

# Retention of International Medical Graduates Following Postgraduate Medical Training in Newfoundland and Labrador

Maintien en poste des diplômés internationaux  
en médecine après leur formation médicale  
postdoctorale à Terre-Neuve et Labrador



by MARIA MATHEWS, PHD  
*Associate Professor, Health Policy/Health Care Delivery*  
*Faculty of Medicine, Memorial University*  
*St. John's, NL*

AMANDA PARK, MSC  
*Graduate Student, Division of Community Health & Humanities*  
*Faculty of Medicine, Memorial University*  
*St. John's, NL*

JAMES T.B. ROURKE  
*Dean of Medicine, Memorial University*  
*St. John's, NL*

## Abstract

We linked the Memorial University of Newfoundland (MUN) postgraduate database with Scott's Medical Database to determine 2004 work locations of physicians who started residency training at MUN by 1998 to assess whether international medical graduates (IMGs) are as likely as MUN and other Canadian medical graduates (CMGs) to work in Canada and Newfoundland and Labrador (NL). In 2004, 66.8% of the residents were in Canada (87.8% MUN graduates, 47.3% IMGs, 67.3% CMGs) and 18.8% were in NL (43.2% MUN graduates, 7.9% IMGs, 4.8% CMGs). Compared to MUN medical graduates, IMGs and CMGs were less likely to work in Canada and NL.

## Résumé

Nous avons établi un lien entre la base de données des diplômés de la Memorial University of Newfoundland (MUN) et la Scott's Medical Database en vue de déterminer quel était le lieu de travail, en 2004, des médecins qui ont entrepris leur programme de résidence à la MUN dès 1998 afin de savoir si les diplômés internationaux en médecine (DIM) sont tout aussi susceptibles que les diplômés en médecine de la MUN ou que les autres diplômés canadiens en médecine (DCM) de travailler au Canada et à Terre-Neuve et Labrador (T.-N. L.). En 2004, 66,8 % des résidents se trouvaient au Canada (87,8 % étaient des diplômés de la MUN, à savoir 47,3 % de DIM, 67,3 % de DCM) et 18,8 % se trouvaient à T.-N. L. (43,2 % étaient des diplômés de la MUN, à savoir 7,9 % de DIM et 4,8 % de DCM). Comparativement aux diplômés en médecine de la MUN, les DIM et les DCM étaient moins susceptibles de travailler au Canada et à T.-N. L.

---

**A**LTHOUGH POSTGRADUATE TRAINING LOCATION IS A PREDICTOR OF FUTURE work location among Canadian medical graduates (Mathews et al. 2006; McKendry et al. 1996), little is known about the impact of residency training on international medical graduate (IMG) retention. This study examines the 2004 work location of physicians who did some or all of their residency training at Memorial University of Newfoundland (MUN) to assess whether IMG residents are as likely as MUN graduates and other Canadian medical school (CMG) graduates to work in Canada and Newfoundland and Labrador (NL). Each year, MUN accepts approximately 60 residents into its postgraduate programs, which are open to MUN graduates, CMGs and IMGs through the Canadian Resident Matching Service (CaRMS) (MUN 2004; CaRMS 2004). The training and recruitment of physicians

require a substantial investment of health and educational resources. This study provides an estimate of the “return on investment” in postgraduate medical education in relation to physician supply. In addition, it explores whether residency training is a viable strategy to recruit and retain physicians, particularly IMGs.

## Method

The MUN Human Investigations Committee approved this study. We linked data from the MUN postgraduate database with the 2004 Scott’s Medical Database (formerly known as the Southam Medical Database), an annually updated listing of 56,000 physicians in Canada who are members of the Canadian Medical Association and who permit release of their information (MD Select 2004). Data were linked using first, last and maiden names; gender; and year and school of graduation, as this information was common to each data source.

We included all residents who began their residency by 1998 (residents after this date may still have been completing their postgraduate training in 2004). We excluded deceased and retired graduates (no longer part of workforce), military physicians (limited choice of work location), students sponsored by the Malaysian government (required to return to Malaysia) and residents whose medical school was unavailable from the databases used in the study.

Residents were grouped as MUN, other CMGs or IMGs based on their medical school. The two outcomes, (1) working in Canada in 2004 and (2) working in NL in 2004, were coded as “yes” or “no/unknown.” Physicians may have been working full- or part-time, in clinical, research or administrative positions. Work locations of physicians were based on the work addresses reported in the Scott’s Medical Database.

We examined four covariates: gender, graduation year, MUN residency start year and residency program. We grouped graduation year and MUN residency start year into “before 1973,” “1973–1979,” “1980–1989” and “1990–1998.” We selected 1973 as a cut-off year, as this was the first MUN class to graduate. Residency programs were family medicine, general internship or specialist. Residents’ program was based on the program in which they were most recently registered (i.e., if a resident completed a general internship before entering a specialist program, the resident was considered to have been in the specialist program).

