Mobility of the GP workforce

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Summary

Background: GPs preferences for working in different areas and for practice characteristics have resulted in recruitment and retention difficulties in areas of England. The resulting inequality in the provision of GP services is an important policy concern. Yet there have been few studies analysing geographical variations in GP mobility.

Aim: To analyse the mobility of the GP workforce in England in terms of either migration between PCTs or leaving practice and to identify those features of different areas and practices that determine mobility. Uniquely the study identifies the role that the relative pay of GPs in different areas of England plays in the migration decision.

Method: Mobility is defined in terms of migration (practicing in a different PCT from the previous year) and exit (not practicing compared with previous year). We use a multinomial logit model to regress outcome categories (No migration or exit, Migration, Exit) against a range of individual, practice and local area characteristics. The main data source is the General Medical Practitioner (GMP) database, supplemented with covariates that measure local area characteristics. Mobility is analysed in terms of differences in GP location between 2002 and 2003.

Results: Across all GPs in the 2002 sample, 1.1% had migrated to a different PCT in 2003, and 4.8% were no longer in practice. Factors correlated with mobility included the gender, age, and country of qualification of the GP, whether they worked part-time, the GP list size, and number of dispensing patients. We found that important local characteristics of the population served were the limiting longstanding illness rate, the proportion of the population from ethnic minorities, and population density. The relative pay of GPs was also found to be an important

variable explaining migration. If GPs had chosen to migrate they were more likely to choose destinations with more dispensing patients, and towards PMS (salaried) status.
Conclusion: GP mobility is correlated with the age and gender of GPs and with characteristics of the practice and the local area. They help explain why certain areas experience recruitment and retention difficulties.

1. Introduction

Persistent recruitment and retention difficulties that result in inequality in the geographical distribution of general practitioners (GPs) in England have been a source of enduring health policy concern (DDRB, 2002). An analysis of GP mobility between geographical areas can be used to identify those characteristics of GPs and GP practices and of different areas that are associated with recruitment and retention difficulties (Taylor and Leese, 1998). To date there have been few empirical studies of mobility among NHS staff (Gray and Phillips, 1994), and GPs (Taylor and Leese, 1998). This study is the most detailed to date and is the first to evaluate whether mobility is associated with differences in the relative pay of GPs in different areas.

In the UK the majority of GPs are self-employed. They contract with the NHS to provide primary medical services to registered populations under a nationally-negotiated set of terms and conditions. These general medical services (GMS) Principals form small partnerships and many elect to own their own premises. Until 2004, they were paid under a set of Standard Fees and Allowances which partially reimbursed some of their expenses and provided additional income for registering more patients, practising in deprived or rural areas and providing greater amounts of some activities. All GPs prescribe pharmaceutical products to their patients but where there is no local pharmacy, GPs are licensed to dispense also. This provides additional income through a mark-up on the pharmaceutical products and fees for each item dispensed. A new contractual option for Principals was introduced in pilot form in 1998. Instead of remaining self-employed, GPs could become employees of the local primary care organisation, receiving a salary for a locally-negotiated set of terms and conditions. In general, these personal medical services (PMS) contracts are thought to have been more generously reimbursed than GMS contracts, particularly in deprived areas (Shapiro, 2000).

GPs would be expected to prefer to locate in areas and choose job conditions with the highest net advantages. One element of this is income and GPs can increase their net income by taking on more patients, forming larger partnerships, locating where they can obtain a licence to dispense and opting for salaried (PMS) contracts. We might also expect GPs to locate in areas where their pay is commensurate with that in other occupations. Geographical variation in pay is required to compensate for differences in the cost-of-living and the disamenities associated with working in different areas of England. Where the relative pay for GPs is less than that for other workers this indicates that GPs are insufficiently compensated for working in these areas.

The aim of the paper is to analyse the mobility of the GP workforce. The objectives are to identify the extent to which GPs exit general practice and change practice, and the factors that influence these changes. We will identify the key area, population and practice characteristics that are associated with mobility. For the latter we would ideally consider migration analysis between practices, but the data do not allow this. Our approach, therefore, is similar to that adopted by Taylor and Leese (1998), who investigated migration between health authorities. In this study we conduct the analysis using a finer level of geographical disaggregation; we focus on migration between PCTs. Our analysis goes beyond Taylor's and Leese's because we also examine the impact of individual, practice and local area characteristics on individual GP migration and exit decisions. Decisions to migrate between PCTs and to exit general practice are regressed against a wide range of covariates to determine the importance of factors in explaining mobility. We focus on the mobility of Principals in England over the period 2002-2003.

