Retention of specialist physicians in Newfoundland and Labrador

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ABSTRACT

Background: Although specialist physicians comprise nearly half of the physician workforce in Newfoundland and Labrador (NL), relatively little is known about their retention patterns. We compared 2 cohorts of physicians who were initially licensed to practise in NL between 1993 and 1997 and between 2000 and 2004, to examine whether retention had changed over time. Additionally, we examined the retention of 4 groups of physicians in each cohort: (1) fully licensed medical graduates of Memorial University, (2) fully licensed medical graduates of other Canadian universities, (3) provisionally licensed international medical graduates (IMGs) and (4) fully licensed IMGs. Provisional licences allow physicians who have not received Canadian certification to practise while obtaining credentials. We hypothesized that fully licensed physicians (largely physicians who are locally trained) would remain in NL longer than provisionally licensed physicians (largely IMGs).

Methods: Using data from the provincial medical registrar and Memorial University’s office of postgraduate medical education, we used survival analysis (Cox regression) to compare the retention of the 2 cohorts and the 4 groups of physicians within each cohort.

Results: After 48 months, roughly 60% of the physicians in the 2000–04 cohort and 45% of the physicians in the 1993–97 cohort remained in NL. Medical graduates of Memorial University comprised 61/180 (33.9%) of the 2000–04 cohort and 38/211 (18.0%) of the 1993–97 cohort. Physicians in the 2000–04 cohort were 1.6 (95% confidence interval [CI] 1.23–2.08) times less likely to leave NL than physicians in the 1993–97 cohort. In the 2000–04 cohort, medical graduates of Canadian universities, provisionally licensed IMGs and fully licensed IMGs were 3.19 (95% CI 1.47–6.89), 1.85 (95% CI 1.09–3.17) and 4.39 (95% CI 1.91–10.10) times more likely to leave NL than medical graduates of Memorial University. In the 1993–97 cohort, IMGs with provisional licences were 2.16 (95% CI 1.37–3.42) times more likely to leave NL than medical graduates of Memorial University. There was no significant difference in retention between medical graduates of Memorial University and other Canadian universities or IMGs with full licences in the 1993–97 cohort.

Interpretation: The improvement in the retention of specialist physicians in NL since the 1990s may be attributable to the increase in the relative proportion of medical graduates of Memorial University. Although provisional licensing enables IMGs to begin practice in NL, it does not lead to long-term retention.

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Competing interests: None declared.

Funding: Patrick Fleming was funded by a CIHR Frederick Banting and Charles Best Canada Graduate Scholarship – Master’s Award, a School of Graduate Studies Merit Award, a Master’s Fellowship from the Newfoundland and Labrador Centre for Applied Health Research, and the Canadian Institutes of Health Research grant “Retention of Locally Trained Medical Graduates in Saskatchewan and Newfoundland and Labrador” (PHE-81965). The funders had no role in conducting the study or in the preparation of reports.

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Although the number of specialist physicians in Newfoundland and Labrador (NL) increased from 334 in 1995 to 518 in 2009, local media regularly report on specialist shortages. While the increase in the number of specialist physicians suggests that more of these physicians are moving to the province, the continuing stories of shortages suggest that high turnover may be a concern. Specialists accounted for roughly half of the 1117 practising doctors in NL in 2009; however, although information has been collected about how long general practitioners (GPs) and family physicians practise in the province, relatively little such information is available for specialists.

NL, like many other jurisdictions with chronic physician shortages, has attempted to improve its physician supply by training members of its own population to become physicians and by recruiting international medical graduates (IMGs). NL has used provisional licensing to attract IMG physicians who are otherwise unable to work in Canada. A number of studies have suggested that IMGs see NL as an entry point to practise in Canada, in part because of the availability of provisional licenses. It remains unclear which of these two approaches (“growing your own” versus “recruiting from abroad”) is more successful in creating a stable specialist workforce. The use of provisional or conditional licensure is not unique to Canada. Australia, a country with similar geographic challenges, relies heavily on IMGs to provide care in underserviced areas. Physicians who have not met the full Australian credentialing requirements can enter specialist practice in certain “areas of need.”

