

## **Retention of Specialist Physicians in Newfoundland and Labrador**

Patrick Fleming, MSc, [pfleming@mun.ca](mailto:pfleming@mun.ca), Faculty of Medicine, Memorial University  
Maria Mathews, PhD, [mmathews@mun.ca](mailto:mmathews@mun.ca), Division of Community Health & Humanities,  
Faculty of Medicine, Memorial University of Newfoundland

**Words:** 2564

**Abstract:** 268

**Tables:** 3

**Figures:** 4

**Keywords:** Specialist Physicians, Physician Retention, Health Human Resources, Physician Supply.

**Acknowledgements:** 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 CIHR grant "Retention of Locally Trained Medical Graduates in Saskatchewan and Newfoundland and Labrador." (PHE-81965).

**Contributions:** Patrick Fleming, designed the study, conducted the analysis and prepared the draft of the manuscript. As Patrick's thesis supervisor, Maria Mathews conceived the study and over saw Patrick's activities, provided feedback on the study as well as the final draft of the paper.

**Affiliations:** Patrick Fleming is currently in the second year of medical studies at Memorial University. Dr. Maria Mathews is an Associate Professor of health Policy/Health Care Delivery at Memorial University. Dr. Mathews was Patrick's MSc supervisor and is the guarantor for this study.

### **Corresponding Author:**

Dr. Maria Mathews  
Division of Community Health and Humanities  
Faculty of Medicine  
Memorial University of Newfoundland  
St. John's, NL, Canada  
A1B 3V6  
Email: [mmathews@mun.ca](mailto:mmathews@mun.ca)

## **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 1) compared specialist physicians initially licensed to practise in NL in the 2000s (the 2000 cohort) and 1990s (the 1990 cohort) to assess whether retention had changed over that period of time and 2) examined the retention of fully licensed Memorial University Medical Graduates (MMGs), other fully licensed Canadian Medical Graduates (CMGs), provisionally licensed international medical graduates (IMG(Prov)), and fully licensed international medical graduates (IMG(Full)).

Methods: Using data from the provincial medical registrar and Memorial University's Office of Post-Graduate Medical Education, we used survival analysis (Cox regression) to compare the retention of the two cohorts and the four groups of physicians within each cohort.

Results: After 48 months, roughly 60% of the 2000 cohort physicians and 45% of the 1990 cohort physicians remained in NL. The 2000 cohort physicians were 1.6 times less likely to leave NL compared to the 1990 cohort physicians. In the 2000 cohort CMGs, IMGs(Prov), and IMGs(Full) were 3.19, 1.85, and 4.39 times more likely to leave NL compared to MMGs. In the 1990 cohort IMG(Prov) were 2.16 times more likely to leave NL compared to MMGs. There was no significant difference between MMG and CMGs or MMG and IMGs(Full).

Interpretation: The retention of specialist physicians in NL has improved since the 1990s. This may be attributable to the increase in the relative proportion of locally trained physicians working in NL. While provisional licensing enables IMG to begin practice in the NL, it does not lead to long-term retention.

**Introduction:**

Although the number of specialist physicians in Newfoundland and Labrador (NL) has increased from 334 in 1995 to 527 in 2008<sup>1-2</sup>, local media regularly report on specialist shortages<sup>3-5</sup>. While the increase in the number of specialist physicians suggests that more of these physicians are moving to the province, the continued stories of shortages suggest that high turnover may be a concern. Specialists account for roughly half of the 1110 practising doctors in the province in 2008<sup>2</sup>, however, unlike general practitioners (GPs) and family physicians<sup>5,6</sup>, relatively little is known about the duration of their practice in the province.

A number of studies have suggested that international medical graduates (IMGs) see NL as an entry point to practise in Canada<sup>6,8</sup>. IMGs may work in NL with provisional licences while completing licensing exams and obtaining the necessary credentials for a full licence. An earlier study<sup>6</sup> found that IMGs in primary care (family physicians and GPs) who initially held a provisional licence were more likely to leave the province compared to locally trained physicians; only 5.2% IMGs who began practice with a provisional licence remained in NL at the end of the follow-up period compared to 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.

