

ANALYSIS OF
SECONDARY DATA
TO UNDERSTAND
PHARMACY WORKFORCE
SUPPLY
INITIAL SUPPLY REPORT



PHARMACY WORKFORCE PLANNING STUDY
2008



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The Pharmacy Workforce Planning Study is provided with ongoing expert advice by an Advisory Panel consisting of representatives from:

- the PPSAC Research & Development Steering Committee;
- the Pharmacy Guild of Australia;
- the Department of Health and Ageing;
- the Pharmaceutical Society of Australia;
- the Society of Hospital Pharmacists of Australia;
- the Committee of the Heads of Pharmacy Schools in Australia and New Zealand;
- the Association of Professional Engineers, Scientists and Managers, Australia; and
- the National Health Workforce Taskforce

To learn more about this project and to obtain companion publications go to the following websites:

www.guild.org.au/research

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The Pharmacy Guild of Australia manages the Fourth Community Pharmacy Agreement Research and Development Program which supports research and development in the area of pharmacy practice. The funded projects are undertaken by independent researchers and therefore, the views, hypotheses and subsequent findings of the research are not necessarily those of the Pharmacy Guild.

Contents

Executive summary	iv
<i>Background</i>	iv
<i>Summary of findings</i>	v
<i>Implications for projections</i>	viii
1 Introduction	10
Background to this report	10
Workforce boundaries	11
Scope of this report	12
2 Methodology	13
3 Current workforce	20
Pharmacy workforce overview	20
Number and distribution of current pharmacists	23
Cognitive pharmacy services workforce.....	33
Pharmacy dispensary technicians and pharmacy sales assistant workforce.....	35
4 New supply to the pharmacy workforce	40
New graduate supply of pharmacists	40
New supply of pharmacy dispensary technicians and pharmacy sales assistants.....	47
New supply from overseas immigration	50
5 Workforce transfers from inactive to active status	55
6 Losses from the active workforce	61
Inactive workforce.....	61
Death and disability	62
Loss due to migration overseas.....	63
Retirement	64
7 Discussion on projections	67
Introduction	67
Assumptions	67
Graduate supply.....	67
Immigration	71
Transfers between the inactive workforce.....	72
Assumptions on loss factors	73
Conclusion.....	73
Appendix A	75
Appendix B	78
References	82

Executive summary

Background

A two year project to research the pharmacy workforce commenced in December 2007. The research is funded as part of the Research and Development (R&D) Program of the Fourth Community Pharmacy Agreement and is being conducted under the guidance of an Advisory Panel consisting of representatives from the PPSAC R&D Steering Committee, and a range of pharmacy industry stakeholders.

The study detailed in this report forms a stepping stone on the pathway to achieving the broad objectives of the project which are to:

- provide information about the current state of the pharmacy workforce;
- identify factors impacting on workforce supply and demand; and
- provide projections to inform workforce planning.

The aim of this particular study is to begin to understand pharmacy labour supply and identify and explore major supply variables that will influence future supply projections. 'Pharmacy labour' in this report (and the study more generally) is defined in theory as any persons in the workforce associated with the delivery of pharmacy services. In practice, the pharmacy workforce boundaries have been drawn around relevant Australian and New Zealand Standard Classification of Occupations and include hospital pharmacists, industrial pharmacists and retail pharmacists, as well as pharmacy dispensary technicians and pharmacy sales assistants.

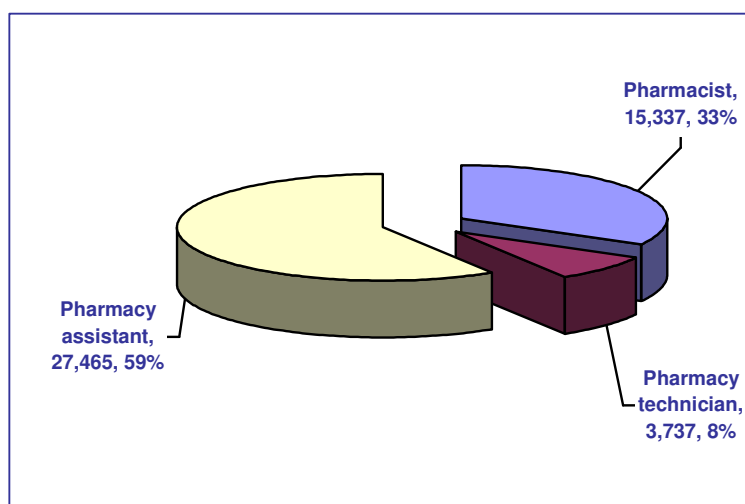
This study relies almost entirely on analysis of secondary data sources. This data was obtained from a range of sources including:

- Australian Bureau of Statistics (ABS)
- Committee of the Heads of Pharmacy Schools in Australia and New Zealand (CHPSANZ)
- Department of Education, Employment and Workplace Relations (DEEWR)
- Pharmacy Guild of Australia (PGA)
- National Centre for Vocational Education Research (NCVER)
- Australian Pharmacy Council (APC)
- Pharmacy Registration Boards (PRBA)

Summary of findings

Based on 2006 Population Census data there were 46,539 people employed (that is in the active workforce) in one of the five ANZSCO pharmacy occupational classifications. Figure 1 shows the *active pharmacy workforce* numbers broken down by broad pharmacy labour types namely pharmacists, pharmacy dispensary technicians and pharmacy sales assistants. The proportional distribution of the pharmacy workforce is strongly influenced by community pharmacy. In the retail or community pharmacy industry sector, for every pharmacist there are 2.5 pharmacy assistant type labour employees. In the other significant area of employment, hospitals, the ratio is almost reversed with two pharmacists for every pharmacy assistant employed.

Figure 1: Active pharmacy workforce broken down by pharmacy labour types



The current (2006) qualified pharmacist active workforce size grew by nine per cent between 2001 and 2006 (that is an approximate growth of 1.8% per annum). In the five years between the 1996 and the 2001 census, there was a 12% growth in the number of active pharmacists. Like most health workforces, the rate of growth of the pharmacist workforce is slowing. Most pharmacists work in community pharmacy as shown in the Table 1.

Table 1: Pharmacy workforce by practice type/setting

Practice type / setting	Proportion of active workforce (%)
Community	78.0
Hospital / clinic	15.4
Industrial	1.5
Administration	1.1
Teaching / education	1.0
Other setting	3.1

Source: AIHW Pharmacy Labour Force Survey 2003

The *age distribution* of the active pharmacist population is generally in line with the age distribution of the total workforce. The pharmacist workforce has marginally higher mature aged workforce participation from the 65+ age group, probably due to pharmacy owners being active in their own practices. In each of the last three census periods (1996, 2001, 2006) the average pharmacist worker age has decreased; in 2006 there was a slightly higher number of pharmacists in the 25-34 year age group and slightly lower number in the 55-64 year age groups.

As well as becoming younger, the pharmacist workforce is also becoming increasingly *female-dominated*, much like most of the other health professions. Between the 1996 and 2006 census periods, the number of female pharmacists in the active workforce has grown from 5,865 to 8,589, a 46 % increase. This has altered the workforce gender balance from females being slightly less than males in 1996 (47.6%) to slightly more in 2001 (51.9%), and to substantially more in 2006 (56.0%).

The *average hours worked* per week by female pharmacists (all ages) is 29.8 hours, not much less than the average male pharmacist working week of 33.1 hours. However, the difference in workforce participation level between male and female pharmacists varies significantly over the age groupings as illustrated in Figure 2 which estimates the full-time equivalent (FTE) conversion factor for each of the age categories for both male and female pharmacists¹.

Table 2: FTE equivalent by gender and age group

Age	Under 30	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65 +	Total
Gender										
Male	0.95	0.96	0.94	0.94	0.94	0.93	0.87	0.79	0.64	0.87
Female	0.94	0.77	0.71	0.74	0.75	0.79	0.77	0.65	0.54	0.78

Source: AIHW Labour Force Survey, 2003

¹ FTE conversion factor calculated by summing all hours worked by pharmacists within a particular classification (excluding hours in excess of 38 hours per week) and dividing by the number of pharmacists in that class.

The *active pharmacy dispensary technician and pharmacy sales assistant workforce* is more female dominated and much younger than the pharmacist workforce. The pharmacy dispensary technician/assistant workforce has only 34% aged 35 years or more and is 94% female. Most assistant-type workers are employed on a part-time or casual basis. The 2006 Population Census estimates the average hours per week (nationally) worked by a pharmacy dispensary technicians was 33 hours, while pharmacy assistants worked 25 hours per week.

The *active pharmacist workforce* is being added to each year, the most obvious and largest contribution is from the *new graduate supply*. There are currently 16 schools of pharmacy offering pharmacy degree programs in Australia of which there are two types of programs offered: Master of Pharmacy (MPharm) postgraduate program and Bachelor of Pharmacy (BPharm) undergraduate program. Two schools offer a combination of both.

Over the last 22 years, from 1985-2007, pharmacy school graduate numbers have steadily grown (with the exception of 1999), with a more spectacular growth over the last decade. In 1985 there were 338 pharmacy graduates; in the most recent year of graduation (2007) there were 1,427 pharmacy school graduates. Since 1997 graduate supply has more than doubled. Since 2003, pharmacy course completion (graduation) numbers have been heavily tipped towards female graduates, with just over or near to 50% more female pharmacy course completions each year. The number and gender balance of current and projected pharmacy school enrolments indicates the recent graduate supply trends will continue.

New supply from *immigration* has been growing significantly over the last eight to ten years. The number of overseas trained pharmacists obtaining eligibility to register in Australia and therefore being able to enter the Australian pharmacist workforce, has increased from 37 in 2001 to 94 in 2007. This is the equivalent of supply from a medium sized school of pharmacy. With a large number of applicants in the examination 'pipeline' the immigration supply is not expected to decrease in the near future.

A similar pattern has been emerging in the migration of pharmacists with Australian qualifications, that is those who have completed their studies and obtained qualifications from Australian schools of pharmacy as overseas full fee paying students. The number of Australian qualified pharmacists applying for and receiving permanent resident status has grown from 92 in 2001 to 172 in 2007 (Australian Pharmacy Council 2008).

Unfortunately secondary data sources available do not allow satisfactory investigation of *the inactive workforce*. Nevertheless the 2006 ABS Population Census data does provide an estimate of the total number of people in Australia with qualifications in the field of study of pharmacy and whether they are working, and if so, working in the pharmacy workforce. In 2006, there were approximately 4,856 qualified pharmacists of working age (15-65 years) not working in the active

pharmacy workforce; that is just over one quarter of all qualified working age pharmacists. Of the 25.4% not in the active pharmacist workforce, 14.2% are estimated to be inactive, and 11.2% judged to be working outside the pharmacy workforce.

Secondary data sources are not sufficient for estimating *losses from the active workforce*. The mortality rate within working years of relevant professions ranges from 115 per 100,000 for males to 65 per 100,000 for females. Based on the active workforce size in 2006 of a total of 15,337, the number of deaths per annum are calculated in Table 2.

Table 2: Number of deaths per annum

Calculation	# deaths
6,751 male pharmacists x 0.00115	7.8
8,589 female pharmacists x 0.00081	7.0
1,479 male pharmacy assistants x 0.00112	1.7
25,991 female pharmacy assistants x 0.00065	16.9

Loss to the pharmacy workforce through permanent or long-term migration overseas can be measured with ABS Overseas Arrivals and Departures data collected by the Department of Immigration. Over the ten year period from 1996 to 2006, migrations have grown in number steadily, peaking in 2006 with 401 qualified pharmacists indicating long term or permanent departure on their emigration cards. The number departing drops down sharply in 2007 to 279. The rapid decrease in 2007 is believed to be attributed to a change in Australian legislation which no longer allows for pharmacist qualifications to be recognised to the United Kingdom.

The rate of retirement as an annual loss to the pharmacy workforce is also difficult to estimate accurately. A likely sign of retirement is when a pharmacist determines not to renew their registration; however there are many other reasons why registration might not be renewed. In 2007 the proportion of pharmacists failing to renew their registration ranged from a low of 4.4% to 9.9% across the jurisdictions (leaving out the Northern Territory which is an outlier at 33%).

Implications for projections

Projections for the supply of pharmacy labour into the future have not been attempted given the significant uncertainty around several key variables. However, having considered the available information and conducted some initial trial supply modelling, several supply variables can be identified that will most likely impact on the projections.

These include:

- A current comparatively high training rate of between 7.5% and 9.8% per annum. It is not yet known whether the current training rate is appropriate or not (a comparison with demand is required first to answer that question); it is clear though that a stronger understanding of future enrolment trends is essential.
- An equally strong growth in supply from immigration. Effectively the current contribution to supply from immigration is the equivalent of supply from a large school of pharmacy. There is genuine uncertainty around the future trend in immigration supply.
- The net wastage rate, which is a critical supply variable.

1 Introduction

Background to this report

A two year project to research the pharmacy workforce commenced in December 2007. The research is funded as part of the Research and Development (R&D) Program of the Fourth Community Pharmacy Agreement and will be conducted under the guidance of an Advisory Panel consisting of representatives from the PPSACR&D Steering Committee, the Pharmacy Guild of Australia, the Department of Health and Ageing, the Pharmaceutical Society of Australia, the Society of Hospital Pharmacists of Australia, the Committee of the Heads of Pharmacy Schools in Australia and New Zealand, the Association of Professional Engineers, Scientists and Managers, Australia and the National Health Workforce Taskforce.

The purpose of the project is to:

- provide information about the current state of the pharmacy workforce;
- identify factors impacting on workforce supply and demand; and
- provide projections to inform workforce planning.

The project is intended to build upon work undertaken in two previous studies of the pharmacy workforce in 1999 and 2003 that identified current and ongoing workforce shortages (HCI, 1999, 2003). The expected outcomes will include an interactive workforce planning model used to explore different policy, administrative and economic possibilities and a series of labour market scenarios with face validity that has been thoroughly tested with industry stakeholders.

This report is an early but important building block towards the achievement of the above detailed expected outcome. It draws almost exclusively on available and appropriate *secondary data sources* to create an understanding of pharmacy workforce supply. While the secondary data for this report was being gathered, considerable qualitative data was also collected through key informant interviews, case studies conducted at hospital and community pharmacies, and interviews with registration boards. This qualitative data is reported on elsewhere, although occasional reference is made to this data source within this report.

The secondary data sources drawn on for this report, and described in the next chapter, in some cases provide the best estimate for certain key workforce supply variables. But this is not the case for all supply variables. As such, this first report on the pharmacy workforce supply variables provides a stepping stone only to the development of an interactive workforce planning model. Significant additional primary quantitative and qualitative data remains to be collected through subsequent phases of the Pharmacy Workforce Planning Study before a truly meaningful model can be constructed.

This initial supply report is largely descriptive in nature.

Workforce boundaries

One of the objectives of the Pharmacy Workforce Planning Study is to detail both current supply of the pharmacy workforce and the projected workforce supply to 2025.

An initial challenge to both enumerating and describing supply of the pharmacy workforce is a determination of the boundaries of the workforce. Who is to be counted and described, and who is not?

A simple definition might be: any person in the workforce associated with the delivery of pharmacy services. This would include potentially anyone working in a community pharmacy, anyone working in a hospital pharmacy, and anyone working in the pharmaceutical industry supporting pharmacy services (at least, that is for which registration as a pharmacist is required). What then of people working in academia in schools of pharmacy who are at least one part removed from the actual delivery of services? One could argue that they are as close to the delivery of pharmacy services as those in the pharmaceutical industry. What of those with pharmacy qualifications who might work in public policy making or public administration and whose work is largely focused on supporting the delivery of pharmacy services (e.g. government health policy in pharmaceutical use, drug information and support of quality use of medicine efforts including the National Prescribing Service²). Similarly, one could argue they are no further removed from delivering pharmacy services than are pharmacy academics.

Community pharmacy services are delivered by a wide range of occupational categories including pharmacists, pharmacy dispensary technicians and pharmacy sales assistants, but also other health professionals including dietitians, naturopaths, herbalists, physiotherapists, occupational therapists, optometrists, and disease state educators (e.g. asthma, diabetes, etc.). Hospital pharmacy services are delivered more exclusively by pharmacists, dispensary technicians and pharmacy assistants. Most hospital pharmacy services, though, also include several other types of labour such as administration support and clerical assistance.

Ultimately the decisions around boundaries are determined by (and subsequently defended on the basis of) available data sources. Hence, for the purposes of this project, the pharmacy workforce boundaries have been drawn to include persons identified as hospital pharmacists (ASCO 2382-11), industrial pharmacists (ASCO 2382-13) and retail pharmacists (ASCO 2382-15), as well as pharmacy dispensary technicians (ANZSCO 311215) and pharmacy sales assistants (ANZSCO 621411). A definition of all Australian Standard Classification of Occupation (ASCO) and Australian and New Zealand Standard Classification of Occupations (ANZSCO) codes used are provided in Appendix A. In respect to pharmacist labour, an

² See the Pharmacy workforce planning study literature review (Chen, 2008)

additional boundary qualification is applied where appropriate, that is, that the person requires registration as a pharmacist to perform the work being examined.

Scope of this report

As the most accessible health service provider to the general populace, pharmacy is commonly agreed to be at the 'front end' of the total health care network and a key element in providing cost effective health care in Australia. This places pharmacy, in its broadest sense, in a dynamic and complex position: faced with the challenge of providing an expanding range of professional pharmacy services and primary healthcare services to consumers. Careful workforce planning is required as workforce shortages could result in compromised patient safety, the inability of the pharmacy profession to meet patient medication management needs, and damage to the professional image of pharmacy.

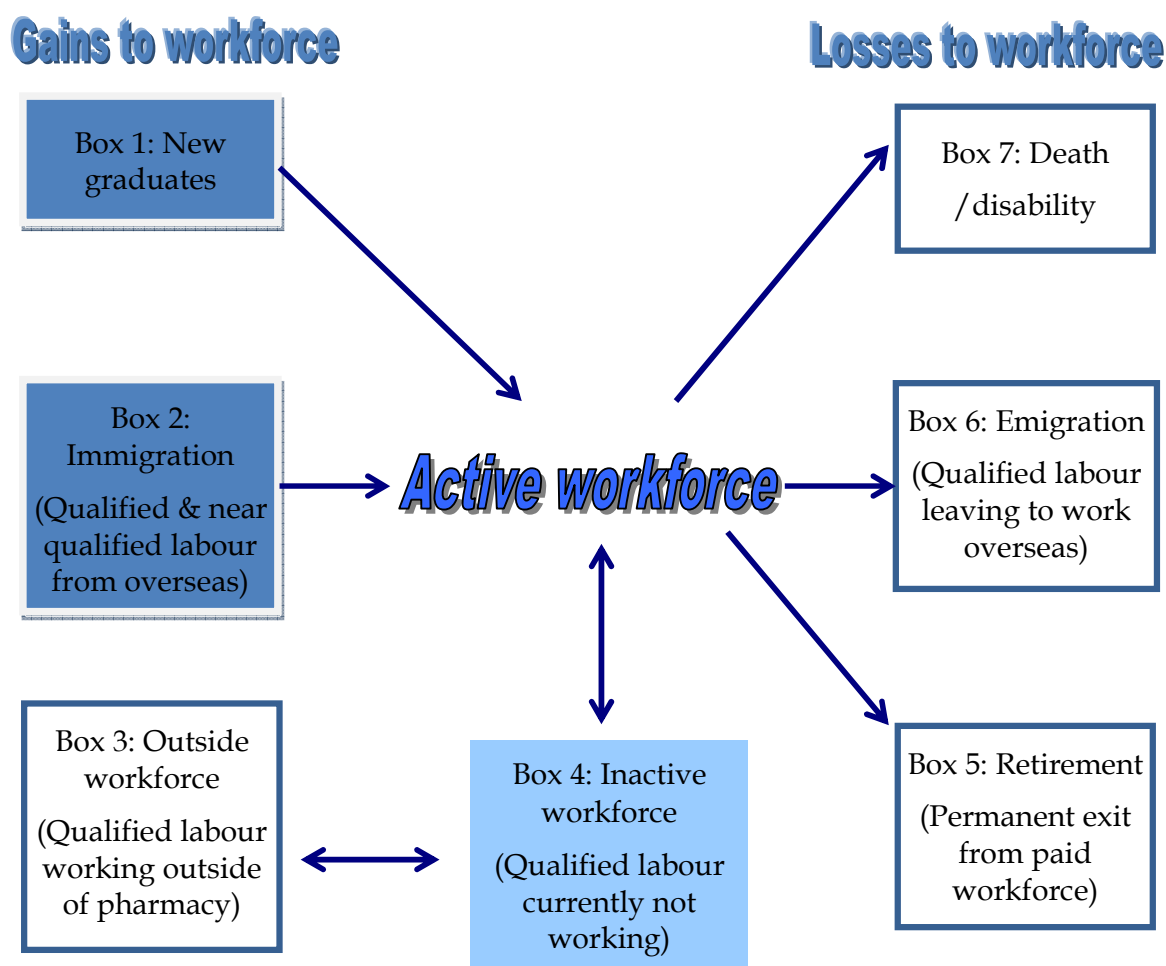
The stakeholder consultations conducted as a part of the Pharmacy Workforce Project revealed pharmacy labour supply to be a subject of considerable interest. Opinions amongst those consulted range from some who believe that there is a 'balanced market' for pharmacists with no need to increase supply, to those who advocate a widespread supply shortage or who at least identify shortages of pharmacists in rural and remote areas, to those who believe an emerging oversupply would see pharmacists pushed into a 'cheap labour' health profession category. This report focuses only on supply, and since all of the above opinions require consideration of supply *relative to an understanding of demand*, then this report will not be able to support (or refute) any of these opinions. A workforce shortage or oversupply argument always requires the question 'for what is the supply required?' to be answered.

