AUSTRALIA’S VETERINARIANS AND THE FRAWLEY REVIEW OF 2002

A thesis submitted for the degree of

Doctor of Veterinary Medical Science

From Murdoch University

by

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I declare that this thesis is my own account of my research and contains as its main content work which has not previously been submitted at any tertiary education institution.

John Alexander Loftus Maxwell
# Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstract</td>
<td>iv</td>
</tr>
<tr>
<td>Abbreviations</td>
<td>vi</td>
</tr>
<tr>
<td>Definitions</td>
<td>vii</td>
</tr>
<tr>
<td>Acknowledgement</td>
<td>ix</td>
</tr>
<tr>
<td>Communications</td>
<td>x</td>
</tr>
<tr>
<td><strong>Chapter 1. Introduction</strong></td>
<td>1</td>
</tr>
<tr>
<td>Historical setting</td>
<td>1</td>
</tr>
<tr>
<td>Thesis: Australia’s Veterinarians and the Frawley Review of 2002</td>
<td>3</td>
</tr>
<tr>
<td>Cultural changes</td>
<td>5</td>
</tr>
<tr>
<td><strong>Chapter 2. The Frawley Review</strong></td>
<td>8</td>
</tr>
<tr>
<td>The Purpose of the Review</td>
<td>8</td>
</tr>
<tr>
<td>Terms of Reference</td>
<td>9</td>
</tr>
<tr>
<td>The Recommendations</td>
<td>9</td>
</tr>
<tr>
<td>Conclusions of the Review</td>
<td>12</td>
</tr>
<tr>
<td>Response to the Review</td>
<td>15</td>
</tr>
<tr>
<td><strong>Chapter 3. Literature Review</strong></td>
<td>17</td>
</tr>
<tr>
<td>Australia’s veterinarians: Pre-Federation</td>
<td>17</td>
</tr>
<tr>
<td>Australia’s veterinarians: Federation 1901-1950</td>
<td>19</td>
</tr>
<tr>
<td>Australia’s veterinarians: Second half of the 20th century</td>
<td>28</td>
</tr>
<tr>
<td>Australia’s veterinarians: The 21st Century</td>
<td>39</td>
</tr>
<tr>
<td>Animal quarantine: Pre-Federation</td>
<td>47</td>
</tr>
</tbody>
</table>
Animal quarantine: The 20th century 54
Animal quarantine: The 21st century 61
Veterinary education: 1888 to 1950 65
Veterinary education: Second half of the 20th century 74
Veterinary education: The 21st century 88

Chapter 4. Research Project 1: Veterinary Service 96
Introduction 96
Materials and methods 96
Results 97
Discussion 107
Conclusions 113

Chapter 5. Research Project 2: Veterinary Quarantine 115
Introduction 115
Materials and methods 115
Results 116
Discussion 123
Conclusions 126

Chapter 6. Research Project 3: Veterinary Education 128
Introduction 128
Materials and methods 128
Results 129
Discussion 147
ABSTRACT

This thesis examines the impact of a Commonwealth Government inquiry, the “Review of Rural Veterinary Services” on Australia’s veterinarians and the services they provide. Chaired by Peter Frawley, the inquiry became known as the Frawley Review and examined rural veterinary services, animal quarantine and veterinary education in Australia and made recommendations concerning all three.

When Australia began as a penal colony of Great Britain in the 18th century, there was little need for veterinarians. This changed during the latter half of the 19th century with an increase in livestock and diseases.

Australia’s first veterinary school was the Melbourne Veterinary College, a private facility, established in 1888. This school was subsequently incorporated into the University of Melbourne in 1909. A further three veterinary schools were established in the 20th century; however today, there are seven veterinary schools in the country and with a population of approximately 24 million, Australia now has more veterinary schools per capita than any comparable Western Nation.

Since colonisation, Australia imported livestock from countries where major diseases occurred. However, it was not until the late 19th century that quarantine was considered necessary. With Federation, Australia’s Quarantine Act (1908) was promulgated and it wasn’t until 2016 that this Act was replaced with the Biosecurity Act (2015). Fortunately, when incursions of exotic diseases of livestock have occurred in Australia, they have failed to gain a foothold or were eliminated.

During 2015 and 2016, the author conducted an on-line survey of registered veterinarians in Australia and face-to-face interviews of quarantine personnel and academics at all veterinary schools.

In the first study, five hundred and fifty-five survey responses were received; the mean age of respondents was 45 and 64% were female. Eighty-seven percent
were employed in practice, with the majority in urban, small animal practice, whilst the balance worked in various institutions. Less than 10% performed work on-farm. Fifty-eight percent worked full-time and 22% had taken significant time-out from veterinary service during their career.

Forty one percent of respondents were dissatisfied with the income they received and nearly 20% were dissatisfied with their status as a veterinarian.

More than half the respondents stated that they had been injured or acquired an illness whilst conducting their veterinary occupation.

Respondents concluded that, although the Frawley Review had made valid observations, it had failed to beneficially influence veterinary services in this country.

The second study was designed to secure data from veterinarians regarding the review’s impact on animal quarantine. Interviews were conducted with eight leaders of animal quarantine in Australia. Interviewees agreed that livestock quarantine was necessary and required the participation of veterinarians for its success.

All expressed misgivings regarding the current status of animal disease quarantine, especially surveillance and monitoring. The participants concluded that although quarantine was essential, our ability to conduct it effectively was questionable and Frawley had done little to ameliorate the situation.

The third study was designed to obtain data on the current status of Australia’s veterinary education by conducting interviews with Deans and Heads of Australia’s seven veterinary schools with 17 participating in the research.

Interview questions included assessment of the Frawley Review, the purpose and funding of veterinary education, different curricula, student selection, different degrees and the oversupply of veterinary graduates. The consensus was that Frawley failed, not only to halt further schools being established in Australia, but also with its other recommendations relevant to veterinary education.
It is concluded that, although veterinarians have functioned in Australia for over 100 years with the nascent profession beginning with great hope, a sense of purpose and confidence in its future, today, there is confusion as to its future role in society and the current models of delivering veterinary services, animal quarantine and veterinary education require modification.

ABBREVIATIONS

The following abbreviations are used in the thesis:

AHA Animal Health Australia
AVBC Australasian Veterinary Boards Council Inc.
ANZCVSc Australian and New Zealand College of Veterinary Science
AVA Australian Veterinary Association
AVJ Australian Veterinary Journal
BSc, BVMS Bachelor of Science, Bachelor of Veterinary Medicine and Surgery
BVSc Bachelor of Veterinary Science
CSIR Commonwealth Scientific and Industrial Research
CSIRO Commonwealth Scientific and Industrial Research Organisation
CSU Charles Sturt University
DVM Doctor of Veterinary Medicine
FRCVS Fellow of the Royal College of Veterinary Surgeons
GMVC Graduate of the Melbourne Veterinary College
JCU James Cook University
DEFINITIONS

For the purpose of the thesis the following definitions are used:

Academic – a university graduate who is engaged in research, teaching or administration at a University. Teacher and researcher are alternative names given to these individuals. Academics are employed to serve the purposes of the institution.

Companion animal practice – veterinary practice serving animal species that are kept primarily for pleasure and companionship. These animal species occupy an emotional and/or sentimental place in the owner’s affection. In some small number of cases these animals can serve an economic role, but essentially, they are kept for their value as a companion, for giving pleasure or as entertainment. Companion Animal Practice encompasses dogs, cats and horses.

Consultant practice – a veterinary surgeon engaged in providing a veterinary service, usually for economic livestock, on a contract or retainer basis, not on a fee-for-service basis. Also, known as Contract practice, Flock or Herd Health service, Planned Animal Health service, Preventive Medicine, Animal Production practice, Whole Farm practice.

Government veterinary officer – the title used for a registered veterinarian employed by and serving the purposes of government. Employed by either State or Commonwealth Governments from which they receive a salary. They are usually engaged in servicing economic livestock, either in a diagnostic, extension,
regulatory or research capacity. They are also known as salaried veterinarians, institutional veterinarians, regulatory veterinarians.

Livestock – animal species, such as sheep, cattle, pigs and poultry, kept for their economic potential through either the sale of meat, eggs or fibre. They are also known as Large animals, Production animals, Economic animals, Farm animals and Food animals.

Private veterinary practice – a clinical veterinary service provided by a veterinarian that makes a direct charge for services rendered, usually on a fee-for-service basis. They usually provide a permanent veterinary facility, but recently some operate ambulatory services.

Registered veterinary surgeon – the title given to a veterinary graduate from an accredited university, who has registered with the State or Territory Veterinary Board. By registering, the veterinary surgeon can be employed within the State or Territory. Only registered veterinary surgeons are entitled to charge for their services and thus act in a professional manner.

Rural veterinary practice – the name given to a private clinical practice which operates and is situated in a rural region servicing both companion animals and economic livestock. Mixed animal practice, Large Animal practice and Country practice are alternative terms for this type of veterinary service.

Urban veterinary practice – describes the type of clinical practice provided in the suburbs of a city or large regional centre. Dog and cat practice, Small animal practice and Companion animal practice are alternative names give to such service.

Veterinarian – one professionally occupied with the treatment of domestic animals; the term used for those competent to deal with health problems of animals. Those educated to treat animal disorders are designated as veterinarians or veterinary surgeons.
Veterinary practice — a veterinary service that attends to the needs of individually sick animals, large or small, companion of economic livestock, through medical and or surgical means. The provision of an animal health service involving the animal (patient) owned by a human (client) and managed by the veterinarian. This is also known as the Traditional or Therapeutic veterinary service.

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Firstly, I acknowledge God of the Holy Bible who created Heaven and Earth and all life within it and who became the man, Jesus Christ, 2,000 years ago to provide salvation for sinful mankind.

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I wish to thank the Human Ethics Research Committee of Murdoch University for authorising the survey questionnaire and oral history interview protocols. I wish to thank the 555 survey respondents for their participation and the Veterinary Boards of NSW, ACT, Victoria, Tasmania, SA, NT and WA. I wish to thank every interviewee who willingly gave of their time, for their patience and candour in answering my questions.
I wish to thank Dr Paul Wynne-Houchin for providing a locum service whilst I undertook travel throughout Australia.

It is my hope that this project will help to provide direction for the future of the profession of veterinary surgery in Australia.

**COMMUNICATIONS**


Chapter 1. Introduction

This thesis examines the impact of an Australian Commonwealth Government inquiry, “The Review of Rural Veterinary Services”, on Australia’s veterinarians and the services they provide.

The Review conducted in 2002, published in 2003 and accepted by the Australian Government in 2004, was chaired by Peter Frawley and became known as the Frawley Review. It examined rural veterinary services, animal quarantine and veterinary education and made recommendations concerning all three.

This thesis examines what has transpired in these three areas since the Frawley Review was conducted 15 years ago.

In this thesis, when a quotation is used it is indented and presented in italics and in a different font to that of the main body of the work, otherwise parentheses are used. This was done to aid clarity.

Historical setting

In the Hammurabi Code of Laws, thought to have been drawn up nearly 4,000 years ago, there is reference to surgery being conducted on the ox and the ass. Elements of the surgery were described – it was carried out by practitioners; a resolution of the health problem was expected and a fee was charged – indicating the existence of an occupation for the treatment of animals in antiquity (Tucker 1956).

Veterinary surgery in the modern era is recognized as commencing about 250 years ago (1762 AD), with the establishment of university courses for the study of animal health and the training of individuals to work in this specialized field (Gunn 1927; Smithcors 1958; Dunlop and Williams 1995).

About that time, Great Britain established a penal colony on the east coast of Terra Australis (1788) and qualified veterinary surgeons began arriving there during the following century.
Although the colony’s economy depended almost entirely on agricultural productivity, it took some time before veterinary education became available in Australia (Fisher 1993a; Mylrea 1994).

One hundred years after colonisation, the Melbourne Veterinary College (1888) began to educate and train Australian veterinary surgeons and, in the first decade of the 20th century, veterinary faculties were established at the Universities of Melbourne and Sydney (Clements 1976; Canfield 2012).

One of Australia's earliest graduates defined the scope of the veterinarian;

There are four main fields of veterinary activity, namely:

VETERINARY PRACTICE, i.e. the treatment of the sick or injured animal, the protection of the healthy by vaccination, and the giving of advice on care and management of domestic animals;

VETERINARY STATE DISEASE CONTROL AND ANIMAL HEALTH ADVISORY SERVICES, i.e. the combating of epidemics that affect herds and flocks and the maintenance of animal health;

VETERINARY RESEARCH, i.e. the seeking of further knowledge of the ills and epidemics affecting animals, of means of treatment and prevention, and of improving methods of husbandry; and

VETERINARY EDUCATION, i.e. the training of veterinary personnel to carry out the aforementioned activities (Seddon 1961).

Those in practice, provided a service directly to the animal-owning public and charged a fee for doing so, whilst the others served in various institutions (government, university or research) and received a salary.

