

HealthWorkforce
AUSTRALIA

Patterns and determinants of medical and nursing workforce exits

Final Report, March 2012

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Foreword

Health Workforce Australia (HWA) was established to address the challenges of providing a skilled, flexible and innovative health workforce that meets the needs of the Australian community. Our goal is to deliver research, and programs and to ensure that governments and health sector leaders are informed, engaged and supported in equipping Australia's health workforce to meet current and future challenges.

HWA is a partner in the National Health Workforce planning and Research Collaboration (the Collaboration); a consortium originally also comprising the Australian Health Workforce Institute and PricewaterhouseCoopers. HWA assumed a role in the Collaboration when the former National Health Workforce Taskforce ceased operations and was subsumed by HWA. This report presents the results of one of the studies conducted in the third year of the Collaboration's three year program.

HWA's remit includes research and workforce planning which will support the maintenance of a sustainable health workforce. Health Workforce 2025 (HW 2025) is a major flagship program of HWA, and draws on simulation modelling and stakeholder consultation to produce national supply and demand projections for various health professions based on a range of alternative planning scenarios.

The Patterns and Determinants of Medical and Nursing Workforce Exits study uses data that follows individuals over time (longitudinal data) to analyse the rate at which doctors and nurses leave the workforce. Workforce exits can be temporary exits such as time out to raise a family or extended periods of leave; or permanent exits, such as retirements, deaths and career changes. HW 2025 depends on having exit rates to enter into the modelling in order to produce projections of future supply and demand for doctors and nurses. The purpose of this study was to provide a technical report to use as a tool to validate the exit rates HW 2025 uses, by using a different data source.

The study uses a different methodology to the HW 2025 methodology for exit rates. Using longitudinal data, it is able to present both temporary exits and permanent exits; whereas HW 2025 currently presents only permanent exits. Being able to split the exits into these categories is useful as this presents a more specific rate, although there are definitional issues in classifying what constitutes a temporary exit.

The permanent exit rates found by this study are generally comparable to HW 2025, but it is difficult to use the results of this study to validate HW 2025 methodology beyond a 'big picture' level as the exits are not broken down into the same medical and nursing specialty categories used in HW 2025. The sample size and low response rates of the data sets relied on in this study means that the results may not accurately reflect the wider medical and nursing workforce.



Overall, the study provides some broader verification of the trends in exits rates that appear in HWA's modelling and provides some methods which HWA may consider in the future analysis of exit rates. For more information on HW 2025 go to www.hwa.gov.au or contact us at iap@hwa.gov.au

Mark Cormack
Chief Executive Officer
Health Workforce Australia

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About Health Workforce Australia

Health Workforce Australia (HWA) is an initiative of the Council of Australian Governments (COAG), and has been established to address the challenges of providing a skilled, flexible and innovative health workforce that meets the needs of the Australian community, now and into the future.

HWA was established following the development of a \$1.6Bn National Partnership Agreement (NPA) on Hospital and Health Workforce Reform by the Commonwealth and State and Territory Governments in November 2008.

HWA reports to Health Ministers and will operate across health and education sectors to devise solutions that integrate workforce planning, policy and reform with the necessary and complementary reforms to education and training.

HWA's functions include:

- The provision of comprehensive, authoritative national workforce planning, policy and research advice to Ministers, Governments and key decision makers in the health and education sectors.
- Improving and expanding access to quality clinical education placements for health professionals in training across the public, private and non-government sectors. This will be achieved through programs that expand capacity, improve quality and other diversity in learning opportunities. This also includes a national network of simulated learning environments (SLE's) to enhance the quality, safety and efficiency of clinical training.
- Developing and implementing a national program of health workforce innovation and reform. This will encourage the development of new models of healthcare delivery, facilitate inter-professional practice and equip health professionals for current and emerging demands on the health care sector.
- Facilitating a nationally consistent approach to international recruitment of health professionals to Australia.

About the Program/Project

The National Health Workforce Planning and Research Collaboration, a consortium of which HWA is a part, assumed the task of undertaking a substantial program of national health workforce planning and research projects over three years. This study will explore workforce exit rates among doctors and nurses using longitudinal datasets, and will provide supporting information for the future iterations of the HW2025 project (formerly the National Training Plan).

Acknowledgements

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1 Executive Summary

Background

1. The quality of data on exit rates can have a large impact on the size of health workforce supply projections, thus having a potentially major impact on projected health workforce requirements.
2. The aims of this project are to examine new datasets to determine exit rates for doctors and nurses, and to examine the factors associated with exit rates.

Exit rates for doctors

3. For doctors we present descriptive analyses of two datasets for calculating exit rates, where individuals can be linked over time. The first dataset is the Australian Medical Publishing Company's (AMPCo) dataset on the population of all Australian doctors in clinical practice that takes a snapshot at May in 2008, 2009, and 2010.
4. Results show a mean exit rate of 5.2%, 1 in 20 doctors leaving the medical workforce each year. This includes both temporary and permanent exits as these data cannot distinguish between these types of exit.
5. There are large differences in exit rates across the age distribution, with the youngest and oldest doctors having highest exit rates. There are also differences in exit rates between doctor types (e.g. specialists and GPs), for example, the exit rate for GPs is 4.4% but for hospital non-specialists and specialist registrars is closer to 10%.
6. The AMPCo data also shows doctors in rural areas having a much higher exit rate (around 10%) compared to urban areas (around 5%) but this is not reflected in the MABEL data where there is more mixed evidence of differences between metropolitan and rural areas.
7. The second dataset for doctors is the MABEL survey, a longitudinal survey of 10,500 Australian doctors. From MABEL we obtain a similar overall exit rate as in the AMPCo data (5.3%) which we can disaggregate into permanent (2.2%) and temporary (3.1%) exits.
8. Permanent exits are most common in older age groups due to retirement, and specialists have a higher rate of permanent exits than GPs (1.8 % for GPs and 2.9% for specialists). Temporary exits are more common among female doctors and junior doctors-in-training.

Factors associated with exits

9. We also examine factors associated with permanent and temporary exits
10. There is no statistically significant difference between female and male permanent exit rates, and age only begins to increase the exit rate for over 60 year-olds. Seeing patients with complex health and social problems is associated with a higher permanent exit rate for both

GPs and specialists. GPs who graduated from an overseas medical school have lower permanent exit rates compared to domestically trained doctors.

11. For specialists, high job satisfaction is associated with lower exit rates. Having rights to private practice are associated with a lower permanent exit rate. Pathology, surgery and anaesthesia have higher exit rates than internal medicine specialties. Western Australia has higher permanent exit rates for specialists compared to NSW/ACT, whilst those for Queensland and Victoria are slightly lower.
12. With respect to temporary exits, GPs in younger age groups and female GPs, have a higher temporary exit rate. Partners/associates, those with higher job satisfaction, and GPs who do hospital work, have lower temporary exit rates.
13. For specialists, females have higher temporary exit rates than males, as do those in pathology. Self-employed doctors have lower temporary exit rates, as do older specialists. Specialists in non-metro areas also have lower temporary exit rates. Specialists in WA and Queensland have higher exit rates than those in NSW/ACT.

Exit rates for nurses

14. For nurses, we have used the Nurses E-Cohort data and HILDA data to analyse exit rates
15. The mean exit rates between Waves 1 and 2 of the Nurses E-Cohort are 5.5% for permanent exits, 6.8% for temporary exits and 12.3% for combined exits. These are similar to Waves 2 and 3.
16. There is no evidence in these data of increased permanent exits for nurses in the years following graduation, or for younger ages. Permanent exit rates are fairly constant from 4% to 6% for nurses under 60 years of age and are significantly higher for nurses 60 years and over.
17. Temporary exits are much higher for nurses up to the age of 35, and for those up to 10 years post-graduation. These are largely due to parenting and/or home duties. However, though these are classified as temporary, it is not known what proportion of these end up being permanent. This would require a longer period of follow up.
18. Regression analysis on nurse exits shows that female nurses, nurses under the age of 35 and aged 60 years and over, on casual contracts, and working in the private-for-profit sector are more likely to permanently leave the nursing workforce.
19. Nurses under the age of 40 and over 60 years old, private sector nurses, and those on temporary contracts are less likely to temporarily exit the workforce.
20. The sample of respondents with nursing qualifications in HILDA is small. Of those with nursing qualifications who responded in all nine waves of the survey, approximately 54% to 60% are working as nurses, with the remainder either working on other occupations or out of the labour force. The year-on-year exit rates vary considerably across each wave, ranging from 5.2% to 12.8%. This is likely due to a small sample size.

Implications for workforce planning models

21. Exit rates for GPs, specialists, and doctors in training are quite different across the age and gender distribution, and should be included separately in workforce projection models. Within each doctor group, exit rates should also be disaggregated, where possible, for overseas trained doctors, by rurality, by specialty and by State/jurisdiction.
22. It would be desirable for workforce planning models to distinguish between permanent and temporary exits. Permanent exits mainly represent retirement behaviour and are potentially more important in terms of long term workforce implications. Temporary exits typically happen much earlier in life for child rearing, travel overseas, non-clinical work (eg academic work) and a range of other reasons.
23. However there are problems in distinguishing between permanent and temporary exits because of the potential bias caused by the lack of long-run datasets to follow up doctors who have exited. MABEL data showed that 23% of those classified as temporary exits in Wave 2 became a permanent exit in Wave 3. This could therefore underestimate permanent exits. Of those who were a permanent exit in Wave 2, 11% were still in clinical practice in Wave 3, which could lead to an overestimate of permanent exits.
24. Misclassification of exit type may be a particular issue for nurses, who have higher exit rates than doctors, and it is still unclear the extent to which temporary exits, e.g. maternity leave, become permanent.

Implications for Policy & Research

25. For doctors, there was evidence that job satisfaction was associated with exits, in addition to some job characteristics, including type of contract and hospital work (for GPs). If job characteristics influence job satisfaction, and job satisfaction influences exit rates, then these relationships need to be more fully explored in order to develop policies that could increase retention.
26. For nurses, those on casual or temporary contracts and the sector of work seemed to be associated with exit rates. The role of job satisfaction, and factors influencing it such as shift work, should be explored further.
27. Further research using longitudinal data is needed to find out the extent to which assumed temporary exits, e.g. for maternity leave, become permanent. This is likely to have important effects on the quality of existing data on exit rates.

2 Introduction

Previous work for HWA (Scott and Sivey 2010) has shown that the assumptions about exit rates used in workforce planning models have a major impact on the forecasts of future training requirements. It is therefore important to produce more accurate data on exit rates and also examine the determinants of exits to help inform policy about how exits can be reduced. Previous data on exits have been poor and have simply compared the net changes in the workforce numbers across years.

There has been no work using longitudinal data to examine the actual transitions for individual health professionals from being in the clinical workforce at one point in time, to being out of the clinical workforce at subsequent points in time in their career. Reducing permanent and some temporary exits is important given the investment in the costs of training a doctor or nurse and ensuring they participate in the workforce. This is also important in the context of falling hours of work amongst male and female doctors and a higher proportion of female doctors who have lower levels of workforce participation than males.

This research will therefore:

- Examine the feasibility of providing improved and more accurate data on exit rates for workforce planning models for doctors and nurses with different characteristics (age, gender, specialty, geographic area)
- Provide advice about what policies could potentially be used to reduce exit rates and increase retention.

Though the new national registration database has the potential to be able to be used to calculate national exit rates, it may still be a couple of years that these data are available to use. However, it is unclear whether it will be able to distinguish between permanent and temporary exits.

3 Exit rates for Doctors

3.1 Previous Research

3.1.1 Descriptive analyses of exit rates for doctors

Previous research from the US, UK, and Australia provides some information about retirement and other exit behaviour of doctors.

A group of English authors have published several studies examining at the career progression of cohorts of doctors from UK medical schools. The studies included analyses of retention of medical graduates in the British National Health Service (Goldacre et al 2009) and career destinations of cohorts of doctors over 20 years (Taylor et al 2010). Although these studies do not look at year-on-year exit rates per se, the information on the number of doctors who have left clinical practice over a given period, can give an implied exit rate. Goldacre et al (2009) provides cumulative exit rates for doctors for 5 year intervals after qualification. These are summarised in Table 1. The cumulative exit rates rise over time from graduation at a decreasing rate. This leads to lower implied annual exit rates further away from graduation. Exit rates closer to graduation (therefore earlier in life) could be more influenced by temporary exits whereas doctors out of the workforce 20 or 25 years after graduation will mainly be permanent exits. Also note that even the maximum time after graduation (25 years) is still pre-retirement for most doctors so these exit rates only pick up pre-retirement exits. Overall then the figures provide an estimate of 0.8% to 1.1% for the average pre-retirement (under age 55) exit rate for UK doctors.

Table 1. Cumulative exit rates for British doctors from Goldacre et al (2009)

Years after qualification	Cumulative exit rate (%)	Implied annual exit rate (%)
10	14.0	1.5
15	14.9	1.1
20	18.3	1.0
25	19.2	0.8

Schofield and Beard (2005) provide a description of the retirement behaviour for cohorts of doctors and nurses using Australian census data (Table 2). Their results show cumulative 5-year exit rates of 11%, 15-23%, 34-39% and 55-61% for 55-59 year old, 60-64 year old, 65-69 year old and 70 to 74 year old General Practitioners. Their main conclusion is retirement amongst GPs is relatively dispersed, with substantial early retirement coupled with substantial late retirement. This is in contrast to registered nurses who have almost all retired by age 65.

Table 2. Implied annual exit rates from Schofield and Beard (2005) for Australian GPs

Age Group	55-59	60-64	65-69	70-74
Implied annual exit rate (%)	2.30	3.00	6.29	7.97

Rittenhouse et al (2004) evaluate alternative measures of physician attrition in the US. They report results of a specialist physician survey that indicates a 3-year (permanent) exit rate of around 17% based on stated intentions to stop practising medicine. When comparing these survey results against actual status three years later, they find only about one third of those intending to exit the workforce have actually done so. A smaller number who had not stated they intended to exit had exited after 3 years. The overall actual three year exit rate was around 10%. This gives an implied annual exit rate of 3.5%, and highlights issues about large inaccuracies in defining permanent exits using data on exit intentions. This can overstate the exit rate and therefore lead to an over-estimate of workforce requirements.

There is a lack of literature examining determinants of exit rates for doctors. Scott et al (2006) estimate regression models to explain GP intended 'quitting' behaviour. The paper uses data from a job satisfaction survey of GPs that includes questions on intentions to quit. A 'structural' model is estimated accounting for the effect of job satisfaction on the probability of intentions to quit, and the effect of job characteristics on job satisfaction. Low job satisfaction is found to be associated with a higher rate of exits. Job characteristics such as business relationship with the practice (partner or not), workload and experience with local primary care organisation are also associated with quitting intentions.

3.2 Exit rates for Doctors using AMPCo data

3.2.1 Data and method

The Australian Medical Publishing Company (AMPCo) maintains a list of all doctors in Australia in clinical practice. Their list is compiled from a range of sources including registration databases, AMA membership lists, mailing lists for the Medical Journal of Australia, and other sources. We obtained the AMPCo data as part of the MABEL project as it provides the sampling frame for each annual wave of the MABEL survey (Joyce et al, 2010)). We have data on a snapshot of the population of doctors in clinical practice in May each year from 2008 to 2011. These data classify doctors into GPs/GP registrars, specialists, specialist registrars, and hospital non-specialists (interns and medical officers). The data also contain information on age, gender, and geographic location.

As the AMPCo data define doctors in clinical practice at a single point in time, and can be linked by doctor ID from year to year, we can simply define exits by doctors who are in the AMPCo data in one year and are missing in the following year. Exit rates are therefore always calculated using two years of data. An illustrative example is given in Table 3 where there are ten doctors who are in

clinical practice, and therefore in the AMPCo data in 2008. We merge this to the 2009 AMPCo data by doctor id to see which doctors are in the data in 2009 and identify that doctor 2 and doctor 6 are missing in 2009. These two doctors are then classified as exits, and the exit rate for this group of doctors in 2008/9 is 0.2.

These data include both permanent and temporary exits, as there is no information on the type of exit. In addition, as we only observe the exits between two years, we cannot define what proportion of exits will be permanent or temporary. This requires more detailed data on the reasons for exit coupled with a longer follow up period.