In order to gain a clear quantitative picture of the current workforce supply and enable accurate workforce supply projections to be made, data has been collected and analysed from a number of sources each of which is detailed in the methodology and subsequent sections.

2 Methodology

A number of key variables can be identified that affect the active workforce size and composition from year to year. These include the new graduate supply of pharmacists, pharmacy dispensary technicians and pharmacy sales assistants, immigration, emigration, retirement, level of workforce participation, occupational separation, and mortality. These variables are overviewed in Figure 1.

Figure 1: Workforce supply framework



Secondary data has been collected from several sources to cast light on each of the above variables for pharmacy workforce *supply*. These data sources are listed below:

- Committee of the Heads of Pharmacy Schools in Australia and New Zealand (CHPSANZ)
- Department of Education, Employment and Workplace Relations (DEEWR)

- Pharmacy Guild of Australia (PGA)
- National Centre for Vocational Education Research (NCVER)
- Australian Pharmacy Council (APC)
- Australian Bureau of Statistics (ABS)
- Pharmacy Registration Boards (PRBA).

Each of these data sources is described briefly in the table below.

Table 1: Description of data source and collection method

Data source	Description
Australian Bureau of Statistics (ABS)	<p>ABS is Australia’s official statistical organisation, with primary access to data collected through the national population census process.</p> <p>The research team commissioned numerous data sets from ABS of the population census data for the 1996, 2001 and 2006 censuses.</p> <p>Data from ABS for 1996, 2001 and 2006 used throughout the report is referred to as ABS Population Census data 2008.</p>
Committee of the Heads of Pharmacy Schools in Australia and New Zealand (CHPSANZ)	<p>CHPSANZ collects and maintains data from Australia and New Zealand’s schools of pharmacy. Data is gathered mostly on graduations, but also in the first semester of each year on enrolments.</p> <p>The study was supplied data by CHPSANZ on total graduations from ANZ schools of pharmacy from 1985 to 2007. Current student enrolments for each year, in each of the Australian pharmacy school courses, were provided in order to develop reasonably precise graduation projections for the next four years. CHPSANZ offered opinions on the likely attrition rate between years of the various pharmacy courses.</p> <p>Data from CHPSANZ used throughout the report is referred to as CHPSANZ pharmacy graduates 2008.</p>
Department of Education, Employment and Workplace Relations (DEEWR)	<p>DEEWR collects statistical information relating to the provision of higher education in Australia through a series of annual collections and special collections. The collections provide information about students, staff, finances, research income, research publications and educational profiles.</p>

Data source	Description
	<p>The research team commissioned data from DEEWR on total enrolments and course completions by school of pharmacy from 2002 to 2006 broken down by age, gender and year level. Data was used to look at historic and current enrolment and graduation trends, demographic make-up, as well as providing a basis to calculate future enrolments and course completions.</p> <p>Data from DEEWR from 2002 to 2006 used throughout the report is referred to as DEEWR 2008.</p>
<p>Pharmacy Guild of Australia (PGA)</p>	<p>The Guild Digest is compiled annually in Canberra from data received via member surveys. Providing information on community pharmacy trends, vital revenue, income and profit statistics and state, rural and metropolitan benchmarks, it is the most comprehensive analysis of pharmacy performance available in Australia.</p> <p>Guild Digest data provided an informative picture of community pharmacy practice in areas such as hours worked.</p> <p>The Guild 2006 Community Pharmacy Census collected in mid-October 2006 provides an almost complete picture of community pharmacy in Australia with information ranging from the professional services offered by individual pharmacies to staffing, and opening hours, etc.</p> <p>The study provided unit record data in Excel spreadsheets. The research team analysed data in Access creating frequency distributions and relevant cross-tabulations. Analysed data provided extensive information on pharmacy operating procedures, make-up and services offered.</p> <p>Data from the Guild 2006 Census used throughout the report is referred to as Guild Census data 2008.</p> <p>Assistant training: Guild Training has been providing and collecting data on nationally recognised training to pharmacy and dispensary assistants throughout Australia since 1995 through the Community Pharmacy Training Package.</p> <p>The study was provided with commentary on legislation surrounding pharmacy dispensary technicians and sales assistants, courses run, and the number of those</p>

Data source	Description
	undertaking certificate studies and training.
National Centre for Vocational Education Research (NCVER)	<p>The Vocational Education and Training (VET) Provider Collection contains information about activity in the publicly-funded VET system in Australia.</p> <p>The VET provider collection is an administration collection of information compiled by the National Centre for Vocational Education Research (NCVER) through a joint initiative of the Australian Government and state and territory governments.</p> <p>Reporting to the collection is required by all training organisations receiving public funding for the delivery of VET programs. The providers include technical and further education (TAFE) institutes, other government providers, community providers, and private providers who have been allocated public funds to deliver VET programs.</p> <p>Information on VET students and programs related to activities in the previous year, for each state and territory in Australia, is collected annually at the end of March and published in July each year.</p> <p>The research team commissioned data from NCVER on course enrolments for selected pharmacy training packages, by gender, age group and ARIA+ region for 2005 and 2006, as well as qualifications completed for selected pharmacy training packages by gender, age group and ARIA+ region for 2002-2006.</p> <p>Data from NCVER used throughout the report is referred to as NCVER 2008.</p>
Australian Pharmacy Council (APC)	<p>The Australian Pharmacy Council, formed in 2002, is the national body for Australian state and territory authorities responsible for the registration of pharmacists.</p> <p>The APC, together with Australian Pharmacy Examining Committee (APEC), maintains data on stream A and stream B examination procedures and outcomes.</p> <p>The study was provided with data for each of the various examination streams, as well as information on the examination process overseas trained pharmacists would undergo in order to gain eligibility to register as pharmacists in Australia.</p>

Data source	Description
	Data from APC used throughout the report is referred to as Australian Pharmacy Council 2008.
Pharmacy Registration Boards (PRBA)	<p>Each state's registration board keeps a record of pharmacists in its state. In addition workforce data is often collected during the renewal of registration, occurring for the majority towards the end of the calendar year. The last year majority of registration boards collected workforce data was 2003.</p> <p>The study received workforce survey data from the 2003 pharmacy labour force survey generated through 2003 pharmacy registration renewals. Data was analysed separately by a partner member of the research team, the Australian Institute of Health and Welfare (AIHW). See Appendix B for more information on the data source and the methodology applied for cleaning and analysing the data.</p>

The different data sources described in Table 1 can be associated with the pharmacy workforce supply variables for which they provide estimates or descriptions. These relationships are displayed in Table 2 (references to 'Box 1 to 7' relate to Figure 1).

For some cases in Table 2, multiple data sets were available to provide an estimate for or a description of the same supply variable. In these cases, our approach in the analysis process to 'alternative' data sets was to assess different data sources taking into account the data's currency, format, analysing compatibility, credibility and reliability. Where more than one data set was assessed as appropriate and/or no single data set was established as authoritative, data was used to cross-validate and confirm the figures in question.

Table 2: Workforce supply variables by data sources

Workforce supply variables	CHP-SANZ	DEEWR	NCVER	APC	ABS	PGA	PRBA
Current active workforce (pharmacist workforce size)							
Current active workforce (other pharmacy labour workforce size)							
Box 1 New graduates (pharmacists)							
Box 1 New graduates (tech. and assistants)							
Box 2 Immigration							
Box 3 Outside workforce							
Box 4 Inactive workforce							
Box 5 Retirement							
Box 6 Emigration							
Box 7 Death and disability							

The most noteworthy and potentially most critical of the assessments of alternative data sources revealed in Table 2 are concerned with the supply variable ‘current active workforce’ for pharmacists, since this variable affects the precision of all supply projections. The workforce size can be estimated using the 2006 Population Census data or by using estimates from the 2003 registration authorities data collection (analysed by the AIHW for this study). In all instances in this report, the ABS Population Census data has been preferred for estimating current workforce

size, and to describe current workforce parameters (where possible)³. The reasons for this are:

- The ABS Population Census data is more current (collected in 2006 versus 2003);
- Population Census data has no opportunity for double counting, whereas pharmacists who are registered in more than one state can be counted twice (even though allowance is made for this in the AIHW calculations; see Appendix B);
- ABS data is a census and captures data from all potential members of the workforce. The registration authority data is also a census in that the scope includes all pharmacists registered with the pharmacy board in each state and territory. However, coverage may exclude pharmacists who registered for the first time in 2003 and does not include registered pharmacists in the Northern Territory for 2003. The estimated response rate was 72%;
- The Population Census captures data on all forms of pharmacy labour, not just pharmacists.

There are some stakeholders who might argue that Population Census data is effectively self-reported and therefore open to question, whereas registration authority data will only count registered (and therefore valid) pharmacists. In classifying into ASCO codes, however, ABS data uses not just the self-reported occupation, but also highest qualification data to make the classification judgement.

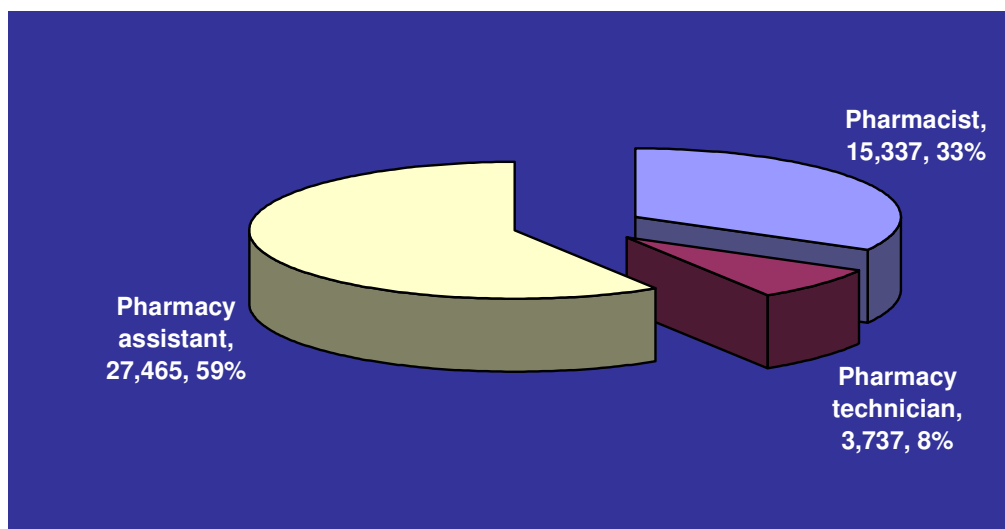
³ In some instances registration authority data estimates have been provided as a point of comparison or because greater detail in analysis is possible. To avoid confusion, in most cases where registration authority data is used, proportions only are provided, not numbers.

3 Current workforce

Pharmacy workforce overview

According to the 2006 Population Census data there were 46,539 people employed (that is in the active workforce) in one of the five ASCO occupational classifications 2382-11, 2382-13, 2382-15, 311215 and 621411 (see Appendix A for a description of each of these occupational categories). Figure 2 represents the 2006 census of active pharmacy workforce numbers broken down by broad pharmacy labour types namely pharmacists, pharmacy dispensary technicians and pharmacy sales assistants.

Figure 2: Total Australian pharmacy workforce by broad occupational classification (n=46,539)



Source: ABS Population Census data 2006

Pharmacy sales assistants make up 59% of the total pharmacy workforce, pharmacy dispensary technicians account for eight per cent, and qualified pharmacists 33% of the total workforce. The proportional distribution of the pharmacy workforce shown in Figure 2 is strongly influenced by community pharmacy; as will be shown later, community pharmacy services dominate total pharmacy workforce employment.

In community pharmacy, based on Pharmacy Guild Census data, the broad breakdown of the pharmacy workforce into different occupational categories is as shown in Table 3. Note that the proportions of various staff categories, especially the non-pharmacist occupational categories, are slightly inconsistent with the data in Figure 2. This is because the two different data sources can classify workers slightly

differently⁴. Pharmacy assistants and technicians nevertheless still account for just over 60% of the total community pharmacy workforce. Qualified pharmacists account for slightly less in community pharmacy than the third of the total pharmacy workforce.

Table 3: Distribution of staffing of community pharmacies by occupational category

Occupational category	Proportion of Total (%)
Pharmacists	29.5
Pharmacy dispensary technician	11.6
Pharmacy Assistants	48.5
Non-pharmacist Manager administration staff /	7.9
Other	2.6

Source: Guild Census data 2008

Another perspective on community pharmacy labour is possible to be obtained from the annual Guild Digest survey. The latest Digest survey (2006) estimates that for every hour of qualified pharmacist labour employed in a community pharmacy there are two hours of assistant type labour employed.

Table 4: Average number of employees per respondent pharmacy and average hours worked by labour category (based on 12 months' trading to 30/6/06)

Labour category	Hours per labour category	% of total labour hours
Proprietors	44.4	17.6
Managers	8.1	3.2
Pharmacists in charge	22.0	8.7
Other qualified pharmacists	12.6	5.0
Pharmacy dispensary technicians	44.6	17.7
Pharmacy sales assistants & other staff	120.2	47.7

Source: Guild Digest 2008

⁴ Community pharmacy is less concerned with qualifications when classifying assistants and technicians. Pharmacy managers are more likely to classify assistants as technicians based on the role they perform rather than the recognised qualifications they might possess.

On average, each Guild member pharmacy employs 3.7 fulltime workers and 6.6 part-time workers, who together work a total of 251.9 hours per week. This implies part-time workers are employed on average 16.7 hours per week.

It was noted in the introduction that other professionals also work in the community pharmacy setting. They account for a small but significant proportion (2.6 % as estimated from the Guild Census, 2006) of the workforce employed in community pharmacies. Table 5 lists the types of health professionals other than pharmacists employed in community pharmacies.

Table 5: Proportion of community pharmacy practices ‘employing’ other health professionals by type of professional (n=3,172)

Type of health professional employed by community pharmacies	Number of practices employing	% of Pharmacies with identified type of labour
Nurse (including midwives)	547	17.2
Dietician / Nutritionist	108	3.4
Naturopath	518	16.3
Herbalist	145	4.6
Other natural therapies	43	1.4
Podiatrist	20	0.6
Physiotherapist	18	0.6
Occupational Therapist	17	0.5
Optometrist	26	0.8
Disease State Educator (eg Asthma, Diabetes)	180	5.7
Professionals for hearing & bone density testing	46	1.5

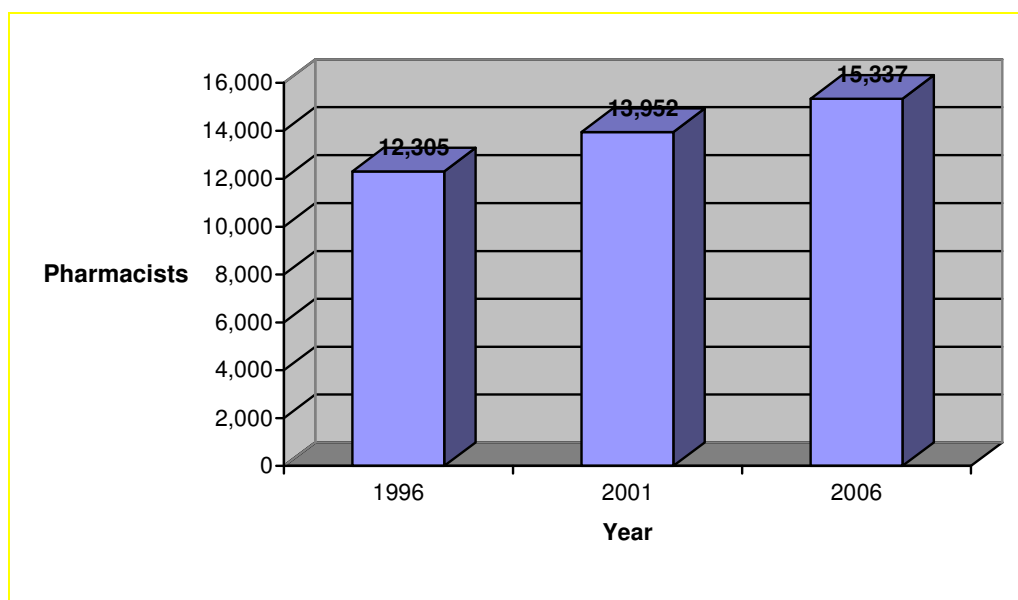
Source: Guild Census data, 2008

At least 52.6% of pharmacies make use of another type of health professional in their premises to provide services. The employment of other professions is often likely to be limited (e.g. one session per week); nevertheless, the community pharmacy’s role as an informal gateway to other types of allied services appears confirmed.

Number and distribution of current pharmacists

The current (2006) qualified pharmacist active workforce size shows a nine per cent increase on the 2001 active workforce size (that is approximate growth of 1.8% per annum). In the five years between the 1996 and the 2001 census, there was a 12% growth in the number of active pharmacists. Like most health workforces, the rate of growth of the pharmacist workforce is slowing. The relative growth is shown in Figure 3 below.

Figure 3: Active pharmacist workforce numbers



Source: ABS Population Census data 2006

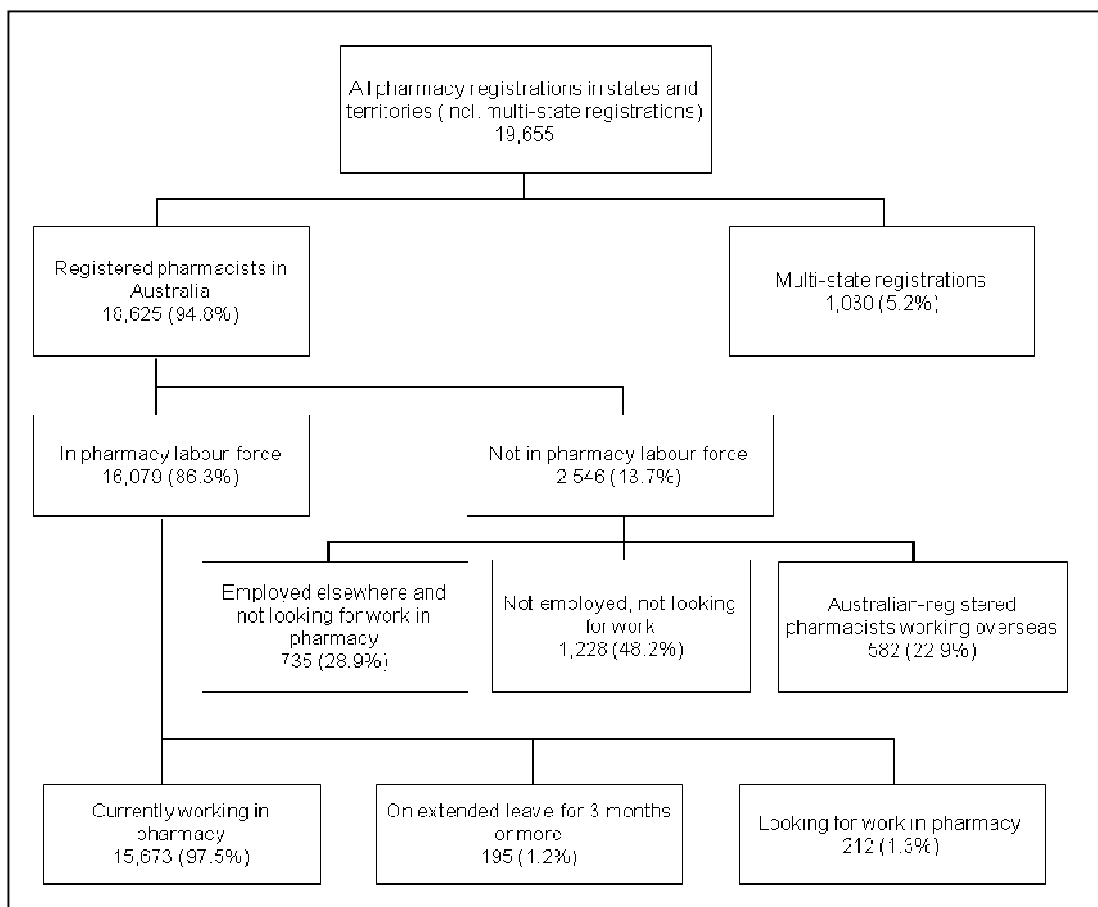
Based on latest available registration authority data (analysed for this study by the Australian Institute of Health and Welfare), there were 18,625 registered pharmacists in Australia in 2003, of which 84.2% were 'currently working in pharmacy'. The distribution of the pharmacy workforce according to workforce status is shown in Figure 4.