2. Data

2.1. Data sources

The main data source is the General Medical Practitioner (GMP) database. This is an annual Census of GPs in post at September each year. It was used to derive the mobility measures and the individual and practice level covariates. The Principals Dataset for September 2002 and September 2003 were obtained and then linked via the partnership code to the Partnership

Dataset, which provides variables relating to the characteristics of registered patients and details of practice organisation such as the number of partners and list size.

We added to these data a variety of local area characteristics supplied by the Technical Steering Committee Secretariat in the Health and Social Care Information Centre and derived from the 2001 Census in England. The data were available at the Super Output Area level and linked to GPs on the basis of the geographical distribution of their registered populations through the Attribution Dataset. Finally, we employed the method detailed in Elliott et al. (2005a) to construct a measure of the relative wages of GPs; the mean differences between the standardised spatial wage differential (SSWD) for GPs and other workers in the same area. The data employed in this study were obtained from Elliott et al. (2005b). This variable was available at the PCT level for the financial year 2002-2003 and was linked to GPs on the basis of the PCT in which they worked in September 2002.

2.2. Mobility

Mobility is analysed in terms of differences in GP location between 2002 and 2003. Two distinct elements of mobility were identified and examined: migration, and exit. A GP was defined as having migrated if they worked in a different PCT in September 2003 compared with where they worked at the baseline (September 2002). This was identified using the PCT code attributed to the GP in the GMP database. A GP was defined as having exited practice if they were listed in September 2002 but then not listed in September 2003. Turnover was the sum of these two behaviours. The definitions of mobility are summarised in Box 1.

2.3. Independent variables

We include a number of independent variables, grouped in three categories. These are variables describing:

(1) The GP: their gender; age and age squared; part time status; and, country of qualification (UK, Non-UK Europe, Rest of World).

(2) The Practice: list size (average list size per partner in the practice/1,000); partnership size (9 categories, 1–9+); dispensing status (number of dispensing patients registered on the GPs list/1,000); whether the GP was employed on a PMS (salaried) contract; and, whether the practice had at least one female partner.
(3) The population served and the local area: the local standardised rate of limiting long-term illness; the proportion of the local population from an ethnic minority; the local population density (persons per hectare/10); and, the difference between the SSWD in the local area. This last variable measures the difference between the relative rewards of GPs working in an area (measured by their net income divided by their hours worked) and those for other workers in the same area (measured by the hourly wage). Crudely, it is a measure of the relative pay of other workers in each PCT area minus the relative pay of GPs.

3. Estimation

3.1. Regression models

We model mobility as a two-stage process. At the first stage we wish to identify the factors that are correlated with GP migration and exit decisions. The data were analysed using multinomial logistic regression, which allows us to model the impact of the independent variables on the three choices faced by GPs at the baseline (No migration or exit, Migration, Exit). We regressed these outcome categories, based on changes over the period 2002-2003, against the individual and practice characteristics (measured in 2002) and the local area and population characteristics (based on 2001, 2002 and 2003 data). We report six models, adding in sequentially the individual, practice and then local area and population characteristics.

The omitted category in every model is No migration or exit. The coefficients therefore indicate the conditional effect of each independent variable on migration or exit relative to no migration or exit. We also report the results of Small-Hsiao tests of the independence of irrelevant alternatives (IIA) assumption that underpins the multinomial logit framework. A p-value > 0.05 for every omitted category indicates that the model satisfies the IIA condition.

At the second-stage we examine the choices made by the GPs that had decided to migrate. We compare the characteristics of the destination and origin locations. We first compare, using standard two-tailed t-tests, mean differences in practice characteristics in 2002 and 2003 in the migrating sample. We then examine the influences on the decision to choose the destination location over the origin location as a function of the differences between the characteristics of working at the two locations using logistic regression. Traditionally, the dependent variable in these models is whether the GP chose the destination location over the original location. Since the sample consists only of GPs who did migrate, all observations in the sample would have a value of one for this dependent variable. Therefore, we randomly assign half the sample to take a value of zero for the dependent variable and for these individuals we multiply the differences in practice characteristics by a factor of minus one.