Table 3. Defining exits in the AMPCo data

Doctor	AMPCo 2008	AMPCo 2009	Exit
1	Yes	Yes	0
2	Yes	No	1
3	Yes	Yes	0
4	Yes	Yes	0
5	Yes	Yes	0
6	Yes	No	1
7	Yes	Yes	0
8	Yes	Yes	0
9	Yes	Yes	0
10	Yes	Yes	0

3.2.2 Exit rates

Table 4 presents the mean exit rates in the AMPCo data by doctor type and by metropolitan/non-metropolitan location, for all doctors, and split into males and females. In the first column of data the overall mean exit rate is 5.2%, which implies 1 in 20 doctors exit the workforce each year.

GPs have substantially higher exit rates than specialists and both hospital non-specialists and specialist registrars have even higher exit rates, more than twice that of GPs at approximately 1 in 10 leaving the workforce every year. We might expect hospital non-specialists and specialist registrars

to have higher exit rates as they are mostly junior doctors in training who might have a relatively high probability of leaving temporarily or emigrating. Finally, metropolitan doctors have a lower exit rate than their non-metropolitan counterparts and more remote non-metropolitan areas have the highest exit rates, around 10%.

The second and third columns of data provide some information about gender differences in exit rates. On average, female doctors have higher exit rates, around 6% compared to 4.7% for males, although within doctor-types females have very similar or lower exit rates than males. This finding indicates the gender composition of doctor types may explain differences between in exit rates. Females have higher exit rates and are a higher proportion of GPs than specialists. Hence GPs have higher exit rates than specialists on average. There is also a high and rising number of females among younger cohorts of doctors represented by the hospital non-specialists and specialist registrar doctor types. Gender differences seem to be similar with respect to location. In both metropolitan and non-metropolitan areas, female doctors have higher exit rates.

Table 4. Comparing exit rates in the AMPCo data

Doctor category	Mean Exit Rate (%)	Mean Exit Rate – Males (%)	Mean Exit Rate – Females (%)
All	5.2	4.7	6.0
GPs	4.4	4.9	4.0
Specialists	3.0	3.1	2.7
Hospital non-specialists	9.6	9.5	9.8
Specialist registrars	10.1	10.3	9.7
Metropolitan	5.0	4.6	5.8
Inner Regional	5.6	4.9	7.2
Outer Regional	5.8	5.5	6.5
Remote	10.1	10.1	10.0
Very Remote	9.5	6.5	15.1

We will now present a series of charts comparing exit range across the age distribution. These charts are useful because we expect exit rates will be higher at older ages as doctors retire. Presenting graphical comparisons provides much more information than mean exit rates about the patterns of exit behaviour through doctors' career pathway. For example we can determine if a difference in mean exit rates between two types of doctors is due to earlier retirement of one group or due to doctors 'dropping out' through emigration or career change near the beginning of their careers.

Figure 1 presents the exit rates summarised in the first row of Table 4, the differences between male and female doctors. Comparing the two charts we can see both males and females have relatively high exit rates early in their careers, although the peak for females at nearly 11% for 30 to 34 year-olds is higher than for the males at around 8%. An explanation for this could be career breaks to raise children among young women. Previous research (Joyce and Mc Neil 2006) found similar patterns of exits at 5-10 years after graduation as many graduates work overseas for 1 or 2 years. The chart also shows that female doctors retire earlier than their male counterparts. For example, their exit rate in the 60 to 64 age group is around 6% and it is only around half that figure for men. However, something to take into account when interpreting these figures is that there are relatively few female doctors in the upper ends of the age distribution. One reason for this is that female doctors were relatively rare 30 years ago.

Figure 2 presents the differences in exit rates between male GPs and specialists across the age distribution. Figure 3 presents the same figures for females. For both males and females, the exit rate of GPs is higher than specialists over most of the age distribution. We can see for males that GPs appear to have a higher probability of exiting the workforce at younger ages (e.g. ages 35 to 50) and also appear to retire earlier, having a higher exit rate at ages 60 to 75 than male specialists. For female doctors there is a very different pattern of exits between GPs and specialists. Female GPs have a high exit probability (8 to 10%) early in their careers (ages 30 to 39) which is not observed in female specialists (they have an exit rate of 2 to 4 % in the same age range). This difference is likely to be explained by female doctors choosing general practice because of more flexible arrangements for career breaks to raise children. We don't present charts of exit rates over the age distribution for hospital doctors and specialist registrars because most of these doctors are in the younger age groups.

Figures 4 and 5 present exit rates for male and female doctors across the age distribution, showing the differences between doctors in metropolitan areas and doctors in non-metropolitan areas. For males there is evidence of earlier retirement amongst non-metropolitan doctors, otherwise exit rates follow a very similar pattern between doctors in both types of location. For females, there is a higher exit rate for doctors in rural areas in the middle of the age distribution but this relationship reverses and exit rates are higher for metropolitan doctors in older age groups.

Figure 1: Exit rates by age and gender in AMPCo data 2008-2009

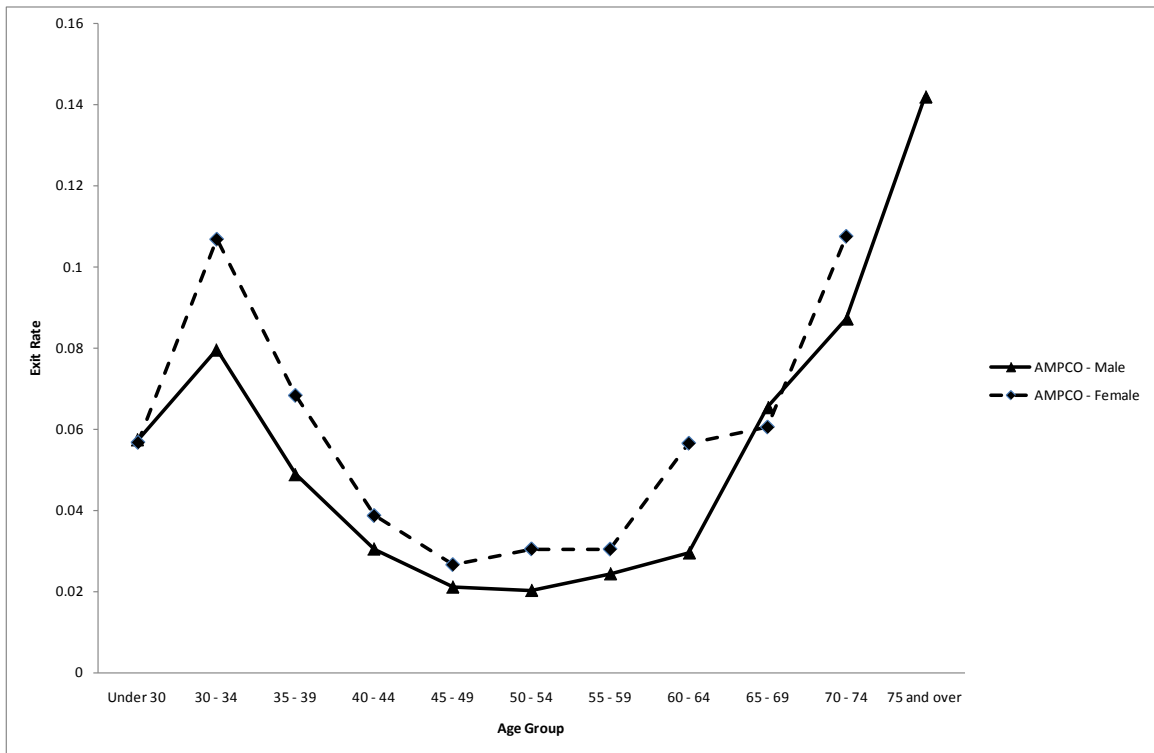


Figure 2. Exit rates for male GPs and specialists

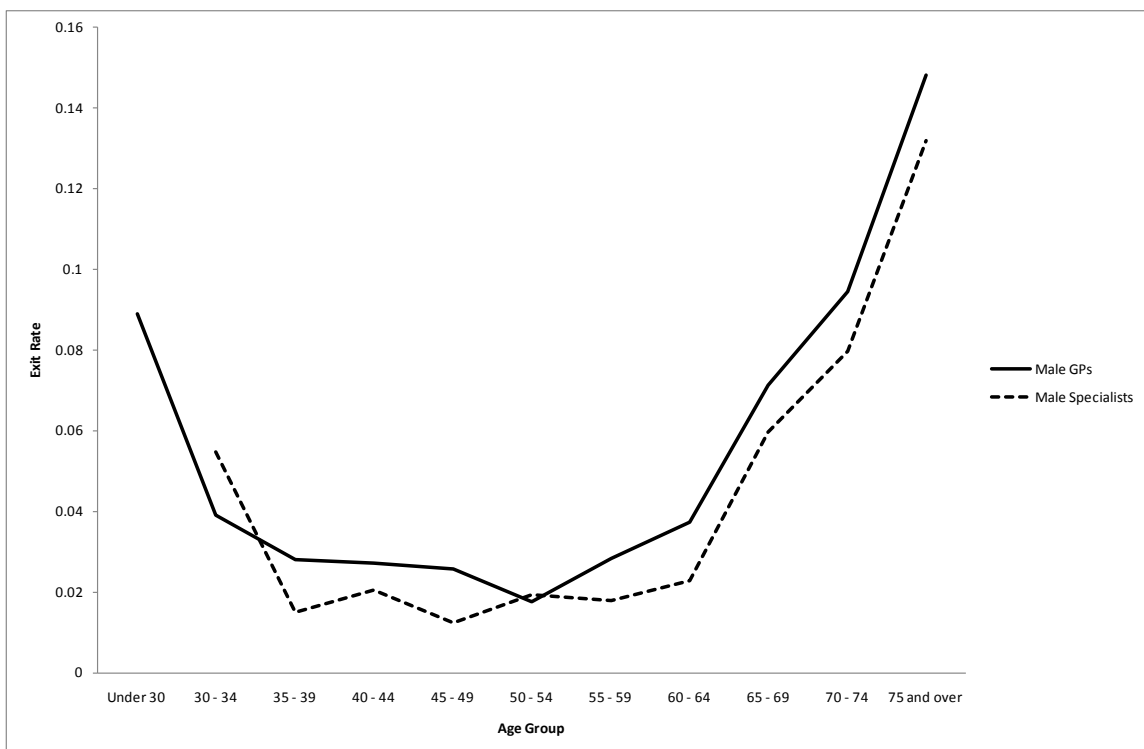


Figure 3. Exit rates for female GPs and specialists

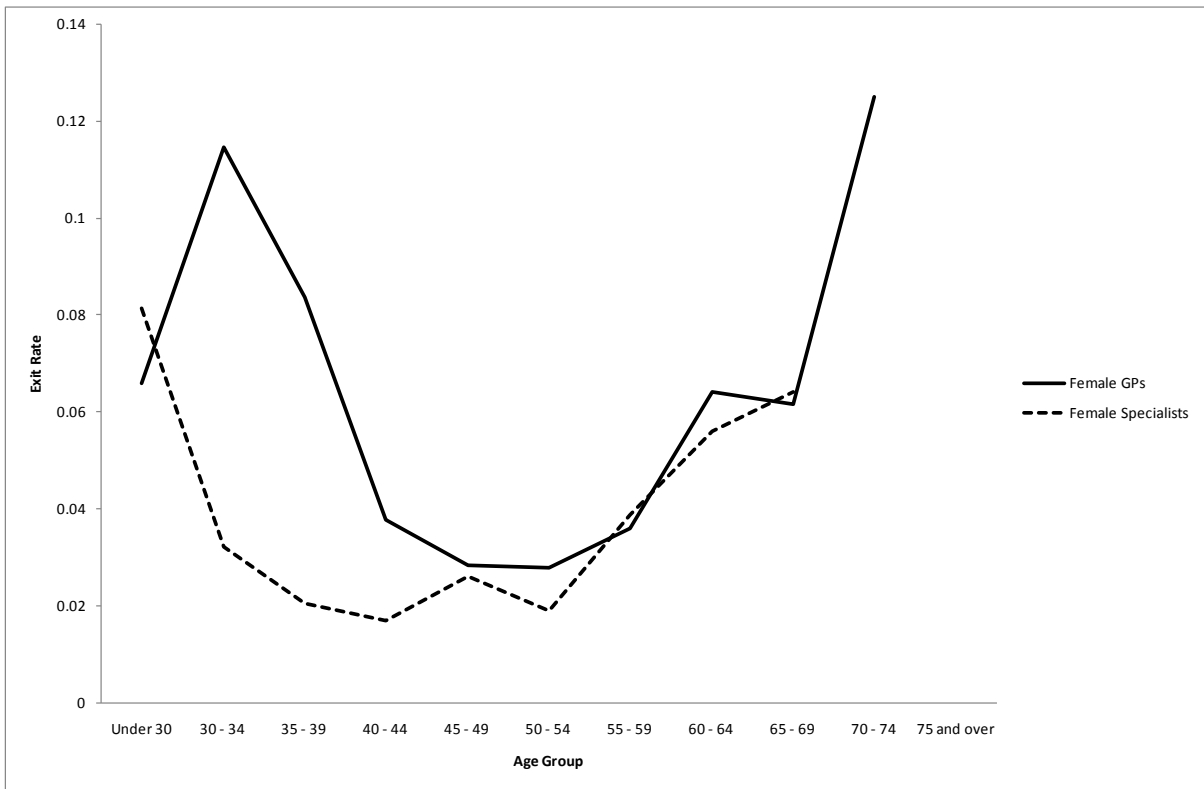


Figure 4: Exit rates for male doctors – Metropolitan and non-metropolitan areas

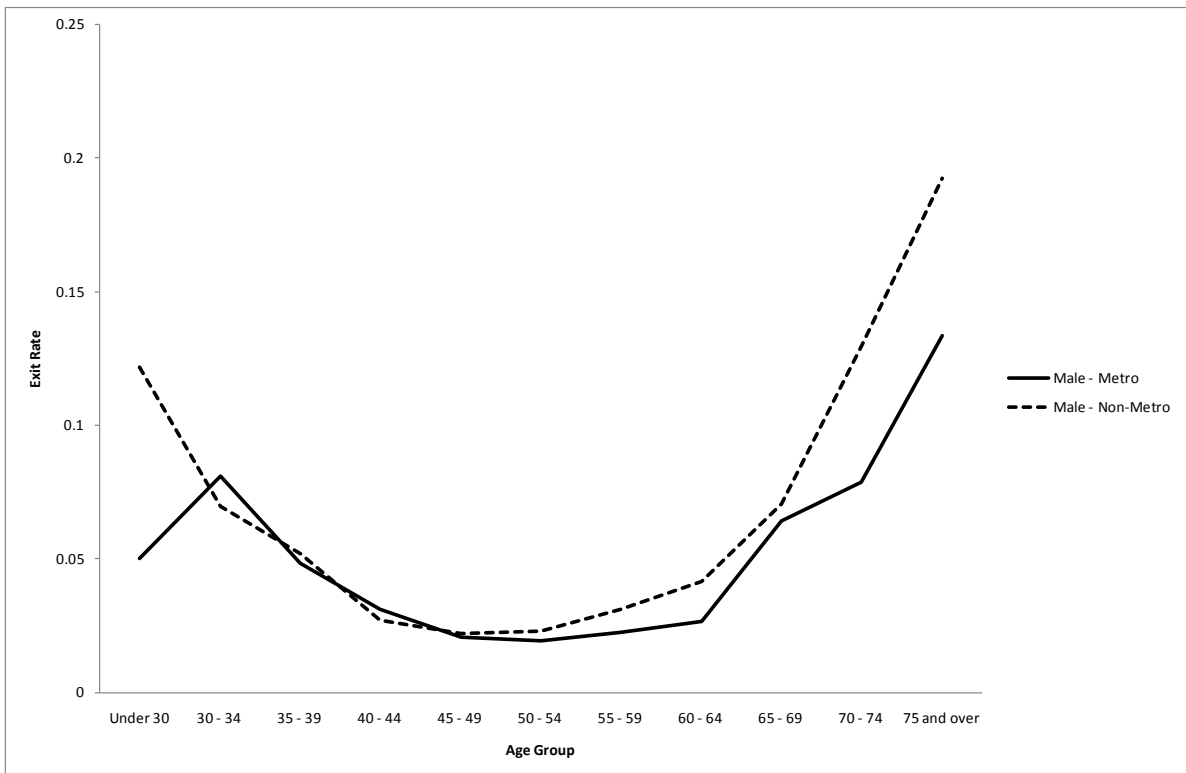
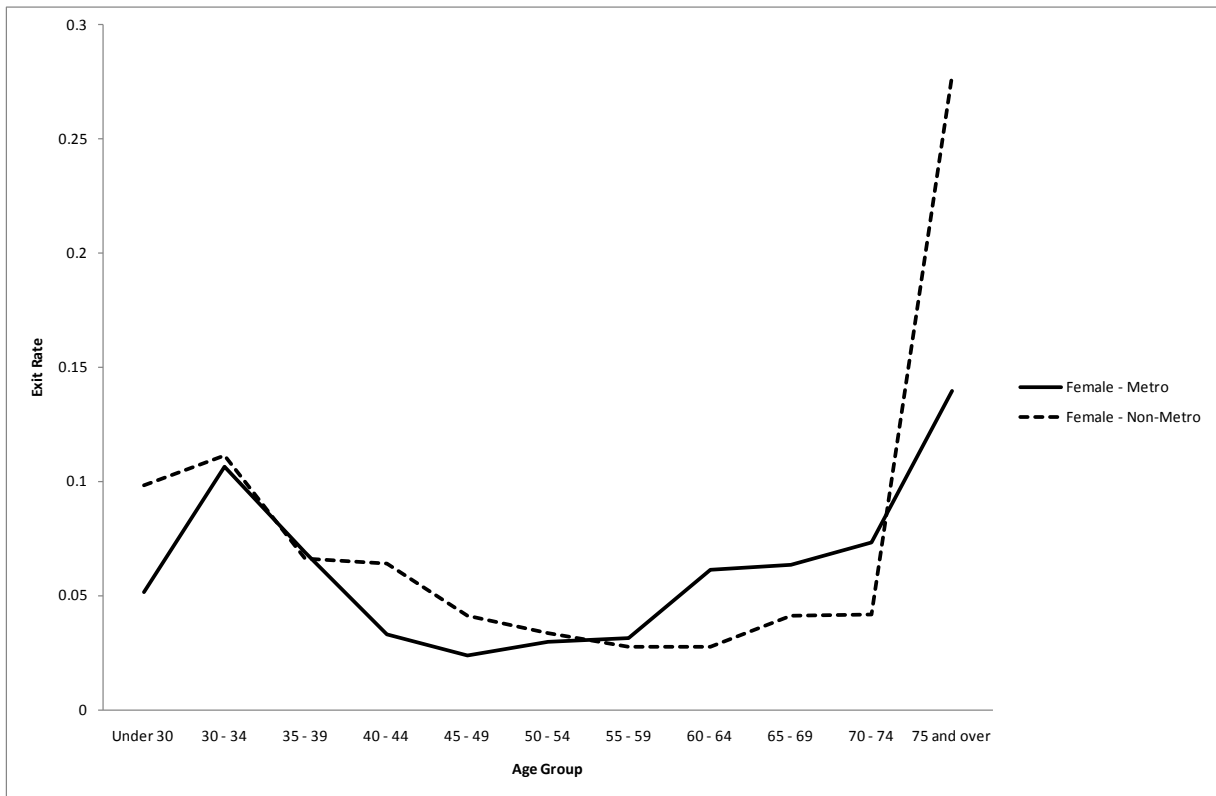