Immediately after university veterinary education was established in Australia, the world became embroiled in World War I. This, accompanied by the manufacture of the motor car, which replaced the horse as the mode of transport, led to few veterinarians graduating from either Melbourne or Sydney universities (Anon. 1929).
A third school commenced at the University of Queensland in 1936, but World War II interrupted its flow of graduates and the outcome of this series of events meant that that few Australian’s qualified as veterinary surgeons during the first half of the 20th century (Seddon 1961).

After operating for 50 years, the University of Sydney had graduated only 263 veterinarians; an average of just over five per year (Canfield 2011).

By 1950, there were approximately 400 registered veterinarians in Australia, with most employed within various government services, both State and Commonwealth (Pearson 2011).

In this era, attempts to establish rural practices floundered for two main reasons. Firstly, it was government policy to supply an animal health service to the farming community at no direct cost, so the rural practitioner, who charged for their services, competed with a government “free-service”. Secondly, the farming community came to see itself as Australia’s aristocracy and, like aristocrats throughout history, thought it a privilege to serve them and impertinent to seek payment for such service (Fethers 1933; Needham 1958; Neiderer 1958; Maxwell 1978; 2008 and 2009).


Cultural changes took place during the latter half of the 20th century which influenced veterinary services and led the Commonwealth Government to establish the “Review of Rural Veterinary Services” (Frawley 2003), which focussed on three aspects of Australia’s veterinary service;

- Rural veterinary services;
- Surveillance and monitoring of livestock for quarantine purposes; and
- Veterinary education.
All three are the subject matter of this thesis and are examined historically from colonial times until the present and by research (survey and oral history interviews) conducted with current veterinary graduates.

The Frawley Review was a watershed moment in the history of veterinary service in Australia, as it provided the veterinary community with an opportunity to examine, consider and assess its place in this country’s future.

Although livestock formed part of the cargo of the First and Second Fleets to Australia in the 18th Century, it was not until Federation (1901) that veterinary service, animal quarantine and veterinary education can be said to have truly begun, so, the Frawley Review provided an opportunity to examine the first 100 years of Australia’s veterinary history.

At the beginning of the 20th century, most veterinary graduates entered government service, but by the end of that century, most sought employment in urban small animal practice. Veterinary attention initially began with a focus on livestock in rural Australia, but today, that attention has shifted to servicing dogs and cats in the cities and major centres (Stewart 1939; Seddon 1961; Churchward 1972; Morris et al 1972; Smyth et al 2015).

This thesis attempts to gather and evaluate facts and opinions regarding the three elements raised in the Frawley Review. It is an examination of the history of veterinary services, quarantine and education and documents the results of research conducted on all three.

There is considerable veterinary literature, so each of the three elements identified by Frawley was considered in-depth to establish their history, current status and to draw conclusions on where they were heading in the Australian setting.

The research component of the thesis employed a survey questionnaire of Australia’s registered veterinarians and oral history interviews of veterinarians engaged in quarantine surveillance and monitoring as well as academics,
currently or previously employed by each of the seven Australian veterinary schools.

To begin, it was necessary to conduct a detailed examination of the Frawley Review itself.

A historical examination of the provision of veterinary services to Australia was next undertaken. This was followed by a study of quarantine and surveillance of the health of livestock from the foundation of the colony to the present. Then the focus turned to a study of the history of veterinary education.

With this completed, attention shifted from the past, to an examination of the present. A survey questionnaire was designed and implemented to determine the impact of the Review on Australia’s registered veterinarians. This was followed by data collected during face-to-face interviews with individual veterinarians involved with animal quarantine and veterinary education (Oral History Interviews). This research provided data as to the impact that the Frawley Review made and indicated future trends in each area.

This was followed with a consideration of alternatives and options for the future of veterinary service.

**Cultural changes**

Throughout most of last century, Australian veterinarians operated as members of a profession. However, in the last quarter of the century, a subtle but significant shift took place and, by the end of the century, veterinarians in clinical practice were no longer referred to as members of the “Veterinary Profession”, instead they had become members of the “Veterinary Industry” and, to this day, there is confusion among veterinarians as to the implications of this paradigm shift (Maxwell 2010). Nearly all information received by veterinary practitioners today, especially via the internet, uses the term “industry” not “profession”.
An equally significant change was that during most of the 20th century, being a veterinarian was seen as a full-time, all-of-life vocation – a calling. The working conditions, especially those in rural practice – available at any time of the day or night, seven days a week, including public holidays – was commented on by Frawley (2003) as well as others (Needham 1958; Niederer 1958; Sier et al 1971; Knight 1978). Today, being a veterinarian has become a job and for some a part-time hobby (Maxwell et al 2008; Porritt 2013).

For most of the 20th century, a significant number of veterinarians serviced the farming community, but during the latter part of the century, attention shifted to servicing small animals in urban Australia (Churchward 1972; Morris et al 1972; Wales 1975; Frawley 2003).

The establishment of a Veterinary School at Murdoch University marked a significant change in veterinary education in Australia. Until that time, the degree awarded for the successful completion of the course in Veterinary Science in Australia was the Bachelor of Veterinary Science (BVSc). This is considered to have arisen because of our British heritage during the establishment of university veterinary education in Australia (Parsonson 1998; 2005). However, Murdoch University introduced a different qualification, the Bachelor of Science, Bachelor of Veterinary Medicine and Surgery (BSc, BVMS) which was accepted by the Australian Veterinary Surgeons’ Boards (Clark and Grandage 2005). Subsequently during the first decade of the present century, some Australian universities decided to abandon the BVSc altogether and replace it with the Doctor of Veterinary Medicine (DVM) (Caple 2011).

Until the 1970’s, Australia’s veterinary schools produced insufficient numbers of graduates, but with the establishment of the fourth school at Murdoch University in Perth, this changed and since then the schools have produced excess graduates to domestic demand (Morris et al 1976; Frost 1976; Heath 2007).

Running parallel to this oversupply is the significant shift in the proportion of male and female veterinary graduates. An examination of recent State
Veterinary Registers, confirm that what was once a male dominated profession, had become dominated by female graduates. Today, the majority of graduating veterinarians are female and a previously male occupation has become a female occupation and the full implication of this dramatic change is not yet known (Heath 2007; Maxwell et al 2008).

For most of the 20th century, veterinary education, like all forms of university education, was limited to those who paid a fee, or those who gained scholarships that allowed entrance to tertiary institutions. That changed in the 1970’s, when the Whitlam Government decided to fund tertiary education (Anon. 2017).

These cultural changes have brought about significant changes in the size, structure and direction of the veterinary profession in Australia and resulted in the Howard Government’s commissioning of the “Review of Rural Veterinary Services” in 2002, which is the central focus of the research outlined in this thesis.
Chapter 2. The Frawley Review

Concern over a number of aspects of veterinary service, including the viability of rural veterinary practice and the adequacy of surveillance in animal quarantine over the last quarter of the 20th century, led the Howard Commonwealth Government to commission a “Review of Rural Veterinary Services”.

The Review, conducted in 2002, was chaired by Peter Frawley and became known as The Frawley Review (Frawley 2003).

A consultative group was established, consisting of members of the Australian Veterinary Association (AVA), Department of Education Science and Training, Cattle Council of Australia (representing extensive industries), Australian Meat Council Limited (representing meat processors and exporters), National Farmers Federation, Department of Agriculture, Fisheries and Forestry – Australia, Animal Health Australia (AHA), Australia Pork Limited (representing intensive industries), Rural Skills Australia, the Department of Primary Industries and Resources, South Australia (representing States/Territories) and Murdoch University.

One hundred and twenty-eight submissions were received and a number of organisations and individuals were consulted.

The Review committee travelled throughout Australia interviewing interested parties and the Review was tabled in January 2003 and accepted by the Government in 2004 (Frawley 2003; Anon. 2004).

The Purpose of the Review

The Review was commissioned to evaluate Australia’s future animal health needs and the role, availability and capability of veterinarians, especially those in rural Australia, to meet those needs.

The Review only focussed on Australia’s economic livestock species. The veterinarians involved were those employed by government in pursuit of the
The conduct of livestock policy and private practitioners established in rural Australia. The Review was not an examination of companion animal health or of urban companion animal veterinarians.

This was the first Australian Government review to focus entirely on specific aspects of veterinary service.

Terms of reference

The Review stated;

"Australia’s animal health systems, the services they provide and the animal health status they deliver influence the profitability of Australia’s livestock industries. In turn, this influences the contribution of these industries to rural and regional Australia and the economy more generally..."

"A widely held view within the livestock industries and the animal health system is that Australian animal health capabilities are not keeping pace with the changing and more stringent needs being placed on them. While market requirements become more demanding and maintaining profitability becomes more challenging, the required resources and veterinary expertise appear to be in decline or at least not developing to meet future needs.

Veterinarians and particularly those outside the major metropolitan centres, are a key resource in Australia’s animal health systems."

The Recommendations

A total of 15 recommendations were made. These focussed on: Policy development and implementation (recommendation 1); System design and implementation (recommendations 2 to 6); Surveillance and monitoring (recommendations 7 and 8); Rural veterinary practice (recommendations 9 and 10); Education and training (recommendations 11 to 14); and Funding (recommendation 15).
Some of the recommendations concerned government and industry policy (1-6) and are not dealt with in this thesis. However, recommendations regarding Surveillance and monitoring, Rural veterinary practice, Education and training and Funding (7-15) are examined.

**Surveillance and monitoring:** The current surveillance and monitoring system is unlikely to continue to meet the increasing stringent requirements of Australia's trading partners for assurances about disease freedom and status.

**Recommendation 7**, directed AHA to enhance surveillance by: addressing the poor appreciation of producers and livestock handlers of the value of surveillance and the general reluctance to report disease in their livestock; improving data collection and management from both government and private activities; involving veterinary practitioners in surveillance; finalising the funding arrangements of both government and industry regarding surveillance and monitoring.

**Recommendation 8**, called upon the Primary Industries Ministerial Council to request AHA to assess the risk of disease occurrence, evaluate the current information of livestock diseases and the specifications of surveillance regimes needed to confirm disease status.

**Rural veterinary practices:** The existing network of rural veterinary practices servicing animals is unlikely to be sustained...as practice costs rise and lifestyle and income opportunities divert new graduates to companion animal/urban practices.

**Recommendation 9**, called on the Australian Veterinary Boards Council (AVBC) and the State and Territory Veterinary Boards to adopt a uniform approach to registration and regulations and remove barriers to practice consolidation and efficiency. Issues such as limitations on practice ownership, service obligations, requirements for separate registration in each of the eight jurisdictions, and the formal recognition of veterinary nurses were highlighted.
**Recommendation 10**, suggested that the veterinary profession, through the AVA and other relevant professional organisations, develop, a “best practice” model for rural mixed practice, along with, mentoring schemes, post-graduate education short courses, and a better management of after-hours work.

Frawley recognised that, although the number of veterinarians entering rural service was increasing, it was considered insufficient for future needs. It also acknowledged that urban practice in metropolitan and larger centres was drawing veterinary graduates away from rural practice. Further, it considered that it might become necessary to devise means whereby graduates would be attracted to rural service.

**Education and training:** Rising costs and reductions in real terms in both Commonwealth funding and university internal funding allocations have placed severe pressure on Veterinary Schools over the past decade. They have been able to maintain standards, staffing and facilities only by admitting full fee paying local students and overseas students who, in the main, will not be looking to careers in Australian rural mixed practice...

A second matter of serious concern in relation to veterinary education in Australia is the likelihood of a shortage of specialists emerging over the next 10 years. The reasons for this shortfall include reduced job opportunities, lack of career path and the attraction of overseas pay and conditions.

**Recommendation 11,** was concerned with the Commonwealth Government’s “Higher Education at the Crossroads Report” which was to be completed in 2003 with its recommendations on Veterinary School funding.

**Recommendation 12,** concerned AHA undertaking regular reports to the Primary Industries Ministerial Council on the needs for future specialisation and actions to be taken to avoid shortages.

**Recommendation 13,** acknowledged that the existing four schools were graduating enough veterinarians to meet current and immediate future needs
for the profession and the establishment of a fifth school in Australia was not warranted at this time.

**Recommendation 14**, called upon the AVBC to initiate a thorough review of veterinary science education and registration requirements.

**Funding**: The Commonwealth has announced it will provide $2 million towards implementation of the recommendations of the Review.

**Recommendation 15**, the last recommendation, concerned “seed funding” for the implementation of its recommendations. This funding consisted of an initial allocation to: establish the Australian Veterinary Reserve (AVR); plan and implement further integration of rural veterinary practices into services “which have wider community benefit”; and develop a new national health information system. However, it also stated that additional “seed money” may be required to be negotiated between governments and industries. Priority was directed to the funding of the AVR, with no details regarding the funding of other items given.

Frawley acknowledged that veterinary school funding was of real concern, as it was reducing, whilst costs of providing high-quality veterinary education was rising rapidly. The reviewers considered that this adverse funding situation could lead to closure of an existing school and proposed that the Higher Education at the Crossroads Report could help this funding dilemma.

It also acknowledged that a shortage of specialists able to deal with the health problems of Australia’s economic livestock could develop and proposed a means of identifying and correcting the insufficient number of specialists through AHA.