Interestingly, the estimate for current active pharmacy workforce derived from the registration authority data is 15,673 which is slightly higher than the estimate derived from the Population Census data of 15,337, even though the registration data is three years 'older'. If the ABS annual growth rate (that is 1.8% per annum) is applied to the registration authority data estimate, then a comparative 2006 active workforce size estimate from the registration authority source would be 16,535. This is nearly an eight per cent difference in estimates.

The researchers' opinion is that this discrepancy can be accounted for by registration authority data invariably over-estimating the workforce size because:

- a. It is difficult to account and adjust for all the duplication of data that result from multiple state registrations;
- b. The adjustment for non-respondents (approximately 30% of registrants) assumes non-respondents behave in the same manner as respondents; instead it may be that the non-respondent population is biased towards non-participation in the workforce.

Figure 4: All registered pharmacists, Australia, 2003



Source: AIHW Pharmacy labour force survey 2003.

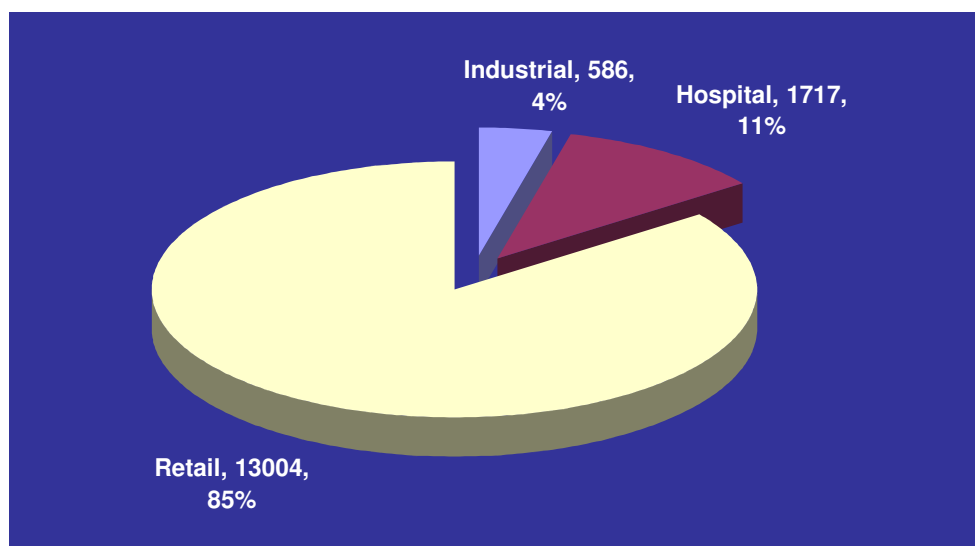
Notes:

- (1) Survey was not undertaken in the Northern Territory in 2003. In 1999 1.4 % of all registered pharmacists were registered in the Northern Territory.
- (2) Victorian data based on responses to 2004 Pharmacy Labour Force Survey (see Appendix B).
- (3) Data from the AIHW surveys may not add to the totals shown due to the estimation process used for non-responses. Results have been rounded to whole numbers.

The stated preference for use of ABS Population Census data to estimate the current active workforce is noted again.

According to 2006 ABS Census data, the great majority of pharmacists (85%) are employed in the community pharmacy or 'retail' setting. Figure 5 represents the 2006 census active pharmacist workforce numbers distributed by pharmacy practice type.

Figure 5: Active pharmacist workforce numbers by type of pharmacy practice



Source: ABS Population Census data 2006

The registration authority data provides the opportunity for a more detailed analysis of the active pharmacist workforce by type of pharmacy practice (see Table 6).

Table 6: Active pharmacist workforce by type of pharmacy practice

Practice type / setting	Proportion of active workforce (%)
Community	78.0
Hospital / clinic	15.4
Industrial	1.5
Administration	1.1
Teaching / education	1.0
Other setting	3.1

Source: AIHW Pharmacy Labour Force Survey 2003

Note that the registration authority estimates for workforce distribution allow for a significantly lower proportion of the total workforce in community pharmacy when compared with the Population Census data. The discrepancy is difficult to explain; and in this case the registration authority data appears to be more credible. Note too

that neither the ABS ANZSCO taxonomy of pharmacy occupations nor the workforce categories of the registration authorities' survey allow for an emerging category of the pharmacist workforce that delivers only professional services (that is a 'consultant pharmacist'). This no doubt reflects the need for occupational taxonomies to catch up with emerging practice, but also the fact that 'professional services' work is widely performed by all categories of pharmacist labour. The professional services workforce is discussed in more detail in a later section.

A more detailed distribution of the pharmacy workforce by *main* pharmacy job setting is provided in Table 7.

Table 7: Employed pharmacists setting of main pharmacy job, Australia (excluding Northern Territory), 2003

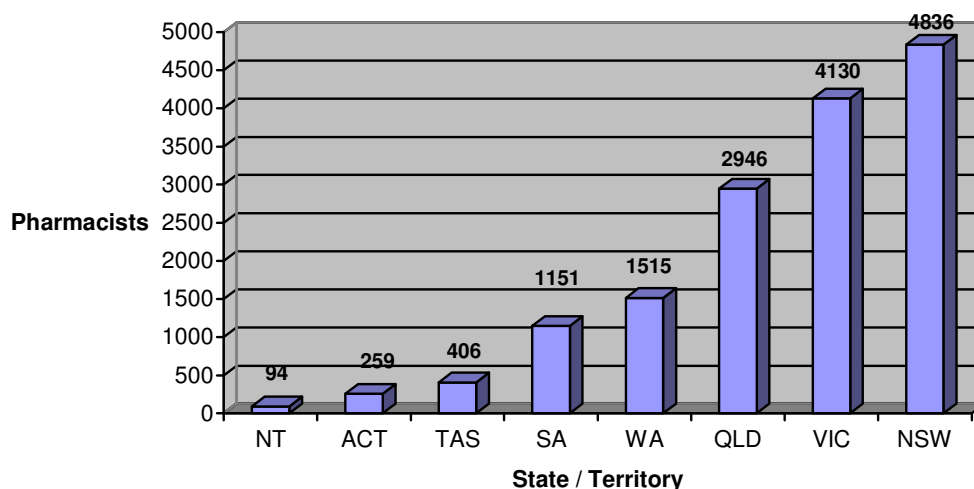
Pharmacy job setting	% of total pharmacists
Retail pharmacy	76.4
Public hospital (ex. psych.)	12.2
Private hospital (ex. psych.)	1.9
Psychiatric hospitals (Public & private)	0.4
Public nursing home	0.2
Private nursing home	0.4
Public medical centre	0.2
Private medical centre	0.1
Public tertiary education institution	1.1
Private tertiary education institution	0.05
Government department	1.2
Defence forces	0.4
Public Pharmaceutical Manufacturing org.	0.4
Private Pharmaceutical Manufacturing org.	1.4
Pharmaceutical wholesaling organisation	0.1
Public other health establishment	0.7
Private other health establishment	0.8
Not stated	2.1

Note: Data from the AIHW surveys may not add up to the totals shown due to the estimation process used for non-responses. Results have been rounded to whole numbers.

Source: AIHW Pharmacy Labour Force Survey 2003

Figure 6 illustrates the distribution of pharmacist residence, broken down by the state/territory throughout Australia. The distribution is in line with the population of each state and therefore also loosely in line with a crude understanding of demand for services. NSW and Victoria account for just under 60% of the entire active pharmacist workforce.

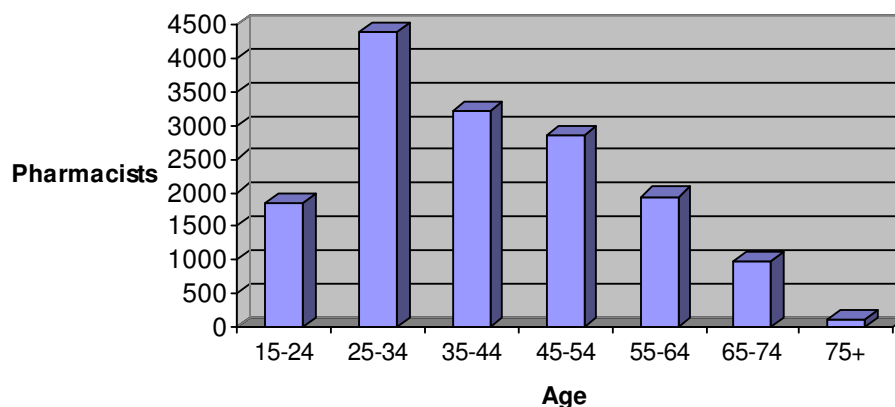
Figure 6: Number of pharmacists by state of residence (n=15,337)



Source: ABS Population Census data 2006

The age distribution of the active pharmacist population is generally in line with the age distribution of the total workforce (see Figure 7). Pharmacy experiences a marginally higher than average mature aged workforce participation from the 65+ age group due to pharmacy owners being active in their own practices.

Figure 7: Age distribution of total active pharmacist workforce, Australia (n=15,337)

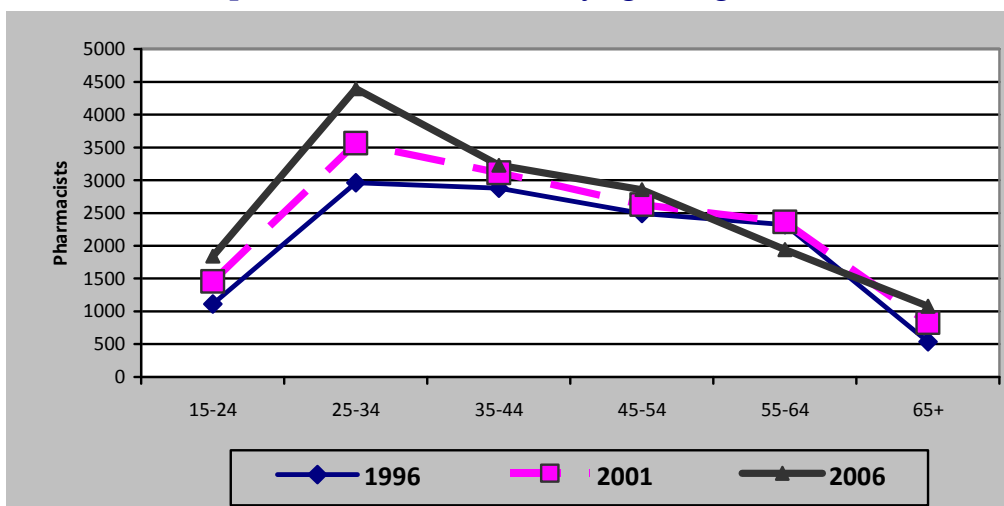


Source: ABS Population Census data 2006

A further variation for pharmacy compared to workforce trends at large is the lower proportion in the 35-45 year age group, most likely due to the high proportion of female pharmacists in the average child-rearing years.

In each of the last three census periods (1996, 2001, 2006) the 25-34 year age group has had the largest number of working pharmacists (see Figure 8). Each of the census years follow a similar pattern of age distribution with the exception of a slightly higher number in the 25-34 year age group and slightly lower number in the 55-64 year age groups for 2006.

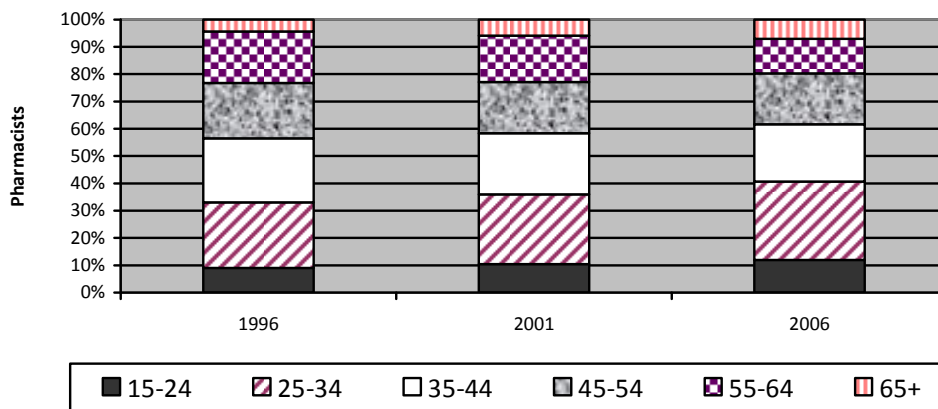
Figure 8: Number of pharmacists distributed by age categories 1996, 2001, 2006



Source: ABS Population Census data 2006

The proportion of workers in younger age groups is highest in 2006, continuing a trend towards a gradual decrease in the average age of the pharmacist workforce (see Figure 9).

Figure 9: Comparative distribution of total pharmacists by age 1996, 2001, 2006



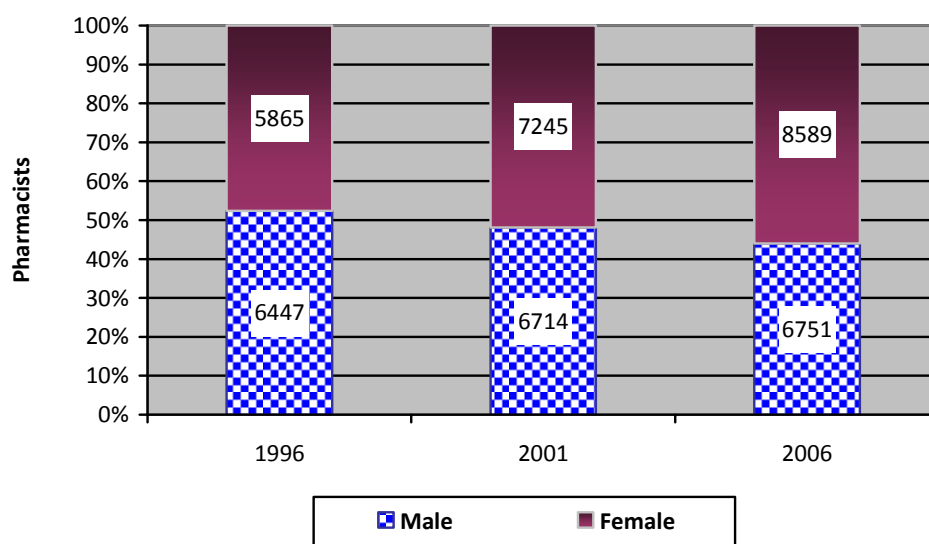
Source: ABS Population Census data 2006

Over 40% of the current active pharmacist workforce is now under 35 years of age. This is no doubt the result of the significantly increased new graduate supply over the last decade.

As well as becoming younger, the pharmacist workforce is also becoming increasingly female-dominated, much like most of the other health professions (see Figure 10).

Between the 1996 and 2006 census periods, the number of female pharmacists in the active workforce has grown from 5,865 to 8,589, a 46% increase. Figure 10 shows the 1996, 2001 and 2006 census distribution of pharmacists by gender.

Figure 10: Distribution of the total pharmacist workforce by gender 1996, 2001, 2006



Source: ABS Population Census data 2006

Figure 10 illustrates changes to the pharmacist workforce over the last ten years regarding female participation in the workforce. Female participation has changed from slightly less than males in 1996 (47.6%) to slightly more in 2001 (51.9%), and to substantially more in 2006 (56%). Over the last decade the number of male pharmacists has virtually stagnated, with new supply simply replacing male pharmacist losses.

According to ABS Population Census data, the average hours of work for pharmacists in 2006 was 37.8 hours per week. The average hours varied only slightly by type of practice as follows: hospital pharmacist, 36 hours, industrial pharmacist, 39 hours and retail pharmacist, 38 hours. A similar pattern is displayed across jurisdictions as shown in Table 8 constructed from AIHW data.

Table 8: Employed pharmacists average hours worked¹ in all jobs, states and territories, 1999 and 2003

	NSW	Vic ²	Qld	WA	SA	Tas	ACT	NT ³	Total
Average hours worked in 1999	37.6	36.5	39.2	38.5	38.3	37.7	37.2	39.1	37.8
Average hours worked in 2006	38.9	36	36.7	37	37.2	36.4	35.8	—	37.3

(1) Excludes travel time (except travel to call-outs) and unpaid professional and/or voluntary activities

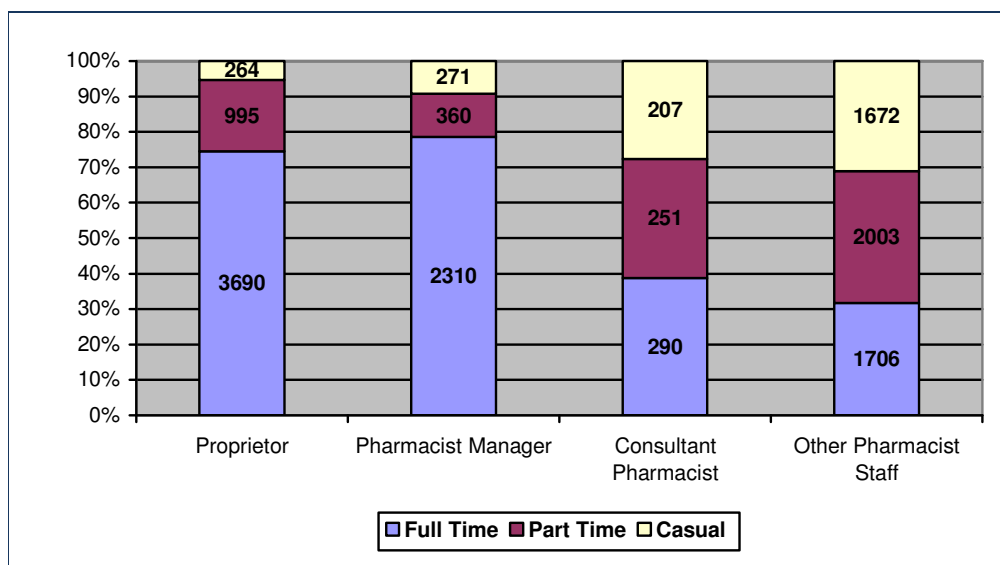
(2) Victorian data based on responses to 2004 Pharmacy Labour Force Survey (see Appendix B).

(3) Survey was not undertaken in the Northern Territory in 2003.

Source: AIHW Pharmacy Labour Force Survey, 1999 & 2003.

The average hours worked per week provide a misleading impression of few in the workforce working part time. On the contrary, just over two thirds of the total workforce currently work fewer than 38 hours per week (accepted full-time hours). Within the community pharmacy sector, however, the level of workforce participation varies between job category as shown in Figure.

Figure 11: Workforce participation level (FT, PT, casual) of various community pharmacy job categories



Source: Guild Census data, 2008

The average figures in Table 8 are inflated to some extent by the long hours of work reported by some pharmacists, especially community pharmacy owners. In Table 9 the average hours worked by different age categories have been adjusted to remove the effect of some pharmacists working longer than 38 hours per week.

Table 9: Employed pharmacists average paid hours worked per week^{1,2,3} by field of main pharmacy job, sex and age (excludes Northern Territory)

Age group	Under 30	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65 + years
Community/retail pharmacist	35.6	31.6	30.4	31.8	31.8	32.1	31.2	28.4	23.4
Hospital/clinic pharmacist	37.1	32.7	30.9	31.4	31.4	33.3	33.7	30.3	27.0
Industrial pharmacist	37.0	34.0	31.8	32.7	36.7	33.1	33.7	29.6	23.0
Administrator	38.0	37.6	36.8	35.8	36.2	35.3	34.7	32.4	29.8
Teacher/Educator	37.6	32.3	26.5	34.4	28.8	32.7	36.8	38.0	16.2
Other (pharmacy related)	35.9	30.1	30.7	27.8	31.0	34.6	28.6	25.1	23.0
Total	35.9	31.8	30.5	31.7	31.8	32.5	31.7	28.6	23.7

- (1) Excludes employed pharmacists who did not state their number of paid hours.
- (2) For this table pharmacists who worked more than 38 hours per week are considered to have worked 38 hours per week.
- (3) Includes hours worked in main and second pharmacy jobs.