Figure 5: Exit rates for female doctors – Metropolitan and non-metropolitan areas



3.3 Exit rates for Doctors using MABEL data

3.3.1 Data and methods

Our second data source for calculating exit rates for doctors is the MABEL survey. This also allows us to examine the reasons for exits, and whether they are temporary or permanent. The “Medicine in Australia: Balancing Employment and Life (MABEL)” study investigates workforce participation patterns and their determinants using a longitudinal survey of Australian doctors. All Australian doctors undertaking clinical work in 2008 (n=54,750) were invited to participate in the first Wave in 2008 and 10,498 doctors in clinical practice responded (response rate= 19.36%). Data are collected by paper or optional online version of a questionnaire, with content tailored to four sub-groups of clinicians: general practitioners, specialists, specialists in training, and hospital non-specialists. The survey methods are discussed in detail in Joyce et al (2010).

The MABEL survey is a longitudinal study so doctors are asked to fill in the same questions each year. There are currently three waves of data available (data from 2008, 2009 and 2010). In the first year, only doctors in clinical practice were invited to respond. In subsequent years, we ask doctors to respond, even if they have left clinical practice.

For example in 2009 (wave 2) at the beginning of the survey we ask doctors the following two questions:

1. Are you currently doing clinical work within Australia? (Followed by tick boxes for "Yes" and "No")

And if their response is "No" we ask:

2. Do you intend to return to clinical work within Australia? (Followed by tick boxes for "Yes" and "No")

We can then define exits from the MABEL data using these questions. Table 5 outlines the process.

Table 5: Defining exits in the MABEL data

Doctor	In Clinical Practice in 2008?	In Clinical Practice in 2009?	Return to Clinical Practice?	Exit	Permanent Exit	Temporary Exit
1	Yes	Yes	N/A	0	0	0
2	Yes	No	Yes	1	0	1
3	Yes	Yes	N/A	0	0	0
4	Yes	Yes	N/A	0	0	0
5	Yes	Yes	N/A	0	0	0
6	Yes	No	No	1	1	0
7	Yes	Yes	N/A	0	0	0
8	Yes	No	No	1	1	0
9	Yes	Yes	N/A	0	0	0
10	Yes	Yes	N/A	0	0	0

First we start from a cohort of doctors who responded to the MABEL survey in 2008 and 2009. Given a group of doctors who responded that they were in clinical practice in 2008 (eg doctors 1 to 10 in Table 3) we define an exit if they respond that they are not in clinical practice in 2009. We can also disaggregate these exits into 'temporary' and 'permanent' based on whether they plan to return to clinical practice. We classify exits as permanent if doctors state they will not return to clinical practice, if they say they are permanently retired from medical work or if they state they are employed outside of medicine. We can then calculate three different exit rates, an 'overall' exit

rate (30% in Table 5) a 'permanent' exit rate (20% in Table 5) and a 'temporary' exit rate (10% in Table 5).

There is one additional consideration when using the MABEL data compared to the AMPCo data: accounting for response bias. In order to calculate exit rates we can only include doctors who responded to both waves of the MABEL data (2008 and 2009). Our exit rates might be inaccurate and biased if doctors who respond to both waves have higher or lower exits on average compared to the population of doctors. This is a general issue in using any type of longitudinal survey data. The AMPCo data which provides the sampling frame for MABEL are used to create weights to correct for any response bias that is associated with variables in the AMPCo data (doctor type, age, gender, state and rurality).

3.3.2 Exit rates

Table 6 presents mean exit rates for different groups of doctors. The first two rows present the MABEL estimate of the overall exit rate (including temporary and permanent exits) and the estimate of the same exit rates from the AMPCo data. We can see that the MABEL data provides a good approximation of the exit rate in the AMPCo data (5.3% vs 5.2%). However, when we look at male and female doctors separately, the MABEL data seems to overstate the difference in exit rates between male and female doctors.

Compared with the AMPCo data (Table 4) the MABEL data finds a similar exit rate for GPs, higher exit rate for specialists and lower exit rate for hospital doctors and specialist registrars. For rurality, MABEL finds the highest exit rate in 'remote' areas (the same as for AMPCo) but finds the lowest exit rate in 'inner regional' whereas AMPCo has the lowest exit rate in metropolitan areas.

Table 6. Comparing exit rates with the MABEL data

Doctor category	Mean Exit Rate (%)	Mean Exit Rate – Males (%)	Mean Exit Rate – Females (%)
MABEL – All Exits	5.3	4.4	7.1
AMPCo	5.2	4.7	6.0
GPs	4.2	3.0	6.1
Specialists	5.2	5.1	5.8
Hospital docs	7.5	5.3	9.5
Specialist Registrars	7.4	5.4	10.2
Metropolitan	5.5	4.5	7.3

Inner Regional	3.8	3.2	5.3
Outer Regional	4.2	2.9	6.7
Remote	12.7	12.9	12.4
Very Remote	6.3	4.3	9.5
Permanent exit	2.2	2.7	1.1
Temporary exit	3.1	1.6	6.0
GPs – permanent exit	1.8	2.2	1.2
Specialists – perm. exit	2.9	3.5	1.0
Hospital docs – perm exit	2.2	2.8	1.6
Specialist registrars –perm exit	1.1	1.4	0.7
GPs – temp exit	2.4	0.8	5.0
Specialists – temp exit	2.4	1.7	4.8
Hospital docs – temp exit	5.3	2.5	8.0
Specialist registrars – temp exit	6.3	4.1	9.4
Aus Med Sch – permanent exit	2.1	2.7	1.0
Overseas Med Sch – permanent exit	2.4	2.8	1.7
Aus Med Sch – temporary exit	3.1	1.5	6.0
Overseas Med Sch – temporary exit	3.0	2.0	5.5

Table 6 also provides a breakdown of the MABEL exit rates into temporary and permanent exits. Less than half of all exits appear to be permanent (2.2 % permanent vs 3.1 % temporary) but the male/female breakdown provides much more information. The figures show females higher overall exit rate is explained by much higher temporary exits compared to men (6.0% vs 1.6%) whereas females actually have a substantially lower permanent exit rate than men (1.1% vs 2.7%). We might expect women to have a higher temporary exit rate as they are more likely to take career breaks for raising a family. The lower permanent exit rates for females might be a representation of a 'cohort effect': the female medical workforce is younger than the male medical workforce, therefore a lower proportion of female doctors than male doctors are reaching retirement age. Figures 8 and 9

provide a comparison of permanent exit rates (Figure 8) and temporary exit rates (Figure 9) by gender across the age range. The most notable feature is the large spike in temporary exits for females aged 30 to 39.

Disaggregating the permanent exit rates by doctor type reveal that male specialists have the highest permanent exit rate (3.5%) which may be influenced by the age of the male specialist workforce. GPs have a much lower permanent exit rate than specialists (around 1.8% vs 2.9% for specialists). Disaggregating temporary exits, we see that females of all doctor types have at least three times as many temporary exits as male doctors. Temporary exits are particularly common among young female doctors in the junior doctor categories: 'hospital doctor' and 'specialist registrar'.

Finally the figures reveal doctors who graduated from overseas medical schools have only slightly higher permanent exit rates compared with Australian-qualified doctors. There are some gender differences, with overseas trained females much more likely to exit permanently than Australian-trained females. For temporary exits there is very little overall difference between Australian and overseas-trained doctors. However, by gender there is a higher temporary exit rate for overseas-trained females but a lower temporary exit rate for overseas-trained males.

Table 7 presents some data on the types of exits from the MABEL data. For permanent exits, about half (1.06% out of 2.20%) are due to retirement. Much of the other half of permanent exits (0.90%) is doctors moving out of clinical work to other types of employment. For temporary exits, nearly half (1.35% out of 3.10%) are due to home and parenting duties. The other common temporary exits are doing non-clinical work and moving overseas.

Table 7: Types of permanent and temporary exit

Type of exit	Number	% (weighted)
<i>Permanent exits</i>		
All	156	2.20
Permanently retired	76	1.06
Doing non-clinical work	64	0.90
Moved overseas	8	0.15
Other	8	0.09
<i>Temporary exits</i>		
All	253	3.10
Home/parenting duties	122	1.35
Doing non-clinical work	39	0.46
Moved overseas	33	0.49
Other	59	0.80

Table 8 shows some data on the doctors who exited in wave 2 (409 in total who were not in clinical practice in wave 2 having been in clinical practice in wave 1) followed up in Wave 3. In total, around a third have unknown status (30.6%), because they didn't respond to the survey in Wave 3, a third are back in clinical practice (34.0%) and the other third (35.5%) are still not in clinical practice. What is most informative is to break down the Wave 2 exits into those classified as temporary and those classified as permanent. Of the 156 permanent exits in Wave 2, 17 (10.9%) are in fact back in clinical practice in Wave 3. The remainder is split between being not in clinical practice (44.2%) and non responders for whom the status is unknown (44.9%). Of the 253 temporary exits in wave 2, 122, nearly half (48.2%) have returned to clinical practice the following year (Wave 3), with 76 (30%) still not in clinical practice and 55 (21.7%) unknown.

Table 8: Clinical practice status in Wave 3 (2010) of doctors who exited in Wave 2 (2009)

Type of exit in wave 2						
	All Exits		Permanent		Temporary	
Status in Wave 3	Number	%	Number	%	Number	%
Not in clinical practice	145	35.5	69	44.2	76	30.0
In clinical practice	139	34.0	17	10.9	122	48.2
Unknown	125	30.6	70	44.9	55	21.7
Total	409	100	156	100	253	100

Table 9 shows more detailed data on the 145 doctors who exit in Wave 2 (the first row of Table 8) who are not in clinical practice in Wave 3. From the 69 who were classified as permanent exits in Wave 2, almost all of them (66) are still classified as permanent exits in Wave 3. However, for the exits classified as temporary in Wave 2, 18 (23.7%) are classified as permanent exits in Wave 3.

Table 9: Exit status of doctors who exited in Wave 2 and are not in clinical practice in Wave 3

Type of exit in wave 2						
	Total		Permanent		Temporary	
Exit status in Wave 3	Number	%	Number	%	Number	%
Permanent exit	61	42.1	66	95.7	18	23.7
Temporary exit	84	57.9	3	4.4	58	76.3
Total	145	100	69	100.1	76	100

Figures 6 and 7 present exit rates over the age distribution for male doctors (Figure 6) and female doctors (Figure 7) comparing AMPCo and MABEL data sources.

