




Nurse workforce futures



Development and application of a model of demand for and supply of graduates of Australian and New Zealand pre-registration nursing and midwifery courses to 2010



Barbara Preston

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Melbourne

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The Council of Deans of Nursing and Midwifery (Australia & New Zealand) (CDNM), formerly known as the Australian Council of Deans of Nursing (ACDN), is the peak organisation that represents the deans and heads of the schools of nursing in universities that offer undergraduate and postgraduate programs in nursing and midwifery throughout Australia and New Zealand.

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Foreword

The Council of Deans of Nursing and Midwifery (Australia and New Zealand) (CDNM) has been concerned for some years with obtaining reliable projections of the nurse labour market to inform policy on intakes into pre-registration nurse education courses. There has been substantial work over recent years by state and national agencies in developing methodology, improving data and preparing projections. However, this work has not provided consistent projections directly relevant to the responsibilities of the CDNM, which now include New Zealand as well as Australian providers of university level pre-registration nurse and midwifery courses. The shortages of nurses nationally and internationally have added urgency to our concerns.

The CDNM Executive initially approached Barbara Preston because we were aware of the work she has carried out on teacher supply and demand for the Australian Council of Deans of Education. She produced a report in 2002 containing projections to 2006 which was well received and useful. Barbara has since worked with the CDNM to refine her projections model, collecting further data (including New Zealand data) and analysing findings. The model now incorporates a factor that takes account of the increased requirements for nurses because of population ageing – which varies between jurisdictions and over time. The model also accounts for the accumulating impact of shortages and for the international movements of nurses. This report carries the projections through to 2010 for each state and territory, for Australia as a whole, and for New Zealand, and discusses broad national projections to 2020.

Scenarios are developed covering a range of matters, such as progressive improvements in staffing levels where such levels have been low and shortages severe, and increases or decreases in net overseas arrivals of nurses.

Strategies intended to reduce or ameliorate projected shortfalls are discussed in the report. These include reductions in net separation rates (that is, reductions in resignations, retirements or leave, and increases in recruitment of those already qualified), increases in graduate numbers, or decreases in staffing levels (nurses per 100,000 population). Strategies have effects other than on shortfalls or surpluses. Strategies to reduce beginning nurses' resignation rates are sure to benefit patient care and the professional and personal lives of nurses – whether or not they would otherwise have left the profession. On the other hand, decreases in staffing levels may reduce shortfalls, but are likely to damage patient care and nurses' lives.

This report makes a further contribution to good evidence-based policy on nurse education intakes, on programs to improve the quality of nursing and nurses' and midwives' work lives, and much more. We urge our political leaders to act constructively on the solid information here contained.

Professor John Daly

Chair, Council of Deans of Nursing and Midwifery (Australia and New Zealand)

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Abbreviations and glossary

<i>ABS</i>	Australian Bureau of Statistics
<i>AIHW</i>	Australian Institute of Health and Welfare
<i>Baseline staffing</i>	Baseline staffing levels are the actual FTE staffing levels (RNs per 100,000 general population) in 2003 in each Australian jurisdiction and 2004 in New Zealand (data from the AIHW and NZHIS respectively)
<i>CDNM</i>	Council of Deans of Nursing and Midwifery (Australia and New Zealand)
<i>COAG</i>	Council of Australian Governments - the council of the Australian prime minister, state premiers, and territory chief ministers.
<i>DEMAND</i>	DEMAND is used in this report to signify the requirement for graduates of pre-registration RN (see below) education programs who completed the previous year, including those not available or suitable (in the short or long term). This is Row 19 in the projections tables.
<i>Effective balance</i>	According to the model used in this report, balance results when SUPPLY equals DEMAND. However, the reality of any labour market is such that a balance so defined can exist while there are serious difficulties in filling some positions with appropriate personnel, and some of those seeking positions are unable to find anything suitable. Therefore an 'effective balance' occurs only once a surplus (as defined in this model) is greater than a certain approximate percentage of the workforce. This percentage will differ according to circumstances and will be difficult to estimate. Effective balance is only incorporated in the model to estimate the surplus in any year carried over to the next, and is set in this application of the model at a surplus of SUPPLY over DEMAND of 8 per cent, well above the largest surpluses in the projections in this report (though large surpluses were carried over from year to year in jurisdictions such as Victoria in the early to mid 1990s). A further development of the model could more fully incorporate this phenomenon.
<i>FTE</i>	Full time equivalent, based on a full time week of 38 hours
<i>NZHIS</i>	New Zealand Health Information Service
<i>PAPF</i>	Population age profile factor. This is a factor developed for this report based on the assumption that as the population ages there will be an increasing demand for RNs per 100,000 population (all other things equal). The derivation of the PAPF is set out in Appendix B. The values of the PAPF each year to 2010 for each jurisdiction, indexed to the 2003 PAPF for Australia and the 2004 PAPF for New Zealand, are in Row 3 in the projections tables.
<i>RN</i>	Registered nurse. In this report 'RN' includes midwives and others in the nursing profession (such as registered psychiatric nurses and mental health nurses) for whom the equivalent of a bachelors university degree is required for registration. Thus enrolled nurses

are not included. Employed RNs include those working outside the formal health system in positions that require RN qualifications such as school nurses and nurses in industries such as mining. Academic nurse educators (with RN qualifications and registration) are also included, but not academics in schools of nursing who do not have such qualifications and registration.

Standard assumptions Standard assumptions are the assumptions used for the first scenario projections for each jurisdiction, and are generally those considered most likely over the projections period. These assumptions are set out in Box 4.1.

SUPPLY SUPPLY is used in this report to signify the projected number of graduates of pre-registration RN (see above) education programs who completed the previous year. This is Row 20 in the projections tables. International students are included because almost all stay and work in Australia, but they are discounted from 'Net overseas migration' (Row 16). RNs who are already registered as RNs and who are upgrading academic qualifications are excluded. Matters concerning the supply of graduates are discussed in Appendix E.

Target RN workforce The target RN workforce is the projected total employed FTE RNs based on total projected population in the jurisdiction and projected staffing levels according to baseline staffing and PAPF (and improved staffing levels in some scenarios). The target workforce is not be actual projected workforce when shortfalls are projected (which is most years in most jurisdictions in most scenarios).

Training rate The training rate is SUPPLY (completions the previous year) as a percentage of the target employed RN workforce (persons, not FTE).

Underlying DEMAND Underlying DEMAND is DEMAND excluding any shortfall (or surplus) carried over from the previous year.

Summary

Introduction

This report was commissioned by the Council of Deans of Nursing and Midwifery (Australia and New Zealand), and follows an earlier report by the author, *Australian nurse supply and demand to 2006: A projections model and its application* (Preston 2002). These reports are concerned with the development and application of models for RN labour market projections, and are intended to contribute to on-going work by diverse agencies on improving workforce planning, as well as having some conclusions that may be used to directly inform policy in areas such as future intakes into pre-registration nurse education courses.

In this report there are projections of comparable DEMAND and SUPPLY to 2010 for RNs (graduates of pre-registration courses) in Australia and New Zealand and Australian states and territories. For each jurisdiction a number of different scenarios are provided that take account of the particular circumstances of that jurisdiction, and possible external developments and policy interventions.

The projections model

Labour market projections are inherently difficult and controversial. All methodologies and models, and many assumptions about input factors, will be open to debate. The methodology used in this report seeks to incorporate all significant factors, and to make reasonable assumptions about the values for those factors through the projections period.

The intention is for the projections to be policy-useful. Even so, it is essential that all projections are treated with caution, and the values of the different assumptions should be assessed before decisions are made to use any projections as the basis of policy.

The policies that this work is primarily intended to inform are concerned with future numbers of graduates of pre-registration nursing and midwifery programs (thus decisions regarding intakes that will lead to graduates). The model therefore presents in *comparable* form (a) the number of graduates (completions the previous year) necessary to meet requirements according to the specified assumptions about staffing levels, net separation rates, migration and so on, which is DEMAND, and (b) the number of completions of the previous year summed from projections provided by schools of nursing (and other information), which is SUPPLY. For projections prepared for other purposes it may be appropriate to define 'supply' and 'demand' differently. However, the outcomes of this model can also usefully inform a wide range of strategies to avoid or ameliorate shortages, such as those involving overseas recruitment, improved retention of RNs at various stages in their careers, attracting those with RN qualifications not currently working as RNs, or increased average working hours.

The model is based on that developed for Preston (2002), with some significant changes. The most important changes involve

- development of a population age profile factor (PAPF) to account for population ageing and its effects on requirements for RNs through the projections period and at baseline (the rationale and methodology for the PAPF is detailed in Appendix B)
- incorporation of overseas migration, including international student graduates who remain in the jurisdiction to work as RNs, and resident graduates and other

RNs who depart for overseas (migration information and methodological matters are detailed in Appendix D)

- the use of full time equivalent (FTE) measures for staffing levels which are converted to ‘persons’ for determining the demand for graduates by a method that uses age profile projections - because of the substantial differences in the ratio of average hours worked and thus persons to FTE according to age of RNs (issues related to FTE and persons staffing levels are discussed in Appendix A, and the projection of age profiles and FTE to persons ratios in Appendix C)
- a recognition that surpluses are always necessary to some extent (which will vary according to circumstances) – however, this is only built into the model where a proportion of large surpluses may be carried over (Row 14), but it is raised in discussions of projections and could be further incorporated in future models (see Appendix F for an explanation and discussion of the issues raised).

Model inputs, calculations and outputs

There are ten different external inputs for each jurisdiction for each year to 2010. These inputs will now be considered in turn, with a description of how they are incorporated in the calculations of the model.

1. **Population projection to 2010**, which is the ‘medium assumptions’ total population projection for the particular jurisdiction for each year.
2. **Baseline FTE staffing level**, of full time equivalent RNs per 100,000 of population in the jurisdiction, which is the actual staffing level for 2003 (2004 for New Zealand).

For those jurisdictions with particularly low baseline staffing levels (in part because of severe shortages of RNs in 2003 or 2004) there are scenarios which involve progressive improvements in baseline staffing levels.

3. **Population age profile factor (PAPF)** applied to population age range projections each year to 2010. This is based on evidence of higher levels of RN utilisation by older age groups, especially those aged over 85. For each jurisdiction the PAPF is indexed to 2003 (or 2004).

The PAPF is applied to the baseline staffing level to arrive at an **adjusted FTE RN/100,000** staffing level.

This adjusted FTE RN/100,000 staffing level is then applied to the projected population of the jurisdiction to arrive at a **target total employed FTE RNs** number. This is a ‘target’, rather than a projected actual number, because in most years in most jurisdictions a shortfall is projected, and such a situation of shortage should not be used as a basis for subsequently estimating the sufficiency or otherwise of the number of graduates.

The **change from previous year target total** is the difference between the previous and current years’ target totals.

4. An **estimate of the percentage of any shortfall of the previous year not met sustainably**. This necessarily broad estimate is applied to the shortfall that was projected for the previous year to arrive at a FTE number for the projected **shortfall carried over** to the current year.

This projected shortfall carried over is added to the difference between the target employed RNs of the current and previous years to arrive at a **projected actual change from the previous year** in projected FTE RNs. This is the ‘growth’ requirement for new RNs.

5. **Net separation rate.** This includes re-entrants and returnees from leave and some other entry categories, as well as those leaving the employed RN workforce (see Appendix C for details on the way projected net separation rates are calculated). The net separation rate is increasing though the period in all jurisdictions (some more than others) because of increasing retirement rates and increasing proportions of RNs in the high separation younger age ranges.

The net separation rate is applied to the target total employed FTE RNs (minus the shortfall carried over from the previous year) to arrive at the **net separation number**. This is the 'replacement' requirement for new RNs over the current year.

6. **Persons to FTE RNs ratio.** It is necessary to translate the FTE numbers of the above factors into persons because graduates of pre-registration courses are actual persons, not FTE. The ratio is based on projected RN age profiles in each year in each jurisdiction.

The **number of recruits required to meet the target total** is the sum of the projected actual change from previous year and the net separation number, which is a FTE total, and to which the persons to FTE RNs ratio is applied so that the result is in a form comparable with subsequent elements of the model.

7. An estimate of the **percentage of any surplus of the previous year carried over**. This element of the model recognises that surpluses carried over can be very significant in requirements for new RNs – as was the case in a number of jurisdictions in the early to mid 1990s. However, it is not a factor of any magnitude in this application of the model.
8. **Net overseas migration.** Net overseas migration covers settler arrivals, and the arrivals and departures of visitors and Australian and New Zealand resident RNs. This includes graduates who have not worked in their home jurisdiction before departing overseas, and international students who stay on after graduation. The numbers have been relatively large in recent years, and must be included in any projections of requirements for new RNs.

The number of **graduate recruits required** is then derived. It is the number required to meet the target total (covering both growth and replacement needs), minus any surplus carried over (zero in all scenarios in this application of the model) and net overseas arrivals.

9. An **estimate of the percentage of graduates who are available and suitable for work in the jurisdiction**. Estimating the percentage of graduates who are available and suitable is necessary before the final number of graduates required is calculated. Those not available includes those who enter non-RN occupations or do not enter the workforce. Those who move overseas temporarily or permanently are accounted for in 'net overseas migration'. Those who are 'unsuitable' is probably a negligible group, but may include those who do not gain registration (and thus cannot enter the RN workforce) on character or criminal grounds unrelated or subsequent to graduation. The estimation draws from Graduate Careers Council and other data sources.

DEMAND for graduates is then calculated by adding to the number of graduates required the percentage of graduates who are not available or suitable.

10. **Number of graduates (completions of pre-registration nurse and midwifery education courses in the previous year).** This is **SUPPLY**.

SUPPLY and DEMAND are then compared to arrive at several different model outputs

- the surplus or shortage number (persons)

- the surplus or shortage as FTE
- the surplus or shortage FTE as a percentage of the total target FTE RN workforce
- the surplus or shortage number as a percentage of DEMAND
- the surplus or shortage number as a percentage of SUPPLY
- SUPPLY as a percentage of DEMAND.

The external inputs, calculations and outputs are explained in more detail in Box 4.1, and their relationships illustrated in Figure 2.1.

The training rate (SUPPLY as a percentage of the total workforce) is also provided for information in each of the standard assumptions (first scenario in each jurisdiction) tables – it is not part of the projections model.

Projections findings

The projections scenarios for each jurisdiction based on standard assumptions are summarised first. They should not be taken at face value. This is particularly so for those jurisdictions that have relatively low baseline staffing levels – that is, relatively fewer RNs per 100,000 population in 2003 (2004 for New Zealand). Low staffing levels are likely to be in part a consequence of shortages, and not indicate any desirable level of staffing, even within the financial constraints of the time. For such jurisdictions there are scenarios that progressively increase baseline staffing levels to the equivalent of the Australian average in 2003 after adjustments for population age profiles.

For Australia as a whole, the projections are for a substantial shortfall of more than 3,000 at the beginning of the period, reducing to a shortfall of 470 in 2010 (this includes accounting for the new places announced by the Australian Government in 2006). This projected 2010 shortfall of 470 is 0.2 per cent of the RN workforce, which will still be effectively a substantial shortage. The reduction in the projected shortages is in large part because of the substantial projected improvement in SUPPLY, reflected in the increase in the training rate from 3.3 per cent in 2006 to 4.6 per cent in 2010. If the new places are not included, the shortfall does not reduce as much and the training rate increases to just 4.2 per cent. If the cumulative effect of shortfalls is excluded, over the period from 2006 to 2010 DEMAND is projected to increase by just under four per cent annually – this is the projected increase in *underlying* DEMAND.

For New Zealand, a reduction, then increase, in shortfalls is projected, with the training rate over the period remaining stable at around 3.8 per cent. The shortfall is around 0.4 per cent of the projected FTE RN target workforce through the period, but the size of that target workforce under standard assumptions reflects relatively low staffing levels. Thus projections outcomes for New Zealand if staffing levels are adjusted to more equitable levels are considered in section 3.2.

NSW and the ACT combined have a shortfall of more than one per cent of the workforce in 2006 becoming a small surplus by the end of the period – what most probably will be still effectively a shortage. As for Australia as a whole, this improvement is largely a consequence of a significant improvement in the training rate – from 2.8 per cent to 4.5 per cent.

Victoria and Queensland have large shortfalls projected to continue through the period. In Victoria the shortfalls are projected to be just over two per cent of the total workforce each year until 2010, when the shortage is 1.7 per cent of the workforce – still quite substantial. In Queensland the substantial shortfalls are projected to increase from 3.4

per cent to 4.1 per cent of the workforce in 2009, reducing a little to 3.8 per cent in 2010. In both states there are improvements projected in the training rates, but these are not sufficient for SUPPLY to come close to DEMAND. Queensland also has an initial low staffing level, and a scenario with projected improvement in staffing to a more equitable level leads to much more substantial projected shortfalls (see below).

In Western Australia small surpluses are projected through the period – up to 1.6 per cent of the workforce at the end of the period. However, if the initially very low baseline staffing level is adjusted to a more equitable level, then the surpluses become substantial shortages. The training rate is a little higher than the national average (not including the new places), but this is not sufficient to cover DEMAND resulting from population growth, ageing and RN workforce replacement needs.

South Australia has small surpluses projected through the period, and the highest training rate (other than the Northern Territory later in the period). The surpluses remain too small to not be effectively shortfalls.

Tasmania has a projected shortfall increasing to 3.6 per cent of the total workforce in 2009, before reducing a little to 2.7 per cent of the workforce in 2010. The training rate is stable around four per cent until 2009, then increases to 5.3 per cent in 2010.

The Northern Territory (scenario 2 with net separation rates above standard assumptions) has a shortfall initially rising sharply to almost six per cent of the workforce because of reduced 2007 SUPPLY as a result of cessation of an intensive two year course, then reducing to almost zero. However, projections for the Territory should be treated cautiously because of high interstate mobility of RNs and other variable factors.

The projected continuing importance of overseas migration for Australia is shown by the scenario of a progressive reduction in net overseas migration to zero in 2010 (there may still be high rates of overseas movements – only that arrivals equal departures). In this scenario, Australia-wide projected shortfalls increase through the period to 5,355 in 2010, which is 2.5 per cent of the RN workforce.

Projections outcomes if baseline staffing is adjusted to more equitable levels

The baseline staffing levels (that is, row 2 in the projections tables - before the application of the population age profile factor) in the standard assumptions projections are the actual FTE staffing levels in the jurisdictions in 2003 (or 2004 for New Zealand).

Across Australia and NZ shortages in RNs have been officially assessed at those times (and more recently) (DEWR 2006, and Department of Labour 2005). It is likely, therefore, that FTE staffing levels in most jurisdictions were lower than they would have otherwise been because of those shortages. Therefore, for most policy purposes it would be reasonable to judge future DEMAND on the basis of staffing levels that are not so distorted by shortages and are more equitable between jurisdictions. What is a reasonable baseline staffing level is a matter of judgement. However, for scenarios of improved staffing levels the Australian national level is primarily used as a standard, and in some cases the 2003 South Australia level is also used.

Each jurisdiction that had a 2003 (2004 for NZ) PAPF-adjusted staffing level below that of Australia had its 2003 Australia-equivalent staffing level calculated. Once the 2003 (or 2004) staffing levels have been adjusted for the PAPF for that year, it is clear that WA was still relatively most under-staffed, followed by NZ, Queensland, and NSW/ACT.

Each of these four jurisdictions have scenarios in which their baseline staffing level is progressively increased over the period to a level equivalent to the Australian 2003 level (adjusted to the jurisdictions' population age profiles of that year). This required annual increases of between 2.2 and 14.0 FTE RNs per 100,000 population. These annual

numbers may seem small, but they have a significant impact on the DEMAND for graduates (or need for other new recruits). For NSW/ACT, by 2010 the annual increase in just 2.2 FTE staffing per 100,000 has resulted in a surplus of 592 becoming a shortfall of 12 – a difference of 604. For 2010 WA projections, a small surplus becomes a more substantial shortfall, and for Queensland a large shortfall becomes even larger.

Jurisdictions with substantial projected shortfalls

Following are summary outcomes for 2010 for those jurisdictions for which substantial shortfalls are projected under standard assumptions and if staffing levels are increased - in order of relative shortfall

- for standard assumptions scenarios: Queensland, Tasmania, Victoria and NZ, where the shortfalls range from 3.8 per cent to 0.4 per cent of the workforce
- for the improved staffing level scenarios: Queensland and NZ have increased shortfalls (to 7.0 per cent and 5.7 per cent of the RN workforce respectively), and WA and NSW/ACT have surpluses turning to shortfalls of 1.9 per cent and just over 0.0 per cent of the RN workforce respectively.

Details are provided in the following table.

Projected 2010 shortage (FTE) as a percentage of total RNs (target) and shortage number, those jurisdictions with significant shortfalls with (a) standard assumptions baseline staffing, and (b) progressive increase in baseline staffing to 2003 Australia-equivalent levels

	Jurisdiction	2010 shortage (FTE) as % of total RNs (target)	2010 shortage (number)
Standard assumptions	Qld	3.8%	1 461
	Tas	2.7%	154
	Vic	1.7%	938
	NZ	0.4%	137
Progressive increase to 2003 Australia-equivalent staffing level	Qld	7.0%	2 849
	NZ	5.7%	2 296
	WA	1.9%	377
	NSW/ACT	0.0%	12

Source: Table 3.5

Staffing and graduate requirements to around 2020

There is evidence available to make broad estimates of requirements for graduates RNs (DEMAND in this report) at least up to around 2020. The estimates that follow need to be compared with *underlying* DEMAND over the period 2006 to 2010, which for Australia and New Zealand is projected to increase by an average of just under four per cent a year.

Here it is assumed that there will not be any significant change over to period from 2010 to around 2020 in net separation rates by age; average working hours by age; staffing levels per 100,000, adjusted for population aging (according to the PAPF); net migration, and the availability and suitability of graduates. If significant variation is expected, then the following conclusions need to be adjusted accordingly. This includes increasing staffing levels where the baseline level is relatively low.

The two major components of requirements for graduate RNs (DEMAND) – growth (or reduction) in the size of the RN workforce and the need for replacements for those who leave the workforce - will be considered in turn.

The annual growth rate in the total population and in the age ranges relevant to the PAPF are most important in determining the size of the future target RN workforce – the annual *growth* component of DEMAND.

After 2011 the annual total population growth rate is projected by ABS (Series B) to decline from an average annual rate of 1.16 per cent from 2006 to 2011 to 0.96 per cent from 2011 to 2021, and continue to decline to the end of the century.

The average annual growth rate of the number aged 65 and over will be greater in the period 2011 to 2021 than 2006 to 2011, but will then slow – though the numbers will continue increasing. On the other hand, after large average annual growth rates from 2004 to 2011, the average annual increase in the number aged 85 and over is projected to slow between 2011 and 2021, and then increase again. The value of the PAPF will thus continue to increase through the period to around 2020, though its annual rate of increase will be a little slower than in the period to 2010. However, it will have an increasing proportional effect on DEMAND because of the compounding effect of population ageing on the PAPF.

The age projections for the Australian RN workforce indicate that over the period to around 2013 annual net separation rates can be expected to continue to increase - as increasing proportions of the RN workforce reach retirement and are in the higher net separations under 30 age ranges, and there is little change in the proportion who are in the lower net separation age ranges 35 to 44. The rate of net separations would not be expected to start reducing until around 2020 when the peak in the age profile has passed through retirement (other things being equal – policy interventions or external events can change expected net separation rates). This points to increasing requirements for *replacement* RNs through the coming decade.

Little change in DEMAND is expected from changes in average working hours (persons to FTE ratios). While the age profile of RNs is expected to change significantly, it is largely an increase in early career RNs (aged to mid 30s) balancing a decrease in late career RNs (aged from around mid 40s) – both age ranges with longer average working hours –, and less change in the proportion in the age ranges where shorter hours are more common.

In summary, for Australia over the decade after the period of the projections in this report, the major impact on changes in DEMAND from one year to the next is likely to be

- annual decrease from a projected slowing in growth of the total population
- annual increase from the compounding effect of aging on the PAPF
- substantial annual increase from increasing net separation rates (which are certain to continue to have the single largest impact on DEMAND).

We can therefore expect over the decade to around 2020 an annual increase in DEMAND for graduates in Australia, and thus requirements for annual increases in SUPPLY. The situation in New Zealand is likely to be similar. The annual increases in DEMAND (and thus need for comparable increases in SUPPLY) can be expected to be in the order of around three to four per cent. Even greater annual increases in graduate numbers (SUPPLY) will be required after 2010 if staffing levels are to be increased to adequate levels in those jurisdictions where they are relatively low, if the current shortages are not overcome by around 2010, or if net overseas migration reduces.

Part 1

*Background &
methodology*

1. Background

This report was commissioned by the Council of Deans of Nursing and Midwifery (Australia and New Zealand), and follows an earlier report by the author, *Australian nurse supply and demand to 2006: A projections model and its application* (Preston 2002).

1.1 Labour market planning and labour market projections

These reports are concerned with the development and application of models for labour market projections. Such projections are just part of a labour market planning process. The complex and dynamic nature of effective labour market planning is discussed in the Australian Health Workforce Advisory Committee's *Nursing workforce planning in Australia: A Guide to the process and methods used by the Australian Health Workforce Advisory Committee* (AHWAC 2004).

For professions that require a number of years of professional preparation it is essential that there is good quality labour force planning that uses appropriate labour market projections. This has been recognised as important for nursing and midwifery for some years, and was given impetus by the report and recommendations of the National Review of Nursing Education, *Our Duty of Care* (2002).

This report includes projections of comparable DEMAND and SUPPLY to 2010 for RNs (graduates of pre-registration courses) in Australia and New Zealand and Australian states and territories. For each jurisdiction a number of different scenarios are provided that take account of the particular circumstances of that jurisdiction, and possible external developments and policy interventions. It is intended to be a contribution to ongoing work by diverse agencies in improving workforce planning, as well as having some conclusions that may be more directly used to inform policy in areas such as future intakes into pre-registration nurse and midwifery education.

1.2 The need to avoid both shortages and large surpluses

Throughout Australia and New Zealand there have been RN shortages of varying severity for some years (DEWR 2006, and Department of Labour 2005). These shortages follow some large surpluses in some jurisdictions in the early to mid 1990s. These surpluses were a consequence of a combination of reductions in staffing levels, reductions in net separations because of the age profile of the RN workforce and the recession of the time, and graduate numbers that had not been sufficiently reduced from the numbers required in the expansionism of the previous decade.

Substantial shortages and substantial surpluses are both to be avoided.

Shortages are clearly unsatisfactory because health authorities and other employers of RNs cannot provide the necessary quality of care (or supervision of student RNs), and RNs' work intensifies, putting them under pressure to work longer hours than they desire or not take the leave to which they are entitled. They lack time for mentoring colleagues, for their own professional development, and for the reflective time needed in for personal and professional sustenance and growth in the often stressful practices of nursing and midwifery. As RNs become stressed and have less quality of work-life, being an RN can be seen in the community as an unattractive career, creating recruitment and retention difficulties (both qualitative and quantitative), and lowering the morale of nurses and midwives even further. Difficulties in both recruitment and retention result, and thus vicious circles are created.

Substantial surpluses are also undesirable. Graduates and intending re-entrants cannot obtain the positions they are qualified for, and an oversupply discourages potential entrants to the profession, lowering the quality of entrants to pre-registration courses and thus of future entrants to the profession, and lowering the standing of the profession in the community.

However, surpluses must be substantial before they are undesirable. Surpluses as measured by most labour market analyses and projections (including those in this report) are necessary to some degree to allow the flexibility and time required to match RNs to particular vacancies (requiring particular expertise, in particular settings, in particular locations, at particular times).

What is a minimum level of surplus will vary according to circumstances. Such circumstances include the rate of recruitment from both growth in the workforce and replacement, turnover within the workforce ('churn'), the matching of particular individual RNs to particular positions (which involves, along with much more, the mobility of RNs associated with age), and the time-efficiency of recruitment processes. This is further discussed in Appendix F.

2. The projections model

2.1 Introduction to the model and its purposes

Labour market projections are inherently difficult and controversial. All methodologies and models, and many assumptions about input factors, will be open to debate. The methodology used in this report seeks to incorporate all significant factors, and to make reasonable assumptions about the values for those factors through the projections period. A number of different scenarios are provided, especially for the major jurisdictions. These different scenarios cover different possibilities for external factors and for factors that can be changed through deliberate interventions by stakeholders. Some of the different scenarios involve changes in staffing levels, in net migration of RNs, or in retention of early or late career RNs.

The intention is for the projections to be policy-useful. Even so, it is essential that all projections are treated with caution, and the values of the different assumptions should be assessed before decisions are made to use any projections as the basis of policy.

The primary policies that this work is intended to inform are concerned with future numbers of graduates of pre-registration nursing and midwifery programs (thus decisions regarding intakes that will lead to graduates). The model therefore presents in *comparable* form (a) the requirements over a given year for graduates (completions the previous year) according to the specified assumptions about staffing levels, net separation rates, migration and so on, which is DEMAND, and (b) the number of completions of the previous year summed from projections provided by schools of nursing (and other information), which is SUPPLY. For projections prepared for other purposes it may be appropriate to define 'supply' and 'demand' differently. However, the outcomes of this model can also usefully inform a wide range of strategies to avoid or ameliorate shortages, such as those involving overseas recruitment, improved retention of RNs at various stages in their careers, attracting those with RN qualifications not currently working as RNs, or increased average working hours.

2.2 New features of the model

The model is based on that developed for Preston (2002), with some significant changes. The most important changes involve

- development of a population age profile factor (PAPF) to account for population ageing and its effects on requirements for RNs through the projections period and at baseline (the rationale and methodology for the PAPF is detailed in Appendix B) – the PAPF is based on evidence that older Australians, especially those over 85, have much higher rates of RN utilisation than other Australians
- incorporation of overseas migration, including international student graduates who remain in the jurisdiction to work as RNs, and resident graduates and other RNs who depart for overseas (migration information and methodological matters are detailed in Appendix D)
- the use of full time equivalent (FTE) measures for staffing levels which are converted to ‘persons’ for determining the demand for graduates by a method that uses age profile projections - because of the substantial differences in the ratios of persons to FTE according to age of RNs (issues related to FTE and persons staffing levels are discussed in Appendix A, and the projection of age profiles and FTE to persons ratios in Appendix C)
- a recognition that surpluses are always necessary to some extent, which is only built into the model where a proportion of large surpluses may be carried over (Row 14), but it is raised in discussions of projections and could be further incorporated in future models (Appendix F discusses conceptual issues regarding surpluses and effective balance).

As far as possible up-to-date, appropriate and detailed data sets have been used to develop assumptions and input values. There may be more up-to-date data in some jurisdictions, and after this report is completed new data will become available. Such data can be used to assess particular assumptions and projections, and make any adjustments necessary for policy development.

2.3 Model inputs, calculations and outputs

A conceptual chart of the projections model is set out in Figure 2.1. The elements are outlined here, with more information about definitions and sources provided in Box 4.1 which provides the notes to each row of the projections tables.

There are ten different external inputs for each jurisdiction for each year to 2010. These will now be considered in turn, with a description of how they are incorporated in the calculations of the model.

1. **Population projection to 2010**, which is the medium assumptions total population projection for the particular jurisdiction for each year.
2. **Baseline FTE staffing level**, of full time equivalent RNs per 100,000 of population in the jurisdiction, which is the actual staffing level for 2003 (or 2004).

For those jurisdictions with particularly low baseline staffing levels (in part because of severe shortages of RNs in 2003 or 2004) there are scenarios which involve progressive improvements in baseline staffing levels. The assessment of baseline staffing levels and the assumed change to 2010 in those scenarios take account of the 2003 (or 2004) population age profile in the jurisdiction relative to a standard (usually Australia as a whole, or South Australia). This is explained further in Appendix B, section B.6.

3. **Population age profile factor (PAPF)** applied to population age range projections each year to 2010. This is based on evidence of higher levels of RN utilisation by older age groups, especially those aged over 85. For each jurisdiction the PAPF is

indexed to 2003 (or 2004) because the population age profile in that year is assumed to be a component of actual staffing levels in that year (see previous).

The PAPF is applied to the baseline staffing level to arrive at an **adjusted FTE RN/100,000** staffing level.

This adjusted FTE RN/100,000 staffing level is then applied to the projected population of the jurisdiction to arrive at a **target total employed FTE RNs** number. This is a 'target', rather than a projected actual number because in most years in most jurisdictions a shortfall is projected, and this situation of shortage should not be used as a basis for subsequently estimating the sufficiency or otherwise of the number of graduates.

The **change from previous year target total** is the difference between the previous and current years' target totals.

4. **An estimate of the percentage of any shortfall of the previous year not met sustainably**, which can only be a broad estimate. The high value given in this application of the model takes account of (a) the recruitment work over recent years that has sought to draw into the RN employed workforce those qualified but not working as RNs and to increase hours of work where possible, and (b) the fact that net migration is incorporated elsewhere in the model, and that immigration (temporary as well as permanent) has been a significant means of sustainably meeting shortfalls in recent years.

This estimate is applied to the shortfall that was projected for the previous year to arrive at a FTE number for the projected **shortfall carried over** to the current year.

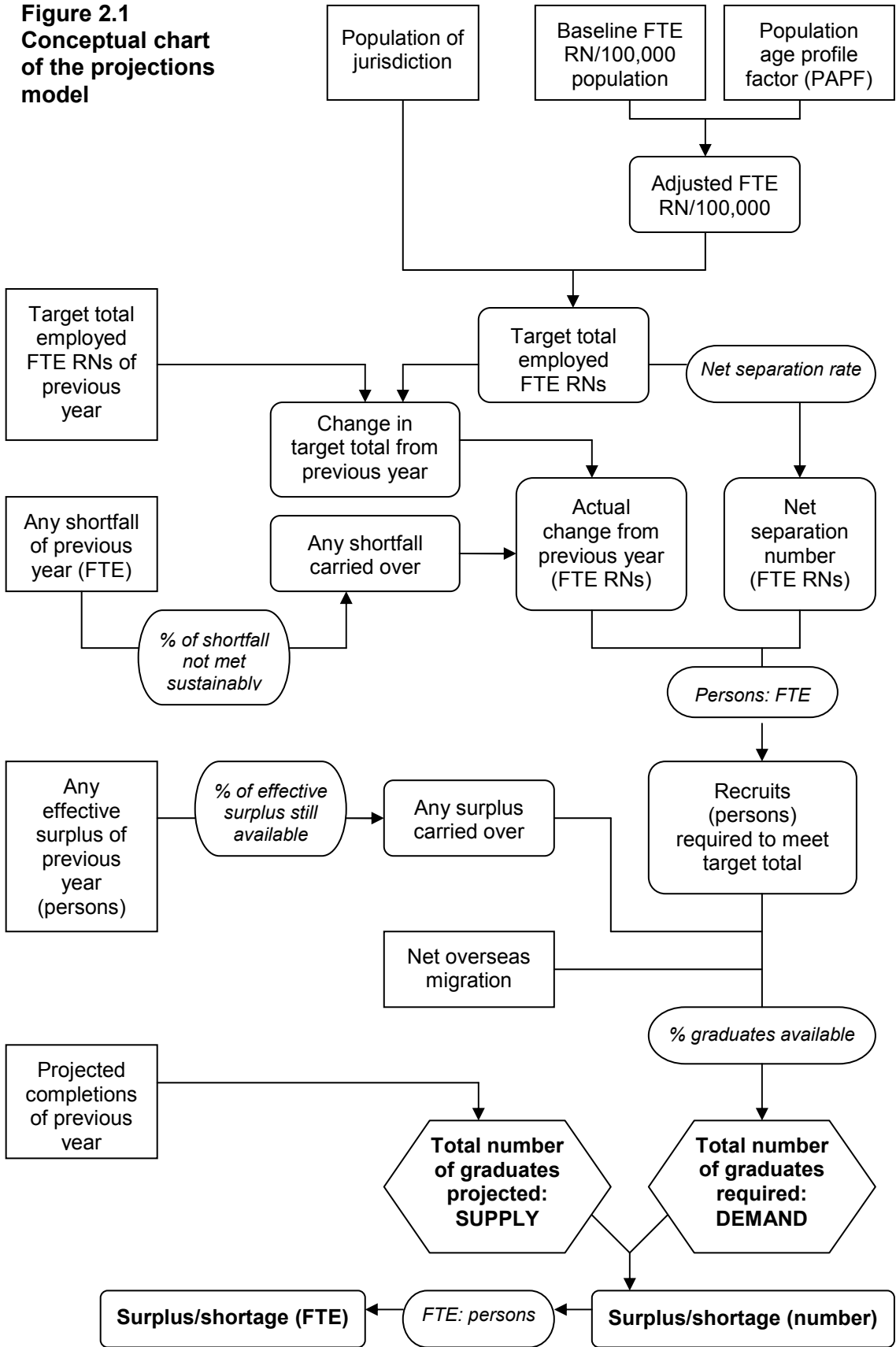
This projected shortfall carried over is added to the difference between the target employed RNs of the current and previous years to arrive at a **projected actual change from the previous year** in projected FTE RNs. This is the *growth* requirement for new RNs.

5. **Net separation rate**. This includes re-entrants and returnees from leave and some other entry categories, as well as those leaving the FTE employed RN workforce (see Appendix C for details on the way projected net separation rates are calculated). The net separation rate is increasing though the period in all jurisdictions (some more than others) because of increasing retirement rates and increasing proportions of RNs in the high separation younger age ranges.

The net separation rate is applied to the target total employed FTE RNs (minus the shortfall carried over from the previous year) to arrive at the **net separation number**. This is the *replacement* requirement for new RNs over the current year.

6. **Persons to FTE RNs ratio**. It is necessary to translate the FTE numbers of the above factors into persons because graduates of pre-registration courses are actual persons, not FTE. The ratio is based on the projected RN age profiles in each year in each jurisdiction because average hours worked varies significantly by age.

Figure 2.1
Conceptual chart
of the projections
model



The *number of recruits required to meet the target total* is the sum of the projected actual change from previous year and the net separation number, which is a FTE total, and to which the persons to FTE RNs ratio is applied so that the result is in a form comparable with subsequent elements of the model.

7. ***An estimate of the percentage of any surplus of the previous year carried over.*** This element of the model recognises that surpluses carried over can be very significant in requirements for new RNs – as was the case in a number of jurisdictions in the early to mid 1990s. However, it is not a factor of any magnitude in this application of the model.

8. ***Net overseas migration.*** Net overseas migration covers settler arrivals, and the arrivals and departures of visitors and Australian and New Zealand RNs. This includes graduates who have not worked in their home jurisdiction, and international students who stay on. The numbers have been relatively large in recent years, and must be included in any projections of requirements for new RNs. For some jurisdictions there are scenarios involving net overseas migration reducing to zero or increasing over the period to 2010.

The number of *graduate recruits required* is then derived. It is the number required to meet the target total (covering both growth and replacement needs), minus any surplus carried over (zero in all scenarios in this application) and net overseas migration arrivals.

9. ***An estimate of the percentage of graduates who are available and suitable for work in the jurisdiction.*** Estimating the percentage of graduates who are available and suitable is necessary before the final number of graduates required is calculated. Those not available includes those who enter non-RN occupations or do not enter the workforce. Those who move overseas temporarily or permanently are accounted for in ‘net overseas migration’. Those who are ‘unsuitable’ is probably a negligible group, but may include those who do not gain registration (and thus cannot enter the RN workforce) on character or criminal grounds unrelated or subsequent to graduation. The estimation draws from Graduate Careers Council and other data sources.

DEMAND for graduates is then calculated by adding to the number of graduates required the percentage of graduates who are not available or suitable.

10. ***Number of graduates (completions of pre-registration nurse and midwifery education courses in the previous year).*** This is ***SUPPLY***.

SUPPLY and DEMAND are then compared to arrive at

- the surplus or shortage number (persons)
- the surplus or shortage as FTE
- the surplus or shortage FTE as a percentage of the total target FTE RN workforce
- the surplus or shortage number as a percentage of DEMAND
- the surplus or shortage number as a percentage of SUPPLY
- SUPPLY as a percentage of DEMAND.

The external inputs, calculations and types of findings are explained and sources provided in Box 4.1.

The training rate (SUPPLY as a percentage of the total workforce) is also provided for information in each of the standard assumptions tables – the training rate is not part of the projections model.

2.4 Necessary surpluses and effectively increased shortages

It is important to take account of the necessary level of surplus appropriate in a particular jurisdiction at a particular time. Larger surpluses are generally necessary when there is stronger growth in requirements for new RNs, when there are higher levels of internal movements ('churning') in the RN labour market, and when there is less efficient matching of RNs and positions. Similarly, in such circumstances, shortages will effectively be greater than the quantum projected.