Source: AIHW Pharmacy Labour Force Survey 2003

On average, the ‘administrator’ category of pharmacists work longer hours per week (34.9) than other pharmacist job categories, including industrial pharmacists (33.9 hours per week), hospital pharmacists (32.9 hours per week), and community pharmacists (31.1 hours per week).

The average hours worked per week by female pharmacists (all ages) is 29.8, not much less than the average male pharmacist working week of 33.1 hours. However, the difference in workforce participation level between male and female pharmacists varies significantly over the age groupings as shown in Table 10 which estimates the full-time equivalent (FTE) conversion factor for each of the age categories for both male and female pharmacists⁵.

Table 10: FTE conversion factors for pharmacists by age and by gender

Age	Under 30	30-34	35-39	40-44	45-49	50-54	55-59	60-64	65 and over	Total
Gender										
Male	0.95	0.96	0.94	0.94	0.94	0.93	0.87	0.79	0.64	0.87
Female	0.94	0.77	0.71	0.74	0.75	0.79	0.77	0.65	0.54	0.78

Source: AIHW Labour Force Survey, 2003

⁵ FTE conversion factor calculated by summing all hours worked by pharmacists within a particular classification (excluding hours in excess of 38 hours per week) and dividing by the number of pharmacists in that class.

While young male and female pharmacist workforce participation levels are virtually the same, through the middle-aged years of 30 to 60, male participation levels are considerably higher. Still, the widely believed gap between male and female workforce participation levels is not as great as many would portray.

Nor is the widespread belief that female pharmacists are significantly more concentrated in urban areas than male pharmacists easily sustained by the data. While there is some justification to the claim (see Table 11), females are generally distributed across the different geographic locations similar to male pharmacists.

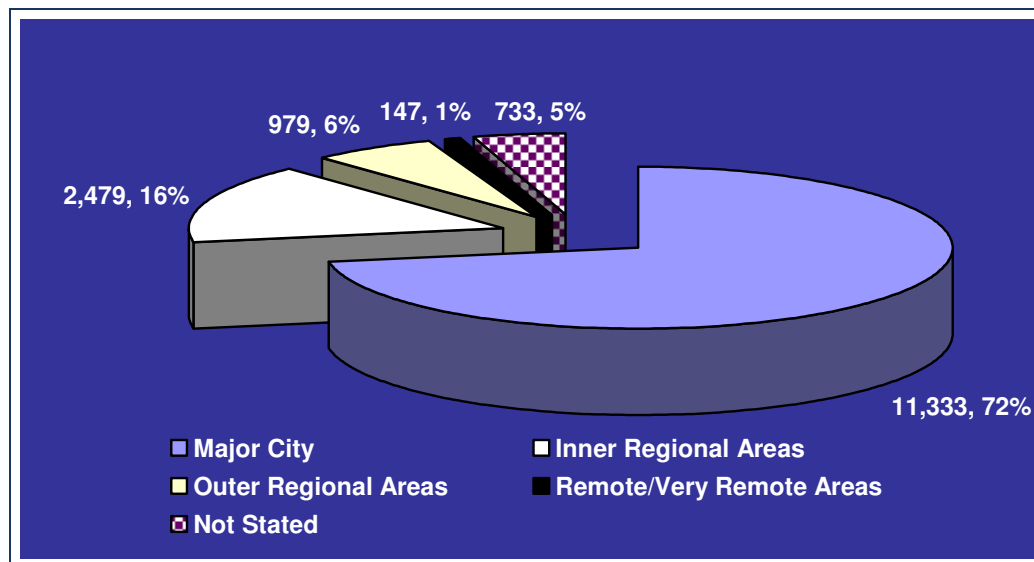
Table 11: Distribution of pharmacists by location type and by gender

Location	Male		Female		Total
Major city	5,429	69%	5,904	75.6%	11,333
Inner regional areas	1,365	17.4%	1,115	14.3%	2,479
Outer regional areas	583	7.4%	396	5.1%	979
Remote/very remote areas	85	1.1%	62	0.8%	147
Not stated	401	5.1%	333	4.3%	733
Total	7,863		7,810		15,673

Source: AIHW Labour Force Survey 2003

In fact, both male and female pharmacists are concentrated in major city and large regional centres as shown in Figure 12.

Figure 12: Distribution of pharmacists by location type



Source: AIHW Labour Force Survey 2003

Cognitive pharmacy services workforce

Over the past two decades there has been a significant move in the pharmacy profession in Australia and internationally to increase the range of new cognitive services and strategies. To some extent these strategies have simply built on the opportunities presented to pharmacists to provide cognitive services within their traditional service activities. In this sense, behaviour of all pharmacists has been potentially influenced and changed.

In Australia a shift towards engaging the community pharmacist workforce in cognitive services delivery has been facilitated by a range of remuneration supports particularly in the area of medication management, in which Australia is regarded as a world leader. Established Australian programs include the Residential Medication Management Review (RMMR; introduced first in 1997) and Home Medicines Review (HMR; introduced in 2001). Both these programs attract a fee for service, and require accreditation of pharmacists. The HMR program requires registration of pharmacies in order to be able to claim the fee. This allows some understanding and analysis of this professional services workforce.

More recently other professional pharmacy disease statement management programs are being introduced through the Fourth Community Pharmacy Agreement including the Diabetes Pilot Program (DMAS) and the Asthma Pilot Program (PAMS). These are pilot programs which are expected to grow. Other programs being introduced include those for Dose Administration Aids (DAA) and the provision of Patient Medication Profiles (PMP). More broadly, leading community pharmacies are pursuing unfunded cognitive pharmacy services as a means of creating market differentiation between themselves, other pharmacies and health service providers. Such services include compliance programs (e.g. *MedsIndex*) and medication related programs supported by technology (*HygeiaRx*) (Sclavos, 2008).

The intention of various stakeholders in the pharmacy industry (and manifest in the Fourth and previous Community Pharmacy Agreements) is that growth in cognitive pharmacy services delivery should be distributed across the entire pharmacist workforce. In theory then discussion of a 'cognitive pharmacy services workforce' should be superfluous, since the work of cognitive services should be embedded in the typical roles of most hospital and community pharmacists. According to statistics available on the Guild HMR website (March 2008)⁶ there is a cumulative number of just over 4000 pharmacies registered for HMR service provision in Australia; given the estimated number of approved pharmacies in Australia (30 June 2007) is 4,992⁷ this means most (>80%) pharmacies are registered to accept HMR referrals and make review claims. This data supports the intent of widespread participation of community pharmacy in cognitive services delivery.

⁶ www.guild.org.au/mmr/content.asp?id=404

⁷ Guild census data

Any pharmacist undertaking a medication management review (HMR and RMMR) must be accredited by the Australian Association of Consultant Pharmacy (AACP) or the Society of Hospital Pharmacists of Australia (SHPA). The number of pharmacists accredited has steadily increased since the introduction of the medication management review programs; according to the Guild HMR website statistics over the five years from March 2003 to March 2008 the number of accreditations has grown by 40%. A recent count provided by the AACP (1 September, 2008) showed that there were 1,814 accredited pharmacists distributed across the state and territory jurisdictions (refer to Table 12).

Table 12: Distribution of accredited pharmacists

State/Territory	# of accredited pharmacists
ACT	29
NSW	629
Northern Territory	11
QLD	326
SA	199
WA	144
Tasmania	73
Victoria	401
Overseas	2

Accredited pharmacists represent an estimated 11.8% of the total pharmacist workforce; that is only about 1 in 10 pharmacists are accredited and therefore eligible to perform medication management reviews. Over the last two financial years the accredited pharmacist workforce has made an average of 8,825 HMR claims per quarter for completed reviews (Guild website statistics). This implies an average of approximately 4.9 medication reviews each quarter per accredited pharmacist.

A survey of a sample of the accredited pharmacist population (n=560) undertaken by the AACP in 2008⁸ revealed that in fact it is likely an even smaller proportion of the total pharmacist workforce that delivers cognitive services, at least in respect to the funded services of medication management review. In practice then, cognitive services delivery has been largely undertaken by a small proportion of the workforce 'specialising' in the conduct of reviews. This component of the workforce is becoming known as 'consultant pharmacists', and this element of the pharmacist workforce performs more reviews than community pharmacy owners/employees. Consultant pharmacists work for, on average 3 to 4 community pharmacies and spend about a day per week conducting HMRs (this would equate to approximately

⁸ The survey results were made available to the consultant by the AACP. The full results of the survey are to be published in the AJP September 2008 issue.

24 to 30 reviews per month). This same segment of accredited pharmacists seems to also spend *at least* one day per week undertaking RMMRs.

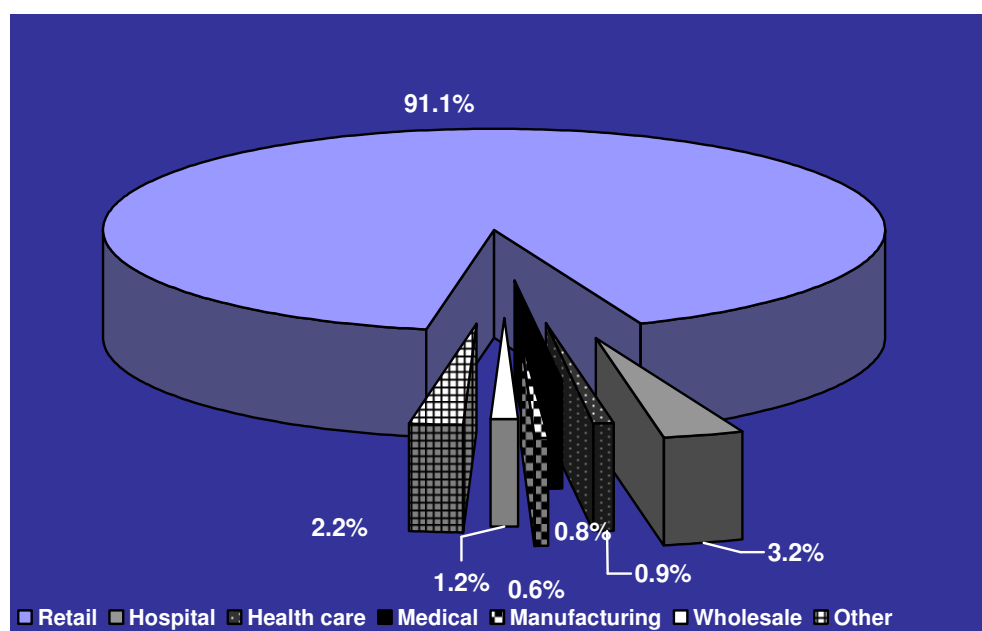
The consultant pharmacist workforce, those who specialise in delivery only of cognitive services such as medication management reviews, is estimated to include 300 and 400 active workforce participants.

Pharmacy dispensary technician and pharmacy sales assistant workforce

As noted earlier in this chapter, non-professional labour in the pharmacy workforce significantly outnumbers the professional (pharmacist) workforce component. While the vast majority of the pharmacy assistant type labour categories work in the 'Pharmaceutical and Other Store-Based Retailing' industry sector (classified by the ANZSIC 2006 coding system), significant numbers also work in the hospitals industry sector, and there are small numbers in several other industries including wholesale and some manufacturing sectors. Figure 13 illustrates the uneven distribution of the non-professional pharmacy labour workforce.

In the retail or community pharmacy industry sector, for every pharmacist there are 2.5 pharmacy assistant type labour employees. In the other significant area of employment, hospitals, the ratio is almost reversed with two pharmacists for every pharmacy assistant employed.

Figure 13: Distribution of pharmacy assistant type labour by industry sector



Source: ABS Population Census data 2006

ABS identifies two separate forms of pharmacy assistant, namely pharmacy dispensary technicians (ANZSCO 311215) and pharmacy sales assistants (ANZSCO 621411). The ANZSCO descriptors are provided in Appendix A. The ASCO distinctions are widely recognised in both the community and hospital pharmacy settings. The primary distinguishing feature between ‘assistants’ and ‘technicians’ is the latter’s more significant involvement in the dispensing process. In the hospital setting, 66.6% of the ‘assistant’ workforce is classified at the higher technician level (ABS Population Census data 2006); in the community pharmacy setting only 19.2%.

In the community pharmacy setting there is no general requirement for assistants and technicians to be qualified⁹. Most, therefore, are recruited with no qualifications appropriate to their role and they are trained ‘on the job’. In recent years under the influence of the Quality Care Pharmacy Program (QCPP) and promotion of assistant training by the Guild, incentives to train assistant staff have been stronger. According to Guild Census data, however, the majority of assistant level workers (61.3%) remain unqualified at least in respect to the community pharmacy role¹⁰. The training and qualifications deemed relevant for assistants in the community pharmacy setting are described briefly in Table 12.

Table 12: Description of qualifications for community pharmacy assistant labour

Qualification	Description
<i>WRP10102 Certificate I in Community Pharmacy</i> (WRP02 Community Pharmacy Training Package)	Suitable for entry level employees working in the pharmacy industry under constant supervision. The qualification recognises the small business nature of the industry and the need for multi-skilling and would prepare a person to perform a range of varied activities or knowledge applications where there is a clearly defined range of contexts in which the choice of action required is usually clear and there is limited complexity in the range of options to be applied.
<i>WRP20102 Certificate II in Community Pharmacy</i> (WRP02 Community Pharmacy Training Package)	The qualification is designed to reflect the role of employees who work with some degree of autonomy within a defined range of skilled operations, usually within a range of broader-related activities involving known routines, methods and procedures, where some discretion and judgement is required.
<i>WRP 30102 Certificate III</i>	Suitable for employees who operate independently with

⁹ In a later chapter specific exceptions to this statement will be detailed.

¹⁰ Note that ‘unqualified’ does not equate to untrained, nor does it imply a lack of competence to perform the work of an assistant or even a technician. During the case study process, several pharmacists were noted to be employing some older and trusted staff, with no qualifications, within the dispensary function.

Qualification	Description
<i>in Community Pharmacy (WRP02 Community Pharmacy Training Package)</i>	limited supervision within a broad range of varied contexts that may be complex and non-routine. This qualification provides the opportunity to specialise in a range of areas in the pharmacy under the supervision of the pharmacist in the provision of advice or recommendation to patients on medicines and medicinal products. It is considered increasingly to be the minimum requirement to approach dispensing functions.
<i>WRP 40102 Certificate IV in Community Pharmacy (WRP02 Community Pharmacy Training Package)</i>	This qualification is designed to reflect the role of employees who require complexity in planning and initiating alternative approaches to skill or knowledge applications across a broad range of <i>management requirements</i> , evaluation and co-ordination. It incorporates self-directed application of knowledge and skills, with substantial depth in some areas where judgement is required such as planning and selecting appropriate staff, staff training, merchandising, recommending/providing products, services and equipment for self and others. Within the context of the community pharmacy industry, advice and information about medicines and medicinal products is provided to patients under the supervision of the pharmacist.

Source: NTIS 2008

Based on Guild Census survey data the proportion of the total community pharmacy assistant workforce with each of the above qualifications is estimated in Table 13:

Table 13: Proportion of qualified pharmacy assistant workforce

Qualification	Proportion qualified (%)
Certificate I	5.5
Certificate II	12.5
Certificate III	8.0
Certificate IV	1.7

In addition, a further 7.9% of the community pharmacy assistant workforce has completed the 'Dispensary Assistant Course', which was ostensibly designed for, and intended to be delivered only to, the hospital-based pharmacy assistant workforce. The two relevant qualifications for the hospital setting are in the Health Training Package (HLT02) and described in Table 14.

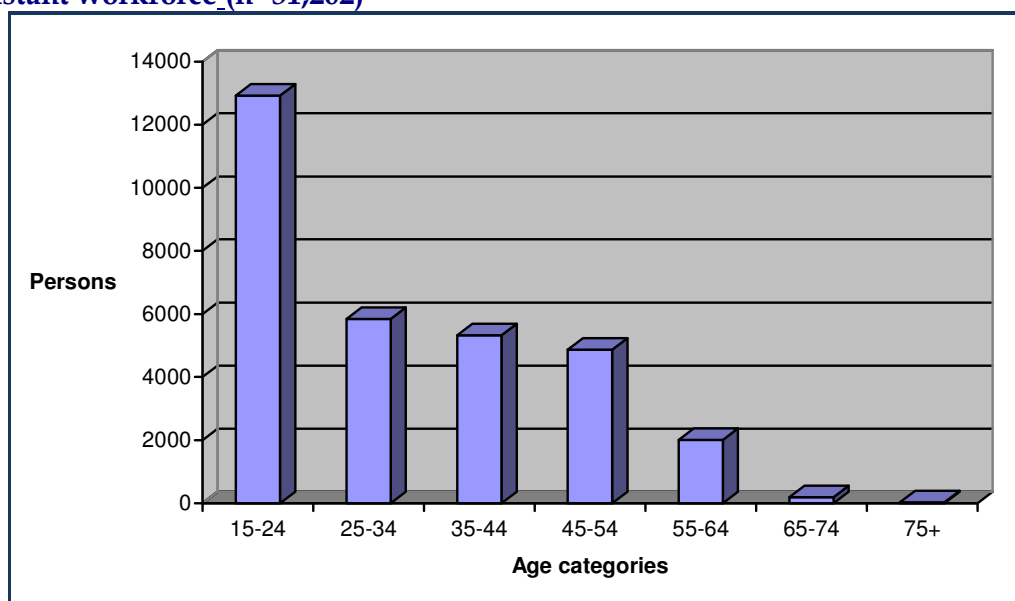
Table 14: Description of qualifications for hospital pharmacy assistant labour

Qualification	Description
HLT31402 Certificate III in Health Service Assistance (Hospital and Community Health Pharmacy Assistance)	This qualification covers workers who provide a range of varied assistance to pharmacists in hospital and community health settings, and the common occupational title is pharmacy assistant.
HLT40502 Certificate IV in Health Service Assistance (Hospital and Community Health Pharmacy dispensary technician)	This qualification covers workers who provide a range of technical tasks under the supervision of a pharmacist in a hospital or community setting. These workers may also have a role in coordinating the work of pharmacy assistants or aides. Common occupational titles may include pharmacy dispensary technician.

Source: NTIS 2008

The age distribution of the active pharmacy dispensary technician and pharmacy sales assistant workforce are shown in Figure 14. The most prevalent age group, by a large margin, is the 15-24 year age group. Numbers in other age categories decline rapidly, so that unlike the pharmacist workforce, which has nearly 60% 35 year age group or over, the pharmacy assistant workforce has only 34% aged 35 years or more. Figure 14 clearly shows that the pharmacy dispensary technician and pharmacy assistant workforce is made up of predominately younger aged persons.

Figure 14: Age distribution of pharmacy dispensary technician and pharmacy assistant workforce (n=31,202)



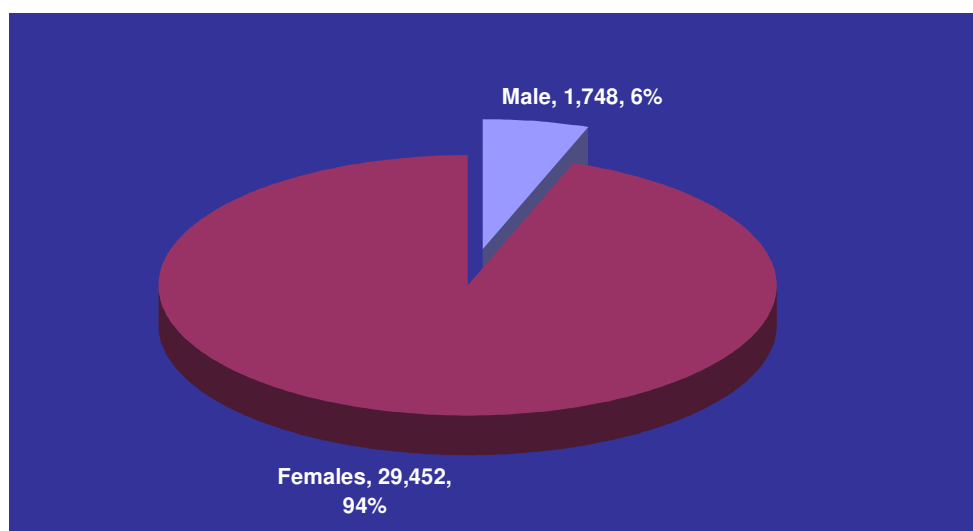
Source: ABS Population Census 2008

The pharmacy dispensary technician and pharmacy sales assistant workforce is predominantly female (94%). Figure 15 illustrates the gender distribution of the pharmacy dispensary technician and pharmacy sales assistant workforce in 2006.