Figure 6: Comparing exit rates from MABEL and AMPCo datasets – Males

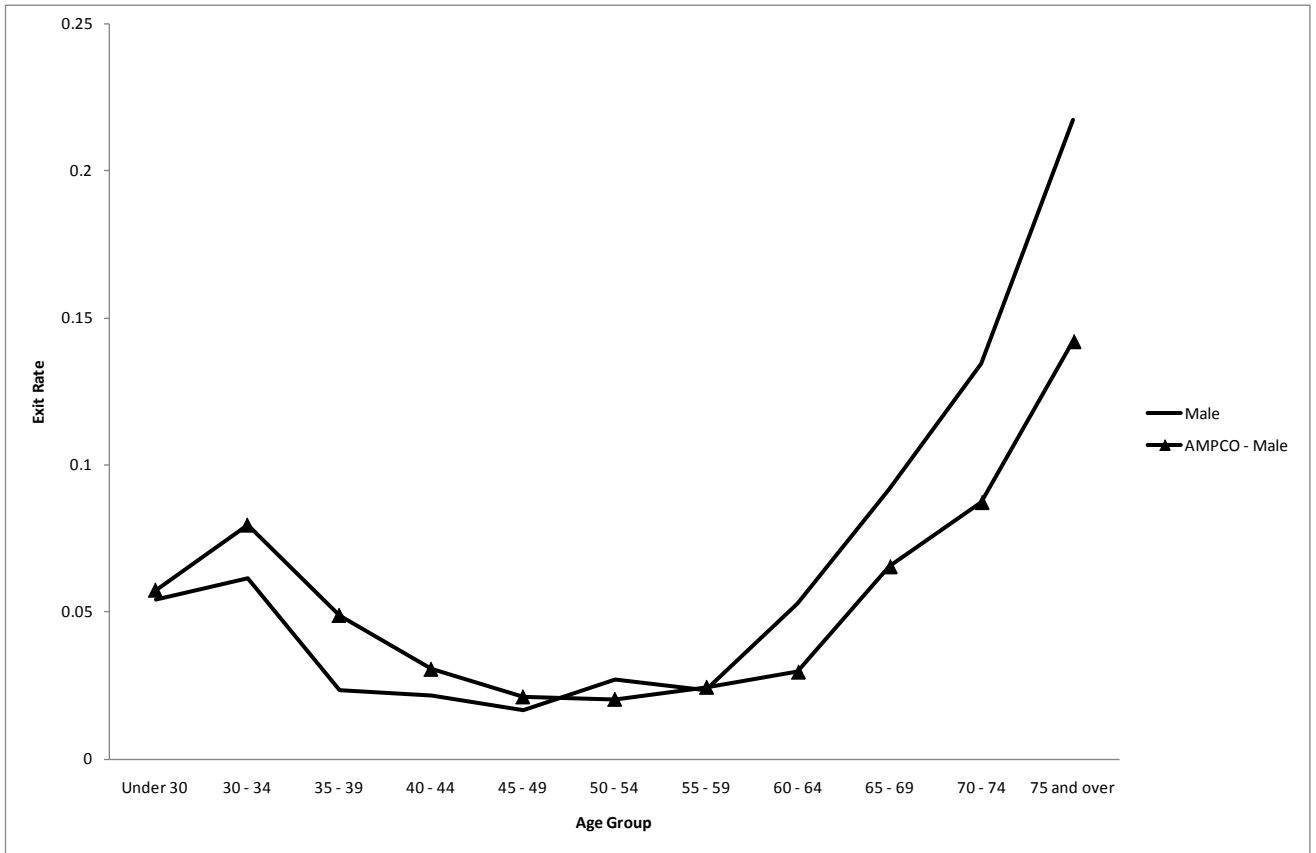


Figure 7: Comparing exit rates from MABEL and AMPCo datasets – Females

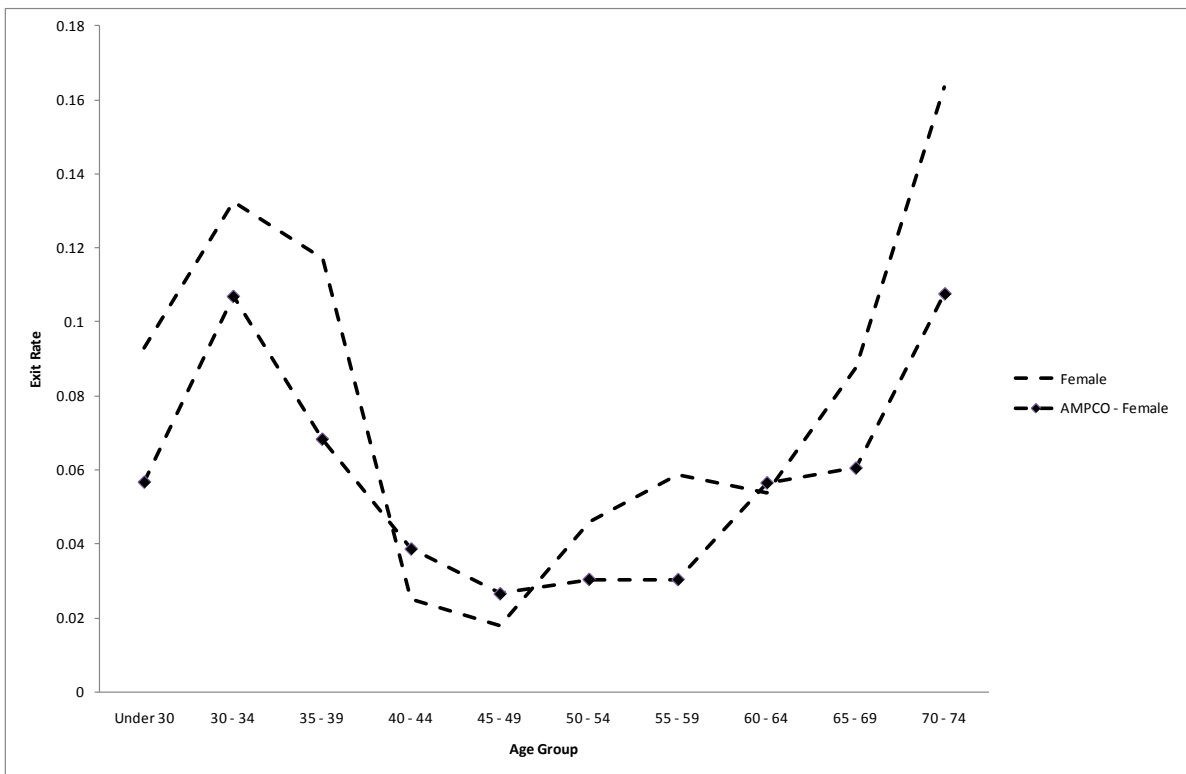


Figure 8: Permanent exit rates by gender (source: MABEL)

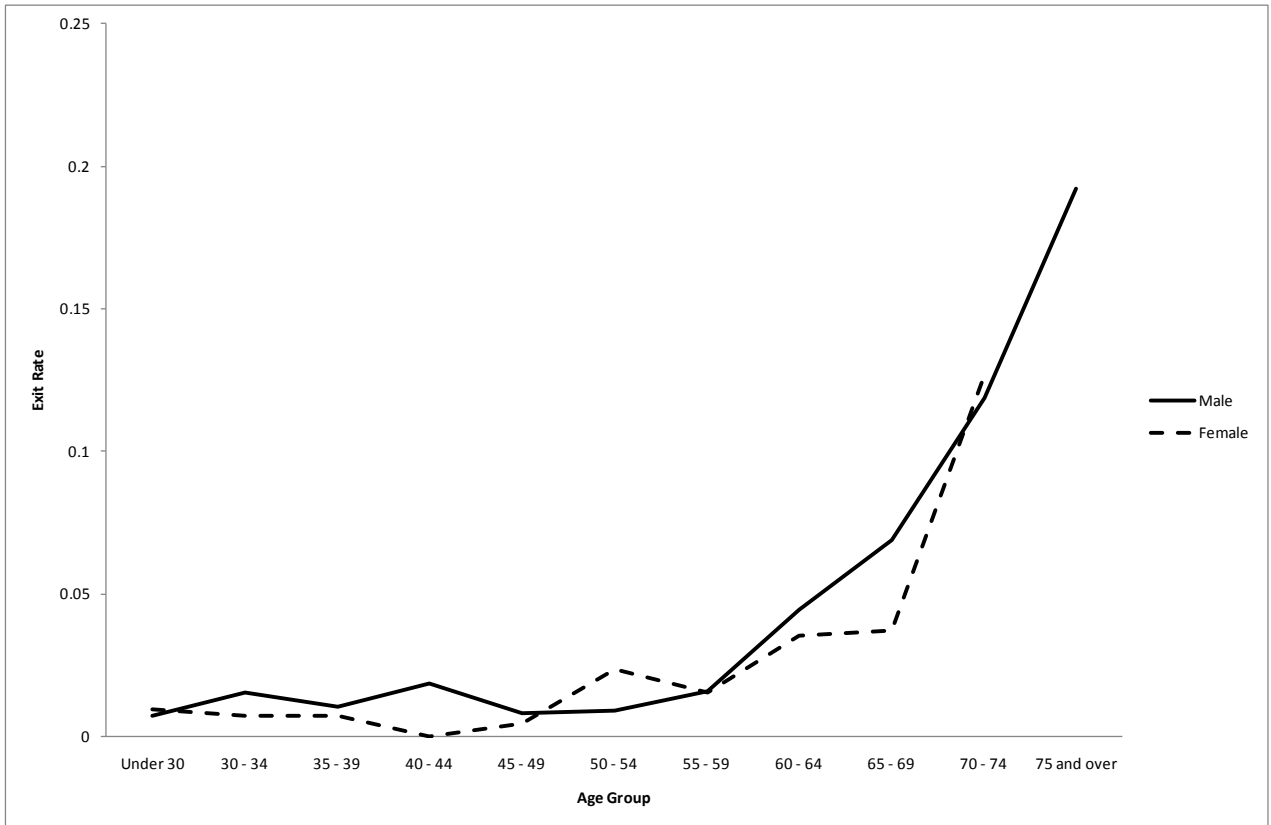
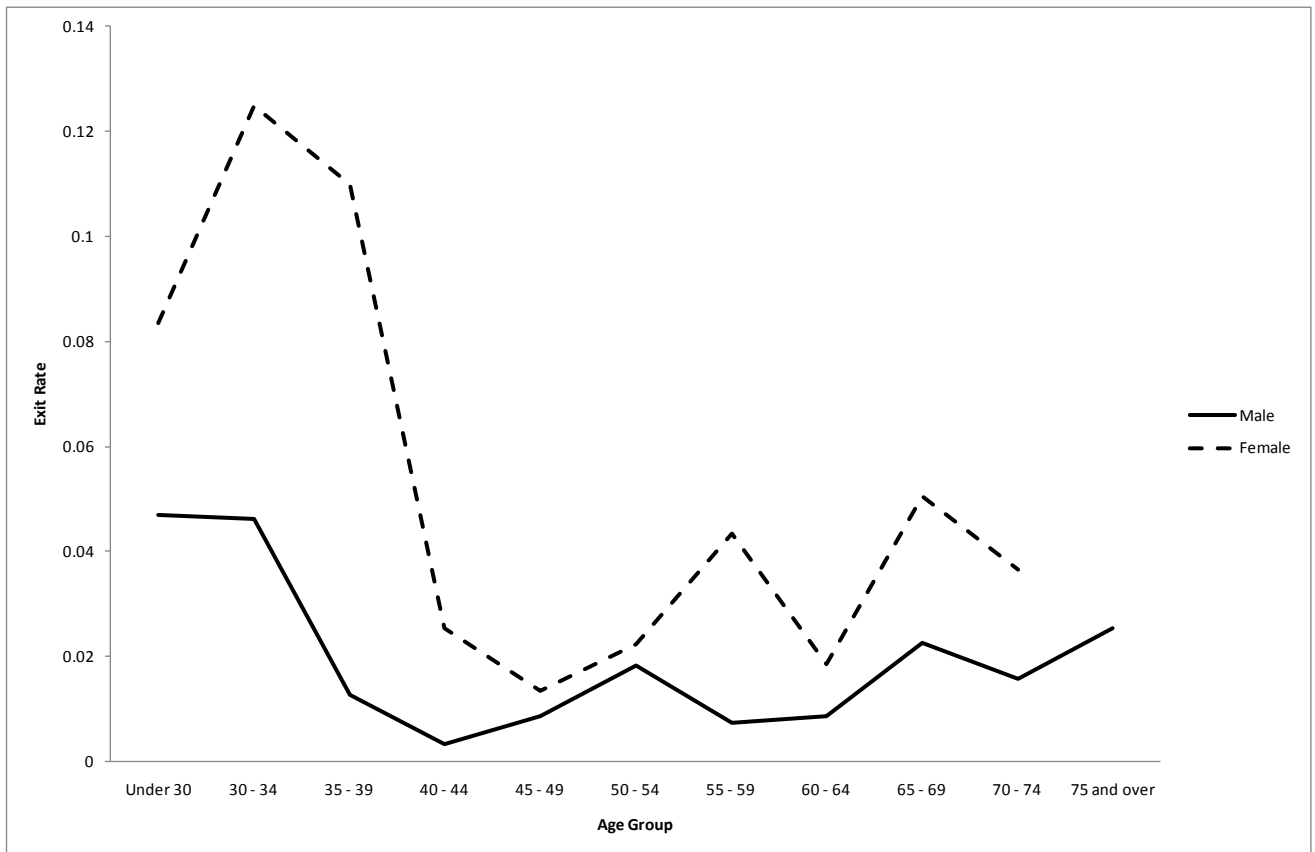


Figure 9: Temporary exit rates by gender (source: MABEL)



3.4 What factors are associated with exit rates?

In this section we try to learn more about the determinants of exit rates in the MABEL data. Using a regression model we can estimate the association between doctor characteristics and the probability of exiting the workforce. For example, we can see if overseas medical graduates have a higher exit rate than Australian-trained doctors, whilst controlling for differences in the age-gender composition of each group, and differences in other doctor characteristics.

3.4.1 Data and methods

We estimate a model informed by the paper by Scott et al (2006) who define the relationship between job characteristics, job satisfaction and exiting the workforce. The main insight is that the exit rate may be determined by job satisfaction (we expect higher job satisfaction will reduce the exit rate), but job satisfaction is also determined by 'job characteristics'. Job characteristics for doctors include measures of workload, earnings, work environment (eg practice size) and patient casemix. To allow for either job satisfaction to affect the exit rate or for job characteristics (determinants of job satisfaction) to affect the exit rate directly, we estimate two alternative models:

Model A: The job satisfaction model

The probability of an exit (the dependent variable, 0 or 1) is determined by the following explanatory variables:

Personal characteristics: age, gender, training (Australian or overseas), self assessed health.

Overall job satisfaction

Geographical characteristics: State and Metropolitan/non-metropolitan

Model B: The job characteristics model

The probability of an exit (the dependent variable, 0 or 1) is determined by the following explanatory variables:

Personal characteristics: age, gender, training (Australian or overseas), self assessed health.

Job characteristics (Model B): Hourly earnings, after hours/on-call work, assessment of patients' complex health and social problems, work opportunities for partner. For GPs: Size of practice, status as a principal/associate in the practice, hospital work. For Specialists: hospital/non hospital employment as a salaried employee or self employed, rights to private practice.

Geographical characteristics: State and Metropolitan/non-metropolitan

The variables used are described in more detail in Table 10

Table 10: Explanatory variables used in regression models

Variable	Categories	Description
Gender	Male (Ref), Female	Gender of doctor, stated in MABEL survey or imputed from AMPCo
Age	Under 30, 30-34 (Ref), 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65+	Age of doctor from date of birth stated in MABEL or imputed from AMPCo
Overseas medical school	Australian medical school (Ref), Overseas medical school.	MABEL question: "In which country did you complete your basic medical degree?"
Self-assessed health	Excellent/ Very Good (Ref), Good, Fair/Poor	MABEL question: "In general, would you say your health is:"
Overall job satisfaction	Very dissatisfied/ moderately dissatisfied/not sure (Ref), Moderately satisfied/very satisfied	MABEL question "Taking everything into consideration, how do you feel about your work"

Ln(hourly earnings)	Continuous variable	Natural log of gross hourly earnings calculated from earnings and hours worked questions
After hours/On-call	Do no after hours/on-call work (Ref), Do some after hours/on-call work	MABEL question "Do you do any after hours or on-call yourself?"
Complex health and social problems	Neutral/disagree/strongly disagree (Ref), agree/strongly agree.	MABEL question: "The majority of my patients have complex health and social problems"
Good opportunities for partner	Neutral/disagree/strongly disagree (Ref), agree/strongly agree.	MABEL question "There are good employment opportunities for my partner in this work location"
Practice size	Solo, 2-3 doctors (Ref), 4-5 doctors, 6-9 doctors, 10+ doctors	MABEL question "How many GPs work at your current main practice"
Hospital work	No hospital work (Ref), any hospital work	MABEL question "Do you currently work in a hospital"
Specialist employment type	Salary with no RPP (Ref.), salary with RPP, self employed in hospital, self employed non-hospital	First we use a MABEL question on how many hours worked in different settings (hospital/non-hospital). Second we use a MABEL question "How are you paid for this hospital work?"
Specialty groups	Internal medicine (Ref), pathology, surgery, anaesthesia, psychiatry	MABEL question "What is the main specialty in which you practise?"
Rurality	Metropolitan (Ref), non-metropolitan	Geo-coded from GP's address in AMPCo
States	NSW/ACT (Ref), VIC/TAS, SA/NT, QLD, WA	Geo-coded from GP's address in AMPCo

We present tables of results showing marginal effects of each variable on the probability of exit (and the standard error of the associated coefficient in brackets below). All marginal effects are to be interpreted relative to the 'reference case'. For example, a marginal effect of 0.010 for the variable 'Female' suggests female doctors are 1% more likely to exit the workforce in comparison to the reference case – male doctors. Another example: a marginal effect of 0.008 for the variable 'Practice size: 6-9 docs' suggest doctors (GPs in this case) in practices with 6-9 doctors are 0.8% more likely to exit the workforce than the reference case – doctors in practices with 2-3 doctors. 'Stars' following each marginal effect represent statistical significance: *** represents statistical significance at 1%, ** represents statistical significance at 5%, * represents statistical significance at 10%.

The descriptive statistics showing means, standard deviation, minimum and maximum of each variable used in the probit regression models is included in Appendix A, Tables A1 and A2.

3.4.2 Determinants of permanent exit rates

Tables 8 and 9 present the results of probit regression equations for model A and model B with the probability of permanent exit as a dependent variable. All of the marginal effects can be interpreted relative to the average permanent exit rate. From Table 6 we can see the average permanent exit rates for GPs and specialists are 1.6% and 2.7% respectively. We present results separately for GPs and Specialists (in separate columns) and separately for model A (the job satisfaction model, Table 11) and for the model B (the job characteristics model Table 12). Other doctor types had too few permanent exits to estimate a reliable statistical model.

The results indicate no significant difference between female and male doctors in term of permanent exits, for either GPs or specialists. Both models show that only the top two age groups '60 to 64' and '65 and over' have a significantly higher permanent exit rate than younger age groups. This finding applies to both GPs and specialists. The job satisfaction model predicts the age groups '60 to 64' and '65 and over' increase the exit rate by 6.4 and 10.6 percentage points for GPs and 6.7 and 19.0 percentage points for specialists. The job characteristics model (model B) predicts a much smaller effect of these two age groups on the exit rate: 5.3 and 3.3 percentage points for GPs; 2.8 and 6.7 percentage points for specialists. This difference between the two models implies some association between doctors in older age groups and the job characteristics included in Table 12.