In analyses of the general labour market the inverse relationship between the vacancy rate and unemployment rate that indicates the general requirement for some surplus in both available employees and vacancies is known as the 'Beveridge curve'. The Beveridge curve and the application of its underlying concepts to the RN labour market are discussed in Appendix F.

The methodology used in this model misses key indicators of the degree of 'churn' and movements in and out of the RN workforce because *net* measures are used for both separations and overseas migration – for example, for either the net number may be 500, but we do not know if that figure is a result of 500 separations (or migrant arrivals) and zero re-entrants (or migrant departures), or 2,500 separations (or migrant arrivals) and 2,000 re-entrants (or migrant departures). The latter would indicate a much higher level of 'churn'.

However, the model does give an indication of the number of new graduate recruits required (a result of both growth in the size of the labour force, and replacements required for net/permanent separations), and this can be calculated as a percentage of the total workforce. The higher the percentage, the greater the surplus necessary to cover matching of recruits to positions. The higher percentages generally occur when there have been large shortages carried over from the previous year. And thus the need in such circumstances for a greater surplus effectively exacerbates the shortfall that usually occurs in such situations. Table 3.1, 'Summary of projections outcomes, standard assumptions, 2006 to 2010, all main jurisdictions', includes a row for 'recruits required as % of total nurses (target) (persons)'. For Australia and New Zealand as a whole recruits required (Row 17 in the full projections tables) are between four and five per cent of the total target workforce (Row 5). However, in the jurisdictions with substantial shortages projected through the period (Queensland, Tasmania, Victoria) and/or high levels of replacements required (Northern Territory scenario 2), the number of recruits required are a much higher proportion of the workforce (over 10 per cent in the Northern Territory scenario 2 in 2009). Other things being equal, in these jurisdictions, shortages will be effectively very much greater than the projected quantum, and much larger surpluses would be required to effectively move out of shortage.

Part 2

Projections & scenarios

3. Summaries of main findings and key factors

In this section the main projections findings are summarised and the key factors leading to those findings considered. There is also a discussion of likely DEMAND to around 2020.

The projections based on standard assumptions, summarised in section 3.1, should not be taken at face value. This is particularly so for those jurisdictions that have relatively low baseline staffing levels – that is, relatively fewer RNs per 100,000 population in 2003 (2004 for New Zealand). Low staffing levels are likely to be in part a consequence of shortages, and not indicate any desirable level of staffing, even within the financial constraints of the time. For such jurisdictions, in section 3.2 there are summary findings from scenarios that progressively increase baseline staffing levels to the equivalent of the Australian average in 2003 after adjustments for population age profiles.

Different factors have varying impacts on the projections outcomes in different jurisdictions. Factors vary in their impact depending on their initial and continuing magnitude (especially important for net separation rates) or change in value from year to year (especially important for total population and the population age factor). This is discussed in section 3.3.

In addition to the progressive increases in staffing levels discussed in section 3.2, there are a range of other scenarios prepared for individual jurisdictions. These include, for selected jurisdictions, further increases in staffing levels (to the equivalent of 2003 South Australian levels), increases and reductions in net migration, variations in separation rates (such as increased retention of early career or late career RNs), and various combinations of these.

3.1 Outcomes of standard assumptions projections of RN graduate supply and demand for Australia, New Zealand and Australian states and territories

The outcomes of standard assumptions projections of RN graduate supply and demand for Australia, New Zealand and Australian states and territories are summarised in Table 3.1, which includes for each year 2006 to 2010 the shortage/surplus number, shortage/surplus (FTE) as a percentage of total RNs (target), SUPPLY as a percentage of DEMAND, recruits required as a percentage of total RNs (target), and the training rate. This information is extracted from the relevant projections tables for each jurisdiction in section 4.

For Australia as a whole a substantial shortfall of more than 3,000 graduates in 2006 becomes a projected shortfall of 470. The reduction in projected shortage is in large part because of the substantial projected improvement in SUPPLY, reflected in the increase in the training rate from 3.3 per cent in 2006 to 4.6 per cent in 2010. The largest part of the improvement occurs between 2009 and 2010 when the large increase in graduates from the 2007 new places announced by the Australian Government become available. In 2009 the projected shortfall is 1,701 and the training rate 4.1 per cent.

For New Zealand, a reduction, then increase, in shortfalls is projected, with the training rate over the period remaining stable at around 3.8 per cent. The shortfall is around 0.4 per cent of the projected FTE RN target workforce through the period, but the size of that target workforce under ‘standard assumptions’ reflects relatively low staffing levels. Thus projections outcomes for NZ if staffing levels are adjusted to more equitable levels are considered in section 3.2.

Table 3.1 Summary of projections outcomes, standard assumptions, 2006 to 2010, all main jurisdictions

	2006	2007	2008	2009	2010
Australia					
Surplus/shortage (number)	-3 243	-3 000	-2 316	-1 701	-470
Surplus/shortage (FTE) as % of total nurses (target)	-1.6%	-1.5%	-1.1%	-0.8%	-0.2%
SUPPLY as % of DEMAND	66.6%	71.0%	77.6%	83.3%	95.4%
Recruits required as % of total nurses (target) (persons)	4.7%	4.9%	4.8%	4.7%	4.6%
Training rate	3.3%	3.7%	3.9%	4.1%	4.6%
New Zealand					
Surplus/shortage (number)	-269	-187	-98	-102	-137
Surplus/shortage (FTE) as % of total nurses (target)	-0.8%	-0.5%	-0.3%	-0.3%	-0.4%
SUPPLY as % of DEMAND	83.2%	87.8%	93.6%	93.3%	91.3%
Recruits required as % of total nurses (target) (persons)	4.3%	4.1%	4.0%	4.0%	4.0%
Training rate	3.8%	3.8%	3.9%	3.9%	3.8%
NSW & ACT					
Surplus/shortage (number)	-849	-599	-209	125	592
Surplus/shortage (FTE) as % of total nurses (target)	-1.3%	-0.9%	-0.3%	0.2%	0.8%
SUPPLY as % of DEMAND	69.3%	79.7%	92.6%	104.8%	122.6%
Recruits required as % of total nurses (target) (persons)	3.9%	4.1%	3.8%	3.6%	3.5%
Training rate	2.8%	3.4%	3.7%	3.9%	4.5%
Victoria					
Surplus/shortage (number)	-1 202	-1 162	-1 100	-1 083	-938
Surplus/shortage (FTE) as % of total nurses (target)	-2.3%	-2.2%	-2.1%	-2.0%	-1.7%
SUPPLY as % of DEMAND	56.2%	61.4%	63.4%	64.6%	70.0%
Recruits required as % of total nurses (target) (persons)	5.1%	5.5%	5.4%	5.4%	5.4%
Training rate	3.0%	3.5%	3.6%	3.7%	4.0%
Queensland					
Surplus/shortage (number)	-1211	-1425	-1458	-1528	-1461
Surplus/shortage (FTE) as % of total nurses (target)	-3.4%	-4.0%	-4.0%	-4.1%	-3.8%
SUPPLY as % of DEMAND	50.9%	49.2%	51.7%	51.2%	55.6%
Recruits required as % of total nurses (target) (persons)	6.6%	7.4%	7.8%	7.9%	8.1%
Training rate	3.6%	3.8%	4.3%	4.3%	4.7%

continued over

continued

Table 3.1 Summary of projections outcomes, standard assumptions, 2006 to 2010, all main jurisdictions

	2006	2007	2008	2009	2010
Western Australia					
Surplus/shortage (number)	115	120	190	190	285
Surplus/shortage (FTE) as % of total nurses (target)	0.7%	0.7%	1.1%	1.1%	1.6%
SUPPLY as % of DEMAND	122.0%	122.9%	134.5%	132.4%	146.0%
Recruits required as % of total nurses (target) (persons)	2.9%	2.9%	3.0%	3.1%	3.2%
Training rate	3.8%	3.7%	4.2%	4.3%	4.9%
South Australia					
Surplus/shortage (number)	140	212	226	261	248
Surplus/shortage (FTE) as % of total nurses (target)	0.8%	1.2%	1.3%	1.5%	1.4%
SUPPLY as % of DEMAND	122.1%	134.6%	135.7%	139.3%	135.4%
Recruits required as % of total nurses (target) (persons)	3.5%	3.4%	3.5%	3.6%	3.8%
Training rate	4.5%	4.8%	5.0%	5.3%	5.4%
Tasmania					
Surplus/shortage (number)	-144	-162	-182	-208	-154
Surplus/shortage (FTE) as % of total nurses (target)	-2.6%	-2.9%	-3.2%	-3.6%	-2.7%
SUPPLY as % of DEMAND	60.1%	58.1%	55.3%	52.0%	66.8%
Recruits required as % of total nurses (target) (persons)	6.2%	6.5%	6.8%	7.2%	7.6%
Training rate	3.9%	4.0%	4.0%	3.9%	5.3%
Northern Territory (scenario 2)*					
Surplus/shortage (number)	-38	-138	-174	-108	-7
Surplus/shortage (FTE) as % of total nurses (target)	-1.3%	-4.7%	-5.8%	-3.5%	-0.2%
SUPPLY as % of DEMAND	76.5%	30.3%	40.8%	68.0%	97.7%
Recruits required as % of total nurses (target) (persons)	5.3%	6.3%	9.3%	10.5%	8.7%
Training rate	4.2%	2.0%	4.0%	7.5%	9.0%
Australian Capital Territory (scenario 2)**					
Surplus/shortage (number)	-108	-108	-112	-121	-87
Surplus/shortage (FTE) as % of total nurses (target)	-3.3%	-3.2%	-3.3%	-3.5%	-2.4%
SUPPLY as % of DEMAND	33.8%	39.2%	40.1%	38.2%	57.6%
Recruits required as % of total nurses (target) (persons)	4.7%	5.1%	5.2%	5.4%	5.5%
Training rate	1.7%	2.1%	2.2%	2.2%	3.3%

Source: Tables 4.1.1, 4.2.1, 4.3.1, 4.4.1, 4.5.1, 4.6.1, 4.7.1 4.8.1, 4.9.2, 4.10.2.

* Northern Territory scenario 2: Net separation rate one percentage point greater than 'standard assumptions' each year.

** Australian Capital Territory scenario 2: Shortfalls are assumed to be met each year 100 per cent sustainably. Using 'standard assumptions' the projected 2010 shortage is 405, which is more than 11 per cent of the ACT FTE RN workforce.

NSW and the ACT combined, have, with standard assumptions, a shortfall of more than one per cent of the workforce in 2006 becoming a small projected surplus by the end of the period. As for Australia as a whole, this improvement is largely a consequence of a significant improvement in the training rate – from 2.8 per cent to 4.5 per cent. Like NZ, NSW/ACT standard assumptions include relatively low staffing levels, so the projected outcomes if staffing is adjusted to more equitable levels are considered in section 3.2.

Victoria and Queensland have large shortfalls projected to continue through the period. In Victoria the shortfalls up to 2009 are projected to be over a thousand a year, and over two per cent of the total workforce. In 2010 the increased number of completions from the new places become available, but the shortfall remains substantial at 938 - 1.7 per cent of the workforce. The Queensland shortfalls are projected to increase to 2009 from 1,211 to 1,528 (3.4 per cent to 4.1 per cent of the workforce). The projected shortfall reduces in 2010 to 1,461 (3.8 per cent of the workforce) because of the graduates of the new 2007 places becoming available. In both states there are improvements projected in the training rates, but these are not sufficient for SUPPLY to come close to DEMAND. Queensland also has an initial low staffing level, and a projected improvement in staffing to a more equitable level, considered in section 3.2, leads to even larger projected shortfalls.

In WA the standard assumptions lead to small surpluses through the period – up to 1.7 per cent of the workforce at the end of the period. However, if the initially very low staffing levels are adjusted to a more equitable level, then the small surpluses become shortages. The training rate is a little higher than the national average, but this is not sufficient to cover DEMAND resulting from population growth and ageing (see section 3.3).

SA has small surpluses projected through the period (though the surpluses are still effective shortages in a tight labour market), and the highest training rate (other than the NT later in the period).

Tasmania has a projected shortfall increasing to 208 in 2009, before dropping back to 154 in 2010. This 2010 projected shortfall is 2.7 per cent of the workforce even with the completers of the new 2007 places adding to SUPPLY.

The NT (scenario 2 with net separation rates above standard assumptions) has a shortfall initially rising sharply to almost six per cent of the workforce because of reduced 2007 SUPPLY as a result of cessation of an intensive two year course, then reducing to almost zero. However, projections for the NT should be treated cautiously because of high interstate mobility of RNs and other variable factors.

3.2 Projections outcomes if baseline staffing is adjusted to more equitable levels

The baseline staffing levels (that is, row 2 in the projections tables - before the application of the population age profile factor) in the standard assumptions projections are the actual FTE staffing levels in the jurisdictions in 2003 (or 2004 for New Zealand).

Across Australia and NZ government departments officially assessed shortages of RNs at those times (and more recently) (DEWR 2006, and Department of Labour 2005). FTE staffing levels in most jurisdictions were probably much lower than they would have otherwise been because of those shortages. Therefore, for most policy purposes it would be reasonable to judge future DEMAND on the basis of staffing levels that are not so distorted by shortages and are more equitable between jurisdictions.

What is a reasonable baseline staffing level is a matter of judgement. For a number of jurisdictions there are scenarios that progressively increase staffing levels to those

prevailing for Australia as a whole and in SA in 2003 (with the levels of each jurisdiction adjusted according to the population age profile of that year – see Table B.6).

Table 3.2 sets out for major jurisdictions the ratios of actual staffing levels in 2003 (2004 for NZ) to that of Australia as a whole once each has been adjusted for the population age profile factor for that year (taken from Table B.6). An equitable staffing level, therefore, would be higher in those jurisdictions with an older age profile (such as Tasmania and SA) than in those jurisdictions with a younger age profile (such as WA). While the application of the PAPF provided a justification (and an apparent movement closer to the Australian average level) of the relatively high levels of staffing in Tasmania and SA, and the relatively low levels of staffing in WA, Queensland and New Zealand, differences remain.

Table 3.2 FTE RNs per 100,000 population, Australian states (2003), and New Zealand (2004), as a ratio of Australia (2003), actual and adjusted by each jurisdiction’s population age profile factor (PAPF)

	NSW/ACT	Vic	Qld	WA	SA	Tas	NZ	Australia
Actual 2003 (2004 for NZ) staffing level indexed to Australia	0.99	1.03	0.92	0.87	1.12	1.19	0.90	1.00
PAPF-adjusted 2003 (2004 for NZ) staffing level indexed to Australia	1.00	1.02	0.95	0.91	1.05	1.15	0.93	1.00

Source: Table B.6, Rows 2 & 6. Note that NSW and the ACT are combined here.

Once the 2003 (or 2004) staffing levels have been adjusted for the population age profile factor for that year, it is clear that Western Australia was still relatively most understaffed, followed by NZ, Queensland, and NSW/ACT. For those jurisdictions with lower staffing levels, Table 3.3 shows the annual increase in FTE RNs per 100,000 population necessary for the Australia-equivalent staffing level to be achieved over five years.

Table 3.3 FTE RNs per 100,000 population, selected Australian states (2003), and New Zealand (2004), adjusted by population age profile factor (PAPF)

	NSW/ACT	Qld	WA	NZ	Australia
Original 2003 (or 2004) staffing level (FTE RNs per 100,000 population)	817	759	717	741	821
Australia-equivalent staffing level (Australian FTE RNs per 100,000 population adjusted to each jurisdiction’s PAPF for 2003 (2004 for New Zealand), indexed to Australia 2003 PAPF)	828	799	787	801	821
Percentage difference	1.35%	5.27%	9.79%	8.10%	0.00%
Annual increase in FTE RNs per 100,000 population to change from original to Australia-equivalent over five years	2.2	8.0	14.0	12.0	0.0

Source: Table B.6, Rows 1 & 5. Note that NSW and the ACT are combined here.

Each of these four jurisdictions have scenarios in which their baseline staffing levels is progressively increased over the period to a level equivalent to the Australian 2003 level (adjusted to the jurisdictions’ population age profiles of that year). This requires annual increases of between 2.2 and 14.0 FTE RNs per 100,000 population. These annual

numbers may seem small, but they have a significant impact on the DEMAND for graduates (or need for other new recruits). For NSW/ACT, by 2010 the annual increase in just 2.2 FTE staffing per 100,000 has resulted in a surplus of 592 becoming a shortfall of 12 – a difference of 604. In WA, too, a small surplus becomes a more substantial shortfall, and in Queensland a large shortfall becomes even larger – to 2,849 which is seven per cent of the workforce. For NZ relatively small shortfalls become large shortfalls. Full details for each of these scenarios are provided in the section on the jurisdiction (see sources noted below Table 3.4).

Table 3.4 Surplus/shortage number, with baseline staffing according to standard assumptions, and progressive increase to Australian 2003-equivalent levels, 2006 to 2010, NSW/ACT, Queensland, Western Australia and New Zealand

		2006	2007	2008	2009	2010
NSW & ACT	Standard assumptions	-849	-599	-209	303	592
	Increase to Australian-equivalent staffing level	-1 024	-928	-675	-465	-12
	Difference - number	175	329	466	468	604
Queensland	Standard assumptions	-1 211	-1 425	-1 458	-1 528	-1 461
	Increase to Australian-equivalent staffing level	-1 558	-2 075	-2 382	-2 696	-2 849
	Difference - number	347	650	924	1 168	1 388
Western Australia	Standard assumptions	115	120	190	190	285
	Increase to Australian-equivalent staffing level	-186	-329	-384	-431	-377
	Difference - number	301	449	574	621	662
New Zealand	Standard assumptions	-269	-187	-98	-102	-137
	Increase to Australian-equivalent staffing level	-816	-1 207	-1 535	-1 918	-2 296
	Difference - number	547	1 020	1 437	1 815	2 159

Source: Tables 3.1, 4.2.2, 4.3.2, 4.5.2, 4.6.2.

3.3 Jurisdictions with substantial projected shortfalls

Sections 3.1 and 3.2 summarised the overall situation if standard assumptions were applied and, in those jurisdictions with low baseline staffing levels, progressive increases in staffing levels to the 2003 Australia-wide level.

Table 3.5 provides summary outcomes for 2010 for those jurisdictions for which substantial shortfalls are projected under standard assumptions and if staffing levels are increased. These are, in order of proportional shortfall

- for standard assumptions scenarios: Queensland, Tasmania, Victoria and NZ, where the shortfalls range from 3.8 per cent to 0.4 per cent of the workforce
- for the improved staffing scenarios: Queensland and NZ have increased shortfalls (to 7.0 per cent and 5.7 per cent of the RN workforce respectively), and WA and NSW/ACT have surpluses turning to shortfalls of 1.9 per cent and just over 0.0 per cent of the RN workforce respectively.

The effective magnitude of these shortfalls will be much greater than is apparent from the figures in Table 3.5 because of the necessary surplus needed to match individual RNs

to particular vacancies. This matching involves individual attributes of RNs and positions, geographic location, and the time needed for recruitment and placement (see Appendix F).

Table 3.5 Projected shortage (FTE) as a percentage of total RNs (target) and shortage number, 2010, those jurisdictions with significant shortfalls with standard assumptions baseline staffing and with progressive increase in baseline staffing to 2003 Australia-equivalent levels

		2010 projected shortage (FTE) as % of total RNs (target)	2010 projected shortage (number)
Standard assumptions	Qld	3.8%	1461
	Tas	2.7%	154
	Vic	1.7%	938
	NZ	0.4%	137
Progressive adjustment to 2003 Australia-equivalent staffing level	Qld	7.0%	2 849
	NZ	5.7%	2 296
	WA	1.9%	377
	NSW/ACT	0.0%	12

Source: Tables 4.2.1, 4.4.1, 4.5.1, 4.8.1, 4.2.2, 4.3.2, 4.5.2, 4.6.2

3.4 Key factors and their impact on projections

To understand the outcomes of the projections in terms of shortages or surpluses it is necessary to consider the key factors. The importance of these will differ between jurisdictions, and, often, from year to year. In this section some of the key factors are investigated - the assumptions here being the 'standard assumptions' set out in Box 4.1 and in the first projections table for each jurisdiction unless otherwise indicated. There is more detail in the sections covering particular jurisdictions, and in the appendixes.

Table 3.6 shows the projected change between 2006 and 2010 in population, population age profile factor (PAPF), target total FTE RNs, the RN persons to FTE ratio, and net separation rate for Australia, New Zealand and the Australian states and territories. The 2006 and 2010 projected net separation rates are also shown.

The table indicates that a projected total population increase is especially important in Queensland, followed by WA. An increase in population age profile factor is especially important in Tasmania, followed by SA and WA - the value of the WA PAPF is much lower than that of SA though the period, but the *change* between 2006 and 2010 in the PAPF in both those states is the same, and thus the effect on changing DEMAND is similar. The combination of the two factors – total population and PAPF - result in the change in the period in the target total FTE RNs, which is greatest in Queensland, followed by WA.

Over the period there are generally small reductions in the RN persons to FTE ratios, reflecting smaller proportions of the RN workforce in the age ranges where shorter hours are worked, and a larger proportion of beginning career RNs who tend to work longer hours. The higher the ratio the greater the DEMAND (the more individual graduates are required to attain a given FTE staffing level if individual RNs are averaging shorter hours), thus these reductions in the ratio would slightly reduce DEMAND through the period.

Table 3.6 Projected change 2006-10 in population, population age profile factor (PAPF), target total FTE RNs, RN persons to FTE ratio, and net separation rate, and 2006 and 2010 projected net separation rates, Australia, New Zealand and Australian states and territories

	Projected change 2006-2010					2006	2010
	Population	PAPF	Target total FTE RNs	Persons to FTE ratio	Net sepn rate	net sepn rate	net sepn rate
Australia	4.5%	2.9%	7.5%	-0.7%	7.7%	3.49%	3.76%
New Zealand	3.2%	2.8%	6.1%	-0.8%	8.5%	3.39%	3.68%
NSW	3.6%	2.9%	6.6%	-0.5%	9.0%	3.42%	3.72%
NSW & ACT	3.7%	2.9%	6.7%	-0.6%	9.3%	3.43%	3.75%
Vic.	3.8%	2.9%	6.9%	-0.3%	6.1%	3.35%	3.55%
Qld	7.4%	2.7%	10.3%	-1.0%	4.5%	3.66%	3.82%
WA	6.1%	3.2%	9.5%	-0.9%	4.8%	3.92%	4.11%
SA	1.1%	3.2%	4.5%	-0.7%	14.1%	3.31%	3.77%
Tas.	1.2%	3.9%	5.1%	-0.9%	9.7%	3.88%	4.26%
NT (scenario 2)*	5.8%	1.5%	7.4%	-0.8%	12.7%	4.39%	4.82%
ACT	5.6%	3.4%	9.2%	-1.1%	14.1%	3.68%	4.20%

Source: Tables 4.1.1, 4.1.2, 4.2.1, 4.3.1, 4.4.1, 4.5.1, 4.6.1, 4.7.1, 4.8.1, 4.9.2, and 4.10.1, rows 1, 3, 5, 10, 12.

* Northern Territory scenario 2: Net separation rate one percentage point greater than 'standard assumptions' each year.

Net separation rates are usually the major factor influencing DEMAND through the requirement for replacement RNs. Net separation rates are largely influenced by the age profile of the RN workforce. Appendix C explains what 'net separation rates' signify in this report – for example, re entrants and some other entries are included, and departures overseas are not included (they are accounted for in net overseas migration). The particular rates generally reflect the proportions of the RN workforces at retirement age, in the high net separation under 30 age range, and in the low net separation 30s and 40s. Knowing the *average age* of the RN workforce can give little assistance in gauging whether net separation rates will be high or low. For example, an average age in the early 40s can mean that there is a peak in the age profile around that age and thus a low overall net separation rate, or there could be a bimodal age profile with a small proportion in the 30s and 40s and high proportions at retirement age and in the high separation 20s age range, and thus a very high overall net separation rate. Such bimodal age profiles are developing in many jurisdictions – see for example Figure 3.2 which graphs actual and projected age profiles for WA.

Table 3.6 indicates that there are projected increases between 2006 and 2010 in net separation rates in all jurisdictions - because of increasing proportions of the RN workforces reaching retirement and increasing proportions in their 20s. The largest increases are projected for SA and the ACT, followed by the NT, Tasmania and NSW. In 2006 the highest projected rates (other than NT) are in WA followed by Tasmania.

The high rates projected for WA through the period may be counter-intuitive, but are explained by the actual and projected age profiles. For illustrative purposes, Table 3.7 compares WA and SA age profiles – actual for 2003 and projected for 2008 and 2013. WA has one of the highest net separation rates through the period, and SA has the

largest increase in rates from 2006 to 2010. In Table 3.7 the profiles have been simplified to the high net separation 20-29 range, the low net separation 30-49 range, and the high net separation 50-64 range. In 2003 SA had a much higher proportion in the low net separation 30-49 range (a large proportion of whom would have been in their late 40s, but still some years before retirement). As SA had been recruiting new RNs at a greater rate than WA (significantly improving staffing levels between 1999 and 2003 – see Table A.1) there was a higher proportion of the workforce in their 20s in SA than WA, leaving a relatively larger proportion around retirement age in WA. The larger proportion of early career RNs in SA will move into the low separation 30-49 age range around 2008, when there will be a smaller proportion in that range in WA because of their earlier low rates of recruitment. The age peak in SA will have moved well into the 50-64 age range and through retirement by 2013 and there will be an increasing proportion of replacement RNs in their 20s. WA will also have even larger proportions of new RNs to cover growth in the workforce as well as replacement, but the proportion of the workforce retiring is projected to decline. These projections are based on the ‘standard assumptions’, and would be different if there were other assumptions (such as a progressive improvement in WA staffing levels, which would be projected to further increase the proportion of RNs in their 20s in that state).

Figures 3.1 and 3.2 (from the same sources as Table 3.7) graph the actual and projected age profiles for these two states. There are similar graphs of actual and projected age profiles for the Australian RN workforce (FTE and number) in Appendix A.

Table 3.7 Percentage of FTE RN workforce in age ranges 20-29, 30-49 and 50-64, Western Australia and South Australia, 2003 (actual), and 2008 and 2013 (projected)

		20-29 years	30-49 years	50-64 years
2003	WA	10%	54%	36%
	SA	15%	59%	27%
2008	WA	20%	45%	35%
	SA	17%	50%	33%
2013	WA	27%	41%	32%
	SA	22%	42%	36%

Source: 2003 actual from AIHW 2005a; 2008 and 2013 projections by the author, method explained in Appendix C.

Note that the WA response rate to the AIHW 2003 survey was low, (AIHW 2005, p.30), but the data is consistent with that of earlier surveys in 1999 and 2001 (AIHW unpublished data)

Figure 3.1 Actual 2003 and projected 2008 and 2013 age profiles (percentage in each five year age range), target total RNs (FTE), South Australia

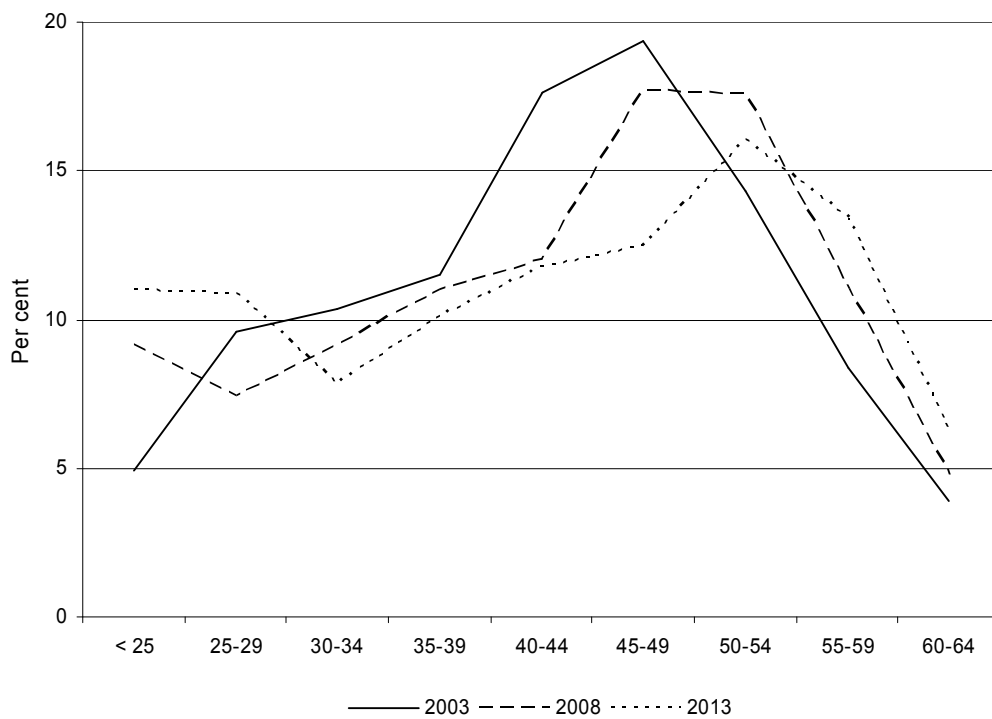
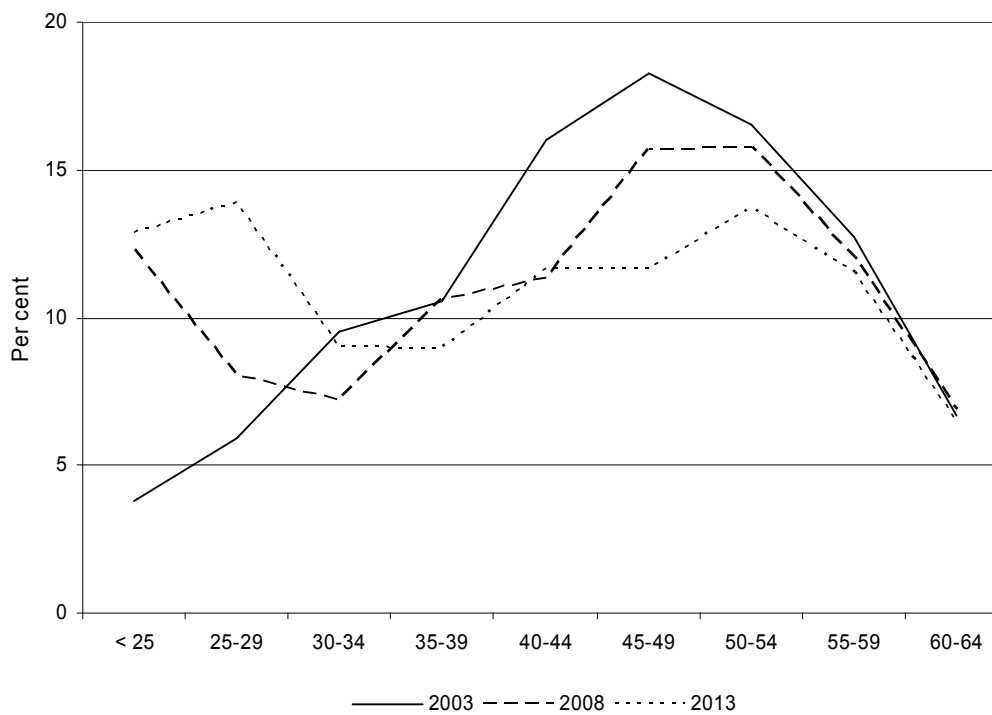


Figure 3.2 Actual 2003 and projected 2008 and 2013 age profiles (percentage in each five year age range), target total RNs (FTE), Western Australia



3.5 Projected change in DEMAND and SUPPLY

The changes in the various factors discussed above and the carry over of shortfalls from one year to the next are the significant factors in changes in DEMAND over the period 2006 to 2010. The changes in SUPPLY reflect increases in projected completions. The percentage changes in projected DEMAND and SUPPLY for each jurisdiction, with standard assumptions (except for NT and ACT), are set out in Table 3.8.

In most jurisdictions there would be much larger increases in DEMAND if the shortfalls of the previous years are not carried over - because the shortfalls are generally reducing. For example, if the shortfalls of the previous years are excluded, for Australia the increase in DEMAND between 2006 and 2010 is 15.3 per cent, while if the accumulating shortfalls are included the increase in DEMAND is only 4.6 per cent. Thus for Australia we can conclude that the *underlying* increase in DEMAND is a little under four per cent a year. For NZ a small fall in DEMAND becomes an increase of 14.3 per cent if accumulated shortfalls are excluded, which indicates an underlying increase in DEMAND similar to Australia's. Some jurisdictions (Victoria, Queensland and NT) have a reduction in increase in DEMAND if accumulated shortfalls are excluded because the shortfalls are projected to increase through the period.

Changes in DEMAND and SUPPLY do not in themselves indicate shortfalls (or surpluses) - the situation at the beginning of the period must also be known. For example, the percentages changes in both DEMAND and SUPPLY in Victoria and WA are very similar. Yet through the period Victoria is projected to experience large shortfalls, which accumulate from one year to the next, and WA to experience small surpluses (with standard assumptions). Similarly, the reduction in DEMAND in NSW reflects the ending of the very large shortfalls which accumulated early in the period, while the very large increase in DEMAND in the ACT reflects the accumulation of large shortfalls through the period while the increase in SUPPLY is well below sufficient to meet the accumulating DEMAND.

Between 2006 and 2010 SUPPLY is projected to increase in Australia by 50 per cent and NZ by only seven per cent. Between 2000 and 2009 Australia is projected to almost double the number of completions of pre-registration nurse education courses – from 5,049 to 9,674 (including the new places). A much smaller increase of just over twenty per cent is projected for New Zealand – from 1,184 to 1,432 (details in Appendix E).

Table 3.8 Projected change 2006-10 in DEMAND and SUPPLY, standard assumptions, and excluding accumulated shortfalls*, Australia, New Zealand, and Australian states and territories

	DEMAND*	SUPPLY		DEMAND*	SUPPLY
Australia	4.6% (15.3%)	49.8%	WA	19.0% (24.0%)	42.3%
New Zealand	-2.3% (14.3%)	7.1%	SA	11.3% (17.6%)	23.2%
NSW & ACT	-5.1% (19.7%)	68.0%	Tasmania	28.5% (9.5%)	42.9%
Victoria	14.0% (10.2%)	42.1%	NT **	76.7% (15.3%)	125.8%
Queensland	33.3% (13.7%)	45.5%	ACT	115.8 % (26.1%)	114.5%

Source: Tables 4.1.1, 4.1.2, 4.2.1, 4.3.1, 4.4.1, 4.5.1, 4.6.1, 4.7.1, 4.8.1, 4.9.2 and 4.10.1, rows 19, & 20.

* Percentages in parentheses exclude accumulated shortfalls, better indicating changes in *underlying* DEMAND.

** Northern Territory scenario 2: Annual net separation rate one percentage point greater than standard assumptions.

3.6 Staffing and graduate requirements to around 2020

There is evidence available to make broad estimates of requirements for graduate RNs (DEMAND in this report) at least up to around 2020. The estimates that follow need to be compared with *underlying* DEMAND over the period 2006 to 2010, which for Australia and New Zealand is projected to increase by an average of just under four per cent a year.

Here it is assumed that there will not be any significant change over to period from 2010 to around 2020 in net separation rates by age; average working hours by age; staffing levels per 100,000, adjusted for population ageing (according to the PAPF); net migration, or the availability and suitability of graduates. If significant variation is expected, then the following conclusions need to be adjusted accordingly. This includes increasing staffing levels where the baseline level is relatively low.

The two major components of requirements for graduate RNs (DEMAND) – *growth* (or reduction) in the size of the RN workforce and the need for *replacements* for net separations from the workforce - will be considered in turn.

The annual growth rate in the total population and in the age ranges relevant to the PAPF are most important in determining the size of the future target RN workforce – the annual *growth* component of DEMAND.

From 2011 the annual total population growth rate is projected by ABS (Series B) to decline from an average annual rate of 1.16 per cent from 2006 to 2011 to 0.96 per cent from 2011 to 2021, and continue to decline to the end of the century (see Table 3.9).

Table 3.9 Projected size and growth of the Australian population and the age groups 65 years and over and 85 years and over, selected time periods, 2006 to 2031

	Total population		65 years and over		85 years and over	
	Number (at end of period)	Average annual growth rate	Number (at end of period)	Average annual growth rate	Number (at end of period)	Average annual growth rate
	'000	%	'000	%	'000	%
2006 - 2011	21 699.2	1.09	3 171.6	3.0	431.8	5.4
2011 - 2021	23 871.4	0.96	4 472.0	3.5	584.4	3.1
2021 - 2031	25 772.9	0.77	5 780.1	2.6	856.1	3.9

Source: ABS 2005a, pp. 38-39

The average annual growth rate of those aged 65 and over will be greater in the period 2011 to 2021 than 2006 to 2011, but will then slow – though the numbers will continue increasing. On the other hand, after large average annual growth rates from 2004 to 2011, the average annual increase in the number aged 85 and over is projected to slow between 2011 and 2021, and then increase again. The value of the PAPF will thus continue to increase through the period to around 2020, though its annual rate of increase will be a little slower than in the period to 2010. However, it will have an increasing proportional effect on DEMAND because of the compounding effect of population ageing on the PAPF. To illustrate: if the PAPF is 1.05 (close to that for Australia in 2010, indexed to 2003), an annual increase in the PAPF of five per cent will add 0.1025 to the PAPF in the first year. In contrast, if the PAPF is 1.075, an annual increase of only three per cent will

add more to the PAPF (0.1073) and thus require a greater number of additional RNs per 100,000 population to maintain adequate staffing.

The age projections for the Australian RN workforce indicate that over the period to around 2013 annual net separation rates can be expected to continue to increase as increasing proportions of the total RN workforce reach retirement and are in the higher net separations under 30 age ranges, and there is little change in the proportion who are in the lower net separation age ranges 35 to 44. The rate of net separations would not be expected to start reducing until around 2020 when the peak in the age profile has passed through retirement (other things being equal – policy interventions or external events can change expected net separation rates). This points to increasing requirements for *replacement* RNs through the period to around 2020.

Little change in DEMAND is expected from changes in average working hours (persons to FTE ratios) between 2010 and 2020. While the age profile of RNs is expected to change significantly, it is largely an increase in early career RNs (aged to mid 30s) balancing a decrease in late career RNs (aged from around late 40s) – both age ranges with longer average working hours – and less change in the proportion in the age ranges where shorter hours are more common.

In summary, for Australia over the decade after the period of the projections in this report, the major impacts on changes in DEMAND from one year to the next are likely to be

- annual decrease from a projected slowing in growth of the total population
- annual increase from the compounding effect of ageing on the PAPF
- substantial annual increase from increasing net separation rates (which are certain to continue to have the single largest impact on DEMAND).

We can therefore expect over the decade to around 2020 an annual increase in DEMAND for graduates in Australia, and thus requirements for annual increases in SUPPLY. The situation in New Zealand is likely to be similar. The annual increases in DEMAND (and thus need for comparable increases in SUPPLY) can be expected to be in the order of around three to four per cent. Even greater annual increases in graduate numbers (SUPPLY) will be required after 2010 if staffing levels are to be increased to adequate levels in those jurisdictions where they are relatively low, if the current shortages are not overcome by around 2010, or if net overseas migration reduces.

4. The projections tables

Projections tables with standard assumptions are provided in full for each jurisdiction: Australia, New Zealand and the Australian states and territories (New South Wales and the Australian Capital Territory combined). There are also scenarios taking account of a range of alternative assumptions, future developments and/or policy interventions.

Box 4.1 provides notes on sources, assumptions and methodology for the 27 rows of inputs and calculations in the standard assumptions or first scenario tables for each jurisdiction. The notes also apply (with some obvious adjustments) to the numbered rows in the other scenario tables.

Box 4.1 Notes for each row in the projections tables

Each of the numbers refers to a row in the standard assumptions or first scenario table for each jurisdiction. Subsequent scenario tables use the same row numbering, with varying assumptions. (Rounding in the projections tables has occurred after calculations within the tables using exact or more precise values, and thus manual checking of figures in the tables may lead to different results; these differences are not significant.)