Clearly the pharmacy dispensary technician/assistant workforce is dominated in composition by young females. In the stakeholder consultations, the high turnover of pharmacy assistant staff in community pharmacy (some estimated it was as high as 50 % per annum) was argued to be a contributing influence to this skewed workforce distribution. It could also be that young females prefer the work environment of a community pharmacy to begin their employment life before they progress to another occupation or industry.

Most assistant-type workers (56.4%) are employed in community pharmacy on a part-time or casual basis. The 2006 Population Census estimates the average hours per week (nationally) worked by pharmacy dispensary technicians was 33, while pharmacy assistants worked 25 hours per week. This allows for a full-time equivalent (FTE) conversion factor of 0.87 and 0.66 respectively.

Figure 15: Gender breakdown of the pharmacy dispensary technician and pharmacy sales assistant workforce



Source: ABS Population Census 2008

4 New supply to the pharmacy workforce

The pharmacy workforce is supplied with new *pharmacists* from two sources:

- new pharmacist graduates from the schools of pharmacy (via the pre-registration year and the Pharmacy Graduate Training Course)
- from the immigration and registration of overseas trained pharmacists.

New *pharmacy dispensary technician and assistant* labour is able to be recruited comparatively easily and with few barriers from the broader labour market. Ideally, pharmacy assistants would be formally trained for their roles, especially the dispensing function, but since training options are designed for apprentice-like conditions – a preference of pharmacy employers anyway – training is invariably post-recruitment.

In the following sections, these means of generating new supply to the pharmacy workforce are explored.

New graduate supply of pharmacists

There are currently 16 schools of pharmacy offering pharmacy degree programs in Australia, of which there are two types of programs offered: Master of Pharmacy (MPharm) postgraduate program and the Bachelor of Pharmacy (BPharm) undergraduate program. Two schools offer a combination of both. The schools are listed by the type of program offered in Table 15¹¹.

The MPharm program takes two years to complete and is only offered for Domestic Fee-Paying (DFEE) students who hold a bachelor's degree in a relevant knowledge area. A range of 'relevant knowledge areas' are considered appropriate; however the Bachelor of Medical Science is the most common undergraduate pathway. The MPharm graduate program generally commences at the beginning of the year, with the exception of Canberra University which has a mid-year intake and graduation occurring in July. We have been informed that Griffith University also has a mid-year intake but this was not able to be verified prior to drafting this report.

The BPharm undergraduate program takes four years to complete and is offered for all fee-paying types: Higher Education Loan program (HELP), Commonwealth-Supported Place (CSP) or Domestic Fee-Paying (DFEE). Universities offering the

¹¹ Most lists of Schools of Pharmacy, especially any of those from our main source of secondary data in this area CHPSANZ, include the two New Zealand Schools of Pharmacy, Otago and Auckland. In all the tables and figures in this section these schools are not included, nor is any data concerning those schools. We assume that most of the supply from the two NZ schools enters the local (NZ) labour market, and while some of that supply might find its way to Australia this would be counter-balanced by supply going to NZ.

BPharm undergraduate program all commence at the beginning of the academic year.

Table 15: List of universities offering pharmacist training by type of pharmacy program offered

Universities offering MPharm program	Universities offering BPharm undergraduate program
South Australia*	South Australia*
Sydney*	Sydney*
Western Australia	La Trobe
Canberra**	James Cook
Newcastle	Monash (Victorian College of Pharmacy)
Griffith**	Curtin
Murdoch	Charles Darwin
	Queensland University of Technology
	Charles Sturt
	Tasmania
	University of Queensland

Source: CHPSANZ Pharmacy graduates, 2008

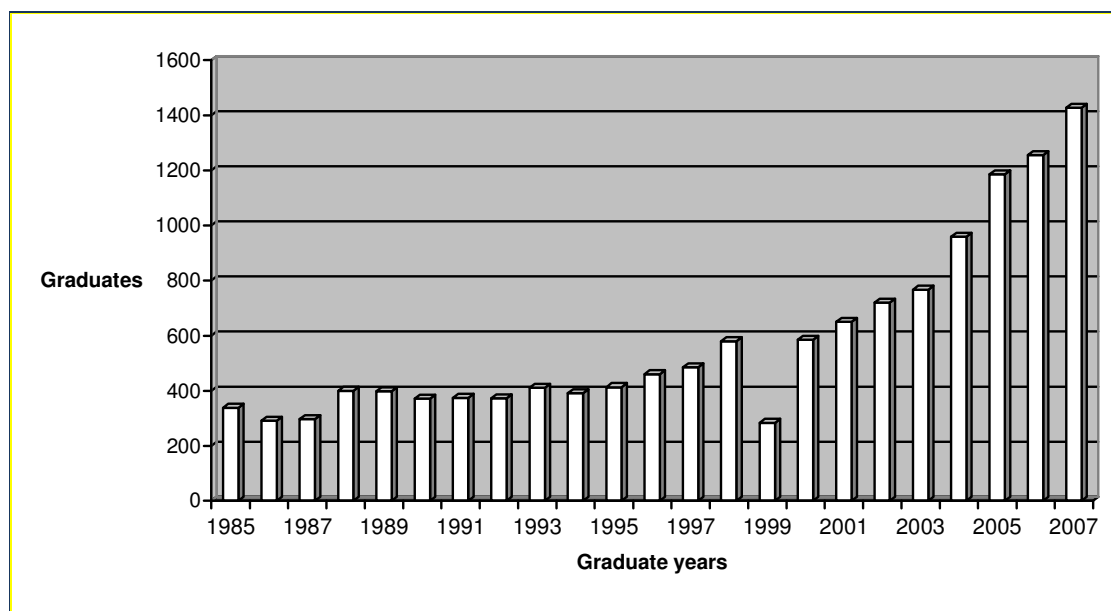
*South Australia and Sydney University run a combination of both the MPharm graduate program and the BPharm undergraduate program in their schools of pharmacy.

**Canberra and Griffith Universities have a mid-year intake and graduation occurring in July.

Over the last 22 years, from 1985-2007, pharmacy school graduate numbers have steadily grown (with the exception of 1999¹²), with a more spectacular growth over the last decade (see Figure 16). In 1985 there were 338 pharmacy graduates; in the most recent year (2007) there were 1,427 pharmacy school graduates. Since 1997 graduate supply has more than doubled.

¹² There was a reduction in 1999 as it was the third year of the newly introduced four-year courses which started at most universities in 1997. There were still graduates from the University of Tasmania and Curtin University, and 'delayed' graduates from other universities who had failed units/subjects during 1998 and managed to complete their degrees in 1999. Contrary to a commonly held view, therefore, 1999 was not a 'fallow' year without graduates.

Figure 16: Total pharmacy school graduate supply from 1985-2007



Source: CHPSANZ pharmacy graduates 2008

The impressive growth in graduate supply in recent years has been fuelled primarily by the creation of no fewer than eight new schools of pharmacy and 11 new courses since 2000, these are listed in Table 16.

Table 16: New schools of pharmacy & courses

Pharmacy School University	Award	Commencement of pharmacy course date	Accreditation of pharmacy course date
School of Health Sciences University of Canberra	MPharm	2004	Dec 04
School of Sciences and Primary Industries Charles Darwin University	BPharm	2006	Aug 07
School of Pharmacy Murdoch University	MPharm	2005	Jun 06
School of Life Sciences Queensland University of Technology	BPharm	2005	Jun 06
School of Biomedical, Biomolecular and Chemical Sciences University of Western Australia	MPharm	2005	Sep 05

Pharmacy School University	Award	Commencement of pharmacy course date	Accreditation of pharmacy course date
School of Biomedical Sciences University of Newcastle	MPharm	2004	Aug 06
School of Pharmacy Griffith University	BPharm/MPharm	2002	Dec 04
School of Pharmacy and Applied Science La Trobe University	BPharm	2000	Dec 04
School of Pharmacy and Medical Sciences University of South Australia	MPharm	2005	Apr 06
Faculty of Pharmacy University of Sydney	BPharm (Rural)	2003	Jun 05
	MPharm	2004	Jun 05

Source: Australian Pharmacy Council 2008

This development was not even fully anticipated in the 2003 pharmacy workforce study (Health Care Intelligence 2003), and as a consequence the graduate supply projections in that report under-estimated supply by at least 500 graduates per annum. The total graduate supply will be swelled further in the coming years by pharmacy graduates from Queensland University of Technology and Charles Darwin University, both of which are yet to deliver graduates from their fledgling programs. Further contributing to the new graduate supply has been the increased enrolments at most of the traditional schools of pharmacy.

The relative contribution to total graduate supply from different schools of pharmacy over the last three years is shown in Table 17.

Table 17: New graduate supply for 2005, 2006, 2007 by school of pharmacy

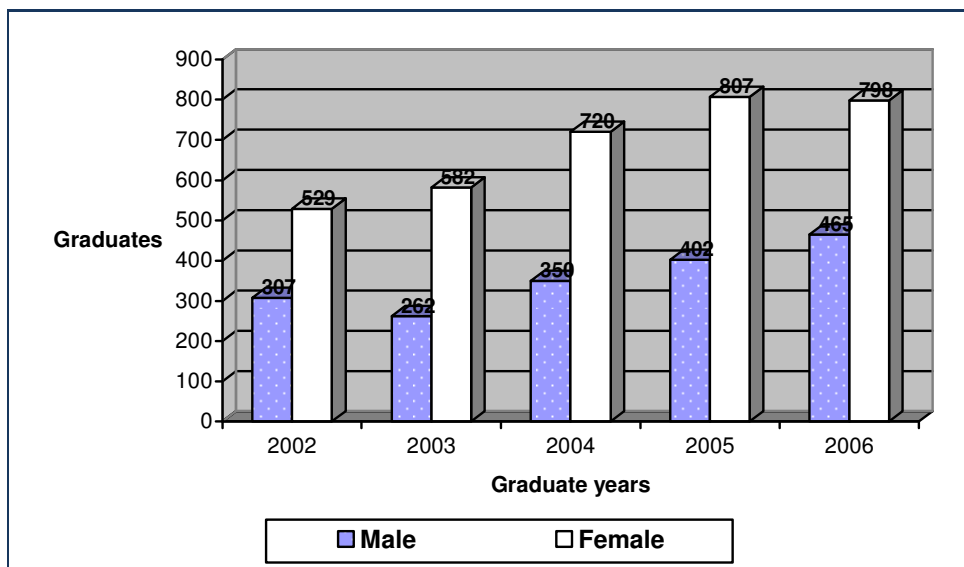
School of Pharmacy / University	Graduations		
	2005	2006	2007
University of Tasmania	52	18	25
La Trobe University	37	34	44
Queensland University of Technology	-	-	-
Curtin University	119	143	128
University of Western Australia	-	-	28
Monash University	184	164	195
Griffith University	-	50	41
James Cook University	75	65	92
University of Queensland	150	144	162
University of Sydney	197	245	274
University of South Australia	138	124	156
Charles Darwin University	-	-	-
Murdoch University	-	-	10
Charles Sturt University	52	58	50
Newcastle University*	-	27	35
University of Canberra	-	15	18
Total:	1004	1087	1258

Source: CHPSANZ pharmacy graduates, 2008

* due to lack for primary data for Newcastle University, numbers are based on calculations using DEEWR enrolment data.

During the period of significant growth in graduations, there has also been a fundamental change in the composition of the graduate population from predominantly male to predominantly female. Figure 17 illustrates the end result of this change by presenting the 2002-2006 pharmacy course completions (graduations) distributed by gender.

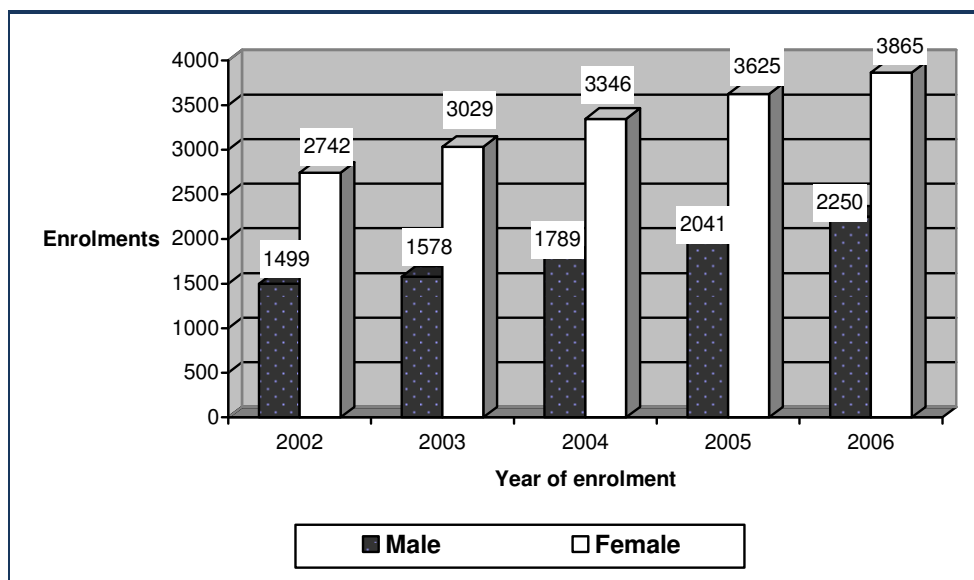
Figure 17: Pharmacy course completion (graduation) numbers for 2002-2006 by gender distribution



Source: DEEWR 2008

Since 2003, pharmacy course completion (graduation) numbers have been heavily tipped towards female graduates, with just over or near to 50% more female pharmacy course completions each year.

Figure 18: Pharmacy course total student enrolment numbers for 2002-2006 by gender distribution



Source: DEEWR 2008

Figure 18 outlines gender distribution of total student *enrolment* numbers for the 2002-2006 pharmacy courses, it also shows that the feminisation trend in composition of the graduate population will continue.

Current enrolments in Australian schools of pharmacy reflect the recent trend in growth of enrolments. Table 18 lists the 2008 student enrolment numbers by school and by year of enrolment.

Table 18: Student enrolment numbers in Australian universities in 2008 for years 1-4/1-2 by school of pharmacy

University / school of pharmacy	Year of enrolment			
	1	2	3	4
<i>Tasmania</i>				
University of Tasmania	88	73	44	52
<i>Victoria</i>				
La Trobe University	61	51	55	42
Monash University	185	238	232	202
<i>Queensland</i>				
Qld University of Technology	85	86	57	38
*Griffith University	117	81	79	
University of Queensland	257	215	178	173
James Cook University	100	85	80	84
<i>Western Australia</i>				
Curtin University	165	178	140	155
*University of Western Australia	36	26		
*Murdoch University	44	23		
<i>New South Wales</i>				
University of Sydney	305	269	250	235
**Newcastle University	50	47		
Charles Sturt University	133	96	101	109
<i>South Australia</i>				
University of South Australia	154	155	176	160

University / school of pharmacy	Year of enrolment			
	1	2	3	4
<i>Northern Territory</i>				
Charles Darwin University	35	35	17	8
<i>Australian Capital Territory</i>				
*University of Canberra	31	28		
Total Australian universities	31	28	17	8

Some schools because of their recent commencement do not have all academic years enrolled. Others only have two years because they are Masters programs.

New supply of pharmacy dispensary technicians and pharmacy sales assistants

As noted in an earlier chapter, the market for pharmacy assistant type labour, unlike that for pharmacists, is not nearly so regulated. There are no registration requirements and in most states no training requirements.

The exception in relation to pharmacy dispensary technicians is the requirement in two states, Victoria and Queensland, that a pharmacy dispensary technician (dispensary assistant) have some formal skill/knowledge. In Victoria, this requirement of the Pharmacy Board is satisfied by every pharmacy dispensary technician engaged in dispensary activity completing a recognised course of study — one unit from the Certificate III in Community Pharmacy 'Assist in Dispensary Operations (WRPDIS303A)'. The Pharmacy Board of Victoria also requires that this unit be delivered face-to-face, presumably in a class room.

Queensland also requires the nominated dispensary unit (WRPDIS303A) to be completed by assistants active in the dispensary, but the Queensland Registration Board does not insist that training be delivered face-to-face, accredited education can be a combination of distance learning and on the job training.

The Victorian Board requirement means that pharmacy dispensary technicians (dispensary assistants) attend training for approximately 16 hours and complete a workbook which is then assessed by a pharmacist. The Victorian Branch of the Pharmacy Guild, which provides the course, trains approximately 200-250 pharmacy dispensary technicians (dispensary assistants) every year¹³.

Apart from these requirements, there are few barriers to entry and employers, particularly in the community pharmacy sector, are just as likely to employ

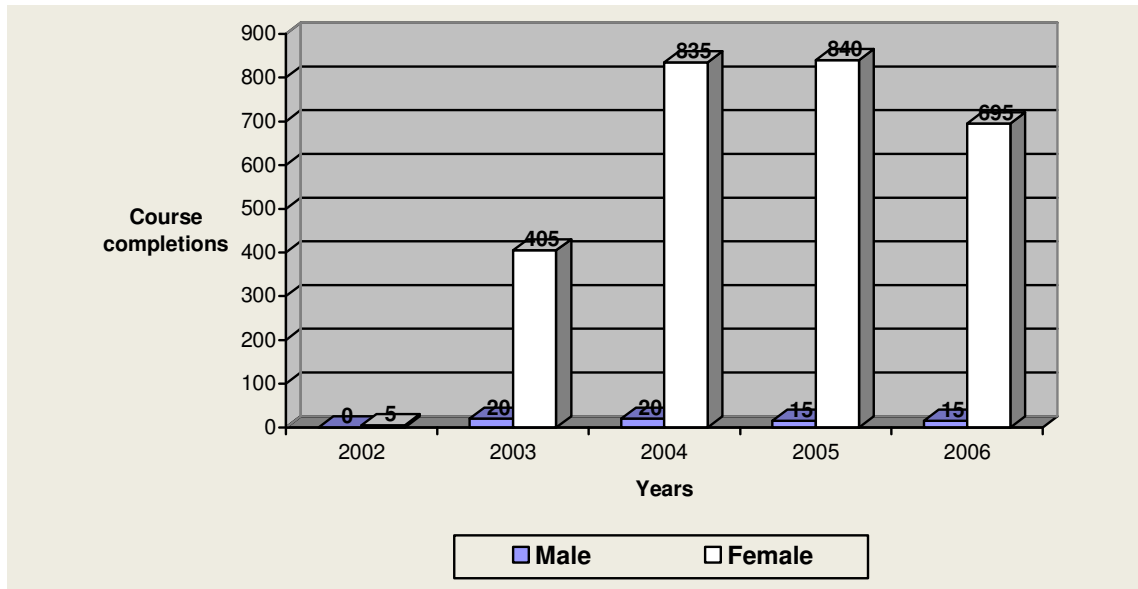
¹³ Personal communication with Sue Bond 2008

untrained people into various assistant roles. Training is supported by employers on a 'voluntary' basis to help staff gain knowledge or recognise their current skills in the form of a national qualification.

In the hospital pharmacy sector, the industrial relations conditions can apply more regulations on assistant type labour. For instance, the NSW state award covering pharmacy dispensary technicians and assistants allows for four grades of pay for pharmacy dispensary technicians and two grades of pay for assistants. Progression to 'technician' grades requires at least a Certificate III in Health Service Assistance (Hospital and Community Health Pharmacy Assistance), while appointment to grades 2 and above requires Certificate IV in Health Service Assistance (Hospital and Community Health Pharmacy dispensary technician). A grade 2 pharmacy assistant requires at least a Certificate III in Community Pharmacy. Only grade 1 pharmacy assistants do not require a qualification.

Figure 19 shows the number of people over the years 2002 to 2006 who have completed qualifications in any of the six certificates (see Tables 12 and 13) suitable for technicians and assistants in the Health and Community Pharmacy Training Packages. The previously highlighted female dominance of the pharmacy assistant workforce is evident also in the distribution of the course completions.

Figure 19: Completions of pharmacy dispensary technician and pharmacy sales assistant courses by gender



Source: NCVET 2008

Within the total course completions, two courses, the Certificate II and III of the Community Pharmacy Training Package, account for most of the completions as

shown in Table 19 which details 2006¹⁴ completions (which is typical of all the other years).