GPs who qualified at an 'overseas medical school' have 0.8 percentage point lower exit rate than GPs who completed their degree in Australia for GPs. There is no association between self-assessed health status and the exit rate for either GPs or specialists.

Job satisfaction appears to influence the exit rate only for specialists. Model A predicts that moderately/very satisfied specialists are 0.7 percentage points less likely to exit the workforce permanently.

In the model B (Table 12) there is no evidence that earnings per hour, or partners work opportunities are associated with the exit rate for either GPs or specialists. However there is evidence that GPs and specialists who have patients with complex health and social problems have a higher exit rate (0.6 percentage points for GPs, 0.2 percentage points for specialists). The results also show that specialists working after hours and on-call are less likely to exit. This may be a finding influenced by reverse-causality (doctors less likely to exit are more likely to choose to work extra hours).

For GPs, there is no evidence that practice size, employment type (principal/associate or not), or hospital work is associated with the exit rate. For specialists though, type of employment is associated with the exit rate. Compared to salaried specialists with no rights to private practice, specialists with the right to private practice (RPP) have a 0.3 percentage point lower exit rate. There are also substantial differences in exit rate between groups of specialties. Compared to internal medicine specialties (the reference category), pathology, surgical and 'other' specialties (including radiology, obstetrics, emergency medicine, ophthalmology and others) are associated with higher exit rates (between 1.0 and 1.9 percentage points higher).

There are also some State differences in exit rates, with specialists in WA having between a 0.6 and 1.3 percentage point higher exit rate than specialists in NSW/ACT.

Table 11: Probit models for permanent exits including job satisfaction (Model A): GPs and Specialists

	GPs (N=2188)	Specialists (N=2547)
	Marg eff. (S.E.)	Marg eff. (S.E.)
Female	0.001 (0.003)	-0.003 (0.003)
Age 35-39	0.000 (0.010)	
Age 40-44	-0.001 (0.009)	0.008 (0.012)
Age 45-49	0.005 (0.012)	0.005 (0.010)
Age 50-54	0.012 (0.015)	0.002 (0.009)
Age 55-59	0.021 (0.021)	0.013 (0.016)
Age 60-64	0.064*** (0.047)	0.067*** (0.040)
Age 65+	0.106*** (0.066)	0.190*** (0.078)
Overseas medical school	-0.008** (0.003)	0.001 (0.003)
Health - Good (Ref: Excellent/Very Good)	-0.002 (0.003)	0.000 (0.003)
Health - Fair/Poor	0.003 (0.006)	0.001 (0.004)
Overall job satisfaction – moderately/very satisfied	0.000 (0.004)	-0.007* (0.005)
Pathology (Ref: Internal Medicine)		0.019* (0.016)
Surgery		0.011** (0.007)
Other Specialty		0.010*** (0.005)
Anaesthesia		0.005 (0.006)
Psychiatry		0.007 (0.006)

3.4 What factors are associated with exit rates?

	GPs (N=2188)	Specialists (N=2547)
	Marg eff. (S.E.)	Marg eff. (S.E.)
Non-metropolitan	0.003 (0.003)	0.001 (0.003)
VIC and TAS (Ref: NSW and ACT)	-0.006* (0.003)	-0.005** (0.002)
QLD	-0.005 (0.003)	-0.004 (0.002)
WA	0.002 (0.005)	0.013** (0.008)
SA and NT	-0.002 (0.004)	0.000 (0.003)

Table 12: Probit models for permanent exits including job characteristics (Model B): GPs and Specialists

Variable	GPs (N=2188)	Specialists (N=2547)
	Marg eff. (S.E.)	Marg eff. (S.E.)
Female	0.000 (0.003)	-0.003* (0.001)
Age 35-39	0.002 (0.011)	
Age 40-44	-0.001 (0.008)	0.002 (0.004)
Age 45-49	0.004 (0.011)	0.002 (0.004)
Age 50-54	0.005 (0.011)	-0.001 (0.002)
Age 55-59	0.017 (0.020)	0.000 (0.003)
Age 60-64	0.053** (0.045)	0.028*** (0.024)
Age 65+	0.033* (0.036)	0.067*** (0.047)
Overseas medical school	-0.008** (0.003)	0.001 (0.002)
Health - Good (Ref: Excellent/Very Good)	-0.003 (0.003)	0.000 (0.001)
Health - Fair/Poor	-0.002 (0.004)	0.000 (0.002)
Ln(hourly earnings)	-0.004 (0.003)	0.000 (0.001)
After hours/On-call	-0.003 (0.003)	-0.004** (0.003)
Complex health and social problems: Agree	0.006* (0.003)	0.002** (0.001)
Good opportunities for partner: Agree	-0.002 (0.003)	0.002 (0.001)
Solo practice (Ref: 2-3 docs)	0.009 (0.010)	

3.4 What factors are associated with exit rates?

	GPs (N=2188)	Specialists (N=2547)
	Marg eff. (S.E.)	Marg eff. (S.E.)
Practice size 4-5 docs	0.003 (0.005)	
Practice size 6-9 docs	0.001 (0.004)	
Practice size 10+ docs	0.000 (0.005)	
Principal/Associate	0.001 (0.003)	
Any hospital work	0.001 (0.004)	
Self-employed in hospital (Ref: Salary with no RPP)		-0.002 (0.001)
Self-employed non-hospital		-0.001 (0.001)
Salary with RPP		-0.003** (0.002)
Other		0.000 (0.002)
Pathology (Ref: Internal Medicine)		0.038*** (0.029)
Surgery		0.008** (0.007)
Other Specialty		0.005** (0.003)
Anaesthesia		0.007* (0.007)
Psychiatry		0.000 (0.002)
Non-metropolitan	0.005 (0.004)	0.000 (0.001)
VIC and TAS (Ref: NSW and ACT)	-0.003 (0.003)	-0.001 (0.001)
QLD	-0.002 (0.004)	-0.002* (0.001)
WA	0.005 (0.007)	0.006** (0.005)
SA and NT	0.002 (0.005)	0.000 (0.002)

3.4.3 Results for determinants of temporary exit rates

Table 13 and 14 present results of the job satisfaction (model A) and job characteristics (model B) exit models for temporary exits. Again we present results for GPs and specialists separately but also include hospital doctors and specialist registrars (junior doctors). The average temporary exit rate is 2.6% for GPs, 2.6 % for specialists, and 6.3% for hospital doctors and registrars (see Table 6).

In contrast to the results for permanent exits, gender is associated with the probability of temporary exit for all three doctor types. Female GPs, specialists and junior doctors are 2.2, 2.0 and 6.3 percentage points more likely to exit the workforce temporarily according to model A. In model B, the association with gender is much smaller and insignificant for GPs, suggesting there is some association between job characteristics and gender. But the differences between Model A and Model B is similar for specialists (1.8 percentage points) and even higher (7.2 percentage points) for junior doctors.

For GPs and specialists, the youngest age group (Under 35 for GPs and Under 40 for specialists) have the highest exit rate in both models. For GPs, in model A, 40 to 60 year olds are between 2 to 3 percentage points less likely to have a temporary exit than the under 35 group. In model B the effect is smaller, 40 to 60 year olds have a 1.1 to 1.7 percentage point lower temporary exit rate. For specialists, in model A, 40 to 60 year olds have a 1.0 to 1.9 percentage point lower temporary exit rate than the under 40's. Again the effect is smaller in the job characteristics model, 40 to 60 year-olds have a 0.7 to 1.4 percentage point lower temporary exit rate than under 40s.

For GPs and specialists, there is no evidence doctors from overseas medical schools have different temporary exit rates to Australian-trained doctors. The two models model estimate a substantial association between 'Overseas medical school' and the exit rate for hospital doctors and registrars (2.5 percentage points in the model A, 3.6 percentage points in the model B), this is only marginally statistically significant (at 10%) in the model B.

For specialists in the job satisfaction model do we see a significant association: doctors with fair/poor health are 1.5 percentage points more likely to have a temporary exit compared to those with excellent/very good health. However, this becomes insignificant in the job characteristics model.

Overall job satisfaction (only in model A) shows an association with temporary exits for GPs but not for specialists or junior doctors. Higher job satisfaction is associated with a 1.2 percentage point lower exit rate. This is a contrast with the results for permanent exits where job satisfaction affected the exit rate only for specialists.

In terms of job characteristics, in model B we find no association between temporary exits and hourly earnings, after hours work, or patients' complex health and social problems. We do find an association between good job opportunities for the partner and temporary exits (0.7 percentage points). For GPs we find doctors in solo practices are more likely to have a temporary exit (2.9 percentage points) compared to a practice with 2-3 GPs. Principals/associates and GPs doing any hospital work are less likely to have a temporary exit (1.3 and 0.9 percentage points respectively). Hospital work is closely linked to the opportunity to do procedural work.

For specialists, in Model B we find self-employed specialists are less likely to have a temporary exit (1.2 to 1.3 percentage points), compared to salaried specialists without the right to private practice.

Compared to internal medicine specialties, those in pathology have a 3.2 percentage point higher temporary exit rate, but this is no longer significant in the job characteristics model.

For hospital doctors and registrars, the type of employment (HMO intern or CMO) has no association with the exit rate.

Table 13: Probit models for temporary exits including job satisfaction (Model A): GPs, Specialists, Hospital Doctors and Registrars

	GPs (N=2188) Marg eff. (S.E.)	Specialists (N=2547) Marg eff. (S.E.)	Hospital Doctors and Registrars (N=1031) Marg eff. (S.E.)
Female	0.022*** (0.006)	0.020*** (0.007)	0.063*** (0.013)
Age U30			-0.026 (0.016)
Age 35-39	-0.011** (0.004)		-0.010 (0.019)
Age 40-44	-0.024*** (0.004)	-0.015*** (0.004)	-0.031 (0.017)
Age 45-49	-0.025*** (0.004)	-0.019*** (0.004)	
Age 50-54	-0.027*** (0.004)	-0.010** (0.004)	
Age 55-59	-0.022*** (0.004)	-0.018*** (0.003)	
Age 60-64	-0.020*** (0.003)	-0.008 (0.005)	
Age 65+	-0.016*** (0.004)	-0.005 (0.006)	
Overseas medical school	-0.001 (0.006)	0.002 (0.006)	0.025 (0.019)
Health - Good (Ref: Excellent/Very Good)	-0.003 (0.005)	0.005 (0.006)	-0.003 (0.016)
Health - Fair/Poor	0.001 (0.008)	0.015* (0.011)	-0.009 (0.020)
Overall job satisfaction	-0.012* (0.008)	0.001 (0.006)	0.001 (0.017)
Pathology (Ref: Internal Medicine)		0.032** (0.020)	
Surgery		-0.007 (0.006)	
Other Specialty		0.010* (0.006)	

3.4 What factors are associated with exit rates?

	GPs (N=2188)	Specialists (N=2547)	Hospital Doctors and Registrars (N=1031)
	Marg eff. (S.E.)	Marg eff. (S.E.)	Marg eff. (S.E.)
Anaesthesia		-0.003 (0.006)	
Psychiatry		-0.001 (0.007)	
HMO/intern			0.006 (0.018)
CMO/other MO			-0.026 (0.018)
Non-metropolitan	0.004 (0.005)	-0.010* (0.005)	
VIC and TAS (Ref: NSW and ACT)	-0.004 (0.005)	0.003 (0.006)	-0.013 (0.015)
QLD	-0.012** (0.004)	0.012* (0.008)	-0.020 (0.017)
WA	0.002 (0.007)	0.019* (0.013)	0.003 (0.023)
SA and NT	-0.009 (0.005)	-0.005 (0.007)	-0.007 (0.027)

Table 14: Probit models for temporary exits including job characteristics (Model B): GPs, Specialists, Hospital Doctors and Registrars

Variable	GPs (N=2188)	Specialists (N=2547)	Hospital Doctors and Registrars (N=1031)
	Marg eff. (S.E.)	Marg eff. (S.E.)	Marg eff. (S.E.)
Female	0.005 (0.004)	0.018*** (0.007)	0.072*** (0.016)
Age U30			-0.032* (0.017)
Age 35-39	-0.007** (0.003)		-0.019 (0.019)
Age 40-44	-0.013*** (0.003)	-0.011** (0.004)	-0.021 (0.020)
Age 45-49	-0.015*** (0.004)	-0.014*** (0.004)	
Age 50-54	-0.017*** (0.004)	-0.007 (0.004)	
Age 55-59	-0.012*** (0.003)	-0.012** (0.004)	
Age 60-64	-0.011*** (0.003)	-0.004 (0.006)	
Age 65+	-0.007 (0.004)	0.001 (0.008)	
Overseas medical school	-0.004 (0.004)	0.000 (0.005)	0.036* (0.024)
Health - Good (Ref: Excellent/Very Good)	-0.003 (0.004)	0.004 (0.006)	-0.007 (0.018)
Health - Fair/Poor	0.001 (0.007)	0.011 (0.011)	-0.012 (0.022)
Ln(hourly earnings)	0.000 (0.004)	0.005 (0.004)	0.001 (0.017)
After hours/On-call	0.006 (0.004)	-0.004 (0.006)	0.007 (0.017)
Complex health and social problems: Agree	0.000 (0.004)	0.004 (0.004)	-0.007 (0.017)

3.4 What factors are associated with exit rates?

	GPs (N=2188) Marg eff. (S.E.)	Specialists (N=2547) Marg eff. (S.E.)	Hospital Doctors and Registrars (N=1031) Marg eff. (S.E.)
Good opportunities for partner: Agree	0.007** (0.004)	-0.001 (0.004)	0.012 (0.015)
Solo practice (Ref: 2-3 docs)	0.029* (0.025)		
Practicesize 4-5 docs	0.010 (0.010)		
Practice size 6-9 docs	0.008 (0.008)		
Practice size 10+ docs	0.019* (0.015)		
Principal/Associate	-0.013*** (0.005)		
Any hospital work	-0.009** (0.004)		
Self-employed in hospital (Ref: Salary with no RPP)		-0.012* (0.004)	
Self-employed non-hospital		-0.013** (0.005)	
Salary with RPP		0.005 (0.007)	
Other		0.004 (0.007)	
Pathology (Ref: Internal Medicine)		0.018 (0.018)	
Surgery		-0.005 (0.007)	
Other Specialty		0.009 (0.007)	
Anaesthesia		-0.003 (0.006)	
Psychiatry		0.002 (0.008)	
HMO/intern			0.003 (0.022)
CMO/other MO			-0.032 (0.018)

3.4 What factors are associated with exit rates?

	GPs (N=2188) Marg eff. (S.E.)	Specialists (N=2547) Marg eff. (S.E.)	Hospital Doctors and Registrars (N=1031) Marg eff. (S.E.)
Non-metropolitan	0.005 (0.005)	-0.009* (0.004)	
VIC and TAS (Ref: NSW and ACT)	0.001 (0.005)	0.006 (0.006)	0.004 (0.019)
QLD	-0.006 (0.004)	0.013* (0.009)	-0.004 (0.021)
WA	0.004 (0.007)	0.020* (0.015)	0.006 (0.026)
SA and NT	-0.002 (0.006)	-0.002 (0.008)	-0.009 (0.029)

4 Exit rates for nurses

4.1 Previous Research

Studies reporting estimates of attrition (retention) rates.

A number of studies have analysed the retention (and attrition) of nurses within the nursing workforce in Australia. Schofield and Beard (2005) analysed four years of census data in Australia from 1986 to 2001 and found that 28% of registered nurses aged 50-54 years in 1986 had retired by 1991. This translates to an implied annual attrition rate of 5.6%. Two studies have reported estimates of retention rates for nurses using nurses' registration data.

Doiron et al (2008) analysed the trends in the retention¹ of nurses over 1993 – 2000 using Nursing Registration Board data in NSW and reported an overall retention rate of 82.3% (or an implied annual attrition rate of 17.7%) in 1994-1995. The retention rate was found to be higher for registered nurses compared with enrolled nurses (83.6% vs 75.6%). Nurses on both ends of the age distribution have the lowest retention rates, ranging roughly from 0.7 to 0.75 for registered nurses aged 29 years and under, and 0.69 to 0.77 for those aged 60 and over. Using the same data, Doiron and Jones (2004) reported retention rates ranging from 0.78 to 0.80 (an attrition rate of 0.20 to 0.22) between 1996 and 1997. Retention rates within public hospitals are considerably lower, ranging from 0.69 to 0.72.