Analyses were done using Statistical Program for the Social Sciences (SPSS) 14.0. We used chi-square tests to identify differences between MUN, Canadian and international graduates. Because the variables “graduation year” and “year residency started” were highly correlated ( $r=0.88$ ), only “year residency started” was considered in the logistic regression models in order to avoid multi-collinearity. The final regression models include only significant covariates.

As Scott's Medical Database describes only Canadian work locations, a large proportion (29.4%) of residents were missing location data. This number was significantly higher for IMGs (65.4%) than for Canadian (31.4%) or MUN (3.1%) graduates. In a previous study of MUN medical graduates (Mathews et al. 2006), we used the alumni database to supplement the Scott's Medical Database and increased the number of cases with work locations from 65% to 98%. In that study, using the alumni database, we found that 47% of MUN graduates whose locations were not listed in the Scott's Medical Database were in Canada and 16.7% were in NL. We did not use the alumni database in the present study of residents because this would bias the results by overrepresenting MUN graduates.

In this study, we included all cases in the analysis but defined the outcomes as "yes" or "no/unknown" (e.g., yes – in Canada; no – not in Canada or unknown) to reduce the potential bias from excluding a large number of cases with missing data. To assess the impact of this approach on the results, we estimated the proportion of "unknown" cases that may have been in Canada or NL using rates from our previous study (47% and 16.7%, respectively) and calculated unadjusted odds ratios using both approaches for each outcome.

## Results

Of the 2,495 physicians who began their residency at MUN by 1998, we excluded 14 deceased physicians, eight retired, one military, one sponsored by the Malaysian government and 19 whose medical school was not known, leaving a total of 2,452 residents.

In our study sample, 34.1% of residents were MUN graduates, 37.2% were IMGs and 28.7% were CMGs. The largest proportion of residents was male (70.1%), graduated in the 1980s (36.2%) and started their postgraduate residency training in the 1980s (38.6%). Over half (51.2%) were enrolled in a specialist residency program. In 2004, 1,639 (66.8%) of the residents were working in Canada (87.8% MUN graduates, 47.3% IMGs, 67.3% CMGs) and 460 (18.8%) were working in NL (43.2% MUN graduates, 7.9% IMGs, 4.8% CMGs).

A larger proportion of IMGs than MUN or Canadian graduates were male, graduated before 1973, started their residency between 1973 and 1979 and were in a specialist program (Table 1). Since 1980, IMGs have made up a smaller proportion of the residents at MUN than either MUN or other Canadian graduates. After controlling for other significant predictors, compared to MUN graduates, IMGs and CMGs were 0.16 and 0.29 times as likely, respectively, to have worked in Canada in 2004, and 0.12 and 0.07 times as likely to have worked in NL in 2004 (Table 2). Supplementary analyses suggest our coding strategy does not change the overarching result: IMGs and CMGs were less likely than MUN graduates to have worked in Canada and NL in 2004 (Table 3).

TABLE 1. Characteristics of MUN medical residents by medical school

Characteristic	MUN n (%)	IMGs n (%)	CMGs n (%)	p value
<b>Gender</b>				0.000
Male	501 (60.1)	743 (81.8)	469 (66.8)	
Female	332 (39.9)	165 (18.2)	233 (33.2)	
<b>Graduation Year</b>				0.000
Before 1973	0 (0)	366 (40.9)	46 (6.6)	
1973–1979	197 (23.6)	299 (33.4)	138 (19.9)	
1980–1989	338 (40.4)	219 (24.5)	320 (46.0)	
1990–1998	301 (36.0)	11 (1.2)	191 (27.5)	
<b>Year Residency Started</b>				0.000
Before 1973	0 (0)	103 (11.3)	17 (2.4)	
1973–1979	180 (21.5)	371 (40.7)	144 (20.5)	
1980–1989	344 (41.1)	264 (28.9)	337 (47.9)	
1990–1998	312 (37.3)	174 (19.1)	205 (29.2)	
<b>Residency Type</b>				0.000
Family	184 (22.1)	34 (4.0)	237 (33.9)	
General Internship	264 (31.8)	207 (24.1)	239 (34.2)	
Specialist	383 (46.1)	617 (71.9)	223 (31.9)	
<b>In Canada</b>				0.000
No	102 (12.2)	481 (52.7)	230 (32.7)	
Yes	734 (87.8)	432 (47.3)	473 (67.3)	
<b>In NL</b>				0.000
No	482 (57.7)	841 (92.1)	669 (95.2)	
Yes	354 (42.3)	72 (7.9)	34 (4.8)	