Robust standard errors are used in all the regression models.

3.2. Sample size

The 2002 Principals Dataset was merged with the 2003 Principals Dataset on the date of birth and GMC number of the GP, which is reported fully in both datasets. 26,555 GPs appeared in both datasets, 1,351 GPs appeared in the 2002 dataset but not the 2003 dataset (indicating an exit rate of 1,351/(1,351+26,555) = 4.8%), and 1,889 GPs appeared in the 2003 dataset but not the 2002 dataset. This last group were dropped from the sample. The final sample therefore comprised 27,906 GPs.

4. Results

4.1. Summary statistics

Across all GPs in the 2002 sample, 1.1% had migrated to a different PCT in 2003, and 4.8% were no longer in practice. The turnover rate was 5.9%.

Migration, exit and turnover rates by Strategic Health Authority are shown in Table 1. Turnover varies from 4.1% to 8.1%. It is lowest in parts of Yorkshire and the West Country and highest in Essex and parts of London. The higher turnover in Essex and London is due to both higher migration and higher exit rates, though in all areas the exit rate is greater than the migration rate.

4.2. Impact of individual, practice and local area characteristics on GP migration and exit

Regression results for models including the individual level variables only are in Table 2. The first model contains only gender and age and shows that these variables, unconditionally, have little effect on migration. Relative to No migration or exit females are more likely to exit practice. There is a broad U-shaped effect of age on exit from practice with the likelihood of exit declining with age up to around 40 years and then increasing thereafter. The Small-Hsiao tests indicate that the IIA assumption is met in these models. The same result is found in all subsequent models.

The second model in Table 2 also includes part-time status and country of qualification. The impact of working part-time on migration is insignificant and those who were qualified outside the UK are significantly more likely to migrate. The latter effect is possibly due to this group having fewer personal ties. Part-timers are more likely to exit general practice, as are those GPs who qualified in Europe (the latter may have remained in practice but left England). Those who qualified outside of Europe are less likely to exit.

The next two models, in Table 3, add variables for list size, partnership size, and other practice characteristics. Conditional on partnership size, the effect of list size per GP on both migration and exit is significant and negative. It is likely this is picking up an income effect – i.e. the higher capitation income associated with a greater patient/GP ratio. GPs working in larger practices (in terms of the number of partners) are less likely to migrate, though the effect is significant only for larger partnership sizes. Partnership size is negatively correlated with exiting practice. In the second model in Table 3 we introduce additional practice characteristics. GPs with more dispensing patients are less likely to migrate, as are those working in PMS practices, though the effect of the latter is insignificant. Both variables have an insignificant impact on exit decisions.

The impact of working in a practice with at least one female partner is insignificant in terms of migration, but significant and negative in terms of the decision to exit. The individual level variables are unchanged with the addition of the practice variables.

In Table 4 we add local area characteristics. The small reduction in sample size is due to missing local area data for some GPs. All else equal limiting long-term illness has an insignificant effect on migration and a significant and negative effect on exit. Higher proportions of the population from minority ethnic groups are positively associated with migration and exit, and population density, conditional on the other area covariates, has a negative effect on both outcomes. The effect of the individual level variables on exit change little with the addition of these variables, though age is now shown to have a statistically significant inverse U-shaped relationship with migration, with the likelihood of migration increasing with age up to around 30 years of age and declining thereafter. List size retains its significant and negative effect on both outcomes, and partnership size is now insignificant.

Also in Table 4 we include the SSWD gap for GPs and other workers. Crudely, this measures the relative pay of the comparator group minus the relative pay of GPs in each PCT area. The results reveal that it is positively correlated with GP migration (the effect on exit decisions is insignificant). This indicates that the greater the difference between the relative pay that GPs receive for working in an area and that the comparator group receives the more likely it is that GPs will move to another area. This is entirely as expected. The SSWD for the comparator group measures the differences in pay required to compensate for differences in the cost-of-living and the disamenities associated with working in different areas of England. Where the relative pay for GPs is less than that for the comparator group GPs are being insufficiently compensated for working in these areas.