Provisional licenses are available in NL to specialist physicians who do not have full Canadian credentials. Physicians may obtain a provisional license for specialty practice if they (1) graduated from a recognized undergraduate medical program, (2) completed (in most cases) a minimum of 4 years of postgraduate medical training in selected Western countries (United States, Ireland, United Kingdom, Australia, New Zealand, South Africa), (3) passed board certification examinations in the country where they completed their postgraduate medical training, (4) obtained specialist status in the country where they trained, and (5) have an employment sponsor approved by the medical registrar.

Physicians in NL may obtain a full license for specialist practice if they (1) graduated from an approved undergraduate medical program, (2) completed 2 or more years of postgraduate training at accredited schools, (3) obtained the Licentiate of the Medical Council of Canada status and (4) obtained certification from the Royal College of Physicians and Surgeons of Canada (the Royal College). An earlier study found that IMGs in primary care (family physicians and GPs) who initially held a provisional licence were more likely to leave the province than locally trained physicians; only 5.2% of IMGs who began family practice with a provisional licence remained in NL at the end of the follow-up period, as compared with 35.7% of fully licensed physicians who had graduated from Memorial University. It is not known what impact the availability of provisional licensing has had on the retention of specialist physicians in the province.

Our study aimed to examine the retention of specialist physicians in NL. Specifically, we compared 2 cohorts of physicians who were initially licensed to practise in the province between 1993 and 1997, and between 2000 and 2004, to determine whether overall retention had changed. Additionally, we examined the retention of 4 groups of physicians within each cohort to determine whether licensing status and place of training affect retention: (1) fully licensed Memorial University medical graduates (MMGs), (2) fully licensed medical graduates of other Canadian universities (CMGs), (3) provisionally licensed IMGs (IMGs[Prov]) and (4) fully licensed IMGs (IMGs[Full]). We hypothesized that physician retention in NL has improved over time but that the retention of physicians who begin practice with a full licence (largely physicians who are trained in NL) is greater than the retention of physicians who begin practice with a provisional licence (largely IMGs).

Methods

This retrospective cohort study used administrative data obtained from the College of Physicians and Surgeons of Newfoundland and Labrador (CPSNL) and Memorial University’s office of postgraduate medical education to create 2 cohorts of specialist physicians who obtained licences to practise in NL. The 2000–04 cohort consisted of specialists who received their first non-trainee licence to practise in NL between 1 Jan. 2000 and 31 Dec. 2004. The 1993–97 cohort consisted of specialists who received their first non-trainee licence to practise in NL between 1 Jan. 1993 and 31 Dec. 1997. We followed both cohorts until 31 Dec. 2007, a maximum of 8 and 15 years for the 2000–04 and 1993–97 cohorts, respectively.

In each cohort we included all fully and provisionally licensed specialist physicians (non-trainees) who received their first licence to practise in NL in the specified period. Physicians were excluded from the study if they were a locum tenens (less than 3 months) or non-practising physician (e.g., if they were retired or had non-clinical appointments), if they held postgraduate trainee
licences during the inception period, if they graduated during the inception period, or if there were insufficient data to assess when they started working in NL. Community medicine specialists were excluded because we were unable to determine from the available data whether they were practising family medicine or community medicine. The 3-month cut-off for locums was used to be consistent with the definition used in a previous study in NL.6 We used the end date listed in the database of the office of postgraduate medical education to ensure that start times for licences did not include residency training.

We created these 2 cohorts to address data quality and statistical issues. Before 2000, the CPSNL database recorded only the most current status of physicians; if specialists left NL, only the date when they ceased practice was recorded, not the date they started practice. Before 1993, after graduating from medical school, all physicians completed a general rotating internship, after which they became fully licensed GPs and chose to continue in a specialty residency or enter general practice. Physicians could also return to residency to complete specialty training after practising as a GP.12 The CPSNL database does not distinguish between specialists and general practitioners, so we could not be completely certain that physicians had not previously worked in NL as a GP (and thus somehow differed from other specialists). By creating a cohort of physicians initially licensed between 2000 and 2004, we could be certain we included physicians who had not previously worked in the province. Although the creation of the 2000–04 cohort addresses issues pertaining to data quality and changing licensure, it permits only a limited follow-up period (8 years for physicians licensed in 2000 but only 4 years for those licensed in 2004). A shorter inception period produced a sample that would be too small for meaningful analysis, given the relatively small number of specialists who entered the physician workforce during that period. The creation of a 1993–97 cohort allowed for a longer follow-up period (but this cohort may include physicians who previously worked in the province). Lastly, as the hazard was different for each cohort, we stratified the analysis by cohort to meet the proportionality of hazard assumptions for the Cox regression analysis.

