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**The Australian Veterinary
Association Ltd
AVA Workforce
Modelling Environmental
Scan Report**

Draft Report

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EXECUTIVE SUMMARY

1.0. Overview

This report is an Environmental Scan of the veterinary profession and its services. Environmental scanning involves a systematic approach to collecting and analysing information relating to an organisation's internal and external operating environment or the internal and external environment that influences the role and practice of a workforce or profession.

The steps in developing an Environmental Scan include:

- Knowledge and understanding of the external environment (Government policies and funding arrangements, the regulatory environment);
- Business models and commercial arrangements regarding ownership and provision of veterinary services in the private sector;
- Types of veterinary services;
- Government and research organisations and their roles and responsibilities;
- Educational authorities and the courses offered;
- Demand drivers for the workforce;
- Current workforce characteristics;
- Analysis of current workforce data & relevant data sources; and
- Potential sources of risk in undertaking modelling and relevant to analysing the findings.

For planning purposes, it is important to determine whether the present workforce is adequately meeting population and service requirements (as defined by health needs of the animal population and areas of unmet need) or whether a shortage or excess or maldistribution situation applies. This evaluation is then incorporated into the workforce modelling process. Assessing current workforce requirements means identifying whether a profession or workforce is operating effectively to meet service needs and where problems or areas for improvement are already known. This assessment provides a basis for considering what the profession will be doing in the future and what skills will be needed.

Therefore the environmental scan is designed to address these questions and determine the environmental issues that are currently driving the supply of and demand for veterinarians and to what extent they will play that role in the future.

This report has been prepared to be one component of the documentation that supports the workforce planning process for the profession including the development of workforce projections and scenarios for balancing supply and demand.

Another paper, the "*Technical Workforce Modelling Paper for the Veterinary Workforce*" is also being prepared to provide more detailed analysis of current and historic supply and demand data, document assumptions supporting the projection modelling and report on findings from the projection modelling including scenario projections.

Key findings are as outlined below.

1.1. Demand drivers

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The overview of the veterinarian profession and key demand issues has identified the complexity of the veterinary workforce for the purposes of workforce modelling. The Environmental Scan indicates that there have been major changes in the funding and organisational arrangements for veterinary services, including the composition of the types of veterinary practice, business models and commercial arrangements regarding ownership of private practices and the government funding and delivery of government services. There are major changes occurring in key demand factors such as levels of pet ownership, the provision of rural services and services to the equine industry, as well as changes in the roles performed by veterinarians, together with increasing roles for paraprofessionals.

The study conducted by Baguley (2011) is the most definitive study reviewed for the Environmental Scan regarding projected demand for the veterinarian profession, and this study was limited to the demand for and revenue from companion animal veterinary services in Australia. Baguley concluded that the market for companion animal veterinary services is a mature market and that growth in demand is expected to remain low over the forecast period from 1996 to 2026.¹ His conclusion is that the companion animal industry in Australia is likely to grow in real terms by around 1.2% over the next 10-15 years (p. 359). However he also highlights demand factors which could limit the translation of this demand growth into similar growth in demand for veterinarians, which includes factors such as a change in the skills mix of the workforce to a greater proportion of paraprofessional staff, as well as consolidation of practices resulting in more economies of scale.

Baguley's study used industry data on pet population estimates from the time series 1994 to 1997 and then from a separate data set in 1998 (p. 357). The analysis has provided some key conclusions including that the model forecasts an increase in dog and cat populations during the period under analysis, despite decreases in the percentage of households owning dogs and cats. This is related to the more than proportionate growth in household numbers over the same period.

The international experience during the global financial crisis however indicates that the role of pets in households is increasingly important, and that both pet ownership and related expenditure is relatively resilient to broader economic downturn. However Baguley also argues that there is mixed data on the level to which expenditure is price inelastic (the extent to which increases in fees will result in increased revenue) and therefore the market has multiple segments which will respond differentially to changes in fee levels. Purchasing behaviour may decrease as fees increase, but there will be a segment of the market that is willing and able to pay for new, higher priced services and products created by technological innovation.

The drivers for demand for other sectors of the veterinary workforce are also complex in that there are significant challenges for growth in the rural sector with increasing reliance on companion animal services to support rural practice viability. The level of government services provided by veterinarians has fallen substantially but there is minimal evidence of the extent to which the concept of an enhanced role for private practices to contract those essential services back to producers and government agencies has actually occurred.

¹ Op. cit. p. 352.

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There is also increasing specialisation in the market, particularly in areas such as surgery for small animals and equine services. There is also increasing emphasis being placed on biosecurity services to replace the more traditional quarantine services. However it is unclear to the extent to which these changes will consolidate and strengthen the role of veterinarians as there are changes occurring in the skills mix in practices with the use of paraprofessionals as well as increasing competition from non-veterinary providers in niche markets which will challenge future growth in the workforce.

1.2. Supply factors

The key data on the supply indicators to date show:

- An increasing number of university courses, together with increasing student commencements and completions. The student completions are yet to increase further as increased commencements flow through to completions;
- A major variation in the gender mix of the workforce with a majority of females in the workforce (55.8%), very high proportions of females in the younger age groups up to 44 years, after which there are more male veterinarians by age group. Females make up 82.1% of the workforce aged up to 24 years, and the proportion of females then declines by age cohort. This trend is apparent across every State and Territory within Australia;
- A high modal range for hours worked, with the largest number of veterinarians working 49 hours and over per week;
- Emerging oversupply with an increasing proportion of graduates seeking work at four months after graduation from 2004 onwards; together with a reduction in parity with overall graduate wages, particularly since 2009.

1.3. Next steps

The next steps are to undertake projection modelling of supply and demand for veterinarians across Australia. It is proposed to do a national projection as a baseline, together with the following projections:

- Urban versus rural (using the Commonwealth Government classification of ASGC-RA);
- State and Territory projections;
- Sector projections for small animal practices, mixed practices, equine, production animal and other (including education, research, government, industry and other areas).

These individual projections will be subject to more data analysis before being undertaken to ensure that data sources are sufficiently robust to undertake this level of projection modelling. Data is required for completing students, the workforce, migration levels, and wastage at five year age and sex cohort level and therefore cell sizes can be too small for projection modelling.

These projections will be reported in the Technical Paper and final report. Interviews with key stakeholders are currently being undertaken which will also assist in identifying key demand drivers and supply factors, which will be incorporated into the modelling and final report.

INTRODUCTION

2.0. Background to Project

Thinc Health has been appointed by The Australian Veterinary Association Ltd (the “Association”), for the development of a projection modelling strategy and to undertake the projection modelling for the organisation. The future size and structure of the workforce of registered vets, especially those in clinical practice, has emerged as a major issue of concern for the profession (Porritt, D., 2013, p. 3).²

2.1. Definitions of Workforce Planning

The most common definition of workforce planning is:

“having the right people, in the right place, with the right capabilities at the right time”.(WHO, 2004).³

The process can be described as follows:

“Workforce planning typically examines the current state, the desired future state and identifies ways of dealing with gaps that emerge between the two” (Mercer College, 2009, p.16)⁴.

The Mercer College Guide provides a workforce planning framework which describes the steps in the process as shown below. The definition of the components of modelling future supply and demand are as follows:

“Supply forecasting is the process of calculating the likely future supply of current employees with a particular skills set “. (Mercer College, p.18)

“Demand forecasting is the process of calculating the future demand for employees with a particular skills set, to meet future service delivery requirements”. (Mercer College, p.19)

² Porritt, D., (2013) *Australian Veterinary Workforce review report*. Taverner Research & The Australian Veterinary Association Ltd.

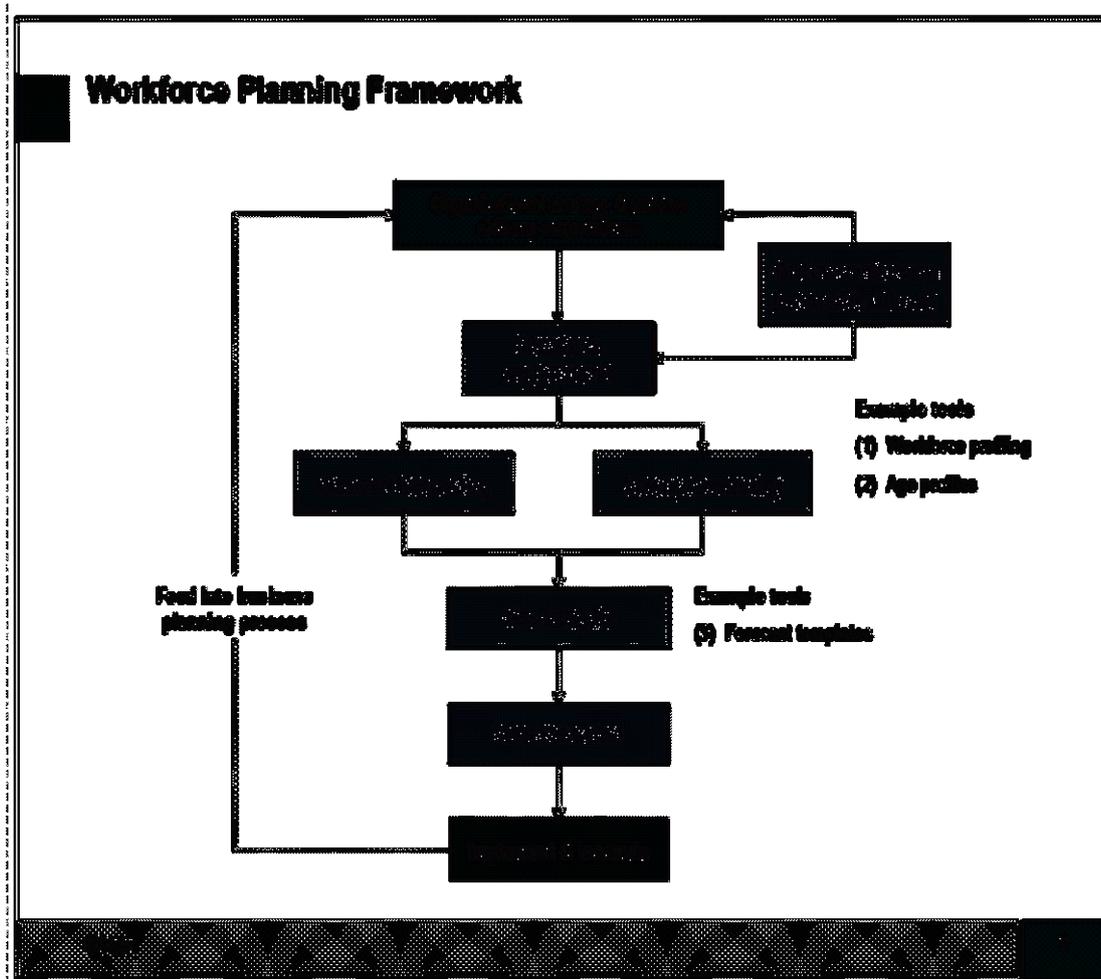
³

⁴ Mercer College (2009). *Workforce Planning– Facilitator’s Guide*. Department of Premier and Cabinet, New South Wales Government.

Retrieved 28 August from the World Wide Web:

http://www.dpc.nsw.gov.au/_data/assets/pdf_file/0005/54716/Workforce_planning_training_-_Facilitators_Guide.pdf

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Source: Mercer College (2009). *Workforce Planning – Facilitator’s Guide*. Department of Premier and Cabinet, New South Wales Government (p.16).

2.2. Environmental Scan

Environmental scanning involves a systematic approach to collecting and analysing information relating to the internal and external environment that influences the role and practice of a workforce or profession.

The steps in developing an Environmental Scan include:

- Knowledge and understanding of the external environment (Government policies and funding arrangements, the regulatory environment);
- Business models and commercial arrangements regarding ownership and provision of veterinary services in the private sector;

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- Types of veterinary services;
- Government and research organisations and their roles and responsibilities;
- Educational authorities and the courses offered;
- Demand drivers for the workforce;
- Current workforce characteristics;
- Analysis of current workforce data & relevant data sources;
- Financial factors influencing the workforce; and
- Potential sources of risk in undertaking modelling and relevant to analysing the findings.