4.3. Changes in practice characteristics among migrating GPs

Table 5 presents results on differential practice characteristics among the 307 GPs in the sample who migrated. We report two-tailed t-tests comparing differences in mean practice

characteristics among this sub-sample. There are significant differences in list size, dispensing patients and whether or not the GP worked in a PMS practice.

The results of the multivariate analysis reported in Table 6 are broadly similar. GPs who migrated were, on average, more likely to move to a practice with a smaller list size, though the effect is only weakly significant. Combined with the multinomial logit regression results this indicates that conditional on the covariates GPs with longer lists are less likely to migrate, but if they do migrate the list size in their new practice is lower than in their old practice.

We find no significant change in partnership size among migrating GPs. This indicates that this variable has little effect on migration, all else equal. We noted above that GPs working in dispensing practices were significantly less likely to migrate. Table 6 shows that among those who did migrate, the trend was towards practices with more dispensing patients.

While working in a PMS practice has no significant effect on the decision to migrate or exit, we find that, among those who did migrate, there was a trend towards moving to a PMS practice. It is important to note, however, that there was a very rapid increase in the proportion of PMS practices in the 2003-2003 period. So this result maybe due to the fact that even if GPs ignore PMS status they were more likely to be in a PMS practice in the second year than in the first year. Finally, those who migrated were no more or less likely to move to a practice with at least one female partner.

5. Concluding remarks

In this paper we investigate the mobility of GPs in England using individual level data. We use a regression based approach and a dataset containing individual, practice and local area characteristics, to identify the factors correlated with GP migration and exit decisions. These factors include list size, dispensing patients, and local characteristics reflecting limiting longstanding illness rate, proportion of the population from ethnic minorities, and population density. Uniquely the study includes a measure of the relative pay of GPs in different areas of the country and judges the appropriateness of these pay differences against those of a comparator

group of other workers. Among GPs who migrated there was a trend towards choosing practices with smaller list sizes, more dispensing patients, and PMS status.

The turnover rates found in this study are broadly consistent with those from previous work. According to our estimates, the GP migration rate was 1.1% and the exit rate was 4.8%. The exit rate found by Taylor and Leese (1998) is very similar to the one reported here (they report an England average of 4.0%). Their migration rate is half the size of the figure reported here (0.6%), but their focus is on migration between health authorities, which are larger than PCTs, and so a higher migration rate is to be expected in our study. Nonetheless the headline findings are broadly consistent. Similarly to Taylor and Leese we also find that GP turnover is driven mainly by the decision to exit practice rather than migration.

In comparison with other NHS staff GP turnover appears to be relatively low. For example, Gray and Phillips (1994) reported an average turnover rate of 13.6% across a range of NHS staff groups, including nurses, midwives, physiotherapists, radiographers, medical laboratory scientific officers and clerical officers. Turnover ranged form 10.1% for nurse management and tutorial grades to 15.6% for physiotherapists. The Chartered Institute of Personnel and Development (2003) recently reported an average UK turnover rate of 16.1%, based on 577 organisations in the private, public and voluntary sectors. Across the public services they report a turnover rate of 12.5%, which in the health sector was slightly higher at 15.3%. Overall, turnover rates for GPs therefore appear to be lower than for other NHS workers, and for those outside the NHS.

In terms of our investigation of the factors correlated with GP migration and exit, our findings are also broadly consistent with previous studies. In particular, we find a statistically significant and positive effect of ethnic minority population proportions on both exit and migration decisions. Since minority ethnic groups are concentrated in deprived, urban areas, this is consistent with previous research, which finds that geographical areas that experience the greatest problems with GP recruitment and retention tend to be urban and deprived (Gosden et al., 2000; Department of Health, 2004).

Also consistent with previous research, which finds that higher income is an important determinant of practice choice (Gosden et al. 2000; Wordsworth et al. 2004), we find that, affecting controlling for other variables, factors positively affecting GP income are negatively correlated with migration and exit. For example, all else equal, list size and dispensing status have a negative impact on particularly migration. We find also that while factors influencing the level of GP income have a significant effect, the relative pay of GPs in different areas is also an important determinant of migration. The relative pay of GPs is compared to that of other workers and where GPs are compensated relatively less than their comparators this is associated with higher migration. All else equal, the greater the difference between the SSWD for GPs and the SSWD for other professional employees in the local area, the more likely it is that GPs will move to another area.

We conclude that GP mobility is correlated with various practice and local area characteristics, which can be used to identify areas with potential recruitment and retention difficulties.