We examined how long a physician remained in NL throughout the follow-up period and calculated his or her total length of practice in the province. The independent variables were cohort for the inter-cohort comparison and the 4 groups of physicians characterized by licensing status and location of training (MMGs, CMGs, IMGs[Prov] and IMGs[Full]) for the intra-cohort comparisons. Covariates in our analysis included sex, certification by the Royal College (yes/no), certification by any specialist authority (including an authority in the country where they previously practised) (yes/no), specialist group (clinical, laboratory, surgical), year of graduation (earlier than 1973, 1973–79, 1980–89, 1990–99), age in 2008, age at graduation from medical school, and residency training of any duration at Memorial University (minimum 1 rotation) (yes/no). We used 1973 as a cut-off for decade of graduation because it was the first year in which Memorial University graduated physicians. We used 2 certification variables (i.e., certification by the Royal College and certification by any specialist authority) to examine whether source of certification was related to retention.

Using analysis of variance and chi-squared and Mantel–Cox tests, we compared the characteristics of each cohort and then the characteristics of the physicians who stayed and left NL in each cohort. The proportionality of hazards assumption was tested and met, and we used survival analysis (Cox regression) on all physicians in the study to compare retention in the 2 cohorts. We then repeated the survival analysis on each cohort to compare the 4 groups of physicians in each cohort.

For each regression, variables that were significant in the bivariate analyses were entered in the model. Significant covariates (based on the Wald statistic and change in the –2log likelihood score) were retained and presented in the final regression models. Bivariate correlations were used to determine whether variables were highly correlated. In cases where 2 variables were highly correlated (e.g., current age and age at graduation), only 1 covariate was included in the regression. We did not detect large standard error values indicative of multi-collinearity.13

Memorial University’s Human Investigations Committee approved this study.

Results

After we applied our inclusion and exclusion criteria, there were 180 physicians in the 2000–04 cohort and 211 physicians in the 1993–97 cohort (Fig. 1).

Table 1 shows the characteristics of physicians in each cohort. Compared with the 1993–97 cohort, the 2000–04 cohort contained a larger proportion of MMGs, IMG(Prov), and physicians who were not certified by the Royal College, were not certified by any specialist authority and had graduated from medical school in the 1990s. Physicians in the 2000–04 cohort were also younger (but had graduated at an older age) and had worked for a longer time in NL than their counterparts in the 1993–97
A larger proportion of the 1993–97 cohort had left the province and never returned. Table 2 compares the physicians who stayed and left NL in each cohort. In both cohorts, IMGs(Prov) made up a larger proportion of physicians who left than of those who stayed. In contrast, while physicians certified by the Royal College or any specialist authority made up a larger proportion of physicians who left than physicians without certification in the 1993–97 cohort, they made up a smaller proportion of physicians who left in the 2000–04 cohort.