For planning purposes, it is important to determine whether the present workforce is adequately meeting population and service requirements (as defined by health needs of the animal population and areas of unmet need) or whether a shortage or excess or maldistribution situation applies. This evaluation is then incorporated into the workforce modelling process. Assessing current workforce requirements means identifying whether a profession or workforce is operating effectively to meet service needs and where problems or areas for improvement are already known. This assessment provides a basis for considering what the profession will be doing in the future and what skills will be needed.

Therefore the environmental scan is designed to address these questions and determine the environmental issues that are currently driving the supply of and demand for veterinarians and to what extent they will play that role in the future.

This report has been prepared to be one component of the documentation that supports the workforce planning process for the profession including the development of workforce projections and scenarios for balancing supply and demand.

Another paper, the “*Technical Workforce Modelling Paper for the Veterinary Workforce*” is also being prepared to provide more detailed analysis of current and historic supply and demand data, document assumptions supporting the projection modelling and report on findings from the projection modelling including scenario projections.

As statistical information is relevant to the environmental scan, this paper includes summary data and analysis where appropriate, as well as documenting data sources and their contribution to the workforce modelling process.

This report includes sections on:

- the definitions and components of workforce planning;
- an analysis of the profession within the context of service sectors, regulatory, funding and private practice models including ownership; as well as the range of veterinary services and demand drivers including pet ownership, rural services trends, equine services, and government and research organisations and services and bio-security developments. This section concludes with a summary of demand issues and factors to be addressed in the modelling;
- an overview of workforce supply including trends in educational courses including student commencements and completions, current workforce characteristics including age, gender, distribution by State, and an analysis of relevant data sources.

3.0. The veterinarian profession

The *Higher Education Base Funding Review* (CVDANZ, n.d.)⁵ reports that “veterinary science is the application of medical, diagnostic, prophylactic and therapeutic principles to companion, domestic, exotic, wildlife, and production animals. Veterinary science is vital to the study and protection of animal production, provision of herd health and monitoring and preventing the spread of disease. It requires the acquisition and application of scientific knowledge in multiple disciplines and uses technical skills to manage disease prevention in both domestic and wild animals” (p.8)

The review by the Council of Veterinary Deans of Australia and New Zealand (CVDANZ) identifies the importance of the veterinary role in ensuring human health through treatment and prevention of disease in animals. The role of veterinarians in Australian society often covers multiple sectors and responsibilities including practice and care for the health, wellbeing and welfare of pets and production animals, roles in academia and also in industry as biomedical scientists investigating basic and applied aspects of human and animal disease. “Many veterinarians enter public service to secure the safety and wholesomeness of human food and safeguard animal industries by preventing incursions of exotic diseases, or work to prevent the spread of diseases from animals to humans”. (p. 4)

The Australian Workforce and Productivity Agency has nominated veterinarians as one of the ‘specialised occupations’ that should be the focus of national planning. Veterinarians are on the Specialised Occupations List in recognition of their high value to Australian economy and community and because their skills take a long time to develop and acquire. As the labour market is not able to adjust quickly there is a potential for market failure.

3.1. Regulatory environment

The veterinary workforce is regulated by eight Veterinary Boards in Australian States and Territories whose major roles are to:

- Register appropriately qualified persons as veterinarians and veterinary specialists and provide a public roll recording those persons;
- Ensure that the interests of the public and the welfare of animals in each jurisdiction are protected;
- Conduct inquiries as required to ensure that professional standards of practice are maintained; and
- Provide advice to government agencies and interest groups.

Health professions are regulated by the Australian Health Practitioner Regulation Agency (AHPRA). AHPRA's operations are governed by the Health Practitioner Regulation National Law, as in force in each state and territory (the National Law), which came into effect on 1 July 2010. This law means that fourteen health professions are now regulated by nationally consistent legislation under the National Registration and Accreditation Scheme. AHPRA also conducts national annual workforce surveys for each of the registered health professions.

⁵ Council of Veterinary Deans of Australia and New Zealand (n.d.). *Higher Education Base Funding Review*. Unpublished document.

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While these changes have not occurred for the regulation of the veterinary profession, there have been developments to standardise the roles and functions of each of the jurisdictional Boards. An initial review of annual reports from the States and Territories identified major differences in the level of reporting of registration data and workforce survey data.

3.2. Funding environment

In 2001 the Australian Bureau of Statistics reported that the veterinary industry contributed \$549 million to gross domestic product (GDP) and by 2007 this had increased to \$681 million. (NAB Health, 2009, p.5)⁶ Animal Health Alliance (2013) report that the pet care industry is estimated to be worth \$8.0 billion annually (p. 12). Veterinary services were estimated to account for 21% or \$1,650 million of that expenditure in 2012-13. (p. 40)⁷

The provision of insurance to fund the provision of private veterinary services is discretionary, based on a user-pays system and not supported by government funding. Therefore income to practices is dependent on the performance of the broader economy and capacity to pay for the services. Therefore the concept of demand should be interpreted as “economic demand”, which reflects consumers’ willingness to pay for veterinary services given the price of services. There is evidence from the recent report by the Animal Pet Alliance of Australia (2013) that the popularity of pet insurance is increasing, but varies by generation within the population.⁸

While there are views that “need” should be based on expert clinical judgement of the care required, animal owners may not be willing to pay for such services at prevailing prices or may be unaware of the need for such services. This results in unmet demand. An example of this lack of translation into effective demand is the provision of preventative services such as vaccinations and medications to prevent parasitic infestation. (American Veterinary Medical Association, 2013, p. 3)⁹

Baguley, J. (2011) has analysed the demand for and revenue from companion animal veterinary services between 1996 and 2026 and shown that revenue growth has been much stronger than demand growth. Therefore pet ownership trends are the most important factor in determining the potential demand for and revenue from companion animal veterinary services (p. 352).¹⁰ Baguley concluded that the market for companion animal veterinary services in Australia is mature and that growth in demand is expected to remain low over the forecast period to 2026. As a result, for most veterinary practices within this environment, growth in revenue will be a function of growth in average client fees.

⁶ National Australia Bank Health (2009). *The changing face of the healthcare industry; a special report on the veterinary sector by NAB Health*.

⁷ Animal Health Alliance (2013). *Pet Ownership in Australia*.

⁸ *Ibid.* (p. 12).

⁹ American Veterinary Medical Association (AVMA) (2013). *2013 U.S. Veterinary Workforce Study: Modelling Capacity Utilisation*. The Centre for Health Workforce Studies, School of Public Health, University of Albany, N.Y.

¹⁰ Baguley, J. (2011). An analysis of the demand for and revenue from companion veterinary services in Australia between 1996 and 2026 using industry revenue data and household census and pet ownership data and forecasts. *Australian Veterinary Journal*, Vol.89, No. 9., September.

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NAB Health also reported that there was a 41% increase in average income for vets between 1996 and 2006, increasing to \$61,464 by 2006. Male vets earned on average \$71,552 and females \$50,908. Access Economics examined ten medical professions (dentists, pharmacists, veterinarians, general practitioners and six medical specialties) and rated vets the fourth highest paid, after general practitioners, dentists and pharmacists (as quoted in NAB Health, p. 7).

The variation in income levels by gender is attributable to employee status (where the large majority of female veterinarians are employees; the fact that females are more likely to work part time (38% compared to 15% of male vets) and the fact that men are much more likely to own a veterinary practice than women (78% for males and 36% for females (NAB Health, p. 7). These figures also vary by length of time since graduation and city versus country location of practice.

There is evidence from the Australian Veterinary Association (2013) to suggest that the veterinary starting salary has fallen significantly against other professions (from 6th rank in 1996 to 20th rank in 2012). (Source: Graduate Careers Australia, starting salary for graduates less than 25 years and in first full time employment)¹¹. The Skilled Occupation List data in the annual review indicated that median annual university graduate earnings for veterinarians four months after completion were \$45,000 compared to \$56,000 for university graduates working full time as professionals. (Source: Graduate Careers Australia, 2011 as quoted in Skilled Occupation List, No. 2347)¹²

There are multiple studies which also report that the number of veterinarians working in the government or public sector is decreasing in areas such as disease surveillance and field veterinarians monitoring and responding to livestock diseases (Heath, 2008, AVA, 2013). This suggests decreased funding for these services, although this analysis is not based on an analysis of actual government expenditure figures.

3.3. Business models and commercial arrangements regarding ownership and provision of veterinary services in the private sector

Baguley (2011) reports that veterinary services that provide services to companion animals contribute approximately 83% of total veterinary service industry revenue (Australian Bureau of Statistics, 2001, as cited in Baguley, J. (2011), p. 352). His analysis also reveals that any significant growth in industry profitability in Australia will be based on increased pet ownership, increased fees and/or decreased costs rather than organic growth. His view is that profitability is of particular concern to the Australian industry, because of poor returns to veterinary practice owners and the comparatively low veterinary graduate starting salaries (p. 358).

¹¹ Australian Veterinary Association (2013) *Review of the demand-driven funding system, Submission from the AVA Ltd.*
Graduate earnings as retrieved from World Wide Web:
<http://www.graduatemcareers.com.au/>

¹² Graduate Careers Australia (2011) *Australian Graduate Survey.*

Baguley also discusses market sensitivity to pricing levels. The author argues that increases in fees will result in increased revenue from some pet-owning segments (defined as price inelastic) and decreased revenue from other pet owning segments (price elastic). He foresees the potential for a shift in market segmentation with fewer households but more willingness to pay for new, highly priced services and products created by technological innovations.

Animal Health Alliance in their report on *Pet Ownership in Australia* (2013) provided information to support the view that despite periods of weak consumer confidence, pet owners have not been prepared to economise on pet care, and therefore expenditure has a level of resilience in the market place. The reports indicates that prioritisation of pets has also led to the growth of new and emerging products and services in the pet care sector. This includes pet insurance, alternative healthcare, hotels catering for pets and spas and pet massage (p. 26).

However international studies such as the one undertaken by the American Veterinary Medical Association (AMVA) indicate that there is excess national capacity for veterinary services in private clinical practice, with their analysis indicating 17% excess capacity under certain assumptions. This was estimated to be highest for equine practice (23% excess capacity) followed by small animal (18%), food animal (15% and mixed practices (13%). These estimates allowed for the fact that 42% of veterinarians who reported on the capacity status of their practice reported that their practice was already working at full capacity.¹³

In terms of ownership arrangements, there have been changes made to ownership arrangements which Baguley (2011) reports may facilitate industry consolidation (p. 359). His argument is that industry consolidation has the potential to achieve cost efficiencies through economies of scale. There are direct parallels with the market for medical general practice in Australia where the number of practices has continued to decline nationally over an extended period. (Note: The *Summary Data Report of the 2011-2012 Annual Survey of Divisions of General Practice* (Carne, 2013)¹⁴ is the most recent source of information on general practices and the most recent comprehensive estimate of general practices was 7,035 practices in 2010/11 (p. 7). The report documents the longitudinal declining trend in the total number of practices nationally from 2000-01 to 2010-11 (from 8,309 practices to 7,035 practices), while there has been growth in the number of general practitioners overall. (p. 7)

4.0. Veterinary services

4.1. Overview

The AVMA study (2013) in developing their Veterinary Workforce Model, prepared forecasts for pet ownership and food animal populations, demand for veterinary services, and the derived demand for veterinarians through to 2025 by employment sector. The demand projections were developed at State level for the small animal, equine and food animal

¹³ Op. cit. p. 14.

¹⁴ Carne, A. (2013). *Summary Data Report of the 2011-2012 Annual Survey of Divisions of General Practice*. Adelaide: Primary Health Care Research and Information Service and Australian Government Department of Health and Ageing.

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sectors, but calculated at the national level for industry, academia, government, and the “other” employment due to lack of state-level data and the regional nature of these employment sectors (p. 37).