1. Australian population numbers are Australian Bureau of Statistics population projections Series B (Cat. No. 3222.0, published in November 2005). This series is based on 'medium' assumptions for all components (fertility, mortality, immigration and interstate migration). The New Zealand population projections are based on the equivalent 'medium' projection (Series 5) from Statistics New Zealand.
2. 'Baseline FTE RN/100,000 population' is the actual 2003 figure published by the Australian Institute of Health and Welfare (AIHW) for Australian jurisdictions, and equivalent data for New Zealand for 2004 from the New Zealand Health Information Service (NZHIS). Jurisdictions with low PAFP adjusted FTE staffing levels in 2003 (see Table B.5) have scenarios in which the levels are progressively increased to the Australian or South Australian 2003 level.
3. 'Population Age Profile Factor' (PAFP) is calculated on the assumption that through the period to 2010 the age groups 0-64, 65-74, 75-85 and 85+ will have the same relative intensity of RN utilisation that those age groups had across Australia nationally in 2003. The factor is indexed to the actual FTE 2003 staffing level in each jurisdiction. The relative Australian rates of RN utilisation by each age group in 2003 are applied to the New Zealand population projections as well as the Australian states and territories. The different values of the PAFP in the different jurisdictions are a consequence of the different rates and patterns of ageing projected in those jurisdictions (Australia using Series B, New Zealand using Series 5, as for Row 1). An analysis of the issues and a detailed explanation of the method is provided in Appendix B.
4. 'Adjusted FTE RN/100,000' is the multiplication of the Baseline FTE RN/100,000 by the PAFP.
5. 'Target total employed FTE RNs' is the Adjusted FTE RN/100,000 applied to the Population (Row 1). Generally it is increasing both because of the increasing PAFP as the population ages and because of the increase in total population. The target total is not the actual projected total because in most jurisdictions in most years a shortfall is projected.
6. 'Change from previous year target total' is the additional number of FTE RNs from one year's target total to the next. The 2006 figure is derived from the calculations for 2004 and 2005 that are not included in the tables that follow.

continued on next page

continued . . . **Box 4.1 Notes for each row in the projections tables**

7. '% of shortfall of previous year not met sustainably' is a broad estimate that the large proportion (90 per cent) of the shortfall was met in ways that are ultimately unsustainable. Unsustainable ways of meeting shortfalls include unfilled vacancies, RNs working longer hours than they would prefer, re-entry earlier than planned, and delayed departure (delayed retirement or delays of leave such as long service or annual leave). The estimate in this row recognises that the strategies to overcome shortages over recent years have drawn into the profession many of those who may not have otherwise re-entered (and thus the 'pool' of such people is much less than it was in the late 1990s and earlier 2000s), and that net overseas migrant arrivals are included elsewhere in this model (Row 16). Note that the 'net separations' estimates (Row 10) incorporate those who re-enter or return to nursing in the same way that was common in 2001. 'Sustainable' meeting of shortfalls requires *additional* immigration and/or *additional* re-entry, and/or long term retention at a *greater rate* than was common in 2001, and/or permanent and acceptable increases in average hours worked (controlling for age group).
8. 'Shortfall carried over from previous year' is the FTE shortfall (Row 22) of the previous year multiplied by the % of shortfall of previous year not met sustainably. The 2006 value is derived from the 2005 FTE shortfall value that is not shown on these tables.
9. 'Actual change from previous year' is the 'Change from previous year target total' (Row 6) plus 'Shortfall carried over from previous year' (Row 8).
10. 'Net separation %' is derived from complex calculations that are described in Appendix C. It incorporates RN re-entries and entries not otherwise accounted for as well as exits. Only exits who remain in the country are counted here: recent graduates and others who *depart the country* are accounted for in 'Net overseas migration' (Row 16). The estimates of national underlying net separation rates are based on 2001 ABS Census data for the population of individuals whose highest qualification is in professional nursing - the proportion who are working as professional nurses in each five year age group. A separation rate is calculated for each five year age group (with adjustments for the younger age groups to account for the entry to the profession of recent graduates and net overseas arrivals at different ages, mostly concentrated under 30). These different rates are then applied to age profile projections for each jurisdiction. Those projections build on AIHW data for 2003 for the number of FTE RNs in each age group in each jurisdiction, and incorporate the 'Target total employed FTE RNs' (Row 5) projected for 2008 and 2013, and the age profiles of pre-registration nurse education course completers and migrant arrivals. For New Zealand, the Australian rate for each age group is applied to age profile projections based on New Zealand data from the NZHIS.
11. 'Net separation number' is the net separation rate (%) applied to the 'Target total employed FTE RNs' (Row 5) minus the shortfall carried over from the previous year (Row 8).
12. 'Persons: FTE RNs' is derived from age profile projections to 2010 (done in association with the projected net separation rate calculations) and the persons to FTE ratios for each five year age group in 2003 (AIHW and NZHIS data – see Appendix A). The age profile projections for each jurisdiction are those developed as part of the complex calculations used to determine the net separation rates for each year (see Appendix C). In general, the *higher* the proportion of RNs under 30 and the *lower* the proportion aged between 30 and 44, and over 60, the lesser the persons to FTE ratio (that is, the longer the average hours worked).
13. 'Recruits (persons) required to meet target total' is the sum of the projected actual change from previous year (Row 9) and the net separation number (Row 11), which is a FTE total, and to which the persons to FTE RNs ratio is applied so that the result is in a form comparable with subsequent elements of the model.

continued on next page

continued . . . **Box 4.1 Notes for each row in the projections tables**

14. '% of effective surplus carried over from previous year' only applies to any surplus (Row 21) above 8 per cent of the total workforce (Row 5). This recognises that an effective surplus only occurs after an allowance for unavoidable labour market frictions, job-matching etc (see Appendix F). This allowance is here set at 8 per cent in all jurisdictions, but in fact it would vary according to circumstances. This element of the model recognises that, beyond the necessary minimum, any surpluses do, to some extent, continue from year to year. Some large surpluses remained available from year to year in several states around the early to mid 1990s. However, in the current period of national and international shortages it is assumed that only a small percentage (10 per cent) of any effective surplus would remain available in that jurisdiction the following year.
15. 'Surplus carried over from previous year' is the surplus number (that is, not FTE) resulting from the application of the '% of effective surplus carried over from previous year' (Row 14) to any effective surplus in the previous year (any among in Row 21 that is more than 8 per cent above total workforce (Row 5). This is not above zero in any scenario in this report.
16. 'Net overseas migration' is an estimate derived from actual net arrivals of RNs in 2003-04 minus an estimate of international student graduates who obtain visas for working in Australia and enter the nursing workforce – these graduates are already accounted for in 'Total number of graduates projected (SUPPLY)' (Row 20). The standard projections assume no change in net arrivals. See Appendix D for a discussion of migration issues.
17. 'Graduate recruits required (persons)' is the recruits required to meet target total (Row 13) minus any surplus carried over from previous year (Row 15) plus net migrant arrivals (Row 16). This is in persons (not FTE) because graduate numbers are in persons.
18. '% of graduates who are available and suitable' is a figure that is consistent with the calculations for the net separation rates and with available data (for example, from the Graduate Careers Council and from those schools of nursing that track graduates), and takes account of the several hundred graduates who leave Australia to work overseas and who are accounted for in 'Net overseas migration' in Row 16 (as departures).
19. 'Total number of graduates required (DEMAND)' is derived from the number of graduate recruits required (Row 17), divided by the percentage available and suitable (Row 18).
20. 'Total number of graduates projected (SUPPLY)' is the total number of completions at the end of the previous year for each jurisdiction, derived from information provided by schools of nursing, plus the new places announced by the Australian Government in July 2006.
21. 'Surplus/shortage (number)' is the number of graduates required (Row 19) minus the number of graduates supplied (Row 20). This is the relevant number when considering policy about pre-registration nurse education intakes.
22. 'Surplus/shortage (FTE)' is the 'Surplus/shortage (number)' divided by the 'Persons:FTE RNs' (Row 12). This is appropriate for assessing the impact on effective staffing levels, especially the shortfall as a percentage of the FTE nursing workforce (Row 23).
23. 'Surplus/shortage (FTE) as % of total nurses (target)' is Row 22 as a percentage of Row 5.
24. 'Surplus/shortage as % of DEMAND' is Row 21 as a percentage of Row 19.
25. 'Surplus/shortage as % of SUPPLY' is Row 21 as a percentage of Row 20. This is relevant to assessments of the impact on universities or other providers of seeking to overcome shortfalls by increasing intakes.
26. 'SUPPLY as % of DEMAND' is Row 20 as a percentage of Row 19.
27. 'Training rate' is the number of graduates (Row 20) as a percentage of the target total (persons), which is the target total employed FTE RNs (Row 5) multiplied by the 'Persons:FTE RNs' (Row 12). Training rates are only rough indicators of the adequacy of graduate numbers, because they do not take account of changes in the replacement requirements for new graduates, any shortages or surpluses carried over, or migration.

Table 4.1.1 Australia Scenario 1: RN supply and demand projections, 2006 to 2010, standard assumptions

	2006	2007	2008	2009	2010
1. Population	20 555 300	20 786 000	21 015 700	21 244 500	21 472 300
2. Baseline FTE RN/100,000 population (2003 actual)	821	821	821	821	821
3. Population age profile factor	1.019	1.026	1.033	1.040	1.049
4. Adjusted FTE RN/100,000	837	842	848	854	861
5. Target total employed FTE RNs	171 964	175 110	178 197	181 446	184 856
6. Change from previous year target total	3 230	3 146	3 087	3 248	3 411
7. % of shortfall of previous year not met sustainably	90%	90%	90%	90%	90%
8. Shortfall carried over from previous year	2065	2540	2356	1822	1340
9. Actual change from previous year	5 295	5 686	5 443	5 071	4 751
10. Net separation %	3.49%	3.56%	3.63%	3.69%	3.76%
11. Net separation number (FTE)	5 933	6 143	6 379	6 634	6 899
12. Persons: FTE RNs	1.149	1.146	1.143	1.143	1.142
13. Recruits (persons) required to meet target total	11 228	11 829	11 821	11 705	11 650
14. % of effective surplus of previous year remaining available	10%	10%	10%	10%	10%
15. Surplus carried over from previous year	0	0	0	0	0
16. Net overseas migration	2 013	2 013	2 013	2 013	2 013
17. Graduate recruits required (persons)	9 215	9 816	9 808	9 692	9 637
18. % of graduates who are available and suitable	95%	95%	95%	95%	95%
19. Total number of graduates required (DEMAND)	9 700	10 332	10 325	10 202	10 144
20. Total number of graduates projected (SUPPLY)	6 457	7 332	8 009	8 501	9 674
21. Surplus/shortage (number)	-3 243	-3 000	-2 316	-1 701	-470
22. Surplus/shortage (FTE)	-2 822	-2 617	-2 025	-1 489	-411
23. Surplus/shortage (FTE) as % of total nurses (target)	-1.6%	-1.5%	-1.1%	-0.8%	-0.2%
24. Surplus/shortage as % of DEMAND	-33.4%	-29.0%	-22.4%	-16.7%	-4.6%
25. Surplus/shortage as % of SUPPLY	-50.2%	-40.9%	-28.9%	-20.0%	-4.9%
26. SUPPLY as % of DEMAND	66.6%	71.0%	77.6%	83.3%	95.4%
27. Training rate	3.3%	3.7%	3.9%	4.1%	4.6%

Notes and sources: see Box 4.1

4.1 Australia

Greater explanatory detail and a larger number of different scenarios are provided for Australia as a whole than for individual Australian jurisdictions.

4.1.1 Australia: standard assumptions scenario

With the standard assumptions (see Box 4.1), the current large shortfalls in graduate numbers of around 3,000 a year across Australia are projected to progressively reduce to 1,701 in 2009. The expected additional 881 completions in 2009 arising from commitments made by the Australian Government in 2006 (see Table E.6) are projected to result in a shortfall of 470 in 2010. Table 4.1.1 provides details. Without the additional places the projected 2010 shortfall would be 1,351.

The reductions in projected shortfalls through the period are largely because of the expected increases in completions in pre-registration courses (SUPPLY). The increasing completions play a part in the reduction in DEMAND for graduates from 2007 to 2010 as any shortfalls are in large part carried over from one year to the next. Thus the large shortfall in 2006 adds to the projected shortfall for 2007. This is shown in Row 8 in Table 4.1.1 – with shortfalls of more than 2,000 carried over each year early in the period.

Graduate numbers (completions the previous year) (SUPPLY – Row 20) are projected to increase by 50 per cent, from 6,457 in 2006 to 9,674 in 2010. Without the additional places committed by the Government in 2006, the increase from 2006 is 36 per cent to 8,793 in 2010.

Most major elements in the calculation of the number of graduates required (DEMAND – Row 19) are projected to increase, but at a very much lower rate than the increase in graduate numbers. Following are projected percentage changes from 2006 to 2010

- increase of 4.5 per cent in the population of Australia (Row 1)
- increase of 2.9 per cent in the Population Age Profile Factor (reflecting the ageing of the Australian population) (Row 3)
- consequent increase of 7.5 per cent in the target total employed RNs (FTE) (Row 5)
- as noted above, a very large decrease in the shortfall carried over from the previous year (reflecting the progressively reducing shortfalls) (Row 8)
- increase of 7.7 per cent in net separation rates (reflecting the increasing proportion of retirees and beginning RNs, and a reducing proportion of RNs in the low separation thirties to mid forties age range) (Row 10)
- decrease of 0.7 per cent in the ratio of RN persons to FTEs (reflecting changes in the age profile) – reductions in the persons to FTE ratio result in reductions in the number of graduates required (other things being equal) (Row 12).

The magnitude of the numbers differs according to focus. What is very significant in terms of graduate numbers, new recruits or the number of net overseas arrivals is much less so in relation to the total workforce. While the projected shortfall for 2008 is more than a quarter the number of graduates (Row 25), it is just one per cent of the total workforce (Row 23). However, even a shortfall of that magnitude – or a projected surplus of similar small magnitude – entails a very tight labour market, and possibly quite severe shortages in particular geographic locations, settings, or times of the year. Such a tight labour market gives little flexibility for employing agencies and for RNs themselves.

The discussion of the Beveridge Curve in Appendix F indicates the necessity of at least a small surplus.

The training rate (graduates as a percentage of target total employed RNs (persons)) improves substantially through the period, from 3.3 per cent to 4.6 per cent (Row 27). Training rates are only rough indicators of the adequacy of graduate numbers, because they do not take account of changes in the replacement requirements for new graduates, any shortages or surpluses carried over, or in the levels of net overseas arrivals.

4.1.2 Australia: improvement in staffing levels scenario

What is a reasonable staffing level? The scenario set out in this section involves a progressive change in Australian staffing levels (FTE RNs/100,000 population) to one that is arguably more adequate and reasonable than the 2003 level that is used for the main projection (4.1.1). This results in graduate supply less than 60 per cent of projected requirements (DEMAND) in 2010 (even with the additional places announced in 2006).

The substantial shortages of RNs throughout Australia are likely to have artificially lowered FTE staffing levels through positions being left unfilled, needed positions not being created, substitution by staff other than RNs, and so on. Shortages also lead to decreases in the persons to FTE ratios by increasing hours worked through extra shifts and less formal mechanisms. This is consistent with the projections for each of the five larger states for 2003 in Preston (2002) and data for those states on average hours worked by 45-49 year olds (one age range was selected so that differences in RN age profiles between the states would not distort the data) and FTE staffing levels. The state with the most severe projected shortfall (NSW) also had the longest average hours worked and the lowest level of staffing (FTE per 100,000 adjusted for population age profile – see Table D. 5). The reverse was the case for South Australia where there was the least projected shortfall, the shortest average hours worked by RNs aged 45-49, and the highest FTE staffing level (adjusted for population age profile). (Tasmania was higher, and otherwise similar to SA, but, like the NT and the ACT, has been excluded here because of its small size.)

There have been RN shortages in each state and territory in recent years (based on surveys of employers and other labour market intelligence gathered by the Commonwealth Department of Employment and Workplaces Relations - for the most recent report see DEWR 2006). Most RN employment in Australia is funded via accountable funds from governments, and thus it would be reasonable to assume that in all jurisdictions overall there is no planned staffing beyond reasonable need, and all shortages reported to DEWR are within reasonable need.

Therefore, even the highest level of 2003 staffing (adjusted for population age profile), may be considered lower than reasonable need. After the small jurisdictions (with their particular circumstances), the highest level of staffing occurred in SA, which was five per cent above the national level (Table B.6, Row 6) (but twelve per cent above if no adjustment is made for the older population age profile in SA – Table B.6, Row 1).

For Scenario 2 for Australia (Table 4.1.2), baseline staffing levels (row 2) are progressively improved until 2010 when they are equivalent to the SA 2003 level – and five per cent above the Australian 2005 level of 821 FTE RN/100,000 population. This modest improvement in staffing levels results in substantial shortfalls projected through the period. Projected graduate supply is only 55.1 per cent of projected requirements (DEMAND) in 2010 even with the additional places. The projected shortfall in 2010 is 7,895 graduates, 3.6 per cent of the workforce.

Table 4.1.2 Australia Scenario 2: RN supply and demand projections, 2006 to 2010, baseline staffing level progressively increased to 2003 South Australian level (adjusted for population age profile)

	2006	2007	2008	2009	2010
2. Baseline FTE RN/100,000 population	829	837	846	854	862
19. Total number of graduates required (DEMAND)	11 574	13 829	15 254	16 430	17 569
20. Total number of graduates projected (SUPPLY)	6 457	7 332	8 009	8 501	9 674
21. Surplus/shortage (number)	-5 117	-6 497	-7 245	-7 929	-7 895
22. Surplus/shortage (FTE)	-4 452	-5 668	-6 336	-6 940	-6 916
23. Surplus/shortage (FTE) as % of total nurses (target)	-2.6%	-3.2%	-3.5%	-3.7%	-3.6%
24. Surplus/shortage as % of DEMAND	-44.2%	-47.0%	-47.5%	-48.3%	-44.9%
25. Surplus/shortage as % of SUPPLY	-79.2%	-88.6%	-90.5%	-93.3%	-81.6%
26. SUPPLY as % of DEMAND	55.8%	53.0%	52.5%	51.7%	55.1%

Notes and sources: see Box 4.1. For other input rows see Table 4.1a, progressive calculations to Row 19 not included here.

4.1.3 Australia: net overseas migration increase scenario

Table 4.1.3 Australia Scenario 3: RN supply and demand projections, 2006 to 2010, net overseas migration increasing by five per cent a year

	2006	2007	2008	2009	2010
16. Net overseas migration	2 113	2 219	2 330	2 446	2 569
17. Graduate recruits required (persons)	9 115	9 530	9 264	8 824	8 389
18. % of graduates who are available and suitable	95%	95%	95%	95%	95%
19. Total number of graduates required (DEMAND)	9 595	10 032	9 752	9 289	8 830
20. Total number of graduates projected (SUPPLY)	6 457	7 332	8 009	8 501	9 674
21. Surplus/shortage (number)	-3 138	-2 700	-1 743	-788	844
22. Surplus/shortage (FTE)	-2 730	-2 355	-1 524	-689	739
23. Surplus/shortage (FTE) as % of total nurses (target)	-1.6%	-1.3%	-0.9%	-0.4%	0.4%
24. Surplus/shortage as % of DEMAND	-32.7%	-26.9%	-17.9%	-8.5%	9.6%
25. Surplus/shortage as % of SUPPLY	-48.6%	-36.8%	-21.8%	-9.3%	8.7%
26. SUPPLY as % of DEMAND	67.3%	73.1%	82.1%	91.5%	109.6%

Notes and sources: see Box 4.1. For Rows 1 to 15 see Table 4.1.1.

The 'net overseas migration increase' scenario assumes an increase in net overseas arrivals of 5 per cent a year. This leads to a reduction in shortfalls, and a small surplus in 2010.

Such an increase in net arrivals is a reasonable scenario. Even if active overseas recruitment of RNs by health authorities is not increased, many RNs arrive in Australia as spouses of other skilled workers who are actively recruited. There is a strong indication of reducing recruitment in the UK of overseas RNs, including Australians or others who may chose Australia if they cannot work in the UK (see Appendix D). On the other hand, Australian RNs may be increasingly recruited to work overseas as shortages intensify in the USA and elsewhere.

Overseas migration arrivals play a significant part in the RN labour market. The number of net arrivals has increased more than six-fold since the late 1990s – from fewer than 400 in 1997-98 and 1998-99 to more than 2,400 in 2003-04 and 2004-05. In 2006 net arrivals are assumed to reduce the demand for graduates by more than 14 per cent. Therefore, whether migration is assumed to remain unchanged, assumed to increase by five per cent a year, or assumed to reduce to zero, makes a significant difference in the final projection of shortage or surplus.

4.1.4 Australia: net overseas migration reduction scenario

This scenario (Table 4.1.4) assumes a gradual reduction from 2005 levels in net overseas arrivals to zero, which results in substantial shortfalls of at least a third the number of graduates required through the period (even with the new places).

Table 4.1.4 Australia Scenario 4: RN supply and demand projections, 2006 to 2010, net overseas migration reducing to zero

	2006	2007	2008	2009	2010
16. Net overseas migration	1 610	1 207	804	401	0
17. Graduate recruits required (persons)	9 619	10 943	11 915	12 986	14 278
18. % of graduates who are available and suitable	95%	95%	95%	95%	95%
19. Total number of graduates required (DEMAND)	10 125	11 519	12 542	13 669	15 029
20. Total number of graduates projected (SUPPLY)	6 457	7 332	8 009	8 501	9 674
21. Surplus/shortage (number)	-3 668	-4 187	-4 533	-5 168	-5 355
22. Surplus/shortage (FTE)	-3 191	-3 652	-3 965	-4 523	-4 691
23. Surplus/shortage (FTE) as % of total nurses (target)	-1.9%	-2.1%	-2.2%	-2.5%	-2.5%
24. Surplus/shortage as % of DEMAND	-36.2%	-36.3%	-36.1%	-37.8%	-35.6%
25. Surplus/shortage as % of SUPPLY	-56.8%	-57.1%	-56.6%	-60.8%	-55.4%
26. SUPPLY as % of DEMAND	63.8%	63.7%	63.9%	62.2%	64.4%

Notes and sources: see Box 4.1. For Rows 1 to 15 see Table 4.1.1.

The National Health Workforce Strategic Framework, endorsed by the Council of Australian Governments (COAG) on 10 February 2006, calls for ‘national self-sufficiency in health workforce supply, while acknowledging that Australia is part of a global market’. Therefore this scenario has been prepared that progressively reduces net arrivals until they are zero in 2010. Of course this does not preclude movement of RNs in and out of Australia, only that departures become equal to arrivals. This would require an increase in departures of about 55 per cent on 2004-05 levels, or a decrease in arrivals

of about 36 per cent – or some combination. Such changes are small compared with the changes over the past decade (see Appendix D).

4.1.5 Australia: improvement in staffing and net overseas arrivals reduction scenario

This scenario (Table 4.1.5) combines both improvements in staffing levels (Scenario 4.1.2) and reductions in net overseas arrivals to zero (Scenario 4.1.3). It shows the effect of combining two possible policy interventions.

In this scenario, from 2007 projected SUPPLY is less than half that needed to meet DEMAND (Row 26). The projected shortfall in 2010 is more than 12,781, which is almost six per cent of the total RN workforce (Row 23). Thus additional policy interventions are indicated if both improvements in staffing levels and national self-sufficiency are sought.

Table 4.1.5 Australia Scenario 5: RN supply and demand projections, 2006 to 2010, net overseas migration reducing to zero & baseline staffing level progressively increased to 2003 South Australian level (adjusted for population age profile)

	2006	2007	2008	2009	2010
2. Baseline FTE RN/100,000 population	829	837	846	854	862
16. Net overseas migration	1 610	1 207	804	401	0
17. Graduate recruits required (persons)	11 398	14 265	16 599	18 902	21 332
18. % of graduates who are available and suitable	95%	95%	95%	95%	95%
19. Total number of graduates required (DEMAND)	11 998	15 016	17 472	19 897	22 455
20. Total number of graduates projected (SUPPLY)	6 457	7 332	8 009	8 501	9 674
21. Surplus/shortage (number)	-5 541	-7 684	-9 463	-11 396	-12 781
22. Surplus/shortage (FTE)	-4 821	-6 703	-8 276	-9 974	-11 195
23. Surplus/shortage (FTE) as % of total nurses (target)	-2.8%	-3.8%	-4.5%	-5.3%	-5.8%
24. Surplus/shortage as % of DEMAND	-46.2%	-51.2%	-54.2%	-57.3%	-56.9%
25. Surplus/shortage as % of SUPPLY	-85.8%	-104.8%	-118.2%	-134.1%	-132.1%
26. SUPPLY as % of DEMAND	53.8%	48.8%	45.8%	42.7%	43.1%

Notes and sources: see Box 4.1. For other input rows see Table 4.1.1, progressive calculations to Row 16 not included.

4.1.6 Australia: no population age profile factor scenario

The impact of the population age profile factor (PAPF) is substantial. If there are no improvements in staffing levels in line with population ageing, then surpluses are projected from 2007. Table 4.1.6 indicates the demand for graduates if there is no population age profile factor – that is, if the ‘adjusted FTE RN/100,000’ remains constant through the period (other factors the same as 4.1.1). (Note that the population age profile factor takes effect each year from 2003, the year of the AIHW baseline data used for calculations.)

Projected DEMAND through the period is substantially reduced. By 2010, rather than the shortage of 470 projected in Table 4.1.1, there is a surplus of 3,062, and SUPPLY is almost 50 per cent greater than DEMAND (1.5 per cent of the total RN workforce).

It is unlikely (and unreasonable) that the ageing of the Australian population will have no significant effect on overall RN staffing levels. This scenario, when it is compared with the scenario in Table 4.1.1, shows the reasonable magnitude of the effect.

Table 4.1.6 Australia Scenario 6: RN supply and demand projections, 2006 to 2010, no population age profile factor

	2006	2007	2008	2009	2010
4. Adjusted FTE RN/100,000	821	821	821	821	821
19. Total number of graduates required (DEMAND)	7 078	6 763	6 454	6 639	6 826
20. Total number of graduates projected (SUPPLY)	6 457	7 332	8 009	8 501	9 674
21. Surplus/shortage (number)	-621	569	1 555	1 862	2 848
22. Surplus/shortage (FTE)	-540	497	1 360	1 629	2 495
23. Surplus/shortage (FTE) as % of total nurses (target)	-0.3%	0.3%	0.8%	0.9%	1.4%
24. Surplus/shortage as % of DEMAND	-8.8%	8.4%	24.1%	28.0%	41.7%
25. Surplus/shortage as % of SUPPLY	-9.6%	7.8%	19.4%	21.9%	29.4%
26. SUPPLY as % of DEMAND	91.2%	108.4%	124.1%	128.0%	141.7%

Notes and sources: see Box 4.1. For other input Rows see Table 4.1.1, progressive calculations to Row 19 not included.

4.1.7 Australia: increased retention of beginning RNs scenario

Improving the retention of beginning nurses is frequently promoted as a positive way to reduce shortages. Strategies can include better induction and support for beginning RNs, and better salaries and conditions for early career RNs - including professional and career development and support. Such strategies may significantly improve RNs' competence, confidence and job satisfaction, and thus benefit patient care as well as RNs' work lives. They can also save employers' employee turnover costs (recruitment and induction), and reduce requirements for supervision and informal support by colleagues.

The very large majority of graduates enter the Australian RN workforce. Those RNs who leave the workforce in their 20s mostly do so either to take up employment in other occupations or to leave the workforce temporarily (mostly to care for children). Figure C.1 (in Appendix C) graphs the activities of Australians aged 21 to 71 whose highest qualification is in professional nursing. Of those not working as RNs, until around age 36 there are similar and increasing percentages both in other occupations and not working. Thus strategies can either make working as an RN more attractive than working in alternative occupations, and/or make continuing work (or returning to work early) more attractive for those with family responsibilities.

Scenario 7 involves reducing the net separation rates of RNs in their 20s by one fifth, with the separation rates for all other age groups remaining the same. This has an increasing effect on reducing the net separation rate for the RN workforce as a whole (compared to what it would otherwise be), and thus an increasing effect on reducing DEMAND until in 2010 there is a projected surplus of 1,748 graduates (less than one per cent of the workforce), compared with the standard assumptions shortfall of 470 (Table

4.1.1). The *increasing* effect on overall net separation rates is largely a consequence of the increasing proportion of the RN workforce as a whole being in their 20s (in all scenarios) – this is further discussed in section 4.1.9. The even greater effect on DEMAND (and thus shortages/surpluses) is also a consequence of the cumulative effect of decreasing shortfalls carried over from one year to the next through the period (see Row 8 in Table 4.1.1 for the standard assumptions, where the shortfall carried over in 2008 is 2,356 and in 2010 is 1,340, while in this scenario the shortfall carried over in 2008 is 1,644 and in 2010 it is zero).

Note that this scenario and the following scenario are for illustrative purposes because to make the impact of the strategy clear over time, the reduction in net separation rates for those in their 20s or in their 50s is commenced in 2005. If the reduction in separation rates commenced in 2007 or 2008 the effect on overall separation rates would be similar (but not identical because of slightly different age profiles) for those and subsequent years, but the effect on DEMAND (and thus shortages/surpluses) would not be as great in the period to 2010 because there would not be the effect of reducing the shortfalls carried over to subsequent years early in the period. Other scenarios could assume further reductions in net separations at the different career stages, but to achieve such outcomes may be very difficult, given the effectiveness of diverse ‘recruitment and retention’ strategies in recent years.

Table 4.1.7 Australia Scenario 7: RN supply and demand projections, 2006 to 2010, increased retention of beginning RNs

	2006	2007	2008	2009	2010
10. Net separation %	3.34%	3.40%	3.45%	3.51%	3.57%
19. Total number of graduates required (DEMAND)	9 108	9 426	9 053	8 493	7 927
20. Total number of graduates projected (SUPPLY)	6 457	7 332	8 009	8 501	9 674
21. Surplus/shortage (number)	-2 651	-2 094	-1 044	8	1 747
22. Surplus/shortage (FTE)	-2 306	-1 826	-912	7	1 530
23. Surplus/shortage (FTE) as % of total nurses (target)	-1.3%	-1.0%	-0.5%	0.0%	0.8%
24. Surplus/shortage as % of DEMAND	-29.1%	-22.2%	-11.5%	0.1%	22.0%
25. Surplus/shortage as % of SUPPLY	-41.1%	-28.6%	-13.0%	0.1%	18.1%
26. SUPPLY as % of DEMAND	70.9%	77.8%	88.5%	100.1%	122.0%

Notes and sources: see Box 4.1. Net separation rates for RNs in their 20s reduced by 20%. For other input rows see Table 4.1.1, progressive calculations to Row 19 not included.

4.1.8 Australia: increased retention of older RNs scenario

An alternative strategy for reducing shortages is to improve the retention of those in their 50s. This may occur in a number of ways, but there is some impetus for delayed retirement until after 60 in the May 2006 Australian Budget decision to have superannuation payments for those 60 and over untaxed or taxed at a lower rate compared with payments made to those under 60. Older RNs may also be encouraged to stay on or return to work by providing working arrangements, recognition and support to suit their needs.

Table 4.1.8 sets out the outcomes of reducing the net separation rates of those in their 50s by one fifth from 2005 to 2010.

Compared with the increased retention of those in their 20s, this strategy has a similar effect overall, but a greater effect early in the illustrative period, which is reversed later in the period. The reasons for this are discussed in the following section.

Table 4.1.8 Australia Scenario 8: RN supply and demand projections, 2006 to 2010, increased retention of older RNs

	2006	2007	2008	2009	2010
10. Net separation %	3.29%	3.38%	3.46%	3.54%	3.62%
19. Total number of graduates required (DEMAND)	8 912	9 233	8 911	8 438	8 034
20. Total number of graduates projected (SUPPLY)	6 457	7 332	8 009	8 501	9 674
21. Surplus/shortage (number)	-2 455	-1 901	-902	63	1 640
22. Surplus/shortage (FTE)	-2 134	-1 656	-788	55	1 434
23. Surplus/shortage (FTE) as % of total nurses (target)	-1.2%	-0.9%	-0.4%	0.0%	0.8%
24. Surplus/shortage as % of DEMAND	-27.5%	-20.6%	-10.1%	0.7%	20.4%
25. Surplus/shortage as % of SUPPLY	-38.0%	-25.9%	-11.3%	0.7%	16.9%
26. SUPPLY as % of DEMAND	72.5%	79.4%	89.9%	100.7%	120.4%

Notes and sources: see Box 4.1. Net separation rates for RNs in their 50s reduced by 20%. For other input Rows see Table 4.1.1, progressive calculations to Row 19 not included.

4.1.9 Australia: comparison of increased retention of beginning RNs and older RNs

Scenarios 4.1.7 and 4.1.8 reduce net separation rates by one fifth (20 per cent) for RNs in their 20s and in their 50s respectively. The net separation rates for all other groups remain the same.

The effects of these alternative strategies in response to shortages are similar, but the relatively small differences may be significant for policy.

Early in the period the effect of improving retention of those in their 50s is greater than the effect of improving retention of those in their 20s. This reflects the larger proportion of the RN workforce in the older age range as well as the higher initial net separation rate of those in their 50s (actually only those 55-59 – net separation rates are not particularly high until age 55), so that a one fifth reduction affects a larger proportion of the age group.

Later in the period, the impact on overall separation rates of a reduction in net separation rates of those in their 50s declines (see Table 4.1.9). This is because a reduction in net separation rates for those in their 50s essentially involves *delayed* retirement, and those moving from their late fifties into their sixties enter the very high net separation age ranges. In addition, reduced net separations of those in their 50s lead to a reduced need for replacement RNs early in the period, and this results in a lower proportion of the total RN workforce in their 20s, and higher proportions in the low net separation age ranges 30-49.

In contrast, a reduction of net separations of those in their 20s (with no change for other age groups) has an increasing effect over the period. The continual need for new RNs to replace the older RNs who are leaving, as well as the reduced net separations of those in their 20s (especially under 25) means that those in their 20s continue to increase as a proportion of the total RN workforce. Thus the reduction of the net separation rates of those in their 20s has an increasing effect of reducing the net separation rates of the whole RN workforce.¹

This difference between the scenarios is clear from Table 4.1.9, which compares net separation rates through the period (a) according to standard assumptions, with (b) increased retention of those in their 20s, and (c) increased retention of those in their 50s.

Table 4.1.9 Comparison of net separation rates, (a) standard assumptions, (b) improved retention of those in their 20s, and (c) improved retention of those in their 50s

	2006	2007	2008	2009	2010
(a). Net separations: Standard assumptions	3.49%	3.56%	3.63%	3.69%	3.76%
(b). Reduced net separation rates by 20% for those in their 20s	3.34%	3.40%	3.45%	3.51%	3.57%
(c). Reduced net separation rates by 20% for those in their 50s	3.29%	3.38%	3.46%	3.54%	3.62%
<i>Difference (percentage points) between (a) Standard assumptions & (b) Reduced net separation rates by 20% for those in their 20s</i>	0.15%	0.16%	0.18%	0.18%	0.19%
<i>Difference (percentage points) between (a) Standard assumptions & (c) Reduced net separation rates by 20% for those in their 50s</i>	0.20%	0.18%	0.17%	0.15%	0.14%

Sources: From Tables 4.1.1, 4.1.7 & 4.1.8.

Matters other than the effect on overall shortages/surpluses would be taken into account in decisions on whether or not to pursue strategies that increase retention of those in their 20s or 50s. The value to patient care, RN work-lives, and employer costs of strategies to improve retention have already been mentioned. In addition, the effect on the overall age profile of the RN workforce may be considered relevant.

Table 4.1.10 sets out the actual 2003 percentage of the FTE RN workforce in each five year age range, and the percentages projected for 2013 (rather than just 2010) under the standard assumptions scenario (4.1.1), the increased retention of those in their 20s scenario (4.1.7) and the increased retention of those in their 50s scenario (4.1.8). For each of these projections, factors such as the general population, the population age profile factor and net separation rates up to 2013 have been incorporated to arrive at a total RN 'target' workforce and age distribution for 2013 – the method is explained in Appendix C.

¹ The reduction in net separations of those in their 20s may involve retention of those who would have re-entered at a later time (aged mostly between 30 and 44). Technically these should be accounted for by a subsequent increase in net separation rates for these older age groups to account for the non-occurrence of re-entries. While for this scenario we could assume that most of those retained would have otherwise permanently left the RN workforce for other occupations, strategies to retain those who would have left temporarily need to take account of the consequent reduction in future re-entrants.

Table 4.1.10 Australia: actual 2003 FTE RN age profile (percentage in each age range), and projected 2013 FTE RN age profiles, given net separation rates according to (a) standard assumptions, (b) improved retention of those in their twenties, and (c) improved retention of those in their fifties

	< 25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
2003 -	5.0%	9.6%	11.5%	11.0%	15.8%	18.2%	14.3%	9.3%	5.3%
2013 - (a) Standard assumptions	11.9%	12.6%	8.6%	10.4%	12.7%	11.9%	13.9%	11.9%	5.9%
2013 - (b) 20s improved retention	11.5%	12.7%	8.9%	10.6%	12.6%	11.8%	13.9%	11.9%	5.9%
2013 - (c) 50s improved retention	11.5%	12.0%	8.4%	10.2%	12.5%	11.8%	13.9%	12.5%	7.0%

Source and notes: 2003 actual from AIHW; 2013 from the complex calculations used to derive net separation rate projections, which include age projections for 2008 and 2013 (see Figure A.3). The 'improved retention' involves reduction in net separation rates by one fifth for those in their 20s and in their 50s respectively.

Under each of the three scenarios the age profile in 2013 is very different from that in 2003 (see also figures A2 and A3). In 2013, compared with 2003, there are projected to be a higher proportion of the RN workforce in their 20s and aged 55 and over. The age profile is projected to flatten significantly from 2003 as the peak of 34 per cent of the workforce in their 40s moves into the retirement age range.

While the differences between the three scenarios projected for 2013 may not appear great, those differences may be relevant where such magnitudes are important, and, especially, if strategies with a greater expected impact than in these particular scenarios are being considered.

- Both improved retention scenarios result in fewer very young RNs than the standard assumptions scenario because a smaller number of replacements are required (the model assumes a continuation of recent graduate age profiles – see Appendix C and Table E.6).
- The 'improved retention of those in their 20s' scenario results in those aged 25-39 being a higher proportion of the total RN workforce than either of the other scenarios – 32.2 per cent compared with 30.6 per cent for the '50s improved retention scenario' and 31.6 per cent for the standard assumptions scenario. This is because those extra RNs retained when in their 20s move into the older age groups through the period to 2013.
- Not surprisingly, the scenario of improved retention of those in their 50s results in an increased proportion of the RN workforce 55 and over – 19.5 per cent compared with 17.8 per cent for the two other scenarios in 2013, and only 14.6 per cent in 2003.

The differences noted above would be greater if net separation rates at the different age groups were further reduced.

Scenarios similar to these are not prepared for individual Australian jurisdictions, but some of the issues involved for jurisdictions with different age profiles (illustrated by Victoria and Tasmania) are discussed in section 5.1.

Scenarios that parallel the above scenarios for Australia are set out for New Zealand in sections 4.2.5 (increased retention of beginning RNs) and 4.2.6 (increased retention of older RNs), with the two compared in section 4.2.7.

Table 4.2.1 New Zealand Scenario 1: RN supply and demand projections, 2006 to 2010, standard assumptions

	2006	2007	2008	2009	2010
1. Population	4 127 000	4 156 000	4 188 000	4 224 000	4 258 000
2. Baseline FTE RN/100,000 population (2004 actual)	741	741	741	741	741
3. Population age profile factor	1.015	1.022	1.030	1.037	1.044
4. Adjusted FTE RN/100,000	752	758	763	768	773
5. Target total employed FTE RNs	31 043	31 486	31 951	32 447	32 927
6. Change from previous year target total	460	443	465	496	481
7. % of shortfall of previous year not met sustainably	90%	90%	90%	90%	90%
8. Shortfall carried over from previous year	304	212	148	77	81
9. Actual change from previous year	764	655	613	573	562
10. Net separation %	3.39%	3.45%	3.51%	3.60%	3.68%
11. Net separation number (FTE)	1 042	1 080	1 118	1 164	1 208
12. Persons: FTE RNs	1.141	1.138	1.134	1.133	1.132
13. Recruits (persons) required to meet target total	1 806	1 735	1 731	1 738	1 770
14. % of effective surplus of previous year remaining available	10%	10%	10%	10%	10%
15. Surplus carried over from previous year	0	0	0	0	0
16. Net overseas migration	280	280	280	280	280
17. Graduate recruits required (persons)	1 526	1 455	1 451	1 458	1 490
18. % of graduates who are available and suitable	95%	95%	95%	95%	95%
19. Total number of graduates required (DEMAND)	1 606	1 531	1 528	1 534	1 569
20. Total number of graduates projected (SUPPLY)	1 337	1 344	1 430	1 432	1 432
21. Surplus/shortage (number)	-269	-187	-98	-102	-137
22. Surplus/shortage (FTE)	-236	-165	-86	-90	-121
23. Surplus/shortage (FTE) as % of total nurses (target)	-0.8%	-0.5%	-0.3%	-0.3%	-0.4%
24. Surplus/shortage as % of DEMAND	-16.8%	-12.2%	-6.4%	-6.7%	-8.7%
25. Surplus/shortage as % of SUPPLY	-20.1%	-13.9%	-6.8%	-7.1%	-9.6%
26. SUPPLY as % of DEMAND	83.2%	87.8%	93.6%	93.3%	91.3%
27. Training rate	3.8%	3.8%	3.9%	3.9%	3.8%

Notes and sources: see Box 4.1

4.2 New Zealand

In New Zealand the level of demand for graduates is difficult to project because of the very high level of international movement of RNs in and out of the country.