Finally, it stated that there was no need for the establishment of further veterinary schools at that time.

**Conclusions of the Review**

Three general conclusions were reached in the Review. Firstly, Australia’s animal health needs were being met on a day-to-day basis, but they would need to be
enhanced to meet future requirements. To this end, the immediate priority was
the establishment of the AVR and the strengthening of disease surveillance.

Secondly, although no immediate crises regarding the veterinary workforce
existed, the review recognised there were difficulties facing rural practice,
namely, rising costs, reluctance of producers to use their services, long working-
hours, and limited social and schooling opportunities for the families of the rural
veterinary workforce. These factors were considered capable of leading to a
“chronic shortage of production animal veterinarians”.

Thirdly, the most lasting solution was to build up demand for rural veterinary
services rather than policies which “might artificially induce supply”.

Frawley acknowledged that, although the situation at the time was acceptable,
this would not continue and proposed, as an immediate priority, the formation
of the AVR, which it considered would improve surveillance. In addition, it
acknowledged that a crisis could develop in rural veterinary practice, and
solutions that would increase demand for such services were favoured. However,
it did not specify what these services might be.

Regarding surveillance, Frawley concluded that to meet continued certification
requirements of importing countries, there must be an ongoing surveillance
program of disease detection. However, Australia’s ability depended on having
skilled veterinarians in the field, a capable diagnostic infrastructure and an
efficient recording and retrieving data system. To achieve this, the Review
proposed the establishment of the AVR and a greater involvement by private
veterinarians in surveillance programs.

Regarding rural practice, Frawley observed that, “Only 20% to 30% of livestock
producers regularly employ private veterinarians” and this was usually to treat
sick individual animals. Two other factors were identified, firstly, the feminisation
of the profession, “females prefer to work fixed and/or casual hours and are
often reluctant to purchase practices.” Secondly, although a large percentage of
graduates initially find work in rural mixed practice, most left within one-to-five-years and “do not return.”

Regarding veterinary education, Frawley acknowledged that the four Australian Veterinary Schools provided a high standard of education and training, but identified problems that could jeopardize this, namely, funding, course content and entry conditions. It even considered, that with the current funding constraints, it would be difficult for the four schools to continue providing high quality education and training. It recognized an increasing emphasis being placed on education for the servicing of companion animals with a decrease in content focussing on economic livestock and made suggestions to correct this.

Course curricula depended principally on accreditation requirements, but there was a measurable decline “in production animal health in favour of companion animal health”.

Standards for entry to university were particularly high and at present “many capable and highly motivated aspirants are excluded from entry.” This was considered significant regarding students interested in rural practice.

With these concerns in mind, Frawley recommended a separate review of accreditation by the professional regulatory body in Australia, the Australasian Veterinary Boards Council Inc (AVBC) which became the Craven Review (2004).

Finally, regarding funding of the recommendations, Frawley stated that the initial $2 million in Commonwealth funding was a “down payment” to upgrade Australia’s animal health system. This was to go toward the establishment of the AVR, to integrate rural veterinary practice into a wider community benefit and toward a new national health system. The review made the point that future funding must include allocations from both government and livestock industries.

There was no incentive or compulsion for government, industry or academia, to take any action regarding the recommendations of the Review.
Response to the Review

The Review was an exploration of the situation that existed at the time due to changes over the previous 20 to 30 years. It was comprehensive and its observations, criticisms and conclusions could be considered an accurate reflection of the problems faced by veterinarians at the end of the 20th century.

The Government response to Frawley was given in April 2004 and “broadly endorses the recommendations of the Review.” Of the recommendations considered in this thesis, the Government supported 7, 10, 12 and 14 and supported, in part or in principle, 8, 9 and 15. Recommendation 11, concerning “Higher Education at the Crossroads Report” had already been attended to in the 2003 Commonwealth Budget.

Recommendation 13, concerned the number of Veterinary Schools in Australia and stated that there was no immediate need for the public funding of a fifth Veterinary School in Australia “at this time”. The government noted this recommendation, but;

...the Government considers that initiatives which focus on production animals, herd management and protection and that enhance the likelihood of graduates practicing in rural and regional areas would make valuable contributions to Australia’s veterinary science capability particularly with regard to supporting a strong and visible livestock export market. In December 2003 the Government supported a proposal for a rural-based veterinary science program, funded within existing arrangements, to achieve these goals. (Anon 2004)

This led to the establishment of a Veterinary School at Charles Sturt University and opened the door for James Cook University and the University of Adelaide to establish schools within the next few years.

Disquiet began to emerge within a relatively short time of the release of the Frawley Review.
At the annual conference of the AVA in 2005, questions were asked as to how it would benefit rural practice and how the AVR could benefit quarantine as it was activated when an exotic disease had already been detected in Australia.

Opinion began to develop that Frawley would deliver little of its intended purpose. At the annual conference of the AVA in 2008, a talk addressing its failures was given (Maxwell 2008).

It is now 15 years since the Frawley Review was commissioned and it is appropriate to re-examine its premises, findings and results.

This thesis asks the question – “Did Frawley achieve its stated objectives regarding veterinary practice and livestock quarantine?”

It does so by examining the history of veterinary practice, livestock quarantine and veterinary education in this country and by conducting research into each.

Finally, it examines alternatives to the present models for each of these aspects of veterinary science.
Chapter 3. Literature Review

Australia’s Veterinarians: Pre-Federation

With the establishment of the colony in 1788, there was seen to be no immediate need for the services of veterinarians.

Livestock arriving with the First and Second Fleets were attended by those having skill at handling horses and cattle. Farriers were;

... employed in shoeing and physicing government horses, cattle, etc, [and by 1822 there were] 14 farriers possessing veterinary skills of a sort, as horse-doctors, cow-leechers and the like (Fisher 1994).

As Australia was established as a penal colony, anonymity was paramount and many new arrivals changed their names or discarded their qualifications (Robertson 1936; Fisher 1993b).

Veterinarians were considered competent to deal with the diseases of the horse, hence were known as “Horse doctors”. Sheep and cattle diseases were not considered within their expertise and no demand was made for their services with these species (Fisher 1994).

Arundel (1993) provided a list of unqualified practitioners vying with qualified veterinary surgeons in serving Australia’s early livestock owners;

...horse surgeons, farriers, cow leeches, cattle doctors, castrators, speyers and gelders, charmers, spell workers, butty colliers and water doctors.

The first qualified veterinary surgeon to establish a practice in this country is thought to have been John Stewart. A graduate of the University of Edinburgh (1827), Stewart came to Australia for health reasons and established a practice in Sydney (1844). Although he had little success as a veterinarian, he did become a landowner and a Member of the NSW Parliament (Fisher 1994; Mylrea 1994).
In spite of the fact that Australia’s livestock numbers exceeded those in Great Britain by the end of the 19th century, the prospects for veterinary practice were poor. The low incidence of animal disease, the low economic value of individual animals and the agricultural management methods adopted were considered responsible for this state (Stewart 1913; Fisher 1994).

Changes took place in agriculture in the latter half of the 19th century due to the dramatic increase in the human population and the occurrence of livestock diseases in Australia. The Gold Rush in 1851, brought large numbers of people to Australia. Some “struck-it-rich”, but the majority didn’t and Australia became flooded with migrants looking for some way to make a living. As a result, legislation was enacted to encourage farming. For example, in Western Australia, the government enacted legislation (Homestead Act, 1883 and the Land Act, 1898) to allow new land settlement. The Agricultural Bank was established in 1894 to make advances to settlers with limited capital. The Bureau of Agriculture was also established in 1894 to regulate the rural industries and their produce (Burvill 1979).

When disease did occur in economic livestock during the 1860’s and 70’s, there were very few qualified veterinarians available and these were often overlooked in favour of seeking advice on the health of animals by consulting members of the medical profession (Parsonson 1998).

Colonial Stock Departments were formed in New South Wales and Victoria in response to an increasing incidence of livestock diseases during the latter part of the 19th century. However, laymen were appointed as Chief Inspectors of Stock; Alexander Bruce in New South Wales and Edward Curr in Victoria. At that time, veterinarians were considered competent only to treat horses, so they were not initially involved in the operation and policy making of the stock departments (Stewart 1913; Fisher 1995).

In New South Wales, John Pottie (MRCVS) was employed, part-time, by the Stock Branch, later to be called the Stock Department and the first full-time veterinarian employed was Arthur Willows (MRCVS). These State Stock
Departments became the precursors of the State Departments of Agriculture. Edward Stanley (FRCVS) replaced Willows and continued in the post from 1884 to 1892, when he became Chief Veterinary Inspector at the Board of Health (Fisher 1995).

From a list of qualified veterinary surgeons in the 19th century in Australia, we read;

...the veterinary profession in Australia has a history extending back at least to the 1840s. There are records of nearly one hundred Members of the Royal College of Veterinary Surgeons (MRCVS) being in Australia in the nineteenth century...Most of these veterinary surgeons were born and trained overseas and so were migrants to Australia; there was no veterinary education in Australia until the Melbourne Veterinary college was founded in 1888. The first MRCVS in Australia was probably John Stewart who arrived in 1841. Thereafter there was a fairly constant stream roughly as follows: 1850s 8; 1860s 28 (gold?); 1870s 12; 1880s 26; and 1890s 19 (Mylrea 1994).

Any Australian wishing to gain qualification as a veterinarian was required to travel to the United Kingdom and one of those who undertook this was James Douglas Stewart, the grandson of John Stewart and the future Dean of the Veterinary Faculty at the University of Sydney.

The period from Federation, 1901 to 1950

In a 1913 address to the Australian Association for the Advancement of Science, the Dean of the University of Sydney’s Veterinary Faculty, J.D. Stewart canvassed issues that were important to veterinary surgeons at the beginning of this new nation regarding animal health (Stewart 1913);

Fifty years ago the position of the disciples of veterinary science in Australia was by no means an enviable one. In concrete terms it was financially bad and socially unsatisfactory...
...after many years of strife, the claims of the profession for proper recognition, as with all claims based upon intrinsic merit, gradually became acknowledged, and in the fullness of time a few veterinarians were appointed to official positions. The efficient and satisfactory manner in which the holders of these positions carried out the duties of their respective officers led to further appointments, so that towards the close of last century fairly extensive veterinary services existed in New South Wales, Victoria, and Queensland, while the remaining Colonies possessed at least a Government veterinary surgeon...

The appointment of veterinarians to the time-honoured position of Chief Inspector of Stock in the States of Western Australia, New South Wales, and Victoria, in order named, was a material advance, as these appointments marked an official recognition in Australia of veterinarians as responsible administrators.

...[the most] important development that has taken place in connection with veterinary science in Australia has undoubtedly been the establishment of Veterinary Schools by the Universities of Melbourne and Sydney.

The distinction conferred upon the profession by the admission of veterinary science to the University grade has done much to elevate its status...from an unsympathetic past, when the future appeared so hopeless as to discourage many visiting veterinarians from settling among us, our present satisfactory position has been won.

...important as the work of the veterinary service in suppressing disease that arise with the State, of still greater importance is its duty to prevent the introduction of diseased from without; but unfortunately few...conceive what our freedom from such diseases as foot-and-mouth disease, rinderpest, glanders, rabies, etc., means to the prosperity of the country and the welfare of the community.

Stewart dealt with all the matters of importance to this fledgling profession – private practice, poor income, low social status, veterinary education,
government veterinary services and quarantine – matters that continue to plague the profession to this day.

A veterinary historian recently recorded;

The standing of veterinarians in the 19th century in disease control...was such that it was not until the 20th century (1900-23) that veterinarians were appointed to the positions of Chief Inspectors of Stock, the current equivalent of the Chief Veterinary Officer...The first veterinary appointments to the post of Chief Inspector of Stock were William J Crother (Victoria), Max Henry (New South Wales), Claude R Toop (Western Australia), RCT (Tas) Philip (Tasmania), Arthur H Cory (Queensland) and John Desmond (South Australia) (Turner 2011a).

With the beginning of centralised government in Australia at Federation, socialistic ideology became prominent in political thinking and, for most of our history, veterinary services have been provided by a government to the farming community at no direct cost. Instead, all have paid for it through taxation and this was justified on the basis of it being a “public good”. The practicing veterinary surgeon, who levied a charge, had to compete with a “free-service” and this was predominantly responsible for the failure of private practice to thrive until the second half of the 20th century (Caple 2011).

Sixty years after the presentation by Stewart, two veterinarians made observations regarding Australia’s propensity for socialistic welfare;

... the Australian is a strong individualist in his own business, but he is not averse to strong support from government sources. This characteristic has been well documented as far back as Macquarie’s governorship (Auty 1976).

Two sources of veterinary service have been available to farmers. In New South Wales, the State Government, through the Department of Agriculture provides assistance to stock owners from their field Veterinary Officers and Veterinary Inspectors of the Pasture Protection Boards. These services are free...The other form of service is the rural practitioner who is usually
located in one of the larger towns within the more concentrated livestock areas (Edwards 1976).