There are several sources of data on the range of employment areas where veterinarians work, including Veterinary Registration Board data and the 2012 workforce survey conducted by the AVA. The following table is an extract of data collected by three of the Veterinary Registration Boards in 2013, Western Australia, Tasmania and New South Wales from their survey data. Based on the 2011 Census data, these three States represented 42.1% of all veterinarians working in the field (ANZSCO code 234711).

Table 1: Employment category by State, 2013

Employment category	Frequency				Percentage by employment category			
	WA	NSW	Tas.	Total 3 states	WA	NSW	Tas.	Total 3 states
Small animal practice	690	1469	93	2252	51.4%	51.9%	46.7%	51.5%
Large animal practice	28	218	4	250	2.1%	7.7%	2.2%	5.7%
Mixed practice	294	518	69	881	21.9%	18.3%	34.6%	20.2%
Equine practice	52		10	62	3.9%	0.0%	5.0%	1.4%
Aquaculture			3	3	0.0%	0.0%	1.6%	0.1%
Consultancy practice	39		2	41	2.9%	0.0%	1.1%	0.9%
Other practice	4			4	0.3%	0.0%	0.0%	0.1%
DAFWA/State govt	49	43		92	3.7%	1.5%	0.0%	2.1%
Other State government	11	45		56	0.8%	1.6%	0.0%	1.3%
Meat inspection	8			8	0.6%	0.0%	0.0%	0.2%
Other Government	11	46	8	65	0.8%	1.6%	3.8%	1.5%
Teaching/research	82	335	3	420	6.1%	11.8%	1.6%	9.6%
Industry	16	118	0	134	1.2%	4.2%	0.0%	3.1%
Other	58	36	7	101	4.3%	1.3%	3.3%	2.3%
Total	1342	2828	200	4370	100.0%	100.0%	100.0%	100.0%
Census data 2011 (working)	792	2095	158	3045	Note: WA includes 84 non-residents and 13 conditional registrants. Therefore the number working in WA is overstated by 6.3%			
Census as percentage of Board survey data	59.0%	74.1%	79.1%	69.7%				

Sources: Annual Reports, Veterinary Surgeons' Board Western Australia, 2013; Veterinary Board of Tasmania, 2012-2013; Veterinary Practitioners Board of NSW, 2013

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This profile is supported by the 2013 data reported by the Veterinary Practitioners Registration Board of Victoria, which indicated that small animal practice accounted for 50% of employment type, large animals two percent, mixed practices 21%, production animals two percent, non-private practice 19% and not specified one percent (p. 12).¹⁵

There has been a comprehensive review of employment patterns of veterinary graduates by Heath, T. J. (2005a, 2005b)^{16 17} and number, distribution and concentration of Australian veterinarians between 1981 and 2006 (Heath, 2008).¹⁸

The two studies published in 2005 were based on the results of surveys sent to about 100 veterinarians who graduated in or about each of the decades from 1950 to 2000. The response rate was 68% (420 out of 615 mailed questionnaires). Overall, Heath found that over the last five decades from 1950 to 2000 that the average recent graduate has had progressively more opportunity for support and advice from other veterinarians, to work more sociable hours, and to work with a narrower range of species, especially dogs and cats (2005a, p. 626). There is an increasing dependence on cats and dogs by recently-graduated veterinarians. (2005b, p. 750)

Heath's analysis of employment trends has shown the following changes over the period:

- There was a different employment pattern for graduates of 1950 and 1960, where about half of graduates were employed in their first position in government service, with financial support provided by Departments of Agriculture (or equivalent) in the home state as cadetships. With the phasing out of cadetships the number entering government service decreased to 27% in 1970, and to only two percent in 1980 and later years. Almost half of those who started in government departments then moved to mixed practice in the main over the following decade;
- From 1970 and more recently there has been an increasing proportion of graduates employed in small animal practice, followed by mixed practice. Almost all graduates were initially in private practice, with about half in mixed practices, and the majority of those working as employees;
- Accompanying this shift in employment following graduation, there has been a major decline in the proportion of graduates seeing cattle. Some 39% of graduates from 1970 saw cattle as part of their caseload compared to an average of 19% for the 1990 graduates. By the tenth year of work for the 1990 graduates only eight percent included cattle in their caseload. By 200 only one-tenth of the work of the 1990 cohort was made up of production animals, with about eighty percent seeing dogs and cats;
- The proportion of the 2000 graduate cohort in mixed practice declined from 59% to 36% within three years. Heath believes that continuation of this trend will result in further difficulties for principals seeking to retain veterinarians, especially those with experience, for their rural practices;

¹⁵ Veterinary Practitioners Registration Board of Victoria (2013). *Annual Report 2012-13*.

¹⁶ Heath, T.J. (2005a) Recent veterinary graduates over the last five decades: initial career experiences. *Australian Veterinary Journal*. Vol 83, No. 10, October. p. 626-632.

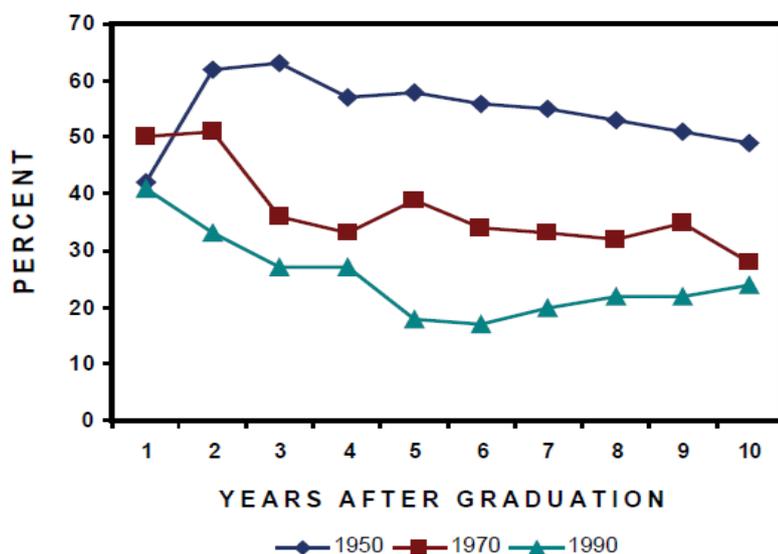
¹⁷ Heath, T.J. (2005b) Recent veterinary graduates over the last five decades: the first ten years. *Australian Veterinary Journal*. Vol 83, No. 12, December. p. 746-750.

¹⁸ Heath, T.J. (2008) Number, distribution, and concentration of Australian veterinarians in 2006, compared with 1981, 1991 and 2001. *Australian Veterinary Journal*. Vol. 86, No. 7. July. p. 283-289..

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- There were significant differences between genders in the percentages working in mixed practice, small animal practice, government service and other career paths immediately after graduation and ten years later. There were higher percentages of males in mixed practice and higher percentages of females in small animal practice, in each of the ten years after graduation;
- Ownership of practices changed over the period with all 1950 graduates in private practice after ten years being sole owners (62%) or part owners (38%). Fewer than half of those who graduated in 1990 were sole (17%) or part (30%) owners of their practices, with many employed or working as practice associates. Some eight percent of these 1990 graduates were employed to manage practices. This trend is also influenced by gender, with males twice as likely to be sole (52%) or part owners (32%) ten years after graduation (totally 84%) compared to females at 40% (16% sole, 24% part-owners);
- There have also been major changes in the career pathways by location of work over the decades. For each of the cohorts of 1950, 1970, and 1990 there has been a pattern of movement from location in towns at the commencement of the decade to higher proportions in cities by the end of the decade. The major change has been the percentages remaining in country towns after ten years (46% for 1950 graduates, 26% for 1990 graduates) (see Figure 1 below).

Graph 1: Percentage of graduates of 1950, 1970 and 1990 who were working in towns of <10,000 people in each of the first ten years after graduation



Source: As reproduced from Heath, 2005b: Figure 4, p. 748

- Heath has shown that there have been changes in the caseload associated with horses; from ten percent of the caseload for 1950 graduates in both the first and tenth years to 14% for 1990 graduates halving to seven percent by the tenth year. Heath indicates that relevant factors may include that there has been a decrease in the amount of

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horse work generally in mixed practices, an increase in female veterinarians who on average work more with small animals and less with horses (and production animals) than males, the exodus from mixed practice, the economic climate affecting horse owners and the increasing role of non-veterinarians into equine veterinary practice.

- Heath has also documented changes in the role and function of veterinarians together with the decline in the proportion seeing production animals; including increases in parvovirus and kennel/canine cough, increases in skin conditions for canines, decreases in trauma for canines related to motor vehicle accidents, increases in the removal of lumps and repair of lacerations for canines; and changes in anaesthetic procedures (Heath, 2005a).

4.2. Pet ownership

The comprehensive report referred to previously and prepared by Animal Health Alliance *on Pet ownership in Australia* (2013) has provided a useful overview of the economic context of pet ownership, and identifies that pets have become an important part of the everyday lives of the majority of Australians. Therefore Australia's pet care industry has grown and evolved and withstood the impact of the global economic crisis. Australia has had consistently strong economic growth over more than 20 years, on average 3.5% per year. The country avoided a technical recession in 2008-09 and the economy now features low unemployment, inflation within acceptable ranges, very low public debt and a strong and stable financial system (p. 7).

The reported data in the report used a different methodology to previous reports and based its findings on the *Australian Pet Ownership Survey*, undertaken by Galaxy Research in January 2013. The survey was based on a representative sample of adults, with 1,734 respondents of which 1,089 were pet owners. The data was weighted by region to reflect the latest ABS household estimates to generate national and State figures.

As a result, its findings showed dog and cat numbers to be higher than previously estimated and bird and fish numbers lower than previously estimated in the 2010 report of the Australian Companion Animal Council.^{19 20}

Major findings are as follows and shown in Graph 2:

"In 2013 there are estimated to be more than 25 million pets in Australia, with nearly 5 million of Australia's 7.6 million households home to pets. At 63%, Australia has one of the highest rates of pet ownership in the world. Dogs are the most common pet, with 39% of households owning a dog. There are estimated to be 4.2 million pet dogs in Australia; 19 dogs for every 100 people.

Cats are the second most common pet, with 29% of households owning a cat. There are estimated to be 3.3 million pet cats in Australia; 15 cats for every 100 people. Fish are the most numerous pet type, with a total population of 10.7

¹⁹ Op. cit. p. 7-8.

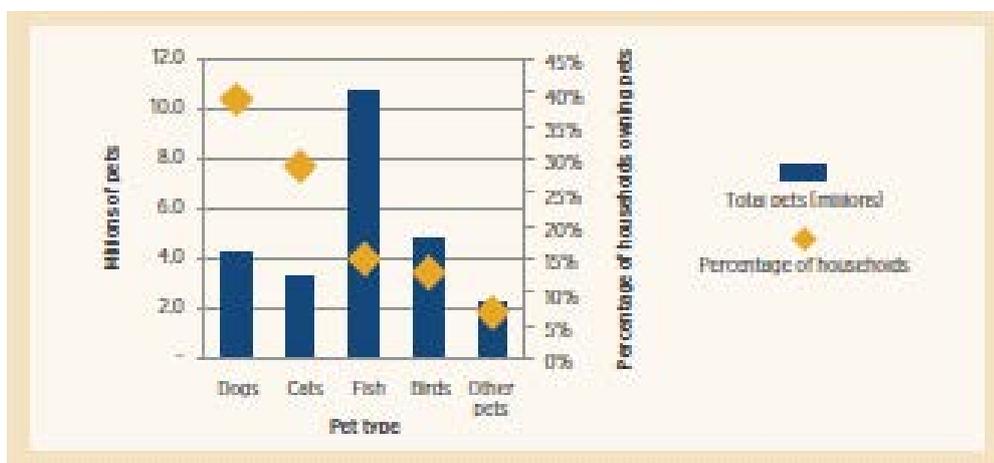
²⁰ Australian Companion Animal Council (2010). *Contribution of the pet care industry to the Australian economy*. 7th Edition.