We conducted a study to examine the retention of specialist physicians in NL. Specifically, 1) We compared two cohorts of physicians who were initially licensed to practise in the province between 1993 and 1997, and between 2000 and 2004 to compare whether overall retention had changed and 2) we examined the retention of fully licensed Memorial University Medical Graduates (MMGs), other fully licensed Canadian Medical Graduates (CMGs), provisionally licensed IMGs (IMG(Prov)), and fully licensed IMGs (IMG(Full)). Our study is

timely given the Agreement of Internal Trade (AIT) which is intended to enhance the level of mobility among certified or registered professions including medicine. A recent amendment to this agreement will allow professionals certified in one province to move to other provinces without restrictions providing they are in good standing<sup>9,10</sup>. The receiving province may not require any additional assessment, training, or certifications on such professionals. This study will explore the potential impact of the AIT on physician retention patterns by describing the number of physicians who could now migrate to other provinces.

## **Methods:**

This study was approved by Memorial University's Human Investigations Committee. This study was also funded in part from a grant from CIHR (PHE-81965). The funding had no role in conducting the study or in the preparation of reports.

This retrospective cohort study used administrative data obtained from the College of Physicians and Surgeons of Newfoundland and Labrador (CPSNL) and the Memorial University's Office of Post-Graduate Medical Education to create two cohorts of specialist physicians who worked in NL. The 2000 cohort consisted of specialists who received their first non-trainee licence to practise in NL between January 1, 2000 and December 31, 2004. The 1990 cohort consisted of specialists who received their first non-trainee licence to practise in NL between January 1, 1993 and December 31, 1997. We followed both cohorts until December 31, 2007, a maximum of 8 and 15 years for the 2000 and 1990 cohorts respectively.

We included all fully and provisionally licensed specialist physicians (non-trainee) who received their first licence to practise in NL between either January 1, 1993 and December 31,

1997 or January 1, 2000 and December 31, 2004. We excluded: physicians who received their first licence outside these periods, residents, non-practising physicians (e.g. retired or non-clinical appointments), community medicine specialists, and locum tenens (less than three months). Community medicine specialists were excluded because based on the available data, we were unable to determine if they were practising family medicine or community medicine. The three months cut-off for locums was used in a previous study in NL<sup>6</sup>. We used the end date listed in Post-Graduate Medical Education to ensure that start times for licences did not include residency training.

We examined whether or not a physician stayed in NL by the end of follow-up period and calculated his/her total length of practice in the province. The independent variable was physician group. We compared four groups of physicians: MMGs, CMGs and IMGs who started practice on a full licence, and IMG who started practice on a provisional license. Covariates in our analysis included sex, held FRCPC/ FRCSC (yes/no), certified by another body (yes/no), specialist group (clinical, laboratory, surgical), decade of graduation (<1973, 1973-1979, 1980-1989, 1990-1999), age in 2008, age at graduation from medical school, and whether or not the physician did any residency training at Memorial University (yes/no). We used 1973 as a cut-off for decade of graduation because it was the first year Memorial graduated physicians.

Using ANOVA, chi-square, and Mantel-Cox tests, we compared the characteristics of each cohort, and then the physicians who stayed and left in each cohort. We used survival analysis (Cox regression) on all physicians in the study to compare the retention of the two cohorts. We then repeated the survival analysis on each cohort to compare the four 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 two variables were highly correlated (e.g. current age and age at graduation), only one covariate was included in the regression. We did not detect large standard error values indicative of multi-collinearity<sup>11</sup>.

## **Results:**

After applying our inclusion and exclusion criteria, there were 180 physicians in the 2000 cohort and 211 physicians in the 1990 cohort (Figure 1). Physicians were excluded from the study if they were a locum, they held a non-trainee license before the cohort inception dates, if there was insufficient data to assess when they started working in NL, if they held trainee licences during the inception period, or if they graduated during the inception period.

Table 1 shows the characteristics of each cohort. Compared to the 1990 cohort, the 2000 cohort contained a larger proportion of MMGs and IMG(Prov) and physicians who had the FRCP/SC designation. They were certified, had graduated from medical school in the 1990s, were younger in 2008 (but older at graduation) and had worked for a longer time in NL. A larger proportion of the 1990 cohort than the 2000 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 those who stayed. In contrast, while FRCP/SC and certified physicians made up a larger proportion of physicians who left in the 1990 cohort, they made up a smaller proportion of physicians who left in the 2000 cohort.