Table 19: Pharmacy dispensary technician & assistant course completions

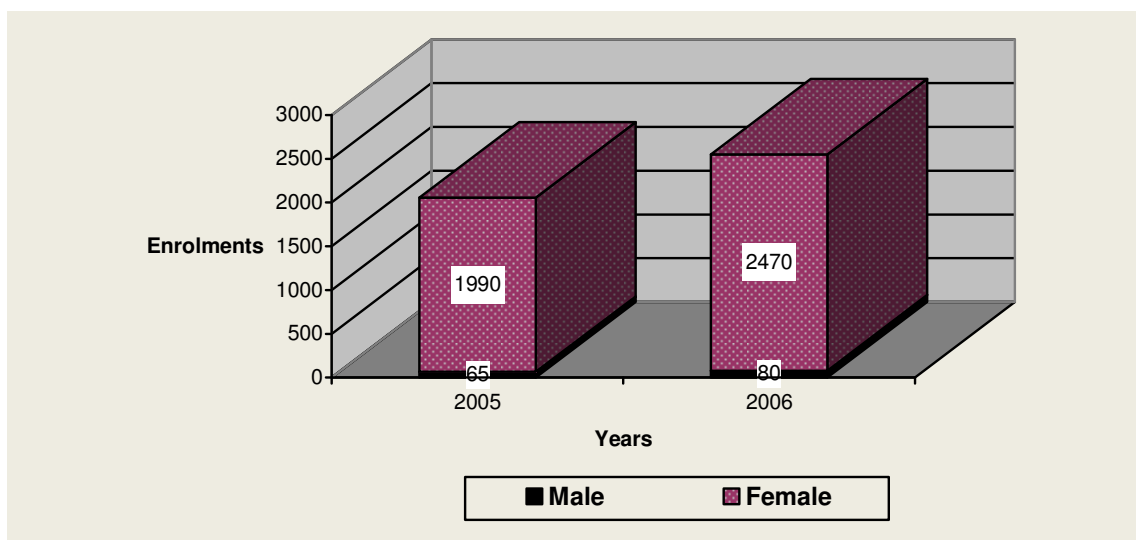
Course	Completions
HLT31402 - Certificate III in Health Service Assistance (Hospital and Community Health Pharmacy Assistance)	30
HLT40502 - Certificate IV in Health Service Assistance (Hospital and Community Health Pharmacy dispensary technician)	'c'
WRP10102 - Certificate I in Community Pharmacy	0
WRP20102 - Certificate II in Community Pharmacy	465
WRP30102 - Certificate III in Community Pharmacy	200
WRP40102 - Certificate IV in Community Pharmacy	15

Source: NCVER 2008

Due to confidentiality reasons 'c' represents figures 1 to 4 inclusive.

Figure 20 shows the number of students from 2005 and 2006 enrolled in one of the six certificate courses for pharmacy dispensary technicians or assistants.

Figure 20: Pharmacy dispensary technician and pharmacy sales assistant course enrolment



Source: NCVER 2008

¹⁴ The 2006 final course completion figures only become available in late July, hence NCVER consider the 2006 course completion figures to be preliminary only.

The total number of students enrolled in pharmacy certificate studies in 2005 was 2,055. The number of pharmacy certificate completions in 2005 was 855. The total number of students enrolled in pharmacy certificate studies in 2006 was 2,550, yet the number of pharmacy certificate completions in 2006 was 710. The apparently very high attrition rate is difficult to explain. It is likely, though, that most people enrolling had no intention of completing the course, but rather were content to complete only one or a few specifically chosen units of competency (possibly including WRPDIS303A to meet registration board requirements in Victoria and Queensland).

In an earlier chapter it was noted that in the community pharmacy sector less than 40% of assistant type labour active in the workforce is qualified. Given the total assistant workforce is estimated to be 31,202, then the training rate is less than three per cent per annum — far too low to make much of an impression on the significant proportion of the workforce without qualifications.

New supply from overseas immigration

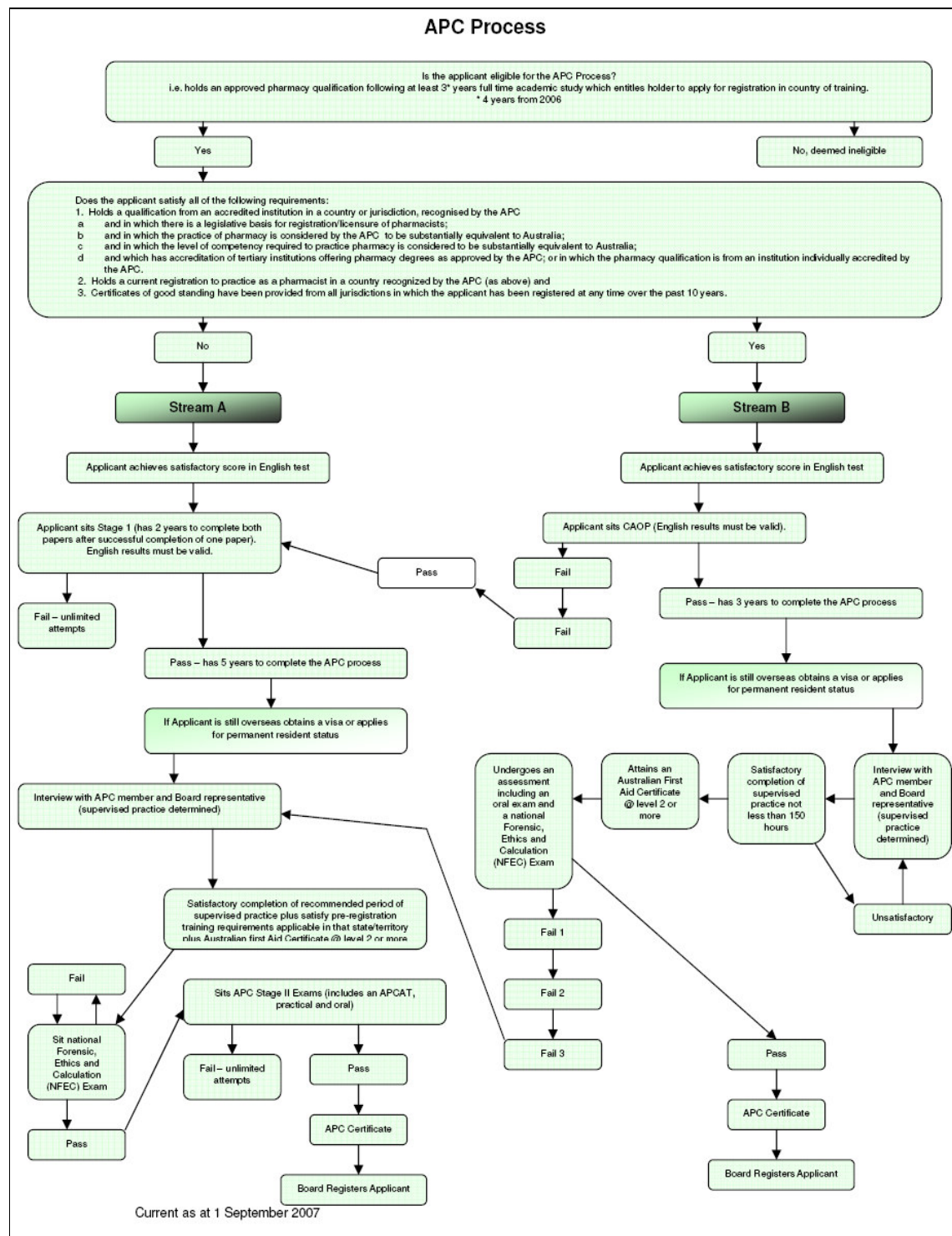
Under current regulations (since 1 December 2006), all pharmacists with qualifications obtained from overseas must go through a series of assessments of competence before applying for registration to practise pharmacy in Australia. Applicants are offered one of two pathways to satisfy this requirement (see the APC website for more details: www.pharmacycouncil.org.au):

- Stream A - This pathway comprises an eligibility assessment, English test, Stage I examination (a Multiple Choice Questionnaire [MCQ]), a period of up to twelve months' supervised practice in Australia, a National Forensics, Ethics and Calculations Examination [NFECE] and a Stage II examination (comprising an MCQ, a practical and an oral examination).
- Stream B - This pathway comprises an eligibility assessment, English test, an MCQ examination, a period of at least four weeks' supervised practice, an NFECE, which is an MCQ and an oral examination.

Most applicants are required to undertake the Stream A process. However, individuals who trained and registered as a pharmacist in the UK, Ireland, Canada or the USA may be eligible to undertake the Stream B process. The two pathways are detailed in Figure 21.

Because of the fairly long pathway that pharmacists must traverse prior to obtaining registration in Australia, there can be at any one time a significant 'pool' of applicants tied up at various stages.

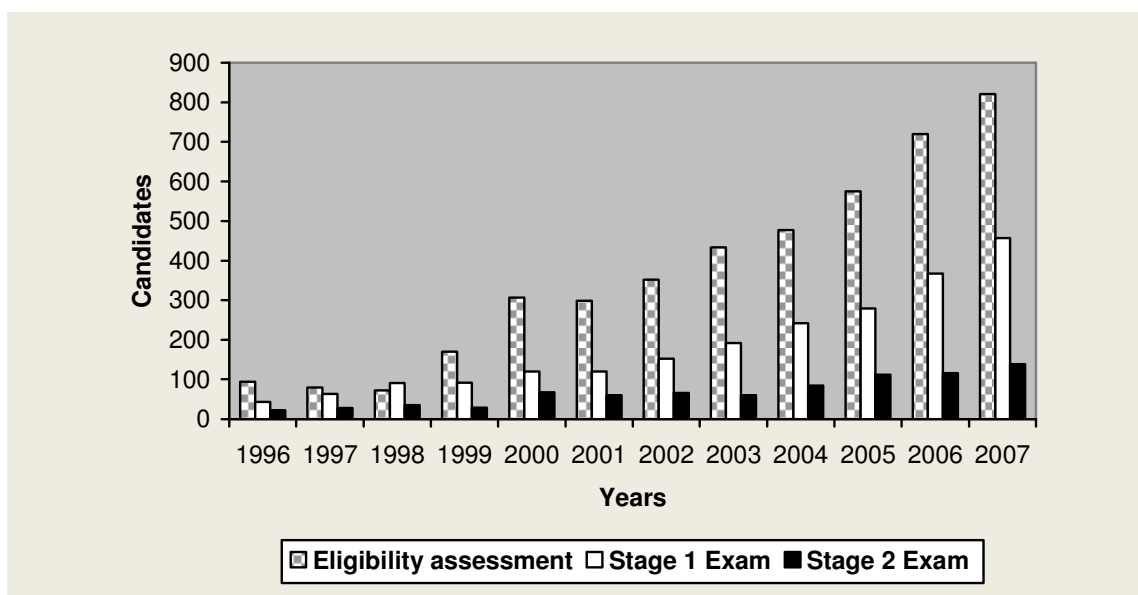
Figure 21: Outline of the APC competency assessment process for overseas qualified pharmacists



Source: Australian Pharmacy Council 2008

Figure 22 shows that in 2007 there were approximately¹⁵ 1,400 candidates at various stages of assessment. Figure 22 also demonstrates that despite the challenging process adopted by APC, the number of overseas pharmacists trying to enter the Australian labour market has rapidly increased in recent years. Since 1999, for instance, there has been a four-fold increase in the number of applications.

Figure 22: Number of overseas qualified pharmacists at various stages of the APC assessment process each year between 1996 and 2007



Source: Australian Pharmacy Council 2008

Of course, all the assessment activity occurring ‘under the surface’ has meaning only when it delivers candidates who have progressed through the final assessment stage. In Table 20, the number of Stage 2 Certificates issued for each of the years 2001 to 2007 is stated; obtaining a Stage 2 Certificate makes the person eligible for immediate registration as a pharmacist in any Australian jurisdiction.

While the total numbers in Table 20 are less spectacular than for the number of assessments, the same growth trend over the last eight to ten years can be observed in the number of overseas trained pharmacists eligible to enter the Australian pharmacist workforce.

¹⁵ It is difficult to provide a precise figure since candidates can sit exams more than once in the same year.

Table 20: Number of overseas qualified pharmacists obtaining eligibility to register in Australia 2001 – 2007

Year of Certificate issue	Number of recipients
2001	37
2002	56
2003	34
2004	61
2005	70
2006	91
2007	94

Source: Australian Pharmacy Council 2008

A similar pattern has been emerging in the migration of pharmacists with Australian qualifications, that is those who have completed their studies and obtained qualifications from Australian schools of pharmacy as overseas full fee paying students. Their assessment for migration status (i.e. permanent residence) is much less complicated, especially as immigration restrictions on their re-entry to Australia post-study have been removed in recent years. The number of Australian qualified pharmacists applying for and receiving permanent resident status since 2001 is shown in Table 21.

Table 21: Number of pharmacists with Australian qualifications migrating from overseas countries 2001 – 2007

Year of migration	Number obtaining permanent resident status
2001	92
2002	65
2003	77
2004	87
2005	97
2006	153
2007	172

Source: Australian Pharmacy Council 2008

Observers from the APC note the exponential growth in immigration as a source of new supply to the pharmacy workforce. APC does not expect this trend to continue, rather they anticipate a gradual plateau being reached after which supply will achieve a relatively stable level.

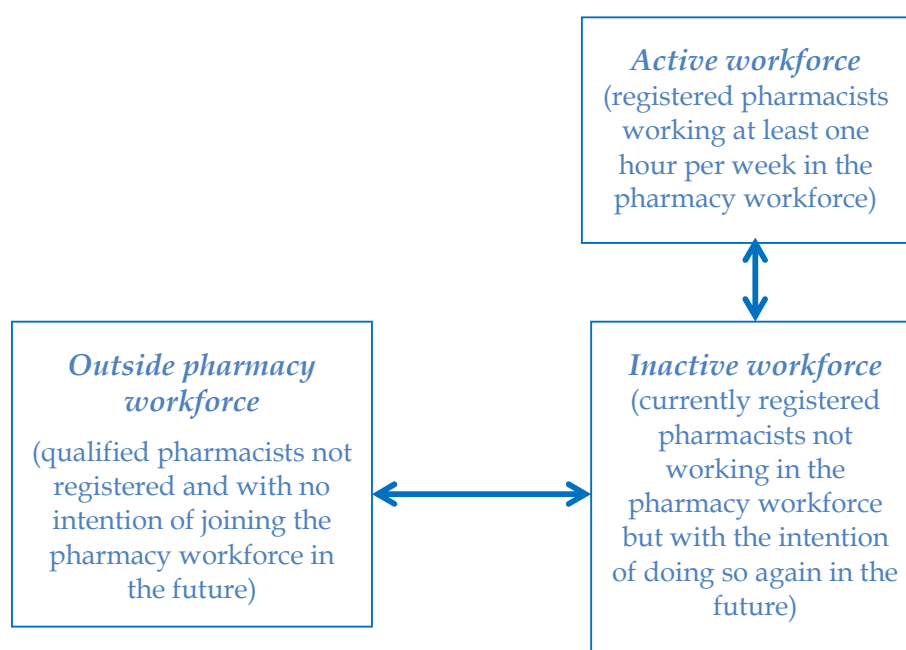
5 Workforce transfers from inactive to active status

The active and inactive components of the pharmacy workforce were conceptualised earlier in Chapter 2 (see Figure 1). There is a dynamic relationship of transfer of labour between these two workforce components, although the pattern of transfer over time has been shown elsewhere to be quite consistent (see for instance Health Care Intelligence 2003).

In this chapter we review the potential size of the 'inactive' pharmacy workforce, and the rate of transfer of labour from this component to the active workforce. The focus is on pharmacists, for other types of pharmacy labour the potential to quantify the inactive workforce is hampered by the lack of workforce entry criteria (for instance registration or a qualification). Moreover, the investment demand for new supply of non-professional pharmacy labour is not sufficient enough to create a strong interest in inactive pharmacy assistants. On the contrary, investment in professional pharmacy labour is significant, demanding a stronger approach when it is not being actively employed.

In respect to pharmacist labour we can revisit Figure 1 and more precisely conceptualise the relevant supply components as shown Figure 23.

Figure 23: The relationship between active and inactive workforce components



Two aspects have been added to this diagram compared to Figure 1 to sharpen the conceptualisation of the relationship between the different components of supply with a view of creating quantitative estimates. The two aspects are:

- The inactive workforce is defined as being *currently registered*. This is a somewhat arbitrary requirement. However the research team believes that by maintaining their registration a pharmacist (a) demonstrates a willingness and intent to return to the pharmacy workforce (otherwise why continue the annual expense of registration renewal) and (b) emphasises their capacity to return *immediately* to the workforce, a pre-condition for which would be financially registered status. This distinction is arbitrary though because, depending on the circumstances of the individual (for instance a short lapse in registration, returning from overseas pharmacy practice), an unregistered pharmacist may be able to renew their registration status in a short time frame. Kendall, Ridoutt and Schoo (2008) however, have demonstrated that the vast majority of pharmacists who allow their registration to lapse are likely to be out of the active workforce for more than three years, and therefore will require some remedial competency development (in most jurisdictions mandatory) prior to re-obtaining unconditional registration status and being able to re-enter the workforce; this is a medium to longer term process.
- The workforce defined as 'outside pharmacy' is qualified (that is able to register as a pharmacist), but is *not currently registered*. Indeed, a highly probable characteristic of this component of the workforce is that its members would have allowed their registration to lapse. Additionally, they are likely to be working in another industry and have no intention of returning to the active pharmacy workforce.

Of course, these components of the non-active pharmacy workforce are subject to fluid circumstances; people in the inactive workforce can change their intentions and decide not to return to the pharmacist workforce, preferring employment elsewhere with better pay or more suitable conditions. Similarly, the life circumstances of people working outside pharmacy may change such that pharmacy work again becomes attractive or appropriate. Moreover, there are workforce categories such as retired pharmacy owners who maintain their registration status but have no intention of re-entering the active workforce.

Unfortunately neither of the two secondary data sources used in this report to analyse the inactive workforce allow investigation according to the above conceptualisation. The ABS Population Census data does not record registration status. The 2003 Registration Board data does not collect data from pharmacists who are not registered.

Nevertheless the 2006 ABS Population Census data does provide an estimate of the total number of people in Australia with qualifications in the field of study of

pharmacy (code 0605)¹⁶ and whether they are working and, if so, working in the pharmacy workforce. In 2006, there were approximately 4,856 qualified pharmacists of working age (15-65 years) not working in the active pharmacy workforce: just over one quarter of all qualified working age pharmacists (see Table 20). An additional 4,327 qualified pharmacists counted in the census over the working age (> 65 years) are not working and are assumed to be retired and not likely to return to the active pharmacy workforce. A small pool of 391 qualified pharmacists over 65 years old was still working but not in the pharmacy workforce.

Table 22: Estimated size of various components of the active and non-active pharmacy workforce

Pharmacist workforce category	Number	%
<i>Working age people (15-64 years)</i>		
People with pharmacist qualification	19,124	100
Qualified pharmacists in the pharmacy workforce (<i>active workforce</i>)	14,268	74.6
Qualified pharmacists not currently working (<i>estimated inactive workforce</i>)	2,709	14.2
Qualified pharmacists judged not to be working in pharmacy (<i>estimated working outside pharmacy workforce</i>)	2,147	11.2
<i>Non-working age (65 years and over)</i>		
Total qualified pharmacists	5,396	100
Qualified pharmacists in the pharmacy workforce (<i>active workforce</i>)	1,069	19.8
Qualified pharmacists not currently working (<i>most likely retired</i>)	3,936	72.9
Qualified pharmacists working but not in pharmacy (<i>estimated working outside pharmacy workforce</i>)	391	7.3

Source: ABS Population Census data 2006

Of the total of 24,520 estimated qualified pharmacists counted in the 2006 Population Census just under two thirds (62.5%) are in the active pharmacy workforce, an estimated 2,709 (11%) are in the inactive workforce component and a further 2,538 (10.3%) are working outside the pharmacy workforce¹⁷.

¹⁶ Code 0605 is listed in the ABS Census Dictionary for 2006 (ABS 9001.01.2006) and refers to broad Field of Study 06 Health and 0605 Pharmacy.

¹⁷ A further 16% are estimated to have retired from the workforce, any workforce.

Table 23 shows the distribution of those qualified pharmacists who are working but not as a pharmacist by current industry of work.