For the case of the UK, Buchan and Seccombe (2005) reported a 'wastage rate' among NHS nurses of 9.4% in 2004, with nearly one-in-ten nurses leaving the NHS completely each year. This is similar to Frijters et al (2007), who analysed 16 waves (1997 to 2002) of longitudinal data from the Quarterly Labour Force Survey of the UK. The authors reported from the sample they analysed that approximately 10% of nurses leave the UK NHS each year. The authors noted that over an 18 month period that a small proportion (18% of 186 nurses observed) of nurses who left do return to their NHS nursing occupations.

Parker and Rickman (1995) investigated the labour force out-flows of registered nurses in the US using data from the Current Population Survey for the years 1980-1990. The authors found that an average of 2.9% of registered nurses reported having a different occupation in the following year, of which many who changed occupations have maintained affiliation with the health care industry. Over the period analysed, approximately 16% of registered nurses exited the labour force in the subsequent year.

¹ The authors defined retention as nurses who remained working as a nurse in NSW in the following year. This is true even if nurses had switched their job premise (e.g. from a public hospital to private hospital) over the year in question.

Factors associated with attrition (retention) of nurses

A number of studies have examined the factors that influenced both the retention in, and attrition out of the nursing workforce. Hayes et al (2006) provides an excellent survey of the current literature on nurse turnover. The studies that were surveyed have highlighted the role of job (dis)satisfaction; organisational factors such as workload, empowerment and autonomy; professional attitudes such as professionalism and commitment; and personal characteristics such as age, work experience and educational attainment.

Below we survey a selection of Australian studies investigating the factors associated with the actual and intended decision to quit the nursing workforce. For the international literature, see Shields and Ward (2001) and Frijters et al (2007) and for the UK, Elliot et al for nurses vacancies in the UK, Holmas (2002) for Norway, Parker and Rickman (1995) for the US.

Doiron and Jones (2006) analysed the factors associated with the retention of public sector nurses using NSW nursing registration data linked with hospital characteristics for 1996 and 1997. The categories of explanatory variables include *personal characteristics* (age, sex, residency, post basic qualifications, years registered); *work characteristics* (work hours, specialty, job classification); *hospital type*; *hospital characteristics* (bed days, waiting time); and *local area characteristics* (unemployment rate, % foreign born, % age < 15 years). The key results are:

- Retention is positively associated with age and experience, with lowest retention rates among junior and youngest nurses.
- Having post basic qualification improves retention
- Males and UK born nurses more likely to leave the workforce.
- Promotion to higher classifications increase retention but only for junior classifications.
- Larger hospitals have greater nursing retention rates (controlling for workload).
- Increases in workload reduce retention.
- Higher numbers of nursing staff, and expenditure improve retention.
- Large expenditures on VMOs reduce retention.

Cowin (2002) examined the role of job satisfaction on nurses' intention to remain in nursing using survey data from working nurses and final year nurses in NSW. The author found that nurses who are satisfied with their professional status are likely to remain in nursing. The issue of remuneration is also a significant area of dissatisfaction. For student nurses, the difficulties arising from the transition from student to registered nurse is a significant factor on student nurses' intentions to quit.

Dockery (2004) investigated the quitting intentions of nurses using data from a survey of registered nurses in WA. The results from the survey of nurses indicate that nurses who are older, and those who have low levels of satisfaction with their job and their personal safety, are more likely to indicate that they anticipate ceasing to practice nursing in the next five years.

4.2 Exit rates for nurses using the Nurses e-Cohort

The Nurses and Midwives e-Cohort Study is a longitudinal electronic cohort (e-cohort) study which seeks to examine factors associated with recruitment and retention of the nursing and midwifery workforce. Data from the Nurses e-Cohort will be used for the analysis of exit rates for nurses. Below, we briefly describe the e-Cohort sample and calculate estimates on the exit rates for nurses and midwives based on this dataset.

4.2.1 Study background and sample characteristics

The study protocol and cohort profile for the e-Cohort study is described in detail in Turner et al. (2009). Recruitment for the study was conducted from 2006 to 2007, and three follow-up surveys were administered annually from April 2008. The number of respondents who attempted the surveys are 8074 (Wave 1), 5371 (Wave 2) and 4991 (Wave 3). In the analysis below, we focus on survey respondents who were classified as being an Australian registered nurse and/or midwife at the time of recruitment into the study.

In each survey wave, respondents were asked to provide information on their employment status. Those employed were asked if they were working as nurse and/or midwife, and if they were on extended leave (e.g. long service, maternity). The distribution of the sample from all three waves by employment status is presented in Table 15 below.

Table 15: Employment status in Waves 1 to 3

Employment status	Wave 1 (2008)		Wave 2 (2009)		Wave 3 (2010)	
Working as nurse and/or midwife	3774	73.6%	2754	82.8%	2531	81.3%
Working as nurse and/or midwife and currently on leave	68	1.3%	209	6.3%	187	6.0%

Not working in Nursing/ Midwifery ¹	1284	25.1%	364	10.9%	401	12.9%
Total	5126	100%	3327	100%	3119	100%

¹These are respondents who are either not in employment, or who are employed but not working in nursing and midwifery.

4.2.2 Exit rate by age

Using the employment status categories described in Table 15, exits are classified as *permanent* or *temporary*. Exits are defined as permanent when nurses no longer work in nursing and midwifery for reasons including retirement and changing professions. Temporary exits include extended leave for maternity, illness and long service.

The definition used to calculate the exit rates for nurses is similar to that for doctors described above. Exit rates are calculated using two consecutive years of data, i.e. waves 1 & 2, and waves 2 & 3. Permanent (or temporary) exit rates are defined as the proportion of working nurses in wave *t-1* who permanently (temporarily) exit the nursing/midwifery workforce in wave *t*.

Figure 10 describes the exit rates by age for Wave 1-2. Overall, the mean exit rates, weighted using national estimates of the age distribution of nurses in 2008², are 5.5% (Permanent), 6.8% (Temporary) and 12.3% (Combined). The unweighted exit rates are 5.3%, 6.3% and 11.7% respectively. Permanent exit rates are fairly constant between 4% to 6% for all age groups up to age 55 to 59 before increasing significantly for nurses age 60 years and over. This is likely to be a result of permanent exits due to retirement. Temporary exit rates are highest for nurses of all age groups up to 35-39 years, as well as 60-64 and over.³ The former exits are likely to be for childbearing, and the latter for medical and long service leave.

Figure 11 describes the exit rates by age for Wave 2-3. The mean exit rates across all age groups are 6.2% (Permanent), 6.1% (Temporary) and 12.3% (Combined). The unweighted exit rates are 5.8%, 5.3% and 11.2%. Compared with Wave 1-2, the permanent exit rates for nurses aged under 30 years are considerably higher (9.6% for Wave 2-3 vs 5.8% in Wave 1-2). As with the case for Wave 1-2, permanent exit rates for ages 30 years and over are fairly constant up to age 60 years and over. Temporary exit rates for Wave 2-3 show a similar pattern with that for Wave 1, except for ages 55 years and over which is significantly lower. This is likely to be due to truncation in that older nurses who have been observed to be temporarily out of the nursing workforce at Wave 2 are not included in the calculation of exit rates for Wave 2-3.

² Weighted by age distribution of nurses reported in the AIHW Nursing and Midwifery Labour Force 2008 survey. The age categories presented in the former is slightly condensed: Ages <25, 25-34, 35-44, 45-54, 55 and over.

³ It is possible that nurses who are close to retirement and on long service leave may not return to work in which case they would be considered having permanently exited the workforce.

Figure 10: Exit rates between Waves 1 and 2 by age

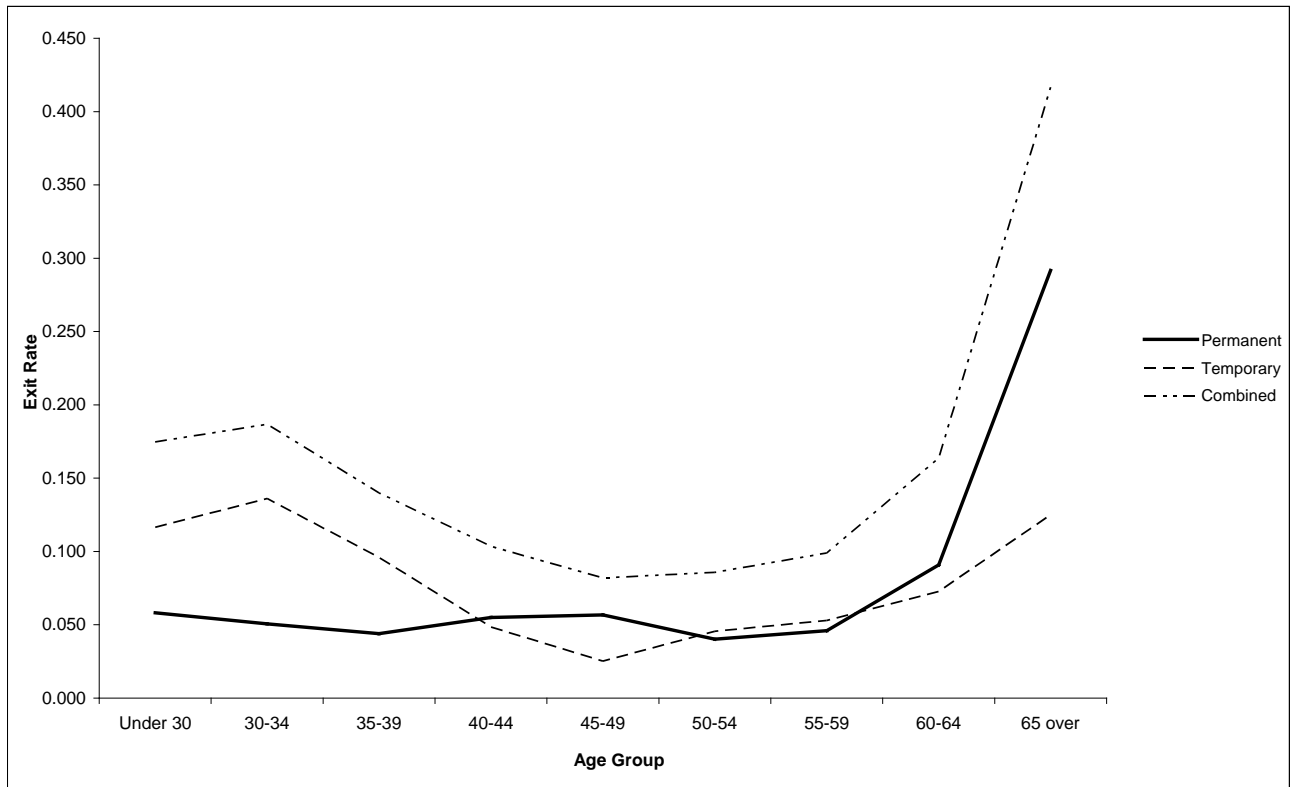
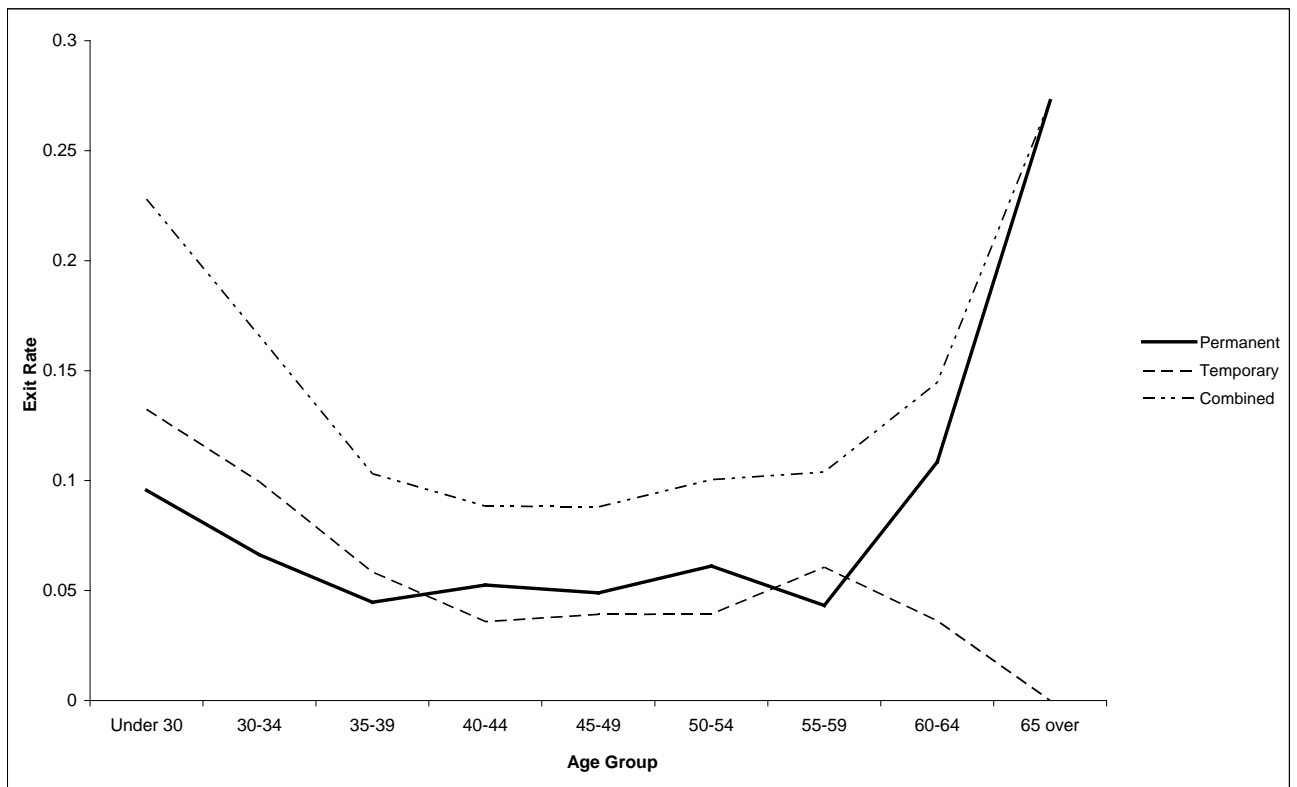


Figure 11: Exit rates between Wave 2 and 3 by age

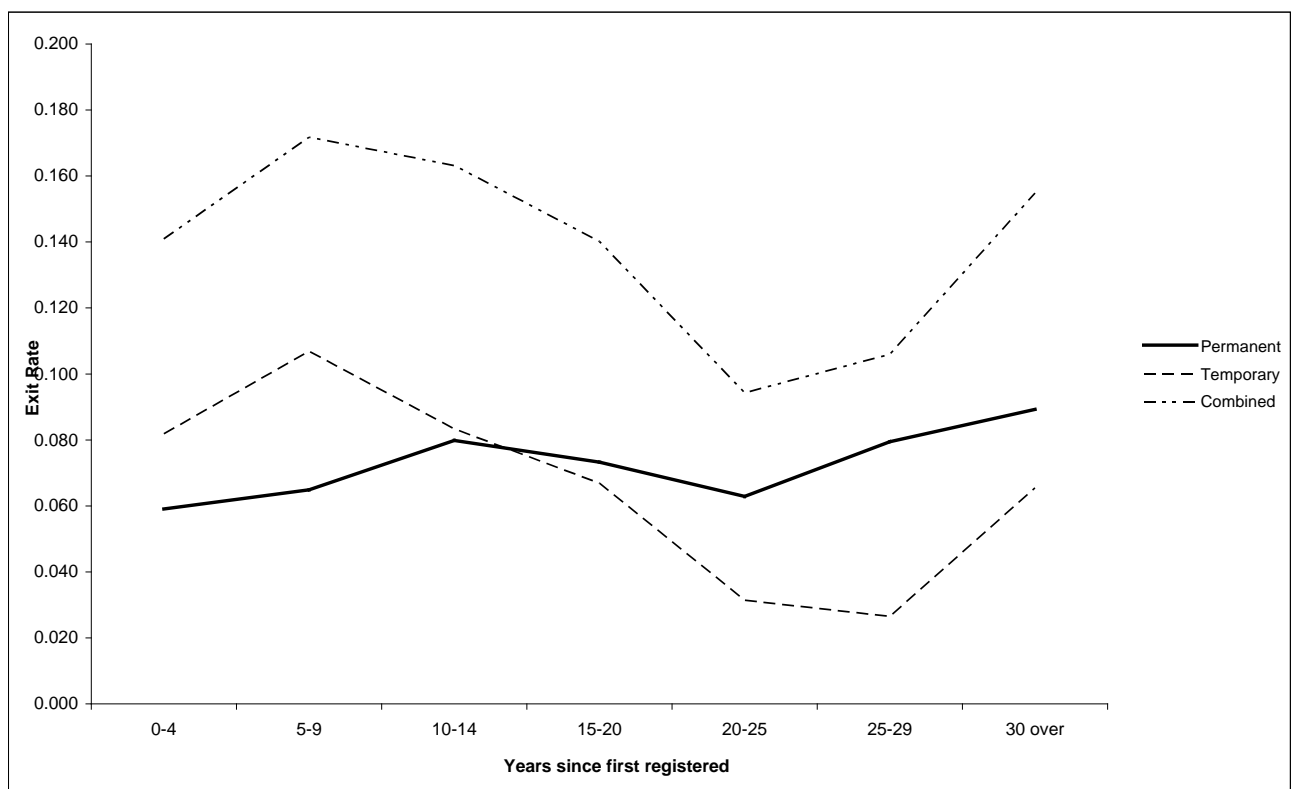


4.2.3 Exit rate by years worked since first registration

This exit rates by age in Section 4.1.3 show some evidence of higher exits by younger nurses who are in the early stages of their nursing career. These are likely to be newly qualified nurses who were observed to permanently leave the nursing workforce due to reasons such as moving overseas or changing professions.⁴