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million. The number of birds is estimated to be 4.8 million, with a further 2.2 million other pets including small mammals and reptiles.

Almost half (48%) of all Australians would like to either get a pet or get another pet. More than 1.1 million Australian households (14.9%) are planning to get a companion animal in 2013.” (p.11)

Graph 2: Australian pet population and ownership rates



Source: As reproduced from Animal Health Alliance, 2013: Figure 1, p. 11.

The key trends identified in the report include:

- Pet food accounts for the largest area of expenditure (38% of some 8.0 billion) followed by veterinary services (21% of the total, estimated at 1.65 billion). Pet foods have become more sophisticated and the market has become more segmented with products for different life stages and breeds (p. 12)
- Alternative healthcare treatments have become increasingly popular amongst Australians generally and that popularity is expected to rise over the next five years (p. 12)
- There are 4.9 million pet owning households in Australia, with 68% pet ownership for people living in freestanding houses compared to 39% living in units or apartments. This varies by type of pet, with just 15% of people living in units or apartments owning a dog. (p. 18)
- There is major variation in pet ownership by State (see Table 2 below) with 73% of households in South Australia owning a pet. Almost half of all households own a dog in that State, and it also has the highest rate of ownership of fish. Victoria and Tasmania and Queensland also show high rates of dog ownership. Victoria/Tasmania also have the highest rates of cat ownership followed by Queensland and Western Australia. Western Australia has the lowest rate of pet ownership overall as 56% of household include companion animals. (p. 18)

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Table 2: Percentage of households with pets by State

Pet type	NSW	VIC/TAS	QLD	SA	WA	National
Dogs	35%	43%	40%	48%	34%	39%
Cats	24%	36%	26%	31%	26%	29%
Fish	17%	13%	15%	23%	12%	15%
Birds	13%	15%	12%	22%	6%	13%
Other pets	6%	7%	6%	10%	5%	7%
Total (for any type of pet)	59%	71%	62%	73%	56%	63%

Source: As reproduced from Animal Health Alliance, 2013: Table 3, p. 18.

- Almost half of Australians would like to own a companion animal or get an additional one, and dogs were the most popular choice (26%), followed by cats (13%). More than 1.1 million Australian households are also planning to get a companion animal in the next 12 months with one in five households becoming new pet owners (p. 31). Nearly 600,000 or 8% of households identify strata by-laws or property regulations preventing pet ownership. Around a third of respondents indicated that they would be prepared to pay more rent or strata fees to obtain approval;
- The younger generation is most likely to invest in pet insurance with 20% of Gen Y pet owners having insurance for their cats and 27% for their dogs. Only 12% of pet owning Baby Boomers have insurance for their dogs and nine percent have insurance for their cats;
- Some 83% of dog-owning households recorded expenditure in Australia on veterinary services in 2013 at \$431 per household, and \$308 per animal; while 68% of cat-owning households recorded expenditure on these services in 2013, at an average of \$325 per household or \$217 per animal;
- There are growth drivers for the care of pets identified in the study with increased awareness about animal health issues and responsible pet ownership together with the drive to maximise the longevity of cats;
- Pet owners were more likely to use veterinary services for the treatment of sick animals (85%), with 70% identifying the need to keep pets healthy and 59% identifying preventative advice as the role of veterinarians (p. 72);
- There has been growth in preventative care and elective treatments, with substantial increases in surgery, in-patient care, diagnostic treatments, oncology and dentistry. Alternative treatments are also growing in popularity (p. 73). It is reported that advancements in medical, surgical and diagnostic procedures along with more pharmaceutical products are expected to translate into greater patient throughput in veterinary practices.

4.2.1. International trends in pet ownership

- International comparisons show pet ownership to be similar in Australia to United States at 62% although New Zealand has higher rates at 68% of households. The United Kingdom is lower at 48% of households (although data excludes fish ownership);
- The international trend data shows varying rates of pet ownership between 2009-10 and 2011-12, with dog ownership increasing in the US by 42% since 1994, and between 77.5 million on 2009-10 to 78.2m in 2011-12. However other pet types showed decreases. In comparison the UK pet population decreased between 2009 and

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2011 (from 66 million to 64 million) but then recovered to reach 67 million in 2012. Dog and cat ownership remained constant at 8 million each over the period 2009 to 2012;

- Trends in Europe show an increase in pet numbers compared to previous estimates, with a total pet population of 240.8 million in Europe. Previous estimates recorded 200 million. Almost the same proportion of households own dogs (26%) and cats (25%). The number of cats is higher therefore there are more cats per household in Europe compared to dogs;
- Data on expenditure on pets in the UK shows that owners only reduced pet services by six percent for treats, four percent on pet food costs and three percent for veterinary visits during the 2008 recession, with much higher reductions in expenditure on essentials such as food (16%), petrol (15%) and heating (12%). Therefore pets are seen as either members of the family or valued companions and are given priority within household expenditure.

4.3. Rural services

Neumann, G., (2007)²¹ summarised the role of rural veterinary practice in the agricultural sector as follows:

“The livestock industries are one of the largest sectors of Australia’s agricultural industries and with a major focus on export markets their continued success depends on maintaining an internationally acceptable animal health status. Veterinarians have a significant role in ensuring that the systems are in place not only to enable the collection of appropriate surveillance information but to investigate and resolve any outbreak of disease.

Rural practices are a significant component of these systems providing services that investigate and resolve outbreaks of disease, report on the health of livestock and improve productivity. Any failure of the provision of services threatens Australia’s disease status and thus exports and impacts on the prosperity of the livestock industries.” (p.3)

The most comprehensive review of rural veterinary services in Australia was undertaken by Peter Frawley in 2003, entitled “*Review of Rural Veterinary Services*”.²² The report addressed the roles, availability and capability of rural veterinarians to meet future animal health needs. The three broad conclusions reached included:

- Australia’s animal health needs were being met on a daily basis but the animal health system would need to be enhanced to meet more stringent requirements for international trade into the future. This included the establishment of a veterinary reserve and the strengthening of surveillance. Both of these conclusions have been supported by more recent experience with outbreaks of animal infections, greater recognition of the transmission of viral diseases from animals to humans and the need for pandemic planning for the major spread of diseases. The entry of animal

²¹ Neumann, G. (2007) *Transition of Veterinary Students to Rural Practice, Continuing Professional Development and Sustainable Rural Veterinary Practices*. Phase 1 Report.

²² Frawley, P.T., (2003). *Review of Rural Veterinary Services*. Commonwealth of Australia. Departments of Education, Science and Training and Agriculture, Fisheries and Forestry.

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diseases into the food chain has also created major community and government concern and the need for rapid responses and containment. The export of live animals overseas has also raised concerns regarding humanitarian management in those overseas countries;

- There was no current crisis (as at 2003) in the availability of veterinarians but that rural veterinarians had to contend with rising costs, a reluctance of producers to utilise their services, long hours, limited social opportunities and schooling for their families. Frawley highlighted the impact of these factors on the willingness of veterinarians to live in rural areas, create local shortages and the potential for a chronic shortage of production animal veterinarians.
- Frawley identified the importance of developing the demand for veterinary services rather than policies focussed on supply. A major strategic approach involved the integration of rural veterinarians into the provision of services that have industry and/or community wide benefit. (p. iii)

Key issues which Frawley identified included:

- Only twenty to thirty percent of individual producers in livestock industries regularly engaged private veterinary surgeons. This was based on views associated with cost, minimal value add and lack of experience of veterinarians in marketing their expertise;
- The commercial returns for services typically provided by rural veterinarians to individual production animal customers are barely sufficient to maintain most rural practices and their viability is generally underpinned by companion animal medicine;
- The number of veterinarians located in rural Australia almost doubled between 1981 and 2001 to 2,473 but the percentage fell marginally from 42% to 39% of all practicing veterinarians in that period;
- There has been an impact with the changing gender mix of the profession, with female veterinarians preferring to work mixed and/or casual hours and less likely to purchase practices;
- Some rural practices have difficulty attracting and retaining experienced veterinarians and shortages could emerge starting in remote areas with practices that have a high reliance on production animal services;
- The rationalisation of government laboratory services and introduction of fee for service has limited career progression for veterinary specialists;
- The need to develop new models of professional practice by broadening the skills base of rural veterinarians and thus enabling them to offer a broader range of services to producers;
- The importance of a staged integration of a new national animal health information system.

Frawley identified that rural mixed practice generally comprised small practices with relatively low income, poor profitability and low capitalisation and concluded, according to Neumann (2007), that the model at the time resulted in inefficient service delivery. Neumann also notes trends including the growing number of paraprofessionals who perform routine procedures traditionally the domain of veterinarians and that rapid advances in technology and increased availability of drugs also reduced the demand for traditional veterinary services.

Neumann summarises that Frawley felt that a new model of rural practice was required; with rural practices becoming larger, multi-person and multi-skilled; servicing wider areas to obtain the flexibility and income needed to be able to keep up-to-date with equipment and facilities and to attract and retain staff. (Frawley, 2003 as cited in Neumann, 2007; p. 12)

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As a result of the report there were initiatives implemented including the Rapid Response Team, the Australian Veterinary Reserve and the Rural Veterinary Surveillance Team. There has also been experience of a significant outbreak in Australia with the equine influenza outbreak.

The report prepared by Neumann, G. (2007) was a response to two of the recommendations in the Frawley report of 2003. These included the need to sustain rural practice including new practice models, professional assistance and broadening of the skills base, and the conduct of a review of veterinary science education and registration requirements. The report focuses on rural veterinary activities that service the sheep and cattle industries including mixed rural practice and the various consultancy services to these industries.

Neumann identified the need to re-focus on the food animal industries based on a strategic perspective on the future of the profession linked to the future of livestock industries. His recommendations include:

- The need for a survey on livestock producers' attitudes to the future of their industry and the role of veterinarians in the changing industry, particularly in relation to cattle and sheep producers;
- The AVA and AVBC work together to seek funding for the design and implementation of a survey of veterinary graduates in rural areas linked to annual veterinary registration;
- Development of mapping capability related to livestock numbers linked to rural veterinary activities;
- Determine the beneficiaries associated with the initiatives in the report as a basis for negotiation with potential funding sources;
- The AVA continue to encourage government funded programs that utilise rural practitioners and support the ongoing viability of rural practices;
- The AVA review the accreditation process (APAV) including the charging arrangements in place;
- The AVA examine the potential for a government and/or industry funded farm biosecurity program;
- The AVA investigate the continuing education (CE) needs of veterinarians including the role of agencies in providing CE relevant to rural veterinarians;
- Development of training programs to facilitate more rural practitioners attempting Membership and/or Fellowship of the Australian College of Veterinary Scientists (ACVSc);
- The AVA conduct a review of the New Graduate Support Program to provide funding for coverage across Australia
- The AVA review uptake levels of its New Graduate Friendly Practice Accreditation Program to improve its attractiveness;
- The AVA reviews its website to include a "New Graduates Site" that provides information and a level of assistance to all new veterinary graduates as well as co-ordinating national information resources to assist new veterinary graduates;
- The profession (AVA and AVBC) investigate programs to assist the development of skills in new graduates appropriate to employment in rural practice in Australia;
- The AVA enhance the availability of advice to ensure that optimum business practice advice is readily available to rural practitioners;
- The AVA support rural Branches to assist in organising speakers who present on issues associated with successful rural veterinary practice;

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- The AVA give further consideration to a formal marketing program to promote rural veterinary services to livestock producers.²³

Other data reported on by Neumann which is directly relevant to this document included data on practice sizes, attitudes of producers to the use of veterinary services, multi-disciplinary models of care and the role of paraprofessionals in practices. These are summarised as follows:

Practice sizes: Graduates in 2005 as reported by Heath (2008)²⁴ worked in greatly varying practice sizes with twelve percent working with one veterinarian, 27% with two veterinarians, 41% with three to five, 12% with six to ten and seven percent with greater than ten veterinarians. (Heath, 2008, as cited in Neumann, 2007; p. 53)

Views of livestock producers: There were varying views across different livestock industries regarding the use of veterinary services, producers from grazing industries were less likely to use veterinary services, particularly for strategic advice on herd management whereas intensive industries such as the dairy industry had better acceptance of the value of strategic advisory services (Frawley, 2003 as cited in Neumann, 2007; p. 11)

Role of paraprofessionals and working with other professionals: A review of the Frawley and Neumann reports indicates that the use of paraprofessionals is contentious within the veterinary services industry. Frawley reported a range of views including:

- an increase in paraprofessionals had contributed in part to the existing problems and had made it harder for veterinarians to gain entry to farms and maintain contact with their clients and animals;
- development and widening of the role of nurses and animal technicians should occur to operate in a broadly based service providing services such as blood testing, reproduction programs including bull testing, pregnancy diagnosis, cattle spaying and artificial insemination;
- some producers favoured the training and accreditation of lay persons in some routine procedures as a way of reducing costs. Frawley expressed the view however that, without care in implementation, such a step could reduce veterinarian access to farms to give advice, detect problems and improve health and production and has implications for disease surveillance.