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Box 1. Definitions

Migration rate

100 * Number of GPs practising in a different PCT in 2003 from that in 2002 *divided by* (those who are practising in a different PCT in 2003 *plus* those who left practice *plus* those who stayed)

Exit rate

100 * Number of GPs practising in 2002 who left practice by 2003 *divided by* (those who are practising in a different PCT *plus* those who left practice *plus* those who stayed)

Turnover rate

Migration rate plus exit rate

Or

100 * (Number of GPs practising in a different PCT in 2003 from that in 2002 *plus* those who left practice) *divided by* (those who are practising in a different PCT *plus* those who left practice *plus* those who stayed)

Table 1. GP migration, exit and turnover rates by Strategic Health Authority, ranked in ascending order of turnover rate.

Strategic Health Authority	Number of GPs in 2002	Migration rate	Exit rate	Turnover rate
NORTH & EAST YORKSHIRE & NORTHERN LINCOLNSHIRE	951	0.7	3.4	4.1
SOMERSET & DORSET	776	0.5	3.7	4.3
SOUTH WEST PENINSULA	1,035	0.5	4.0	4.4
SOUTH YORKSHIRE	714	1.0	3.5	4.5
CUMBRIA & LANCASHIRE	1,079	0.6	4.5	5.1
COVENTRY, WARKS, HEREFORDSHIRE & WORCS	865	0.1	5.1	5.2
SOUTH WEST LONDON	697	0.3	5.0	5.3
CHESHIRE & MERSEYSIDE	1,334	1.0	4.3	5.3
HAMPSHIRE & ISLE OF WIGHT	1,028	1.2	4.4	5.5
THAMES VALLEY	1,260	1.0	4.5	5.6
SURREY & SUSSEX	1,441	0.7	4.9	5.6
NORFOLK, SUFFOLK & CAMBRIDGESHIRE	1,267	1.0	4.7	5.7
NORTH CENTRAL LONDON	703	1.0	4.7	5.7
BIRMINGHAM & THE BLACK COUNTRY	1,263	1.5	4.2	5.7
COUNTY DURHAM & TEES VALLEY	645	1.1	4.7	5.7
AVON, GLOUCESTERSHIRE & WILTSHIRE	1,328	0.9	4.9	5.8
SHROPSHIRE & STAFFORDSHIRE	778	1.0	4.9	5.9
TRENT	1,408	1.4	4.6	6.0
BEDFORD & HERTFORDSHIRE	889	1.2	5.1	6.3
KENT & MEDWAY	847	1.1	5.5	6.6
NORTH WEST LONDON	973	1.0	5.7	6.7
GREATER MANCHESTER	1,388	1.4	5.3	6.8
NORTHUMBERLAND, TYNE & WEAR	838	1.9	5.0	6.9
WEST YORKSHIRE	1,247	1.6	5.6	7.2
LEICESTERSHIRE, NORTHAMPTONSHIRE & RUTLAND	814	2.0	5.3	7.2
NORTH EAST LONDON	716	1.1	6.6	7.7
SOUTH EAST LONDON	823	1.8	6.1	7.9
ESSEX	799	2.0	6.1	8.1

Table 2. Multinomial logit regression: impact of individual characteristics on GP migration and exit

	Migration*		**Exit***		**Migration***		**Exit***	
	Coef.	z	Coef.	z	Coef.	z	Coef.	z
Female	0.146	1.20	0.342	5.62	0.174	1.25	0.195	2.78
Age	-0.057	-0.81	-0.487	-21.49	-0.027	-0.36	-0.494	-20.52
Age squared	-0.00003	-0.04	0.006	23.91	-0.0005	-0.54	0.006	22.83
Part time					-0.055	-0.34	0.486	6.36
Qualified: Non-UK Europe**					0.755	2.59	0.984	6.04
Qualified: Rest of world**					0.529	2.81	-0.389	-4.22
Constant	-1.940	-1.28	6.931	12.98	-2.535	-1.60	6.822	12.07
Observations	27,906				27,906			
Pseudo-R^2	0.0594				0.0680			
Small-Hsiao tests of IIA assumption								
Omitted category	lnL(full)	lnL(omit)	χ^2	df	p	lnL(full)	lnL(omit)	χ^2	df	p
Migration	-2545.68	-2544.47	2.429	4	0.657	-2538.54	-2535.4	6.271	7	0.509
Exit	-784.528	-781.978	5.099	4	0.277	-771.005	-769.561	2.887	7	0.895
No migration or exit	-341.816	-338.187	7.258	4	0.123	-335.295	-331.209	8.171	7	0.318

* The baseline category is “No migration or exit”.