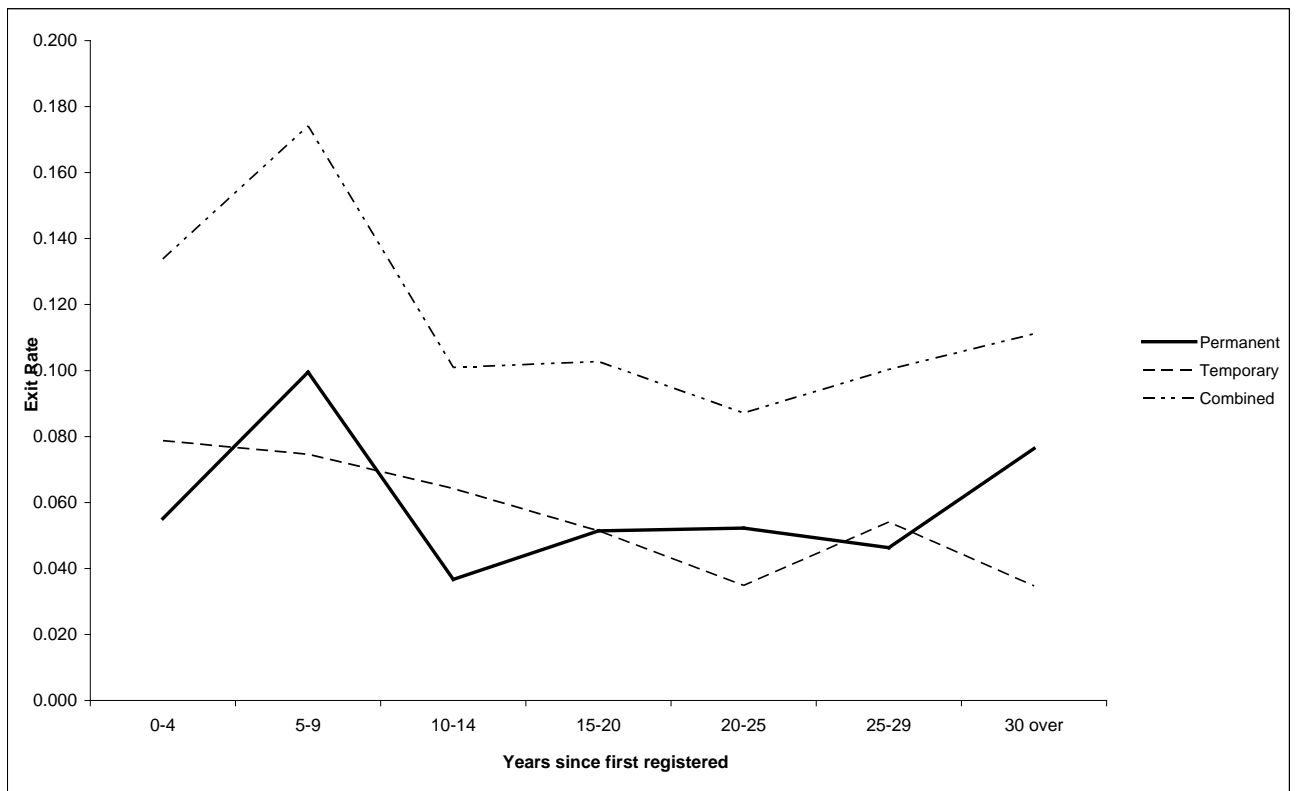
Below we examine how exit rates differ by the number of years nurses worked since first registration. Figure 12 shows the exit rates between Wave 1-2 by years worked since first registration. The pattern of permanent exits differs significantly from that shown in Figure 10 and indicates a gradual increase in the proportion of nurses permanently leaving the nursing workforce as the number of years worked increases. The pattern of exits between Wave 2-3 however reveals some evidence of higher permanent exits by nurses with 0-9 years of work experience compared with nurses with 10 to 29 years of experience. The patterns of temporary exits in Figures 12 and 13 are similar to that in Figures 10 and 11.

Figure 12: Exit rates between Waves 1 and 2 by years since first registered as nurse/midwife



⁴ A second group are student nurses who, upon graduation, permanently leave the nursing workforce due to reasons such as moving overseas or changing professions. These may be identified by looking at nurses in the advanced stages of completing their undergraduate degree in Wave 1 of the e-Cohort study, and tracking their subsequent employment status. Unfortunately, the number of student nurses is too small (249 undergraduates in full sample, 16 in years 3 and 4 of their undergraduate studies) to facilitate accurate analysis along this line of inquiry.

Figure 13: Exit rates between Waves 2 and 3 by years since first registered as nurse/midwife



4.3 What factors are associated with nursing exits?

3.3.1 Methods

We conducted a regression analysis to investigate factors associated with nurses' exits. The outcome variable of interest is a binary variable which assumes a value of 1 if a nurse exits the workforce between Wave 1 and 2, and 0 otherwise. Given the binary nature of the outcome variable, we employ the probit regression model. The explanatory variables used are similar to those reviewed in the literature which can be classified into the following categories:

- Personal characteristics (age, gender, country of birth, self-assessed health)
- Job characteristics (contract type, sector of work, job classification, specialty)
- Geography (state/territory of nursing registration)

The means of the outcome and explanatory variables are shown in Table C1 in Appendix C. Table 16 presents the estimates of the marginal effect on nurses exit for permanent, temporary and combined exits. The marginal effects are interpreted as the change in the probability of an exit occurring for a 0 to 1 change in the binary explanatory variables. Below we elaborate on the results for both permanent and temporary exits.

3.3.2 Results

For permanent exits, all else being equal, females are 2.8 percent more likely to exit the workforce compared to males. The probability of permanent exits occurring is higher for those under the age of 35 years and 60 years and over, compared with nurses age 45-49 years. These results are indicative evidence of both early career exits, as well as exits due to retirement. Nurses on casual contracts are 3.4 percent more likely to exit compared with those on permanent contracts, while those working in the private for profit sector are 3.3 percent more likely to leave the workforce permanently relative to public sector nurses. The probability of exit is not significantly associated with nurses' job classifications (e.g. enrolled nurse, consultant) or specialty. The propensity to exit is also not significantly associated with the state/territory that nurses are registered to practice.

In the case of temporary exits, nurses under the age of 40 years are considerably more likely to temporarily leave the workforce. This is likely to be due to childbearing or study leave. The probability of temporary exit is also higher for nurses age 60 years and over which is likely to arise from long service and sick leave. Nurses who were born in countries that fall into the 'Other' category are less likely to exit compared with Australia-born nurses. Private sector nurses have a lower probability of leaving the workforce temporarily compared with their public sector counterparts. Nurses on temporary contracts are also less likely to temporarily leave the workforce. The probability of temporary exits does not vary significantly by specialty except for nurses in Aged Care, Rehabilitation, Primary and Community Care which are lower compared with Medical/Surgical. Finally, the propensity of exits is not significantly associated with the location of practice except for South Australia which is higher than NSW.

Tables C2 and C3 in Appendix C present the results from the exit regressions for nurses age under 55, and 55 years and over. These results corroborate those from the pooled regression in Table 16.

Temporary exits are likely to occur for younger (below 40 years of age) nurses while older nurses (60 years and over) are more likely to permanently exits the nursing workforce.

Table 16: Estimates of marginal effect from probit regression on nurses exit

Variables	Permanent Exit (N=1551)	Temporary Exit (N=1619)	Combined Exit (N=1747)
Female	0.028*** (0.0074)	0.032*** (0.012)	0.058*** (0.015)
Age <30 years (Ref 45-49 years)	0.039* (0.031)	0.15*** (0.052)	0.16*** (0.051)
Age 30-34 years	0.040* (0.029)	0.13*** (0.046)	0.15*** (0.047)
35-39 years	0.0021 (0.016)	0.082*** (0.033)	0.079** (0.034)
40-44 years	0.013 (0.017)	0.047* (0.029)	0.055*** (0.032)
50-54 years	-0.0035 (0.014)	0.025 (0.025)	0.023 (0.028)
55-59 years	0.016 (0.022)	0.057* (0.040)	0.065* (0.040)
60-64 years	0.12*** (0.058)	0.084* (0.063)	0.20*** (0.072)
65 years and over	0.38*** (0.15)	0.24** (0.17)	0.52*** (0.13)
Country of birth: NZ (Ref: Australia)		0.0055 (0.026)	-0.024 (0.028)
UK	-0.0024 (0.012)	2.63e-05 (0.017)	-0.00089 (0.021)
Other	0.0080 (0.017)	-0.038*** (0.011)	-0.031 (0.021)

4.3 What factors are associated with nursing exits?

Variables	Permanent Exit	Temporary Exit	Combined Exit
	(N=1551)	(N=1619)	(N=1747)
Self-assessed health: Good (Ref: Excellent/Very Good)	0.0029 (0.0088)	0.018 (0.012)	0.020 (0.015)
Fair/Poor	0.0086 (0.015)	0.030 (0.021)	0.038 (0.026)
Contract: Casual (Ref: Permanent)	0.034* (0.020)	0.027 (0.022)	0.056** (0.028)
Temporary	0.015 (0.028)	-0.031* (0.017)	-0.026 (0.029)
Sector: Private for Profit (Ref: Public)	0.033* (0.017)	-0.034*** (0.011)	-0.011 (0.018)
Public and Private	-0.011 (0.014)	-0.019 (0.018)	-0.033 (0.024)
Private non-Profit	0.0206 (0.0183)	-0.046*** (0.0094)	-0.034* (0.018)
Registered nurse (Ref: Enrolled nurse)	0.0160 (0.0179)	0.0173 (0.022)	0.031 (0.029)
Clinical nurse	0.0095 (0.032)	0.061 (0.051)	0.060 (0.054)
Clinical nurse consultant	0.034 (0.044)	0.020 (0.039)	0.043 (0.051)
Nurse practitioner		0.21 (0.15)	0.22 (0.15)
Lecturer	0.037 (0.057)	0.019 (0.050)	0.050 (0.067)
Administrator/Other	0.041 (0.045)	0.029 (0.042)	0.055 (0.052)

4.3 What factors are associated with nursing exits?

Variables	Permanent Exit (N=1551)	Temporary Exit (N=1619)	Combined Exit (N=1747)
Specialty: Midwifery (Ref: Medical/Surgical)	0.016 (0.015)	-0.010 (0.013)	-0.00078 (0.019)
Aged Care/Rehab	0.0084 (0.016)	-0.024* (0.015)	-0.011 (0.022)
Mental health	-7.02e-05 (0.018)	-0.018 (0.016)	-0.018 (0.024)
Primary/Community	-0.0029 (0.012)	-0.023* (0.013)	-0.025 (0.018)
Paediatric/Neonatal	0.010 (0.029)	-0.00200 (0.0259)	0.0041 (0.037)
Rural/Remote	0.068 (0.068)	0.0012 (0.044)	0.061 (0.074)
Other	-0.0079 (0.016)	-0.020 (0.018)	-0.027 (0.025)
State of registration: VIC (Ref: NSW)	0.0023 (0.014)	-0.020 (0.014)	-0.020 (0.020)
QLD	-0.00019 (0.010)	-0.016 (0.012)	-0.016 (0.016)
WA	0.022 (0.018)	0.012 (0.018)	0.029 (0.024)
SA	-0.012 (0.019)	0.077* (0.044)	0.069 (0.048)
TAS/NT	-0.00088 (0.020)		0.030 (0.037)
ACT	0.0025 (0.023)	0.033 (0.032)	-0.060*** (0.021)

4.3 What factors are associated with nursing exits?

Variables	Permanent Exit (N=1551)	Temporary Exit (N=1619)	Combined Exit (N=1747)
Note: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$			

4.4 Exit rates for nurses using the HILDA data

4.4.1 The HILDA survey

The Household Income and Labour Dynamics in Australia (HILDA) survey is a nationally representative longitudinal survey which collects extensive information on household and family formation, labour force participation and income, and life satisfaction, health and well-being. Below, we briefly describe the HILDA sample and calculate estimates on the exit rates for nurses and midwives based on this dataset.

4.4.2 Study design

The population of interest is the group of respondents who have a nursing qualification in at least one of the nine waves (2001 to 2009) of the HILDA data. We restrict the sample to respondents aged 62 and younger. Respondents have to be in the survey for at least two years during the nine-year survey period. We classify the respondents based on the employment status in each wave: (i) working in nursing; (ii) working outside nursing and (iii) not in labour force. Employment in nursing is distinguished from other occupations based on the Australian and New Zealand Standard Classification of Occupation (ANZSCO 2006). Those classified as working in nursing include registered nurses, midwives and mothercraft nurses.⁵ The analysis sample includes 4161 person-year observations for 758 nursing qualification holders.

4.4.3 Exit rates

In contrast to e-Cohort study, we are unable to differentiate HILDA respondents into those who are permanent or temporary exits in the nursing workforce because no questions are asked on the reason for leaving. Therefore we classify an exit as nurses leaving the workforce either to work in other occupations or to leave the labour force entirely. Exit rates are calculated using two consecutive years of data. Exit rates are defined as the proportion of working nurses in wave $t-1$ who exits the nursing workforce in wave t .

Table 17 shows the wave-on-wave exit rates for nurses in the HILDA survey. Mean exit rates vary considerably across the different waves, and range from 5.2% to 12.8%. The variation is likely a result of small sample sizes.

Table 18 shows the distribution of work status for qualified nurses who are observed in all nine waves of the HILDA survey. The percentage of qualified nurses working within nursing varies between 54 and 60 percent, and is relatively constant across time.

The wave-on-wave exit rates by age are shown in Table D1 in the Appendix D. One would observe that the exit rates fluctuate significantly and do not exhibit the patterns that are obtained from the MABEL study and the e-Cohort study. This is likely to be due to small numbers.

⁵ Those who are working in a lower skilled, such as aged, disabled or personal care, are also included as nurses. Nurses in non-clinical positions such as nurse educators, researchers or managers are also included.

Table 17: Wave-on-wave exit rates from HILDA

Waves	Exit Rate in % (Number of respondents working in nursing at wave <i>t-1</i>)
1-2	9.4 (224)
2-3	12.8 (218)
3-4	7.8 (215)
4-5	5.2 (211)
5-6	6.8 (235)
6-7	7.7 (248)
7-8	7.8 (243)
8-9	8.7 (265)

Table 18: Work status of respondents with qualification in Wave 1 (N=259)

Waves	% Working in Nursing	% Not Working in Nursing/Not in Labour Force
1	59.9	40.1
2	58.7	41.3
3	57.5	42.5
4	55.6	44.4
5	58.3	41.7
6	58.7	41.3
7	57.5	42.5
8	57.1	42.9
9	54.4	45.6

5 Conclusions

This research has examined several new datasets and calculated the exit rates for doctors and nurses. We also examined factors associated with high and low exit rates.

Permanent exit rates vary by more than just age and gender. There are statistically significant differences between GPs and specialists, across different medical specialties, and some evidence of differences across States/jurisdictions. Furthermore, there was some evidence that exit rates for doctors are associated with job satisfaction, the types of patients seen, and whether they graduated in Australia.