Frawley noted that in WA nurses are registered with the Veterinary Surgeons' Board and can legally undertake a wider range of procedures compared to the other jurisdictions. Frawley suggested that an accreditation system that would allow paraprofessionals with animal technician training (including nurses) to provide basic diagnostics, surgical care and emergency care without direct veterinary supervision could support greater use of paraprofessionals and support veterinary practice. (Frawley, 2003 as cited in Neumann, 2007, p. 13)

Neumann indicates that the veterinary profession is one of the last professions to fully utilise paraprofessionals and while the use of veterinary nurses is well accepted for companion animal clinical work the role is almost totally absent in large animal work (p. 56)

²³ Op. cit. p. i-xii.

²⁴ Heath, 2008, as cited in Neumann, 2007; p. 53.

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Baguley (2011) also referred to increasing non-veterinarian to veterinarian staff ratios in companion animal hospitals in the US, driven by increased productivity drivers within the US market (p. 359).

Neumann also reviewed Frawley's view of multi-disciplinary team work and identified that there was considerable scope for veterinarians, paraprofessionals and professionals in allied fields to work more cooperatively. The benefits were identified to include freeing up veterinarians to undertake more specialised tasks and expanding the opportunities for veterinarians and agricultural scientists to broaden the focus of mixed practice and potentially establish joint farm consultancy practices. He proposed the veterinary profession should promote such new models and that rural practices should become larger multi-person, multi-skilled practices that actively promote their skills to animal production enterprises and service larger areas.

Mutual benefits were identified where veterinary practitioners worked as part of multi-disciplinary teams with other professionals such as agronomists and economists to improve animal health and provide other farm advice. If practices were to amalgamate this would facilitate specialisation and the multi-disciplinary approaches become more practical.. (Frawley, 2003 as cited in Neumann, 2007, p. 13)

Many of these findings are reflected in the findings of the Lowe report released in 2009 in the UK.²⁵ He suggests that food animal activity is a distinct minority in the veterinary profession, with concerns reading the extent to which this aspect is emphasised in educational courses. He emphasises a lack of public awareness that veterinarians, through their relationships with clients, are central to animal welfare, biosecurity, disease prevention and surveillance and therefore play an important role in protecting public health and assuring the safety and quality of food.²⁶ Lowe suggest that there is a need for making a link between farm health planning and business planning, improving training for new graduates in the sector, developing the concept of the veterinary team and addressing the lack of awareness, poor marketing and weak communication.

4.4. Equine services

Heath, T. J. (2004a, b, c) published a series of articles the role of veterinarians in the equine industry, including their attitudes to work and their career, and their views of the future. His articles were based on a survey of 866 veterinarians who reported working with horses in both rural and urban settings and the response rate was 87%.

In 2004 Heath reported (2004a) that about twelve percent of Australia's veterinarians were doing all of the veterinary work with horses, and about three percent worked exclusively with horses, performing more than fifty percent of the work

²⁵ Lowe, P. (2009) *Unlocking potential: A report on veterinary expertise in food animal production*. Vets and Veterinary Services Steering Group.

²⁶ Editorial (2009). Call for a new relationship between farm vets, their clients and government. *The Veterinary Record*. August 15.p. 186-188.

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in total with horses (58%).²⁷ Heath defined an equine veterinarian to be a veterinarian seeing more than 90% of horses in their caseload, which totalled 151 veterinarians or twenty four percent of respondents to the question (n=636). The author identified most private practitioners working with horses were in mixed practice. Of the equine veterinarians, twenty two percent were female (compared to females being 40% of the workforce at the time of the study), they worked 57 hours per week (median hours), their average age was 44 years, and forty percent had extra qualifications (they were significantly more likely to have postgraduate clinical qualifications; $p < 0.001$ than other veterinarians working to a less extent with horses). Some 69% of equine veterinarians had horses in racing as their main caseload and thirty percent had other horses as their main caseload.

Heath identified (2004b) that if the percentage of females entering and continuing in equine practice continued to be less than the proportion graduating, that it would only be possible to service the horse industry if a disproportionate number of males entered the field compared with other fields (p. 407).²⁸

In his third study (Heath, 2004c) asked survey respondents of their views of the future. It was felt by respondents that economic and local factors would result in an increasing proportion of equine work being done in specialised equine centres, and that the future of horse work in many mixed practices was “at best, precarious”. (p. 474)²⁹

The article provides a comprehensive qualitative analysis of the issues likely to affect future prospects, and they included:

- The strength of horse industries, the challenges of the economic climate affecting horse owner with increasing costs, farm subdivision and urbanisation, the competitive roles of equine veterinarians and mixed practitioners, the challenges in attracting and retain veterinarians with skill and interest in working with horses, competition from non-veterinarians, the impact of governments and other regulatory bodies as well as the increasing need for insurance for horses, and public liability and professional indemnity costs for veterinarians (p. 475-476).

However Heath also documented comments that there was a view from some practitioners that a general practitioner with a good and varied caseload had a role working with horses including minor surgery, reproductive work, AI, dentistry, racetrack work, physical therapy, foal medicine and ultrasonography. (Heath, 2004c, p.476)

4.5. Government and research organisations

²⁷ Heath, T. J. (2004a). Australian veterinarians who work with horses: an analysis. *Australian Veterinary Journal*. Vol. 82, No. 6. June. p. 340-345.

²⁸ Heath, T.J. (2004b). Australian veterinarians who work with horses: attitudes to work and career. *Australian Veterinary Journal*. Vol. 82, No. 7. July. p. 404-408.

²⁹ Heath, T.J. (2004b). Australian veterinarians who work with horses: vies of the future. *Australian Veterinary Journal*. Vol. 82, No. 8. August. p. 474-478.

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Table 1 reporting on the employment category of veterinarians in 2013 from three States shows that there are 81.9% of veterinarians working in some type of veterinary practice. Therefore there are about eighteen percent of veterinarians working in other areas including Industry, teaching and research, government, and other employment areas. This is consistent with the data reported by the Veterinary Practitioners Board of Victoria in 2012-13 which showed that 19% of employment type was non-private practice and not specified was one percent.³⁰

There are several reports that indicate that over the last ten to twenty years state and territory governments have successively reduced government veterinary services such as disease surveillance and field veterinarians monitoring and responding to livestock diseases (Frawley, 2003; Heath, 2005b; Maxwell. J. et.al., 2008).³¹ Maxwell et. al. (2008) reported that, based on a survey conducted in 2006 of government veterinarians in Western Australia (67% response rate), government veterinary services were undergoing major changes, with the services decreasing in size and scope. Just under half or 22 out of 45 government veterinarians surveyed, worked in the city in administration, regulation, research and laboratory diagnosis, while 23 or 51% of respondents worked and resided in rural areas. There were thirty respondents; 53% residing in the city and 47% residing in country areas. There were 29 males and one female. Key findings were:

- Some 87% were working full time with two part time and two retired recently;
- They were considered an ageing workforce with a mean age of 54 years;
- Some four out of five respondents were recruited before 1986; with the remainder recruited during the last twenty years, all after a period in practice or university;
- Over eighty percent considered their theoretical knowledge gained as a student adequate in most aspects of their work, with some ninety percent receiving on-the-job training. Some 70% had acquired post-graduate qualifications and half had worked overseas;
- Some 73% performed all tasks of a Government Veterinary Officer (GVO), including administration, regulation, research, extension, diagnostic and field work; while others had more limited scopes of practice;
- Sheep and beef cattle occupied approximately 75% of GVO's time, dairy cattle approximately ten percent with pigs and poultry less than ten percent;
- Slightly less than half of respondents (43%) indicated that the introduction of charging for government services had affected the type of services provided and 53% considered that farmer attitudes had changed towards the state government service with the introduction of charging. On-farm service, extension and field research had decreased and administration, regulation, reporting and bio-security had increased;
- Generally there had been a decrease in the use of government service and respondents reported that this had resulted in lower veterinary staff numbers;
- Only one in ten felt that the government service would continue as it had in the past with most believing a change in emphasis to the greater provision of public health and biosecurity services.

³⁰ Op. cit. (p. 12)

³¹ Maxwell, J., Costa, N.D., Layman, L.L., & Robertson, I.D. (2008). Rural veterinary services in Western Australia: Part A. Government veterinary services. *Australian Veterinary Journal*. Vol. 86, No. 1. p. 7-11.

The review by Frawley in 2003 suggested that in some rural areas, greater involvement of practitioners in roles traditionally the province of government veterinarians would provide efficiencies and support the viability of rural practice. Some proposed an even more flexible approach to servicing the animal health needs of producers by considering job sharing between the state government and rural practices. (Frawley, 2003 as cited in Neumann, 2007; p. 13)

Research veterinarians play a significant role in the monitoring disease outbreaks including zoonotic outbreaks, developing regulations for food safety and human animal treatment, tracking wildlife, studying disease in animals, monitoring environmental toxicology and its impact on animal species and developing pharmaceutical and other treatments for animals including conduct of clinical trials. An article by Maxmen, A. regarding the role of research veterinarians in the US indicates that the educational pathway involves a dual degree, usually with a focus on both veterinary medicine and a basic science such as toxicology, genetics, epidemiology or parasitology. The article indicates that people with a doctorate in veterinary medicine and a masters in a relevant field or masters business degrees are in high demand and receive high salaries.³²

4.6. Bio-security issues

A review of Australia's biosecurity regime was conducted in 2008 entitled "*One Biosecurity: A Working Partnership*" and known as the Beale review.³³ (Beale, R., et.al., 2008). The report indicates that Australia currently has a privileged pest and disease status which provides significant economic, environmental and community benefits. The report indicates that the management of biosecurity is becoming increasingly challenging for the following reasons:

- An increase in international trade with globalisation;
- Increasing intensive agriculture and population spread into new habitats which increases the risk of zoonoses (animal diseases capable of transmission to human populations) and the capability for containment;
- Growth in tourism, and passenger and cargo movements increasing the risk of exotic pest and disease incursions;
- The potential risk of agri-terrorism;
- Increasing global movements of genetic material, heightening the need for pre-and post-border security;
- Climate change contributing to the spread of pests and diseases;
- An emerging shortage of highly qualified plant and animal pest and disease professionals;
- Physical constraints for border interception activities (including major airports);
- Financial constraints with limited government funding (p. xiii-xiv).

The report indicates that there have been increasing numbers of biosecurity events receiving major media attention, including international outbreaks of foot and mouth disease, BSE outbreaks in Europe and North America, emergence of

³² Maxmen, A. (2012). Beyond the Farm. *Nature*. Vol. 490, October. p. 131-132.

³³ Beale, R., et. al. (2008). *One Biosecurity: A Working Partnership*. Commonwealth of Australia. Retrieved from the World Wide Web:

http://www.daff.gov.au/quarantinebiosecurityreview/report_to_the_minister_for_agriculture_fisheries_and_forestry

http://www.daff.gov.au/__data/assets/pdf_file/0007/931552/Chapter7.pdf

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the H5N1 strain of avian influenza, the outbreak in Australia of equine influenza, incursions of severe exotic pests and diseases into Australia, and disputes involving the potential importation of banned products (p. xiv).