Thus, in the servicing of livestock there was competition – the “free-service” provided by institutional veterinarians, versus private veterinary surgeons who charged a fee (Baker 1936).

One veterinarian reported;

Since 1888, tensions have resulted in battles for pre-eminence and prestige between ‘veterinary surgeons’ and ‘veterinary scientists’ … There has been tension between government-employed veterinarians and veterinarians in private practice (Caple 2011).

In this context, the term “veterinary surgeon” referred to those in private clinical practice and the term “veterinary scientist” meant those working in government, research or teaching.

From the very beginning, there has been a division between those engaged in private practice and the rest of the profession;

There has been a regrettable tendency in some veterinary circles in Australia to regard the day of the practitioner, if not definitely over at least declining to a wintery eve of doubt and depression. It is admitted that a small number may continue to find employment in connection with racing stables, and that a slightly larger number may be required for the canine and feline work, but beyond this little future is seen for the practitioner (Anon. 1932a).

A private practitioner indicated the extent of the problem in the early 1930’s and declared that this was disastrous to the development of a private practice and called for an overhaul of the system and consultation between the salaried State officers and practitioners;

The written code of ethics is a most one-sided document purporting to direct the actions of individuals in the veterinary profession as a whole, but in reality, it is nothing more than an instruction to the private practitioner and
is administered for the most part by those on the pay of the State...the farmer has developed a sense of dependence upon government assistance...

It may amuse some readers to learn that I am frequently told by farmers I have no right to charge for services rendered. The farmer says the government should pay the fee. He honestly believes that any taxes he pays are for that purpose. This is actually the feeling which has grown up amongst the great many dairy farmers (Fethers 1933).

The editor of the Australian Veterinary Journal (AVJ) responded;

A recent Editorial on Veterinary Ethics in the journal has led to the receipt by us of communications from private practitioners, stressing once more the attitude that the operation of any ethical code falls with its full weight upon them, while leaving the Government veterinarians and salaried officers relatively unaffected. A more important complaint, however, has been made namely, that the Government and other salaried veterinarians in many of their activities are guilty of unethical conduct in so far as they perform duties which do not legitimately fall within their scope and which should be the perquisite of the practitioner (Anon. 1932b).

On the eve of the Second World War, “Nationalization of Australian Veterinarians” was debated within the AVA. The protagonist, the Chief, Division of Animal Health and Nutrition, Council for Scientific Investigation and Research (CSIR) stated;

We have two extremes of political philosophy, one depending upon complete organization by the State, in other words nationalization of all activities, and the other depending on individualism with complete freedom of action for each individual. In most countries at this time of our social development we have varying degrees of compromise between the two extremes (Bull 1938).

Bull claimed that veterinary schools were established to provide veterinarians for national service in the Army, which was a function of the State. As livestock producers in Australia sought Commonwealth Government involvement in
quarantine, livestock health research and education, then all elements of veterinary service should come under the umbrella of centralised government control. He cited other nations that had adopted a centralised administration of their veterinary services and thought Australia should do the same;

*If it is in the nations interest to nationalize veterinary services, then ipso facto it is in the interests of the profession...Veterinary science, in its broadest meaning, can help the animal industry, and this industry is essential to the welfare of Australia.*

Under nationalization, he envisaged that the private practitioner;

*...gradually disappears, but, in the cities particularly, some remain mainly to care for the animals that have no economic value to the nation.*

His opponent in the debate, a practitioner, claimed;

*...veterinary education was developed rapidly in the eighteenth and nineteenth centuries not to provide Army Veterinary Officers for the wars on the Continent, but to cope with such plagues as sheep scab, rinderpest, foot-and-mouth disease, glanders, rabies, anthrax and a score of other diseases which were playing havoc amongst the stock of peoples engaged in the peaceful pursuits of farming.*

And he concluded;

*The vicious cycle which we have permitted to develop must be broken somewhere. The practitioners must be acknowledged as accredited members of the profession: they must be included in the general organisation, used and given some consideration, some respect, and some responsibility. This is the weakest link in our organization today. The realization of it seems hard to bring home. We must direct our energies to the solution of this problem. Let this Association work out the salvation of private practice for the benefit of the farmers...I cannot imagine any greater misfortune for our valuable animals than that private practice be denied or rendered impossible (Bull 1938).*
I enrolled at the Veterinary Faculty at the University of Sydney in 1956 and upon entering rural practice in the 1960’s, found conflict still existed between government officers and private practitioners in Victoria, South Australia and Western Australia, where I eventually settled.

During the first half of the 20th century, government veterinarians dominated the profession;

*In those days the great majority of members were in governmental service with a few academics and a handful of clinicians.* (Pearson 2011)

The luminaries among Australia’s veterinarians were those researching and making discoveries regarding diseases of livestock. An examination of the proceedings of the annual AVA conferences confirms that the majority of speakers were research personnel and this led to elevation of the status of research veterinarians employed by governments and universities relative to their practitioner colleagues (Caple 2011).

This issue was highlighted in an article detailing the research of sheep diseases that had taken place by veterinarians up to 1950 in Australia where Bull (1951), demonstrated that all significant research in sheep had been conducted by veterinarians working for various State Departments of Agriculture in one of the three University Veterinary Faculties or in the CSIR/CSIRO.

Not only did he describe the establishment of various research institutions for the study of sheep diseases, he also demonstrated that the investigations were carried out within a 40-year period by about 40 researchers.

The schism that developed within the profession during the first half of the 20th century could be said to have divided the profession into two camps. The institutional camp, operating in the environment of research and portrayed as dedicated scientists was contrasted with the private practitioner, who dealt with the animal-owning public and whose primary interest was money. These stereotypes were not entirely accurate.
When asked to provide a list of the 10 most notable Australian veterinary graduates up to 1950, the veterinarian who gave the Harold Albiston Oration stated;


All were non-practitioners, although Kendall began his career in practice.

A further example of the schism was provided when, in delivering the 11th Kendall Oration, Sutherland (1994), stated;

_WT Kendall was a clinician, so it was fortunate that when the Melbourne Veterinary College was absorbed into the University of Melbourne Veterinary School, the university selected as the first Dean a pathologist, Dr JA Gilruth._

The privilege of delivering this oration usually provided an opportunity to honour the memory of Kendall, instead, this speaker referred to Kendall as a “clinician”, implying that he was unfit for the role of Dean, whereas, Gilruth, “a pathologist” was.

One notable exception to this discrimination was Gilruth's protégé, Herbert Robert Seddon, who graduated from the University of Melbourne in 1913 and went on to become the Foundation Dean of the University of Queensland.

Speaking at the Silver Jubilee of that school, Seddon (1961) identified the role played by practitioners in the development of veterinary service in this country;

...in the early years of the nineteenth century, we find the term “veterinary surgeon” adopted by those who practiced the then recognized “veterinary art”.

The progress made in Victoria in the early years in this century, and the optimism with which I and others viewed the future of veterinary practice, were rudely shattered by World War I and its aftermath. Practically all the
country veterinary surgeons, and many of those in the cities of all States, held a commission in mounted infantry regiments...On demobilization in 1919 these same practitioners found that their practices had been usurped by quacks, and this, with the reduction in the use of horses because of the transition to motor transport and haulage, together with the relatively low value of other livestock, made it difficult to get a living.

As a result, many accepted appointments with one or other of the government veterinary services which, thanks to the availability of veterinary personnel, were able to expand. Others struggled on in practice for a time, but gradually many of them forsook it for the security of government employment. And of those who had graduated during these four years of war, few indeed went into practice...In consequence of the poor outlook in respect of private practice and the few vacancies then offering for salaried positions, enrolments at both Sydney and Melbourne Veterinary Schools fell sharply, resulting in the closing of the Melbourne School.

But, from 1924 on, an odd veterinary surgeon here and another there ventured into this field, all the earlier in metropolitan practices, and their number slowly and gradually grew. They had not long been in practice when the depression years of 1930 to 1933 were upon them, giving a further set-back to private practice, and of forty who graduated from Sydney University between 1931 and 1935 only five went into private practice, practically all the others taking salaried positions. To their credit, most of those who went into practice in the years 1924 to 1935 were able to carry on, and one cannot but feel that the example of their success contributed much to the subsequent development of veterinary practice in Australia.

Seddon closed his appraisal of practitioners by describing how in the period 1941 to 1961;

...veterinary surgeons have gone into private practice in ever increasing numbers, and many have, in fact, left salaried positions for it. As a result, there are now about 450 veterinary practitioners in Australia, more veterinary graduates being engaged in this than any other form of
veterinary activity. Whilst a large proportion are in the cities and largest towns, many have gone to country areas.

Unlike many of his academic colleagues, Seddon acknowledged the contribution made by the practitioner.

The second half of the 20th century

From 1958 onwards, articles on the subject of “Veterinary Practice in rural areas” began appearing in the AVJ;

Veterinary practice is only one part of the much broader and more important field of veterinary service. Whether the stock owner pays for the practicing veterinarian’s services directly in the form of a fee or indirectly by levy to a dairy company or by taxation of various types through the state should not matter...A nationalised veterinary organisation should in theory provide the ideal service for the animal industries.

This article, was not authored by a rural practitioner, but by the Chief Veterinary Officer of the Queensland Department of Agriculture (Webster 1958).

Other articles also appeared, but they too, were provided by Chief Veterinary Officers of various State Departments of Agriculture, who gave their opinion on what rural practitioners should confine themselves to.

In South Australia, Smith (1963) stated;

...in the late 1940’s the modern type rural private practitioner appeared in SA and incidentally started the upset of the old established order. From a humble beginning of one practitioner at Mt Barker in the Adelaide Hills in 1947 the number gradually increased until today there are 17 qualified veterinarians in rural areas in SA...Any extension of the process of weaning the stockowner away from a free service will have government approval only if the government can be assured that the public will not be exploited or neglected.
In New South Wales, Hall (1963) wrote;

*Prior to World War II veterinary services in rural areas were almost exclusively Government...the few practitioners outside the metropolitan area were almost exclusively non-graduates who confined their activities largely to simple treatments and surgery. During the post war period there was a rapid extension of graduate veterinary practitioners into country areas.*

*The private practitioner veterinary service provides for...the treatment of individual animals and, when utilised for routine diagnostic testing, enables large scale disease control and eradication projects to be undertaken by the Government.*

In Tasmania, Meldrum (1963) stated that;

*The service originated after the turn of the century with the appointment of one officer who was to investigate Midland cattle disease...but the service remained low, staff was of never more than two officers until the late 1920’s...By 1941 the staff number had risen to 12, but apart from several unqualified veterinarians who were accepted for registration under the Veterinary Act of 1918 there was only one qualified veterinarian in private practice and his was mainly a city practice...at the present time of the 41 veterinarian registered in Tasmania, 21 are in State employment and 12 engaged in private practice.*

I graduated in January 1964 and it was my plan to become a veterinarian practicing in rural Australia. For two years, I undertook positions in rural practices in South Australia, Victoria and Western Australia, serving an “apprenticeship”, before establishing my own practice.

When I began at Katanning, the Chief Veterinary Officer of the WA Department of Agriculture made it clear what was expected of me – concern yourself with individually sick animals and leave flock and herd health problems to the State Veterinary Service. However, I earned his enmity by establishing a sheep and cattle practice, servicing livestock at the flock and herd level. I also questioned
various recommendations regarding feeding, breeding, worm control and trace
element administration, especially selenium. However, my greatest
transgression, was detecting a disease condition of sheep that previously had not
been identified in the state (Maxwell 1969).

I decided to concentrate on sheep because Katanning was the centre of the
Merino stud-breeding area of Western Australia. This was undertaken, in spite of
what others had said about this type of venture a few years before;

\[I \text{ would say that it is impossible to make a living as a practitioner in a sheep district... The sheep work of my area forms less than 10% of my total work... However, it must be pointed out that there are three Department officers within 30 miles, which of course considerably reduces the work done by the practitioner (Cole 1958).}\]

Another spoke in the same vein;

\[...probably the first rule in practice in a sheep district should be to place little reliance on sheep work... A practice in a sheep district cannot be established without a large amount of cattle work or a good small animal practice or the sale of sheep medicines from premises in the business centre of the town (Taylor 1958).\]

A third speaker introduced the concept of contract practice and detailed his
experience in the New England Tablelands of NSW;

\[...from a consideration of the case records in a practice specialising in sheep work, the majority of cases concern animals other than sheep...A modification in the technique of practice was instituted in the third year...[which] consisted of the development of a system of annual payment for professional services or contract practice which, on a limited trial, has proved very suitable for the conditions prevailing in pastoral areas... The root cause lay, not in the fundamental nature of private practice but in the system of remuneration commonly used, namely, the fee-for-visit system. This financial system, which has proved quite satisfactory for work with\]
individual sick animals, appeared to be unsatisfactory for practice on livestock production (Osborne 1958).

George Osborne was the first to document the effective private practice veterinary servicing of woolgrowers. Others followed and the method was later called the “Whole-Farm Approach” (Johnstone 1964) and later still the “Preventive Medicine, Animal Production Approach” (Maxwell 1978).