TABLE 2. Predictors of MUN medical residents who worked in Canada and NL in 2004

Variable	Odds Ratio (95% confidence interval)
<b>In Canada in 2004</b>	
<b>Medical School</b>	
MUN	1.00
International	0.16 (0.13–0.21)
Canadian	0.29 (0.23–0.38)
<b>Year Residency Started</b>	
Before 1973	0.46 (0.30–0.71)
1973–1979	1.00
1980–1989	1.77 (1.42–2.21)
1990–1998	2.04 (1.59–2.62)
<b>In NL in 2004</b>	
<b>Medical School</b>	
MUN	1.00
International	0.12 (0.09–0.15)
Canadian	0.07 (0.05–0.10)

## Discussion

The physician’s medical school was a strong predictor of working in Canada and in NL. During the last two decades, between 25% and 31% of physicians migrating from Canada to the United States were IMGs (Tyrrell and Dauphinee 1999; Stoddart and

Retention of International Medical Graduates Following Postgraduate  
Medical Training in Newfoundland and Labrador

Barer 1999). The Task Force on Physician Supply in Canada concluded that IMGs are as likely as CMGs to migrate to the United States (Tyrrell and Dauphinee 1999). Our findings suggest, however, that IMGs who train at MUN are more likely than their Canadian counterparts to leave Canada following their training. Further study is needed to determine whether this is unique to MUN or common to other training centres.

TABLE 3. Impact of alternative strategies of handling missing work location data on unadjusted odds ratios

Medical School	In Canada in 2004			In NL in 2004		
	Yes n (%)	No n (%)	Odds Ratio	Yes n (%)	No n (%)	Odds Ratio
	Assume 0% of cases with unknown location are in Canada			Assume 0% of cases with unknown location are in NL		
MUN	734 (44.8)	102 (12.5)	1.00	354 (77.0)	482 (24.2)	1.00
IMGs	432 (26.4)	481 (59.2)	0.12	72 (15.7)	841 (42.2)	0.12
CMGs	473 (28.9)	230 (28.3)	0.29	34 (7.4)	669 (33.6)	0.07
	Assume 47% of cases with unknown location are in Canada			Assume 16.7% of cases with unknown location are in NL		
MUN	738 (37.3)	98 (20.6)	1.00	356 (61.4)	480 (25.6)	1.00
IMGs	658 (33.3)	255 (53.7)	0.34	152 (26.2)	761 (40.7)	0.27
CMGs	581 (29.4)	122 (25.7)	0.63	72 (12.4)	631 (33.7)	0.15

IMGs make up a larger proportion of the total physician workforce in NL (42%) than in Canada (23.5%) (CIHI 2001, 2004). Based on these proportions, 323 of the physicians in NL are IMGs (Newfoundland Medical Board 2003). However, our results suggest that only 72 (22.3%) entered practice through the MUN residency program. These findings suggest that residency programs offer a modest “return on investment” as a physician recruitment strategy. This finding is particularly noteworthy in NL, where IMGs form a substantial portion of the physician workforce.

Between 1973–1998, only 28.2% of IMGs were in either a family medicine or a general internship residency. In contrast, the majority of MUN (68.1%) and other Canadian graduates (53.9%) were in the family medicine or general internship programs. A Canadian survey of IMGs registered in the second iteration of the 2002 CaRMS reported that 45.6% of IMG applicants chose these programs (Crutchner et al. 2003). This difference may stem from the matching process. Until 2006/07, only CMGs had the opportunity to choose residency positions in the first round of the CaRMS match in the winter of each year. IMGs entered the second round of the match (conducted in spring) and were eligible for unfilled positions. Historically, the MUN family medicine program has been a popular choice among MUN graduates, and few of these spots are available to IMGs. The two-stage residency match-

ing process may discourage IMGs from family medicine programs and contribute to poor retention of IMGs; previous studies have reported lower national retention of specialists than family physicians (Mathews et al. 2006; McKendry et al. 1996). As of 2006/07, IMGs may apply for residency positions in the first round of the CaRMS. Future studies should assess whether this new policy changes the proportion of IMGs in family and specialty medicine residency and affects national and/or provincial retention of IMGs, Canadian and MUN graduates.

Like recent MUN graduates (Mathews et al. 2006), recent residents (those who began residency in 1990–1998) were more likely to remain in Canada than their earlier counterparts. This finding may be related to generational differences; more recent graduates have been suggested to place greater value on a “balanced lifestyle” (Moody 2002; Watson et al. 2004, 2006) and may choose positions in Canada that allow physicians to limit practice commitments. Further study is underway to explore generational differences in physician mobility.