Table 23: Persons qualified in pharmacy but working in an alternative industry by type of industry

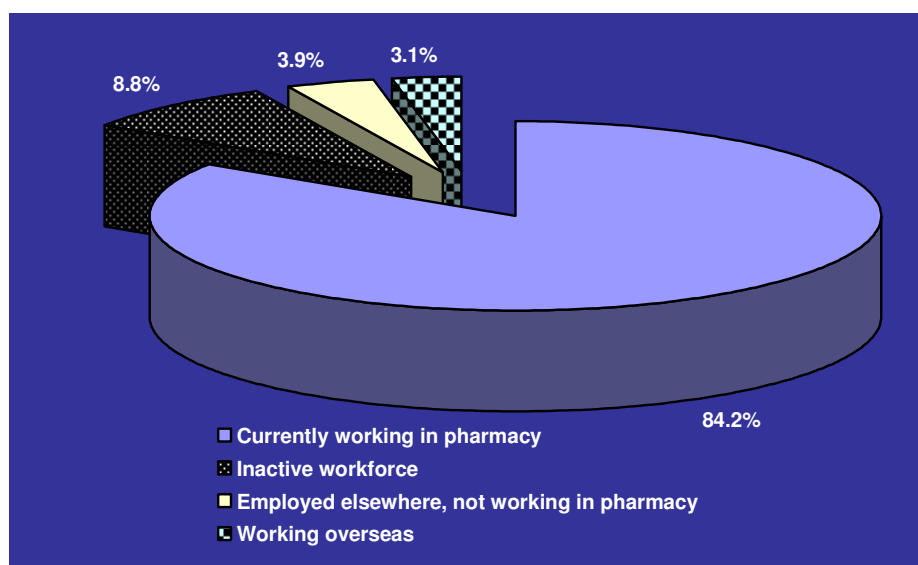
Type of Industry	Number of qualified pharmacists	% of total working but not in pharmacy
Agriculture, Forestry and Fishing	128	5.0
Mining	9	0.4
Other Manufacturing	21	0.8
Electricity, Gas, Water and Waste Services	5	0.2
Construction	76	0.3
Pharmaceutical and Toiletry Goods Wholesaling	343	13.7
Other Wholesale Trade	135	5.4
Supermarket and Grocery Stores	52	2.1
Other Retail Trade	258	10.3
Accommodation and Food Services	149	5.9
Transport, Postal and Warehousing	104	4.1
Information Media and Telecommunications	41	1.6
Financial and Insurance Services	122	4.9
Rental, Hiring and Real Estate Services	108	4.3
Administrative and Support Services	96	3.8
Non tertiary Education	99	3.9
Medical and Other Health Care Services	461	18.4
Residential Care Services	56	2.2
Social Assistance Services	92	3.7
Arts and Recreation Services	31	1.2
Other Services	122	4.9

Source: ABS Population Census data 2006

Qualified pharmacists can be found in almost all industries; however, they are most prevalent in related industries such as pharmaceutical wholesaling and medical and other health care where presumably their base competencies have greater resonance.

The 2003 Registration Board data (analysed for this study by the AIHW) provides more perspective on the inactive workforce component; it identifies from a total of 18,624 registered pharmacists 212 'looking for work in pharmacy', 195 'on extended leave for three months or more' and 1,228 'not employed, not looking for work (in pharmacy)'. All these categories could be assumed to make up the 'inactive' workforce and account for 8.8% of the total registered population. Estimates for the other workforce categories are shown in Figure 24.

Figure 24: Distribution of registered pharmacists by main active and non-active workforce categories



Source: AIHW Labour Force Survey 2003

Note that if pharmacists working overseas¹⁸ are removed from the analysis, then the inactive workforce proportion of total registrants is similar to the inactive pharmacist workforce component estimate derived from ABS Population Census data.

A 2004 survey of Victorian registered pharmacists (Department of Human Services 2006) similarly found approximately 15% of pharmacists not currently working in the Victorian pharmacy workforce. This included:

- seven per cent currently not working;
- four per cent working, but not in the pharmacy workforce;

¹⁸ Australian qualified pharmacists working overseas, irrespective of whether they retain or relinquish their registration status, are a difficult population to categorise. Generally they are not considered to be part of the 'inactive' workforce, but they are generally eligible to work immediately they return to Australia, especially if they have maintained their registration status.

- one per cent on extended leave; and
- three per cent working overseas.

Based on this data, Kendall, Ridoutt and Schoo (2008) calculated re-entry from the inactive workforce to be 0.9% per annum of the total active workforce. Nationally, if applied to the 2006 active workforce, this would translate into 138 pharmacists transferring each year from the inactive workforce to the active workforce.

6 Losses from the active workforce

Losses to the active workforce as illustrated in Figure 1 include:

- transfers from the active workforce to the inactive component, ostensibly only on a temporary basis but as has been estimated elsewhere (Kendall, Ridoutt & Schoo 2008) the majority of these losses (>60%) become permanent;
- death and disability;
- emigration of qualified pharmacists overseas (most often to practise in pharmacy); and
- retirement.

This section will look at each of these four loss areas from the pharmacy workforce in order to attempt to develop an estimate of yearly loss from the active workforce based exclusively on secondary data sources.

Inactive workforce

People leave the pharmacy workforce for a variety of reasons. A study by Kendall, Ridoutt and Schoo (2008) of allied health labour in Victoria (including qualified pharmacist labour) found the most prevalent reason for leaving a workforce (for which qualifications were relevant) was to go to another occupation/profession (see Figure 25).

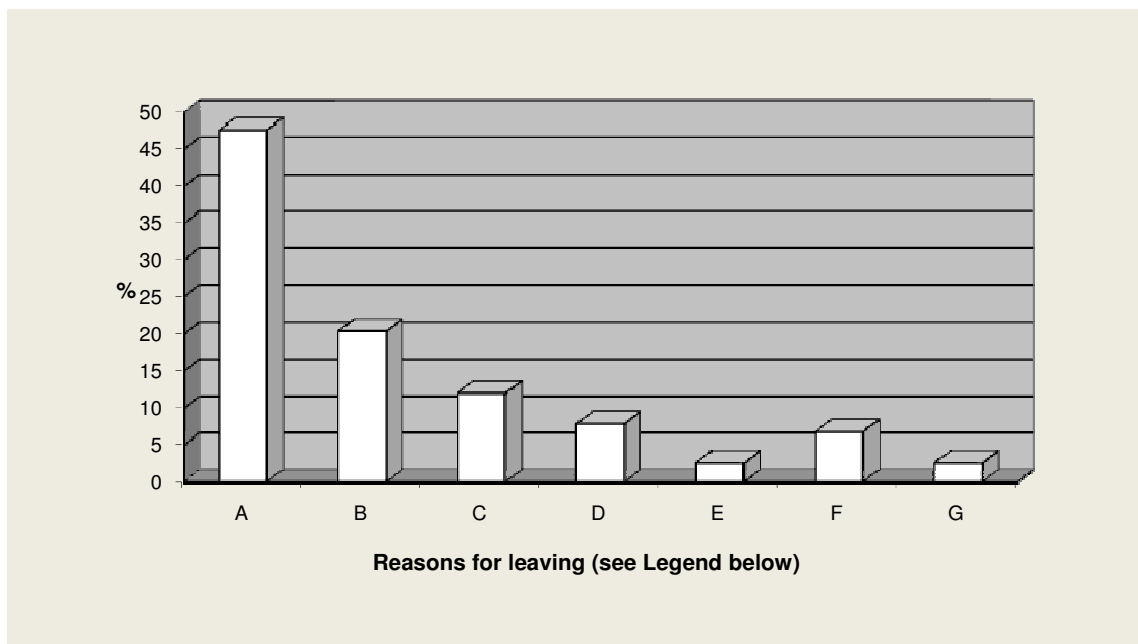
Most likely to return to the Victorian allied health workforce are those who have left for:

- family reasons (55% of this category will return);
- relocation (which often means they are working as an allied health professional interstate; 50% will return); and
- those working overseas (100%, though this category only has small numbers; see Figure 4).

Conversely, those leaving to enter another profession, better remuneration/work conditions, health problems or retirement are most unlikely to return to the active pharmacy workforce and therefore become part of the 'outside of pharmacy' component.

Non-professional labour behaves similarly, although the investment in development of skill is much lower and so the barriers to moving to another occupation are much lower. Anecdotally, the study was advised through stakeholder consultations that turnover and ultimately wastage of non-professional labour from the pharmacy workforce was high; however, no secondary data could be identified that would verify these claims.

Figure 25: Proportion of lapsed allied health workers mentioning reasons for leaving an allied health profession (n=191)



LEGEND:

A: Another profession

B: Family responsibility (starting a family, children, or aged family member needs)

C: Retirement

D: Health problems (e.g. work-related stress)

E: Remuneration

F: Relocation to another geographic location

G: Overseas travel or work

Source: Kendall, Ridoutt & Schoo 2008

Death and disability

There is no data available on the death rate of working-age pharmacists or other types of pharmacy labour. However ABS mortality data for Australian Standard Classification of Occupations (ASCO) major groupings of 1, 2 and 3 – managers, administrators and professionals – can be used to create a sound estimate of loss to the pharmacy workforce by death.

For the period 1998-2000 the age group 25-54 recorded a mortality rate for these occupational categories as 114.6 deaths per 100,000 for males, and 80.7 deaths per 100,000 for females. The non-professional labour component of the pharmacy workforce might best be classified as 'white collar'; the mortality rate for males in this group is 112.5 per 100,000, and 64.5 per 100,000 for females.

There is no comparable data on disability of health professional workforce categories or the impact it has on participation to one's given area of expertise; however, the total numbers lost would be minimal. The effects of death and disability have therefore been grouped together to estimate total loss to the pharmacy workforce, based on the active workforce size in 2006 of a total of 15,337. The number of deaths can be calculated as shown in Table 24.

Table 24: Calculation of number of deaths

Calculation	# deaths
6,751 male pharmacists x 0.00115	7.8
8,589 female pharmacists x 0.00081	7.0
1,479 male pharmacy assistants x 0.00112	1.7
25,991 female pharmacy assistants x 0.00065	16.9

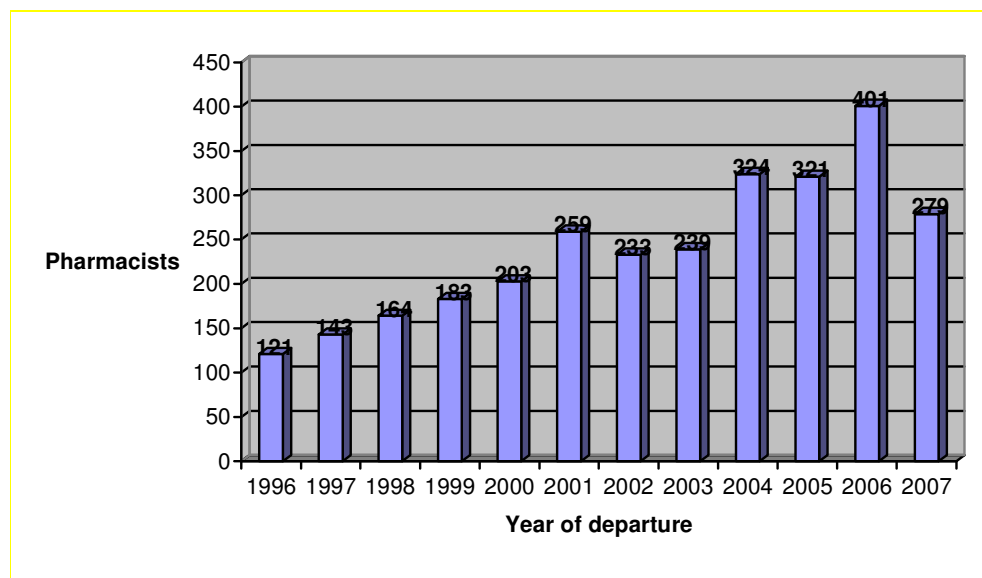
The total estimated losses from the pharmacy workforce annually through death is 33.4. Of course this estimate will vary according to the size and gender composition of the active workforce.

Loss due to migration overseas

Loss to the pharmacy workforce through permanent or long-term migration overseas can be measured with ABS Overseas Arrivals and Departures data, collected by the Department of Immigration.

Over the ten year period from 1996 to 2006, migrations have grown in number steadily, peaking in 2006 with 401 qualified pharmacists indicating long term or permanent departure on their emigration cards. The number departing drops down sharply in 2007 to 279 (see Figure 26).

Figure 26: Pharmacist departures from Australia for permanent and long term migration 1996-2007



Source: ABS 2008

The rapid decrease in 2007 is believed not to be an anomaly, but rather the longer term adjustment to a change in Australian legislation which no longer allows qualified pharmacists to transfer their skills and practice to the United Kingdom.

Prior to 2007, Australia and the United Kingdom allowed mutual recognition of registration status. This was withdrawn in 2007 making the process of migration between the countries much more difficult.

In recent years the migration flow has been dominated by young (less than 30 years old) female pharmacists.

Retirement

The average age of the pharmacist workforce has long been a subject of concern for leaders in the profession. The possibility of an impending mass retirement of pharmacists has been raised as early as the 1980s (see for instance Anderson, Bickle & Ridoutt 1989). More recent pharmacy workforce planning exercises have dispelled the fears to a large extent (e.g. Health Care Intelligence 2003), and the age profile of the current active workforce presented in Chapter 3 further undermines any cause for immediate concern. Nevertheless, it was noted in an earlier section that a significant proportion of the total number of qualified pharmacists at the last (2006) Census had retired (16%).

While it is possible to develop an estimate of the retired pharmacist population, the *rate* of retirement as an annual loss to the pharmacy workforce is more difficult to estimate accurately. A likely sign of retirement is when a pharmacist determines not to renew their registration; however, as discussed previously, there are other reasons why registration might not be renewed. Moreover, if a pharmacist retains ownership in a pharmacy then even in retirement there is a requirement to maintain registration. Table 25 shows the number of registration non-renewals of pharmacists in the year 2006-2007 financial year.

In recent times, registration authorities have reduced the incentive for pharmacists to remain on the registrar when they are not working, with boards in most states/territories requiring more rigorous evidence of competency to practise and/or evidence of currency (within the last 2 years) of practice¹⁹. Prior to 2005 the requirement was to have practised within the last 3 years. Moreover, in most jurisdictions the registration renewal fee has increased and there is little fee differential between 'practising' and 'non-practising' registration status.

Registration authorities themselves revealed through the stakeholder consultations that recent practice requirements may reduce the number of older, previously retired pharmacists returning to part-time work, due to the need to satisfy more difficult competency demands.

¹⁹ Pharmacists who have not practised within the mandatory two year period may be required to undergo some form of assessment prior to being allowed to again practise without supervision.

Table 25: Number of pharmacists allowing registration to lapse in 2006/2007 in Australia, by state / territory

State or territory	Number registered	Non-renewals	% failed to renew
New South Wales	8,165	610	7.5
Victoria	5,365	239	4.4
Western Australia	2,163	115	5.3
South Australia	1,586	157	9.9
Northern Territory	229	76	33.2
Queensland	4,517	307	6.8
Tasmania	557	48	8.6
Australian Capital Territory	422	36	8.5
	23,004	1,588	6.9

Source: Pharmacy Registrations Boards

In 2006-2007 the average age at retirement from the Australian labour market for people aged 45 years and over was 52 years (58 years for men and 48 years for women). Of the 1.4 million men who had retired from the labour force:

- 53% had retired aged 55–64 years;
- 27% had retired aged less than 55 years; and
- 20% had retired aged 65 years and over.

The 1.7 million women who had retired from the labour force had retired on average at a younger age than men. The ages at which women had retired from the labour force were as follows:

- 58% had retired aged less than 55 years;
- 35% had retired aged 55–64 years; and
- 7% had retired aged 65 years and over.

However, the average age at retirement for recent retirees (those who have retired in the last five years) was 60.3 years. Within this group, the difference between the retirement age of men and women was relatively small, with women retiring a little younger than men (the average retirement age for this group was 61.5 years for men and 59.0 years for women). For people aged 45 years and over who have retired from the labour force, by occupation of last job details, the average age at retirement for managers, professionals and for healthcare and social services workers was 60, 59.8

and 55.7 years respectively²⁰. It is likely that the retirement behaviour of pharmacists reflects rather the older average age characteristic of newer retirees and of managers and professionals. Health Care Intelligence (2003) in fact expressed surprise in the most recent pharmacy workforce study at the resilience of the pharmacist supply and attributed much of this to the longevity of pharmacists in the workforce.

In respect to the non-professional components of the pharmacy workforce, the very young workforce profile makes retirement a low interest issue. It would seem that few pharmacy assistant type workers make it through to a reasonable retirement age in the active workforce.

²⁰ Multipurpose Household Survey (MPHS) 2006-2007 financial year, ABS

7 Discussion on projections

Introduction

This report is *preliminary* only, providing in essence a progress description of the project's findings. Any projection calculations that could be developed at this stage, based only on available secondary data, would in respect to several supply variables be rudimentary at best²¹. Projections will therefore be developed later in the project. They will be informed by a well developed model and a broader range of data sources including primary data (a survey of pharmacies) and qualitative data through a search conference, interviews and focus group discussions. A major future effort will be to develop a more sophisticated treatment of flows to and from the inactive workforce and losses from the workforce as the result of retirement.

When supply projections are developed the approach adopted will most likely be a simple, and commonly termed 'stock and flow' model. In previous chapters the commentary has almost exclusively been on the 'stock' components, that is what currently exists. In this chapter we look briefly at the assumptions adopted for the 'flow' components of a supply projection model and summarise findings from previous chapters on key supply variables.

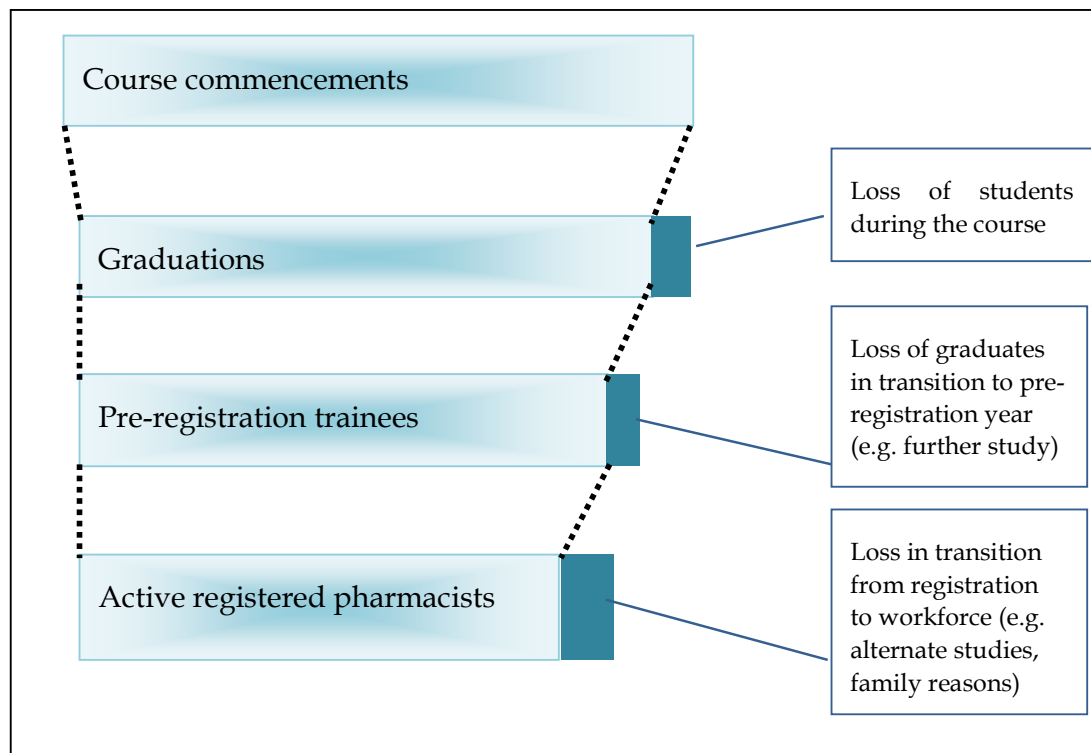
Assumptions

Graduate supply

In an earlier chapter past graduate supply to the pharmacist workforce was detailed, as was the stock of current pharmacy school enrolments. The pathway from commencing enrolments in pharmacy courses to new supply of unconditionally registered pharmacists is illustrated in Figure 27.

²¹ Of course for some variables, notably the active workforce and short term new graduate supply, secondary data will remain the most reliable source for estimates.

Figure 27: Overview of transition losses between course commencement and entering the pharmacist labour market



Based on a range of qualitative (opinion) and quantitative data sources the estimates of percentage loss from each of the components in Figure 27 are as follows:

<ul style="list-style-type: none"> Loss during the pharmacy course (opinion provided by Colin Chapman through CHPSANZ) 	<p>4%</p> <p>In the case of International students, recent estimates are that 80 % of students seek (and obtain) permanent resident status in Australia. This supply source though is dealt with under immigration below to avoid double counting.</p>
<ul style="list-style-type: none"> Loss in transition between graduation and the pre-registration (internship) year of further training (data obtained from Graduate Careers Australia annual <i>Graduate Destination Survey</i>) 	<p>3%</p> <p>The Graduate Destination Survey estimates 10.6% of pharmacy graduates progress to further full-time study. Most of these students presumably continue, at least in the short term, with their pharmacist career part-time.</p>

<ul style="list-style-type: none"> Loss in transition from post-registration training (opinion provided by selected registrars) 	<p>Negligible</p> <p>Although there are some failures in the examination at the completion of the pre-registration training, candidates are allowed to re-sit the exam with one month and are invariably then successful.</p>
<ul style="list-style-type: none"> Loss between initial unconditional registration and entering the workforce (data obtained from Graduate Careers Council of Australia, 2005) 	2.2%

The ultimate composition of the 'new graduate' supply to the active pharmacist workforce in terms of workforce participation is detailed in Table 25 adopted from Graduate Careers Council of Australia (2005).