Exit rates for nurses are more than double that for doctors, at around 12%. Permanent exits are fairly constant up to the age of 60, and there is little evidence of a peak in permanent exits in the years following graduation.

In general, there are issues in being able to classify year-on-year exits as temporary or permanent, and there are no standard definitions for this. Ideally, an individual who did exit would need to be observed over a long period to establish whether their exit was in fact temporary or permanent. This is not possible with data year-on-year exits. For example, though maternity leave is usually classified as temporary, a proportion of these exits may be permanent, or for much longer than originally anticipated. MABEL data show that 23% of temporary exits in one year become permanent in the following year. Similarly, those who work overseas and are classified as permanent exits, may in fact return at some point in the future. This creates inaccuracies in the calculation of permanent and temporary exit rates where this relies on stated intentions of whether to return or not.

Defining exits for forecasting purposes might prove to be a problem if the future workforce does not behave in the same way. For example, using this approach we will capture the retirement behaviour of older doctors with a higher exit rate for doctors in older age groups (e.g. age groups 60 and over). However, when we use these exit rates to predict the *future* retirement behaviour of the cohort of doctors who are currently much younger (e.g. those aged 30 to 40 years), they may be inaccurate. It may be that today's young doctors will retire later (or indeed earlier) on average than today's older doctors. We must bear these cohort issues in mind when interpreting the results of our analysis.

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Appendix A Descriptive statistics for doctors

Table A1: Descriptive statistics for GPs (N=2188)

Variable	Mean	S.D.	Min	Max
Permanent exit	0.172	0.130	0	1
Temporary exit	0.280	0.164	0	1
Female	0.460	0.498	0	1
Age 35-39	0.103	0.304	0	1
Age 40-44	0.122	0.327	0	1
Age 45-49	0.182	0.386	0	1
Age 50-54	0.198	0.399	0	1
Age 55-59	0.150	0.358	0	1
Age 60-64	0.084	0.277	0	1
Age 65+	0.073	0.260	0	1
Overseas medical school	0.212	0.409	0	1
Health - Good (Ref: Excellent/Very Good)	0.207	0.405	0	1
Health - Fair/Poor	0.089	0.285	0	1
Ln(hourly earnings)	4.387	0.453	3.219	6.581
After hours/On-call	0.544	0.498	0	1
Complex health and social problems: Agree	0.670	0.470	0	1
Good opportunities for partner: Agree	0.550	0.498	0	1

Variable	Mean	S.D.	Min	Max
Overall job satisfaction (very/moderately satisfied)	0.856	0.352	0	1
Solo practice (Ref: 2-3 docs)	0.080	0.272	0	1
Practicesize 4-5 docs	0.230	0.421	0	1
Practice size 6-9 docs	0.334	0.472	0	1
Practice size 10+ docs	0.156	0.363	0	1
Principal/Associate	0.460	0.498	0	1
Any hospital work	0.250	0.433	0	1
Non-metropolitan	0.359	0.480	0	1
VIC and TAS (Ref: NSW and ACT)	0.302	0.459	0	1
QLD	0.206	0.405	0	1
WA	0.118	0.323	0	1
SA and NT	0.110	0.313	0	1

Table A2: Descriptive statistics for Specialists (N=2547)

Variable	Mean	S.D.	Min	Max
Permanent exit	0.025	0.127	0	1
Temporary exit	0.023			
Female	0.284	0.451	0	1
Age 40-44	0.166	0.372	0	1
Age 45-49	0.180	0.384	0	1
Age 50-54	0.176	0.381	0	1
Age 55-59	0.115	0.320	0	1
Age 60-64	0.106	0.308	0	1
Age 65+	0.090	0.287	0	1
Overseas medical school	0.170	0.376	0	1
Health - Good (Ref: Excellent/Very Good)	0.203	0.402	0	1
Health - Fair/Poor	0.072	0.258	0	1
Ln(hourly earnings)	4.794	0.514	3.219	7.849
After hours/On-call	0.812	0.391	0	1
Complex health and social problems: Agree	0.622	0.485	0	1
Good opportunities for partner: Agree	0.537	0.499	0	1
Overall job satisfaction (very/moderately satisfied)	0.876	0.330	0	1
Self-employed in hospital (Ref: Salary with no RPP)	0.162	0.368	0	1

Variable	Mean	S.D.	Min	Max
Self-employed non-hospital	0.275	0.447	0	1
Salary with RPP	0.281	0.449	0	1
Other	0.299	0.458	0	1
Pathology (Ref: Internal Medicine)	0.040	0.197	0	1
Surgery	0.114	0.318	0	1
Other Specialty	0.282	0.450	0	1
Anaesthesia	0.165	0.371	0	1
Psychiatry	0.103	0.304	0	1
Non-metropolitan	0.167	0.373	0	1
VIC and TAS (Ref: NSW and ACT)	0.346	0.476	0	1
QLD	0.172	0.377	0	1
WA	0.077	0.267	0	1
SA and NT	0.102	0.303	0	1

Appendix B Exit rates for nurses

Table B1: Exit rates by age

Age Group	Waves 1 & 2			Wave 2 & 3		
	Permanent	Temporary	Combined	Permanent	Temporary	Combined
Under 30	0.058	0.117	0.175	0.096	0.132	0.228
30-34	0.051	0.136	0.187	0.066	0.099	0.166
35-39	0.044	0.096	0.140	0.045	0.058	0.103
40-44	0.055	0.048	0.104	0.052	0.036	0.088
45-49	0.057	0.025	0.082	0.049	0.039	0.088
50-54	0.040	0.046	0.086	0.061	0.039	0.100
55-59	0.046	0.053	0.099	0.043	0.061	0.104
60-64	0.091	0.073	0.164	0.108	0.036	0.145
65 over	0.292	0.125	0.417	0.273	0.000	0.273

Table B2: Exit rates by years worked since first registration

Years worked	Waves 1 & 2			Wave 2 & 3		
	Permanent	Temporary	Combined	Permanent	Temporary	Combined
0-4	0.059	0.082	0.141	0.055	0.079	0.134
5-9	0.065	0.107	0.172	0.100	0.075	0.174
10-14	0.080	0.083	0.163	0.037	0.064	0.101
15-20	0.073	0.067	0.140	0.051	0.051	0.103
20-25	0.063	0.031	0.094	0.052	0.035	0.087

25-29	0.079	0.026	0.106	0.046	0.054	0.100
30 over	0.089	0.065	0.155	0.076	0.035	0.111

Appendix C Descriptive statistics for nurses

Table C1: Means of variables for nursing regressions

Variables	Permanent Exit (N=1551)	Temporary Exit (N=1619)	Combined Exit (N=1747)
Exits	0.040	0.069	0.099
Female	0.90	0.90	0.91
Age <30 years	0.072	0.070	0.072
Age 30-34 years	0.09	0.091	0.093
35-39 years	0.15	0.16	0.15
40-44 years	0.16	0.16	0.16
45-49 years	0.22	0.21	0.21
50-54 years	0.18	0.18	0.18
55-59 years	0.091	0.088	0.090
60-64 years	0.034	0.032	0.034
65 years and over	0.0090	0.0070	0.0090
Country of birth: Australia	0.80	0.80	0.80
NZ		0.048	0.046
UK	0.13	0.12	0.12
Other	0.074	0.067	0.068
Self-assessed health: Excellent/Very Good	0.50	0.51	0.51

Variables	Permanent Exit (N=1551)	Temporary Exit (N=1619)	Combined Exit (N=1747)
Good	0.37	0.38	0.38
Fair/Poor	0.12	0.12	0.12
Contract: <i>Permanent</i>	0.85	0.86	0.85
Casual	0.10	0.10	0.10
Temporary	0.041	0.040	0.040
Sector: Public	0.69	0.69	0.69
Private for Profit	0.14	0.13	0.14
Public and Private	0.050	0.049	0.050
Private non-Profit	0.12	0.11	0.11
Job classification: Enrolled nurse	0.065	0.067	0.065
Registered nurse	0.65	0.64	0.65
Clinical nurse	0.075	0.076	0.074
Clinical nurse consultant	0.080	0.078	0.079
Nurse practitioner		0.0080	0.007
Lecturer	0.035	0.034	0.035
Administrator/Other	0.099	0.098	0.098
Specialty: Medical/Surgical	0.42	0.43	0.42
Midwifery	0.16	0.15	0.16
Aged Care/Rehab	0.11	0.11	0.11

Variables	Permanent Exit (N=1551)	Temporary Exit (N=1619)	Combined Exit (N=1747)
Mental health	0.074	0.074	0.074
Primary/Community	0.13	0.13	0.13
Paediatric/Neonatal	0.035	0.035	0.034
Rural/Remote	0.013	0.012	0.013
Other	0.058	0.057	0.057
State of registration: NSW	0.38	0.39	0.38
VIC	0.11	0.11	0.11
QLD	0.26	0.28	0.27
WA	0.12	0.13	0.13
SA	0.039	0.043	0.041
TAS/NT	0.042		0.039
ACT	0.045	0.047	0.045

Table C2: Estimates of marginal effects of nurses exit (age 55 and under)

Variables	Permanent Exit (N=1343)	Temporary Exit (N=1415)	Combined Exit (N=1515)
Female	0.023*** (0.0079)	0.034*** (0.012)	0.056*** (0.015)
Age <30 years (Ref 45-49 years)	0.033 (0.027)	0.14*** (0.050)	0.15*** (0.049)

Variables	Permanent Exit (N=1343)	Temporary Exit (N=1415)	Combined Exit (N=1515)
Age 30-34 years	0.036 (0.026)	0.12*** (0.045)	0.14*** (0.045)
35-39 years	0.0027 (0.015)	0.078** (0.032)	0.073** (0.032)
40-44 years	0.012 (0.016)	0.045 (0.028)	0.051* (0.030)
50-54 years	-0.0013 (0.013)	0.027 (0.025)	0.024 (0.027)
Country of birth: NZ (Ref: Australia)		0.015 (0.030)	-0.014 (0.030)
UK	-0.0043 (0.012)	-0.0015 (0.018)	-0.0045 (0.023)
Other	0.011 (0.019)	-0.034*** (0.013)	-0.027 (0.022)
Self-assessed health: Good (Ref: Excellent/Very Good)	0.0057 (0.0092)	0.015 (0.013)	0.023 (0.016)
Fair/Poor	0.0067 (0.015)	0.039* (0.023)	0.045 (0.027)
Contract: Casual (Ref: Permanent)	0.028 (0.021)	0.033 (0.025)	0.055* (0.030)
Temporary	0.0072 (0.025)	-0.023 (0.020)	-0.022 (0.031)
Sector: Private for Profit (Ref: Public)	0.020	-0.028**	-0.017

Variables	Permanent Exit (N=1343)	Temporary Exit (N=1415)	Combined Exit (N=1515)
<i>Public)</i>	(0.017)	(0.012)	(0.019)
Public and Private	-0.0035 (0.018)	-0.020 (0.018)	-0.025 (0.026)
Private non-Profit	0.021 (0.019)	-0.048*** (0.0092)	-0.035* (0.019)
Registered nurse (<i>Ref: Enrolled nurse</i>)	0.023 (0.019)	0.012 (0.022)	0.031 (0.029)
Clinical nurse	0.027 (0.048)	0.055 (0.050)	0.068 (0.059)
Clinical nurse consultant	0.049 (0.061)	0.015 (0.037)	0.040 (0.052)
Nurse practitioner		0.24 (0.17)	0.26 (0.17)
Lecturer	0.090 (0.098)	0.0014 (0.044)	0.061 (0.075)
Administrator/Other	0.040 (0.054)	0.0093 (0.037)	0.029 (0.050)
Specialty: Midwifery (<i>Ref: Medical/Surgical</i>)	0.012 (0.014)	-0.0081 (0.014)	-0.0012 (0.019)
Aged Care/Rehab	0.0028 (0.016)	-0.021 (0.016)	-0.016 (0.023)
Mental health	0.011	-0.015	-0.0067

Variables	Permanent Exit (N=1343)	Temporary Exit (N=1415)	Combined Exit (N=1515)
	(0.022)	(0.018)	(0.027)
Primary/Community	-0.0034 (0.013)	-0.030** (0.012)	-0.034* (0.018)
Paediatric/Neonatal	0.012 (0.028)	0.0021 (0.027)	0.0087 (0.037)
Rural/Remote	0.11 (0.092)	0.041 (0.074)	0.13 (0.10)
Other	-0.011 (0.016)	-0.013 (0.022)	-0.020 (0.029)
State of registration: VIC (Ref: NSW)	0.0023 (0.015)	-0.014 (0.015)	-0.012 (0.022)
QLD	0.0016 (0.011)	-0.018 (0.012)	-0.016 (0.017)
WA	0.016 (0.018)	0.013 (0.020)	0.029 (0.026)
SA	-0.0095 (0.018)	0.078* (0.045)	0.072 (0.048)
TAS/NT	0.0034 (0.023)		-0.054** (0.021)
ACT	-0.0078 (0.018)	0.025 (0.031)	0.018 (0.036)
Note: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$			

Table C3: Estimates of marginal effects of nurses exit (age 55 and over)

Variables	Permanent Exit (N=144)	Temporary Exit (N=114)	Combined Exit (N=203)
Female		-0.017 (0.12)	0.047 (0.097)
60-64 years (Ref: 55-59 years)	0.16* (0.085)	0.012 (0.058)	0.11 (0.072)
65 years and over	0.53*** (0.20)	0.12 (0.16)	0.42*** (0.15)
UK (Ref: Australia)	0.011 (0.069)	0.020 (0.0742)	0.0093 (0.069)
Other	-0.025 (0.085)		-0.084 (0.063)
Self-assessed health: Good (Ref: Excellent/Very Good)	-0.028 (0.055)	0.061 (0.052)	0.014 (0.055)
Fair/Poor	0.035 (0.11)		-0.044 (0.081)
Contract: Casual (Ref: Permanent)	0.17 (0.12)	-0.022 (0.061)	0.10 (0.093)
Temporary	0.31 (0.37)		-0.032 (0.14)
Sector: Private for Profit (Ref: Public)	0.15 (0.092)		0.036 (0.077)
Public and Private	0.039	-0.12**	

Variables	Permanent Exit (N=144)	Temporary Exit (N=114)	Combined Exit (N=203)
	(0.15)	(0.050)	
Private non-Profit	0.070 (0.13)	-0.059 (0.045)	-0.042 (0.072)
Clinical nurse (Ref: Registered nurse)	0.12 (0.20)		-0.0027 (0.13)
Clinical nurse consultant	-0.060 (0.056)	0.16 (0.24)	-0.027 (0.096)
Lecturer	0.11 (0.18)	-0.022 (0.099)	0.015 (0.11)
Administrator/Other	0.086 (0.10)	-0.0073 (0.091)	0.049 (0.088)
Specialty: Midwifery (Ref: Medical/Surgical)			
Aged Care/Rehab	0.046 (0.099)	-0.064 (0.046)	0.019 (0.084)
Mental health		-0.038 (0.056)	-0.094 (0.064)
Primary/Community	-0.016 (0.072)	0.00040 (0.062)	0.026 (0.082)
Other	-0.034 (0.071)	-0.052 (0.046)	-0.045 (0.080)
State of registration: VIC (Ref: NSW)	0.027 (0.096)		-0.073 (0.065)

Variables	Permanent Exit (N=144)	Temporary Exit (N=114)	Combined Exit (N=203)
QLD	-0.065 (0.048)	-0.0089 (0.054)	-0.026 (0.059)
WA	0.10 (0.11)	-0.021 (0.056)	0.037 (0.087)
ACT	0.042 (0.16)	0.15 (0.26)	0.11 (0.18)
Note: Standard errors in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$			

Appendix D HILDA exits by age

Table D1: HILDA exit rates by age

Waves						
Age Group	1-2	2-3	3-4	4-5	5-6	6-7
Under 30	0.08	0.11	0.06	0.021	0.018	0.032
30-34	0.097	0.17	0.22	0.15	0.079	0.098
35-39	0.11	0.12	0.077	0.028	0.070	0.098
40-44	0.087	0.090	0.084	0.038	0.023	0.057
45-49	0.091	0.10	0.11	0.10	0.095	0.084
50-54	0.028	0.044	0.091	0.093	0.063	0.066
55 over	0.17	0.17	0.098	0.049	0.072	0.078

Waves		
Age Group	7-8	8-9
Under 30	0.047	0.045
30-34	0.14	0.16
35-39	0.088	0.11
40-44	0.056	0.044
45-49	0.78	0.056
50-54	0.082	0.084
55 over	0.080	0.12



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