The report recommends a shift to the broader concept of biosecurity rather than the narrower concept of quarantine and concludes that the primary objective of the national bio-security system should be to allow the safe movement of animals and plants, genetic material, animal and plant products, people and cargo to and from Australia, and to support an effective response to any pest or disease incursions that occur. This involves a focus on all points within the continuum from pre-border risk assessment, a vigilant border inspection system, targeted measures to reduce risks from imports, and more integrated post-border monitoring, surveillance and response (p. xvii).

In its submission to the review CSIRO identified that Australia is facing declining capability in biosecurity expertise diagnostics and the underpinning research. The organisation identified that there is a major shortage of skilled young talent coming into the field, and declining opportunities for those who do. CSIRO's submission identified some existing training initiatives, but noted that training was not the whole solution and recommended that Australia develop a national strategy to overcome the shortage of skilled diagnosticians.

(CSIRO submission, p.14 as cited in Beale, 2008, p. 152-153)

As a result of the review a national Biosecurity Services Group has been established and the Biosecurity Bill (2014) has been drafted to replace the Quarantine Act (1908). However Lowe (2009) identifies that the veterinary profession needs to identify where expert advice fits into the new system of governance for animal health and welfare.³⁴

4.7. Summary of demand drivers for the workforce

The above overview of the veterinarian profession and key demand issues has identified the complexity of the veterinary workforce for the purposes of workforce modelling. The Environmental Scan indicates that there have been major changes in the funding and organisational arrangements for veterinary services, including the composition of the types of veterinary practice, business models and commercial arrangements regarding ownership of private practices and the government funding and delivery of government services. There are major changes occurring in key demand factors such as levels of pet ownership, the provision of rural services and services to the equine industry, as well as changes in the roles performed by veterinarians, together with increasing roles for paraprofessionals.

The study conducted by Baguley (2011) is the most definitive study reviewed for the Environmental Scan regarding projected demand for the veterinarian profession, and this study was limited to the demand for and revenue from companion animal veterinary services in Australia. Baguley concluded that the market for companion animal veterinary services is a mature market and that growth in demand is expected to remain low over the forecast period from 1996 to 2026.³⁵ His conclusion is that the companion animal industry in Australia is likely to grow in real terms by around 1.2%

³⁴ Op. cit. P. 187.

³⁵ Op. cit. p. 352.

over the next 10-15 years (p. 359). However he also highlights demand factors which could limit the translation of this demand growth into similar growth in demand for veterinarians, which includes factors such as a change in the skills mix of the workforce to a greater proportion of paraprofessional staff, as well as consolidation of practices resulting in more economies of scale.

Baguley's study used industry data on pet population estimates from the time series 1994 to 1997 and then from a separate data set in 1998 (p. 357). The analysis has provided some key conclusions including that the model forecasts an increase in dog and cat populations during the period under analysis, despite decreases in the percentage of households owning dogs and cats. This is related to the more than proportionate growth in household numbers over the same period.

The international experience during the global financial crisis however indicates that the role of pets in households is increasingly important, and that both pet ownership and related expenditure is relatively resilient to broader economic downturn. However Baguley also argues that there is mixed data on the level to which expenditure is price inelastic (the extent to which increases in fees will result in increased revenue) and therefore the market has multiple segments which will respond differentially to changes in fee levels. Purchasing behaviour may decrease as fees increase, but there will be a segment of the market that is willing and able to pay for new, higher priced services and products created by technological innovation.

The drivers for demand for other sectors of the veterinary workforce are also complex in that there are significant challenges for growth in the rural sector with increasing reliance on companion animal services to support rural practice viability. The level of government services provided by veterinarians has fallen substantially but there is minimal evidence of the extent to which the concept of an enhanced role for private practices to contract those essential services back to producers and government agencies has actually occurred.

There is also increasing specialisation in the market, particularly in areas such as surgery for small animals and equine services. There is also increasing emphasis being placed on biosecurity services to replace the more traditional quarantine services. However it is unclear to the extent to which these changes will consolidate and strengthen the role of veterinarians as there are changes occurring in the skills mix in practices with the use of paraprofessionals and increasing competition from non-veterinary providers in niche markets which will challenge future growth in the workforce.

The interaction of these factors with historic, current and projected supply within the workforce is discussed in the next section of this report.

5.0. Workforce supply

A large body of the literature on the veterinarian workforce relates to the historic, current and projected supply of the workforce. There is an overwhelming view in the literature that the market is in oversupply and that this trend will worsen with the recent and projected increases in veterinary graduate numbers. The following sections of the Environmental

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Scan will review this position based on the available literature and data. Not all of the most recent data has been analysed and presented in this report and more data will be reported in the Technical Paper to be produced at a later stage in the modelling, as data is still being collected from relevant sources.

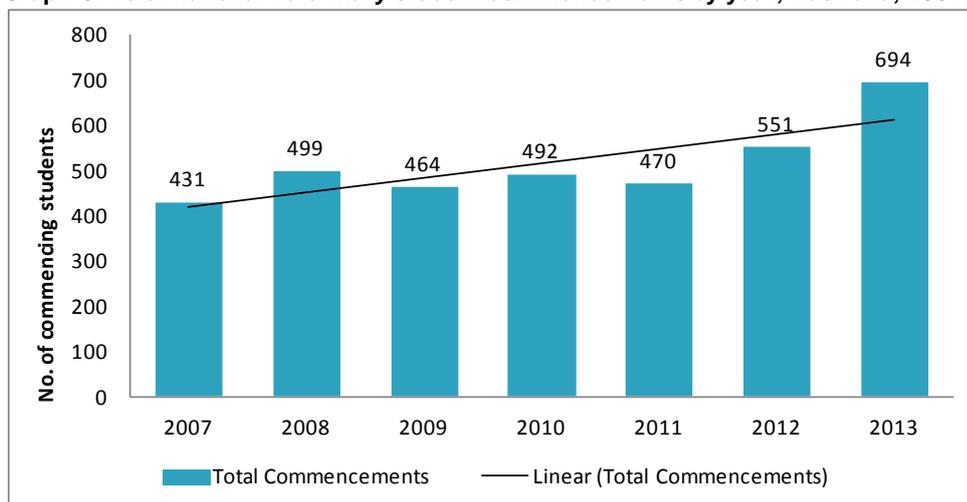
5.1. Educational authorities and the courses offered

There has been a major increase in the number of students entering Australian universities to undertake veterinary degrees, due to an increase in the number of educational providers. (Pratley, J.E. and Abbott, K. (2012); AVA Media releases (2013)). Pratley, J.E. and Abbott, K. (2012) in their analysis of the study of the supply of veterinary science graduates indicate that up to 2010 there was graduate supply from four universities: The University of Queensland (UQ), The University of Sydney (USyd), The University of Melbourne (UMelb) and Murdoch University in Western Australia (MurdU).

There has been a major change in the number of Universities offering these courses with three additional universities commencing educational courses from 2008 onwards; James Cook University (JCU), The University of Adelaide in 2011 (UAdel) and Charles Sturt University in 2012 (CSU). The following graph shows the trends for student commencements between 2007 and 2013.

The graph shows an increase from 431 commencements to 694 commencements, an increase of 263 in total (61.0%).

Graph 3: Total national veterinary student commencements by year, Australia, 2007-2013



Source: <http://highereducationstatistics.education.gov.au/>

The following table and graph shows the changes in commencements by University and year. The largest increase in numbers has been for The University of Queensland (43 additional students, 7.0% per annum average growth), followed by The University of Melbourne (23 additional students, 3.6% per annum average growth). Across all universities there has been a growth of 263 students, with ten percent per annum average growth. Murdoch University has shown a

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different trend with a decline of 42 students or 7.4% decrease per annum on average. There was also a large increase between 2012 and 2013 of 26%, although there were no additional courses commencing in 2013.

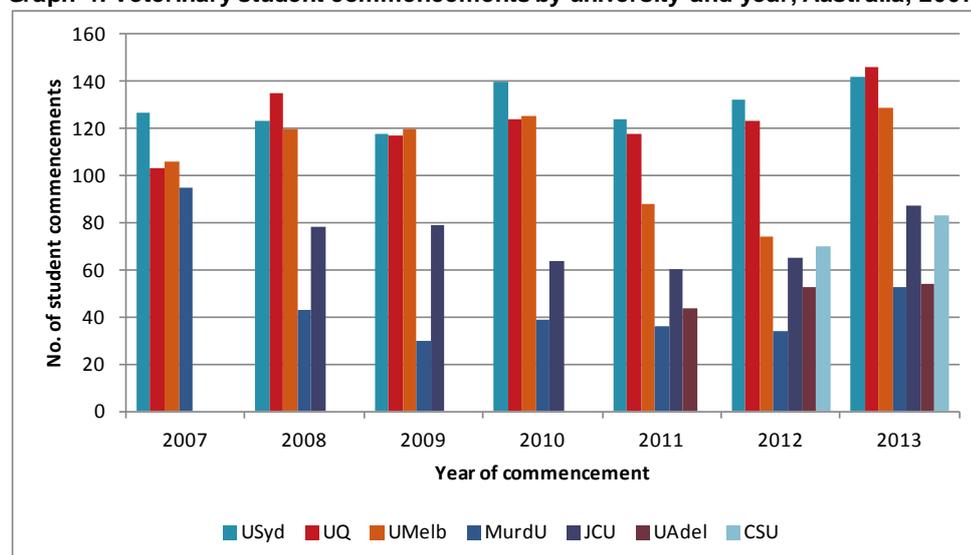
Table 2: Veterinary student commencements by university and year, Australia, 2007- 2013

University	2007	2008	2009	2010	2011	2012	2013	Var. 1	% Annual Var. 1	% Var. 2007-2013
USyd	127	123	118	140	124	132	142	15	2.0%	
UQ	103	135	117	124	118	123	146	43	7.0%	
UMelb	106	120	120	125	88	74	129	23	3.6%	
MurdU	95	43	30	39	36	34	53	-42	-7.4%	
JCU		78	79	64	60	65	87	9	2.3%	
UAdel					44	53	54	10	11.4%	
CSU						70	83	13	18.6%	
Total Commencements	431	499	464	492	470	551	694			
Total change								263	10%	61.0%

Note: (1) Variation and Annual % Variation is calculated from the initial year the course commenced to 2013.

Source: <http://highereducationstatistics.education.gov.au/>

Graph 4: Veterinary student commencements by university and year, Australia, 2007-2013



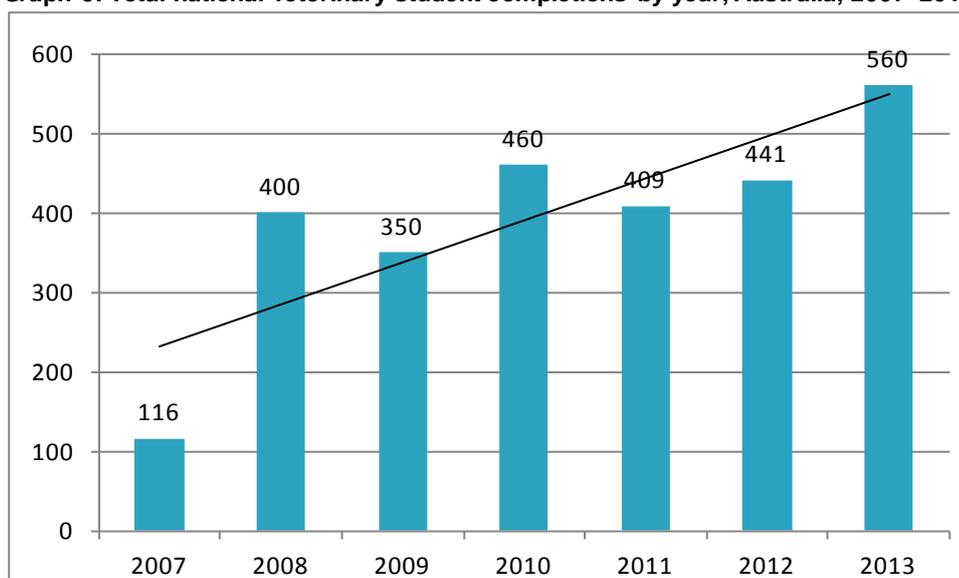
Source: <http://highereducationstatistics.education.gov.au/>

The following graph shows the trends for student completions between 2007 and 2013. The graph shows an increase from 116 completions in 2007 to 560 commencements in 2013. Due to the very low numbers of completions in 2007, the change in completions between 2008 and 2013 was calculated (160 additional students, 40% growth, an average of

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eight percent per annum growth on average. The linear trend line shows that 2013 completions are close to the trend in growth between 2009 and 2013. However it is anticipated that after several years of projected growth based on further recent commencement increases there will be a plateauing of completions.