### Table 1
**Comparison of the 2000–04 cohort (n = 180) and the 1993–97 cohort (n = 211)**

| Characteristic                        | 2000–04 cohort n (%)* | 1993–97 cohort n (%)* | p value |
|---------------------------------------|------------------------|------------------------|---------|
| **Physician group**                   |                        |                        |         |
| MMG                                   | 61 (33.9)              | 38 (18.0)              | <0.000  |
| CMG                                   | 16 (8.9)               | 34 (16.1)              |         |
| IMG(Prov)                             | 94 (52.2)              | 102 (48.3)             |         |
| IMG(Full)                             | 9 (5.0)                | 37 (17.5)              |         |
| **Sex**                               |                        |                        | 0.561   |
| Male                                  | 131 (72.8)             | 161 (76.3)             |         |
| Female                                | 49 (27.2)              | 50 (23.7)              |         |
| **Certified by the Royal College**    |                        |                        | 0.001   |
| No                                    | 86 (47.8)              | 68 (32.3)              |         |
| Yes                                   | 94 (52.2)              | 143 (67.8)             |         |
| **Certified by any specialist authority** |                        |                        | 0.001   |
| No                                    | 85 (47.2)              | 66 (31.3)              |         |
| Yes                                   | 95 (52.8)              | 145 (68.7)             |         |
| **Year of graduation**                |                        |                        | <0.000  |
| < 1973                                | 5 (2.8)                | 28 (13.3)              |         |
| 1973–79                               | 9 (5.0)                | 45 (21.3)              |         |
| 1980–89                               | 60 (33.3)              | 107 (50.7)             |         |
| 1990–98                               | 106 (58.9)             | 30 (14.2)              |         |
| **Did some or all of residency in NL**|                        |                        | 0.572   |
| No                                    | 127 (70.6)             | 153 (72.5)             |         |
| Yes                                   | 53 (29.4)              | 58 (27.5)              |         |
| **Left NL**                           |                        |                        | <0.000  |
| No                                    | 91 (50.6)              | 33 (15.6)              |         |
| Yes                                   | 89 (49.4)              | 178 (84.3)             |         |
| **Returned to NL after leaving**      |                        |                        | <0.000  |
| No                                    | 47 (52.8)              | 140 (66.3)             |         |
| As a locum                            | 33 (37.1)              | 19 (9.0)               |         |
| As a permanent                        | 9 (10.1)               | 19 (9.0)               |         |
| **Specialty type**                    |                        |                        | 0.530   |
| Clinical                              | 114 (63.7)             | 122 (57.8)             |         |
| Laboratory                            | 13 (7.3)               | 18 (8.5)               |         |
| Surgical                              | 52 (29.1)              | 70 (33.2)              |         |
| **Age in 2008, yr, mean (SD)**        | 44.0 (7.1)             | 52.2 (8.2)             |         |
| **Age at graduation, yr, mean (SD)**  | 26.2 (3.7)             | 25.1 (2.1)             | 0.001   |
| **Total time worked in NL, months, median** | 66.0                   | 35.0                   | <0.000  |

*Except for age in 2008, age at graduation, and total time worked in NL.
CMG = medical graduate of another Canadian university with full licence
IMG(Full) = international medical graduate with full licence
IMG(Prov) = international medical graduate with provisional licence
MMG = Memorial medical graduate with full licence
NL = Newfoundland and Labrador
Royal College = Royal College of Physicians and Surgeons of Canada
SD = standard deviation
The survival curves indicate that, after 48 months, roughly 60% of the 2000–04 cohort and 45% of the 1993–97 cohort physicians remained in NL (Fig. 2). After we controlled for physician group, we found that physicians in the 2000–04 cohort were 1.6 times less likely (the inverse of 0.62) to leave NL than physicians in the 1993–97 cohort.

We repeated our analysis with each cohort separately to compare physician groups. In both analyses, physician group was the only significant covariate in the Cox regression models (Table 3). In the 2000–04 cohort, CMGs, IMGs(Prov) and IMGs(Full) were 3.19 (95% confidence interval [CI] 1.47–6.89), 1.85 (95% CI 1.09–3.17) and 4.39 (95% CI 1.91–10.10) times more likely to leave NL than MMGs. The survival curves suggest that roughly half of IMGs(Full), CMGs and IMGs(Prov) remained in NL after 24 months, 34 months and 60 months, respectively (Fig. 3). In contrast, almost 60% of MMGs remained at the end of the 96-month follow-up period.

In the 1993–97 cohort, IMGs(Prov) were 2.16 (95% CI 1.37–3.42) times more likely to leave than MMGs. There was no significant difference between MMGs and CMGs or IMGs(Full). Half of IMGs(Prov), CMGs and IMGs(Full) remained in NL after roughly 32 months, 36 months and 40 months, respectively (Fig. 4). Almost half of MMGs remained after 60 months.