Since 1996 around half the new registrations of RNs every year are overseas trained – in 2003 there were initial registrations of 1,169 NZ-trained and 1,515 overseas-trained RNs (NZ Department of Labour 2005, p. 8). However, about the same number of RNs leave the country each year as arrive – in 2004 there were 1,223 departures and 1,509 arrivals. In three of the previous six years there had been more departures than arrivals, and the average over the twelve years from 1994 to 2005 is for net arrivals of 127 a year. For the most recent years, 2003 to 2004, there were net arrivals of 276, 286 and 284 respectively (1994 to 2004 data, NZ Department of Labour 2005, p. 6; 2005 data from Statistics New Zealand 2006, Table 9). The figure of 280 net arrivals a year is incorporated in the ‘standard assumptions’ New Zealand table (Table 4.2.1). There are different scenarios with net arrivals reducing to minus 165 (the 2001 level), and increasing to 300 (see below).

The supply of graduates in New Zealand was sharply reduced from 1,485 in 1996 to 1,059 in 2003. It has been projected to increase to 1,432 by 2009 (available for employment in 2010) – still below the 1996 level.

Staffing levels (FTE RNs/100,000 population) in New Zealand in 2003/04 were well below those in Australia as a whole, and below all Australian jurisdictions except Western Australia. There are scenarios below that progressively increase the baseline New Zealand staffing level (Row 2) to that of Australia (4.2.2) and that of South Australia (4.2.3) in 2003 (adjusted for the population age profile in that year – see Table B.5).

4.2.1 New Zealand: standard assumptions scenario

With the standard assumptions (see Box 4.1), New Zealand is projected to have shortfalls through the period, from SUPPLY at 83.2 per cent of DEMAND in 2006 to SUPPLY at 93.6 per cent of DEMAND in 2008. Table 4.2.1 provides details.

While DEMAND is projected to decrease through the period by just over two per cent, and SUPPLY to increase by just over seven per cent, these changes are not sufficient to outweigh the shortfalls carried over each year from 2005 (2005 is not shown in Table 4.2.1, but is included in the calculations for 2006), though these shortfalls carried over diminish through the period from over 300 to around 80 (Row 8). The shortfalls might appear minor at less than one per cent of the total workforce (Row 23), but as discussed in Appendix F, a surplus is necessary for an optional situation.

4.2.2 New Zealand: improvement in staffing levels to Australia 2003 level scenario

The scenario set out in Table 4.2.2 has been prepared in recognition that the levels of RN staffing per 100,000 population in New Zealand are well below those prevailing in Australia, (taking account of the population age profiles in both jurisdictions in the baseline years of 2003 and 2004 respectively). If New Zealand staffing levels are progressively improved so that in 2010 they are equivalent to the staffing levels in Australia in 2003 then very severe shortages are projected, with SUPPLY less than half DEMAND from 2008, falling to just 38.4 per cent in 2010. The projected shortfall in 2010 is 5.7 per cent of the total workforce.

Table 4.2.2 New Zealand Scenario 2: RN supply and demand projections, 2006 to 2010, baseline staffing level progressively increased to 2003 Australian level (adjusted for population age profile)

	2006	2007	2008	2009	2010
2. Baseline FTE RN/100,000 population	753	765	777	789	801
19. Total number of graduates required (DEMAND)	2 153	2 551	2 965	3 350	3 728
20. Total number of graduates projected (SUPPLY)	1 337	1 344	1 430	1 432	1 432
21. Surplus/shortage (number)	-816	-1 207	-1 535	-1 918	-2 296
22. Surplus/shortage (FTE)	-715	-1 061	-1 353	-1 692	-2 027
23. Surplus/shortage (FTE) as % of total nurses (target)	-2.3%	-3.3%	-4.0%	-4.9%	-5.7%
24. Surplus/shortage as % of DEMAND	-37.9%	-47.3%	-51.8%	-57.2%	-61.6%
25. Surplus/shortage as % of SUPPLY	-61.1%	-89.8%	-107.3%	-133.9%	-160.3%
26. SUPPLY as % of DEMAND	62.1%	52.7%	48.2%	42.8%	38.4%

Notes and sources: see Box 4.1. Change in Baseline FTE/100,000 to 801, the 2003 staffing level for Australia, taking account of the population age profiles of the two countries (see Table B.6, row 5.) For other input rows see Table 4.2.1, progressive calculations to Row 19 not included here.

4.2.3 New Zealand: improvement in staffing levels to South Australia 2003 level scenario

Table 4.2.3 New Zealand Scenario 3: RN supply and demand projections, 2006 to 2010, baseline staffing level progressively increased to 2003 South Australian level (adjusted for population age profile)

	2006	2007	2008	2009	2010
2. Baseline FTE RN/100,000 population	761	781	801	821	841
19. Total number of graduates required (DEMAND)	2 518	3 231	3 923	4 560	5 167
20. Total number of graduates projected (SUPPLY)	1 337	1 344	1 430	1 432	1 432
21. Surplus/shortage (number)	-1 181	-1 887	-2 493	-3 128	-3 735
22. Surplus/shortage (FTE)	-1 035	-1 658	-2 198	-2 760	-3 298
23. Surplus/shortage (FTE) as % of total nurses (target)	-3.2%	-5.0%	-6.4%	-7.7%	-8.8%
24. Surplus/shortage as % of DEMAND	-46.9%	-58.4%	-63.5%	-68.6%	-72.3%
25. Surplus/shortage as % of SUPPLY	-88.3%	-140.4%	-174.3%	-218.4%	-260.8%
26. SUPPLY as % of DEMAND	53.1%	41.6%	36.5%	31.4%	27.7%

Notes and sources: see Box 4.1. Change in Baseline FTE/100,000 to 841, the 2003 staffing level for SA, taking account of the population age profiles of the two jurisdictions – note that the relative SA staffing level is not the same for NZ as for Australia in Table 4.1.2 because of the different age profiles of the two countries (see Table B.6, row 5.) For other input rows see Table 4.2.1, progressive calculations to Row 19 not included here. For other input rows see Table 4.2.1 progressive calculations to Row 19 not included here.

New Zealand Scenario 3 involves an increase in baseline staffing to that prevailing in South Australia in 2003 (controlling for population age). The consequent shortfalls are very large – SUPPLY is projected to be barely a quarter of DEMAND in 2010.

4.2.4 New Zealand: improvement in staffing levels to Australia 2003 level, and net migration increase scenario

Improvements in RN staffing levels in New Zealand appear a reasonable policy objective, but such improvements will need to be accompanied by concerted strategies to improve supply. If New Zealand staffing levels are to be improved to the equivalent of the levels prevailing in Australia in 2003, and if there can be no other changes (such as improving retention and attracting additional re-entrants, or increasing average hours worked), then net migration will need to be increased by about 38 per cent each year from 2005 if SUPPLY is to equal DEMAND by 2010. By 2010 in this scenario net migration is five times the 2005 level of 280. However, as overseas arrivals were over 1,500 in 2004, such an increase in net arrivals may be feasible with strategies to both decrease departures and increase arrivals.

Table 4.2.4 New Zealand Scenario 4: RN supply and demand projections, 2006 to 2010, baseline staffing level progressively increased to 2003 Australian level (adjusted for population age profile), and net migration increased by 38% each year to 2010

	2006	2007	2008	2009	2010
2. Baseline FTE RN/100,000 population	753	765	777	789	801
16. Net overseas migration	386	533	736	1 015	1 401
19. Total number of graduates required (DEMAND)	2 041	2 195	2 199	1 959	1 427
20. Total number of graduates projected (SUPPLY)	1 337	1 344	1 430	1 432	1 432
21. Surplus/shortage (number)	-704	-851	-769	-527	5
22. Surplus/shortage (FTE)	-617	-748	-678	-465	4
23. Surplus/shortage (FTE) as % of total nurses (target)	-2.0%	-2.3%	-2.0%	-1.3%	0.0%
24. Surplus/shortage as % of DEMAND	-34.5%	-38.8%	-35.0%	-26.9%	0.3%
25. Surplus/shortage as % of SUPPLY	-52.7%	-63.3%	-53.8%	-36.8%	0.3%
26. SUPPLY as % of DEMAND	65.5%	61.2%	65.0%	73.1%	100.3%

Notes and sources: see Box 4.1. Change in Baseline FTE/100,000 to 801 by 2010, the 2003 staffing level for Australia, taking account of the population age profiles of the two countries (see Table B.6, row 5.) Net arrivals increased by 38% per year, the quantum selected because it resulted in SUPPLY equaling DEMAND by 2010. For other input rows see Table 4.2.1, progressive calculations to Row 19 not included here.

4.2.5 New Zealand: increased retention of beginning RNs scenario

The strategy of improving the retention of beginning nurses as a positive way to reduce shortages is discussed in section 4.1.9 in reference to Australia. The same arguments can be applied to New Zealand.

Scenario 5 for New Zealand involves reducing the net separation rates of RNs in their 20s by one fifth, with the separation rates for all other age groups remaining the same. This has an increasing effect on reducing the net separation rate for the RN workforce as a whole (compared to what it would otherwise be), and thus an increasing effect on

reducing demand for new graduates until in 2010 a 'surplus' of 38 graduates is projected, rather than a shortfall of 137. As for Australia, the increasing effect on overall net separation rates is largely a consequence of the increasing proportion of the RN workforce as a whole in their 20s (in all scenarios) through the period. The even greater effect on DEMAND (and thus shortages/surpluses) is also a consequence of the cumulative effect of decreasing shortfalls carried over from one year to the next through the period - see Row 8 in Table 4.2.1 for the standard assumptions, where the shortfall carried over in 2008 is 148 and in 2010 is 81, while in this scenario the shortfall carried over in 2008 is 60 and in 2010 it is zero.

Note that, as for Australia, this scenario and the following scenario are for illustrative purposes because to make the impact of the strategy clear over time, the reduction in net separation rates for those in their 20s or in their 50s is commenced in 2005. If the reduction in separation rates commenced in 2007 or 2008 the effect on overall separation rates would be similar (but not identical because of slightly different age profiles) for those and subsequent years, but the effect on DEMAND (and thus shortages/surpluses) would not be as great in the period to 2010 because there would not be the effect of reducing the shortfalls carried over to subsequent years early in the period.

Table 4.2.5 New Zealand Scenario 5: RN supply and demand projections, 2006 to 2010, increased retention of beginning RNs

	2006	2007	2008	2009	2010
10. Net separation %	3.26%	3.31%	3.36%	3.43%	3.50%
9. Total number of graduates required (DEMAND)	1 527	1 419	1 384	1 398	1 424
20. Total number of graduates projected (SUPPLY)	1 337	1 344	1 430	1 432	1 432
21. Surplus/shortage (number)	-190	-75	46	34	8
22. Surplus/shortage (FTE)	-166	-66	40	30	7
23. Surplus/shortage (FTE) as % of total nurses (target)	-0.5%	-0.2%	0.1%	0.1%	0.0%
24. Surplus/shortage as % of DEMAND	-12.4%	-5.3%	3.3%	2.4%	0.5%
25. Surplus/shortage as % of SUPPLY	-14.2%	-5.6%	3.2%	2.4%	0.5%
26. SUPPLY as % of DEMAND	87.6%	94.7%	103.3%	102.4%	100.5%

Notes and sources: see Box 4.1. Net separation rates for RNs in their 20s reduced by 20%. For other input rows see Table 4.2.1, progressive calculations to Row 19 not included here.

4.2.6 New Zealand: increased retention of older RNs scenario

An alternative strategy for reducing shortages is to improve the retention of those in their 50s. Table 4.2.6 sets out the outcomes of reducing the net separation rates of those in their 50s by one fifth from 2005 to 2010.

As for Australia, compared with the increased retention of those in their 20s, this strategy has a similar effect overall, but a greater effect in the short term, which is reversed later in the period. The reasons for this are discussed in the following section.

Table 4.2.6 New Zealand Scenario 6: RN supply and demand projections, 2006 to 2010, increased retention of older RNs

	2006	2007	2008	2009	2010
10. Net separation %	3.20%	3.28%	3.36%	3.45%	3.54%
19. Total number of graduates required (DEMAND)	1 485	1 377	1 352	1 405	1 437
20. Total number of graduates projected (SUPPLY)	1 337	1 344	1 430	1 432	1 432
21. Surplus/shortage (number)	-148	-33	78	27	-5
22. Surplus/shortage (FTE)	-129	-29	69	24	-5
23. Surplus/shortage (FTE) as % of total nurses (target)	-0.4%	-0.1%	0.2%	0.1%	0.0%
24. Surplus/shortage as % of DEMAND	-9.9%	-2.4%	5.8%	1.9%	-0.4%
25. Surplus/shortage as % of SUPPLY	-11.0%	-2.5%	5.5%	1.9%	-0.4%
26. SUPPLY as % of DEMAND	90.1%	97.6%	105.8%	101.9%	99.6%

Notes and sources: see Box 4.1. Net separation rates for RNs in their 50s reduced by 20%. For other input Rows see Table 4.1.1, progressive calculations to Row 19 not included.

4.2.7 New Zealand: comparison of increased retention of beginning RNs and older RNs

Scenarios 4.2.5 and 4.2.6 reduce net separation rates by one fifth (20 per cent) for New Zealand RNs in their 20s and in their 50s respectively. The net separation rates for all other groups remain the same.

The effects of these alternative strategies in response to shortages are similar, but the relatively small differences may be significant for policy.

Early in the period the effect of improving retention of those in their 50s is greater than the effect of improving retention of those in their 20s. This reflects the larger proportion of the RN workforce in the older age range as well as the higher initial net separation rate of those in their 50s (actually only those 55-59), so that a one fifth reduction affects a larger proportion of the age group.

Later in the period the impact on overall separation rates of a reduction in net separation rates of those in their 50s declines (see Table 4.2.7). This is because a reduction in net separation rates for those in their 50s essentially involves *delayed* retirement, and those moving from their late fifties into their sixties enter the very high net separation age ranges. In addition, reduced net separations of those in their 50s leads to the reduced need for replacement RNs early in the period, resulting in a lower proportion of the total RN workforce in their 20s, and higher proportions in the low net separation age ranges 30-49.

In contrast, a reduction of net separations of those in their 20s (with no change for other age groups) has an increasing effect through the period to 2010. The continual need for new RNs to replace the older RNs who are leaving, as well as the reduced net separations of those in their 20s (especially under 25) means that those in their 20s continue to increase as a proportion as a total RN workforce. Thus the reduction of their net separation rate has an increasing effect on the net separation rate of the RN workforce as a whole.

This difference between the scenarios is clear from Table 4.2.7 which compares overall net separation rates through the period according to (a) standard assumptions, (b) increased retention of those in their 20s, and (c) increased retention of those in their 50s.

Table 4.2.7 Comparison of net separation rates, standard assumptions, improved retention of those in their 20s, and improved retention of those in their 50s, New Zealand

	2006	2007	2008	2009	2010
a. Net separations: Standard assumptions	3.39%	3.45%	3.51%	3.60%	3.68%
b. Reduced net separation rates by 20% for those in their 20s	3.26%	3.31%	3.36%	3.43%	3.50%
c. Reduced net separation rates by 20% for those in their 50s	3.20%	3.28%	3.36%	3.45%	3.54%
<i>Difference (percentage points) between (a) Standard assumptions & (b) Reduced net separation rates by 20% for those in their 20s</i>	0.13%	0.14%	0.15%	0.17%	0.18%
<i>Difference (percentage points) between (a) Standard assumptions & (c) Reduced net separation rates by 20% for those in their 50s</i>	0.19%	0.17%	0.15%	0.15%	0.14%

Sources: From Tables 4.2.1, 4.2.5 & 4.2.6 .

Matters other than the effect on overall shortages/surpluses would be taken into account in decisions on whether or not to pursue strategies that increase retention of those in their 20s or 50s. The value to patient care, RN work-lives and employer costs of strategies to improve retention, especially of younger RNs, have already been mentioned. In addition, the effect on the overall age profile of the RN workforce may be considered relevant.

Table 4.2.8 sets out the actual 2003 percentage of the FTE New Zealand RN workforce in each five year age range, and the percentages projected for 2013 (rather than just 2010) under the standard assumptions scenario (4.2.1), the increased retention of those in their 20s scenario (4.2.5) and the increased retention of those in their 50s scenario (4.2.6). For these projections factors such as the general population, the population age profile factor and net separation rates up to 2013 have been incorporated to arrive at a total RN 'target' workforce and age distribution for 2013.

Under each of the three scenarios the age profile in 2013 is very different from that in 2003, and the patterns are very similar to the parallel scenarios for Australia (see also the technical discussion in section 4.1.9.) There are differences between the three scenarios that may be relevant where such magnitudes are important, and if strategies with a greater impact than in these particular scenarios are being considered.

- Both improved retention scenarios result in a smaller proportion of very young RNs than the standard assumptions scenario because a smaller number of replacements are required.
- The improved retention of those in their 20s scenario results in those aged 25-39 being a higher proportion of the total RN workforce than either of the other scenarios – 29.1 per cent compared with 27.7 per cent for the 50s improved retention scenario and 28.6 per cent for the standard assumptions scenario. This is because those extra RNs retained when in their 20s move into the older age groups through the period to 2013.

- Not surprisingly, the strategy to improve retention of those in their 50s results in an increased proportion of the RN workforce 55 and over – 19.4 per cent compared with 17.9 per cent for the two other scenarios.

Table 4.2.8 New Zealand: actual 2003 FTE RN age profile (percentage in each age range), and projected 2013 FTE RN age profiles, given net separation rates according to (a) standard assumptions, (b) improved retention of those in their twenties, and (c) improved retention of those in their fifties

	< 25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
2003 -	3.6%	7.5%	12.0%	12.9%	17.4%	18.4%	13.0%	9.3%	5.8%
2013 - (a) Standard assumptions	11.1%	12.1%	7.6%	8.9%	13.0%	13.6%	15.5%	12.4%	5.5%
2013 - (b) 20s improved retention	10.8%	12.2%	7.9%	9.0%	12.9%	13.5%	15.5%	12.4%	5.5%
2013 - (c) 50s improved retention	10.8%	11.6%	7.4%	8.7%	12.9%	13.5%	15.5%	13.0%	6.5%

Source and notes: 2003 actual from AIHW; 2013 from the complex calculations used to derive net separation rate projections, which include age projections for 2008 and 2013 (see Figure A.3). The 'improved retention' involves reduction in net separation rates by one fifth for those in their 20s and in their 50s respectively.

Table 4.3.1 NSW/ACT Scenario 1: RN supply and demand projections, 2006 to 2010, standard assumptions

	2006	2007	2008	2009	2010
1. Population	7 164 600	7 231 700	7 298 000	7 364 100	7 429 800
2. Baseline FTE RN/100,000 population (2003 actual)	817	817	817	817	817
3. Population age profile factor	1.021	1.028	1.035	1.043	1.051
4. Adjusted FTE RN/100,000	834	840	845	851	858
5. Target total employed FTE RNs	59 746	60 729	61 684	62 694	63 755
6. Change from previous year target total	983	983	955	1 010	1 061
7. % of shortfall of previous year not met sustainably	90%	90%	90%	90%	90%
8. Shortfall carried over from previous year	573	676	478	167	0
9. Actual change from previous year	1 556	1 659	1 433	1 177	1 061
10. Net separation %	3.43%	3.51%	3.59%	3.67%	3.75%
11. Net separation number (FTE)	2 029	2 106	2 194	2 293	2 390
12. Persons: FTE RNs	1.130	1.127	1.125	1.124	1.123
13. Recruits (persons) required to meet target total	3 585	3 765	3 628	3 470	3 451
14. % of effective surplus of previous year remaining available	10%	10%	10%	10%	10%
15. Surplus carried over from previous year	0	0	0	0	0
16. Net overseas migration	962	962	962	962	962
17. Graduate recruits required (persons)	2 623	2 803	2 666	2 508	2 489
18. % of graduates who are available and suitable	95%	95%	95%	95%	95%
19. Total number of graduates required (DEMAND)	2 761	2 951	2 806	2 640	2 620
20. Total number of graduates projected (SUPPLY)	1 912	2 352	2 597	2 765	3 212
21. Surplus/shortage (number)	-849	-599	-209	125	592
22. Surplus/shortage (FTE)	-751	-531	-186	112	527
23. Surplus/shortage (FTE) as % of total nurses (target)	-1.3%	-0.9%	-0.3%	0.2%	0.8%
24. Surplus/shortage as % of DEMAND	-30.7%	-20.3%	-7.4%	4.8%	22.6%
25. Surplus/shortage as % of SUPPLY	-44.4%	-25.5%	-8.0%	4.5%	18.4%
26. SUPPLY as % of DEMAND	69.3%	79.7%	92.6%	104.8%	122.6%
27. Training rate	2.8%	3.4%	3.7%	3.9%	4.5%

Notes and sources: see Box 4.1

4.3 New South Wales and the Australian Capital Territory

New South Wales and the Australian Capital Territory are best considered together. The ACT is a small jurisdiction surrounded by NSW, and

- ACT health facilities serve many patients from surrounding areas of NSW - for example, patients from NSW took up almost a quarter of ACT public hospital bed-days in 2003-04 (DHA 2005). Thus the apparently better staffing levels in the ACT of 869 FTE per 100,000 compared with 814 FTE per 100,000 in NSW (2003 data – see Table B.5) does not reflect the reality of RN to patient ratios in the ACT.
- There is high mobility of RNs (especially NSW graduates working in the ACT), and the very large majority of new registrations in the ACT each year are from interstate trained nurses.

4.3.1 NSW/ACT: standard assumptions scenario

NSW/ACT is projected to move from substantial shortages at the beginning of the period to small surpluses in 2009 and 2010. In 2010 the surplus is projected to be 606, just 0.8 per cent of the workforce. Table 4.3.1 provides details.

The reduction in shortfalls is largely because of significant increases in projected completions. Including the new places announced by the Australian Government in 2006², the projected increase in completions from 2005 to 2009 (SUPPLY in 2006 and 2010 respectively) is 68 per cent. There are projected to be notable increases in completions over the period at Charles Sturt University and Australian Catholic University (where they are projected to more than treble), and at Southern Cross University.

The projected surplus in 2010 is 0.8 per cent of the total RN target workforce, and thus an effective shortage. In addition, the baseline staffing level of 817 FTE RNs per 100,000 population is below that national 2003 staffing level, and well below that of South Australia (adjusted for population age profile), which, as noted in section 4.1.2, was still in a situation of overall shortage and staffing levels would not have been beyond reasonable need. It is likely that the lower staffing level in NSW/ACT in 2003 (which is reflected in the national figure) would have been partially a consequence of the relatively severe shortages in NSW/ACT (see section A.3). Therefore scenarios follow that progressively improve staffing levels to those of Australia and SA in 2003 (in both cases adjusted for age profiles).

4.3.2 NSW/ACT: improvement in staffing levels to Australia 2003 level scenario

If NSW/ACT staffing levels are progressively improved so that in 2010 they are equivalent to the staffing levels in Australia nationally in 2003 then the small surpluses become shortfalls. The improvement in staffing is only 1.3 per cent over five years, but it

² Some of the NSW new places are in two year graduate/intensive courses. However, the NSW/ACT scenarios do not take account of the course length of these new places. If the University of Sydney and University of Tasmania (Sydney) new places are assumed to complete in 2008, with the 2008-commencing cohort completing in 2009, then the NSW/ACT projected surplus in 2010 increases from 592 to around 770, 1.2 per cent of the target workforce.

is sufficient to turn a 2010 surplus of 592 to a shortfall of 12. Table 4.3.2 sets out the details.

Table 4.3.2 NSW/ACT Scenario 2: RN supply and demand projections, 2006 to 2010, baseline staffing level progressively increased to 2003 Australian level (adjusted for population age profile)

	2006	2007	2008	2009	2010
2. Baseline FTE RN/100,000 population	819	821	823	825	828
19. Total number of graduates required (DEMAND)	2 936	3 280	3 272	3 230	3 224
20. Total number of graduates projected (SUPPLY)	1 912	2 352	2 597	2 765	3 212
21. Surplus/shortage (number)	-1 024	-928	-675	-465	-12
22. Surplus/shortage (FTE)	-906	-823	-600	-414	-10
23. Surplus/shortage (FTE) as % of total nurses (target)	-1.5%	-1.3%	-1.0%	-0.7%	0.0%
24. Surplus/shortage as % of DEMAND	-34.9%	-28.3%	-20.6%	-14.4%	-0.4%
25. Surplus/shortage as % of SUPPLY	-53.6%	-39.4%	-26.0%	-16.8%	-0.4%
26. SUPPLY as % of DEMAND	65.1%	71.7%	79.4%	85.6%	99.6%

Notes and sources: see Box 4.1. Change in Baseline FTE/100,000 to 828, the equivalent for NSW of the 2003 staffing level for Australia, taking account of the population age profiles of NSW/ACT compared with Australia as a whole (see Table B.6, row 5 for NSW, ACT and Australia.) For other input rows see Table 4.2.1, progressive calculations to Row 19 not included here.

4.3.3 NSW/ACT: improvement in staffing levels to South Australia 2003 level scenario

Table 4.3.3 NSW/ACT Scenario 3: RN supply and demand projections, 2006 to 2010, baseline staffing level progressively increased to 2003 South Australian level (adjusted for population age profile)

	2006	2007	2008	2009	2010
2. Baseline FTE RN/100,000 population	827	837	848	858	869
19. Total number of graduates required (DEMAND)	3 589	4 506	5 008	5 430	5 854
20. Total number of graduates projected (SUPPLY)	1 912	2 352	2 597	2 765	3 212
21. Surplus/shortage (number)	-1 677	-2 154	-2 411	-2 665	-2 642
22. Surplus/shortage (FTE)	-1 485	-1 911	-2 143	-2 371	-2 352
23. Surplus/shortage (FTE) as % of total nurses (target)	-2.5%	-3.1%	-3.3%	-3.6%	-3.5%
24. Surplus/shortage as % of DEMAND	-46.7%	-47.8%	-48.1%	-49.1%	-45.1%
25. Surplus/shortage as % of SUPPLY	-87.7%	-91.6%	-92.8%	-96.4%	-82.3%
26. SUPPLY as % of DEMAND	53.3%	52.2%	51.9%	50.9%	54.9%

Notes and sources: see Box 4.1. Change in Baseline FTE/100,000 to 869, the 2003 equivalent of staffing level for South Australia, taking account of the population age profiles of the two jurisdictions For other input rows see Table 4.2.1, progressive calculations to Row 19 not included here.

If the NSW/ACT baseline staffing level is progressively improved to the equivalent level of South Australia in 2003 (taking account of the population age profiles of the different jurisdictions in that year), then SUPPLY is only around half of DEMAND through the period 2006 to 2010. This shortfall increases from 2.5 per cent to 3.5 per cent of the workforce though the period, and in 2010 the projected shortfall is 2,642, the new places leading to a very small improvement on the 2009 shortfall of 2,665. Table 4.3.3 provides details.

4.3.4 NSW/ACT: reduction in net overseas migration to zero scenario

Around 44 per cent of net overseas RN arrivals occur in NSW/ACT, while those jurisdictions have only 34 per cent of Australian RNs. Therefore any percentage change in net migration will have a proportionally greater effect on NSW/ACT than other Australian jurisdictions except Western Australia. The standard assumptions scenario (4.3.1) assumes net migration will be constant through the period.

This scenario (Table 4.3.4) assumes that net migration will progressively reduce to zero. This may be some combination of (a) increasingly aggressive recruitment of Australian and other RNs who may otherwise work in Australia to overseas jurisdictions such as the USA and (b) a deliberate policy in line with the Australian National Health Workforce Strategic Framework.

With net migration reducing to zero, the small projected surplus becomes a substantial projected shortfall of 1,679.

Table 4.3.4 NSW/ACT Scenario 4: RN supply and demand projections, 2006 to 2010, net overseas migration progressively reduced to zero

	2006	2007	2008	2009	2010
16. Net overseas migration	770	577	385	192	0
19. Total number of graduates required (DEMAND)	2 963	3 520	3 875	4 317	4 891
20. Total number of graduates projected (SUPPLY)	1 912	2 352	2 597	2 765	3 212
21. Surplus/shortage (number)	-1 051	-1 168	-1 278	-1 552	-1 679
22. Surplus/shortage (FTE)	-931	-1 036	-1 136	-1 381	-1 495
23. Surplus/shortage (FTE) as % of total nurses (target)	-1.6%	-1.7%	-1.8%	-2.2%	-2.3%
24. Surplus/shortage as % of DEMAND	-35.5%	-33.2%	-33.0%	-35.9%	-34.3%
25. Surplus/shortage as % of SUPPLY	-55.0%	-49.6%	-49.2%	-56.1%	-52.3%
26. SUPPLY as % of DEMAND	64.5%	66.8%	67.0%	64.1%	65.7%

Notes and sources: see Box 4.1. Progressive decrease in net overseas migration to zero (row 16). For other input rows see Table 4.2.1, progressive calculations to Row 19 not included here.

Table 4.4.1 Victoria Scenario 1: RN supply and demand projections, 2006 to 2010, standard assumptions

	2006	2007	2008	2009	2010
1. Population	5 068 100	5 117 200	5 166 000	5 214 400	5 262 400
2. Baseline FTE RN/100,000 population (2004 actual)	850	850	850	850	850
3. Population age profile factor	1.020	1.027	1.034	1.041	1.049
4. Adjusted FTE RN/100,000	867	873	878	885	892
5. Target total employed FTE RNs	43 922	44 659	45 382	46 146	46 933
6. Change from previous year target total	781	737	724	764	787
7. % of shortfall of previous year not met sustainably	90%	90%	90%	90%	90%
8. Shortfall carried over from previous year	661	922	892	846	833
9. Actual change from previous year	1 442	1 659	1 615	1 610	1 620
10. Net separation %	3.35%	3.39%	3.43%	3.49%	3.55%
11. Net separation number (FTE)	1 449	1 483	1 527	1 582	1 638
12. Persons: FTE RNs	1.173	1.172	1.171	1.170	1.170
13. Recruits (persons) required to meet target total	2 892	3 142	3 143	3 192	3 258
14. % of effective surplus of previous year remaining available	10%	10%	10%	10%	10%
15. Surplus carried over from previous year	0	0	0	0	0
16. Net overseas migration	285	285	285	285	285
17. Graduate recruits required (persons)	2 607	2 857	2 858	2 907	2 973
18. % of graduates who are available and suitable	95%	95%	95%	95%	95%
19. Total number of graduates required (DEMAND)	2 744	3 008	3 008	3 060	3 129
20. Total number of graduates projected (SUPPLY)	1 542	1 846	1 908	1 977	2 191
21. Surplus/shortage (number)	-1 202	-1 162	-1 100	-1 083	-938
22. Surplus/shortage (FTE)	-1 024	-991	-940	-926	-802
23. Surplus/shortage (FTE) as % of total nurses (target)	-2.3%	-2.2%	-2.1%	-2.0%	-1.7%
24. Surplus/shortage as % of DEMAND	-43.8%	-38.6%	-36.6%	-35.4%	-30.0%
25. Surplus/shortage as % of SUPPLY	-77.9%	-62.9%	-57.7%	-54.8%	-42.8%
26. SUPPLY as % of DEMAND	56.2%	61.4%	63.4%	64.6%	70.0%
27. Training rate	3.0%	3.5%	3.6%	3.7%	4.0%

Notes and sources: see Box 4.1

4.4 Victoria

4.4.1 Victoria: standard assumptions scenario

The standard assumptions scenario for Victoria (Table 4.4.1) results in substantial projected shortfalls of over a thousand through the period. Victoria begins the period with a large shortfall and over the period 2000 to 2009 has a projected increase in completions of only 18.7 per cent, compared with a total Australia increase of 31.9 per cent (Table E.1).

The accumulating shortfalls (row 8) carrying over from one year to the next are a major factor in the severity of shortfalls. It is unlikely that Victoria can meet its shortfalls much more sustainably. However, if this can be done, there would still be shortfalls every year to 2010, though they would be much smaller, especially from 2007 after the strong increase in completions from 2006 onwards.

4.4.2 Victoria: increase in net overseas migration scenario

The projected Victorian shortfalls could be reduced by an increase net overseas migration. A small projected surplus in 2010 of 0.5 per cent of the workforce requires an annual increase in net overseas migration of 25 per cent per year (all else remaining the same) (Table 4.4.2). This might occur without any explicit intervention because the greater availability of RN positions might encourage local nurses to stay in the jurisdiction, and attract individual overseas RNs. However, shortages usually result in less attractive working conditions and work-lives, which might outweigh the drawing power of readily available positions. Deliberate and concerted overseas recruitment could increase net overseas migration. If departures remain unchanged, to have a small surplus in 2010 requires a more than doubling the number of arrivals between 2005 and 2010. If net overseas arrivals are projected to increase by only five per cent a year, the shortage in 2010 is projected to reduce from 938 to 755 (this scenario not tabulated).

Table 4.4.2 Victoria Scenario 2: RN supply and demand projections, 2006 to 2010, net overseas migration progressively increased by 25 per cent per year

	2006	2007	2008	2009	2010
16. Net overseas migration	342	411	493	592	710
19. Total number of graduates required (DEMAND)	2 683	2 828	2 649	2 457	2 211
20. Total number of graduates projected (SUPPLY)	1 542	1 846	1 908	1 977	2 191
21. Surplus/shortage (number)	-1 141	-982	-741	-480	299
22. Surplus/shortage (FTE)	-973	-838	-633	-410	256
23. Surplus/shortage (FTE) as % of total nurses (target)	-2.2%	-1.9%	-1.4%	-0.9%	0.5%
24. Surplus/shortage as % of DEMAND	-42.5%	-34.7%	-28.0%	-19.5%	15.8%
25. Surplus/shortage as % of SUPPLY	-74.0%	-53.2%	-38.9%	-24.3%	13.7%
26. SUPPLY as % of DEMAND	57.5%	65.3%	72.0%	80.5%	115.8%

Notes and sources: see Box 4.1. For other input rows see Table 4.2.1, progressive calculations to Row 19 not included.

Table 4.5.1 Queensland Scenario 1: RN supply and demand projections, 2006 to 2010, standard assumptions

	2006	2007	2008	2009	2010
1. Population	4 043 400	4 117 500	4 192 200	4 266 800	4 341 400
2. Baseline FTE RN/100,000 population (2004 actual)	759	759	759	759	759
3. Population age profile factor	1.015	1.021	1.027	1.034	1.042
4. Adjusted FTE RN/100,000	770	775	780	785	791
5. Target total employed FTE RNs	31 138	31 916	32 686	33 492	34 346
6. Change from previous year target total	799	779	770	806	854
7. % of shortfall of previous year not met sustainably	90%	90%	90%	90%	90%
8. Shortfall carried over from previous year	653	962	1138	1171	1227
9. Actual change from previous year	1 451	1 741	1 908	1 976	2 082
10. Net separation %	3.66%	3.70%	3.74%	3.78%	3.82%
11. Net separation number (FTE)	1 115	1 144	1 179	1 221	1 265
12. Persons: FTE RNs	1.133	1.127	1.121	1.121	1.121
13. Recruits (persons) required to meet target total	2 566	2 886	3 087	3 198	3 347
14. % of effective surplus of previous year remaining available	10%	10%	10%	10%	10%
15. Surplus carried over from previous year	0	0	0	0	0
16. Net overseas migration	222	222	222	222	222
17. Graduate recruits required (persons)	2 344	2 664	2 865	2 976	3 125
18. % of graduates who are available and suitable	95%	95%	95%	95%	95%
19. Total number of graduates required (DEMAND)	2 467	2 804	3 016	3 132	3 289
20. Total number of graduates projected (SUPPLY)	1 256	1 379	1 558	1 604	1 828
21. Surplus/shortage (number)	-1 211	-1 425	-1 458	-1 528	-1 461
22. Surplus/shortage (FTE)	-1 069	-1 265	-1 301	-1 364	-1 304
23. Surplus/shortage (FTE) as % of total nurses (target)	-3.4%	-4.0%	-4.0%	-4.1%	-3.8%
24. Surplus/shortage as % of DEMAND	-49.1%	-50.8%	-48.3%	-48.8%	-44.4%
25. Surplus/shortage as % of SUPPLY	-96.4%	-103.3%	-93.6%	-95.3%	-79.9%
26. SUPPLY as % of DEMAND	50.9%	49.2%	51.7%	51.2%	55.6%
27. Training rate	3.6%	3.8%	4.3%	4.3%	4.7%

Notes and sources: see Box 4.1

4.5 Queensland

4.5.1 Queensland: standard assumptions scenario

Queensland, like Victoria, is projected to experience substantial shortfalls through the period, mostly equivalent to more than four per cent of the workforce.

Even though the Queensland training rate (row 27) is projected to be higher than that of Victoria through the period, the shortfalls are proportionately larger. This is because DEMAND is proportionately greater because of higher Queensland population growth and higher projected net separation rates through the period. These two matters point to a greater need in Queensland for a buffer between SUPPLY and DEMAND – that similar shortfalls in the two states would be effectively greater in Queensland (see Appendix F). In addition, the Queensland baseline staffing level for the standard assumptions is well below the national level (Victoria is very slightly above), and may well reflect the shortages of 2003 when the AIHW collected the data. Therefore, a scenario is developed that shows Queensland baseline staffing progressively increased to the equivalent of the level for Australia as a whole in 2003 (taking account of the population age profile in Queensland and Australia as a whole in that year).

4.5.2 Queensland: improvement in staffing levels to Australia 2003 level scenario

Table 4.5.2 shows that if staffing levels are improved in Queensland to national levels by 2010, in that year SUPPLY is less than 40 per cent of DEMAND, and the shortfall is almost seven per cent of the RN workforce.

Table 4.5.2 Queensland Scenario 2: RN supply and demand projections, 2006 to 2010, baseline staffing level progressively increased to 2003 Australian level (adjusted for population age profile)

	2006	2007	2008	2009	2010
2. Baseline FTE RN/100,000 population	767	775	783	791	799
19. Total number of graduates required (DEMAND)	2 814	3 454	3 940	4 300	4 677
20. Total number of graduates projected (SUPPLY)	1 256	1 379	1 558	1 604	1 828
21. Surplus/shortage (number)	-1 558	-2 075	-2 382	-2 696	-2 849
22. Surplus/shortage (FTE)	-1 376	-1 842	-2 125	-2 406	-2 541
23. Surplus/shortage (FTE) as % of total nurses (target)	-4.4%	-5.7%	-6.3%	-6.9%	-7.0%
24. Surplus/shortage as % of DEMAND	-55.4%	-60.1%	-60.5%	-62.7%	-60.9%
25. Surplus/shortage as % of SUPPLY	-124.1%	-150.5%	-152.9%	-168.1%	-155.8%
26. SUPPLY as % of DEMAND	44.6%	39.9%	39.5%	37.3%	39.1%

Notes and sources: see Box 4.1. Change in Baseline FTE/100,000 to 801, the 2003 staffing level for Australia, taking account of the population age profiles (see Table B.6, row 5.) For other input rows see Table 4.2.1, progressive calculations to Row 19 not included here.