In conclusion, we found that 66.8% of MUN postgraduate medical residents were working in Canada in 2004, 18.8% in NL. After residency training in NL, IMGs were less likely than MUN medical graduates to remain in Canada or NL, suggesting that location of postgraduate training is not positively associated with retention of IMGs. Although providing postgraduate training opportunities facilitates the entry of IMGs to medical practice in Canada, it is not a highly effective means of recruiting or retaining IMGs. This study underscores the need for further investigation of the factors related to IMG retention.

### Study limitations

The cross-sectional design allowed us to consider only 2004 locations. We do not know whether physicians have remained in one location over their entire career or returned after an absence. From the MUN postgraduate database, we could not determine whether residents had completed their training when they exited the MUN program, whether they had met licensing requirements and were eligible to practise or whether they continued their training elsewhere. The use of secondary administrative data limited the number and scope of the predictor variables we were able to consider in this study. Although the use of administrative data limits our ability to determine the location of a large number of residents in the study, our sensitivity analyses support the robustness of our findings.

Correspondence may be directed to: Maria Mathews, PhD, Associate Professor, Health Policy/Health Services, Division of Community Health & Humanities, Faculty of Medicine, Memorial University of Newfoundland, St. John's, NL A1B 3V6; tel.: 709-777-7845; fax: 709-777-7382; e-mail: mmathews@mun.ca.

Retention of International Medical Graduates Following Postgraduate  
Medical Training in Newfoundland and Labrador

ACKNOWLEDGMENTS

Maria Mathews holds a New Investigator Award from the Canadian Institutes of Health Research (Regional Partnership Program). Amanda Park held a master's fellowship from the Atlantic Regional Training Centre funded by the Canadian Health Services Research Foundation/Canadian Institutes of Health Research.

REFERENCES

- Canadian Institute for Health Information (CIHI). 2001. *The Practicing Physician Community in Canada, 1989/90–1998/99: Workforce and Workload as Gleaned through Billing Profiles for Physician Services*. Ottawa: Author.
- Canadian Institute for Health Information (CIHI). 2004. *Full-Time Equivalent Physicians Report, Canada 2002–2003*. Ottawa: Author.
- Canadian Resident Matching Service (CaRMS). 2004. "Eligibility." Retrieved September 21, 2007. <[http://www.carms.ca/eng/r1\\_eligibility\\_e.shtml](http://www.carms.ca/eng/r1_eligibility_e.shtml)>.
- Crutchner, R.A., S.R. Banner, O. Szafran and M. Watanabe. 2003. "Characteristics of International Medical Graduates Who Applied to the CaRMS 2002 Match." *Canadian Medical Association Journal* 168(9): 1119–23.
- Mathews, M., J.T.B. Rourke and A. Park. 2006. "National and Provincial Retention of Medical Graduates of Memorial University of Newfoundland." *Canadian Medical Association Journal* 175(4): 357–60.
- McKendry, R.J., G.A. Wells, P. Dale, O. Adam, L. Buske, J. Strachan and L. Flor. 1996. "Factors Influencing the Emigration of Physicians from Canada to the United States." *Canadian Medical Association Journal* 154: 171–81.
- MD Select. 2004. 2004 National MD Select (database). Toronto: Business Information Group.
- Memorial University of Newfoundland. 2004. "Postgraduate Medical Education." Faculty of Medicine. Retrieved September 21, 2007. <<http://www.med.mun.ca/pgme/default.asp>>.
- Moody, J. 2002. "Recruiting Generation X Physicians." NEJM Career Centre. Retrieved September 21, 2007. <<http://www.nejmjobs.org/rpt/recruiting-gen-x-physicians.aspx>>.
- Newfoundland Medical Board. 2004. "Statistics Regarding Physician Numbers." Retrieved September 21, 2007. <<http://www.nmb.ca/PDF/Statistics2003.pdf>>.
- Stoddart, G.L. and M.L. Barer. 1999. "Will Increasing Medical School Enrolment Solve Canada's Physician Supply Problems?" *Canadian Medical Association Journal* 161(8): 983–84.
- Tyrrell, L. and D. Dauphinee. 1999. "Task Force on Physician Supply in Canada." Retrieved September 21, 2007. <[http://www.cua.org/socioeconomics/physician\\_supply\\_2000.pdf](http://www.cua.org/socioeconomics/physician_supply_2000.pdf)>.
- Watson, D.E., A. Katz, R.J. Reid, B. Bogdanovic, N. Roos and P. Heppner. 2004. "Family Physician Workloads and Access to Care in Winnipeg: 1991–2001." *Canadian Medical Association Journal* 171: 339–42.
- Watson, D.E., S. Slade, L. Buske and J. Tepper. 2006. "Intergenerational Differences in Workloads among Primary Care Physicians: A Ten-Year, Population-Based Study." *Health Affairs* 25(6): 1620–28.