As shown in Figure 2, the survival curves indicate that after 48 months, roughly 60% of the 2000 cohort and 45% of the 1990 cohort physicians remained in NL. After controlling for

physician group, 2000 cohort physicians were 1.6 times less likely (the inverse of 0.62) to leave NL compared to 1990 cohort physicians.

We repeated our analysis with each cohort separately. In both analyses, physician group was the only significant covariate in the Cox regression models (Table 3). In the 2000 cohort, compared to MMGs, all other physician groups were more likely to leave NL: CMGs, IMGs(Prov), and IMGs(Full) were 3.19, 1.85, and 4.39 times more likely to leave. 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 (Figure 3). Almost 60% of the MMG group remained at the end of the 96 month follow-up period.

In the 1990 cohort, compared with MMGs, IMG(Prov) were 2.16 times more likely to leave than MMGs. There was no significant difference between MMG 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 (Figure 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 a greater number of physicians practising in the province, a larger proportion of these physicians are staying in the province longer. While the follow-up period differed for the two cohorts, even when compared over an equivalent period, the 2000 cohort had a higher proportion of physicians remaining in the province than the 1990 cohort. The increased retention may stem from many reasons including: improved recruitment efforts, more competitive remuneration, and an increase in the number of Memorial educated physicians working in the province. Memorial graduates made up a larger proportion of the 2000 cohort (33.9%) than the 1990 cohort (19.4%). Like previous studies<sup>6,12</sup>, we found that Memorial

graduates had a higher retention in the province than physicians trained elsewhere in Canada or abroad. However, unlike other studies<sup>6,12</sup>, having done residency training at Memorial was not found to be a significant predictor for retention in the province. These other studies examined only family physicians or both family physicians and specialists together. In this study, less than 30% of specialists in either cohort had done any post-graduate training at in the province. At present, the residency training program available in the province (through Memorial University) generally consists of core areas such as general surgery and general internal medicine<sup>13</sup>. There are limited opportunities for subspecialty programs and trainees must leave NL to pursue in these specialities.

Provisionally licensed IMGs formed a large proportion of specialists in the study (52.2% of the 2000 cohort and 46.9% of the 1990 cohort). IMGs(Prov) compose nearly 30% of the total physician workforce in NL compared to the national average of 5%<sup>8</sup>. By the end of our study period, half of the IMGs(Prov) from the 2000 cohort and 5.0% of the IMGs(Prov) from the 1990 cohort remained in NL. It does not appear that the use of provisional licenses leads to long-term retention in NL. Although relatively few of these physicians remained in the NL, the province continues to rely on IMG to address shortages. Eliminating the provisional licensing policy, which facilitates IMGs entry to practise, would negatively impact physician supply in NL.

Many, but not all IMGs who began their practice with a provisional license, obtained certification from the Royal College of Physicians and Surgeons of Canada (21 of 94 in the 2000 cohort and 42 of 102 in the 1990 cohort). CPSNL data may underestimate the full number of IMGs who obtain Royal College certification. While licences must be renewed annually, the fee to change or update registration information may discourage physicians from updating their



credentials with the CPSNL<sup>6</sup>, especially if they are planning to move to another jurisdiction after receiving the Fellow designation<sup>14</sup>.

Among the physicians who remained in NL at the end of the follow up period, 41.9% were not Fellows of the Royal College and 38.5% were not certified by another body. While the majority of these physicians were IMGs, a small number were Memorial University and Canadian medical graduates who had full licences. The CPSNL has discretion under its own by-laws and regulations in determining what training is equivalent to RCPSC approved training<sup>15</sup>. Likewise, the CPSNL may grant a “full licence” to physicians who are not board certified (by the Royal College or other body). For example, in the 2000 cohort, 13 (15.1%) of the 86 fully licensed specialists were not Fellows of the Royal College and 12 (14.0%) were not certified (by any body). In the 1990 cohort, 8 (7.1%) of the 112 fully licensed specialists were not Fellows of the Royal College and 5 (4.50%) were not certified (by any certifying authority). Non-certified specialists comprise roughly one quarter (26.9%) of the specialist workforce in NL compared to 0.78% in Ontario<sup>16</sup>. In these CIHI statistics, “non-certified” refers to physicians who have not earned Canadian specialist credentials. They have generally obtained equivalent certification from their home jurisdiction.