### Interpretation
Our study indicates that retention of specialist physicians in NL has improved since the 1990s. In addition to the fact that a greater number of physicians are practising in the province, a larger proportion of these physicians are staying in the province longer. Although the follow-up period differed for the 2 cohorts, even when compared over an equivalent period, the 2000–04 cohort had a higher proportion of physicians remaining.
in the province than the 1993–97 cohort. There may be many reasons for the increased retention, including improved recruitment efforts, more competitive remuneration for all physicians and an increase in the number of physicians educated at Memorial University who are working in the province. Memorial University graduates made up a larger proportion of the 2000–04 cohort (33.9%) than the 1993–97 cohort (18.0%). As in previous studies,\textsuperscript{6,14} we found that there was a higher retention of Memorial University medical school graduates in the province than of physicians trained elsewhere in Canada or abroad. However, unlike in other studies,\textsuperscript{6,14} the completion of any amount of residency training at Memorial was not found to be a significant predictor of retention in the province. These other studies examined only family physicians or both family physicians and specialists in 1 cohort. In our study, fewer than 30% of specialists in either cohort had completed any postgraduate training in the province. This may be related to the fact that specialist residency training in NL is available only through

Table 2

| Characteristic                                      | 2000–04 cohort |               | p value | 1993–97 cohort |               | p value |
|-----------------------------------------------------|----------------|---------------|---------|----------------|---------------|---------|
|                                                     | Stayed n (%)*  | Left n (%)*   |         | Stayed n (%)*  | Left n (%)*   |         |
| Physician group                                     |                |               | 0.006   |                |               | <0.000  |
| MMG                                                 | 42 (46.7)      | 19 (23.1)     |         | 15 (45.5)      | 23 (12.9)     |         |
| CMG                                                 | 6 (6.7)        | 10 (12.3)     |         | 6 (18.2)       | 28 (15.7)     |         |
| IMG(Prov)                                           | 42 (46.7)      | 52 (64.2)     |         | 5 (15.2)       | 97 (54.5)     |         |
| IMG(Full)                                           | ††             | ††            |         | 7 (21.2)       | 30 (16.9)     |         |
| Sex                                                 |               |               | 0.182   |               | 0.182         |         |
| Male                                                | 62 (68.1)      | 69 (77.5)     |         | 22 (66.7)      | 139 (78.1)    |         |
| Female                                              | 29 (31.9)      | 20 (22.5)     |         | 11 (33.3)      | 39 (21.9)     |         |
| Certified by the Royal College                      |               |               | 0.036   |               | 0.025         |         |
| No                                                  | 36 (41.9)      | 50 (56.2)     |         | 5 (15.2)       | 63 (35.4)     |         |
| Yes                                                 | 55 (59.8)      | 39 (43.8)     |         | 28 (84.8)      | 115 (64.6)    |         |
| Certified by any specialist authority               |               |               | 0.025   |               | 0.040         |         |
| No                                                  | 35 (38.5)      | 50 (56.2)     |         | 5 (15.2)       | 61 (34.3)     |         |
| Yes                                                 | 56 (61.5)      | 39 (43.8)     |         | 28 (84.8)      | 117 (65.7)    |         |
| Year of graduation                                  |               |               | 0.932   |               | 0.008         |         |
| < 1973                                              | 2 (2.2)        | 3 (3.4)       |         | 3 (9.1)        | 25 (14.1)     |         |
| 1973–79                                             | 4 (4.4)        | 5 (5.6)       |         | 5 (15.2)       | 40 (22.6)     |         |
| 1980–89                                             | 30 (33.0)      | 30 (33.7)     |         | 14 (42.4)      | 93 (52.5)     |         |
| 1990–98                                             | 55 (60.4)      | 51 (57.3)     |         | 11 (33.3)      | 19 (10.7)     |         |
| Did some or all of residency in NL                  |               |               | 0.103   |               | <0.000        |         |
| No                                                  | 59 (64.8)      | 68 (76.4)     |         | 14 (42.4)      | 139 (78.1)    |         |
| Yes                                                 | 32 (35.2)      | 21 (23.6)     |         | 19 (57.6)      | 39 (21.6)     |         |
| Specialty type                                      |               |               | 0.933   |               | 0.266         |         |
| Clinical                                            | 58 (63.7)      | 56 (63.6)     |         | 23 (69.7)      | 99 (55.9)     |         |
| Laboratory                                          | 6 (6.6)        | 7 (28.4)      |         | 3 (9.1)        | 15 (8.5)      |         |
| Surgical                                            | 27 (29.7)      | 25 (28.4)     |         | 7 (21.2)       | 63 (35.6)     |         |
| Age in 2008, yr, mean (SD)                          | 44.2 (7.2)     | 43.5 (6.9)    | 0.423   | 48.6 (7.8)     | 52.9 (8.1)    | 0.005   |
| Age at graduation, yr, mean (SD)                    | 27.0 (4.4)     | 25.3 (2.6)    | 0.002   | 24.8 (1.3)     | 25.2 (2.2)    | 0.343   |
| Total time worked in NL, months, mean (SD)          | 63.7 (17.2)    | 27.5 (20.3)   | <0.000  | 7 (21.2)       | 30 (16.9)     | <0.000  |