Table 25: Workforce status of initial new pharmacy graduate supply when it first obtains unconditional registration from an Australian registration authority

Workforce status	Proportion of new registrants (%)
In full-time employment	80.0
Working part-time, seeking full-time employment	4.9
Not working, seeking full-time employment	1.8
Not working, seeking part-time employment only	0.4
Working part-time, not seeking full-time employment	10.7
Unavailable for work or study	2.2

While a little unsophisticated, an estimated FTE conversion factor derived from Table 26 would be 0.92. Thus each enrolment in a pharmacy course is estimated to deliver approximately 0.84 full time equivalent pharmacists ultimately to the active workforce ($1 \times 0.96 \times 0.97 \times 0.978 \times 0.92$). This estimate will vary based on whether the course is a BPharm or MPharm enrolment.

Current enrolments in 2008 were provided in an earlier table (See Table 18) from which the graduate supply using the above assumptions can be developed for 2009, 2010, 2011 and 2012. Graduate supply projections from 2013 and onwards require an estimate of the commencing pharmacy course enrolments beyond 2008.

Table 26: Current and projected commencing enrolments (a) at Australian schools of pharmacy in relevant & accredited training programs for registered pharmacists

School of Pharmacy	Current commencements 2008	Projected commencements beyond 2008
University of Tasmania	63	60
La Trobe University	55	55
Monash University	124	120
Queensland University of Technology	81	90
University of Queensland	206	220
James Cook University	95	115
Curtin University	95	200 (b)
Charles Sturt University	126	110
Charles Darwin University	32	35
Griffith University	117	81
University of Sydney (B Pharm)	241	220 (c)
*University of Sydney (M Pharm)	29	30
University of South Australia (B Pharm)	77	155
*University of South Australia (M Pharm)	*	*
*Newcastle University	50	45
*University of Western Australia	28	30
*Murdoch University	39	40
*University of Canberra	28	30
Total	1486	1636

(a) Includes only Australian HELP and full fee-paying students

(b) Curtin is planning to introduce a Masters course after 2012 with approximately 40 enrolments

(c) Figures for Sydney University based on school's advice. However the University of Sydney Strategic Plan is catering for a 30% across the board increase in student enrolments by 2025; one would expect pharmacy to be part of this expansion.

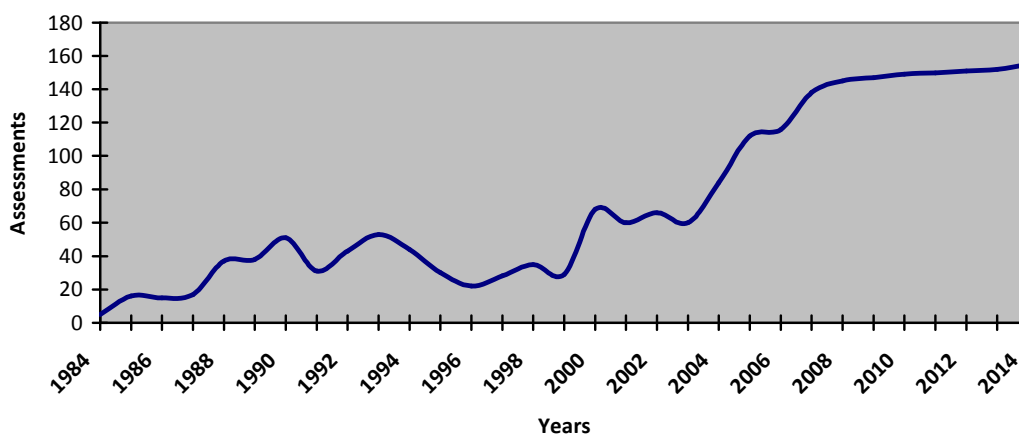
* *Two year Master of Pharmacy degree program.*

Advice on these has been gathered from each of the universities with schools of pharmacy (see Table 26) but no university was particularly comfortable predicting enrolments beyond the next five years. This area needs significantly more work before graduate supply predictions can be generated much beyond what is already 'in the pipeline' and therefore able to be reliably estimated till the year 2013.

Immigration

In an earlier chapter, the rapid increase in immigration of overseas qualified pharmacists as a source of supply to the pharmacist labour market was noted. Most well placed observers expect this rapid rise, depicted in Figure 28 below showing the number of candidates seeking assessment at the Stage II level between 1984 and 2007, not to continue. Based on the growth of inquiries and Stage I assessments, these observers believe an asymptotic type growth curve will evolve, which is also shown in Figure 28 for the years 2008 to 2014.

Figure 28: Trend in numbers sitting Stage II APEC exams; actual 1984 to 2007, projected 2008 to 2014



Source: APC, 2008

In the case of international students who have completed their pharmacy qualifications in Australia, it was shown earlier how the number of these graduates seeking and obtaining permanent residence in Australia has also grown rapidly. Because of recent changes in immigration policy with respect to Australian qualified graduates from overseas, CHPSANZ estimates that 80% of this graduate population now remain in Australia after completing training. It is instructive therefore to review the enrolment projections of overseas students in the Australian schools of pharmacy (see Table 27). Again, these enrolment estimates beyond 2013 need to be more comprehensively discussed and validated.

Table 27: Current and projected commencing enrolments at Australian schools of pharmacy of international students

School of Pharmacy	Current commencements 2008	Projected commencements beyond 2012
University of Tasmania	25	20
La Trobe University	6	5
Monash University	61	25
Queensland University of Technology	4	10
University of Queensland	51	50
James Cook University	5	10
Curtin University	70	50
Charles Sturt University	7	5
Charles Darwin University	3	10
Griffith University	0	0
University of Sydney (B Pharm)	31	30
*University of Sydney (M Pharm)	4	5
University of South Australia (B Pharm)	77	75
*University of South Australia (M Pharm)	0	5
*Newcastle University	0	0
*University of Western Australia	8	6
*Murdoch University	5	5
*University of Canberra	3	3
TOTAL	360	314

* Two year Master of Pharmacy degree program

Transfers between the inactive workforce

In an earlier chapter, the annual gains from the 'inactive' workforce to the 'active' workforce were estimated to be 0.9% of the total active workforce.

Conversely, in a separate chapter, the losses to the inactive workforce were discussed but no quantitative estimate of the loss established. The net wastage rate (rate of loss from the active workforce minus the rate of gain from the inactive workforce to the

active workforce) is one of the most important 'flow' variables to be estimated in any model projecting supply. Small percentage changes in the net wastage rate can have a significant compound effect on projections, especially over such a long projection period.

More work will be undertaken on this variable in future stages of the Pharmacy Workforce Planning Study.

Assumptions on loss factors

In Chapter 6 the losses from death and disability, migration and retirement were discussed and quantitative estimates of their impact developed. These are restated in Table 28 as a proportion of the active workforce.

Table 28: Losses to the pharmacy workforce

Source of loss	Estimate as a % of the active workforce
Death and disability	0.1
Migration	1.8% (280)
Retirement	3.9

Conclusion

As noted above, it would be premature to attempt pharmacy workforce supply projections given the uncertainty around several key variables. However, having considered the above assumptions and conducted some initial trial supply modelling, some supply variables can be highlighted for further research since it is these variables that will most impact on the projections:

- There is currently a comparatively high training rate of between 7.5% and 9.8% per annum. With the significant increase in the number of schools of pharmacy in recent years it is difficult to see how this training rate might decrease other than through a rationalisation of schools (unlikely) or a reduction in commencing enrolments especially in the larger schools. It is not yet known whether the current training rate is appropriate or not (a comparison with demand is required first to answer that question); it is clear though that a stronger understanding of future enrolment trends is essential.
- The high training rate is brought into stronger focus because of the equally strong growth in supply from immigration. Effectively the current contribution to supply from immigration is the equivalent of supply from a large school of pharmacy. There is genuine uncertainty around the future trend in immigration supply; will it continue to grow as per the trend of the last decade or will it gradually plateau as suggested in Figure 28.

- As noted earlier the net wastage rate is a critical supply variable. In the previous HCI (2003) study the rate of wastage was estimated as three per cent per annum. A drop in this estimate though, of as little as one per cent, can deliver an increase in active workforce supply over the life of the projection period (until 2025) by as much as 1000 FTE pharmacists. National Health Workforce Taskforce supply projection models allow for a wastage rate to be estimated on the basis of different age and gender cohorts; this may be an alternative method for developing 'flow' estimates in this area.

Another significant question arises when looking at projections in supply for technicians and assistants. The supply of non-professional pharmacy labour is much easier to recruit and develop than qualified pharmacist labour. Should supply for non-professional labour be expressed simply through a fixed ratio between professional (pharmacist) and non-professional (assistant) pharmacy labour employment. Whether that ratio accepts and adopts current relationships in various sectors of the pharmacy workforce (community and hospital especially) or systematically seeks to vary the ratio up (more assistants per pharmacist) or down will be the subject of further literature review and consultation.

Perhaps too it cannot be assumed as far forward as 2025 that assistant type labour will still be readily available. The nature of assistant work, and therefore the competence requirements, may evolve over that time demanding probably greater training investment.

Appendix A

Definition of all Australian Standard Classification of Occupation (ASCO) and Australian and New Zealand Standard Classification of Occupations (ANZSCO) codes use in the report.

2382-11 Hospital Pharmacist

Prepares and dispenses pharmaceuticals, drugs and medicines in hospital pharmacies.

Skill level:

The entry requirement for this occupation is a bachelor degree or higher qualification. Registration or licensing is required.

Tasks include:

- reviews prescriptions to ensure that correct doses have been prescribed, and that the substances prescribed are compatible
- prepares or supervises the preparation of liquid medicines, ointments, powders, tablets and other medications
- compounds prescribed medicines, packages and labels them, and issues them in accordance with strict control procedures
- maintains stocks and orders supplies of drugs and medicines and maintains inventories of pharmaceuticals
- maintains control records of narcotics, poisons and habit forming drugs
- stores and preserves vaccines, serums and other drugs
- provides advice and information on the use and effects of medications
- advises medical practitioners on drug incompatibility and contra-indications
- may supervise others and manage the pharmacy as a business

2382-13 Industrial Pharmacist

Undertakes research, testing and analysis related to the development, production, storage, quality control and distribution of drugs and related supplies.

Skill level:

The entry requirement for this occupation is a bachelor degree or higher qualification and a one year traineeship. Registration or licensing is required.

Tasks include:

- conducts research to develop or improve pharmaceuticals, cosmetics and related chemical products
- confers with Chemists, Chemical Engineers and other professionals about manufacturing techniques and ingredients
- assists with design, development and testing of production equipment
- develops standards for drugs used in pharmaceuticals
- tests and analyses drugs to determine their identity, purity and strength in relation to specified standards
- determines the most suitable packaging for medicinal substances to avoid deterioration and facilitate distribution
- sets up and supervises sterile production and packaging areas
- evaluates and advises on government controls for the use, packaging and advertising of pharmaceutical products
- supervises and coordinates the work of technical officers and technicians

2382-15 Retail Pharmacist Community Pharmacist

Compounds and dispenses prescribed pharmaceuticals in retail outlets and sells non-prescription medicines and related goods.

Skill level:

The entry requirement for this occupation is a bachelor degree or higher qualification and a one year traineeship. Registration or licensing is required.

Tasks include:

- prepares or supervises the preparation of liquid medicines, ointments, powders, tablets and other medications
- checks prescriptions for correct dosage and for drug interactions and incompatibilities
- compounds prescribed medicines, and packages and labels them
- stores and preserves vaccines, serums and other drugs subject to deterioration
- dispenses medical and surgical products as prescribed
- records prescriptions dispensed, and the issue of poisons, narcotics and other restricted drugs
- provides advice and information on the use and effects of medications
- sells non-prescription drugs, sick-room supplies, toiletries, cosmetics and related commercial products.

311215 Pharmacy dispensary technicians

Fills and labels patients' prescriptions under the supervision of a Pharmacist. May record details of, place orders for, take stock of, and store medications and medical supplies and deliver them to patients

Tasks include:

- referring prescriptions to Pharmacists and assisting in preparing medications

621411 Pharmacy Sales Assistants

Sells pharmaceutical goods, toiletries and related goods in a retail pharmacy.

Tasks include:

- accepting prescriptions for filling by Retail Pharmacists
- determining customer requirements and advising customers on the selection, price and usage of non-prescription medicines
- advising customers on the correct application and storage of medicines
- selling goods such as non-prescription drugs, first aid supplies, toiletries and cosmetics
- accepting payment for goods and services by a variety of payment methods and preparing sales invoices
- promoting goods and services that are for sale
- assisting with the ongoing management of stock such as product inventories and participating in stocktakes
- stacking and displaying goods for sale, and wrapping and packing goods sold

Appendix B

Explanatory notes on the Pharmacy Labour Force Survey

Background

All pharmacists must be registered with a state/territory pharmacy registration board to practise in that state or territory. The registers contain information such as the name, contact details, age, sex and qualifications of pharmacists who are registered to practise in that jurisdiction. The registration boards also manage the annual process of renewing the registration of pharmacists who are qualified and eligible to practise.

Method

The population for the survey is registered pharmacists and is drawn from the registration files maintained by each state/territory pharmacy registration board. Each pharmacy board conducts an annual renewal of registration and, in some years, questionnaires are sent to pharmacists on renewal of their registration. In 2003 the survey was conducted in all jurisdictions except the Northern Territory. Returned surveys were processed by, or on behalf of, the respective health authority. Each participating state/territory then forwarded a data file of de-identified responses to the AIHW for further cleaning, final coding, collation into a national data set, application of national range and edit checks, estimation for item and population non-response, weighting and finally, analysis (see Table 1). Due to limitations in the Victorian 2003 questionnaire it was decided to use data collected from the 2004 survey for Victoria.

Scope and coverage

The scope of the survey is for all pharmacists registered with the pharmacy board in each state/territory, but coverage may exclude pharmacists who registered for the first time in the survey year. This is because the survey questionnaire is distributed as part of the registration renewal process and only pharmacists who are renewing their registration receive a questionnaire. To ensure that the survey provides estimates of the total population of registered pharmacists, the new registrants are treated in the same way as survey non-respondents in the weighting process (see Table 1).

Response rate

Response to the Pharmacy Labour Force Survey in 2003 represented 71.5% of the pharmacists registrations in all participating jurisdictions (Table 1). The overall response rate is an approximation because some pharmacists were registered in more than one state or territory. It is not known how often this occurred because it is not

possible to match survey records across jurisdictions. However the number registered in more than one jurisdiction is estimated based on responses to specific questions in the questionnaire. For example, those who are working and are registered in more than one jurisdiction are assigned to the jurisdiction where they worked the most hours.

Table 1: Estimated survey response rate, states and territories, 1999 and 2003

Response rate	NSW	Vic^(a)	Qld	WA	SA	Tas	ACT	NT^(b)	Total
1999	75.5	65.9	86.9	81.8	90.6	69.9	65.9	75.8	76.3
2003	79.9	44.8	87.1	80.2	75.9	62.4	60.2	..	71.5

(a) Response rate comprised of the number of responses to the 2004 survey as a percentage of total registrations in Victoria as at March 2003.

(b) Survey was not undertaken in the Northern Territory in 2003.

Sources: AIHW Pharmacy Labour Force Surveys, 1999 and 2003.

Estimation procedures for non-response

The AIHW used the data collected in the Pharmacy Labour Force Survey to derive estimates of the total pharmacy labour force. In deriving the estimates, two sources of non-response to the survey are accounted for:

- item non-response, which occurs as some respondents return partially completed questionnaires; and
- population non-response, which occurs because not all registered pharmacists who receive a questionnaire respond, and new registrants do not receive a questionnaire.

A separate estimation procedure is used for each. Weighting is used to account for population non-response and imputation for item non-response.

Both of these procedures are described below.

Imputation: estimation for item non-response

The imputation process involves an initial examination of all information which has been provided by a respondent. If possible, an assumption is made about any missing information for that respondent based on their responses to other survey questions. For example, if a respondent provides information on hours worked and the area in which they work, but leaves the labour force question blank, it is reasonable to assume that they were, in fact, employed.

Missing values remaining after this process are considered for their suitability for further imputation. Suitability is based on the level of non-response to that item. Imputation is usually only applied in cases where the proportion of missing values is less than five per cent of the total number of responses.

In imputation, the known probabilities of particular responses occurring are used to assign a response category *value* to each record, using a random number generator.

Imputed values are based on the distribution of responses occurring in the responding sample. Therefore, fundamental to estimating missing values for survey respondents who returned partially completed questionnaires is the assumption that respondents who answer various questions are similar to those who do not.

Age group and sex values within each state and territory are first imputed to account for missing age and sex values. In 2003, 4.2% of records (587) received an imputed age group and 0.3% (40) received an imputed sex value. Other variables deemed suitable for this process were then imputed. These variables were 'Looking for work' (0.3%, 45 records) and 'Field of main pharmacy job' (Community/retail pharmacist, hospital/clinic pharmacist etc) (1.3%, 178 records).

Weighting: estimation for population non-response

Each survey record (a record equates to a respondent) is assigned a weight which is calibrated to align with independent data on the population of interest, referred to as 'benchmarks'. In principle, this weight is based on the benchmark number divided by the number in the sample. The resulting fraction becomes the expansion factor applied to the record, providing an estimate of the population when aggregate output is generated.

Benchmark data are usually provided to the AIHW by the state/territory pharmacy registration boards. Where data is not available from the boards, benchmark figures are obtained from other sources, such as pharmacy registration board annual reports.

The total number of registered pharmacists on the registration database at a particular time in 2003 were used to benchmark the survey for New South Wales, Victoria, South Australia and Tasmania. For Queensland, Western Australia and the Australian Capital Territory the data was benchmarked according to data provided in the respective pharmacy board's annual report. No survey or benchmark data was available for the Northern Territory in 2003.

The calculation of weights is usually part of the data processing for a sample survey in which the sample is selected before the survey is conducted. In the Pharmacy Labour Force Survey, all registered practitioners within scope, not a sample, were sent a questionnaire when registration renewal was due. Therefore, technically, it is a census. However, because not all renewing practitioners in scope respond, the result is a data set based on a very large 'self-selecting sample' of the population. Because the group of respondents in the data set is not random, standard errors are not a suitable means of gauging variability.

The weight for each record is based on particular characteristics that are known for the whole population. In 2003, benchmark figures by age and sex were provided for New South Wales, Victoria, South Australia and Tasmania. For Queensland and Western Australia usable age breakdowns were not provided by the registration boards, and the calculation of weights was based on the total male and female figures. For the Australian Capital Territory the calculation of weights was based on the total benchmark figure.

Producing benchmark estimates for the population by weighting the survey data of respondents does adjust for bias in the responding group of pharmacists, but only for *known* population characteristics (age and sex, where provided, in the case of the Pharmacy Labour Force Survey). If information for a variable is not known for the whole population, the variable cannot be used in the calculation of weights and cannot be used in the adjustment process.

For variables not used in the calculation of weights, (for the Pharmacy Labour Force Survey that is all variables *other* than state/territory, age and sex) it is assumed, for estimation purposes, that respondents and non-respondents have the same characteristics. If the assumption is incorrect, and non-respondents are different from respondents, then the estimates will have some bias. The extent of this cannot be measured without more detailed information about non-respondents. However, as registrants who do not renew are probably less likely to respond to the survey it is likely that there will be some bias in the estimates.

Geographic classification

The Remoteness Area Structure of the Australian Standard Geographical Classifications (ASGC), produced by the Australian Bureau of Statistics, is used to present regional data for pharmacists. The Remoteness Area Structure of the ASGC is based on a measure of accessibility/remoteness with the following categories:

- Major cities of Australia
- Inner regional Australia
- Outer regional Australia
- Remote / Very remote Australia (including migratory)

Symbols and other usages

Data from the AIHW surveys may not add to the totals shown due to the estimation process used for non-responses. As a result:

- Numbers of pharmacists may be in fractions, but are rounded to whole numbers.
- Percentages may not add to 100.0 due to rounding.
- Italics within a table denote a subtotal.
- - Nil or rounded to zero
- .. Not applicable
- n.a. Not available
- n.p. Not publishable (some cells have been suppressed to protect confidentiality and/or indicate small cells that may not be statistically reliable)

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