Is certification important? An editorial in the Canadian Medical Association Journal suggested that “...allowing physicians to continue to practise without demonstrating that they meet current standards, will contribute to patient and public dissatisfaction, adverse events and poorer outcomes of care”.<sup>17</sup> Although we were unable to find studies assessing the impact of specialist certification in Canada, a substantial body of evidence from U.S. medical literature indicates that board certification is associated with improved clinical outcomes and higher levels of satisfaction. For example, one systematic review identified 13 high quality studies on board-

certification with 33 separate outcomes.<sup>18</sup> Board specialist certification was linked with a number of improved clinical outcomes such as fewer patient complications and lower mortality.

By removing interprovincial barriers, the AIT will likely increased out-migration of provisionally licensed and non-certified physicians from NL. Current evidence suggests that the majority of IMGs practise in NL only until they receive full licensure at which point they leave the province<sup>6,14</sup>. With these new amendments to the AIT, physicians may 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. Further research is needed to assess the actual impact of the AIT on the physician workforce of both source and receiving provinces.

### *Limitations*

Our analyses are limited by the nature of the administrative data base which was not created for research purposes. For example, the CSPNL data does not distinguish between full licenses awarded to specialists, GPs, or family physicians. Physicians in the 1990 cohort were able to work as general practitioners after completing a general rotating internship before returning for specialist training<sup>19</sup>. Therefore, specialists in the 1990 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 were working as specialists.

The use of administrative data limited the number of variables we could examine. We were not able to examine the effect of variables like marital status, number of children, etc. which may impact retention. In addition, prior to 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 Figure 1).

### **Conclusion:**

Using licensing data from the provincial medical registrar, we found that the retention of specialists in NL has improved from the 1990s. A larger proportion of physicians who began practice in the province between 2000 and 2004 remained in the NL compared to a similar cohort of physicians from the 1990s. Moreover, median practice time had also increased. The increase in retention may be attributable to the increase in the relative proportion of locally trained graduates in the 2000 cohort. Memorial University medical graduates were less likely to leave than other Canadian trained physicians or IMGs who made up a substantial proportion of physicians in each cohort. While provisional licensing enables IMGs to begin practice in the NL, it does not lead to long-term retention of these physicians.