*Except for age in 2008, age at graduation, and total time worked in NL.
† Data for IMG(Full) suppressed from analysis because of small number in each cell.
CMG = medical graduate of another Canadian university with full licence
IMG(Full) = international medical graduate with full licence
IMG(Prov) = international medical graduate with provisional licence
MMG = Memorial medical graduate with full licence
NL = Newfoundland and Labrador
Royal College = Royal College of Physicians and Surgeons of Canada
SD = standard deviation
Memorial University and there are limited opportunities for trainees to undertake subspecialty programs; therefore, trainees interested in such programs must leave NL to pursue their postgraduate education.

Provincially licensed IMGs formed a large proportion of the specialists in the study; in fact, IMGs(Prov) constitute nearly 30% of the total physician workforce in NL; the national average is 5%. It did not appear that the use of provisional licences led to long-term retention in NL. However, elimination of the provisional licensing policy, which facilitates IMGs’ entry to practice, would have a negative impact on physician supply, given the large number of IMGs(Prov) in the province. Moreover, although IMGs(Prov) are more likely to leave than MMGs, in the 2000–04 cohort, IMGs(Prov) are also less likely to leave than either CMGs or IMGs(Full).

Many, but not all, IMGs who began their practice with a provisional license obtained certification from the Royal College (21 of 94 [22.3%] in the 2000–04 cohort and 42 of 102 [41.2%] in the 1993–97 cohort) and qualified for a full licence. CPSNL data may underestimate the number of IMGs who obtain Royal College certification. Although licences must be renewed annually, the fee to change or update registration information may discourage physicians from updating their credentials with the CPSNL, especially if they are planning to move to another jurisdiction after receiving Royal College certification.

The term non-certified refers to physicians who have not earned Canadian specialist credentials: they have generally obtained equivalent certification from their home jurisdiction. Among the physicians who remained in NL at the end of the follow-up period, 41.9% were not certified by the Royal College and 38.5% were not certified by any other specialist certification authority. Although the majority of these physicians were IMGs, a small number were MMGs or CMGs who had full licences. The CPSNL has discretion...
under its own by-laws and regulations to determine what training is equivalent to training approved by Royal College.11 Likewise, the CPSNL may grant a “full licence” to physicians who are not board certified (by the Royal College or other specialist certification authority). Non-certified specialists comprise roughly one-quarter (26.9%) of the specialist workforce in NL; high proportions of non-certified specialists are also seen in other rural provinces, such as Saskatchewan and Prince Edward Island,17 whereas the proportion is 0.78% in Ontario.17

Our study, which provides baseline retention data for NL specialist physicians, is timely given the recent amendment to the Agreement of Internal Trade (AIT), which is intended to enhance the mobility of members of certified or registered professions, including medicine. The Ninth Protocol of Amendment to the AIT, implemented in 2009, allows professionals certified in one province to move to other provinces without restrictions providing they are in good standing with their professional regulatory body.18,19 The receiving province may not require such professionals to complete any additional assessment, training or certifications, and this may influence physician retention patterns in NL and other provinces. Current evidence suggests that the majority of IMGs practise in NL only until they receive full licensure, at which point they leave the province.6,10 With these new amendments to the AIT, physicians may choose to practise in NL for an even shorter period of time before leaving, which may create a potential crisis in physician staffing, especially in rural areas. Although overall specialist retention appears to be improving in NL as a result of the increase in the numbers of MMGs, the local medical training system is unlikely to fill the potential shortages created by outgoing IMGs, given the length of time required to train specialist physicians.