Table 4.6.1 Western Australia Scenario 1: RN supply and demand projections, 2006 to 2010, standard assumptions

	2006	2007	2008	2009	2010
1. Population	2 040 300	2 071 600	2 102 900	2 134 100	2 165 200
2. Baseline FTE RN/100,000 population (2004 actual)	717	717	717	717	717
3. Population age profile factor	1.021	1.029	1.036	1.044	1.053
4. Adjusted FTE RN/100,000	732	738	743	749	755
5. Target total employed FTE RNs	14 936	15 279	15 621	15 979	16 352
6. Change from previous year target total	346	343	342	358	373
7. % of shortfall of previous year not met sustainably	90%	90%	90%	90%	90%
8. Shortfall carried over from previous year	21	0	0	0	0
9. Actual change from previous year	367	343	342	358	373
10. Net separation %	3.92%	4.00%	4.08%	4.09%	4.11%
11. Net separation number (FTE)	584	611	638	654	671
12. Persons: FTE RNs	1.134	1.129	1.125	1.124	1.124
13. Recruits (persons) required to meet target total	951	954	980	1 012	1 045
14. % of effective surplus of previous year remaining available	10%	10%	10%	10%	10%
15. Surplus carried over from previous year	0	0	0	0	0
16. Net overseas migration	456	456	456	456	456
17. Graduate recruits required (persons)	495	498	524	556	589
18. % of graduates who are available and suitable	95%	95%	95%	95%	95%
19. Total number of graduates required (DEMAND)	521	525	551	585	620
20. Total number of graduates projected (SUPPLY)	636	645	741	775	905
21. Surplus/shortage (number)	115	120	190	190	285
22. Surplus/shortage (FTE)	101	106	169	169	254
23. Surplus/shortage (FTE) as % of total nurses (target)	0.7%	0.7%	1.1%	1.1%	1.6%
24. Surplus/shortage as % of DEMAND	22.0%	22.9%	34.5%	32.4%	46.0%
25. Surplus/shortage as % of SUPPLY	18.0%	18.6%	25.6%	24.5%	31.5%
26. SUPPLY as % of DEMAND	122.0%	122.9%	134.5%	132.4%	146.0%
27. Training rate	3.8%	3.7%	4.2%	4.3%	4.9%

Notes and sources: see Box 4.1

4.6 Western Australia

4.6.2 Western Australia: standard assumptions scenario

With standard assumptions Western Australia is projected to have surpluses through the period.

The WA baseline staffing level for the standard assumptions scenario is well below the national level – the lowest of all jurisdictions (see Table 3.2). Therefore, a scenario is developed that shows WA baseline staffing progressively increased to the equivalent of the level for Australia as a whole in 2003 (taking account of the population age profile in WA and Australia as a whole in that year).

4.6.2 Western Australia: improvement in staffing levels to Australia 2003 level scenario

Table 4.6.2 shows that if staffing levels are improved in WA to national levels by 2010, in that year SUPPLY is a little over two thirds of DEMAND, and the shortfall is almost two per cent of the RN workforce.

Table 4.6.2 Western Australia Scenario 2: RN supply and demand projections, 2006 to 2010, baseline staffing level progressively increased to 2003 Australian level (adjusted for population age profile)

	2006	2007	2008	2009	2010
2. Baseline FTE RN/100,000 population	731	745	759	773	787
19. Total number of graduates required (DEMAND)	822	974	1 125	1 206	1 282
20. Total number of graduates projected (SUPPLY)	636	645	741	775	905
21. Surplus/shortage (number)	-186	-329	-384	-431	-377
22. Surplus/shortage (FTE)	-164	-292	-341	-383	-336
23. Surplus/shortage (FTE) as % of total nurses (target)	-1.1%	-1.8%	-2.1%	-2.2%	-1.9%
24. Surplus/shortage as % of DEMAND	-22.6%	-33.8%	-34.1%	-35.7%	-29.4%
25. Surplus/shortage as % of SUPPLY	-29.2%	-51.1%	-51.8%	-55.6%	-41.7%
26. SUPPLY as % of DEMAND	77.4%	66.2%	65.9%	64.3%	70.6%

Notes and sources: see Box 4.1. Change in Baseline FTE/100,000 to 801, the 2003 staffing level for Australia, taking account of the population age profiles of the two jurisdictions (see Table B.6, row 5.) For other input rows see Table 4.2.1, progressive calculations to Row 19 not included here.

Table 4.7.1 South Australia Scenario 1: RN supply and demand projections, 2006 to 2010, standard assumptions

	2006	2007	2008	2009	2010
1. Population	1 543 500	1 548 300	1 552 700	1 556 900	1 560 600
2. Baseline FTE RN/100,000 population (2004 actual)	918	918	918	918	918
3. Population age profile factor	1.020	1.028	1.036	1.044	1.054
4. Adjusted FTE RN/100,000	936	944	951	959	968
5. Target total employed FTE RNs	14 455	14 612	14 767	14 928	15 100
6. Change from previous year target total	165	158	155	161	172
7. % of shortfall of previous year not met sustainably	90%	90%	90%	90%	90%
8. Shortfall carried over from previous year	34	0	0	0	0
9. Actual change from previous year	198	158	155	161	172
10. Net separation %	3.31%	3.43%	3.54%	3.66%	3.77%
11. Net separation number (FTE)	477	501	523	546	570
12. Persons: FTE RNs	1.181	1.179	1.176	1.175	1.174
13. Recruits (persons) required to meet target total	675	658	678	707	742
14. % of effective surplus* of previous year remaining available	10%	10%	10%	10%	10%
15. Surplus carried over from previous year	0	0	0	0	0
16. Net overseas migration	76	76	76	76	76
17. Graduate recruits required (persons)	599	582	602	631	666
18. % of graduates who are available and suitable	95%	95%	95%	95%	95%
19. Total number of graduates required (DEMAND)	630	613	634	664	701
20. Total number of graduates projected (SUPPLY)	770	825	860	925	949
21. Surplus/shortage (number)	140	212	226	261	248
22. Surplus/shortage (FTE)	118	180	193	222	212
23. Surplus/shortage (FTE) as % of total nurses (target)	0.8%	1.2%	1.3%	1.5%	1.4%
24. Surplus/shortage as % of DEMAND	22.1%	34.6%	35.7%	39.3%	35.4%
25. Surplus/shortage as % of SUPPLY	18.1%	25.7%	26.3%	28.2%	26.2%
26. SUPPLY as % of DEMAND	122.1%	134.6%	135.7%	139.3%	135.4%
27. Training rate	4.5%	4.8%	5.0%	5.3%	5.4%

Notes and sources: see Box 4.1 *effective surplus' is any surplus in Row 21 above 8% of total target workforce (Row 5)

4.7 South Australia

4.7.1 South Australia: standard assumptions scenario

With standard assumptions South Australia is projected to have surpluses through the period. As these are at most only around 1.5 per cent of the workforce they cannot be considered effective surpluses – they remain effectively shortages.

4.7.2 South Australia: reduction in net overseas migration scenario

If net overseas migration is reduced to zero over the period the surpluses are reduced, with SUPPLY 121.6 per cent of DEMAND in 2010 – about one per cent of the workforce. (This scenario is not tabulated.)

4.7.3 South Australia: no population age profile factor (PAPF) scenario

Table 4.7.2 indicates the impact of population ageing in South Australia. It is very important that population ageing is taken into account in estimating reasonable levels of future RN staffing, and in assessing the baseline (2003) staffing levels as reasonable (see Table B.6). This is especially important for SA which has the highest PAPF in both 2004 and 2010 (Table B.7). If there are no staffing increases in SA to take account of population ageing, surpluses are projected to increase through the period. However, even though SUPPLY is getting towards double DEMAND, the surplus remains less than three per cent of the workforce, and still most probably an effective shortage.

Table 4.7.2 South Australia Scenario 3: RN supply and demand projections, 2006 to 2010, no population age profile factor

	2006	2007	2008	2009	2010
4. Adjusted FTE RN/100,000 population	918	918	918	918	918
19. Total number of graduates required (DEMAND)	461	479	490	504	511
20. Total number of graduates projected (SUPPLY)	770	825	860	925	949
21. Surplus/shortage (number)	309	346	370	421	438
22. Surplus/shortage (FTE)	262	294	315	359	373
23. Surplus/shortage (FTE) as % of total nurses (target)	1.8%	2.1%	2.2%	2.5%	2.6%
24. Surplus/shortage as % of DEMAND	67.0%	72.3%	75.6%	83.6%	85.8%
25. Surplus/shortage as % of SUPPLY	40.1%	42.0%	43.1%	45.5%	46.2%
26. SUPPLY as % of DEMAND	167.0%	172.3%	175.6%	183.6%	185.8%

Notes and sources: see Box 4.1. For other input rows see Table 4.6.1, progressive calculations to Row 19 not included here.

Table 4.8.1 Tasmania Scenario 1: RN supply and demand projections, 2006 to 2010, standard assumptions

	2006	2007	2008	2009	2010
1. Population	488 400	489 900	491 400	492 800	494 100
2. Baseline FTE RN/100,000 population (2004 actual)	981	981	981	981	981
3. Population age profile factor	1.017	1.027	1.036	1.046	1.057
4. Adjusted FTE RN/100,000	998	1 008	1 017	1 026	1 037
5. Target total employed FTE RNs	4 874	4 936	4 996	5 057	5 122
6. Change from previous year target total	70	62	59	62	65
7. % of shortfall of previous year not met sustainably	90%	90%	90%	90%	90%
8. Shortfall carried over from previous year	88	113	128	144	165
9. Actual change from previous year	157	176	188	206	230
10. Net separation %	3.88%	3.98%	4.09%	4.17%	4.26%
11. Net separation number (FTE)	186	192	199	205	211
12. Persons: FTE RNs	1.143	1.138	1.132	1.133	1.133
13. Recruits (persons) required to meet target total	343	368	387	411	441
14. % of effective surplus of previous year remaining available	10%	10%	10%	10%	10%
15. Surplus carried over from previous year	0	0	0	0	0
16. Net overseas migration	0	0	0	0	0
17. Graduate recruits required (persons)	343	368	386	411	441
18. % of graduates who are available and suitable	95%	95%	95%	95%	95%
19. Total number of graduates required (DEMAND)	361	387	407	433	464
20. Total number of graduates projected (SUPPLY)	217	225	225	225	310
21. Surplus/shortage (number)	-144	-162	-182	-208	-154
22. Surplus/shortage (FTE)	-126	-142	-161	-183	-136
23. Surplus/shortage (FTE) as % of total nurses (target)	-2.6%	-2.9%	-3.2%	-3.6%	-2.7%
24. Surplus/shortage as % of DEMAND	-39.9%	-41.9%	-44.7%	-48.0%	-33.2%
25. Surplus/shortage as % of SUPPLY	-66.3%	-72.1%	-80.8%	-92.3%	-49.7%
26. SUPPLY as % of DEMAND	60.1%	58.1%	55.3%	52.0%	66.8%
27. Training rate	3.9%	4.0%	4.0%	3.9%	5.3%

Notes and sources: see Box 4.1

4.8 Tasmania

4.8.1 Tasmania: standard assumptions scenario

With standard assumptions Tasmania is projected to have substantial shortfalls through the period. Through the period up to 2009 SUPPLY is less than half DEMAND, the shortfall up to 3.6 per cent of the total workforce. The new places committed by the Australian Government in 2006 improve the situation in 2010 when SUPPLY is projected to increase to two thirds of DEMAND (2.7 per cent of the workforce). Net migration of RNs to Tasmania is projected to not change, and remain close to zero through the period (based on the actual 2003-04 data).

4.8.2 Tasmania: no population age profile factor (PAPF) scenario

Table 4.8.2 indicates the impact of population ageing in Tasmania. It is very important that population ageing is taken into account in estimating reasonable levels of future RN staffing, and in assessing the baseline (2003) staffing levels as reasonable (see Tables B.6 and B7).

If there is no allowance in projected staffing levels for population ageing, the projected shortfall of 154 becomes a projected surplus of 62, which is just over one per cent of the workforce, and thus still an effective shortage.

Table 4.8.2 Tasmania: Scenario 2, RN supply and demand projections, 2006 to 2010, no population age profile factor

	2006	2007	2008	2009	2010
4. Adjusted FTE RN/100,000 population	981	981	981	981	981
19. Total number of graduates required (DEMAND)	275	263	253	248	248
20. Total number of graduates projected (SUPPLY)	217	225	225	225	310
21. Surplus/shortage (number)	-58	-38	-28	-23	62
22. Surplus/shortage (FTE)	-50	-34	-25	-21	55
23. Surplus/shortage (FTE) as % of total nurses (target)	-1.1%	-0.7%	-0.5%	-0.4%	1.1%
24. Surplus/shortage as % of DEMAND	-21.0%	-14.5%	-11.1%	-9.4%	25.1%
25. Surplus/shortage as % of SUPPLY	-26.5%	-16.9%	-12.5%	-10.4%	20.0%
26. SUPPLY as % of DEMAND	79.0%	85.5%	88.9%	90.6%	125.1%

Notes and sources: see Box 4.1. Progressive calculations to Row 19 not included here.

4.8.3 Tasmania: increase in net overseas migration scenario

For Tasmania to attain a position of projected SUPPLY equalling DEMAND in 2010 requires an annual increase in net migration of 13 a year, leading to a total of 65 in 2010 (all other factor unchanged from standard assumptions). This is not tabulated.

Table 4.9.1 Northern Territory Scenario 1: RN supply and demand projections, 2006 to 2010, standard assumptions

	2006	2007	2008	2009	2010
1. Population	205 100	208 000	210 900	213 900	216 900
2. Baseline FTE RN/100,000 population (2004 actual)	1425	1425	1425	1425	1425
3. Population age profile factor	1.022	1.026	1.029	1.032	1.037
4. Adjusted FTE RN/100,000	1 456	1 461	1 466	1 471	1 478
5. Target total employed FTE RNs	2 986	3 040	3 091	3 147	3 205
6. Change from previous year target total	60	54	51	55	59
7. % of shortfall of previous year not met sustainably	90%	90%	90%	90%	90%
8. Shortfall carried over from previous year	0	7	72	81	0
9. Actual change from previous year	60	62	124	136	59
10. Net separation %*	3.39%	3.50%	3.61%	3.71%	3.82%
11. Net separation number (FTE)	101	106	109	114	122
12. Persons: FTE RNs	0.979	0.976	0.973	0.972	0.971
13. Recruits (persons) required to meet target total	161	168	233	250	181
14. % of effective surplus of previous year remaining available	10%	10%	10%	10%	10%
15. Surplus carried over from previous year	0	0	0	0	0
16. Net overseas migration	36	36	36	36	36
17. Graduate recruits required (persons)	125	132	197	214	145
18. % of graduates who are available and suitable	95%	95%	95%	95%	95%
19. Total number of graduates required (DEMAND)	132	138	207	225	152
20. Total number of graduates projected (SUPPLY)	124	60	120	230	280
21. Surplus/shortage (number)	-8	-78	-87	5	128
22. Surplus/shortage (FTE)	-8	-80	-90	5	131
23. Surplus/shortage (FTE) as % of total nurses (target)	-0.3%	-2.6%	-2.9%	0.2%	4.1%
24. Surplus/shortage as % of DEMAND	-6.1%	-56.7%	-42.1%	2.2%	83.6%
25. Surplus/shortage as % of SUPPLY	-6.5%	-130.8%	-72.6%	2.2%	45.5%
26. SUPPLY as % of DEMAND	93.9%	43.3%	57.9%	102.2%	183.6%
27. Training rate	4.2%	2.0%	4.0%	7.5%	9.0%

Notes and sources: see Box 4.1.

4.9 Northern Territory

The Northern Territory has a relatively small and mobile professional workforce. In 2003 NT RNs were less than two per cent of the total Australian RN workforce (Table A.1). The high levels of mobility are indicated by evidence that around a third of NT RNs do not re-register each year, primarily because they cease practising in the jurisdiction (AIHW 2005a, p. 30), and in 2001 almost half NT RNs had been in their current location for less than two years, and those working in Indigenous health had the shortest periods in current work but were working the longest hours (Strategic Workforce Services 2002, p. 32).

While it is generally accepted that NT net separation rates are relatively high, the age profile of NT RNs is not very different from the rest of Australia (Table A.2). Because of this, the estimated net separation rates, using standard assumptions, are not very different from those of Australia as a whole.

Therefore it is appropriate to prepare a 'more likely' scenario with a higher net separation rate. This is done in Table 4.9.2, where the net separation rate for each year to 2010 is increased by one percentage point. While this is an assumption without strong specific evidential foundation, it is likely to be more realistic than the standard assumptions. If it is reasonable, it indicates that the significant increases in projected graduate numbers at the Charles Darwin University are appropriate. While the training rate later in the period is almost double the national rate, this might well be appropriate given the turnover in the NT, and the importance of preparing RNs for the particular and demanding work in Indigenous health, and for developing expertise in tropical health. Such expertise is valuable outside the NT, and in tropical regions outside Australia.

Note that, while even greater net separation rates could reasonably be assumed, if this was done it would need to be balanced by incorporating substantial net arrivals from interstate.

Table 4.9.2 Northern Territory Scenario 2: RN supply and demand projections, 2006 to 2010, net separation rates increased by one percentage point

	2006	2007	2008	2009	2010
10. Net separation %*	4.39%	4.50%	4.61%	4.71%	4.82%
19. Total number of graduates required (DEMAND)	163	199	295	339	288
20. Total number of graduates projected (SUPPLY)	124	60	120	230	280
21. Surplus/shortage (number)	-39	-139	-175	-109	-8
22. Surplus/shortage (FTE)	-40	-143	-180	-112	-8
23. Surplus/shortage (FTE) as % of total nurses (target)	-1.3%	-4.7%	-5.8%	-3.6%	-0.2%
24. Surplus/shortage as % of DEMAND	-24.1%	-69.9%	-59.4%	-32.2%	-2.6%
25. Surplus/shortage as % of SUPPLY	-31.8%	-232.4%	-146.1%	-47.5%	-2.7%
26. SUPPLY as % of DEMAND	75.9%	30.1%	40.6%	67.8%	97.4%

Notes and sources: see Box 4.1. * Net separation rates for the NT have been increased by one percentage point above the level derived from the standard methodology described in Appendix C. For other input rows see Table 4.10.1, progressive calculations to Row 19 not included here.

Table 4.10.1 Australian Capital Territory Scenario 1: RN supply and demand projections, 2006 to 2010, standard assumptions*

	2006	2007	2008	2009	2010
1. Population	330 300	334 900	339 500	344 200	348 800
2. Baseline FTE RN/100,000 population (2004 actual)	869	869	869	869	869
3. Population age profile factor	1.026	1.035	1.043	1.052	1.062
4. Adjusted FTE RN/100,000	892	899	907	914	923
5. Target total employed FTE RNs	2 946	3 011	3 078	3 147	3 218
6. Change from previous year target total	58	65	66	69	71
7. % of shortfall of previous year not met sustainably	90%	90%	90%	90%	90%
8. Shortfall carried over from previous year	79	151	211	264	316
9. Actual change from previous year	136	216	277	333	387
10. Net separation %	3.68%	3.84%	4.00%	4.10%	4.20%
11. Net separation number (FTE)	106	110	115	118	122
12. Persons: FTE RNs	1.118	1.113	1.108	1.107	1.106
13. Recruits (persons) required to meet target total	242	326	392	452	509
14. % of effective surplus of previous year remaining available	10%	10%	10%	10%	10%
15. Surplus carried over from previous year	0	0	0	0	0
16. Net overseas migration	12	12	12	12	12
17. Graduate recruits required (persons)	230	315	380	440	497
18. % of graduates who are available and suitable	95%	95%	95%	95%	95%
19. Total number of graduates required (DEMAND)	242	331	400	463	523
20. Total number of graduates projected (SUPPLY)	55	70	75	75	118
21. Surplus/shortage (number)	-187	-261	-325	-388	-405
22. Surplus/shortage (FTE)	-168	-235	-294	-351	-366
23. Surplus/shortage (FTE) as % of total nurses (target)	-5.7%	-7.8%	-9.5%	-11.1%	-11.4%
24. Surplus/shortage as % of DEMAND	-77.3%	-78.9%	-81.3%	-83.8%	-77.4%
25. Surplus/shortage as % of SUPPLY	-340.8%	-373.0%	-433.8%	-517.5%	-343.3%
26. SUPPLY as % of DEMAND	22.7%	21.1%	18.7%	16.2%	22.6%
27. Training rate	1.7%	2.1%	2.2%	2.2%	3.3%

Notes and sources: see Box 4.1. .

4.10 Australian Capital Territory

In section 4.3 inputs and projections for the ACT and NSW were combined because of the large proportion of NSW patients in ACT health facilities and the high mobility of RNs between the two jurisdictions. Affectively the ACT (Canberra) is similar to a large NSW city such as Newcastle or Wollongong.

While the combining of NSW and the ACT is generally more policy-useful, the provision of separate projections for the ACT can be useful for policy-makers in that jurisdiction.

Table 4.10.1 shows that with standard assumptions, through the period SUPPLY is only about 20 per cent of DEMAND, even with the new places announced in 2006. The training rate of just over two per cent through most of the period is well below the national level of around four per cent from 2007 to 2009.

The *increase* in the shortfalls occurs because the standard assumptions carry over of shortfalls from one year to the next. If the shortfalls are assumed to be met sustainably (for example, by recruitment of permanent RNs from NSW and elsewhere), then the projections in Table 4.10.2 result. While SUPPLY increases substantially to 2008, and then again in 2010, DEMAND also increases, and continues to do so through the period – because the ACT population, population ageing and RN net separation rates are all increasing at a greater rate than the national average. Even with an assumption of no carry-over of shortfalls from one year to the next, SUPPLY remains well below half of DEMAND in the ACT until 2010, when it is still below sixty per cent.

ACT staffing levels are low if patients and clients from outside the ACT are taken into account. Therefore there are good grounds for improvements in ACT staffing levels in addition to those indicated through the application of the PAPF to the ACT resident population.

Table 4.10.2 Australian Capital Territory Scenario 2: RN supply and demand projections, 2006 to 2010, shortfalls met sustainably

	2006	2007	2008	2009	2010
7. % of shortfall of previous year not met sustainably	0%	0%	0%	0%	0%
19. Total number of graduates required (DEMAND)	163	178	187	196	205
20. Total number of graduates projected (SUPPLY)	55	70	75	75	118
21. Surplus/shortage (number)	-108	-108	-112	-121	-87
22. Surplus/shortage (FTE)	-96	-97	-101	-110	-79
23. Surplus/shortage (FTE) as % of total nurses (target)	-3.3%	-3.2%	-3.3%	-3.5%	-2.4%
24. Surplus/shortage as % of DEMAND	-66.2%	-60.8%	-59.9%	-61.8%	-42.4%
25. Surplus/shortage as % of SUPPLY	-195.5%	-154.9%	-149.4%	-161.7%	-73.7%
26. SUPPLY as % of DEMAND	33.8%	39.2%	40.1%	38.2%	57.6%

Notes and sources: see Box 4.1. For other input rows see Table 4.10.1, progressive calculations to Row 19 not included here.

5. Strategies to reduce shortages

In section 4 a number of different scenarios are presented, and these can be a consequence of deliberate policy, of unanticipated external developments or alternative estimates of future developments. In this section underlying issues for some deliberate policies are discussed. Such policies can include (a) improved retention of existing RNs (including ‘daily’ retention – increasing hours worked) and attraction of those with RN qualifications who are not currently working as RNs, (b) active recruitment of overseas RNs, (c) increased intakes into pre-registration programs, and (d) a deliberate reduction in staffing levels. This section is primarily concerned with the first of these. The other strategies will be commented on briefly.

5.1 Strategies to reduce FTE net separation rates

Net separations in this report are on a FTE basis. Therefore strategies to increase hours worked (for example, by improving rostering or providing extended childcare for part time and casual RNs) can reduce net separation rates, as well as the more obvious strategies of seeking to retain existing employed RNs and attracting those with RN qualifications who are not working as RNs.

The effect of strategies to reduce net separation rates can have different effects according to the age profile of the RN workforce in the jurisdiction through the period.

In this section we consider the different outcomes of strategies to reduce net separation rates of early, mid and late career RNs in two contrasting jurisdictions. These hypothetical strategies involve reduction in net separation rates for those in their 20s or in their 50s by 20 per cent, and reducing net separation rates for those aged 30-44 by 0.5 of a percentage point. They are for illustrative purposes because to make the effects clear over a number of years the strategies are commenced from 2004. These strategies parallel the scenarios of improved retention for early and late career RNs in Australia and New Zealand, discussed in sections 4.1.7, 4.1.8, 4.1.9, 4.2.5, 4.2.6 and 4.2.7.

Table 5.1 Underlying net separation rates by age group, standard assumptions and scenarios to increase retention (or increase average hours worked) of early career RNs, mid career RNs and late career RNs

	20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65+
Standard assumptions	4.32%	4.35%	1.01%	0.47%	-0.10%	1.21%	3.72%	7.91%	19.05%	20.00%
Early career focus	3.46%	3.48%	1.01%	0.47%	-0.10%	1.21%	3.72%	7.91%	19.05%	20.00%
Mid career focus	4.32%	4.35%	0.51%	-0.03%	-0.60%	1.21%	3.72%	7.91%	19.05%	20.00%
Late career focus	4.32%	4.35%	1.01%	0.47%	-0.10%	1.21%	2.98%	6.33%	19.05%	20.00%

Source: Derivation of the standards assumptions rates for each age range is explained in Appendix C. These hypothetical strategies involve reduction in net separation rates by 20 per cent for those aged 20-24 and 25-29, or those aged 50-54 and 55-59, or reducing net separation rates for those aged 30-34, 35-39 and 40-44 by 0.5 of a percentage point. The affected net separation rates in each of the three scenarios are highlighted.

The resulting net separation rates for each five year age group for the three different strategies (and thus scenarios) are set out in Table 5.1, along with the standard

assumptions rates. (See Appendix C for an account of the derivation of the standard assumptions net separation rate for each age group, and how those rates are applied in the calculations for projected net separation rates for the RN workforce as a whole in each jurisdiction to 2010.)

For illustrative purposes the two contrasting jurisdictions of Victoria and Tasmania are selected. An assessment of the likely impact of similar strategies in other jurisdictions can be made by comparing actual and projected RN age profiles of those other jurisdictions with those of Victoria and Tasmania.

Victoria and Tasmania had very different age profiles in 2003, as shown in Table A.3 and Figure A.2. Victoria had a relatively high proportion of its RN workforce aged under 35, while Tasmania had a relatively high proportion of its workforce aged 40 and over. This probably reflects the different situations of the early 1990s when many RNs in Victoria then aged in their late 30s and 40s were made redundant and left the workforce, and, while there were very few beginning RNs recruited for a short period, by the late 1990s recruitment was at a relatively high level. In Tasmania recruitment of new RNs was very low from the late 1980s on, so those initially recruited in the 1970s and early 1980s remained the much more numerically dominant cohort.

Figure 5.1 shows the outcome for total RN workforce net separation rates, comparing those resulting from the standard assumptions with each of these three alternative strategies. Note that these are hypothetical scenarios, with the reduced net separation rates commencing at the beginning of the period on which the projections calculations are based, which is 2004. A lesser period of application would not allow for such a clear indication of effects.

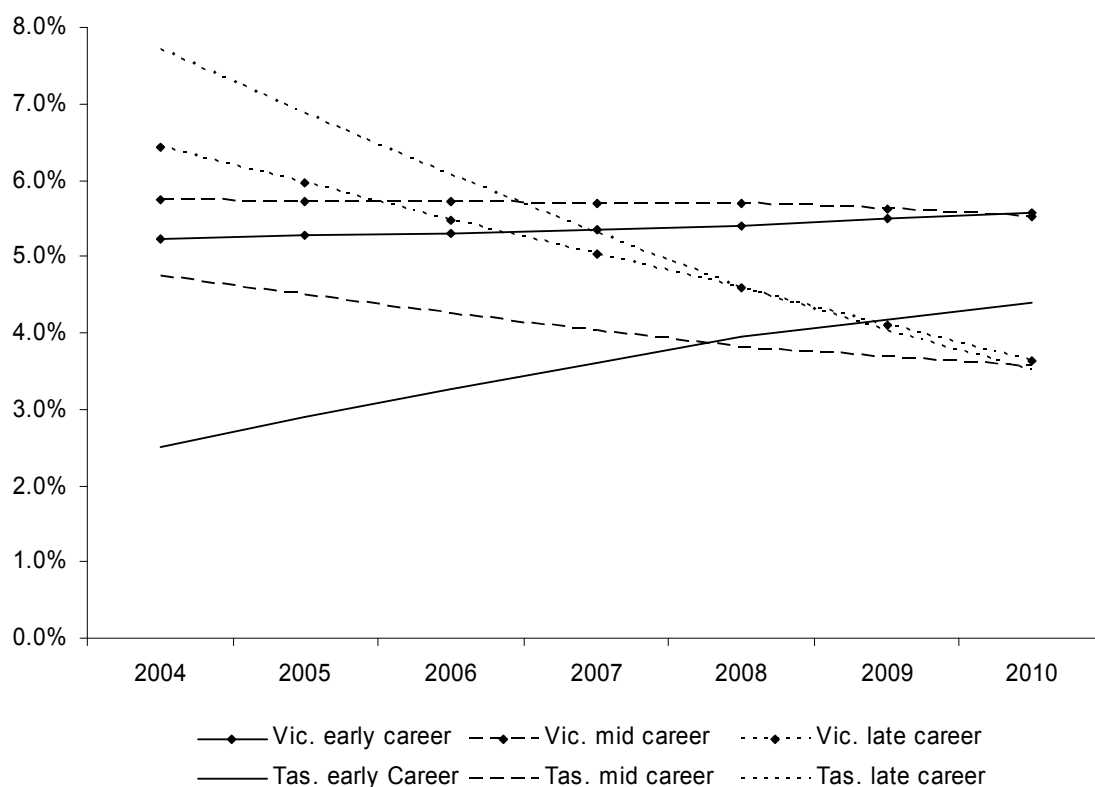
In this figure the most effective strategies are higher (that is, for a particular year and jurisdiction there is a greater difference between the particular improved retention scenario and the net separation rates derived from the standard assumptions). Thus, the greatest effect in these hypothetical examples occurs early in the period with the 'late career' strategies, especially for the Tasmanian RN workforce, when in 2004 the net separation rate for the workforce as a whole is projected to be almost eight per cent lower than it would be without the strategy (that is, with standard assumptions). In contrast, the least effect occurs at the beginning of the period for the Tasmania early career strategy – which is not surprising given the relatively low proportion of the Tasmanian RN workforce estimated to be at that stage of their careers in 2004. This strategy results in a net separation rate for the whole workforce at the beginning of the period less than three per cent below what it would be with standard assumptions.

For both Victoria and Tasmania the early career strategies become more effective through the period and the late career strategies become less effective through the period. This is a common pattern – see for example a comparison of the scenarios for Australia in section 4.1.9, and for New Zealand in section 4.2.7.

In conclusion, strategies to reduce net separations of late career RNs may be a valuable short term strategy for those jurisdictions with a large cohort passing through retirement age. However, such strategies of delayed retirement or attracting back retirees on a part time or casual basis will decline in effectiveness in reducing shortages as the proportion of the workforce who are early and mid career RNs increases (such increasing proportions of younger RNs has been occurring now for several years, and is likely to continue) and retirement can no longer be delayed. As strategies directed at improving retention of late career RNs would be most effective when they are already a high proportion of the workforce, then these strategies would further increase the numerical dominance of older RNs, perhaps making the workplace and the profession less

attractive to younger RNs and potential RNs. Therefore, strategies directed to early and mid career RNs are likely to be more effective both quantitatively and qualitatively, especially over the longer term.

Figure 5.1 Percentage reduction from net separation rates of scenarios based on standard assumptions: scenarios for reducing from 2004 the net separation rates of early, mid and late career RNs, Victoria and Tasmania



Note: The 'early career' strategy involves reducing net separation rates of those in their 20s by 20 per cent, the 'mid career' strategy involves reducing net separation rates of those 30-44 by 0.5 percentage points, and 'late career' strategies involves reducing net separation rates of those in their 50s by 20 per cent.

Source: Calculations done for this report – see Appendix C for details on methodology.

5.2 Active recruitment of overseas RNs

Active recruitment of overseas RNs has played a major part in the easing of shortages in recent years, and is likely to continue doing so. In this report, for the major jurisdictions there are scenarios of increased net overseas RN migration that would generally involve active recruitment. However, other factors may be important, such as the expected sharp reduction in the UK's recruitment of overseas RNs which may lead to fewer Australian RNs departing for the UK and increased numbers of RNs from other countries who would prefer the UK seeking Australian positions, and the likely increasing numbers of RNs coming to Australia as spouses of workers entering on long term temporary 457 visas.

The increasing net overseas migration scenarios indicate the impact of such increases, and, in some cases, the magnitude necessary to eliminate substantial shortfalls by 2010. Migration issues are further discussed in Appendix D.

5.3 Increasing intakes of nurse education courses

The impact of increasing intakes, according to this model, is straightforward as any expected increase in graduate numbers is simply added to SUPPLY (completions the previous year).

However, increasing intakes is not always unproblematic. There are ongoing problems of adequacy of clinical places for student RNs. There may also be problems of supply of sufficient appropriately qualified academic staff to cater for increased student numbers, especially as the impending wave of academic retirements occurs (Hugo 2005). The shortages of academic staff in nurse education is reported to be a significant issue in the US and a constraint on necessary expansion (Buerhaus et al 2003, p.196).

There may also be problems of adequate student interest in new places that are made available. Overall in Australia this has not been a problem with the expansion of nurse education places in recent years. In fact, according to Australian Vice-Chancellors Committee data (AVCC 2006, discussed in detail in Appendix E), nationally student demand has more than kept up with that expansion. However, the pattern is not even across the states and territories, with WA, Queensland and NSW/ACT having relatively low unmet demand (Table E.8), and thus apparently less ability to fill expanded numbers of places with high quality, motivated students unless there are effective publicity campaigns and nursing is seen as a more attractive career and nurse education a more attractive option for those considering higher education courses (undergraduate or graduate). Individual institutions would vary in student demand even more than states, and thus concerted strategies may be needed to ensure the very best future RNs entering all the expanded programs.

5.4 Deliberate reductions in staffing levels of RNs

A deliberate reduction in staffing levels is not considered in this report. However, if a severe shortage is unavoidable, some deliberate policy on staffing levels may help ensure that the impact of the shortage is more evenly spread than if the market was left to itself. The corollary of this is that if improvements in staffing levels (such as according to specified nurse-patient ratios) are planned in a situation of shortage, then the effects on harder-to-staff locations and settings, and on areas not covered by the specified ratios will need to be taken into account and effectively ameliorated if those locations or settings are not to be left less well staffed and much worse off.

Appendixes

Appendix A. Staffing levels: issues and trends

A.1 Assumptions in this report

The assumptions about staffing levels in projections are often contentious. In this report nationally consistent data for 2003 from the Australian Institute of Health and Welfare (AIHW) is used as the basis for the Australian analyses and projections, and for New Zealand similar data for 2004 from the New Zealand Health Information Service (NZHIS). Some jurisdictions may have more up-to-date data, or data they believe is more accurate. However, the necessity for information on matters such as hours worked by age for all employed RNs, as well as national consistency, means that the AIHW and NZHIS data is most appropriate for this work.

The number of RNs (persons) is estimated by the AIHW from the Nursing and Midwifery Labour Force Survey administered by the nurses and midwives registration board (or department of health) in each state and territory on behalf of the AIHW (AIHW 2005a, p. 30). In New Zealand the raw data is similarly collected for the NZHIS by the Nursing Council of New Zealand.

The full time equivalent (FTE) numbers used in this report are calculated on a 38 hour basis. (It would not matter if a different, but reasonable, FTE week was chosen, as long as it was consistently applied in the model.) Staffing levels are projected on a FTE basis, but are converted to persons for the final graduate demand projections because DEMAND must be comparable with graduate SUPPLY, and it is persons, not FTEs, who complete courses.

The standard assumptions projections maintain the 2003 (2004 for New Zealand) staffing levels (as the baseline), with the addition, then, of the population age profile factor (PAPF) (indexed to 2003 or 2004) for each year to 2010 (see Appendix B for details about the PAPF). There are also scenarios that increase baseline staffing levels (that is, before application of the PAPF for each year to 2010) to apparently more adequate levels, such as those of Australia and of South Australia in 2003, with levels for those and the other relevant jurisdiction adjusted for the PAPF for 2003 (2004 for New Zealand). This is in recognition that even the apparently more generous staffing levels (such as South Australia and Tasmania) are most probably inadequate because of evidence of state-wide RN shortages and other indicators (see discussion below in A.2).

There are currently increasing numbers of RNs working in medical general practice, and nurse practitioners being deployed in expanded roles. Australian Government financial and administrative support through, for example, the Practice Nurse Initiative has been important in this expansion. The Practice Nurse Initiative is intended to provide 'extra help to overstretched general practices' in areas where there are medical general practitioner shortages (Abbott 2006). This initiative is likely to involve around 1,200 additional FTE RNs over a number of years (calculated from Abbott 2006). The additional number of FTE RNs resulting from the increased deployment of nurse practitioners is unclear because a large proportion of their work may already be carried out by RNs. Thus, a rough estimation of average annual net increases in FTE RNs from these developments is across Australia is less than 0.2 per cent of the total RN employed workforce and less than five per cent of graduate numbers. While these estimated percentages are small and are not explicitly taken into account in the projections in this report, the situation should be monitored.

A.2 Recent changes in staffing levels

Table A.1 shows 1999 and 2003 staffing levels (FTE and persons) for each Australian state and territory (and total numbers of employed RNs in 2003). There have been substantial improvements in staffing levels. The number of RNs (persons) per 100,000 population has improved nationally by almost eight per cent between 1999 and 2003, while FTE RNs per 100,000 has improved by more than 11 per cent. There are several reasons for this greater increase in FTE staffing levels than in staffing levels based on persons per 100,000. First, the peak in the RN age profile moved from the early 40s, an age when average working hours are relatively low because of the family responsibilities of many RNs, to the late 40s when average working hours are longer (see Figures A.1 and A.2). Second, the AIHW measured increased average hours across all age ranges, especially through the 40s and early 50s age ranges. According to informal advice from the ANF and AIHW, this appears to be a consequence of both real increases in average working hours and an artefact of a change in data collection methodology (AIHW 2005a, p. 33), which should have led to more accurate data (and thus the real improvement in staffing is most probably not as great as it appears). In addition, enrolled nurse staffing levels declined significantly over the period, so the net improvement in total nurses (ENs as well as RNs) per 100,000 was small (AIHW 2005, p. 27).

Table A.1 Comparison 1999 and 2003, persons and FTE, employed RNs per 100,000 population, and 2003 total RNs (persons), states and territories and Australia

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Aust.
1999 RNs (persons) per 100,000	913	908	800	785	864	1021	870	1037	883
1999 FTE RNs per 100,000*	776	731	663	599	632	800	722	966	718
2003 RNs (persons) per 100,000	926	999	874	862	1094	1137	986	1406	951
2003 FTE RNs per 100,000*	814	850	759	717	918	981	869	1425	821
Change 1999 to 2003 RNs (persons) per 100,000	1.4%	10.0%	9.2%	9.7%	26.7%	11.4%	13.3%	35.6%	7.8%
Change 1999 to 2003 FTE RNs per 100,000	4.9%	16.2%	14.4%	19.6%	45.3%	22.6%	20.5%	47.5%	14.4%
Average annual change 1999 to 2003 RNs (persons) per 100,000	0.4%	2.5%	2.3%	2.4%	6.7%	2.8%	3.3%	8.9%	1.9%
Average annual change 1999 to 2003 FTE RNs per 100,000	1.2%	4.0%	3.6%	4.9%	11.3%	5.6%	5.1%	11.9%	3.6%
2003 total RNs (persons)	61 855	49 089	33 218	16 703	16 800	5 425	2 792	3 189	189 071

Source: Calculated from AIHW 2001 Table 10, p.31, & AIHW 2005 Tables A.10, A.11, & A.12, pp. 27-28.

*FTE on a 38 hour week basis.

The substantial improvements in staffing levels in South Australia apparent from the data shown in Table A.1 may well have been made possible by the surpluses projected in Preston (2002) for that state if staffing levels remained constant at 1999 levels. It is

important to note, though, that the higher staffing levels in South Australia (and Tasmania) relative to the national average are in large part justified by the older age profile of the general population in those states. This is discussed in detail in Appendix B. In addition, even in those relatively well-staffed states, the Department of Employment and Workplace Relations (DEWR 2006) reported state-wide shortages, and the fiscal constraints on governments (which ultimately fund most RN positions) mean that generally there are unlikely to be any RN positions beyond reasonable need (though what is 'reasonable need' will always be open to debate).

The apparently relatively high staffing levels in the ACT do not reflect the reality of RN to patient ratios because patients from NSW take up almost a quarter of ACT bed-days (DHA 2005), and thus RN to patient ratios in the ACT are probably well below the national average. Greater health needs in the Northern Territory (especially among the Indigenous population) explain the higher staffing levels in that jurisdiction.