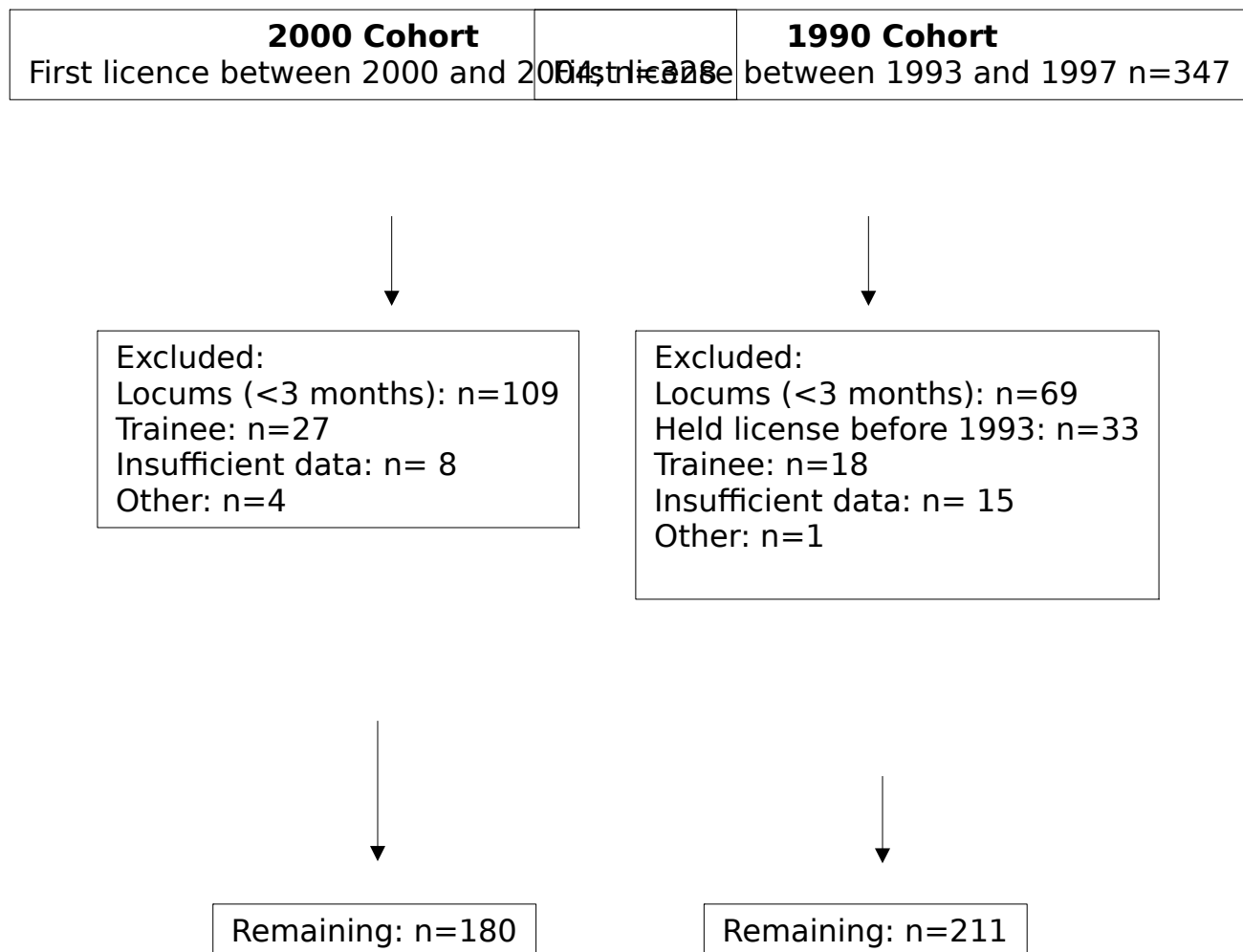


Figure 1 – Sample Construction for the 2000 Cohort (2000-2004) and the 1990 Cohort (1993-1997)

Table 1 – Comparison of the 2000 Cohort (2000-2004) and the 1990 Cohort (1993-1997) n=391

Characteristic	2000 Cohort n (%)*	1990 Cohort n (%)*	p-value
<b>Physician Group</b>			<0.000
MMG	61 (33.9)	38 (18.0)	
CMG	16 (8.9)	34 (16.1)	
IMG(Prov)	94 (52.2)	102 (48.3)	
IMG(Full)	9 (5.0)	37 (17.5)	
<b>Sex</b>			0.561
Male	131 (72.8)	161 (76.3)	
Female	49 (27.2)	50 (23.7)	
<b>Have FRCPC/S</b>			0.001
No	86 (47.8)	68 (32.3)	
Yes	94 (52.2)	143 (67.8)	
<b>Fully Certified</b>			0.001
No	85 (47.2)	66 (31.3)	
Yes	95 (52.8)	145 (68.7)	
<b>Decade of Graduation</b>			<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)	
<b>Did some or all of residency at MUN</b>			0.572
No	127 (70.6)	153 (72.5)	
Yes	53 (29.4)	58 (27.5)	
<b>Left</b>			<0.000
No	91 (50.6)	33 (15.6)	
Yes	89 (49.4)	178 (84.3)	
<b>Came back after leaving?</b>			<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)	
<b>Speciality Type</b>			0.530
Clinical	114 (63.7)	122 (57.8)	
Laboratory	13 (7.3)	18 (8.5)	
Surgical	52 (29.1)	70 (33.2)	
<b>Age (at 2008)</b>			<0.000
Mean (sd)	44.0 (7.1)	52.2 (8.2)	
<b>Age at Graduation</b>			0.001
Mean(sd)	26.2 (3.7)	25.1 (2.1)	
<b>Total time (months)</b>			<0.000
Median	66.0	35.0	

\*Except for age, age graduation, and total time

Table 2- Characteristics of Physicians who Stayed and Left in the 2000 Cohort (2000-2004, n=180) and the 1990 Cohort (1993-1997, n=211)