Graph 5: Total national veterinary student completions by year, Australia, 2007-2013



Source: <http://highereducationstatistics.education.gov.au/>

The following table and graph shows the changes in completions by University and year. The largest increase in numbers between 2008 and 2013 (or between initial years of completion numbers and 2013) was for Charles Sturt University, which more than doubled its completion numbers from 26 in 2012 to 63 in 2013. This was followed by James Cook University, which saw a growth from 43 completions in 2010 to 59 completions by 2013. Therefore the growth in completion numbers overall is due to the addition of student completions from the new courses.

Murdoch University saw a small decline in completions between 2008 and 2013 of six completions or a decrease of 1.6%.

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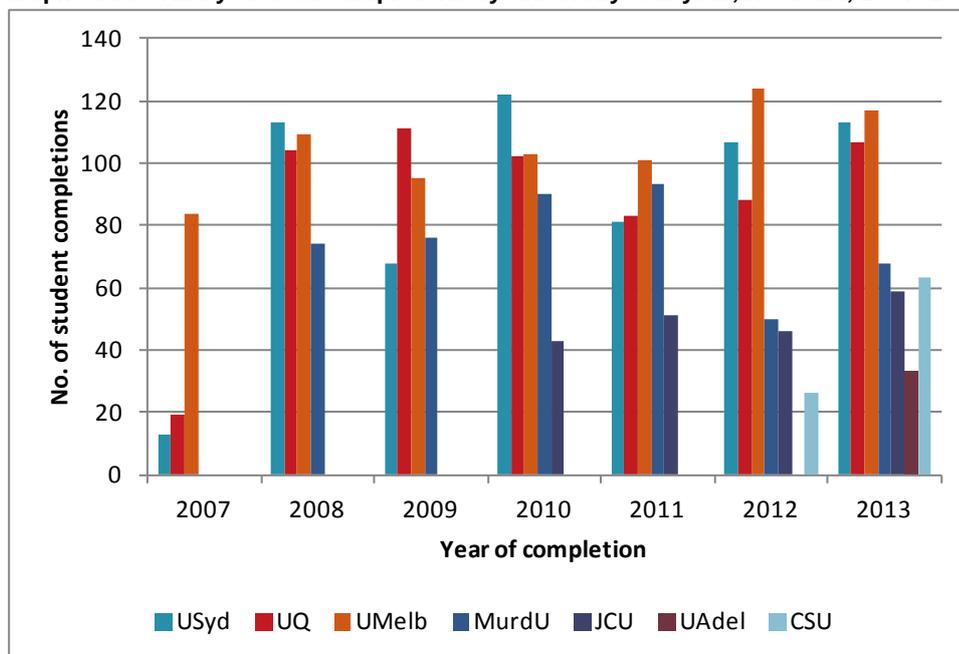
Table 3: Veterinary student completions by university and year, Australia, 2007-2013

University	2007	2008	2009	2010	2011	2012	2013	2008 - 2013 Var. 1	% Annual Var. 1	% Var. 2008- 2013
USyd	13	113	68	122	81	107	113	0	0.0%	
UQ	19	104	111	102	83	88	107	3	0.6%	
UMelb	84	109	95	103	101	124	117	8	1.5%	
MurdU		74	76	90	93	50	68	-6	-1.6%	
JCU				43	51	46	59	16	7.4%	
UAdel							33	n.a.	n.a.	
CSU						26	63	37	142.3%	
Total Completions	116	400	350	460	409	441	560			
Total change 2008 to 2013								160	8%	40.0%

Note: (1) Variation and Annual % Variation is calculated from the initial year the course commenced to 2013.

Source: <http://highereducationstatistics.education.gov.au/>

Graph 6: Veterinary student completions by university and year, Australia, 2007-2013



Source: <http://highereducationstatistics.education.gov.au/>

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Further analysis will be undertaken of student commencements and completions based on gender, age, and domestic versus international status when a special data set is received from the Federal Department of Education, which is being extracted from the Higher Education Statistics Collection.

5.2. Current sources of workforce supply data

A range of sources has been reviewed to determine the best sources of data for the projection modelling including estimates of workforce size and key characteristics of the workforce. These data sources are:

- State and Territory Veterinary Practitioner Registration Boards annual data;
- ABS 2011 Census data; and
- AVA Australian veterinary workforce survey 2012.

All of these data sources have limitations as summarised below.

State and Territory Veterinary Practitioner Registration Boards annual data: data on new registrations, renewals and deletions from the registers is maintained by each of the Boards as part of their statutory role in maintaining a public register. However there is no national collection of data on a regular basis other than the total number of registrations on a routine basis. In addition, some Boards collect additional data on a survey basis but data items and codes are not consistent between Boards.

An analysis is being undertaken of Board data to develop a time series of data on registrations, new registrations and other categories of registration. Other

ABS 2011 Census data: The ABS provides a range of data for occupations under the Australian and New Zealand Standard Classification of Occupations (ANZSCO coding system) which has been used for the coding of 2011 Census data. Veterinarians are classified as Natural and Physical Science Professionals and specifically as code 2347. In 2011, the use of the code identified 7,231 working veterinarians nationally. This figure will be compared to other estimates of workforce size using the other data sources as part of the technical analysis of the data. However the Census data provides the most comprehensive data on information including distribution, age, gender and hours worked. Some of this data is reported below. The major constraint in using Census data is that managers are often counted under different occupational codes and therefore Census data may undercount the workforce size.

Table 1 compares the Census count for three States with the survey population from Registration Board data and the results show the headcount is between 60% and 80% of the survey population numbers. The 2012 national survey reported below shows the total number of registered veterinarians in 2012 was 10,317; much higher than the 7,231 veterinarians counted in the 2011 Census. The actual size of the workforce sits between these two figures as data from the Registration Boards includes non-working and retired veterinarians as well as veterinarians working in other activities.

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Therefore the focus of additional analysis will be on determining the practitioner workforce participation rates in relation to the available Registration Board data and Census data.

AVA Australian veterinary workforce survey 2012: This survey was conducted between January and December 2012 as an on-line survey and the response rate was estimated to be 14%, although response rates varied by State. The data provides a sample of information of key characteristics such as age, gender, hours worked and location (excluding on-call and call back hours worked). The survey also collected data on the area of primary and secondary employment.

The next steps will involve triangulation of the sources of data to determine the most reliable data sources for projection modelling and reporting the workforce characteristics including workforce size for the base year of the projection modelling.

5.3. Workforce characteristics

5.3.1. Age and Gender

There have been several studies which have documented the increasing participation of women in the veterinary workforce (Heath, 2002; Heath, 2008; NAB Health, 2009). Heath (2002) reported on the number of veterinarians in each State by gender who were working and engaged in veterinary activity and the proportion of females has grown from 14.7% of the national workforce in 1981, thirty percent in 1991 and 38.8% in 2001 (Data calculated from Table 1, p. 401). Nab Health reported that the relative number of females to males was increasing, with the total number of female vets expected to overtake the number of male vets by 2010. (NAB Health, 2009, p. 3)

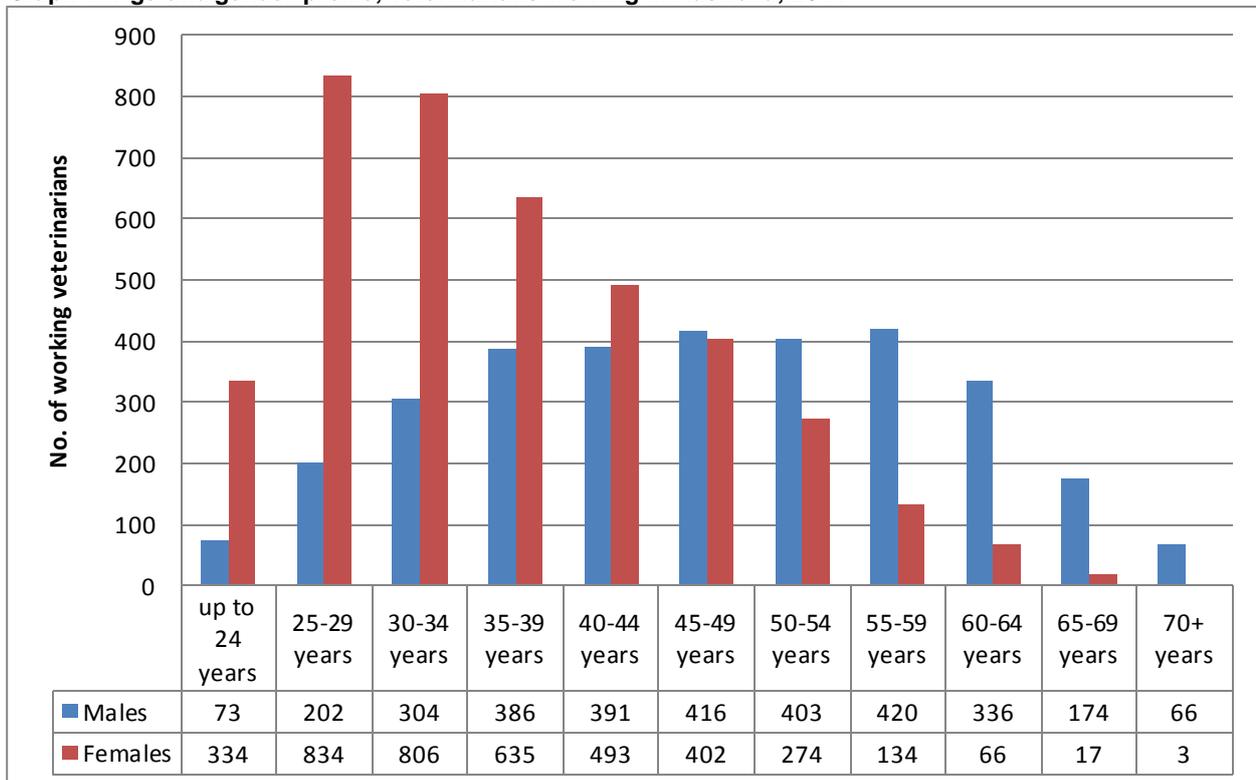
The following graph is based on the ABS Census data for 2011. It reports on the 7,231 veterinarians coded as ANZSCO code 2347. The response to these questions was 99.1% (n=7,169). The data shows that overall, females are now 55.8% of the workforce, consistent with the NAB Health view of the anticipated gender mix of the workforce being predominantly female. By age group, females are now in the majority up to 44 years, after which there are more male veterinarians by age group. Females make up 82.1% of the workforce aged up to 24 years, and the proportion of females then declines by age cohort. Females are less than ten percent of the workforce 65 years and older.

The modal age range (the range with the highest volume by age) is 25 to 29 years for females and 45 to 49 years for males. For the total workforce, the modal age range is 30 to 34 years (n=1,110 in number). Over the next decade, the proportion of females in the workforce will increase.

Further analysis is required by gender and age to determine if females work less hours on average than males across all age groups. If this is the case, the full-time equivalent (FTE) workforce will decline in proportion to the headcount workforce over the next decade.