Osborne explained;

The problem with sheep practice is not that the potential does not exist but that no way has yet been found satisfactory to develop it. It is believed that the contract system of private practice is the best method of providing the graziers with the veterinary service they need.

I established such a practice in Western Australia, the first to do so, but this venture failed and the reasons were subsequently discussed in a PhD thesis (Maxwell 2009).

The composition of Australia’s veterinary profession during the second half of the 20th century can be gauged by an examination of articles that appeared during the 1970’s. Two were commissioned by the AVA and involved surveys of its members (Churchward 1972; Morris et al 1972).

Churchward stated that the total membership of the AVA in 1971, was 1,703 consisting of 51% practitioners, 26% government, 10% university, 5% industry and 7% listed as other or sundry. Earlier, this author had stated that the AVA membership represented 85% of the total Australian veterinary work force (Churchward 1969-70).

Morris and co-workers reported that in their survey, 51% were in private practice, 14% worked for the State government and 14% worked at university, 5% were employed by Commonwealth Government, 4% in industry and 4% in CSIRO with the balance categorised as other (Morris et al 1972).
Three years later, Wales (1975) reported the results of a survey conducted under the auspices of the Veterinary School at the University of Sydney. Of the surveyed groups, 18% were in urban practice, 17% in mixed practice and 13% in rural practice with 25% employed in government service with the balance (27%) in industry, research, teaching postgraduate studies or other areas.

The trend, as indicated by these three studies, was for an increase in private practitioners coupled with a decrease in government veterinary officers. This was a reversal of that seen in the first half of the 20th century.

This demographic change took place at the time of the collapse of Australia’s agriculture resulting from a rural recession of the late-1960’s and the failure of the introduction of most exotic breeds of beef cattle in the mid-1970’s, known as the “Beef Boom Crash”. As a result, one quarter of rural practitioners left to seek employment in urban practice (Sutherland and Gannon 1976).

As the impact of the collapse started to take effect, warnings were sounded at the AVA annual conference of 1978. Firstly, the results of a survey of farmers in WA were presented (Jones et al 1978). The study reported that there had been a recent decline in farmer utilisation of private veterinary services and although there was greater use of free government services, it did not compensate for the decrease. This talk listed farmer’s comments;

> Of the unfavourable comments, fees were mentioned nearly twice as frequently as all other matters. Travelling fees were mentioned specifically in 26 per cent of such criticisms

Secondly, Knight (1978), an experienced NSW rural practitioner, stated;

> The Western World has developed a companion animal service proportionate to its ability and willingness to pay, and the sophistication of service has increased so dramatically over the last two decades that an inability to pay may restrict its further rapid growth, except in specialised fields or areas.
By contrast, the food animal veterinarian has to provide a service which is financially profitable to his client. Market fluctuations influence directly and quickly the clients’ ability to pay for such service. The situation is more unstable than that of the companion animal practitioner. Only about 15 per cent of Australians live outside urban areas. Whereas two decades ago the term ‘rural practice’ would have implied a preponderance of food animal, today rural practices derive most of their income from services to companion animals.

A third talk described the failure of a sheep consulting service in WA; essentially sheep breeders wanted a veterinary service, they just didn’t want to have to pay for it (Maxwell 1978).

Contraction of rural veterinary services continued from the 1970’s and consequently a series of changes developed. The major changes were: firstly, the replacement of the term veterinary profession with veterinary industry; secondly, the oversupply of veterinary graduates; thirdly, the change in the gender of new veterinary graduates from predominantly male to predominantly female; fourthly, attempts to develop different veterinary approaches to service livestock; fifthly, the upheaval in university education; and, finally, the contraction of rural veterinary services, both government and private practice.

From the time of the Melbourne Veterinary College (Anon.1936a; Albiston 1951; Taylor 1992), emphasis was placed upon qualified veterinarians and the veterinary profession. The passing of the Veterinary Surgeons’ Act 1887 in Victoria was designed to ensure this outcome and for the first half of the 20th century there was no question that being a veterinarian was to be a member of the veterinary profession.

However, a subtle change came over the profession during the last quarter of the 20th century, as veterinary practices incorporated activities unrelated to acts of veterinary surgery. For example, to increase practice revenue, veterinary surgeons and management consultants, began espousing the virtues of “merchandising”, such as, dispensing medications, selling dips and drenches,
vaccinating and mulesing lambs and retailing dog and cat food (Tait 2003). Accompanying this has been the attitude of pharmaceutical companies and drug wholesalers to represent themselves as partners with veterinary practices and it was not long before the term veterinary industry emerged and now dominates.

Until the 1970’s;

...the demand for veterinarians in Australia has always clearly exceeded supply, and efforts have been directed towards improving the supply to meet anticipated demand...Over the last few years most professions in Australia have reached the point where the gap between supply and demand has noticeably narrowed, and in some cases there has been an oversupply of graduates (Morris et al 1976).

Another stated that supply of veterinary services had always exceeded demand, but, noted that this was currently changing and highlighted what the author termed the “upheaval” resulting from the instability of the primary industries, especially the collapse of the “Beef Boom” (Frost 1977). Frost considered that there would be a decline in the servicing of livestock and thought that a plateau had been reached in salaried positions in government or universities. He concluded;

Present trends suggest that Australia has invested unwisely in undergraduate education and that the likely result will be a gross oversupply of veterinary graduates in the near future.

A private practitioner also provided his thoughts;

The rapid growth of university facilities in recent years appears not to have been preceded by, nor accompanied by, any in depth market research of the country’s needs (Widdows 1976).

Widdows (1976), also reported that the total number of veterinarians in Australia rose 88% (from 1,336 to 2,520) in the period from 1968 to 1976. In 1968, 30.5% were employed in government service, 10.5% teaching and research, 4% in industry with the balance of 55% in private practice. In eight
years, these proportions had changed dramatically, for in 1976, the corresponding figures were 23% in government service, 9% teaching and research, 2.5% industry and 65.5% in practice. Estimates for 1980 were 18% in government service, 6.8% teaching and research, 1.9% industry and 71% practice and Widdows concluded:

...while small animal practice may offer some minor opportunities for growth and consolidation this type of practice must not be regarded as a sponge. Therefore, I think we have a duty to ensure that a costly and unnecessary oversupply of veterinarians is not allowed to occur.

The trend was clear – a decrease in the number of institutional veterinarians from 45% to less than 30% in this short time period, with private practice increasing from 55% to more than 70%.

Others contributed;

The inexorable overproduction continues. The immorality of training young minds for impending unemployment and the frightening waste of public money in producing unwanted and unnecessary graduates is ignored (Anon. 1977).

The profession sees an alarming prospect of a substantial number of unemployed veterinarians in the years ahead...there has been a sharp increase in the number of urban practitioners so that even that area of practice is becoming oversupplied...I am espousing the need to reduce the overall number of Australian veterinary students to a realistic level (Alexander 1978).

The President of the AVA stated;

The veterinary profession has not been isolated from the impact of inflation, the rural recession and general economic instability...Recognition of a threatened drift from country areas led to the Association responding to find ways of stabilising rural practice (Gee 1976, 1977).
Although there were 500% more veterinarians in Australia at that time than in 1950, the President’s objective was to calm fears;

*We in Australia are unaccustomed to a situation where our graduates cannot find employment clearly and readily as veterinarians... The Associations review of manpower requirements is not unduly pessimistic and does not suggest huge problems in the near future...a small over-supply would be more to the national interest than a shortage.*

Not only did he foresee no problem with over-supply, he also thought rural practice could be saved by involvement in government disease eradication programs.

The predominance of male veterinary graduates began to wane in the late 1970’s and this change can be readily observed with the intake of students at the Veterinary School at Murdoch University in WA. Of its first graduating class of 32 in 1979, 20 (63%) were males, whereas of the 77 graduates in the year 2007, only 13 (17%) were male.

In a commentary of the Veterinary School at the University of Queensland it was stated;

*The BVSc quota of 80 was filled in 1981 by 44 female and 36 male students, this being the first time the enrolment of women had outnumbered men in the first year (English 1986).*

In the 1950’s and 60’s, the depiction of the veterinarian was that found in the James Herriot books; it was a masculine activity – hard, dirty, physical work with long hours (any time of the day or night, 365 days a year) requiring a physically strong person. Whereas today, with female graduates predominating, a softer and caring image has emerged (Lofstedt 2003; Miller 2012).

From the beginning of the modern era of veterinary service emphasis was placed on providing a therapeutic approach to individually sick animals, mirroring the approach in human medicine. However, this approach came under serious questioning by those involved with servicing livestock, which were managed
collectively in flocks and herds. Yet, it was not until the mid-20th century that a change in approach was being seriously considered (Osborne 1958; McFarlane 1963; Johnstone 1964; Blood 1964).

The traditional individual animal approach, although having utility with animals of high intrinsic value, such as stud animals, was not suitable when dealing with commercial flocks and herds.

The remedy was seen to lie not only in being concerned with the health of a flock or herd, but also with its productivity, so means whereby health and productivity could be promoted were examined and this occupied the thinking not only of private practitioners, but also academics.

In Australia, private veterinarians turned their attention not only to prevent serious health issues, but also to promotion of the productivity of livestock (Osborne 1958; Johnstone 1964; Maxwell 1978). This was also mirrored in university teaching (McFarlane 1963; Dowling 1963; Blood 1964).

The University of Melbourne launched two such programs, one a Dairy Cattle production program in the 1970’s and the Mackinnon Project with sheep and beef cattle in 1983, and the AVA featured conference seminars outlining the preventive medicine, animal production approach in the late 1980’s (Abbott 1988; Bell 1988). In a tribute to Professor Blood, a conference was held in Melbourne promoting this approach (Hughes 1985).

Since then the calls for its uptake have all but ceased.

For nearly 200 years Australia’s prosperity depended on mining and agriculture. However, the last 50 years of the 20th century saw, on the one hand a dramatic increase in the value of our mineral industries as export earners and, on the other hand, a gradual, but inexorable decline in our agricultural industries (Massy 2011).

Rural veterinarians were quick to recognise this decline and attempted to highlight it during the 1970’s. In 1971, a committee of the WA Division of the
AVA produced a report describing the decline in the use of veterinary services by livestock producers in that State and recommendation for its reversal. The report was tabled, but not implemented (Seir et al 1971).

In 1975, as a result of the collapse of the beef industry, the AVA appointed “A Task Force on Stabilisation of Rural Practice”. This too was tabled, but the AVA failed to take effective action (Gannon 1976; Sutherland 1976; Sutherland and Gannon 1976).

At the end of the decade, the WA Division again attempted to address this problem and appointed a working party to examine “The delivery of Veterinary Services to Western Australia” (Lewis et al 1979). Once again, no changes followed the release of this report.

One senior AVA member declared that rural practice was beyond salvation;

*It may be the rural practitioner no longer has a role to play...attempts to rehabilitate rural practice may be counterproductive* (Auty 1976).

Since then, Government veterinary services, both in the field and in the laboratory, have contracted dramatically, with as few as 2 – 5% of the Australian veterinary workforce employed in these services (Neutze 2015). At the same time, rural practice has stagnated, whilst urban small animal practice has become the main source of employment for Australia’s veterinarians (Frawley 2003: Porritt 2013).

It is a paradox that veterinarians, who receive a scientific education, should undertake practices that were previously consigned to the realm of quackery (Stephens 2012), for example during the second half of the 20th century, both medical and veterinary graduates have chosen to provide alternative or complementary medicine modalities (Maxwell et al 2008).

A term that emerged in the 1990’s was “evidence-based-practice” which has the appearance of being scientific, but when examined, reveals that there is acceptable and non-acceptable evidence, depending on who authored the
evidence and whether it could be supported statistically. Rather similar to the legal system that accepts some evidence, whilst ruling other evidence “inadmissible”. This has arisen because of the entry into medical fields of therapies that lacked scientific substantiation. In other words, it arose out of a concern to prevent the use of quackery.

So today, there is a veterinary conundrum – we have evidence-based-practice being advocated at the same time as pseudo-sciences are being embraced (Holmes and Ramey 2007).

**The 21st century**

At the beginning of the 20th century, the Dean of the Veterinary Faculty at Sydney University, J.D. Stewart (1913), outlined the issues confronting Australia’s veterinarians.

At the beginning of the 21st century, the Dean of the Veterinary Faculty at Sydney University, R.J. Rose (2000), similarly canvassed the issues confronting Australia’s veterinarians;

*Financial support from government sources is at an all-time low. In addition to the decreased financial support for higher education, changes to the funding formulae used by universities have resulted in real decreases of more than 50% over the past 10 years, in government-based funds to Australian veterinary schools. This has resulted in the need for veterinary schools to find financial support from a range of additional sources including full-fee paying local and international students, as well as looking for increased income from the veterinary teaching hospitals...*

*Curricula also need to be targeted to a more global context, there being students from Asia, Europe and North America...There could be a major impact on the animal industries, where already there are difficulties in attracting veterinarians to rural areas and to provide experienced livestock focussed veterinarians in areas of government services and private practice.*
Internationally, one of the major trends over the past 10-20 years has been in the number of women graduating in veterinary science. In most countries, the percentage of women in recent graduating classes is around 70%...