Characteristic	2000 Cohort (2000-2004)			1990 Cohort (1993-1997)		
	Stayed n (%)*	Left n (%)*	p-value	Stayed n (%)*	Left n (%)*	p-value
<b>Physician Group</b>			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)	
IMF(Full)	†	†		7 (21.2)	30 (16.9)	
<b>Sex</b>			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)	
<b>Have FRCPC/S</b>			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)	
<b>Fully Certified</b>			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)	
<b>Decade of Graduation</b>			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)	
<b>Did some or all of residency at MUN</b>			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)	
<b>Speciality Group</b>			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)	
<b>Age (at 2008)</b>			0.423			0.005

Mean (sd)	44.2 (7.2)	43.5 (6.9)		48.6 (7.8)	52.9 (8.1)	
<b>Age at Graduation</b>			0.002			0.343
Mean (sd)	27.0 (4.4)	25.3 (2.6)		24.8 (1.3)	25.2 (2.2)	
<b>Total time (months)</b>			<0.000			<0.000
Mean (sd)	63.7 (17.2)	27.5 (20.3)		7 (21.2)	30 (16.9)	

\*Except for age, age at graduation, and total time

† IMG(Full) suppressed from analysis because of small number in each cell

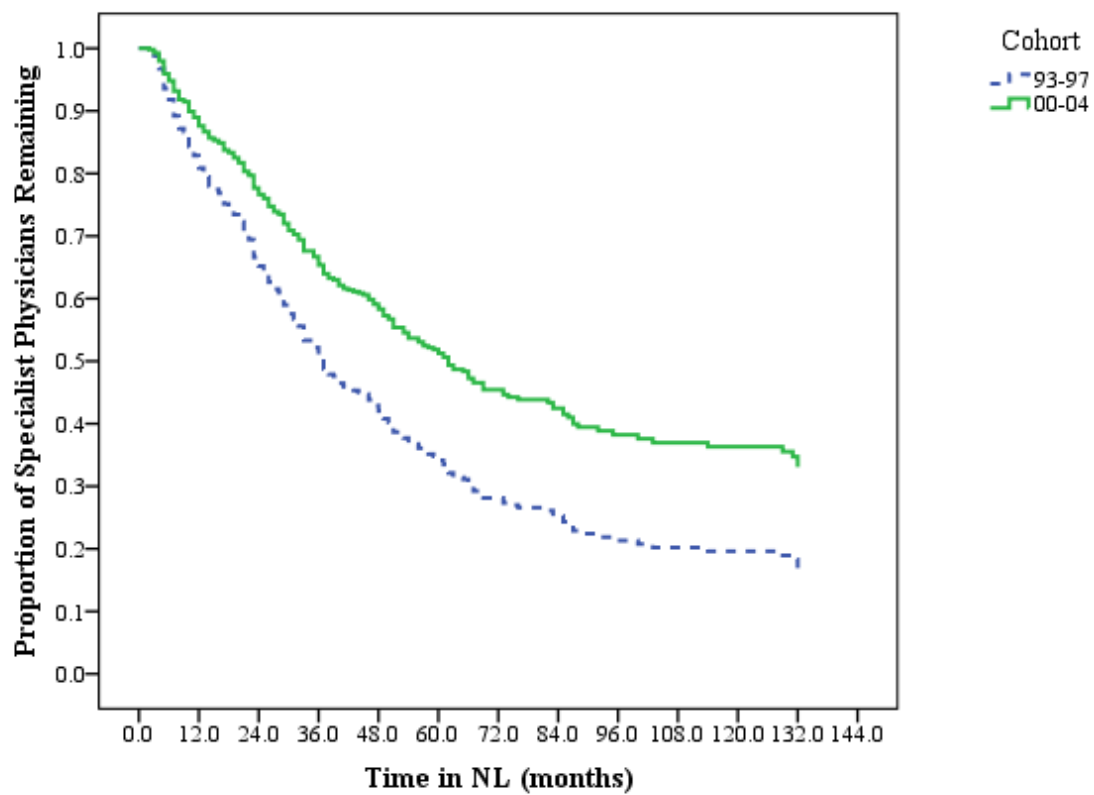


Figure 2 – Survival Curve Obtained from Cox regression Comparing the 2000 Cohort (2000-1004, n=180) and the 1990 Cohort (1993-1997, n=211)