** The omitted category is “Qualified: UK”.

Table 3. Multinomial logit regression: impact of individual and practice characteristics on GP migration and exit

	Migration*		Exit*		Migration*		Exit*	
	Coef.	z	Coef.	z	Coef.	z	Coef.	z
Female	0.169	1.24	0.179	2.55	0.181	1.24	0.244	3.18
Age	-0.014	-0.19	-0.478	-19.48	-0.008	-0.11	-0.474	-19.24
Age squared	-0.001	-0.72	0.006	21.52	-0.001	-0.80	0.006	21.26
Part time	-0.193	-1.16	0.366	4.62	-0.194	-1.16	0.353	4.40
Qualified: Non-UK Europe**	0.684	2.34	0.937	5.73	0.646	2.21	0.930	5.70
Qualified: Rest of world**	0.488	2.50	-0.409	-4.07	0.431	2.21	-0.417	-4.14
Average list size per partner	-0.565	-3.74	-0.524	-8.20	-0.618	-4.00	-0.552	-8.44
Partnership size: 2***	0.032	0.12	-0.329	-2.88	0.133	0.46	-0.248	-2.09
Partnership size: 3***	-0.147	-0.52	-0.258	-2.19	0.007	0.02	-0.129	-1.01
Partnership size: 4***	-0.490	-1.69	-0.419	-3.38	-0.317	-0.98	-0.262	-1.91
Partnership size: 5***	-0.175	-0.63	-0.377	-3.05	0.017	0.05	-0.205	-1.46
Partnership size: 6***	-0.563	-1.87	-0.592	-4.38	-0.370	-1.11	-0.414	-2.74
Partnership size: 7***	-0.468	-1.52	-0.393	-2.82	-0.263	-0.77	-0.209	-1.34
Partnership size: 8***	-0.727	-2.02	-0.484	-3.05	-0.510	-1.29	-0.287	-1.65
Partnership size: 9+***	-0.766	-2.01	-0.594	-3.44	-0.506	-1.24	-0.379	-2.03
Dispensing patients					-0.306	-4.45	-0.037	-1.67
PMS practice					-0.056	-0.42	-0.100	-1.41
At least one female partner					-0.173	-0.79	-0.241	-2.41
Constant	-1.377	-0.88	7.852	13.50	-1.329	-0.85	7.879	13.56
Observations	27,906				27,906			
Pseudo-R^2	0.0778				0.0804			
Small-Hsiao tests of IIA assumption								
Omitted category	lnL(full)	lnL(omit)	χ^2	df	p	lnL(full)	lnL(omit)	χ^2	df	p
Migration	-2515.35	-2505.44	19.825	16	0.228	-2457.13	-2447.93	18.403	19	0.496
Exit	-830.646	-821.593	18.105	16	0.318	-771.864	-761.58	20.567	19	0.361
No migration or exit	-360.659	-351.463	18.392	16	0.301	-330.585	-320.096	20.977	19	0.338

* The baseline category is "No migration or exit".

** The omitted category is "Qualified: UK".

*** The omitted category is "Partnership size: 1".

Table 4. Multinomial logit regression: impact of individual, practice and local area characteristics on GP migration and exit