The impact of gender balance changes on the type of work performed also is likely to be significant for the production animal industries, and it could be anticipated that women may be less likely to work in this sector.

In Australia, there is minimal contact of experienced veterinarians with production animals, and minimal active laboratory surveillance of livestock diseases. Private veterinary practitioners specialising in extensive livestock industries have all but disappeared due to the combination of economics and loss of government work. This situation is unlikely to improve in the next 10-15 years and the base of expertise to the livestock industries will further decline.

Rose (2000) stated that Australia’s veterinary schools were producing 30% more veterinary graduates than in North America adjusted on a per capita basis. Furthermore, due to dramatic changes in the student demographics, with a significant increase in the number of female students who potentially had little interest in livestock, he proposed that this type of practice would “all but disappear” with little likelihood of change in the foreseeable future.

There were 2,600 veterinary practices operating within Australia in 2000, half of which were located in the capital cities (Baguley 2011). Urban practices in metropolitan areas and major regional centres were thriving, but this was not the case in rural practice in country towns.

Australia’s agriculture continued its steady decline, impacting the viability of those enterprises dependent upon it, including rural veterinary services. In response, the Commonwealth Government commissioned an inquiry to examine this issue (Frawley 2003).

Frawley made pertinent observations regarding rural practice and those they served. Firstly, only 20% to 30% of livestock producers engaged private
practitioners and, of these, most used them to treat individually sick animals. As a result, most rural practices relied upon servicing companion animals to survive.

Secondly, whilst acknowledging that the total numbers of veterinarians in Australia had doubled in the 20-year period 1981 to 2001 – from 3,177 to 6,358 – the number involved in rural practice had only increased nominally, but had actually reduced as a percentage of the total number of veterinarians.

Thirdly, it acknowledged that although one-half and two-thirds of new graduates were initially employed in rural practice, most left within five years for other pursuits and did not return to rural practice.

Fourthly, the percentage of female veterinary surgeons had increased dramatically – from 15% to 39% (1981-2001) – and most were unlikely to seek employment in rural practice.

The Review made two recommendations regarding rural practice: change registration requirements and develop “best practice models”, which represented only minor changes for rural practice, which Frawley thought may not even survive.

What has happened in the 15 years since Frawley’s release?

In 2007, Heath wrote;

_The number of veterinary graduates continues to increase...Critical examination of the relevant data must lead to the conclusion that more will become disappointed and disillusioned, unemployed or exploited, or at least unable to pursue the career of their dreams. Having survived a demanding course with the highest entry levels, and graduated with a high level of debt, they are likely to find that the only positions available are at the lowest salary levels. The number of veterinarians per million people in Australia (360) is now >30% higher than in either the USA or UK (270 each). It seems certain that this will continue to increase as the number entering the profession continues to exceed the number leaving it._
Heath provided a table predicting changes in the veterinary landscape to the year 2016. He estimated that by 2011, there would be an annual output of between 500 and 600 veterinary graduates from Australian veterinary schools and he prophesied that;

    Most of these will be female, and half of Australia’s veterinarians will be female within a few years... and there would be about 8900 veterinarians working in Australia by 2011, and more than 10,000 by 2016...how many veterinarians will derive their income from the animal industries...no more than 12% of Australian veterinary effort was devoted to farm animals. Most rural practices are becoming increasingly dependent on dogs and cats for their financial viability...

Heath acknowledged that it was now clear that any increase in competition must put downward pressure on incomes, and he concluded by stating;

    This raises the fundamental question: who is doing what to ensure that Australia does not suffer significant negative effects from our oversupply of veterinarians? Or has the horse already bolted.

A study in Western Australia, published in 2008, found that 88% of rural practices were actually mixed-animal practices with the balance either large animal or consulting practices and the attrition rate for rural practices during 2005/2006 was 13% (Maxwell et al 2008).

In that study, 72% of respondents to a survey questionnaire stated that companion animals formed the major part of their work with 92% reporting that they considered that this trend would continue into the future. As a result, 10% of respondents reported current rural practices had ceased providing large animal services and 19% had reduced them. The study concluded;

    The most striking feature of this study is that the viability of rural practice in Western Australia depends on servicing companion animals, not production animals.

In 2012, Pratley and Abbott (2012) provided details of their research;
Graduate numbers increased from 369 per annum in 2001 to 666 in 2010, a 45% increase in 10 years. The proportion of international students continues to rise from about 7% in 2001 to more than 25% in 2010...

The growth of registered veterinarians over the last 30 years has been spectacular, having risen 3-fold, and there are more than double the number of veterinarians per million Australian in 2010 compared with 1981. The increase has been 35% in the most recent decade.

And they concluded;

When new Schools are fully pipelined, the market is likely to be oversupplied by perhaps 50%, not allowing for regional differences, and without expansion of the profession.

In 2012, Senator, C.J. Back (BVSc) delivered the Kendall Oration and focussed on the increasing demand for food in the world and the part Australia could play. He stated that Australia was the second highest meat exporter and the fourth highest grain exporter, but, noted that our agricultural productivity had declined annually – from 2.8% in the mid-1970’s to less than 1% per annum now – and concluded that if this was to continue our agricultural productivity was “unsustainable”.

The Senator proposed that Australia produce another “Green revolution”, as was done in the 1960’s, and he emphasised the threat to the relatively disease free-status of the livestock industries.

Back raised the issue of veterinary education and highlighted Kendall’s leadership qualities and concluded;

To be sustainable, the profession must be relevant into the future: relevant to the community, to policy makers, to parliaments and to our members.

Will we get there? Will the community turn to veterinarians for leadership in key areas we regard as core to our profession?

In 2013, the AVA published a report on Australia’s veterinary workforce which stated that there could be an oversupply of veterinarians in the future. It found
that, as the number of women graduates increased, the number of full-time equivalents of practitioners decreased. Also, it found that veterinary service, as presently practiced, may become less financially viable (Porritt 2013).

Using data obtained from DEEWR (Australian Government’s Department of Employment Education and Workplace Relations) it found that during the five years from 2005 to 2010 there was an expansion for all occupations of 2.1% per annum, whereas the veterinary workforce had increased by 8.3% per year. From 471 female veterinarians in 1981 there were 3629 in 2008 and they represented 83% of the total increase between 2001 and 2006. Not surprisingly, the percentage of female graduates also increased: from 60-61% in 1995 to 81-83% in 2008.

The report considered that female veterinarians would be more likely to spend part of their career either not working or working part-time to handle child rearing responsibilities, and in addition, they were less interested in rural and production animal work.

In a further study commissioned by the AVA (TH’NC Health 2014), Baguley (2011) was cited as the definitive work on the demand for companion animal practice. There had been major changes in the funding and organisation of veterinary services, including composition of the types of veterinary practice, business models and commercial arrangements regarding practice ownership.

On the supply-side, it highlighted the increasing number of university veterinary courses, the dramatic increase and proportion of female graduates and an increasing number of veterinarians working over 49 hours per week, leading to an oversupply with increasing number of new graduates experiencing difficulty gaining work after they graduated.

Regarding rural veterinary practice, TH’NC Health (2014) cited Frawley, with comments provided by Neumann, who suggested that a new veterinary practice model was needed and large, multi-person, multi-skilled services were proposed.
This report included information on Australia’s veterinary workforce with three-quarters of Australia’s veterinarians located in New South Wales, Victoria and Queensland (29%, 26% and 22%) with 11% in Western Australia, 6% in South Australia, 2% in both Tasmania and the Australia Capital Territory and finally 1% in Northern Territory. The percentage of females ranged from 54% (NSW) up to 78% (NT) with an average of 56%.

In 2015, the AVA reported that the major finding of the Australian Workforce Report was that, without change, there would be a large oversupply of veterinarians where supply exceeded demand by over 50%. However, the situation regarding government veterinary services was the opposite, an undersupply. Government veterinarians at that time made up only 4.8% of the veterinary workforce, whereas previously they had made up half of the workforce in the 1950’s and 60’s (Neutze 2015).

In 2015, Smyth and others documented the number of registered veterinarians in 2002, 2007 and 2012 for the purpose of assessing trends in the year prior to the release of the Frawley Review and then at 5-year intervals.

The total number of registered veterinarians increased from 7,126, to 7,822 and then to 9,678; an increase from 365 veterinarians per million head of population to 425 over this period. The percent increase was 36%, whilst at the same time, Australia’s population increased by only 17% (19.6 million to 22.9 million).

The national distribution of registered veterinarians across urban and regional areas was relatively consistent over the 10-year study period, with approximately 55% of veterinarians in capital cities and 45% in the regions. At the same time as the numbers of veterinarians had increased, the number of animals attended, both companion animal and economic livestock had decreased.

These investigators pointed out that there was the likelihood of fewer employment opportunities and poorer salaries, which would be further depressed due to the gross oversupply of veterinarians (Smyth et al 2015).
In 2016, Smyth presented further data on the veterinary student population comparing data for 2001 with 2013. The total number of students enrolled in veterinary schools in Australia, increased from 1,641 in 2001 to 3,036 in 2013 (85%); female student numbers increased from 1,195 to 2,340 (95%) whilst males increased from 446 to 696 (56%); domestic student numbers increased from 1,411 to 2,391 (69%) whilst international students increased from 230 to 643 (180%).

In discussing these data, Smyth (2016) commented on the role played by the university veterinary schools;

*Universities seek to expand their educational offerings and revenues...Universities act in their own self-interest with no regard to the real or perceived need for graduates or to their fate after graduation.*

With respect to salaries he stated;

*Median starting salary for all graduates in 2001 was A$35,000 and this has increased to A$52,500 in 2013 (50% increase; 3.8% annually). In 2001 veterinary graduates had a median starting salary that was $1000 less than all graduates and the difference has shown a steady increase to reach $6500 less in 2013...the average annual cash earnings for all Australians have increased at double the rate of salaries for recent graduates.*

Smyth (2016) also observed that;

*The number of registered veterinarians per million people in Australia has exceeded that in comparable countries at least for the last 30 years or so.*

And concluded that;

*These data provide additional information about the ongoing increase in the number of domestic and international students studying veterinary science at Australian universities. Between 2001 and 2013 the number of Australian veterinary students and graduates increased at a greater rate than the Australian population.*
Animal Quarantine: Pre-Federation

In the book, “The Australian Arc”, Parsonson (1998) devoted a chapter to the British background of veterinarians in the Australian Colonies. The following quotes are taken from that chapter;

In 1714 catastrophic losses of cattle were occurring on the European Continent due to cattle plague... The Lord Chancellor appointed a commission...to investigate and included Mr. Thomas Bates, surgeon to George I...After assessing the evidence from cow-leeches and other people with experience, the commission identified the disease as cattle plague. Acting on advice of Bates, the Commissioners made some recommendations. First, all infected cattle were to be immediately destroyed and burnt, then all cow byres were to be washed and disinfected by tar, pitch and wormwood burnt, and left empty for three months. Fields where sick cattle had grazed were to be left free of stock for two months and sick cattle were to be reported immediately. Sick animals were not to be sold and large herds were to be split into groups of 12 or less. Compensation was to be paid to those who complied with the orders and inspectors were appointed to ensure that the orders were obeyed. Within three months the outbreak was under control and within six months it was eradicated.

During the reign of George III of Great Britain, agriculture underwent radical changes – mechanical devices to plant seed (Jethro Tull) and managed breeding techniques to improve the quality of livestock (Robert Bakewell) were introduced. In addition, a number of agricultural societies were established and there was a general impetus for agricultural education (Parsonson 1998);

Cattle plague appeared again in 1769 but, by now, there were sufficient experienced people in authority with the information and vivid memories of the previous disastrous outbreak to ensure that a repetition would not occur...within a month an Act for the prevention of spread...was in force. Use of the slaughter policy quickly brought the disease under control.

In 1839, Foot and Mouth disease (FMD) of cattle spread rapidly through the London area;
As the mortality rate in cattle was very low the disease was not afforded the same concerns as those given to cattle plague. The identification of FMD at that time, 1839, in Britain, is interesting because Governor King, in a report dated 1 March 1804, recorded a disease in cattle in NSW which has often been alluded to as possibly foot-and-mouth disease.

Foot and Mouth Disease outbreaks occurred periodically in Britain and, during this time, animals were also imported into Australia. It is fortunate, therefore, that Australia has had only two documented outbreaks of FMD and both were seen nearly 150 years ago, in 1872 (Pullar 1964-65; Fisher 1984).

About the same time as the appearance of FMD in Britain, another cattle disease, Contagious Bovine Pleuropneumonia (CBPP) appeared. Also known as “lung disease”, it became prevalent among dairy cows around London in 1842;

…from 1854 to 1860…there died from pleuropneumonia considerably above one million during the six years and these represented a value of about £12 million sterling.

This disease was eradicated from Britain by 1898, after close tracing of infected stock, followed by slaughter.