Table 3 – Predictors of Physicians Leaving NL Based on Survival Analysis (Cox Regression)  
who were First Licensed from 2000-2004 (n=180) and 1993-1997 (n=211)

Characteristic	Coefficient $\beta$	Standard Error	Wald X <sup>2</sup>	Hazard Ratio	p-value	95% CI
<b>Figure 3 – both cohorts</b>						
<b>Cohort</b>			12.00		0.001	
1990 Cohort*	--	--	--	1.00	--	--
2000 Cohort	-0.475	0.137		0.62	0.001	0.48-0.81
<b>Physician Group</b>			18.55		<0.000	
MMG*	--	--	--	--	--	--
CMG	0.688	0.227	9.23	1.99	0.002	1.28-3.10
IMG(Prov)	0.746	0.175	18.19	2.11	<0.000	1.50-3.00
IMG(Full)	0.618	0.228	7.33	1.86	0.007	1.19-2.90
<b>Figure 4 – 2000 Cohort (2000-2004)</b>						
<i>Physician Group</i>			15.79		0.001	
MMG	--	--	--	1.00*	--	--
CMG	1.159	0.393	8.68	3.19	0.003	1.47-6.89
IMG(Prov)	0.614	0.269	5.24	1.85	0.019	1.09-3.17
IMG(Full)	1.48	0.425	12.14	4.39	<0.000	1.91-10.10
<b>Figure 5: 1990 Cohort (1993-1997)</b>						
<i>Physician Group</i>			11.96		0.008	
MMG	--	--	--	1.00*	--	--
CMG	0.505	0.282	3.19	1.66	0.074	0.952-2.88
IMG(Prov)	0.772	0.235	10.79	2.16	0.001	1.37-3.42
IMG(Full)	0.404	0.278	2.12	1.50	0.146	0.869-2.58