Evidence of RN shortages being disguised by longer hours being worked by individual RNs is provided by a survey of Victorian RNs in 2003 by Buchanan et al (2005). They found that only around 5 per cent of RNs surveyed worked overtime as a matter of free choice ('I want to work extra hours'), and the majority said they worked overtime because of a 'need to work extra to maintain basic standards of care' (p. 11).

A.3 Hours worked by age

Hours worked varies greatly by age, as does the spread of hours worked. Table A.2 shows the percentages for Australia as a whole. It is apparent that those in their 20s overwhelmingly work close to standard full time hours (35-49 hours a week), those under 25 averaging just over a standard full time week. Those in their 30s (especially late 30s) are likely to be working shorter hours, including fewer than 20 hours a week, and the spread of hours worked is wide. Average hours increase again through the 40s to mid 50s, then only dropping back a little – those over 60 averaging longer hours than those in their late 30s.

Average hours worked by New Zealand RNs follow a similar pattern to Australia, except that those in the 20s and those 55 and over work slightly shorter hours, New Zealand RNs in other age ranges work a little longer on average than Australian RNs, and average hours worked by the New Zealand RN workforce as a whole are a little longer than average hours worked by Australian RNs.

While average hours worked for each age group (in each jurisdiction) may be sufficient for preparing projections of persons to FTE ratios (see Appendix C), the more detailed data in Table A.2 indicates the age groups that are most likely to be working very long hours (those aged over 45, especially 50-54), and those most likely to be working very short hours (those aged 35-39).

More detailed data for each jurisdiction is also useful for projections because it can indicate, for example, whether higher average hours are probably a consequence of shortages (manifest, for example, by a higher proportion working 50+ hours across the age groups rather than a smaller proportion working very short hours). This can be illustrated by the pattern of the magnitudes of shortfalls projected for the year 2003 in Preston (2002) and AIHW data for each jurisdiction on the percentage of the RN workforce working 50+ hours in that year. NSW had the greatest projected shortage of all the states (SUPPLY only 51 per cent of DEMAND compared with the national projection for 2003 of SUPPLY at 60 per cent of DEMAND) and that state had the highest percentage of the workforce working 50+ hours (6.5 per cent compared with the national figure of 5.8 per cent). On the other hand, for SA a small surplus was projected for that year (SUPPLY 105 per cent of DEMAND), and that state had the smallest

percentage of the workforce working 50+ hours by a large margin (3.9 per cent). Of course the data and projections are not perfect, but the trend displayed is clearly in the expected direction. (The data for each state and territory equivalent to that for Australia as a whole in Table A.2 was provided by AIHW but is not tabulated in this report.)

Table A.2 Percentage of Australian RNs by age group in each range of hours worked per week, and average hours worked per week Australia, 2003, and average hours worked per week, New Zealand RNs, 2004

Age group	Range of hours worked per week				All hours	Average hours worked per week	
	<20 hrs	20-34 hrs	35-49 hrs	50+ hrs		Australia	New Zealand
<25	2.0%	14.4%	79.2%	4.4%	100.0%	38.8	37.5
25-29	7.8%	23.5%	63.4%	5.3%	100.0%	36.1	35.3
30-34	18.8%	31.0%	45.0%	5.2%	100.0%	31.8	32.4
35-39	23.2%	36.8%	35.5%	4.5%	100.0%	29.5	31.1
40-44	16.9%	39.3%	38.2%	5.7%	100.0%	31.3	32.2
45-49	10.4%	36.8%	45.9%	6.9%	100.0%	33.8	34.1
50-54	8.7%	36.5%	47.7%	7.2%	100.0%	34.3	34.6
55-59	11.3%	37.8%	44.3%	6.7%	100.0%	33.3	33.2
60+	19.7%	41.3%	34.9%	4.1%	100.0%	29.7	29.3
Total	13.8%	34.7%	45.6%	5.8%	100.0%	32.8	33.0

Source: AIHW Nursing and Midwifery Labour Force Survey 2003, unpublished data; NZHIS 2006, unpublished data.

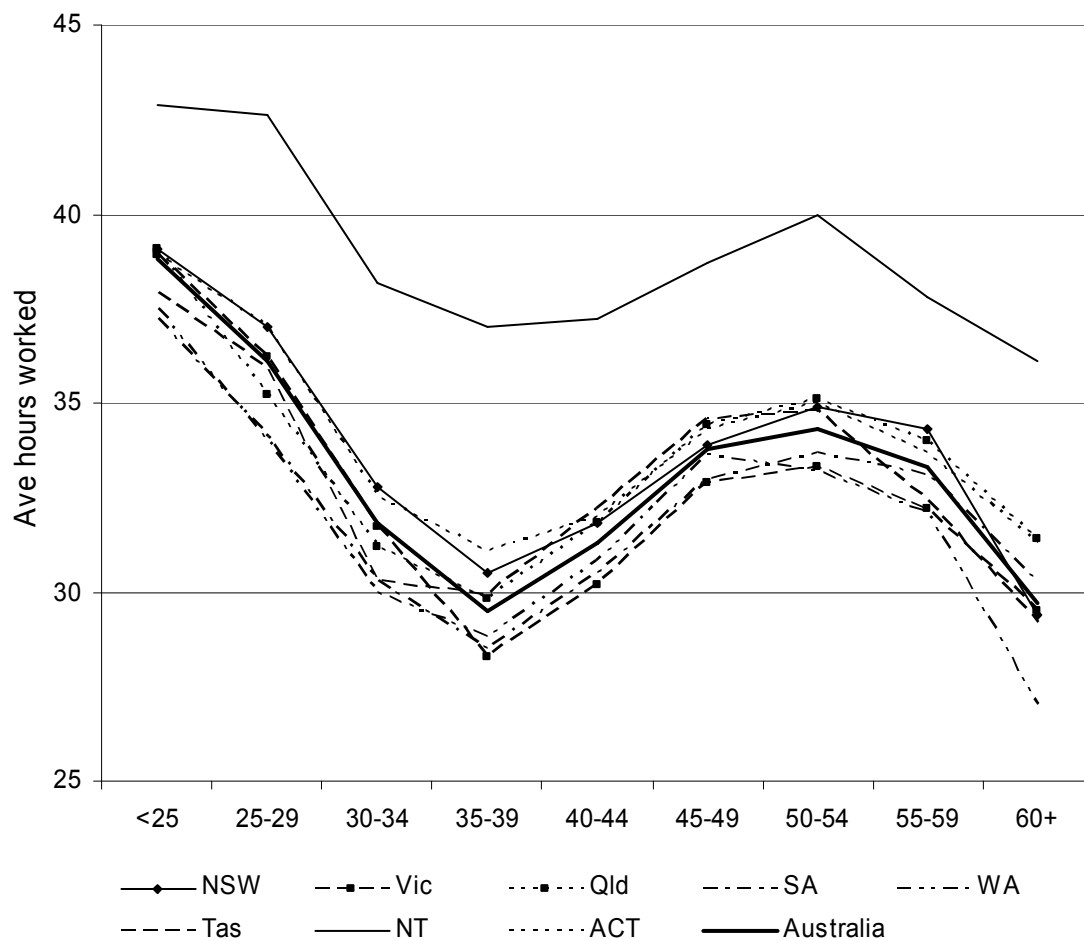
Figure A.1 shows the remarkably consistent *pattern* of average hours worked by age in each Australian jurisdiction. Those in their 20s average more than 35 hours a week, those in their late 30s average about 30 hours a week, those in their late 40s to late 50s average around 34 hours a week, and, finally, those who are still working in their 60s are working about the same hours on average as those in their late 30s.

In the NT RNs in each age group work on average longer hours (a total average of 38.5 hours), but the pattern is still the same. NSW and the ACT, the jurisdictions with the severest shortfalls projected in Preston (2002) for 2003, work the next longest hours (total averages of 33.4 and 33.5 respectively), and next was Queensland (total average of 33.0 hours).

A.4 Changing age profiles

One of the most significant features of the RN workforce is the age profile. Generally it reflects the ageing of a very large cohort initially recruited around the 1970s and early 1980s, followed by more than a decade of relatively low recruitment, then increasing recruitment.

Figure A.1 Average hours worked, RNs, five year age groups, Australian states and territories, 2003



Source: AIHW Nursing and Midwifery Labour Force Survey 2003, unpublished data.

Table A.3 indicates that this pattern is common to all Australian jurisdictions and New Zealand. In every one of them the age peak in 2003 is in the 45-49 age range – from 20.3 per cent in Tasmania to 16.5 per cent in Victoria. Some jurisdictions, such as Victoria and NSW, have relatively low proportions in the 35-39 age range, reflecting particularly low rates of recruitment around the early 1990s (among other factors).

Figure A.2 graphs the age profiles from Table A.3 for selected Australian states and New Zealand. The shape of the age profiles affects two important factors for the workforce as a whole: net separation rates and ratios of persons to FTE RNs.

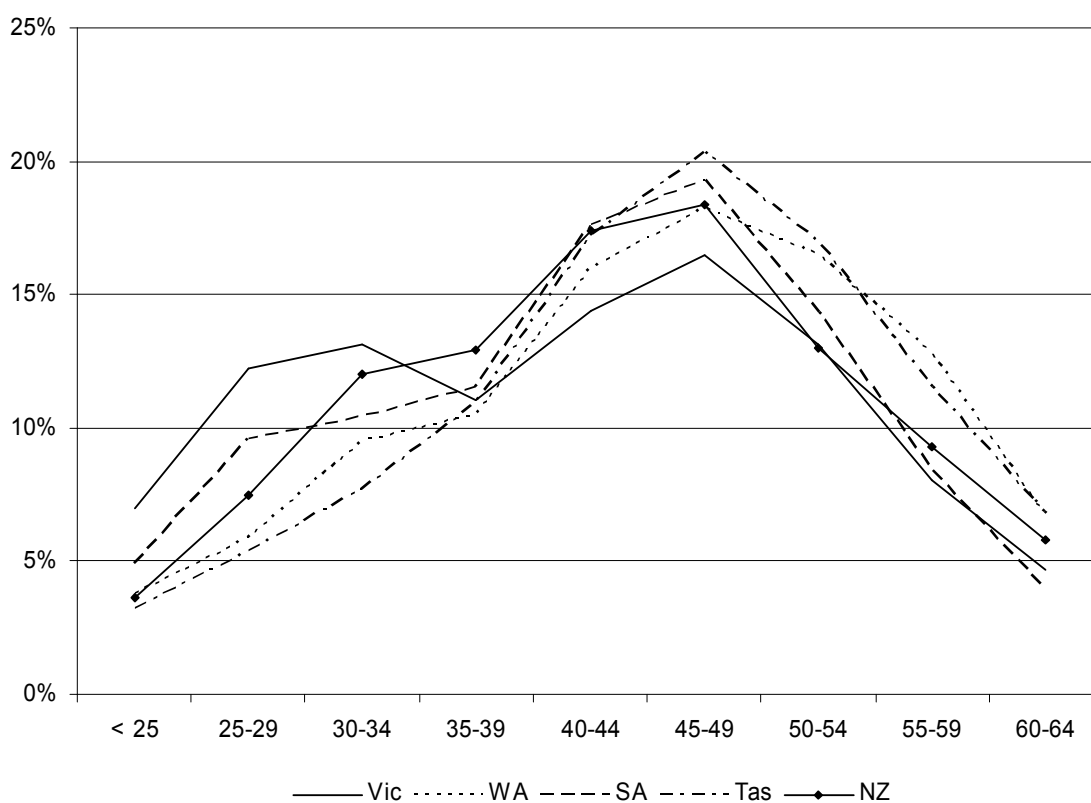
The shape of the age profiles provide the major explanations of different separation rates at different times (and in different jurisdictions). Net separation rates are discussed in detail in Appendix C, where it is calculated that the underlying net separation rates differ very significantly according to age. For the age ranges under 30 the average annual net separation rate is around 4.4 per cent, for those aged 30 to 44 the average annual net separation rate is less than one per cent as re-entrants to the RN workforce are almost as numerous as those leaving. Net separation rates are estimated to remain quite low until after age 50, then progressively increase until most RNs have retired by age 65 (see Table C.1).

Table A.3 Percentage of FTE RNs in each age group, Australia and states and territories, 2003, and New Zealand, 2004

	< 25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
Australia	5.0%	9.6%	11.5%	11.0%	15.8%	18.2%	14.3%	9.3%	5.3%
NSW & ACT	4.6%	10.0%	11.9%	10.4%	15.9%	19.1%	14.2%	8.8%	5.0%
Vic	7.0%	12.2%	13.1%	11.0%	14.4%	16.5%	13.1%	8.0%	4.7%
Qld	3.9%	7.8%	10.7%	12.2%	16.1%	17.5%	14.5%	10.5%	6.8%
WA	3.8%	5.9%	9.5%	10.5%	16.0%	18.2%	16.5%	12.8%	6.7%
SA	4.9%	9.6%	10.4%	11.5%	17.6%	19.3%	14.3%	8.4%	3.9%
Tas	3.2%	5.4%	7.7%	10.9%	17.2%	20.3%	17.0%	11.5%	6.8%
NT	2.5%	7.4%	12.1%	13.0%	16.7%	17.8%	16.7%	9.0%	4.8%
NZ	3.6%	7.5%	12.0%	12.9%	17.4%	18.4%	13.0%	9.3%	5.8%

Source: AIHW Nursing and Midwifery Labour Force Survey 2003, unpublished data; NZHIS 2006, unpublished data.

Figure A.2 Percentage of FTE RNs in each age group, selected Australian states 2003, and New Zealand, 2004

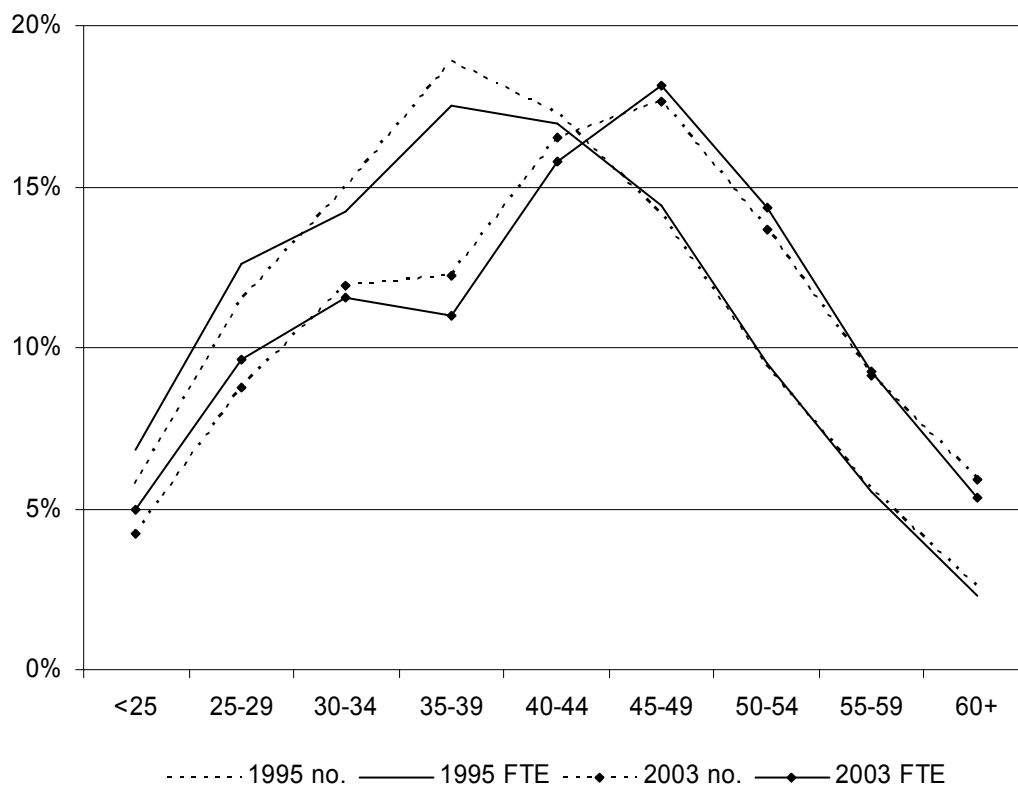


Source: Table A.2

The shape of the age profile is also important in estimating the likely effect of different strategies intended to reduce shortages, such as seeking to improve retention of beginning and early career RNs, increasing the average hours worked of RNs aged 30 to 44, or increasing retention of older RNs (delaying retirement) – see section 5 for a discussion of the projected impact of strategies intended to reduce net separation

(increase retention and/or re-entry) of RNs at different career stages in different jurisdictions and in different years over the period to 2010.

Figure A.3 Age profiles of RNs, percentage in each age group, numbers and FTE, 1995 and 2003, Australia



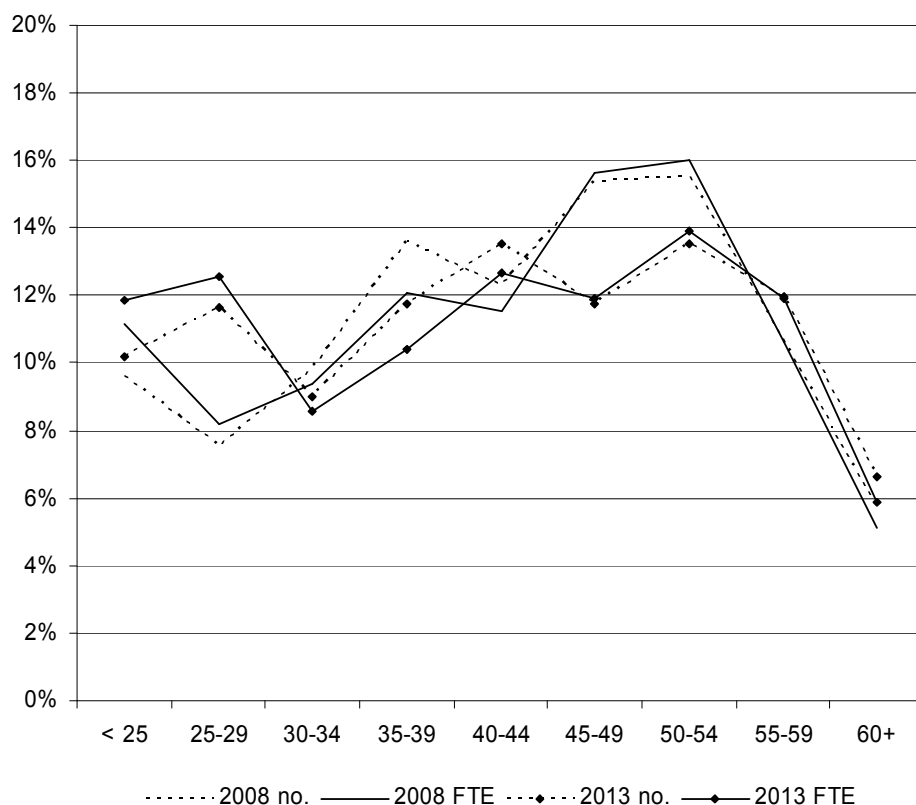
Source: AIHW Nursing Labour Force Surveys 1995-2001, unpublished data; AIHW Nursing and Midwifery Labour Force Survey 2003, unpublished data.

In 1995, according to AIHW data shown in Figure A.3, around half of all RNs were in the very low net separations 30 to 44 age range, and only about three per cent were in the very high net separations over 60 age range. Not surprisingly, there were relatively low net separation rates around 1995, with consequent fewer vacancies for new graduates and thus surpluses (the situation of surplus was exacerbated by intentional increases in staffing levels in several states, and a lack of alternative employment because of the recession in the early 1990s). Through to the late 1980s net separation rates had been higher as the peak in the age profile remained in the relatively high net separations age ranges of mid to late 20s (many of those leaving in this latter age range are doing so for family reasons, and would return though the 1990s). (The peak did not ‘age’ with the years as individuals aged because the continuing expansion of the RN workforce and high net separation rates resulted in early career RNs continuing to be the largest cohort.)

By 2003 net separations substantially increased as the peak in the age profile moved to the 45-49 age range, and there were much higher proportions of the workforce in all the older age ranges where retirements begin - about 30 per cent were aged 50 or over. In addition, in 2003 there was a much small proportion in the very low net separations 35-39 age range.

The difference in the FTE and persons (number) age profiles in each year in Figures A.3 and A.4 reflect the differences in average hours worked by age discussed in section A.3. Figure A.4 shows projected age profiles of RNs (persons and FTE) for 2008 and 2013. The peak in the age profile (largely the cohort initially recruited around the 1970s to early 1980s) will diminish as the group moves into retirement.

Figure A.4 Projected age profiles of RNs, percentage in each age group, numbers and FTE, 2008 and 2013, Australia



Source: Projections prepared for this report to estimate future net separation rates and future ratios of persons to FTE RNs. See Appendix C for details about the methodology.

Over the period to around 2013 net separation rates can be expected to continue to increase as increasing proportions of the total RN workforce reach retirement, and increasing proportions of the workforce are in the higher net separations under 30 age ranges, and a generally decreasing proportion are in the lower net separation age ranges 30 to 44. The rate of net separations would not be expected to start reducing until around 2020 when the peak in the age profile has passed through retirement (other things being equal – policy interventions or external events can change expected net separation rates). Though net separation rates can be expected to reduce, they are unlikely to fall back again to the low levels of the early 1990s when a very large proportion of RNs were clustered in the age range where the number of re-entrants is around the number leaving.

Appendix B. Population age profile factor

B.1 Need for a population age profile factor

In the 2002 report, *Australian nurse supply and demand to 2006: A projections model and its application* (Preston 2002), a population age profile factor (PAPF) was incorporated in the model (row 5), but it was not given an effective value in the application of the model.

The ageing population is generally recognised as leading to a requirement for increased numbers of RNs per 100,000 population (other things being equal). In this appendix a PAPF is developed based on recent Australian data, and its application to recent Australian and New Zealand staffing levels and to the projections in this report explained.

B.2 Health expenditure not a proxy for RN utilisation

The Australian Productivity Commission April 2005 research report, *Economic Implications of an Ageing Australia* (Productivity Commission 2005a) considered in broad terms the impact of the ageing population on matters such as public expenditure and revenue, productivity and the need for health and other workers. That report concludes that if ageing is taken into account, projected health expenditure in 2044-45 will be 25 per cent greater than if ageing is not taken into account (p. 172). The Commission report cites an 'index of health care expenditure per person by age' for Australia (there are also indices for twelve other OECD countries) (p. 148):

25-29 year olds:	100
65-69 year olds:	387.6
85-89 year olds:	614.2.

While the index covers much more than RN staffing intensity, it does provide an indication of the importance of ageing on health expenditure.

There is a range of other data in the Productivity Commission report (covering, for example, hospital separations, pharmaceuticals and medical expenses) that show a similar pattern, but generally less pronounced for the 85 and over range. This pattern is clear in the Australian Institute of Health and Welfare (AIHW) report, *Health Expenditure Australia 2003-04* (AIHW 2005b) where it is noted that

For older people a higher proportion of the expenditure was for in-patient and day care services. . . . Much of this expenditure for older people was for residential aged care services. . . Pharmaceutical expenditure was higher as a proportion for the middle-aged. . . Out-patient services, which includes medical services was more important for children and young adults. (p. 137)

This indicates that health expenditure for those 85 and over has a relatively higher proportion of RN-intensive components than does expenditure for other age groups, and thus that overall expenditure by age range cannot be a proxy for RN utilisation. Data and analysis specific to RN utilisation must be used.

Before a formula for a PAPF specific to RN utilisation over the period to 2010 is developed from recent/current data on RN utilisation, the appropriateness of using such recent/current data needs to be evaluated.

B.3 Debates relevant to the development of a PAPF formula

Here we are concerned with any likely variation over the period to 2010 in per person RN utilisation by age group – is it reasonable to assume continuation of the age/RN

utilisation pattern of the recent past? In this section the broader issues of health expenditure by age and increased life expectancy are considered, then matters specific to RN utilisation.

In *Economic Implications of an Ageing Australia* (Productivity Commission 2005a) the Productivity Commission considered a number of factors related to health expenditure and age (such as attitudes to high technology/high risk treatment of the elderly, and better treatment of chronic conditions, and more healthy lifestyles leading to better health among older people), and concluded that there is no compelling evidence of a 'flattening of the age-cost profile' (p. 154) – in fact that there is 'some evidence that the disparity between expenditure on the old and young is growing' (p. 166). The Commission considered the 'downplaying' by some leading economists of the impact on health expenditure of population ageing. Cited economists claimed that likely impacts on expenditure and requirements for staff such as RNs may well be much less than commonly assumed. This matter is dealt with in detail in Technical Paper 13, *Costs of death and health expenditure* (Productivity Commission 2005b). The 'downplaying' appears to largely occur because actual data seems to indicate that 'demographic change is likely to have had virtually no impact on hospital expenditure over the period 1970-2002' (2005b, p. 10) because the increases in hospital expenditure over that period attributable to population 'ageing have, in fact, been fully offset by decreases from costs attributable to death' (p. 9, emphasis added). The decrease in costs attributable to deaths occurred because of the significant increase in life expectancy over the period. The Commission concluded

it is erroneous to draw the inference that because ageing has not [appeared to have] had a significant impact on expenditure on the past, that it will not do so in the future. (p. 10)

In addition, there is now strong evidence that as life expectancy increases there may well be even greater health expenditure and need for RNs by older age ranges (other spending and staffing criteria constant). Research by Heathcote and Puza (2005) strongly indicates that increases in life expectancy are associated with *greater* levels of 'disability'. They applied complex statistical analyses to the large data sets from the 1988, 1993 and 1998 ABS national disability surveys, taking account of age, sex and disability state ('disability-free', 'severe disability' or 'other disabled'). The general pattern is clear, illustrated by the finding that the age at which the probability of being disabled becomes more than the probability of being disability-free reduced between 1988 and 1998 for women and, even more so, for men. In 1988 women become more likely to be disabled than disability-free at age 75.2 and males at age 70.7. By 1998 this had reduced to age 74.9 for women and 67.7 for men (Table 1, p. 436). While being 'disabled' according to the WHO definition used by the ABS does not necessarily mean an individual needs nursing care or unusual levels of health expenditure, on average those classified as 'disabled' will need higher levels of nursing care and health expenditure than those classified as disability-free Heathcote and Puza conclude

To the extent that the ABS definition of disability reflects morbidity, the results presented here suggest that recent gains in Australian life expectancy tend to be periods of ill health, and, more seriously, there is evidence of a drift away from the disability-free state. . . If the ABS survey results and the conclusions drawn from them are indicative of real trends in community health then the drift seems sufficiently serious to warrant close scrutiny by public health authorities. (p. 428-9)

This research indicates that among the many factors leading to increased life expectancy, those such as technology and techniques keeping people alive, but in a 'disabled' state, may be more important than healthy lifestyles extending disability-free life. If increases in life expectancy continue there may well be a requirement for greater RN staffing intensity by older age groups, counter-balancing the effect of delayed costs associated with death

itself and having a continuing effect after the short term effect of the delay (but not avoidance!) of death. In addition, the health expenditure reductions to 2002 cited by the Productivity Commission may be less a consequence of any reduced need, but rather reflect efficiencies and staffing rationalisations/shortages (earlier hospital discharge, less costly procedures with the same outcomes, tighter restrictions on access to residential aged care, and substitution of RNs and other professionals by lower paid staff in aged care and hospitals).

This suggestion is consistent with some more recent data. According to AIHW data (Table B.1), the number of RNs employed in residential aged care *declined* by almost 8 per cent between 1995 and 2003 (a period when the number of older people was increasing), while the total number of RNs increased by more than 10 per cent. Ameliorating the trend of declining numbers of RNs working in residential aged care was an increase in average hours worked by those RNs, resulting in an *increase* in the FTE RNs working in residential aged care over the period. (There was a much smaller increase in average hours for all RNs.) Most significantly, the decreasing trend in FTE RNs working in residential aged care turned around sharply between 2001 and 2003, with an increase of more than 10 per cent from 15,863 to 17,502. The total FTE of RNs increased by a lesser amount, and thus FTE RNs working in residential aged care increased slightly as a proportion of all FTE RNs between 2001 and 2003.

Table B.1 Registered nurses working in residential aged care and total RNs, number, average hours worked per week and FTE, 1995 to 2003

		1995	1997	1999	2001	2003	Change 1995- 2003	Change 2001- 2003
Residential aged care	Number	22 430	22 153	21 434	20 714	20 655	-7.9%	-0.3%
	Ave hrs	28.6	28.6	28.8	29.1	32.2	12.6%	10.7%
	FTE	16 882	16 673	16 245	15 863	17 502	3.7%	10.3%
Total RNs	Number	171 482	176 217	179 389	183 224	189 071	10.3%	3.2%
	Ave hrs	31.6	31	31	30.9	32.8	3.8%	6.1%
	FTE	142 601	143 756	146 344	148 990	163 198	14.4%	9.5%
Residential aged care as % of total RNs	Number	13.1%	12.6%	11.9%	11.3%	10.9%	-16.5%	-3.5%
	Ave hrs	90.5%	92.3%	92.9%	94.2%	98.2%	8.5%	4.2%
	FTE	11.8%	11.6%	11.1%	10.6%	10.7%	-9.4%	0.9%

Note: FTE calculated on the basis of a 38 hour week.

Sources: AIHW 2005, *Nursing and Midwifery Labour Force 2003*, additional tables: Registered Nurses, Work Settings by Selected Characteristics 2003, Table 5, and Registered Nurses Time Series 1995-2001, Table 12, viewed 4 April 2006, <http://www.aihw.gov.au/publications/index.cfm/title/10146>

There are a number of likely reasons for the decreasing number of RNs in residential aged care. First, the overall shortage of RNs had a particularly significant impact on residential aged care because it is an area of relatively low pay and general less attractiveness. The impact of shortages may well have been a factor in the greater increase in working hours by RNs working in residential aged care compared with the total RN workforce. In addition, in the sector there have been cost rationalisations resulting in substitution where possible of RNs with less expensive staff. All this is consistent with the earlier comment that increased life expectancy may have been associated with increased 'disability', but has not been associated with increased health expenditure.

The key question is whether 2003 is an adequate base year. On the one hand, the cost and staffing rationalisation cycle may be complete, and the continuing shortages are likely to be artificially suppressing RN staffing levels in residential aged care. On the other hand, the Government policy to use Community Aged Care Packages and other types of community support to lessen residential nursing home utilisation may reduce RN requirements, but not as much as may be expected - it is likely to increase the need for RNs in these community-based roles, and will also increase the proportion of RNs to other staff in hostels and nursing homes because of the greater proportion of higher needs residents. On its own this policy direction may be expected to slightly decrease the RN utilisation rate by older people because of the policy intention of lessening overall nursing and other staff costs per aged person by 'ageing in place' at home rather than in a nursing home or hostel wherever possible – thus perhaps counter-balancing the other factors discussed above.

In conclusion, the overall impact of all these developments on RN utilisation by age may be little changed over the period to 2010 if an adequate supply of RNs is assumed. Such an assumption of adequacy is the basis of the 'target' total number of RNs required in the projections model in this report, and thus 2003 is taken as an adequate base year for levels of RN utilisation by age.

B.4 Developing a formula for a population age profile factor

There appears to be no generally accepted existing Australian formula for estimating the impact of ageing on RN requirements (or the requirements for other health professionals). For useful projections of future RN requirements to 2010 in Australian states and territories a formula that is reasonable for Australia over the next few years is required. Such a formula could also be applied to New Zealand.

Overseas formulas cannot be directly applied because of the differing Australian circumstances and data sets. The US Department of Health and Human Services National Centre for Health Workforce Analysis report, *Changing Demographics: Implications for Physicians, Nurses, and Other Health Workers* (HRSA 2003) reports a complex 'Nursing Demand Model' (NDM). The NDM combines state-level population projections with national estimates for eight age categories of 1996 per person utilisation rates of a range of health care services (such as inpatient days, outpatient visits, and nursing facility residents), and estimates of RN 'staffing intensity' for each of these services (p. 80). The relevant finding of the application of the model was that

if health care consumption patterns and [nurse] productivity remained constant over time, the ageing population would increase . . . the demand for full-time equivalent (FTE) registered nurses per thousand population . . . from 7 [in the year 2000] to 7.5 [in the year 2020]. (p. i)

That is an average annual increase over the twenty years of 0.357 per cent. The comparable increase in demand for Australia can be expected to be greater because of

the greater ageing of the Australian population: using middle/medium population projections, the percentage of the US population aged 65+ is projected to increase by 31 per cent from 12.6 to 16.5 per cent between 2005 and 2020 (p. 7), while the percentage of the Australian population aged 65+ is expected to increase by 43 per cent from 13.1 to 18.7 over a similar period (ABS 2005a, pp. 38 & 42).

To develop a PAPF for projected RN requirements, a method of actually estimating current (recent) RN utilisation by age group in Australia is necessary. Such a method is proposed below. It uses data comparable to that used for the US Nursing Demand Model (national data on health service utilisation by age group, and staffing intensity in those health services) and will similarly be applied to state-level and New Zealand national projections of population by age group. Compared with the 1996 data used in the 2003 US report, more recent (2000 and later) Australian data is available for this exercise.

The PAPF formula developed from Australian data on RN utilisation by age is applied to New Zealand population age projections. In New Zealand a smaller proportion of the total population is aged 85 and over (in 2004 1.32 per cent compared with 1.47 per cent in Australia), and a smaller proportion of all New Zealand RNs are working in residential aged care (8.9 per cent, compared with 10.9 per cent in Australia – NZHIS 2005 and Table B.1). As the difference in the proportion of elderly is greater than the difference in the proportion of RNs working in residential aged care it appears reasonable to apply the formula to New Zealand, where it might, if anything, be on the conservative side.

B5 Development of the PAPF formula

For clarity and simplicity a four element formula for per person relative RN requirements is used. The age range 0-64 is given a value of 1.0, then the age ranges of 65-74, 75-84 and 85+ are indexed to the 0-64 value of 1.0. A more finely differentiated formula is possible, but given the assumptions (including all the other factors involved in determining appropriate future RN requirements), the limitations of available data, and the use to which the formula will be put in multi-factor projections, the four element formula is considered adequate. Of course if the concern was with future RN requirements in the context of a rapidly increasing (or decreasing) birth rate, rather than population ageing, then a formula that differentiates the first or early years of life would be appropriate.

The formula uses estimates of average per person utilisation of RNs within the above age ranges. To arrive at this estimate is a complex process given the available data. (Some comparable data and analysis for ENs is also provided so that it is available if a similar formula for ENs is to be developed.)

The first data set utilised is Australian Institute of Health and Welfare unpublished data on health expenditure by age and area of expenditure for 2000-01 from the Disease Expenditure Data Base (AIHW 2006).

There are significant age differences in expenditure in the different categories. This is apparent from the Table B.2, which includes data for the selected areas of hospitals, aged care homes, pharmaceuticals and total expenditure per person. Expenditure on hospitals is 43.9 per cent of all health expenditure, and, while it is 47.6 per cent of all expenditure for those aged 65-74 and it is only 38 per cent of all health expenditure for those aged 85+, per person expenditure for those aged 85+ is more than twice that for those aged 65-74.

Table B.2 Australian health expenditure per person, selected areas, by age range, 2000-01

Age group	Hospitals			Aged care homes			Pharmaceuticals			Total expenditure		
	Expenditure per person	Proportion of total expenditure per person	Ratio to average expenditure in this area by all ages	Expenditure per person	Proportion of total expenditure per person	Ratio to average expenditure in this area by all ages	Expenditure per person	Proportion of total expenditure per person	Ratio to average expenditure in this area by all ages	Expenditure per person	Proportion of total expenditure per person	Ratio to average expenditure in this area by all ages
0-4	\$998	58.2%	0.9	\$ -	0.0%	0.0	\$206	12.0%	0.5	\$1 714	100%	0.7
5-14	\$337	28.4%	0.3	\$ -	0.0%	0.0	\$132	11.1%	0.3	\$1 187	100%	0.5
15-24	\$670	43.2%	0.6	\$ -	0.0%	0.0	\$204	13.2%	0.5	\$1 549	100%	0.6
25-34	\$829	47.5%	0.7	\$ -	0.0%	0.0	\$250	14.3%	0.6	\$1 746	100%	0.7
35-44	\$729	42.1%	0.6	\$ -	0.0%	0.0	\$299	17.2%	0.7	\$1 734	100%	0.7
45-54	\$909	41.4%	0.8	\$25	1.1%	0.1	\$440	20.0%	1.0	\$2 196	100%	0.8
55-64	\$1 437	43.5%	1.3	\$84	2.5%	0.4	\$733	22.2%	1.7	\$3 299	100%	1.3
65-74	\$2 652	47.6%	2.3	\$362	6.5%	1.8	\$1 134	20.4%	2.7	\$5 567	100%	2.1
75-84	\$4 251	47.5%	3.7	\$1 781	19.9%	8.8	\$1 308	14.6%	3.1	\$8 944	100%	3.4
85+	\$5 979	38.0%	5.2	\$6 681	42.5%	33.0	\$1 042	6.6%	2.5	\$15 725	100%	6.0
Total	\$1 143	43.9%	1.0	\$202	7.8%	1.0	\$419	16.1%	1.0	\$2 602	100%	1.0

Source: AIHW 2006

Not surprisingly, expenditure on aged care homes shows a much more pronounced variation by age. While total expenditure on aged care homes is less than a fifth total expenditure on hospitals, per person expenditure for those aged 85+ is greater for aged care homes than for hospitals. Total expenditure on pharmaceuticals is twice that of aged care homes, but expenditure per person for those aged 85+ is less than a sixth that on aged care homes for that age group.

Some major areas of expenditure such as ‘hospitals’ and ‘aged care homes’ are RN intensive, and other major areas such as pharmaceuticals would have little if any RN component. For the development of the formula, all areas in which any significant numbers of RNs are employed must be accounted for. This includes areas in the AIHW health expenditure tables and areas outside the health sector.

The second data set utilised is the AIHW nurse labour force (AIHW 2005a) data on work settings of employed RNs and ENs of main job for Australia. This is set out in Table B.3.

Table B.3 Employed registered and enrolled nurses: work setting of main job, Australia, 2003

Work setting of main job	RNs		ENs	
	No.	% of total	No.	% of total
Hospital (incl. psychiatric hospital)	116 287	61.5%	21 797	45.8%
Day procedure centre	4 074	2.2%	903	1.9%
Residential aged care	20 655	10.9%	13 117	27.6%
Hospice	786	0.4%	298	0.6%
Community health centre	15 709	8.3%	1 636	3.4%
Mental health service	3 056	1.6%	1 449	3.0%
Developmental disability service	1 599	0.8%	963	2.0%
Doctors' rooms	6 057	3.2%	1 788	3.8%
School	1 104	0.6%	105	0.2%
Tertiary education institution	2 694	1.4%	138	0.3%
Remote area service/multipurpose centre	8 903	4.7%	3 367	7.1%
Other	8 146	4.3%	2 014	4.2%
Total	189 071	100.0%	47 574	100.0%

Source: AIHW 2005a.

Next, for each population age group in each area we need to estimate RN utilisation. To do this, the major *areas of health expenditure* need to be matched with the *work settings* of nurses from AIHW nurse labour force data.

The categories for *areas of health expenditure* in the AIHW health expenditure data (AIHW 2006) are: hospital (admitted patients and non-admitted patients); aged care homes; unreferrred attendances; imaging and pathology; out-of-hospital medical; pharmaceuticals (prescribed and over the counter); other professionals (including optometry); dental; research; and Commonwealth mental and public health. As we are

seeking to determine an appropriate ratio for per person RN utilisation in the various age ranges comprehensive analysis is not necessary - the matching only needs to be adequately representative, and areas that do not involve RNs in any significant numbers can be ignored. There is good matching for hospitals (63.7 per cent of RNs work in these settings, and 43.9 per cent of health expenditure is in this area) and age care homes and hospices (11.3 per cent of RNs work in these settings, and 7.8 per cent of health expenditure is in this area). The work settings of doctors rooms (3.2 per cent of RNs work in this setting); community health centre (8.3 per cent); remote/multipurpose service (4.7 per cent); and mental health services (1.6 per cent) are matched with the areas of expenditure of unreferral attendance (7.0 per cent of all expenditure on health); imaging and pathology (3.0 per cent); out of hospital medical (0.3 per cent); and Commonwealth mental health and public health (1.9 per cent).

Around 7 per cent of RNs are in other settings which need to be included in the analysis. (Around 29 per cent of health expenditure is in other areas where few if any RNs are employed - more than 16 per cent in over-the-counter and prescribed pharmaceuticals, the rest spread among dental, other professions, and research – these areas are excluded from the analysis.) Table B.4 sets out the matching of work settings and health expenditure categories, and the number and proportion of all RNs in each category.