During all this time, there was free-trade in animals and animal products between the European countries and Britain, as there was between Britain and the Australian colonies. However, it was not until the 1850’s to 1870’s, that the colonies experienced some of the diseases that were to prove costly for the developing livestock industries.

The first Archivist of the AVA, recorded Australia’s veterinary history from the foundation of the colony until 1900 (Hindmarsh 1967, 1971). The following extracts are taken from these sources;

Australia began as a penal colony, and the first courts set up by Governor Phillip in 1788 were courts of criminal judicature...At the foundation of the colony there was no need for legislation to deal with the health of animals.
In 1824 the system of administration of the colony was altered. A Legislative Council was appointed by the Crown to consult with the Governor on matters affecting the welfare of the colony, and in 1825 Tasmania became detached from the New South Wales administration...The first act to control the slaughter of stock was passed in 1830...The growing importance of the sheep industry is shown by the fact that in 1832 three and one half million pounds of wool was exported to England. In this year was passed the first act aimed at control of animal disease. This was an “Act for Preventing the Extension of the Infectious Disease called Scab in Sheep in the colony of New South Wales (3 William IV 5)...  

In 1855 the colony became self-governing. The Parliament consisted of two houses, a nominated upper chamber and an elected lower house. The executive power was in the hands of the ministers responsible to the lower house.  

Anthrax was now spreading in the Colony...Contagious bovine pleuropneumonia was taking a sever toll. As a result, the first act referring specifically to disease of cattle was passed in 1861. This was the Cattle Disease Prevention act (24 Victoria No. 11)...In 1861 Alexander Bruce was appointed Chief Inspector of cattle and in 1864 he became Chief Inspector of Stock...  

Another Act to prevent the introduction of contagious and infectious diseases of cattle became law in 1871 (35 Victoria No. 6). Under this Act all stock arriving by sea not the produce of Australian colonies were “imported stock”. Diseases proclaimed were cattle plague, foot-and-mouth disease, sheep pox and any other disease which might be proclaimed...Inspectors possessed the rights, privileges and indemnities of custom officers when carrying out duties under the act...  

This Act did not prohibit the inter-colony movement of stock by land, and in 1898 action had to be taken under the Customs Acts of 1879 to stop any Queensland cattle entering New South Wales. Under this Act New Zealand was included as an Australian colony...It was in this year [1874] that a conference of Chief Inspectors of Stock of New South Wales, Queensland,
Victoria, South Australia and Tasmania was held in Sydney, at the instance of New South Wales to consider the means of ensuring joint and simultaneous action in all parts of Australia for dealing with infectious and contagious diseases of stock.

The most serious disorder of sheep in Australia in the 19th century was sheep scab and there are two accounts of this disease;

Sheep scab (*Psoroptes communis ovis* infestation) was introduced into Australia with the first sheep brought in, in the “First Fleet” in 1788 and probably with further introductions of sheep in the early days of settlement (Seddon 1964).

The mites feed on skin debris and exudates. They cause intense irritation to the sheep, which rub and bite themselves causing intense damage to the fleece and producing moist yellow scabs. Sheep lose condition and many deaths were recorded...sheep scab was directly responsible for the first Australian legislation that was aimed at controlling an animal disease...Legislation was first enacted in New South Wales in 1832 and evolved with more and more power being granted well into the 1860s...Once...enacted and enforced, eradication was rapid with the disease being eradicated from the Australian continent by 1896 (Bunn 2002).

The first legislative measure for the control of sheep scab was initiated in 1831, however;

...on account of the opposition of graziers it was not until August the following year that the first Scab Act 1832 was passed.

The aim of this first act was simply to prevent the further spread of sheep scab. However, during the next decade squatters occupied large areas of inland NSW and the sheep population grew to 3.5 – 4.0 million and sheep scab was present throughout the whole of this area (Hindmarsh 1967; Bunn 2002).
Other Acts were introduced as the population of sheep increased and as a result of the formation of the State of Victoria in 1851.

By 1861, with a national sheep population of 6 million, further Acts were introduced. In 1863, a new Act led to the appointment of a Chief Inspector of Sheep (Alexander Bruce). In 1866, Bruce declared NSW free from sheep scab; although legislation was continued in NSW to deal with the disease because it was still present in Victoria, Tasmania and Western Australia. However, the disease was re-introduced to NSW in 1878, 1879 and 1884 and the resultant Royal Commission (1884) found that the Chief Inspector of Sheep (Bruce) was culpable and, in addition, it found against the government veterinarian (Willows). Bruce was suspended and Willows was dismissed.

We have available written accounts of the early history of Australia’s attempts at quarantine. In 1972, an article reporting the events of the first Inter- Colonial Veterinary Conference in Australia appeared and, 30 years later, articles were published detailing the origins of animal quarantine in this country (Bearwood 1972: Fisher 2002a, b and c).

The First Inter- Colonial Veterinary Conference in Australia was a conference of Chief Inspectors of Stock, veterinarians and stock breeders of the Australian colonies and New Zealand and was held in Sydney in 1886 (Bearwood 1972). This meeting was chaired by the Chief Inspector of Stock for NSW and two veterinarians were included amongst the 15 delegates; WA was not represented. This initial meeting became the precursor of future Inter-State Government Veterinary Conferences.

At this meeting, it was resolved that the term Australian colonies comprised the colonies of the continent of Australia, together with Tasmania and New Zealand, and that the term “foreign” included all other parts of the world.

The focus of the meeting was quarantine and considerable time was devoted to the introduction of stock into Australia by sea and the import and export of animals between the various colonies.
In Fisher’s accounts of animal quarantine (Fisher 2002 a, b and c), the formal origin of a unified system of Australian border quarantine was established with the Quarantine Act of 1908. However, he stated that the critical era was in the two decades after 1854, because of three major disease threats; sheep scab, CBPP and the threat of the introduction of FMD.

The first official measure seeking to prevent disease entry came in Tasmania in 1838 in reaction to an outbreak of Catarrh in the Port Phillip District of New South Wales, as Victoria was known at the time. By 1832, sheep scab was an epizootic in NSW and the colony passed its first Sheep Scab Act. Initially, the effort at control was directed at keeping different flocks separate, but in 1854, State border control was introduced with the Sheep Scab Act 1854.

These measures were not without opposition. Firstly, from the beginning of the colony, animals and plants were imported and there were many who wished to be able to continue introducing various species to see which ones would adapt to the Australian climate. Secondly, the colonial government sought advice on animal disease, not from qualified veterinarians, but from the medical community which, at that time, favoured the concept of “Anti-contagionism” (Parsonson 1998).

Fisher concluded, that by the 1870’s, the need for quarantine had become self-evident. The experience with sheep scab, the introduction of CBPP and the threat of FMD gave impetus to the establishment of quarantine measures.

Because of signs of lameness associated with lesions of the mouth in imported livestock, it has been speculated that FMD may have arrived with the First Fleet, but the first documentation of this disease occurring in Australia was in the 1870’s (Fisher 1984). Firstly, in Sydney;

*In 1871 and 1872 there were at least five episodes in which FMD was diagnosed in cattle either bound for Australia, in quarantine or, most seriously of all, in a bull which had been landed for 2 months. The last-mentioned case demonstrated that nothing short of the complete prohibition*
of import from known regions of infection could prevent the introduction of FMD into Australia.

John Pottie (MRCVS) considered it was a case of FMD and despite assurances given by the Minister for Lands that it wasn’t, the Chief Inspector of Stock (Bruce) had no illusions as to the nature of the condition.

At the same time in Melbourne;

Six bulls arrived in Melbourne on 28 February, 1872...they were inspected, but neither then nor for the next 2 months was there any sign of the disease – during which they were used at stud and exhibited. The first signs of FMD appeared only on 9 May.

A month later, Graham Mitchell (MRCVS) diagnosed FMD and he was supported by others. Contact animals were slaughtered, a Royal Commission was established and concluded, with relief, that the outbreak seemed to have been contained. Whilst recommendations were made to tighten controls on imports, Thomas Wragge (MRCVS) called for the total prohibition of importations.

Some years later, an article by Bunn et al (1998), questioned the diagnosis of FMD by asking “Why didn’t it spread faster and wider?” and “Why didn’t it become established?” They wrote;

FMD is considered to be one of the most contagious of all animal diseases. Australia is fortunate in never having had an extensive outbreak of the disease. However, in 1871 and 1872 there were at least four instances in which FMD was diagnosed in cattle either bound for Australia, in quarantine or after release.

It was concluded that these occurrences of FMD provided a strong incentive in support of quarantine at the time. The fear of the introduction of this disease still provides strong support for quarantine today (Fisher 1984).
Animal quarantine in the 20th century

Stringent State quarantine laws, which had been in place since 1871, governed the importation of stock both from interstate and overseas. State legislation for importation from overseas ceased when the Commonwealth passed the Quarantine Act (1908). However, control over interstate movement remained a State responsibility.

Mylrea (1997), documented livestock diseases and their control from Federation until the end of the 20th century and wrote that the period 1923 to 1947 signified fundamental changes;

In 1923 Max Henry DSO, BVSc, MRCVS was appointed to the new position of Chief Veterinary Surgeon...In his first year as Chief Veterinary Surgeon there were three developments that were significant for animal health...the passage of the Veterinary Surgeons Act 1923...The second significant development was the opening of the Glenfield Veterinary Research Station and the appointment of Dr HR Seddon DVSc as the first Director of Veterinary Research...Now for the first time it was possible to investigate animal disease problems systematically within the State...

The main diseases subject to control between 1923 and 1947 and the measures taken are outlined...cattle tick and tick fever...Anthrax...bovine pleuropneumonia...bovine tuberculosis...bovine Brucellosis...Apart from anthrax the only sheep disease covered by the Act were sheep louse and sheep ked infestation...there was also an outbreak of an exotic disease, swine fever in 1942. This was believed to have been introduced into New South Wales in pork products imported by the US Armed Forces. The disease was eradicated.

Rinderpest, the scourge of European cattle in the 18th century, made its one and only documented appearance in Australia at Fremantle in 1923. The condition was diagnosed by W.E.F. Burton, a “Farrier-Sergeant” employed by the WA Government (Throssel 1980; Clark 2008).
The Chief Veterinary Officer of Victoria, W.A.N. Robertson took charge, confirmed the diagnosis, quarantined infected farms, instituted slaughter and set up an eradication program. Some 28 herds were involved and nearly 3,000 cattle were slaughtered (Robertson 1923; Anon. 1925a).

The Premier of Western Australia negotiated with the Commonwealth Government regarding cost sharing;

*The overall cost of the outbreak was £58,000 although that would not take account of indirect costs to businesses affected by the disease. Compensation costs for cattle and pigs slaughtered came to £28,889 half paid by the commonwealth Government (Clark 2008).*

As a result, the Division of Veterinary Hygiene was established within the Commonwealth Department of Health;

*In 1926, WAN Robertson, who directed eradication of the outbreak of rinderpest in Western Australia in 1923, was appointed Director of Veterinary Hygiene, Commonwealth Department of Health, to control animal quarantine at the national level. From 1926 until 1994, only six veterinarians occupied this position, giving great stability with veterinary input enhanced by the arrangements with the States. The six directors over those 68 years were: WAN Robertson and RN Wardle (1924-1960), KS McIntosh (1960-1970), RW Gee (1970-1973), ID Cameron-Stephen (1973-1976) and KA Doyle (1977-1994). In 1994, the Commonwealth resumed responsibility for quarantine, and policy and operations were separated (Doyle 2002).*

The Veterinary Research Institute of Victoria diagnosed Newcastle Disease in poultry (Arundel 1993);

*The outbreaks of Newcastle disease in 1930 and 1932 were quickly diagnosed and controlled. Albiston later commented that their success in eradicating this disease gave them great credibility and established the reputation of the VRI. As most practitioners knew little about poultry diseases Albiston conducted a post-graduate course [in poultry] in 1933.*
There are details of only one recording of scrapie occurring in Australian sheep (Bull and Murnane 1958);

*During a period of over one hundred and fifty years many sheep have been imported into Australia from Great Britain. There is no record, nor has there been any suspicion, of the occurrence of scrapie in any of these imported sheep...A small consignment, one ram and nine ewes of Suffolk sheep was imported into Victoria from Great Britain at the end of 1950.*

These imported sheep did not thrive and a year later;

...*the owner consulted his veterinary adviser, Mr. Geoff. Fethers, who made a careful clinical examination and secured biopsy specimens of skin for microscopic examination at the Veterinary Research Institute, University of Melbourne.*

Various disease conditions were excluded and Bull of the CSIRO suggested testing for scrapie. Laboratory findings, pathology and inoculation experiments were conducted, prior to instituting an eradication program for this disease.

