduates in its regions it is mandated to serve. The findings underscore the university's role in fulfilling its social accountability mandate by contributing to the physician workforce in the regions it is accountable to serve in Quebec and francophone New Brunswick.[4,30,31] In line with the study's conceptual grounding in the context-inputs-processes-products (CIPP) model, our focus on graduate practice locations aligns with the 'Products' component of the framework. By empirically examining where graduates from a Canadian francophone university ultimately practice, we contribute insights into how medical education programs fulfill their social accountability mandate. These findings not only reinforce the relevance of monitoring workforce distribution as a key outcome metric,[2,4,31,32] but also demonstrate the utility of the CIPP model in guiding research that seeks to evaluate and strengthen the social contract between academic institutions and the communities they serve.

The trends observed in our study, particularly the proportion of graduates practicing in the UdeS regions, serve as one example within the university's long-standing social accountability initiatives[33], including the implementation of distributed training campuses. These efforts demonstrate the university's commitment to augmenting healthcare access through targeted training programs. Our findings illustrate how data on graduate practice locations can be used to evaluate whether such strategic educational initiatives are yielding workforce outcomes that align with institutional and societal goals.

The results suggest that graduates predominantly practice in Quebec, with substantial representation in regions such as Sherbrooke region, Montérégie, and Saguenay-Lac-St-Jean. Over time, Montérégie has seen a notable increase in the proportion of both family medicine and other specialty practitioners, reflecting the region's growing healthcare demands. While our study did not set out to examine language or cultural affinity directly, the predominance of graduates practicing within Quebec raises important considerations. It is possible that linguistic and cultural connectedness contributes to these regional retention patterns. In this light, social context and identity may serve as anchors for where physicians choose to establish their practice. Future research could explore the role of Francophone identity in shaping career decisions and compare mobility trends between Francophone and Anglophone medical graduates across Canada. One notable finding is the declining proportion of UdeS family medicine graduates establishing practice in New Brunswick across cohorts. This trend may reflect evolving healthcare policies, shifts in provincial recruitment strategies, or differing opportunities between provinces, and warrants further exploration to understand the underlying drivers and implications for physician workforce planning.

While family physicians account for approximately 50% to 53% of the national medical workforce,[35] and 56% in the province of Quebec,[22] our results suggest that these proportions were surpassed with 57.8% of graduates specializing in family medicine and enhanced skills across two decades (2000-2020). When considering the combined proportions of graduates from family medicine, our institution's contribution to training primary healthcare providers becomes more apparent. Our findings stand as a valuable resource for government healthcare planning such as the regional medical workforce plans implemented by the Quebec government.[22] This alignment with broader workforce needs highlights the university's capacity to address specific regional gaps, particularly in underserved

areas like Saguenay-Lac-Saint-Jean and Francophone New Brunswick. These contributions underscore the potential for academic institutions to strengthen the physician workforce through targeted initiatives and training programs.[36] Additionally, the practice distribution of Sherbrooke graduates within Quebec aligns with provincial healthcare needs and contributes meaningfully to underserved regions. For instance, in 2023, Francophone New Brunswick's Moncton health region had approximately 366 practicing family physicians,[12] 60.9% of whom were Sherbrooke graduates from the 2000-2020 cohort. This highlights the university's substantial contribution to addressing healthcare needs in underserved areas. In contrast, the Saguenay-Lac-Saint-Jean region had 430 practicing family physicians,[12] with Sherbrooke graduates accounting for 31.9% of this workforce during the same time period. Similarly, the Estrie region had 690 practicing family physicians in 2023,[12] of which 30.7% were trained at Sherbrooke. Meanwhile, Montérégie had 1,591 practicing family physicians in 2023,[12] with Sherbrooke graduates making up 14.0% of this workforce from the 2000-2020 cohort. These figures reflect broader workforce distribution patterns across the province of Quebec.

This study also aligns with and contributes to the ongoing national conversation about the need for stronger health workforce planning and data-driven decision-making in medical education.[4,31,37] Recent reports emphasize that Canada must expand health professional training capacity while also improving its ability to plan for the use of robust data on health professionals in training and practice.[31] While the national data provide useful context, further analysis of regional healthcare policies and demographic trends is needed for a comprehensive understanding. For instance, integrating workforce planning data with metrics such as physician mobility, patient access to care, and clinical outcomes could provide a more nuanced understanding of practice location patterns. Additionally, linking national data with local demographic characteristics, such as population age and density, could further inform targeted training and retention strategies. Future research could explore how regional policies influence graduates' decisions to practice in underserved or rural areas. Additionally, scope of practice, particularly among family physicians should also be considered as nearly 30% of family physicians in Canada are not providing services outside of primary care.[11]

Collaborating with the Canadian Post-M.D. Education Registry,[28] we showcase the feasibility of examining data for residency program graduates and lay the groundwork for future partnerships. These collaborations enable academic institutions to assess their impact, contributing to an evidence-based, effective, and accountable healthcare system.[2,4,10,17-19] Establishing robust, longitudinal data collection processes from admissions to practice can lead to transformative advancements in both education and healthcare systems.[20,32] These datasets can guide institutions in optimizing training programs for a balanced mix of generalist and specialist physicians. Finally, integrating practice location data with other metrics like clinical placements and community-based training can provide a comprehensive view of graduates' journeys.[19] Such data-driven assessments can serve as a foundation for future initiatives to refine training pathways, improve physician distribution, and address regional healthcare needs.

Limitations

While this study offers valuable insights into graduate practice locations, several limitations should be acknowledged. First, the CAPER database only includes practice location data for physicians working in Canada and captures this information at fixed intervals (e.g., two, five, 10 years post-training), limiting the ability to track interim mobility or international practice. At each interval, only the most recent practice location is recorded, reducing visibility into previous or transient relocations. CAPER does not collect detailed data on the nature of clinical practice (e.g., practice setting, patient populations, hours worked) and does not routinely include linkages to pre-residency experiences such as undergraduate training, hometown origin, or community-based placements. This limits the interpretation of factors influencing graduates' practice choices, such as returning to rural or underserved areas. Finally, broader contextual influences such as regional workforce policies, institutional mandates, and evolving healthcare needs may shape physician distribution in ways not fully captured by the available data. Despite these limitations, this study offers a foundational view that can support future research into medical education's role in shaping workforce outcomes.

Conclusion

This study offers a practical approach for medical schools seeking to align physician training with regional healthcare needs. By systematically tracking graduates' practice locations, institutions can better understand their population's healthcare needs, design targeted training programs, and assess whether they are meeting physician

workforce priorities. This approach can also support medical schools in refining selection processes, adapting curricula, and ensuring that their graduates contribute meaningfully to underserved regions. More broadly, integrating practice location data with insights into clinical activities and patient populations can help establish relevant social accountability metrics, providing a framework for continuous quality improvement in medical education. Our findings highlight how this method can be applied by other institutions to assess their impact and refine strategies that enhance workforce planning and healthcare access.

Conflicts of Interest: TD and CTO are editors for the CMEJ. They adhered to the CMEJ policy on editors as authors. MT was Associate Dean of PGME at the time this study was conducted. The authors have no competing interests to declare.
Acknowledgment: The authors wish to thank *the Société des médecins de l'Université de Sherbrooke* for financial support, and the Canadian Post-M.D. Education Registry (CAPER) for their collaboration and support.
Funding: This study was supported through funding from *Fonds de développement pédagogique, Société des médecins de l'Université de Sherbrooke*
Edited by: Marcel D'Eon (editor-in-chief)

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