**Limitations.** Our analyses were limited by the nature of the administrative database, which was not created for research purposes. For example, the CSPNL data did not distinguish between full licences awarded to specialists, GPs or family physicians. Physicians in the 1993–97 cohort were able to work as GPs after completing a general rotating internship before returning for specialist training.12 Therefore, specialists in the 1993–97 cohort may have previously worked in NL as a GP. Wherever possible, we cross-referenced start dates with graduation dates from medical school and residency to clarify whether physicians in the study who had previously worked as GPs in NL were now working as specialists. Second, before 2000, the CPSNL database recorded only the most current status of physicians (i.e., if specialists left NL, only the date they ceased practice was recorded, not the date they began practice). If we could not clearly determine start dates from other sources, these physicians were eliminated from our analyses (identified as insufficient data in Fig. 1). Third, the use of administrative data limited the number of variables we could examine. We were not able to examine the effect of variables such as marital status, age of children and spouse’s preference, which are known to affect retention of family physicians and

| Characteristic | Hazard ratio | 95% CI | p value |
|----------------|--------------|--------|---------|
| Figure 2, both cohorts | | | 0.001 |
| Cohort | | | |
| 1999–97* | 1.00 | – | – |
| 2000–04 | 0.62 | 0.48–0.81 | 0.001 |
| Physician group | | | <0.000 |
| MMG* | – | – | – |
| CMG | 1.99 | 1.28–3.10 | 0.002 |
| IMG(Prov) | 2.11 | 1.50–3.00 | <0.000 |
| IMG(Full) | 1.86 | 1.19–2.90 | 0.007 |
| Figure 3, 2000–04 cohort | | | 0.001 |
| Physician group | | | |
| MMG* | 1.00 | – | – |
| CMG | 3.19 | 1.47–6.89 | 0.003 |
| IMG(Prov) | 1.85 | 1.09–3.17 | 0.019 |
| IMG(Full) | 4.39 | 1.91–10.10 | <0.000 |
| Figure 4, 1993–97 cohort | | | 0.008 |
| Physician group | | | |
| MMG* | 1.00 | – | – |
| CMG | 1.66 | 0.952–2.88 | 0.074 |
| IMG(Prov) | 2.16 | 1.37–3.42 | 0.001 |
| IMG(Full) | 1.50 | 0.869–2.58 | 0.146 |

* Reference category. CI = confidence interval
CMG = medical graduate of another Canadian university with full licence
IMG(Full) = international medical graduate with full licence
IMG(Prov) = international medical graduate with provisional licence
MMG = Memorial medical graduate with full licence
NL = Newfoundland and Labrador
GPs. Fourth, given the data available in the CPSNL database, it is not possible to determine whether IMGs were Canadians who had graduated from an international medical school. Reports suggest that a number of Canadians choose to train in medical schools in Europe, the Caribbean, Mexico, Australia or the United States. In our sample, 27 IMGs (19.4%) in the 1993–97 cohort and 14 IMGs (13.6%) in the 2000–04 cohort graduated from medical schools in these countries, but it is not possible to determine whether they were Canadians. The retention of IMGs who graduated from these countries did not differ significantly from that of IMGs in general.

Conclusion

Using licensing data from the provincial medical registrar, we found that the retention of specialists in NL has improved since the 1990s. A larger proportion of physicians who began practice in the province between 2000 and 2004 remained in NL compared with a similar cohort of physicians from the 1990s. The increase in retention may be attributable to the increase in the relative proportion of locally trained graduates in the 2000–04 cohort. Memorial University medical graduates were less likely to leave than other Canadian-trained physicians or IMGs, who made up a substantial proportion of the physicians in each cohort. In terms of addressing physician shortages and creating a stable physician workforce, it appears that in NL the “grow your own” approach is more successful for long-term retention than recruiting from abroad or from other Canadian provinces.

Contributors: Patrick Fleming designed the study, conducted the analysis and prepared the draft of the manuscript. His MSc thesis supervisor, Dr. Maria Mathews, conceived the study, oversaw his activities and provided feedback on the study as well as on the final draft of the paper.

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Published: 24 January 2012

Citation: Fleming P, Mathews M. Retention of specialist physicians in Newfoundland and Labrador. Open Med 2012;6(1):e1–e9.

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