	Migration*		Exit*		Migration*		Exit*	
	Coef.	z	Coef.	z	Coef.	z	Coef.	z
Female	0.147	0.86	0.264	2.65	0.145	0.85	0.272	2.72
Age	0.184	1.88	-0.466	-14.66	0.178	1.82	-0.465	-14.57
Age squared	-0.003	-2.60	0.005	16.55	-0.003	-2.53	0.005	16.46
Part time	-0.317	-1.54	0.320	3.01	-0.360	-1.76	0.316	2.96
Qualified: Non-UK Europe**	0.567	1.62	1.002	4.72	0.593	1.71	1.004	4.72
Qualified: Rest of world**	0.411	1.80	-0.402	-3.18	0.382	1.66	-0.401	-3.17
Average list size per partner	-0.608	-2.77	-0.331	-3.76	-0.613	-2.82	-0.324	-3.67
Partnership size: 2***	-0.076	-0.22	-0.222	-1.46	-0.089	-0.26	-0.208	-1.37
Partnership size: 3***	-0.187	-0.53	-0.126	-0.76	-0.162	-0.46	-0.115	-0.70
Partnership size: 4***	-0.543	-1.44	-0.243	-1.38	-0.493	-1.30	-0.267	-1.50
Partnership size: 5***	-0.123	-0.33	-0.232	-1.27	-0.069	-0.18	-0.222	-1.21
Partnership size: 6***	-0.701	-1.77	-0.222	-1.17	-0.641	-1.61	-0.212	-1.12
Partnership size: 7***	-0.346	-0.87	-0.130	-0.65	-0.304	-0.75	-0.126	-0.63
Partnership size: 8***	-1.025	-1.98	-0.254	-1.11	-1.003	-1.92	-0.251	-1.09
Partnership size: 9+***	-0.913	-1.72	-0.641	-2.38	-0.871	-1.63	-0.629	-2.33
Dispensing patients	-0.385	-4.22	-0.044	-1.48	-0.355	-3.85	-0.041	-1.35
PMS practice	-0.308	-1.70	-0.079	-0.82	-0.196	-1.03	-0.065	-0.65
At least one female partner	-0.176	-0.70	-0.212	-1.69	-0.213	-0.84	-0.218	-1.73
Limiting long-term illness rate	0.410	1.22	-0.456	-2.32	0.485	1.43	-0.458	-2.29
Proportion from ethnic minorities	2.913	4.81	0.807	2.27	3.007	5.07	0.803	2.24
Population density	-0.242	-4.61	-0.065	-2.85	-0.266	-5.04	-0.066	-2.77
SSWD gap (Other workers minus GPs)					1.746	2.07	0.147	0.36
Constant	-5.233	-2.50	7.238	9.16	-5.423	-2.57	7.171	9.00
Observations	26,115				25,949			
Pseudo-R^2	0.0796				0.0800			
Small-Hsiao tests of IIA assumption								
Omitted category	lnL(full)	lnL(omit)	χ^2	df	p	lnL(full)	lnL(omit)	χ^2	df	p
Migration	-1665.37	-1660.65	9.433	22	0.991	-1690.94	-1681.21	19.468	23	0.674
Exit	-580.902	-571.309	19.186	22	0.634	-596.867	-586.551	20.632	23	0.604
No migration or exit	-213.394	-202.197	22.394	22	0.437	-223.658	-211.113	25.091	23	0.346

* The baseline category is "No migration or exit".

** The omitted category is "Qualified: UK".

*** The omitted category is "Partnership size: 1".

Table 5. Mean differences in practice characteristics of migrating GPs.

	No. GPs	Mean	Std.Err.	p
Average list size per partner				
2003	307	1.589	0.037	
2002	307	1.698	0.034	
Difference	307	-0.109	0.043	0.011
Partnership size				
2003	307	4.534	0.140	
2002	307	4.511	0.126	
Difference	307	0.023	0.173	0.895
Dispensing patients				
2003	307	0.494	0.078	
2002	307	0.187	0.041	
Difference	307	0.307	0.084	0.0003
PMS practice				
2003	307	0.407	0.028	
2002	307	0.238	0.024	
Difference	307	0.169	0.034	<0.0001
At least one female partner				
2003	307	0.811	0.022	
2002	307	0.844	0.021	
Difference	307	-0.033	0.026	0.2189

Table 6. Logistic regression of practice choice on differences between destination and origin location characteristics.

	Model 1*		Model 2**	
	Coef.	z	Coef.	z
Difference in Average list size per partner	-0.319	-1.75	-0.528	-1.83
Difference in Partnership size	0.024	0.53	0.038	0.59
Difference in Dispensing patients	0.365	4.01	0.404	3.20
Difference in PMS	0.877	4.07	1.336	3.77
Difference in At least one female partner	-0.387	-1.31	-0.587	-1.33
Observations	307		222	
Pseudo-R^2	0.1022		0.2051	

* Also includes a constant term (results not shown).

** Also includes all the individual, practice and local area characteristics plus a constant term (results not shown).