Table B.4 Matching of AIHW categories of ‘work settings’ of main jobs of RNs and of ‘health expenditure’, and number and percentage of RNs in each setting (and thus approximate number in each area)

RN work setting	Number of RNs	% of all RNs	Health expenditure area
Hospitals (incl. psychiatric hospitals and day procedure centres)	120 361	63.7%	Total hospital
Residential aged care; hospice	21 441	11.3%	Aged care homes
Doctors rooms; community health centre; remote/multipurpose service; mental health services	35 324	18.7%	Other health expenditure areas that include RNs (unreferred attendance; imaging and pathology, out of hospital medical; Commonwealth mental health and public health)
Other (includes academic nurses and nurses working in industry and schools)	11 944	6.3%	(Non-health areas that include RNs)
Total	189 070	100.0%	Total

Table B.5 sets out in detail the derivation of the values in the population age profile factor (PAPF).

First, an estimate is calculated of the utilisation of RNs by each age group for each of the areas/settings of

- hospitals
- age care homes
- other health expenditure areas that include RNs
- non-health areas that include RNs.

For the first three areas this is done by calculating for each of the age groups the percentage of total expenditure by all age groups on that area, and then multiplying this by the percentage of all RNs who work in that area/setting. For example, the 85+ age group accounts for 7.0 per cent of all expenditure on hospitals, and 63.7 per cent of all RNs work in hospitals; therefore the estimate of utilisation of RNs by the 85+ age group in hospitals is 4.5 per cent of all RNs (63.7 per cent of 7.0 per cent). RN utilisation in the area/setting of ‘non-health areas that include RNs’ is assumed to be equal per person across the age groups, so RN utilisation for each group is proportional to the population in each age group.

Second, each age group’s RN utilisation (as a percentage of all RNs) for each of the four areas/settings are then summed.

Third, the 0-64 age groups are combined, leaving the four age groups for the formula (0-64, 65-74, 75-84, and 85+) and the total.

Fourth, the per person RN utilisation for each age group is then calculated from data on the percentage of the total population in each age group divided by the age group’s share of total population. For example, the 85+ age group utilises 10.3 per cent of all RNs, but is only 1.3 per cent of the total population. Indexed to the total population’s per person utilisation of 1.000, the 85+ age group utilisation is 7.672.

Finally, the last column in Table B.5 indexes the values to a value of 1.000 for the 0-64 age group – this results in the values of the formula for the population age profile factor (PAPF).

Table B.5 Derivation of values for the PAPF formula from expenditure on areas of health by age group, the proportion of all RNs working in those areas and non-health settings, and the proportion of total Australian population in each age group

Age group	Hospitals			Aged care homes		
	A	B	C	D	E	F
	Expenditure on hospitals by age group (\$million)	% of total expenditure on hospitals	Estimated RN utilisation by age group as percentage of all RNs (63.7% of RNs are in hospital work settings)	Total expenditure on aged care homes by age group (\$million)	% of total expenditure on aged care homes	Estimated RN utilisation by age group as percentage of all RNs (11.3% of RNs are in aged care settings)
0-4	\$1 280	5.8%	3.7%	\$0	0.0%	0.0%
5-14	\$909	4.1%	2.6%	\$0	0.0%	0.0%
15-24	\$1 760	8.0%	5.1%	\$0	0.0%	0.0%
25-34	\$2 385	10.8%	6.9%	\$0	0.0%	0.0%
35-44	\$2 160	9.8%	6.4%	\$0	0.0%	0.0%
45-54	\$2 389	10.8%	6.0%	\$66	1.7%	0.2%
55-64	\$2 580	11.7%	7.5%	\$151	3.9%	0.4%
65-74	\$3 487	15.8%	10.1%	\$477	12.2%	1.4%
75-84	\$3 536	16.1%	10.2%	\$1 481	38.0%	4.3%
85+	\$1 543	7.0%	4.5%	\$1 725	44.2%	5.0%
Total	\$22 030	100.0%	63.7%	\$3 899	100.0%	11.3%

Table continued over (notes at end)

Continued

Table B.5 Derivation of values for the PAPF formula from expenditure on areas of health by age group, the proportion of all RNs working in those areas and non-health settings, and the proportion of total Australian population in each age group

Age group	Other health expenditure areas that include RNs			Non-health areas that include RNs	
	G	H	I	J	K
	Total expenditure on 'other health areas' by age group (\$million)	% of total expenditure on 'other health areas'	Estimated RN utilisation by age group as percentage of all RNs (18.7% of RNs are in 'other health areas' settings)	Non-health areas (% of total population in each age group - assume equal per person RN utilisation across age groups)	Estimated RN utilisation by age group as percentage of all RNs (6.3% of RNs are in settings outside 'health expenditure areas')
0-4	\$780	4.4%	0.8%	6.7%	0.4%
5-14	\$943	5.3%	1.0%	14.0%	0.9%
15-24	\$1 621	9.1%	1.7%	13.6%	0.9%
25-34	\$2 321	13.0%	2.4%	14.9%	0.9%
35-44	\$2 518	14.1%	2.6%	15.4%	1.0%
45-54	\$2 780	15.6%	2.9%	13.6%	0.9%
55-64	\$2 322	13.0%	2.4%	9.3%	0.6%
65-74	\$2 272	12.7%	2.4%	6.8%	0.4%
75-84	\$1 640	9.2%	1.7%	4.3%	0.3%
85+	\$685	3.8%	0.7%	1.3%	0.1%
Total	\$17 881	100.0%	18.7%	100.0%	6.3%

Table continued over (notes at end)

continued

Table B.5 Derivation of values for the PAFP formula from expenditure on areas of health by age group, the proportion of all RNs working in those areas and non-health settings, and the proportion of total Australian population in each age group

	L		M		N	O	P
Age group	RN utilisation by age group as percentage of all RNs	Age group	RN utilisation by age group as percentage of all RNs	Age group as % of total population	Per person RN utilisation in each age group indexed to average for whole population	Values for the Population Age Profile Factor (PAFP) formula: per person RN utilisation in each age group indexed to 0-64 age group	
0-4	4.9%						
5-14	4.5%						
15-24	7.6%						
25-34	10.3%						
35-44	9.8%						
45-54	10.9%						
55-64	10.9%	0-64	59.0%	87.5%	0.673	1.000	
65-74	14.3%	65-74	14.3%	6.8%	2.091	3.105	
75-84	16.5%	75-84	16.5%	4.3%	3.826	5.681	
85+	10.3%	85+	10.3%	1.3%	7.672	11.392	
Total	100.0%	Total	100.0%	100.0%	1.000	1.485	

Notes and sources (reference is to column letter):

A, D, G AIHW (2006) data on health expenditure by age group and health expenditure category, 2000-01

B, E, H from preceding column

J It is assumed that there is equal average per person utilisation of RNs by age group in these non-health areas that include academic nurses and nurses in industry and schools. Data on the number of people in each age group is from AIHW (2006) Therefore this column is equivalent to columns B, E and H.

C, F, I, K The proportion of all RNs in each area/setting from AIHW (2005a) is distributed among the age groups according to the percentage of expenditure in that area for each age group (columns B, E, H), or, for column K, the proportion of the population in each age group (column J).

L The sum of RN utilisation in each area/setting for each age group (columns C, F, I, K).

M From column L, with all groups 0-64 combined.

N From column J, with all groups 0-64 combined.

O From columns M and N.

P From column O.

The population age profile factor (PAFP) formula thus has the following values per person in each age group:

0-64	:	1.000
65-74	:	3.105
75-84	:	5.681
85+	:	11.392

The PAPF can be used for two purposes. It can be applied to current (recent) RN staffing rates to assist in assessing the adequacy of those staffing levels, as well providing an input to a model for projecting future demand for RNs. These will be considered in turn.

B.6 Application of the PAPF to assess current staffing levels

Application of the PAPF to 2003 staffing levels (AIHW 2005a, the most recent nationally consistent data available) indicates that some of the differences in staffing levels between the states can be explained by the different population age profiles of those states. Of course many other factors are relevant when considering the adequacy of staffing levels, such as the level of need within particular populations (for example, the health needs of Indigenous people in the Northern Territory), geographic spread, treatment of patients from outside the jurisdiction (such as the ACT's treatment of patients from surrounding areas of NSW), or different patterns of deployment or duties of RNs (such as widespread deployment of school nurses or introduction of nurse practitioners and practice nurses undertaking in part work done elsewhere by medical general practitioners).

Table B.6 sets out the application of the PAPF to current (recent) staffing levels in Australia and New Zealand. Row 1 sets out the number of full time equivalent (FTE) nurses per 100,000 population in each state and territory in 2003, and in New Zealand in 2004. These staffing levels are indexed to the level for Australia as a whole (row 2), showing that of the states, New South Wales and Victoria are close to the national staffing level, Queensland and Western Australia are below, and South Australia and Tasmania above. New Zealand is between Queensland and Western Australia – below the Australian average.

Applying the PAPF formula to the population of the states and territories, Australia and New Zealand results in the raw PAPFs in row 3. The Australian raw PAPF is 1.507 – derived from the population profile of 87.21 per cent aged 0-64, 6.78 per cent aged 65-74, 4.55 per cent aged 75-84 and 1.46 per cent aged over 85. The largest PAPF is 1.608 for South Australia - derived from the population profile of 85.18 per cent aged 0-64, 7.54 per cent aged 65-74, 5.55 per cent aged 75-84 and 1.81 per cent aged over 85.

The state/territory PAPFs are indexed to the Australian PAPF in row 4. This makes clear that, compared with the national figure, Western Australia and Queensland have relatively low PAPFs, and South Australia and Tasmania have relatively high PAPFs. Taking account of the data on national RN utilisation by age on which the PAPF formula is based, if there is equity of utilisation by age around the country, and other things being equal, we would expect Western Australia and Queensland to have lower overall levels of RN staffing per 100,000, and South Australia and Tasmania higher levels than the Australia-wide figure.

Row 5 shows the state/territory staffing levels (relative to the actual level for Australia) that would occur if there was equity in staffing levels by age and all else equal between the states. Thus WA, Queensland and NZ are substantially below the Australian national level, and SA and Tasmania well above.

Row 6 compares the actual state/territory and NZ staffing levels (row 1) with the hypothetical staffing levels based on equitable RN utilisation by age (row 5). This brings

WA, Queensland and NZ, on the one hand, and SA and Tasmania, on the other hand, much closer to the Australian level – though the former three remain at levels below the national level, and the latter two are still above the national level.

Table B.6 Application of PAPFs to FTE RNs per 100,000 population, states and territories and Australia (2003), and New Zealand (2004)

	NSW	Vic	Qld	WA	SA	Tas	ACT	NT	Aust	NZ*
1. Actual FTE RNs/ 100,000 population	814	850	759	717	918	981	869	1 425	821	741
2. State/territory FTE RNs/ 100,000 indexed to Australian FTE RNs/ 100,000	0.99	1.03	0.92	0.87	1.12	1.19	1.06	1.74	1.00	0.90
3. Population age profile factor (PAPF) (raw)	1.529	1.525	1.466	1.444	1.608	1.563	1.344	1.136	1.507	1.471
4. State/territory PAPF indexed to Australian PAPF	1.014	1.012	0.972	0.958	1.066	1.037	0.892	0.753	1.000	0.976
5. Hypothetical 'population age equitable' state/territory staffing levels relative to actual Australian FTE RNs/ 100,000 (821)	833	831	799	787	876	852	732	619	821	801
6. Actual state/territory & NZ FTE RNs/ 100,000 (row 1) compared with hypothetical 'population age equitable' state/territory staffing levels (row 5), indexed to actual Australian FTE RNs/ 100,000	0.98	1.02	0.95	0.91	1.05	1.15	1.19	2.30	1.00	0.925

Notes and sources (reference is to row numbers)

1. Table A.1, and NZHIS 2005.

2. State/territory and New Zealand staffing levels relative to the Australia national average.

3. Population age profile factor for each state and territory and Australia for the year 2003, and New Zealand for 2004 is derived from the formula (0-64 age group per person weighting of 1.000; 65-74 age group per person weighting of 3.105; 75-84 age group per person weighting of 5.681; and 85+ age group per person weighting of 11.392) applied to the 2003 population age profile for the jurisdiction (ABS 2003 and Statistics New Zealand 2004).

4. From row 3.

5. Row 4 multiplied by 821 (actual Australian FTE RNs/100,000)

6. Row 5 divided by row 1

B.7 Application of the PAPF to projecting future RN requirements

The PAPFs have been calculated for each state and territory, Australia, and New Zealand for each year of the projections period to 2010, and indexed to 2003 (Australia) or 2004 (New Zealand).

When applying the PAPF to projected future requirements for RNs, the most important matter is the *rate of change*, rather than the absolute level (which is the important matter when assessing the adequacy of current staffing levels, as in the previous section).

The difference between rate of change and absolute levels is most striking in the case of WA, as shown in Table B.7. That state has projected PAPFs for 2004 and 2010 that are well below the national average (1.4524 and 1.5210, compared with the Australian PAPFs for those years of 1.5147 and 1.5807 respectively). Yet it is the percentage change between those two years that will have the impact on demand for newly recruited RNs, and the annual average change for WA (0.67 per cent) is above the national average annual change (0.62 per cent), and is close to the SA average annual change (0.71 per cent), but well below that of the most rapidly ageing state, Tasmania (0.81 per cent).

New Zealand is similar to Queensland in its 2004 PAPF (and thus the population age profile for that year), so is younger than Australia as a whole. But the New Zealand population is projected to grow more slowly than Queensland over the period to 2010 (though not as slowly as SA and Tasmania), and to age (as measured by change in the PAPF) at the same rate as Australia as a whole.

Table B.7 Population Age Profile Factor (raw), 2004 and 2010, and population change 2004-2010, states and territories and Australia, and New Zealand

	Population Age Profile Factor (PAPF)		PAPF change 2004-2010 (%)		Population change 2004-2010 (%)	
	2004	2010	Total period	Average annual	Total period	Average annual
Australia	1.5147	1.5807	4.36	0.62	6.87	0.98
NSW	1.5385	1.6057	4.37	0.62	5.36	0.77
Vic	1.5332	1.6005	4.39	0.63	6.03	0.86
Qld	1.4685	1.5278	4.04	0.58	11.66	1.67
WA	1.4524	1.5210	4.72	0.67	9.46	1.35
SA	1.6138	1.6943	4.99	0.71	1.82	0.26
Tas	1.5634	1.6518	5.66	0.81	2.47	0.35
NT	1.1490	1.1778	2.50	0.36	8.56	1.22
ACT	1.3563	1.4271	5.22	0.75	7.62	1.09
New Zealand	1.4707	1.5348	4.36	0.62	4.85	0.69

Notes and sources:

See text for derivation of PAPF. It is the raw value here, not the indexation to 2003 (or 2004 for New Zealand) that is used for the projections.

Average annual requirements for new RNs resulting from changes in the population age profile and in the size of the total population are, together, still well below the average annual requirements for new RNs resulting from the need to replace RNs who have left nursing (temporarily or permanently). For Australia as a whole, the impact from each of

these on average annual requirements for new RNs, as percentages of the total nursing workforce, are projected to be in 2010 (and it is similar in other years)

Total population increase	:	1.0%
Population ageing (PAPF application)	:	0.9%
Replacement RNs	:	3.8%

While the figures are small as a proportion of the total workforce, they are still significant in the context of future requirements for graduates of pre-registration nurse education programs, and they each vary among the states and territories and New Zealand, and over the years to 2010.

Appendix C Net separation rates

C.1 Historical trends

For more than twenty years those with professional nursing qualifications have become progressively more 'attached' to their profession, whatever their age. This is indicated by those with nursing qualifications across the age ranges being increasingly more likely to be employed as nurses than working in other occupations or not working. This trend is very strong, and not countered by the characterisation of those under 35 (generations 'X' and 'Y') as particularly mobile occupationally, geographically and between employers – whatever their mobility, they are remaining in and/or returning to nursing at a greater rate than their predecessors.

In 1981 and 1986 only 45 and 51 per cent (respectively) of those with nursing qualifications aged 15-64 were employed as nurses (Thomas 1988, p. 6, and Thomas 1990, p. 78). In contrast, according to 2001 Census data, 64 per cent of those aged 20-64 with professional nursing qualifications as their highest qualification were working as professional nurses, 19 per cent were working in other occupations, and 17 per cent were not working. In addition, in 2001, around 70 per cent of those aged 30-49 were working as RNs – a much higher percentage than the comparable figure of between 40 and 50 per cent in 1981 and 1986.

C.2 General matters concerned with separation and workforce planning

Of all the flows in a manpower system, wastage is the most fundamental for manpower planning. (Batholomew & Forbes, 1979, p.12)

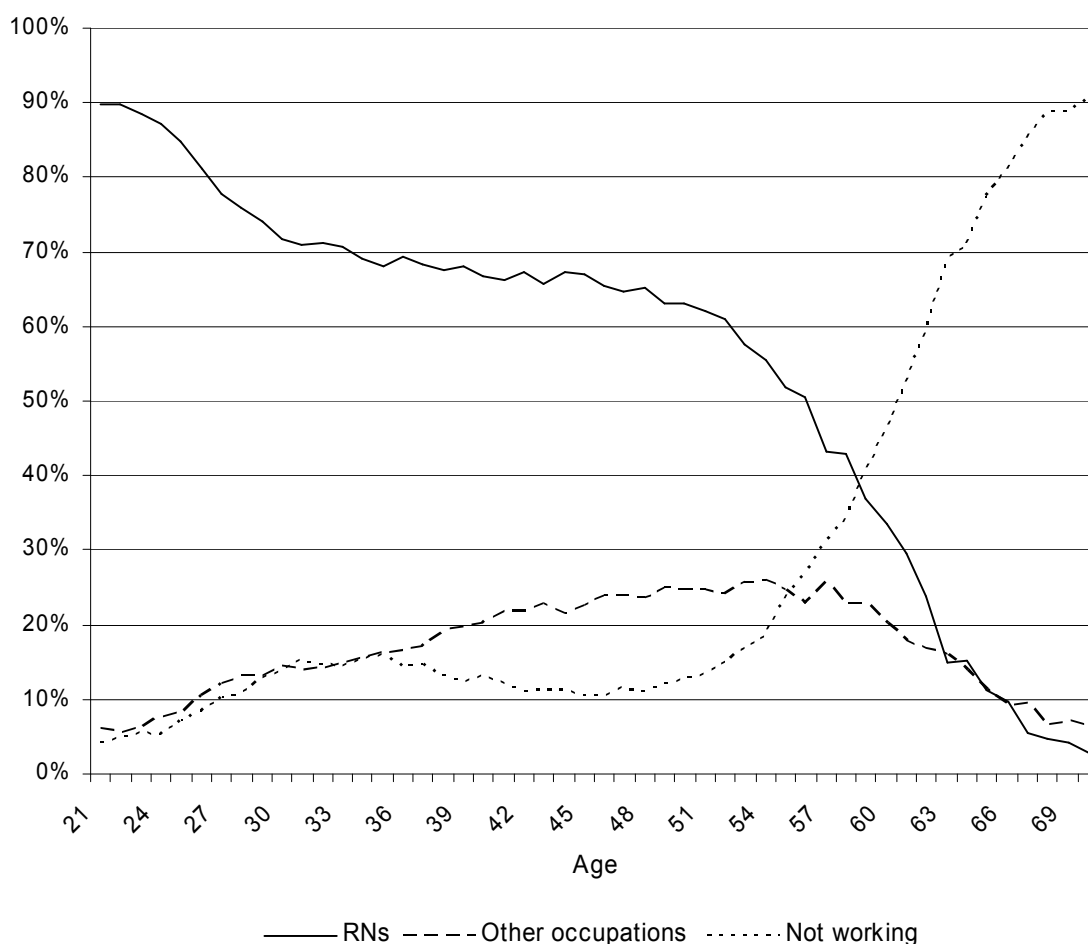
Over the coming period net separations are sure to have a much greater impact on the demand for new RNs than changes in the total population (staffing levels remaining constant) and the ageing of the population (staffing levels for older age groups at 2003 levels) combined, or most reasonable scenarios for variations in staffing levels. For example, the projection for Australia as a whole in the year 2010 has population increase (from 2009) contributing 1,870 to DEMAND for graduates, population ageing contributing 1,541, and annual net separations requiring replacements of 6,899 – more than twice the sum of the increase from both population increase and population ageing.

'Net separations' is the concept used here so that re-entrants and others whose entry or return to the profession are not otherwise accounted for are included. This is most important for those who take extended leave and need replacement while they are on leave and for those who resign and return some years later. It is also important for accounting from those who leave one employer (or agency or jurisdiction where their departure is noted) to take up a position immediately with another employer (or agency or jurisdiction). It is important here that either *both* or *neither* the departure and recruitment are accounted for.

Any adequate method must take account of the projected workforce age profiles. This is because the net separation rate varies greatly by age (and years of experience). Beginning practitioners tend to have a relatively high rate of net separation in the first year or so as some realise that the profession is not for them or they do not receive the necessary support to cope with the stresses of a beginning professional. Younger practitioners are also more likely to move geographically than those who have established relationships, families and purchased houses. While they might move interstate or overseas to work as RNs, they are not a loss to the profession and may return to their home location.

Women around their late 20s and 30s may leave to bear and raise children. They may be out of the workforce for a year or more, and return to work part-time for some years before returning to full-time employment in their 40s. Some men also reduce their workforce participation to care for children (or, alternatively, intensify their work time to increase income). Over those years professionals may also take time out for study or travel. Through the 40s to early 50s there is relatively high attachment to work. In their 50s professionals such as RNs begin to retire, with almost all retiring by around 65 – Census data indicates that RNs retire at a younger age than those with professional nursing qualifications who are working in other occupations (or it may be that older RNs tend to leave nursing for other occupations). The age-related pattern of ‘attachment’ to the nursing profession and the labour force status of those not working as RNs is indicated by Figure C.1, ‘Australians aged 21-71 with professional nursing qualifications, whether working as professional nurses, working in other occupations or not working, 2001’.

Figure C.1 Australians aged 21 to 71 with a highest qualification in professional nursing, percentages working as RNs, employed in other occupations, or not working, 2001



Source: ABS 2001 Census custom tables

In addition to the variation of net separations according to age, there is also variation in the average hours worked a week according to age. Younger RNs tend to work the longest hours and those around their late 30s the shortest hours. According to AIHW data for 2003, those under 25 averaged 39 hours a week, and those aged 35-39 averaged

30 hours a week, and those aged 50-54 averaged 34 hours a week – see Figure A.1. Thus separations of persons (that is, actual individuals leaving nursing) will have (on average) the greatest impact on the effective workforce if the individuals are in the younger age groups, and the separation of those around their late 30s the least impact. While most methods of calculating net separations do not tell us the hours of work of the actual individuals leaving, the aggregate data provides sufficient proxy.

It is therefore essential that calculations of overall workforce net separations take into account the age profile of the workforce in terms of both persons and FTE.

C.3 Methodology used in this report

Developing estimates for future separation (or net separation) rates is difficult and controversial.

A classic method is to use cohort analyses, either where the patterns for actual individuals of a given age or length of service are followed over some years and projected into the future or where aggregate data for a group of a given age or length of service are followed over some years and projected into the future. However, this method is problematic if initial entry occurs across several age groups, exit and re-entry occurs in a complex pattern (which may also involve variations in hours worked), and/or data is limited. For occupations such as nursing cohort analysis may be appropriate for analyses of separations among older nurses (see, for example O'Brien-Pallas et al 2003), but less so for the workforce as a whole.

The method used in this report seeks to overcome the difficulties of a cohort analysis in the context of the characteristics of the Australian professional nursing workforce and currently available data. An 'underlying' net separation rate for each five year age group is estimated, and these rates are applied to projected age profiles of the RN workforce in each jurisdiction. Where relevant New Zealand data is not available, Australian data or estimates are used (with appropriate adjustments).

The underlying net separation rates for each five year age group are derived from 2001 ABS Census data on the population of those with professional nursing qualifications as their highest qualification – those who are qualified in the broad field of study of 'nursing' (QALFP 0603), and qualified at degree level or above (QALLP 1-3 – to exclude enrolled nurses and others with non-professional nursing qualifications), and do not have a higher qualification outside the field of nursing. Within this data set, the proportion who are working as 'nursing professionals' (OCCP 232) by age is provided. Figure C.1 illustrates the general pattern, and Box C.1 at the end of this appendix considers the quality of Census-derived data on qualifications, and the implications for this report.

The important matter is the change from one year (or range of years) in age to the next in the percentage of those with professional nursing qualifications who are working as RNs. (For example, using the data in Figure C.1, the change from the 65 per cent of 48 year olds to the 63 per cent of 49 year olds with professional nursing qualifications who are working as RNs is around 3 per cent.) The weighted average for each five year age group is then calculated for a raw underlying net separation rate for each age group. These rates for the younger age ranges need adjustment to account the entry of many new recruits though the age range to 30 which results in an underestimation of the net separation rates. The net separation rate for the 20-24 group – the age range of most new entrants – is multiplied by 2.75, taking it from 1.57 per cent (clearly an understatement) to 4.32 per cent. The net separation rate for the 25-29 group – also an age range of new entrants though they make up a lesser proportion as the group also includes many who entered when 20-24 as well as around 25-27 – is multiplied by 1.33, taking it from 3.27 per cent to 4.35 per cent. The multiplier in each case is based approximately on the increase in the

total number of RNs in the age group. The resultant rates appear appropriate because if applied to a cohort entering at age 25 (a year older than the mode age for graduates), around 77 percent (net) remain in their early 30s, which is almost identical with the situation indicated by the Census data (if we assume 90 per cent of those with qualifications enter the profession soon after completion).

Table C.1 sets out the resulting estimated underlying average annual net separation rates for each five year age group.

Table C.1 Estimated underlying average annual net separation rates, five year age groups

20-24	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60-64
4.32%	4.35%	1.01%	0.47%	-0.10%	1.21%	3.72%	7.91%	19.05%

Note: See text for derivations method.

These rates are then applied to FTE RN age profile data for 2003 (AIHW) and projections for 2008 and 2013 for each jurisdiction. The projections are based on projections of total ‘target’ FTE numbers of RNs in each jurisdiction (Row 5 in the projections tables), AIHW 2003 data on FTE RNs by five year age group, DEST data on the ages of graduates of pre-registration nurse education courses, and DIMA data on the age profile of overseas arrivals and departures. New Zealand 2004 age profile data is used for the New Zealand calculations.

The net separation rate for the total FTE RN workforce in each jurisdiction in each of 2003, 2008 and 2013 is the weighted average for each five year age range. Thus a jurisdiction with a very high proportion of its workforce aged 30-49 will have a much lower overall net separation rate than jurisdictions with very high proportions of their workforces under 30 or over 50. The proportions of the FTE RN workforce in each five year age range in each major jurisdiction in 2003 (2004 for New Zealand) are set out in Table A.2. The data in that table can explain the 2003 estimated net separation rates set out in Table C.2.

Table C.2 also sets out projected net separation rates for 2008 and 2013, and the percentage change over the time periods 2003 to 2008, 2008 to 2013, and 2003 to 2013. There are significant differences between the Australian states and territories. Among the major jurisdictions the highest estimated 2003 rates are in WA and Tasmania, largely because of their high proportions of the workforce 55 and over. The lowest estimated rate is that of SA, largely because of the high proportion of that state’s workforce aged 40-49 and low proportion aged 55 and over. Because of the very high proportion of the SA workforce aged 45-49 in 2003 and relatively low projected growth in the size of the workforce, that state is projected to have the greatest increase in net separation rates between 2003 and 2013 (excluding the ACT) as the proportion aged 50 and over increases. WA is projected to have a very significant slow-down in the rate of increase in net separation rates largely because of the projected decrease in the proportion of the workforce aged 50 and over, as well as an increase in the proportion of those aged 40-44 – the age range where estimated underlying net separation rates are negative.

Table C.2 Net separation rates estimated and projected for 2003, 2008 and 2013, Australia, New Zealand and Australian states and territories

	Net separation rates			Percentage change		
	2003	2008	2013	2003- 2008	2008-2013	2003-2013
Australia	3.3%	3.6%	4.0%	10.3%	9.1%	20.3%
New Zealand	3.2%	3.5%	3.9%	9.8%	11.7%	22.6%
NSW/ACT	3.2%	3.6%	4.0%	12.2%	11.4%	25.0%
NSW	3.2%	3.6%	4.0%	11.6%	11.3%	24.1%
Vic.	3.2%	3.4%	3.7%	6.4%	8.7%	15.7%
Qld	3.5%	3.7%	3.9%	5.8%	5.5%	11.6%
WA	3.7%	4.1%	4.1%	11.1%	1.4%	12.7%
SA	2.9%	3.5%	4.1%	20.3%	16.0%	39.6%
Tas.	3.6%	4.1%	4.5%	14.6%	10.3%	26.3%
NT	3.1%	3.6%	4.1%	18.0%	14.6%	35.2%
ACT	3.2%	4.0%	4.5%	24.8%	12.6%	40.4%

Note: See text for derivations method.

The average annual differences in net separation rates between 2003 and 2008, and 2008 and 2013 for each jurisdiction are used to calculate net separation rates for each year.

The resulting estimated net separation rates for each jurisdiction for each year to 2010 is then applied to the main supply and demand models for each jurisdiction in Row 10. Some adjustments are made for the particular circumstances of some jurisdictions (especially the Northern Territory), and for particular scenarios (especially of strategies seeking to increase retention).

For the net separations calculations FTE RNs are used. The very different persons to FTE ratios by age mean that to convert the FTE number of recruits required to persons (for comparability with the number of graduates), the RN age profile in each year in each jurisdiction must be taken into account. The outcome of the resulting calculation is incorporated in the model for calculating net separation rates, and provides the 'Persons: FTE RNs' figures of Row 12 for each year for each jurisdiction.

Box C.1 Technical note on ABS Census qualifications data

The calculations for net separations for all age groups assume that as the population gets older those who are not working as RNs are neither more nor less likely than those who are working as RNs to have a highest qualification that is not classified by the ABS as a professional nursing qualification.

The relevant ABS Census question is 'What is the main field of study for the person's highest qualification completed?' For those who have just completed a pre-registration nurse education course at bachelor level it is likely that the 'nursing' field of study would be recognised. However, if the person had previously completed, say, an honours degree in history, or a graduate diploma in education, they would be classified as having 'history' or 'teacher education' as their highest qualification. It is clearly the case that older RNs are less likely to report a highest qualification in nursing – they may be either a career changer with a previous qualification classified as higher than their subsequent nursing qualification, or they may subsequently have undertaken a postgraduate course leading to a qualification classified in a field of study other than nursing - say, within areas of 'health' not classified as 'nursing' such as 'Indigenous health' or other areas of 'public health', or within the broad field of 'management' (which includes 'public and health care administration' and 'hospital management'), or 'education' (which includes 'nursing education teacher training'), or any other non-nursing field (ABS 2001, pp. 121-143). This is indicated by comparing 2001 Census data on those classified as having professional nursing qualifications who are working as professional nurses, with 2001 Census data on all those working as RNs, irrespective of qualifications. There is little difference between the two for the number in the 20-24 age group, with those RNs classified as having nursing qualifications at 93 per cent the number of RNs irrespective of qualifications. There is then a slight decrease to the 25-29 age group at 87 per cent, falling to stabilise around 62 per cent from age 35.

Recent accurate data for those who have a professional nursing qualification that is not their highest qualification and who are not working as RNs is not available*. However, it is reasonable to assume that those not working as RNs are no more likely to have obtained qualifications higher than their nursing qualifications than are those continuing to (or returning to) work as RNs. Only a limited proportion of those moving to other occupations would be much more likely than those who remained in nursing to undertake a higher qualification not classified as 'nursing' (such as those undertaking a postgraduate teacher education course). VET courses that would be undertaken to support small business, hospitality, office administration and similar occupations would not be classified as 'higher' than the original nursing qualification.

For the calculations in this report we are concerned with the **proportions** of those who are reported as having a highest qualification in professional nursing. As long as those proportions are reasonably accurate it does not matter if the absolute numbers are understated.

* In 1989 the ABS carried out a supplementary labour force survey (on a sub-sample of the monthly population survey) which sought data on those aged 15-64 who had ever qualified as registered or enrolled nurses. This was published as *March to July 1989 Career Paths of Qualified Nurses Australia* (ABS 1990). The rich data from this survey includes the number of nurses ever qualified for registration (even if not ever registered), whether currently registered, currently working as an RN (hours of work, location of work, etc), currently working in another occupation (industry, occupation, hours of work, income), by age and state.

Appendix D. Migration issues

D.1 Overseas migration and the RN labour market and workforce

Overseas migration has a substantial impact on the RN labour market in Australia, and even more so in New Zealand. Table D.1 indicates the relative magnitude (as a proportion of the total RN workforce) of graduates, overseas arrivals, overseas departures and net arrivals for Australia and New Zealand. In 2004 completions of pre-registration courses were equivalent to about three percent of the total RN workforce in both Australia and New Zealand. There were more overseas arrivals – about 3.3 per cent of the Australian and 4.4 per cent of the New Zealand RN workforces. Departures balanced out many of those arrivals, being equivalent to 2.1 per cent and 3.5 per cent of the RN workforces respectively. Thus net arrivals were equivalent to a larger proportion of the RN workforce in Australia than New Zealand (1.2 per cent compared with 0.8 per cent), but New Zealand appears more vulnerable to fluctuations with relatively greater proportions of both departures and arrivals.

Table D.1 Estimated equivalent percentages of the total RN workforce: completions of pre-registration courses, overseas arrivals, overseas departures, and net overseas arrivals, Australia and New Zealand, 2004

	Completions of RN pre-registration courses	Overseas arrivals of RNs	Overseas departures of RNs	Net overseas arrivals of RNs
Australia	3.0%	3.3%	2.1%	1.2%
New Zealand	3.0%	4.4%	3.5%	0.8%

Note: These figures are estimates because original data sets are not available in fully comparable form.

Tables D.2 and D.3 show the fluctuations in net arrivals – and in departures and arrivals for New Zealand – over the past decade.

The particular countries of next or last residence, and the category of arrivals or departures, can help in understanding the possibilities of international movements in the Australian (and New Zealand) RN workforce over the coming period. Table D.4 provides data for Australia for 2003-04. The UK is the most important country of last and next residence for each category of arrivals and departures. While settler and net visitor movements are positive arrivals, there are more *Australian resident* departures than returns.

This might appear to indicate an increasing strength in active recruitment to the UK. However, recent developments point to a sharp reduction in the employment of overseas RNs in the UK. On 3 July 2006 the UK Health Minister, Lord Warner, announced that general nurses will be removed from the official list of shortage occupations (Department of Health, UK, 2006). This is expected to have a dramatic impact on overseas general nurses entering the UK, perhaps reducing the number from almost 13,000 to around 2,000 (Hall 2006). The reasons for this policy change include the end of the 'period of expansion in the nursing workforce since 1997, and 'record levels of nurses in training' (Department of Health, UK, 2006). There are also reports of UK nursing graduates being unable to find positions, and actual cuts in staffing because of NHS financial difficulties.

Table D.2 Net arrivals of RNs, Australia 1995-96 to 2004-05

1995-96	1996-97	1997-98	1998-99	1999-2000	2000-01	2001-02	2002-03	2003-04	2004-05
703	421	350	379	470	697	1094	1974	2483	2418

Source: Birrell et al (2005) p. 4, and DIMA unpublished data

Table D.3 Net arrivals of RNs, New Zealand 1994 to 2005

	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005
Arrivals	985	1107	1213	1286	1125	1118	1247	1175	1378	1425	1509	-
Departures	787	790	927	1099	1141	1250	1218	1340	1399	1149	1223	-
Net arrivals	198	317	286	187	-16	-132	29	-165	-21	276	286	284

Source: Department of Labour (2005) p. 6, and Statistics New Zealand (2006)

Table D.4 Arrivals and departures of RNs, Australia, selected countries* 2003-04

Last or next residence	Arrivals			Departures		Net arrivals	
	Settlers	Australian resident returns	Visitors	Australian resident departures	Visitors	Number	% of total
United Kingdom	702	1122	889	1258	368	1087	43.8%
South Africa	107	13	194	11	41	262	10.6%
Philippines	56	3	255	15	67	232	9.3%
New Zealand	318	57	274	309	183	157	6.3%
Zimbabwe	107	13	194	0	33	143	5.8%
Ireland	29	77	152	63	87	108	4.3%
Singapore	48	30	98	39	36	101	4.1%
Hong Kong	32	80	22	63	8	63	2.5%
China (excl Hong Kong & Taiwan)	41	10	57	21	27	60	2.4%
Japan	14	7	93	15	40	59	2.4%
Canada	13	95	50	98	23	37	1.5%
USA	35	173	66	245	42	-13	-0.5%
TOTAL	1748	1964	2728	2644	1313	2483	100.0%

Source: Birrell et al (2005) p. 50. *Selected countries are those with at least 90 in any one column or net arrivals of at least 60.

Table D.5 Permanent and long term RN arrivals and departures, states and territories and Australia, 2004-05

	Arrivals					Departures					Net arrivals	
	Settler arrival	Long term resident return	Long term visitor arrival	Total arrivals		Permanent resident departure	Long term resident departure	Long term visitor departure	Total departures			
NSW	542	608	1 325	2 475	39.2%	367	556	571	1 494	36.8%	981	43.4%
Vic	328	405	569	1 302	20.6%	197	438	296	931	22.9%	371	16.4%
Qld	330	409	329	1 068	16.9%	190	417	182	789	19.4%	279	12.3%
SA	84	121	160	365	5.8%	44	140	71	255	6.3%	110	4.9%
WA	353	215	320	888	14.1%	112	170	144	426	10.5%	462	20.4%
Tas	12	41	13	66	1.0%	11	37	8	56	1.4%	10	0.4%
NT	17	8	54	79	1.3%	12	9	24	45	1.1%	34	1.5%
ACT	11	24	41	76	1.2%	11	39	13	63	1.6%	13	0.6%
Australia	1 677	1 831	2 811	6 319	100.0%	944	1 806	1 309	4 059	100.0%	2 260	100.0%

Source: Department of Immigration and Multicultural Affairs (DIMA) custom tables

Table D.6 Pre-registration nurse education commencements, all, domestic and international students, states and territories and Australia, 2004

	NSW	Vic	Qld	WA	SA	Tas	NT	ACT	ACU**	Australia
Total	2613	2009	1717	805	962	276	186	106	591	9265
Domestic	3277	1859	1595	715	875	259	183	99	392	8354
International	236	150	122	90	87	17	3	7	199	911
% international	9.0%	7.5%	7.1%	11.2%	9.0%	6.2%	1.6%	6.6%	33.7%	9.8%
% of all Australian international	25.9%	16.5%	13.4%	9.9%	9.5%	1.9%	0.3%	0.8%	21.8%	100.0%

Source: DEST 2006, 2004 collection, Tables 60 & 61. **About 70 per cent of the Australian Catholic University international students are in NSW.

However, this sharp reduction in overseas RNs in the UK may be reversed – at least partially. The UK Royal College of Nursing (RCN) pointed out that the independent sector will be affected by the reduction in availability of overseas nurses though it is not affected by the NHS financial difficulties and is very reliant on overseas RNs, and the RCN has argued that the very large number of nurses due to retire over coming years will not all be able to be replaced by locally trained RNs (RCN 2006a). The RCN called on the UK Government ‘to invest in robust workforce planning measures’ (RCN 2006b).

The number of RNs moving to and from the US have been much smaller than the UK. However, net departures from Australia to the US may increase substantially if shortages in the US are not effectively addressed internally, and there is reluctance in the US to recruit from developing countries for both virtuous and self-interested reasons. There is evidence for this from the magnitude of the shortages developing in the US and positions regarding recruitment from developing countries. An April 2006 research and policy retreat involving US national experts in the nursing workforce noted that

The US, which employs half of all nurses . . . in English-speaking countries, is facing possible deficits of as many as 800,000 nurses . . . by 2020-2025. (Cooper & Aiken 2006, p. 1)

The conclusions from that retreat included advocacy of ‘national self-sufficiency in nursing’ through ‘building, innovating and sustaining the core educational capacity in nursing’ (p. 1), and international collaboration to support the education, employment and retention of nurses in developing countries (pp. 2-4). The concern with US recruitment of nurses from developing countries may lead to more active recruitment from countries such as Australia and New Zealand as long as US self-sufficiency is not reached. The strategies proposed by those at the retreat indicate that there is unlikely to be sufficient capacity in nurse education to meet requirements over the coming years, and overseas recruitment may be an easier (or additional) solution to the suggested ‘re-engineering the workplace for nurses’ and changes in professional education.