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Graph 7: Age and gender profile, veterinarians working in Australia, 2011



Source: ABS Census data, 2011

5.3.2. Hours worked

The following table and graph show that 59.1% or virtually six in ten veterinarians work forty or more hours per week. The modal hours worked is 49 or more hours per week with 29.3% working 49 or more hours per week.

Table 4: Hours worked, veterinarians working in Australia, 2011

Hrs. worked per week	No of veterinarians	Percentage
1-15 hours	574	8.4%
16-24 hours	559	8.2%
25-34 hours	739	10.8%
35-39 hours	912	13.4%
40 hours	1067	15.6%
41-48 hours	975	14.3%
49 hours and over	1996	29.3%
Total	6822	100.0%

Source: ABS Census data, 2011

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5.3.3. Distribution

The following table and graph now show that females are the majority of every State and Territory workforce, ranging from 53.8% in Tasmania and 53.9% in New South Wales to 78.1% in Tasmania.

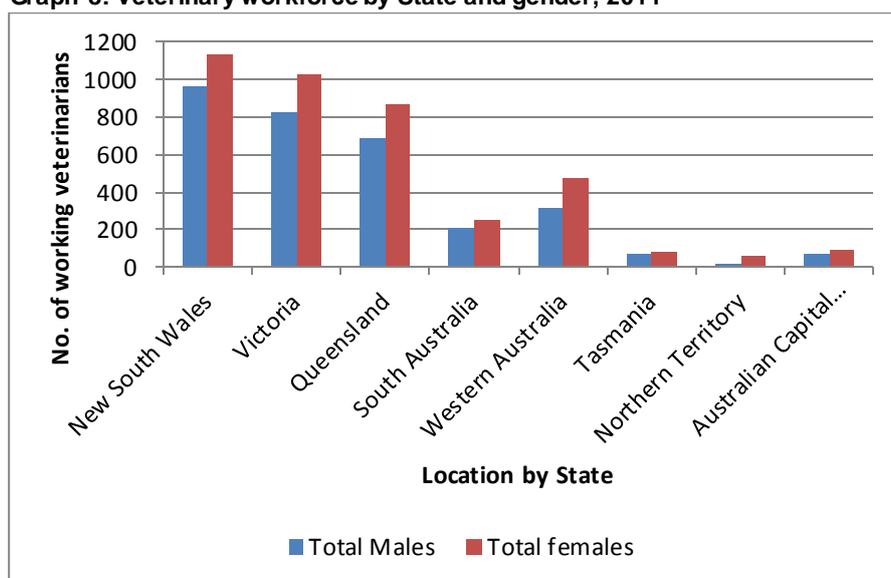
New South Wales had the highest percentage of working veterinarians (29.2% of the national total, followed by Victoria (25.9%). The lowest proportion of veterinarians were in the Northern Territory (1.0% of the total) and Tasmania (2.2%). The proportion in New South Wales is lower than population share, and per capita ratios need to be calculated after comparison with other data sources.

Table 4: Veterinary workforce by State and gender, Australia, 2011

	New South Wales	Victoria	Queensland	South Australia	Western Australia	Tasmania	Northern Territory	Australian Capital Territory	Total
Total Males	964	828	690	214	311	72	16	76	3171
Total females	1129	1028	869	256	480	84	57	95	3998
Total	2093	1856	1559	470	791	156	73	171	7169
% females	53.9%	55.4%	55.7%	54.5%	60.7%	53.8%	78.1%	55.6%	55.8%
Row percentages	29.2%	25.9%	21.7%	6.6%	11.0%	2.2%	1.0%	2.4%	100.0%

Source: ABS Census data, 2011

Graph 8: Veterinary workforce by State and gender, 2011



Source: ABS Census data, 2011

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5.4. Specialists in the workforce

The Australian and New Zealand College of Veterinary Scientists (ANZCVS) is the post-graduate accrediting body for the profession. College Membership signifies that a veterinarian has expertise and competence in a nominated subject area. To become a member of the College a candidate must have at least four years post-graduate experience as a veterinarian and have successfully completed both written and oral/practical examinations in one of the diverse range of subjects on offer.

College Fellowship is associated with scholarly and technical excellence in a particular subject. Standards required for training and examination in Fellowship subjects meet or exceed the prerequisites for registration as a Veterinary Specialist in Australia and/or New Zealand.

Veterinary Registration Boards report on the number and type of registrants for veterinary specialisations in one state (New South Wales) and another State lists the disciplines and sub-categories registered by the Board (Victoria).

Additional data will be analysed on the proportion of specialists in the workforce.

5.5. Current labour market analysis

Heath in 2008 reported that the data available for Australia indicate that the current number of veterinary graduates is likely to be sufficient for the needs of animal owners of Australia over the years ahead. His view was that if shortages occur in particular areas, this is likely to be related to poor distribution rather than an overall shortage (p.28).

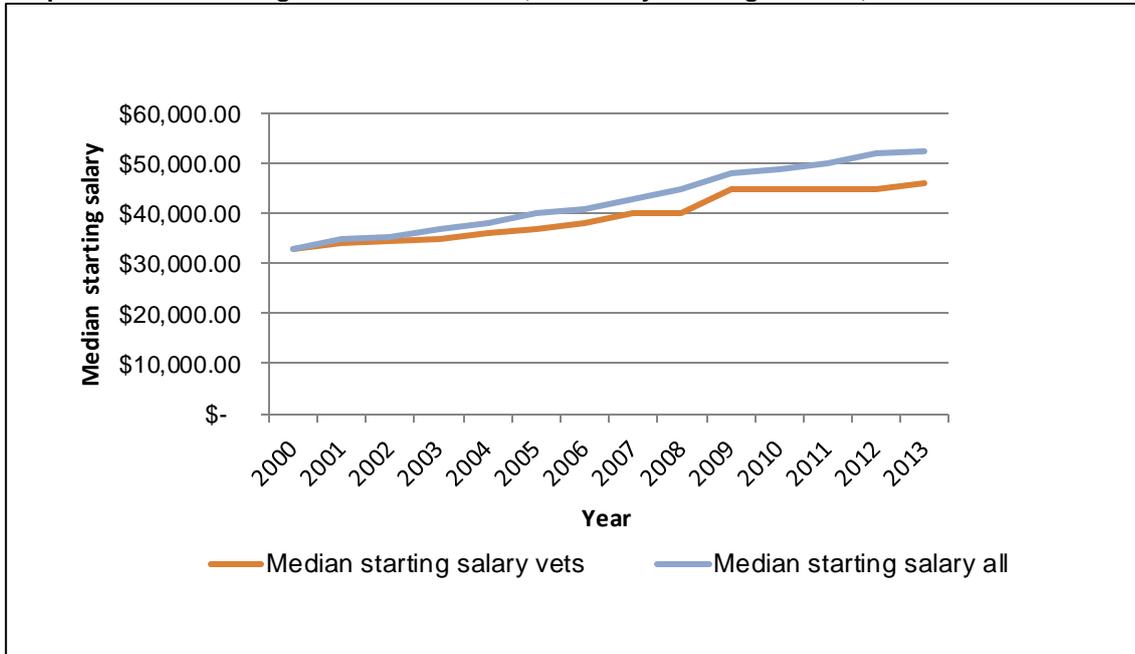
Since then there have been major increases in university students commencing and completing university courses and the AVA (2013)³⁶ put forward the view that Australia is currently facing an oversupply in the veterinary workforce. The AVA argues that veterinary science is one of the most expensive university courses to deliver, yet it is still underfunded, poorly resourced and under strain. The AVA reports that there are constraints on the capacity of the industry to provide enough quality clinical placements.

Supporting evidence of an emerging oversupply comes from data from Graduate Careers Australia. This indicates that the starting salary for veterinary graduates has not kept pace with other graduate salaries between 2000 and 2013, and has plateaued from 2009 onwards (see Graph 9). Graph 10 includes data on the graduates seeking employment four months after graduation and in total the percentage of graduates has continued to increase since 2004, from less than five percent to 20% of graduates. These data indicate a tightening of the labour market and increasing unemployment for new graduates.

³⁶ Op. cit. p. 1

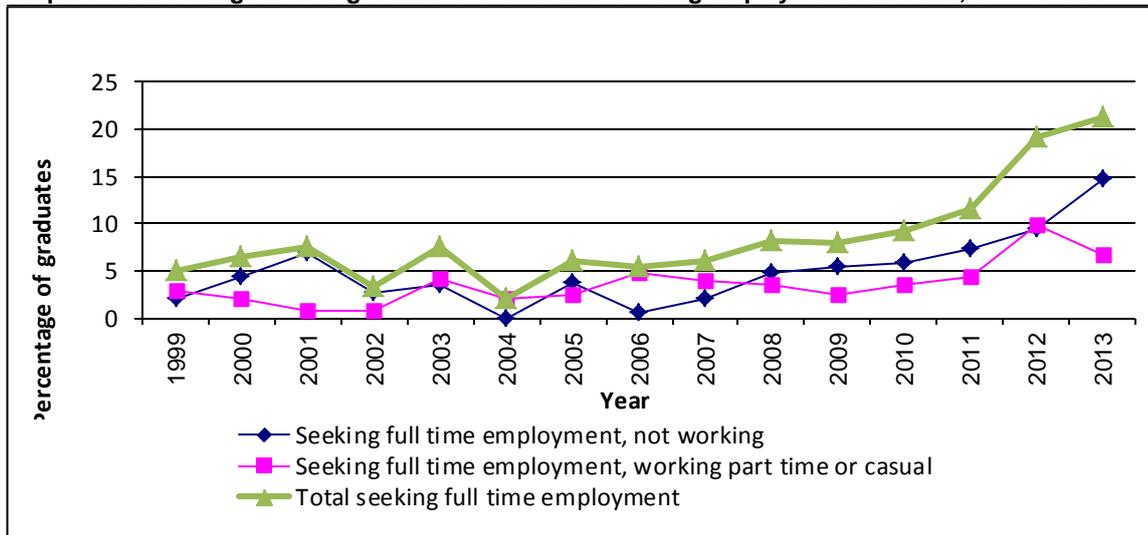
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Graph 9: Median starting salaries in Australia, veterinary and all graduates, 2000 to 2013



Source: Graduate Careers Australia

Graph 10: Percentage of new graduate veterinarians seeking employment Australia, 2000 to 2013



Source: Graduate Careers Australia

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5.6. Summary of Supply data

The key data on the supply indicators to date show:

- An increasing number of university courses, together with increasing student commencements and completions. The student completions are yet to increase further as increased commencements flow through to completions.
- A major variation in the gender mix of the workforce with a majority of females in the workforce (55.8%), very high proportions of females in the younger age groups up to 44 years, after which there are more male veterinarians by age group. Females make up 82.1% of the workforce aged up to 24 years, and the proportion of females then declines by age cohort. This trend is apparent across every State and Territory within Australia.
- A high modal range for hours worked, with the largest number of veterinarians working 49 hours and over per week.
- Emerging oversupply with an increasing proportion of graduates seeking work at four months after graduation from 2004 onwards; together with a reduction in parity with overall graduate wages, particularly since 2009.

6.0. Next steps

As indicated previously, the next steps are to undertake projection modelling of supply and demand for veterinarians across Australia. It is proposed to do a national projection as a baseline, together with the following projections:

- Urban versus rural (using the Commonwealth Government classification of ASGC-RA)
- State and Territory projections
- Sector projections for small animal practices, mixed practices, equine, production animal and other (including education, research, government, industry and other areas).

These individual projections will be subject to more data analysis before being undertaken to ensure that data sources are sufficiently robust to undertake this level of projection modelling. Data is required for completing students, the workforce, migration levels, and wastage at five year age and sex cohort level and therefore cell sizes can be too small for projection modelling.

Another paper, the “*Technical Workforce Modelling Paper for the Veterinary Workforce*” is also being prepared to provide more detailed analysis of current and historic supply and demand data, document assumptions supporting the projection modelling and report on findings from the projection modelling including scenario projections.