\* Reference category

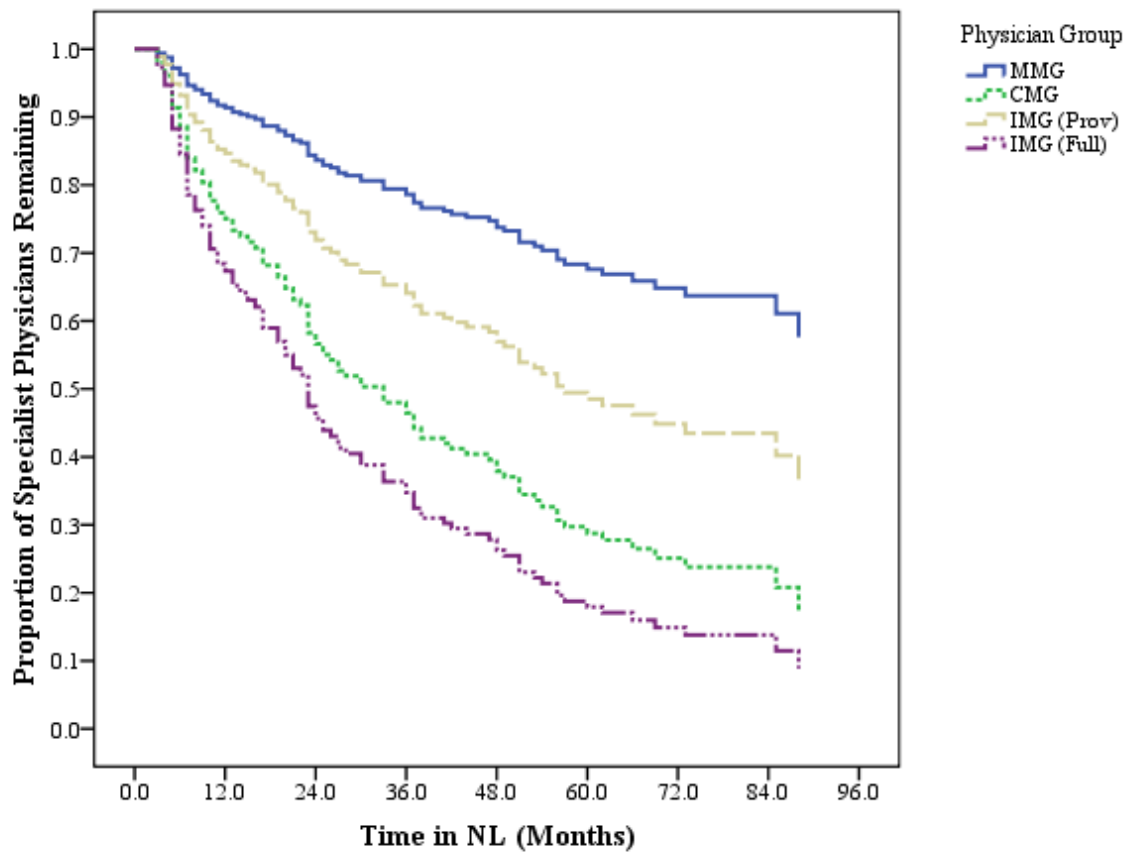


Figure 3 - Survival Curve Obtained from Cox Regression for Specialist Physicians Leaving NL for the 2000 Cohort (2000-2004, n=180) Differentiated by Physician Group

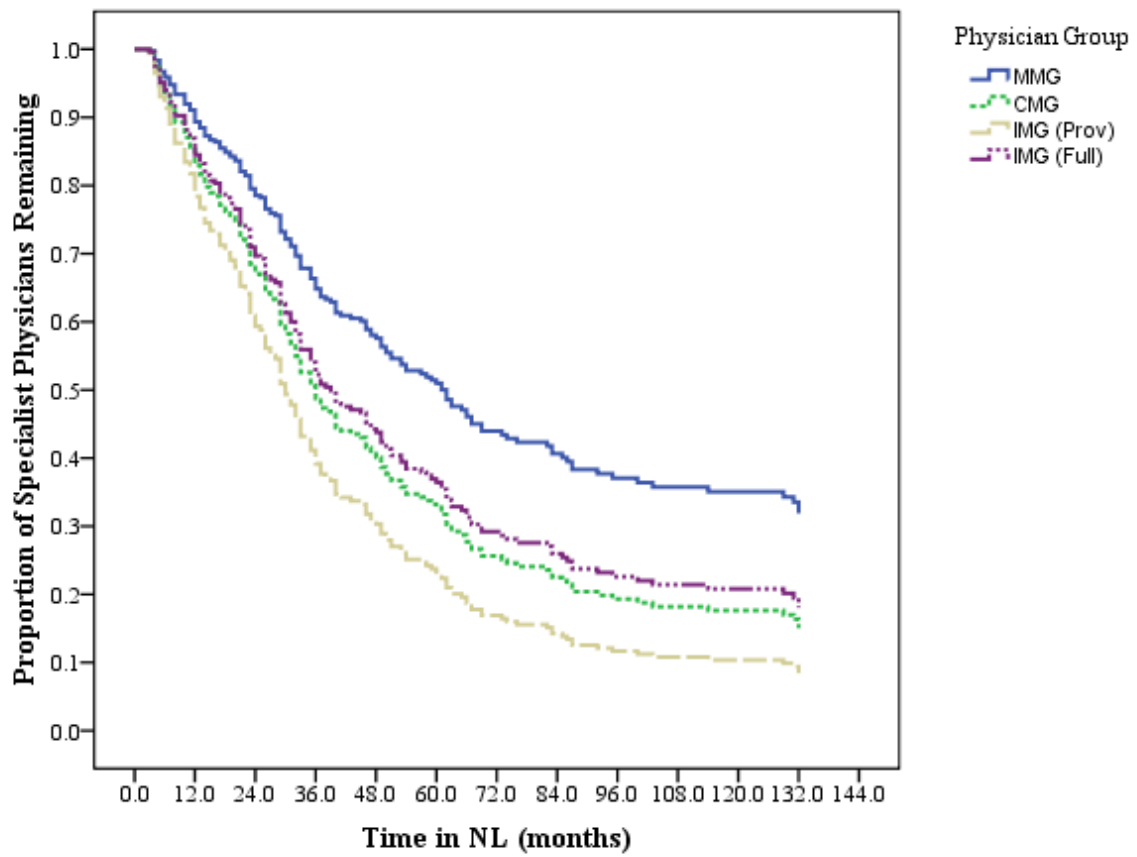


Figure 4 - Survival Curve Obtained from Cox Regression for Specialist Physicians Leaving NL for the 1990 Cohort (1993-1997, n=211) Differentiated by Physician Group

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