Buerhaus et al (2003) note in their analysis of the ‘lingering’ shortage of hospital nurses in the US that since the mid 1990s employment of foreign-born RNs has increased at a much faster rate than domestic RNs (p. 195), and after noting the difficulties in expanding intakes of nurse education programs to necessary levels (p. 196), they conclude

The time has come to recognise that RNs from other countries are likely to play an increasing role in providing nursing care in the United States. (p. 197)

The large magnitude of expected shortfalls is also apparent in Spetz et al (2005) in their investigation of the Californian nurse workforce. They estimated the ‘current shortage’ of RNs in California between 6,872 and 21,161, which they project to increase to between 99,945 and 122,223 in 2030, and the ‘only plausible solution to the RN shortage . . . appears to be continued efforts to increase the numbers of graduates from California nursing programs’ (p. 3). They report that in 2003-04, 3,684 non-US educated RNs received a Californian licence (many using California as a gateway to other states), and they note the 2005 tightening of immigration rules and increasing scrutiny of applications of RNs from the Philippines (p. 10). This may well lead to increased active recruitment of RNs from countries such as Australian and New Zealand who may be perceived as better security and immigration risks.

D.2 Assumptions for this report

The projections in this report usually have three different migration scenarios

- maintaining net arrival numbers at recent levels (the standard assumption)
- progressively reducing net arrivals to zero - in line with the Australian National Health Workforce Strategic Framework, endorsed by the Council of Australian Governments (COAG) on 10 February 2006, which calls for 'national self-sufficiency in health workforce supply, while acknowledging that Australia is part of a global market' (this scenario does not preclude movement of RNs in and out of Australia or New Zealand, only that departures become equal to arrivals)
- increasing net arrivals by five per cent per year (or some other rate of increase).

The 'no change' standard scenario is based on some combination of the following assumptions

- increasing recruitment of Australian and New Zealand RNs to work overseas (and enticement of home nationals and others to work in those overseas jurisdictions, and become less available to work in Australia or New Zealand) – in 2003-04 there were 35 per cent more Australian resident departures than returns, a difference that had increased to 50 per cent in 2004-05 (Tables D.4 and D.5)
- no increase, or some reduction, in active recruitment of overseas nurses by Australian health authorities because of reducing shortages overall in Australia (and similar slow downs in active recruitment in New Zealand)
- some increase in arrivals of RNs as individual applicants and, for example, as spouses of 457 visa holders in other occupations.

The 'reduction to zero' scenario is based on some combination of

- intentional policy to reduce net reliance on overseas nurses (by improving retention in the workforce of existing nurses, especially in the short term, and, in the longer term, increasing intakes)
- increasing recruitment of Australian and New Zealand RNs to work overseas, balancing arrivals.

The 'increasing net arrivals' scenario is based on some combination of

- reduction in recruitment (active or passive) by overseas jurisdictions of RNs who would otherwise work in Australia – the developments in the UK noted above may result in fewer departures from Australia and New Zealand to the UK (1,626 from Australia in 2003-04), and entry to Australia and New Zealand of overseas RNs whose first preference, the UK, is not available
- increased active recruitment of overseas RNs by Australian and New Zealand health authorities and other employers
- incidental increases of RN arrivals as spouses of recruited skilled migrants and as individual migrants.

In evaluating those scenarios we need to consider international developments over which Australian or New Zealand policy-makers have little control and those matters where Australian or New Zealand policy can make a significant difference. There are many different visa options for overseas RNs wishing to work in Australia (similarly for New Zealand). These are detailed on the DIMA webpage, 'Visa options for nurses' (DIMA 2006). For some options active employer recruitment is involved, for others it is a matter

of individual initiative or family connection. Australia and New Zealand do not have a great deal of control over active recruitment and enticement of their graduates and experienced RNs to work overseas, except to make working in Australia or New Zealand relatively more attractive. Of course international experience can be very personally and professionally enriching, and add to the quality of professional experience and expertise that RNs bring to their work.

International students are an increasingly important component of skilled migration to Australia. Most international students who complete Australian pre-registration nurse education courses enter the Australian RN workforce. In 2004 almost ten per cent of commencements in pre-registration nurse education courses were international students, and there are indications that the percentage is increasing. Table D.6 shows that international students were more than eleven per cent of Western Australian commencements, but less than two per cent in the Northern Territory and about six per cent in Tasmania. The Australian Catholic University (especially its Sydney campus) had a particularly large proportion of international commencements. An estimate for international students who enter the Australian RN workforce is discounted from the net migration arrivals in the projections tables (Row 16).

Similarly, an estimate for the Australian graduates who leave for overseas soon after completion and are accounted for as departures in net arrivals (Row 16) are discounted in the percentage of graduates who are available and suitable (Row 18).

Appendix E. Graduate supply

E.1 Historical background

Enrolments in pre-registration nurse education courses in Australia have fluctuated over the past decade and a half. Data has not been collected on a fully comparable basis, but it appears that completions increased strongly between 1990 and 1994 (DEST 2002, Table 5, p. 285) when there were 7,361 students completing basic nursing courses, of whom 5.6 per cent were overseas students (DEST 2006, 2004 Collection, Table 64). The sharp cuts in intakes that occurred around the mid 1990s then took effect, and by 2000 completions had reduced by around 30 per cent. Intakes, and consequently completions, have since been increasing again, and are projected to continue doing so. Total Australian completions are projected to almost double between 2000 and 2009 if the new places announced by the Australian Government in 2006 are taken into account (see below). Without those additional places the projected increase is 74.2 per cent. The actual and projected percentage changes in completions vary substantially between the jurisdictions, with the least increase in Victoria.

Table E.1 Pre-registration nurse education completions, actual 2000 and 2003, and projected 2006 and 2009, Australian states and territories, Australia and New Zealand

	2000	2003	2006	2009	Change 2000-09	Change 2006-09
NSW	1 623	1 562	2 282	3 094	90.6%	35.6%
NSW plus ACT	1 681	1 628	2 352	3 212	91.1%	36.6%
Victoria	1 501	1 505	1 846	2 191	46.0%	18.7%
Queensland	914	1 126	1 379	1 828	100.0%	32.6%
WA	384	501	645	905	135.7%	40.3%
SA	394	539	825	949	140.9%	15.0%
Tasmania	124	187	225	310	150.0%	37.8%
NT	51	144	60	280	449.0%	366.7%
ACT	58	66	70	118	103.4%	68.6%
Australia	5 049	5 630	7 332	9 674	91.6%	31.9%
<i>Australia, % change from previous</i>	-	11.5%	30.2%	31.9%	-	-
Australia, not including additional places	5 049	5 630	7 332	7 793	74.2%	19.9%
New Zealand	1 184	1 059	1 344	1 432	20.9%	6.5%
<i>NZ, % change from previous</i>	-	-10.6%	26.9%	6.5%	-	-

Sources and notes:

Australia 2000 and 2003 from DEST (2006), Table 95 (2000) and Table 65 (2003). Australian Catholic University completions have been allocated between NSW, Queensland and Victoria according to the proportions for those years in Preston (2002, pp. 58-59).

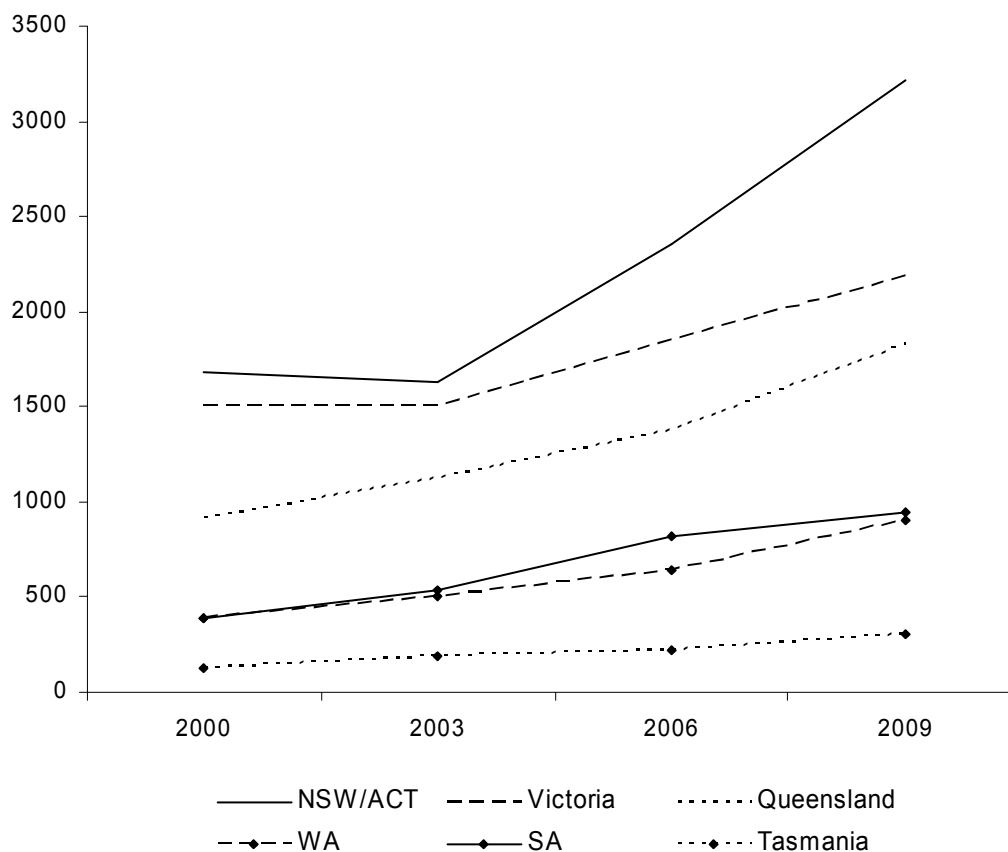
New Zealand 2000 and 2003 from Department of Labour (2005), p. 5.

Australia 2006 & 2009 data provided by all schools of nursing, confirmed or amended, March 2006, plus for 2009, additional Commonwealth-funded places announced in July 2006 (Howard 2006). See Tables E.2 to E.6.

New Zealand 2006 & 2009 data provided by all schools of nursing, confirmed or amended, March 2006. See Table E.7.

Similarly, in New Zealand there was a reduction of more than 20 per cent in completions from 1,485 in 1996 to 1,184 in 2000. Completions are now projected to increase to just below the 1996 level in 2009.

Figure E.1 Pre-registration nurse education, completions of all students, actual 2000 and 2003, and projected 2006 and 2009, selected Australian states



Source: Table E.1

E.2 Projections used in this report

All schools of nursing responded to a survey in 2005 that requested information on their projected (planned/expected) completions for their pre-registration nurse education courses each year to 2009. There were opportunities to revise those projections in February and March 2006. The projections provided by schools of nursing are set out in Tables E.3 to E.5 for Australia, and E.6 for New Zealand.

Since those projections were confirmed, the Australian Government announced 1,036 additional pre-registration nursing places. The allocation of these places to particular institutions was announced by the Prime Minister on 13 July 2006 (Howard 2006). This allocation is set out in Table E.6, along with estimations of completions made by the author for 2009, and the consequent 2010 SUPPLY resulting from the addition of projected completions by schools of nursing and midwifery (from Tables E.3 to E.5) and the estimated completions of the new 2007 places. The projections provided by schools

of nursing and the estimated completions from these new places are combined in the projections tables and other tables and analyses.

In the supply and demand projections the completions of one year are accounted for as 'graduates' available in the subsequent year. Thus these projections of completions go up to the end of 2009, while the SUPPLY projections (Row 20) go up to 2010.

Table E.2 (derived from Tables E.3 to E.7) shows the projected percentage change in completions from one year to the next. In general there is a greater annual increase early in the period than later in the period until 2008 to 2009, when those who have taken up the new places complete. Some of the sharp annual fluctuations reflect changes in course structure or the introduction or termination of courses with relatively large numbers of students.

Table E.2 Pre-registration nurse education completions (actual and projected) 2004 to 2009, percentage change from previous years, states and territories and New Zealand, 2004 to 2009

	2004 to 2005	2005 to 2006	2006 to 2007	2007 to 2008	2008 to 2009
NSW & ACT	17.3%	23.0%	10.4%	6.5%	16.2%
Vic	1.8%	19.7%	3.4%	3.6%	10.8%
Qld	6.3%	9.8%	13.0%	3.0%	14.0%
WA	15.2%	1.4%	14.9%	4.6%	16.8%
SA	18.6%	7.1%	4.2%	7.6%	2.6%
Tas	11.3%	3.7%	0.0%	0.0%	37.8%
NT	-17.3%	-51.6%	100.0%	91.7%	21.7%
Australia	9.9%	13.6%	9.2%	6.1%	13.8%
NZ	17.7%	0.5%	6.4%	0.1%	0.0%
Aust & NZ	11.2%	11.3%	8.8%	5.2%	11.9%

Source: Tables E.3 to E.7. The large increases between 2008 and 2009 for Australian jurisdictions is primarily because of the new Commonwealth-funded places commencing in 2007.

Table E.3 New South Wales pre-registration nurse education, completions (actual and projected) 2004 to 2009

	2004	2005	2006	2007	2008	2009*	Change 2004 to 2009	Change 2005 to 2009
New South Wales								
ACU	126	177	230	350	375	385	205.6%	117.5%
Avondale	33	33	45	43	55	60	81.8%	81.8%
<i>CSU Bathurst/Orange</i>	94	116	184	231	278	342	263.8%	194.8%
<i>CSU Dubbo</i>	31	20	35	28	35	35	12.9%	75.0%
<i>CSU Albury</i>	12	25	21	20	25	25	108.3%	0.0%
<i>CSU Wagga Wagga</i>	40	40	40	40	40	40	0.0%	0.0%
CSU total	177	201	280	319	378	442	149.7%	119.9%
SCU	97	105	160	256	220	220	126.8%	109.5%
<i>UNE BN on campus</i>	74	65	85	95	110	115	55.4%	76.9%
<i>UNE BNS external</i>	21	29	30	30	35	35	66.7%	20.7%
UNE Total	95	94	115	125	145	150	57.9%	59.6%
<i>Newcastle Callaghan</i>	181	204	206	225	225	225	24.3%	10.3%
<i>Newcastle Port Mac.</i>	0	0	11	24	32	35	-	-
<i>Newcastle Central Coast/Gosford</i>	45	48	50	55	61	65	44.4%	35.4%
Newcastle Total	226	252	267	304	318	325	43.8%	29.0%
Notre Dame NSW	0	0	0	0	54	70	-	-
Sydney	150	140	170	80	80	100	-33.3%	-28.6%
UTS	250	300	400	430	450	450	80.0%	50.0%
UWS	266	450	490	490	490	490	84.2%	8.9%
Wollongong	145	105	125	125	125	125	-13.8%	19.0%
TOTAL NSW	1 565	1 857	2 282	2 522	2 690	2 817	80.0%	51.7%
ACT: University of Canberra	65	55	70	75	75	75	15.4%	36.4%
TOTAL NSW & ACT	1 630	1 912	2 352	2 597	2 765	2 892	77.4%	51.3%

Source: Data provided by all schools of nursing, confirmed or amended, March 2006.

*See Table E.6 for additional new places completions.

Table E.4 Victoria, Queensland and Western Australia, pre-registration nurse education, completions (actual and projected) 2004 to 2009

	2004	2005	2006	2007	2008	2009*	Change 2004 to 2009	Change 2005 to 2009
Victoria								
ACU	160	208	223	233	243	253	58.1%	21.6%
<i>Deakin Waterfront</i>	87	85	148	180	180	180	106.9%	111.8%
<i>Deakin Burwood</i>	137	162	210	250	250	250	82.5%	54.3%
<i>Deakin Warrnambool</i>	51	51	54	65	65	65	27.5%	27.5%
Deakin Total	275	298	412	495	495	495	80.0%	66.1%
La Trobe (4 campuses)	361	338	330	330	395	395	9.4%	16.9%
Monash Gippsland & Peninsula	170	207	305	203	200	200	17.6%	-3.4%
<i>RMIT Bundoora</i>	185	174	240	238	220	200	8.1%	14.9%
<i>RMIT Hamilton</i>	18	24	28	30	33	35	94.4%	45.8%
<i>RMIT Sale</i>	19	25	28	35	36	35	84.2%	40.0%
RMIT Total	222	223	296	303	289	270	21.6%	21.1%
Ballarat	131	148	135	150	150	150	14.5%	1.4%
Melbourne	0	0	0	19	30	40	-	-
Victoria U	196	120	145	175	175	175	-10.7%	45.8%
TOTAL Victoria	1 515	1 542	1 846	1 908	1 977	1 978	30.6%	28.3%
Queensland								
ACU McAuley	100	95	105	130	140	145	45.0%	52.6%
CQU	98	120	120	120	120	120	22.4%	0.0%
Griffith	300	320	300	430	430	430	43.3%	34.4%
JCU	133	175	170	180	180	180	35.3%	2.9%
QUT	414	400	400	440	440	485	17.1%	21.3%
UQ	0	0	84	128	154	154	-	-
USQ	137	146	200	130	140	140	2.2%	-4.1%
TOTAL Qld	1 182	1 256	1 379	1 558	1 604	1 654	39.9%	31.7%
Western Australia								
Curtin	200	200	200	270	320	330	65.0%	65.0%
Murdoch	0	0	25	51	55	69	-	-
Edith Cowan	300	380	350	300	300	325	8.3%	-14.5%
Notre Dame	52	56	70	120	100	100	92.3%	78.6%
TOTAL WA	552	636	645	741	775	824	49.3%	29.6%

Source: Data provided by all schools of nursing, confirmed or amended, March 2006.

*See Table E.6 for additional new places completions.

Table E.5 South Australia, Tasmania, Northern Territory, and Australia (total), pre-registration nurse education, completions (actual and projected) 2004 to 2009

	2004	2005	2006	2007	2008	2009*	Change 2004 to 2009	Change 2005 to 2009
South Australia								
Flinders	220	290	320	350	360	370	68.2%	27.6%
UniSA	429	480	505	510	515	520	21.2%	8.3%
Adelaide	0	0	0	0	50	50	-	-
TOTAL SA	649	770	825	860	925	940	44.8%	22.1%
Tasmania - University of Tasmania								
TOTAL Tas	195	217	225	225	225	225	15.4%	3.7%
Northern Territory - Charles Darwin University								
TOTAL NT	150	124	60	120	230	280	86.7%	125.8%
Australia TOTAL	5 873	6 457	7 332	8 009	8 501	8 793	49.7%	36.2%

Source: Data provided by all schools of nursing, confirmed or amended, March 2006.

*See Table E.6 for additional new places completions.

Table E.6 Additional Australian Government funded pre-registration nursing places commencing in 2007, and total estimated 2010 SUPPLY

	New pre-registration nursing places commencing in 2007	Total projected 2009 completions (2010 SUPPLY)
New South Wales	Avondale College	56
	University of New England	20
	University of Sydney	60
	University of Notre Dame (Sydney)	40
	University of Tasmania (Sydney)	150
	TOTAL	326
	<i>Estimated additional 2009 completions</i>	277
		3 094
Victoria	Australian Catholic University - Ballarat	35
	Australian Catholic University - Melbourne	85
	La Trobe University	20
	University of Melbourne	50
	University of Ballarat	20
	Victoria University	40
	TOTAL	250
	<i>Estimated additional 2009 completions</i>	213
		2 191
Queensland	Australian Catholic University - Brisbane	35
	Griffith University	20
	University of Southern Queensland	50
	University of the Sunshine Coast	100
	TOTAL	205
	<i>Estimated additional 2009 completions</i>	174
		1 828
South Australia	University of Adelaide	10
	TOTAL	10
	<i>Estimated additional 2009 completions</i>	9
		949
Western Australia	Murdoch University	25
	University of Notre Dame (WA)	70
	TOTAL	95
	<i>Estimated additional 2009 completions</i>	81
		905
Tasmania	University of Tasmania (Tasmania)	100
	TOTAL	100
	<i>Estimated additional 2009 completions</i>	85
		310
Australian Capital Territory	Australian Catholic University - Canberra	50
	TOTAL	50
	<i>Estimated additional 2009 completions</i>	43
		118
AUSTRALIA	TOTAL	1036
	<i>Estimated additional 2009 completions</i>	881
		9 674

Source and notes: New places – Howard 2006; 85% are estimated to complete in 2009; 2010 SUPPLY from estimated completions of these new places plus projected 2009 completions from schools of nursing (Tables E.3 to E.5). Here it is assumed that the completions will occur in 2009. However, some of the places, especially in NSW, are in graduate/intensive courses with completions in 2008. There is comment on this in section 4.3.1.

Table E.7 New Zealand institutions, and Australia and New Zealand (total), pre-registration nurse education completions (actual and projected) 2004 to 2009

	2004	2005	2006	2007	2008	2009	Change 2004 to 2009	Change 2005 to 2009
New Zealand								
Uni Auckland	60	60	75	80	80	80	33.3%	33.3%
Northland Polytechnic	53	58	42	63	60	60	13.2%	3.4%
Waiariki IT	57	83	110	80	80	80	40.4%	-3.6%
Whitireia Com Poly	48	51	55	55	55	55	14.6%	7.8%
Auckland UT	129	121	119	150	150	150	16.3%	24.0%
Western IT at Taranaki	60	60	60	60	60	60	0.0%	0.0%
Nelson Marlborough IT	45	36	43	43	43	43	-4.4%	19.4%
Waikato IT	120	150	84	125	125	125	4.2%	-16.7%
UCOL Palm Nth	77	90	90	90	90	90	16.9%	0.0%
UCOL Gisborne	25	27	27	27	27	27	8.0%	0.0%
UCOL Wanganui	0	35	27	27	27	27	-	-22.9%
UCOL Masterton	0	0	27	27	27	27	-	-
UNITEC NZ	60	94	100	100	100	100	66.7%	6.4%
Eastern IT	0	55	60	80	80	80		45.5%
Christchurch Poly IT	127	150	140	140	140	140	10.2%	-6.7%
Massey Uni (Palm Nth)	15	19	15	25	30	30	100.0%	57.9%
Manukau IT	97	115	120	120	120	120	23.7%	4.3%
Southern IT	67	58	60	63	63	63	-6.0%	8.6%
Otago Polytechnic	96	75	90	75	75	75	-21.9%	0.0%
New Zealand TOTAL	1 136	1 337	1 344	1 430	1 432	1 432	26.1%	7.1%
Australia & New Zealand TOTAL	7 009	7 794	8 676	9 439	9 933	11 106	58.5%	42.5%

Source: Data provided by all schools of nursing, confirmed or amended, March 2006, and Table E.6.

E.4 Age of graduates

Around two thirds of students completing pre-registration nurse education courses are aged under 30, and almost 60 per cent are aged under 25. Table E.6 provides details for the states and territories. This data (along with data on the age profile of migrants) is used in the development of the net separations projections to allocate new entrants to the RN workforce among the different age ranges. It is thus also used for projections in each jurisdiction of age profiles and ratios of persons to FTE RNs. In those calculations the ages are advanced from those of completing students to take account of the time period between course completion data age cut-off (December the previous year) and likely entry into the RN workforce.

Table E.6 Award course completions for nursing students by age group, Australian states and territories, 2003

	under 30			30-39	40-49	50+
	<25	25-29	Total <30			
NSW	55%	13%	68%	18%	12%	2%
Vic	66%	9%	75%	14%	9%	1%
Qld	56%	12%	68%	17%	13%	2%
WA	53%	12%	66%	19%	14%	2%
SA	55%	13%	69%	19%	11%	1%
Tas	68%	8%	76%	13%	8%	2%
NT	18%	17%	35%	31%	28%	6%
ACT	47%	14%	61%	29%	9%	2%
ACU*	58%	14%	72%	17%	10%	1%
Australia	57%	12%	69%	17%	12%	2%

Source: Higher Education Students Collection, DEST custom tables, provided November 2005

* Australian Catholic University students are not disaggregated by state. The completions are approximately 42 per cent from Victoria, 33 per cent from NSW, and 26 per cent from Queensland..

E.5 Nursing course applicants

Data on applicants and demand for nursing courses can usefully inform policy on future intakes. This is most important when increases in intakes are planned and there is uncertainty whether there will be sufficient numbers of high calibre applicants to fill the places. Targeted strategies to attract such applicants may be a particularly high priority in some situations.

The Australian Vice Chancellors' Committee collates and analyses data on domestic applicants for undergraduate university courses from the tertiary admission centres in each state and territory (AVCC 2006, p. 2). While this data on applicants and offers does not reflect all final applicants or enrolments, it does give a useful indication of trends.

Since 1997 unmet demand (as measured by the proportion of eligible applicants not receiving an offer of a place) for nursing courses has increased substantially. This occurred even while the number of offers for places in nursing courses and nursing offers as a percentage of all offers have also increased substantially (at least since 1998 and 2000 respectively). Until 2002 unmet demand for nursing was well below the figure for all courses, but in 2003 it reached a peak when 37 per cent of eligible applicants for nursing courses did not receive an offer – well above 28 per cent for all courses. Since 2003 unmet demand for nursing and for all courses has declined, but remains higher for

nursing than for all courses. Table E.7 provides data from 1997 to 2006 on unmet demand for nursing and all courses, the number of nursing offers, and nursing applicants as a percentage of all eligible applicants.

Table E.7 Unmet demand for nursing and all courses, the number of nursing offers, and nursing applicants as a percentage of all applicants, 1997 to 2006

	Percentage of eligible applicants not receiving an offer		Number of nursing offers	Eligible applicants for nursing as a percentage of all eligible applicants
	Nursing	All courses		
1997	7%	22%	7 930	3.9%
1998	9%	21%	8 218	4.4%
1999	15%	21%	7 598	4.3%
2000	16%	22%	7 623	4.2%
2001	16%	21%	7 963	4.4%
2002	26%	24%	8 380	5.1%
2003	37%	28%	8 452	5.8%
2004	33%	28%	9 083	6.0%
2005	20%	19%	10 959	6.2%
2006	17%	15%	12 027	6.6%

Note: 'Eligible applicant' is defined by the AVCC as an applicant who has gained an Interstate Transfer Index (ITI) of 53.00 or better, or is a non-Year 12 applicant (AVCC 2006, p. 2)

Source: AVCC 2004, 2005 & 2006

This data indicates strong underlying demand for nursing places, and that generally that demand has been maintained even while there has been strong expansion in offers (and intakes) since 2003. If the number of offers in 2006 was the same as in 2003 (8,452), then the percentage of eligible applicants not receiving an offer would be 41 per cent – above the 2003 level of 37 per cent. Therefore, as long as positive promotion of the nursing and midwifery professions is maintained, and there do not develop in the community adverse views about the professions and the conditions of their work, further expansion of intakes generally should not involve a lack of eligible applicants - as defined by the AVCC as an applicant who has gained an Interstate Transfer Index (ITI) of 53.00 or better, or is a non-Year 12 applicant (AVCC 2006, p. 2). However, there are some significant differences between the different states, and there is a relatively low proportion of applicants with high academic qualifications on entry. These matters will be looked at in turn.

Table E. 8 provides data for the states on unmet demand for 2006 nursing and all courses. Three jurisdictions have very high levels of unmet demand with more than 20 per cent of eligible applicants not receiving offers, while the other three jurisdictions have low unmet demand with fewer than ten per cent of eligible applicants not receiving offers. Victoria stands out as having very high levels of unmet demand for nursing courses, with 29 per cent of eligible applicants for not receiving an offer, followed by SA/NT and Tasmania, both at 22 per cent. Victoria had the highest level of unmet demand for all courses (20 per cent), followed by SA/NT at 16 per cent, but Tasmania was below the national level. In these three jurisdictions applicants for nursing places as a

percentage of applicants for all courses was higher than the national average – especially so in Tasmania and SA/NT. The three jurisdictions with low unmet demand were WA at six per cent of eligible applicants not receiving an offer, Queensland eight per cent, and NSW/ACT also eight per cent.

Table E.8 Applications, offers and acceptances, nursing and all university undergraduate higher education courses, 2006

	Australia	NSW & ACT	Vic.	Qld	WA	SA & NT	Tas.
Nursing							
Eligible applicants	14 435	3 638	3 966	2 921	856	2 412	642
Offers	12 027	3 353	2 810	2 679	801	1 882	502
Not offered	2 408	285	1 156	242	55	530	140
Acceptances	9 373	2 288	2 248	2 418	596	1 440	383
% receiving an offer	83%	92%	71%	92%	94%	78%	78%
% not receiving an offer	17%	8%	29%	8%	6%	22%	22%
% acceptances	65%	63%	57%	83%	70%	60%	60%
All courses							
Eligible applicants	218 529	67 781	51 778	52 039	18 172	22 810	5 949
Offers	184 869	58 213	41 310	44 947	15 823	19 222	5 354
Not offered	33 660	9 568	10 468	7 092	2 349	3 588	595
Acceptances	138 367	37 241	31 825	39 555	11 694	13 968	4 084
% receiving an offer	85%	86%	80%	86%	87%	84%	90%
% not receiving an offer	15%	14%	20%	14%	13%	16%	10%
% acceptances	63%	55%	61%	76%	64%	61%	69%
Nursing as % of all courses							
Eligible applicants	6.6%	5.4%	7.7%	5.6%	4.7%	10.6%	10.8%
Offers	6.5%	5.8%	6.8%	6.0%	5.1%	9.8%	9.4%
Not offered	7.2%	3.0%	11.0%	3.4%	2.3%	14.8%	23.5%
Acceptances	6.8%	6.1%	7.1%	6.1%	5.1%	10.3%	9.4%
% receiving an offer	98%	107%	89%	107%	108%	93%	87%
% not receiving an offer	113%	57%	145%	57%	46%	138%	220%
% acceptances	103%	115%	93%	109%	109%	98%	87%

Source: AVCC 2006, Table 2, pp. 3-5

Section 3 indicated that the jurisdictions that were projected to have the largest shortfalls in 2010 were Queensland and Victoria. If staffing levels were increased to more equitable levels in those jurisdictions that in 2003 were below the Australian national staffing level, then the Queensland shortfall is substantially increased, and there would be shortfalls in WA and NSW/ACT. While the level of unmet demand in Victoria in 2006 indicates (but does not guarantee) that a substantial increase in places could be filled by eligible applicants, this may not be the case in Queensland, WA or NSW/ACT. This data indicates that in those three jurisdictions special attention may need to be given to active recruitment of students and to improving the real and apparent attractiveness of the

profession to potential recruits. Unless such action is taken, a substantial expansion in intakes may result in a higher proportion of entrants to the profession being drawn from the bottom quartile of eligible school leavers and other applicants.

Nursing, like teaching, is a large profession that has attracted a relatively small proportion of the very brightest school leavers, and drawn a large proportion of students from the bottom quartile of eligible school leavers. Table E.8 indicates that this was the case in 1989.

Table E. 8 Distribution of commencing students by tertiary entrance score ranking, nursing, education and all students, 1989

	TE score rankings of all students in their respective states (quartiles)					Number of students
	Highest	Second	Third	Lowest	Total	
Nursing	3.1%	15.9%	27.8%	53.2%	100%	1 189
Education	2.7%	13.4%	29.6%	54.4%	100%	3 379
All students	25.5%	25.8%	24.6%	24.1%	100%	29 812

Note: The data should be taken as indicative only because it covers only students who entered directly from high school in the five mainland states, and in those jurisdictions some data is missing.

Source: DEET 1990, Table 1

There is not readily available comparable data for more recent years (though it could be prepared). However, the AVCC has published data on applicants with an Interstate Transfer Index (ITI) of 90.05 and above – see Table E.9. It appears that there have been some relative improvements for both nursing and teaching since 1989. The 90.05 and above ITI range includes only 13.4 per cent of all students (that is, the highest of 7.5 equal quantiles, a little over half the size of the highest quartile), yet 2.0 per cent of applicants for nursing who received an offer and 3.1 per cent of applicants for teaching who received an offer had ITIs of 90.05 or above.

Table E. 9 Number of offers to applicants with an Interstate Transfer Index of 90.05 or more, as a percentage of all offers, nursing, education and all students, university undergraduate courses, 2006

	Number of offers to applicants with ITI of 90.05+	Total number of offers	Number of offers to applicants with ITI of 90.05+ as a percentage of all offers
Nursing	237	12 027	2.0%
Education	593	19 292	3.1%
All students	24 863	184 869	13.4%

Note: ITI is the Interstate Transfer Index used to make comparable the tertiary entrance scores in individual Australian jurisdictions.

Source: AVCC 2006, Tables 2 & 6

Appendix F. Effective balance

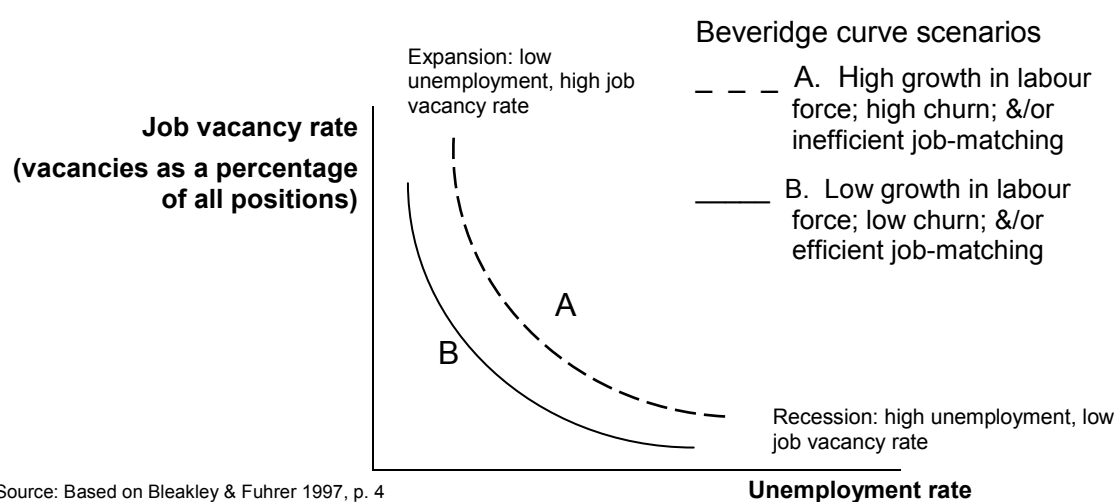
It is important to take account of the necessary level of surplus appropriate in a particular jurisdiction at a particular time. Larger surpluses are generally necessary when there is stronger growth in requirements for new RNs, when there are higher levels of internal movements ('churning') in the RN labour market, and when there is less efficient matching of RNs and positions. Similarly, in such circumstances, shortages will effectively be greater than the quantum projected.

In analyses of the general labour market the inverse relationship between the vacancy rate and unemployment rate that indicates the general requirement for some surplus in both available employees and vacancies is known as the 'Beveridge curve', which is described in Box E.1.

Box E.1 The Beveridge curve

In the general labour market the inverse relationship between the vacancy rate and unemployment rate is known as the 'Beveridge curve'. The Beveridge curve will never reach zero on either – even with a very high unemployment rate (large surpluses) there will be vacancies unfilled (even if temporarily), and even if there is a very high vacancy rate there will be some job seekers not in employment (even if temporarily). The position of the Beveridge curve in relation to the origin of the graph depends on actual circumstances, such as those described for curves A and B.

Figure E.1 Beveridge curves for two different scenarios

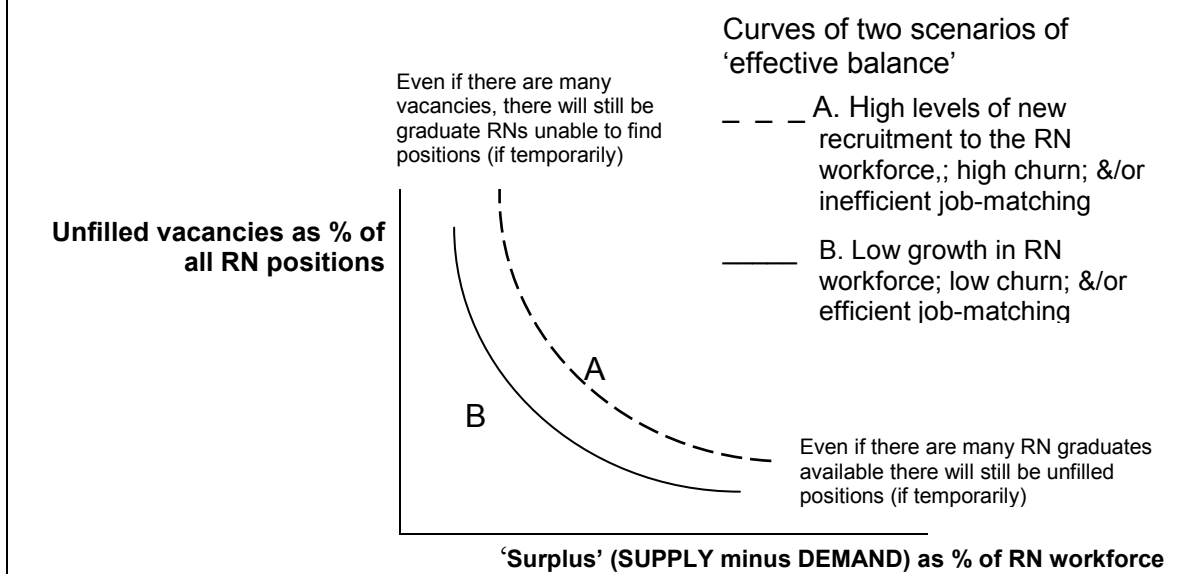


The conceptual framework of the Beveridge curve can be applied to the RN labour market to indicate possible curves of 'effective balance' where vacancies can be filled in a timely manner by suitable RNs, and RNs seeking positions generally can find suitable situations within reasonable time. These curves will be in different positions, depending on circumstances, such as illustrated by curves A and B in Figure E.2.

Box E.2 Curves of 'effective balance' of RN graduate SUPPLY and DEMAND

Figure E.2 applies the conceptual framework of the Beveridge curve to RN graduate SUPPLY and DEMAND to indicate curves of 'effective balance'. Whatever is to the left of the curves is 'effective shortage', which will be greater in circumstances of curve A.

Figure E. 2 Curves of 'effective balance' between RN graduate SUPPLY and DEMAND for two different scenarios



Some implications for this model and particular jurisdictions are discussed in this report. However, the discussion is mostly speculative because the empirical data necessary to better estimate the location of the curves of 'effective balance' is not available for this project. The Beveridge curve in the general Australian labour market is under-researched (Groenewold 2001), and there appear to be no specific applications of it or similar notions to professional labour markets.

Even a projected surplus in this report (in a particular scenario) where projected SUPPLY is 50 per cent above projected DEMAND, the surplus may be still below two per cent of the total workforce. That two per cent indicates a very tight labour market, with little room for matching particular RNs to particular vacancies, and little time for filling vacancies. It is therefore important to take account of Row 23 in the projections tables (the surplus/shortage as a percentage of the total workforce), as well as the particular circumstances of the jurisdiction.

The methodology used in this model misses key indicators of the degree of 'churn' and movements in and out of the RN workforce because *net* measures are used for both separations and overseas migration – for example, for either the net number may be 500, but we do not know if that figure is a result of 500 separations (or migrant arrivals) and zero re-entrants (or migrant departures), or 2,500 separations (or migrant arrivals) and 2,000 re-entrants (or migrant departures). The latter would indicate a much higher level of 'churn'.

However, the model does give an indication of the number of new graduate recruits required (a result of both growth in the size of the labour force, and replacements

required for net/permanent separations), and this can be calculated as a percentage of the total workforce. The higher the percentage, the greater the surplus necessary to cover matching of recruits to positions. The higher percentages generally occur when there have been large shortages carried over from the previous year. And thus the need in such circumstances for a greater surplus effectively exacerbates the shortfall that usually occurs in such situations. Table 3.1, 'Summary of projections outcomes, standard assumptions, 2006 to 2010, all main jurisdictions', includes a row for 'recruits required as % of total nurses (target) (persons)'. For Australia and New Zealand as a whole recruits required (Row 17 in the full projections tables) are between four and five per cent of the total target workforce (Row 5). However, in the jurisdictions with substantial shortages projected through the period (Queensland, Tasmania, Victoria) and/or high levels of replacements required (Northern Territory scenario 2) the number of recruits required are a much higher proportion of the workforce (over 10 per cent in the Northern Territory scenario 2 in 2009). Other things being equal, in these jurisdictions, shortages will be effectively very much greater than the projected quantum, and much larger surpluses would be required to effectively move out of shortage.

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