In 2011, Turner published articles on Australia’s veterinary history, including quarantine of livestock (Turner 2011a, b and c);

*It was not until the 1870s that quarantine laws to control the entry of infectious diseases from overseas livestock imports were enacted individually by each of the colonies. The impetus for this was a foot-and-mouth disease incident in Victoria in 1872.*

With Federation in 1901, changes ensued;

*In the animal health area, the Commonwealth had responsibility for the import and export of animals and animal products, and all external relations with other countries. The States retained responsibility for animal disease control and welfare within their boundaries and the Commonwealth delegated to the states carrying out quarantine functions on its behalf.*

This arrangement continued from 1909 until 1995, with the *Quarantine Act (1908)* administered by the Commonwealth Department of Trade and Customs
until 1921 and the Department of Health between 1921 and 1984 when the Department of Primary Industries and Energy assumed administrative responsibility. After this, the Commonwealth resumed full responsibility for animal and plant quarantine services.

From the 1940’s, biennial meetings of Chief Veterinary officers, in their capacity of Chief Quarantine Officers were held and;

*In 1957, an exotic disease control arrangement was made between the Commonwealth Prime Minister and the State premiers whereby the cost of eradication would be shared 50:50 between the Commonwealth and the states.*

*In the 1960s, State and Commonwealth government veterinarians believed that a plan to establish a Commonwealth Bureau of Animal Health (BAH) during World War 2 should be brought to fruition. The appointment of JH Whittem to a senior post in the Commonwealth Department of Agriculture led to agitation to form the BAH and in 1974 RW Gee was appointed Director and WJ Pryor, J Hart and JH Auty as senior veterinarians.*

Outbreaks of Classical Swine Fever (Hog Cholera) in 1903, 1927-28, 1942-43 and 1960-61 were eradicated and it became listed as a notifiable disease (Turner 2011c).

In the 1970’s, a series of off-shore quarantine stations were built to house high-risk live animals and, because of the success of the eradication of contagious bovine pleuro-pneumonia, Australia undertook Tuberculosis and Brucellosis eradication programs during that time (Lindsay 1988; Gee 1994).

Contagious Equine metritis was diagnosed and controlled in 1977, (Hazard et al 1979) and, at the same time, the bluetongue virus was isolated in a routine insect sample collected in the Northern Territory. However, no livestock cases were recorded at that time (St George et al 1979; St George 2016).

During the 1980’s, Australia developed an “Australian Veterinary Emergency Plan” (AUSTVETPLAN), a program for the management of an emergency
animal disease incident. This plan detailed the responses of governments and the livestock industries to outbreaks of defined animal diseases.

The Australian Agricultural Health and Quarantine Service was formed, only to be replaced in 1986 by the Australian Quarantine and Inspection Service (AQIS).

In 1988, the Department of Primary Industries and Energy commissioned a review of Australia’s quarantine system entitled “Australian Quarantine Requirements for the Future” with Professor David Lindsay, a non-veterinarian, as Chairman (Lindsay 1988).

The Committee set out to establish principles of quarantine for the future and concluded that Australia had a satisfactory quarantine system, but it made a series of significant recommendations, 59 in all, that they considered must be pursued to improve quarantine effectiveness. However, they noted:

Among the many difficulties associated with determining the adequacy and effectiveness of quarantine procedures, the greatest is the fact that we cannot prove or disprove that the absence of any particular pests or disease is due to its exclusion by means of quarantine vigilance.

The Committee stated that the most important question of all regarding quarantine was – has it worked?

The Lindsay Committee found that most earlier reviews of quarantine had made contributions to aspects of quarantine, but none had addressed the whole quarantine system and this they set out to do. They examined quarantine objectives, policies, strategies and principles and concluded that the changes they recommended represented a form of “hazard management”.

They concentrated their attention on AQIS, justifying their recommendation on the estimates of Agriculture’s significance to the Australian economy by stating that agriculture provided more than a third of export earnings.

The Report defined a number of quarantine issues:
Quarantine policy – the purpose of Australia’s quarantine is to aid the safe,
efficient production of our plant and animal industries and to conserve flora and fauna.

Quarantine objectives – to restrict the entry and detect unwanted pests and diseases; to facilitate the introduction of plant and animal material and products; to apply sound scientific principles to quarantine decision-making.

Quarantine strategy – identify unwanted pests and diseases; to assess risks, based on biological and economic evidence; to facilitate passenger and cargo movements and the legitimate movement of plants, animals and their products; and, to comply with international trade obligations.

Quarantine principles – allow rapid and free entry of plants, animals and their products consistent with safety to the local agricultural and environment requirements; and, to adopt a conservative response to risk.

The former President of the Office International des Epizooties (OIE) and Director of the Australian Agricultural Health and Quarantine Service, R.W. Gee highlighted the part played by veterinarians in Australia’s quarantine service (Gee 1994).

Gee raised an alarm, acknowledging the downgrading of government diagnostic laboratories and cutbacks to government field services and importantly concluded that these measures would reduce Australia’s quarantine capability and he closed with a plea to both industry and politicians;

...must be made aware of the need for government to remain in tight control of disease standards for our exports...Australian cannot in the present circumstances of massive downturn in the economy put at risk any of its major export industries...remember that the health status of our livestock industries is directly related to the health status of our profession (Gee 1994).

The Minister for Primary Industries and Energy (Hon. R. Collins) established an independent committee to review Australia’s animal and plant quarantine policies and programs at the end of 1995. Although a change of government took
place in 1996, the incoming Minister for Primary Industry and Energy (Hon. J. Anderson) affirmed this decision.

A Review titled “Australian Quarantine: a shared responsibility” chaired by Professor M.E. Nairn, a veterinarian, which became known as the Nairn Review (1996);

...came to the conclusion that some fundamental changes were required not only in the structure of the organisation delivering quarantine services but also in general community attitudes to quarantine.

The Review Committee received 167 written submissions and as a result of its examination, the Review developed “several fundamental themes” firstly it;

...was convinced that to achieve its objectives, it will be necessary to engage industry, government and the general public in a partnership approach to quarantine [hence its title].

To do this, a structural change within AQIS was proposed by locating quarantine service and policy in a statutory authority known as Quarantine Australia. Secondly, there was an imbalance between animal and plant quarantine and the establishment of an entity “Australian Plant Health with a Chief Plant Protection Officer” was recommended. Thirdly, the committee noted concern in the way “Risk Analysis” was conducted and made recommendations to rectify this. Finally, the Review Committee decided to broaden the focus of quarantine from a border approach to a;

...pre-border, border and post-border approach...continuum of quarantine.

The Review considered that this new approach emphasised the importance of quarantine by placing attention on surveillance and monitoring and preparing a national response to any incursion;

Monitoring is the passive collection of data on Australia’s current animal and plant health status, whereas Surveillance is the active measures to detect new pests and disease incursions and changes in the distribution and prevalence of endemic pests and diseases.
Monitoring and Surveillance are essential components in fulfilling Australia’s international obligations under the Agreement on the application of Sanitary and Phytosanitary Measures (SPS Agreement) in which participating member countries are required to establish scientifically that they are free of specific pests and diseases (Nairn 1996).

The Nairn Review cited the success achieved with the Brucellosis and Tuberculosis Eradication Campaign (BTEC) which commenced in 1970. During its 25 years of operation, the campaign cost $760 million, with both the cattle industry and government sharing the cost. This program resulted in Australia achieving freedom from Bovine Brucellosis in 1989 and enabled Australia to be in a five-year monitoring phase and to be declared free of Bovine Tuberculosis by 1997;

As argued above, monitoring and surveillance programs are an essential tool in managing Australia’s human, animal and plant health and quarantine status.

The Nairn Review made a total of 270 recommendations and in 1997, the Commonwealth Government accepted the majority of them.

The Quarantine and Exports Advisory Council (QEAC), established in 1998, was designed to implement the Nairn recommendations. It also was required to give advice on quarantine and help evaluate the Department of Agriculture Fisheries and Forestry Australia with respect to quarantine (Anon 2000).

Animal quarantine in the 21st century

The first years of the current century saw a number of outbreaks of both human and animal epidemics throughout the world, so the Frawley Review was a timely examination of Australia’s animal quarantine.

Frawley found that the current surveillance and monitoring system was inadequate and unlikely to meet the requirements of our trading partners. It
recognised that weaknesses existed which could challenge Australia’s disease-free status and made recommendations to address this perceived weakness.

Frawley concluded that Australia’s surveillance system required improving and it acknowledging that an effective system required skilled veterinary personnel.

The Australian Biosecurity CRC for Emerging Infectious Disease commenced on 1 July 2003 and was established as an unincorporated joint venture with a nine-member board. The management company was to act as an agent on behalf of the partners and separate commercial entities were to be established for holding and managing intellectual property. Although producing results during its first term (Influenza, Bat-borne viruses, vector borne viruses and developing improved disease detection technologies), this body was not successful in obtaining funding for a second term (Nairn 2010).

In 2007, the virus responsible for Equine Influenza was imported into Australia in a shipment of Thoroughbred horses. Soon after arriving, horses in quarantine exhibited signs of Equine Influenza and within a short time, horses within the general population were found to have contracted this disease.

A Commissioner was appointed under the Quarantine Act (1908) to conduct an inquiry into the outbreak. The report of the inquiry found that the virus escaped from Eastern Creek Quarantine Station and that this was due to negligence on the part of AQIS. The report stated;

_The objective of biosecurity measures at a post-arrival quarantine station for animals, such as Eastern Creek, is to prevent the escape of disease that might be present in the station. It is therefore essential that people and equipment having contact with the animals are adequately decontaminated before leaving the station. That was not happening at Eastern Creek in August 2007...That such measures were not being implemented was a consequence of a number of acts and omissions on the part of various employees and officers of AQIS at different levels of that organisation and over a number of years (Callinan 2008)._
In addition to the multiple failures of the operation of the Quarantine station, the Commissioner found that, “grooms, private veterinarians, farriers, import agents” contributed by failing to follow quarantine protocol.

Since the release of Frawley, another examination of Quarantine has been undertaken. “One Biosecurity: a working partnership. An independent Review of Australia’s Quarantine and Biosecurity Arrangements Report to the Australian Government” was published in 2008 (Beale et al 2008).

Why was it necessary to have another review so soon after that undertaken by Nairn in 1996? Beale cited globalisation, increased risk of zoonoses, growth in tourism, agri-terrorism and climate change, as reasons for the new review.

The Review Panel acknowledged that recent events, such as the 2001 outbreak of FMD in the United Kingdom, the outbreak of Bovine Spongiform Encephalopathy (BSE) in Europe and North America, the outbreaks of Avian Influenza in Asia and Europe and the outbreak in Australia of Equine Influenza had all been well publicised and increased concern that these could occur and some may even impinge on human health.

Although Beale concluded that Australia had a good biosecurity system, it needed “far-reaching change” and pointed out that the review’s recommendations were designed to enhance the good aspects of Australia’s system and rectify its shortcomings.

The Review stated that there were three core principles – “biosecurity continuum”, “science-based assessments”, and “shared responsibility”. The aim being to secure a “seamless biosecurity system” incorporating Nairn’s shared responsibility involving Commonwealth, State, industry and the general community, thus they named it “One Biosecurity: a working partnership.”

The Review also recommended a change from “Quarantine” to “Biosecurity” and emphasised that “Zero risk is unattainable and undesirable”. It raised the concept of the “Appropriate Level of Protection”, which was developed at the Uruguay Round of multilateral trade negotiations (1994) and is a part of the SPS
Agreement. To implement its recommendations, it was thought necessary to make significant amendments to the Quarantine Act (1908) or develop a totally new Act. Although amended in the 1980’s, this Act continued until repealed in 2016 when it was replaced by the Biosecurity Act (2015) (Anon 2016d).

In 2011, the Commonwealth Government commissioned an independent assessment of Australia’s capacity to prevent and respond to an outbreak of FMD, as this was considered a good indicator of the country’s level of preparedness to cope with a range of emergency disease threats (Matthews 2011).

This report stated that Australia’s biosecurity system had strengths, but it considered that an outbreak of FMD would challenge our ability to deal effectively with such an occurrence. It criticised assumptions made by biosecurity personnel regarding such an outbreak. For example, the assumption that the outbreak would be promptly detected and stamped out, whereas they formed the opinion that it may be weeks before detection took place during which the disease would have spread rapidly.

The report also criticised the assumption that the introduction would be made through conventional legal imports. In contrast they believed that entry via illegal channels was more likely. Further they found that whilst legislation was in place, compliance and enforcement capacity was possibly wanting. They thought that the capacity to respond effectively could be readily overwhelmed and finally that the ability for large scale slaughter and burial would be quickly exhausted. In addition, they thought that the local reaction and resistance to control measures might be considerable.

The assessment team identified a series of issues that they considered deserved attention for an effective response to be mounted and concluded by making recommendations for new policy directions for the government to pursue, each of which would improve preparedness and response capacity, not only for FMD, but also for other exotic animal and plant diseases.
Veterinary Education

Modern veterinary education began with the establishment of university and college education in veterinary science during the 18th century (Schwabe 1984; Dunlop and Williams 1996).

The terms “Veterinary” and “Veterinarian” used by those engaged in the health and care of animals were derived from “Veterinarius”, meaning pertaining to cattle (Anon. 1973; Parsonson 2005).

This term was then used to include all domestic species and, in 1762, was used in the naming of the first veterinary college established at Lyon in France (Smithcors 1958; Karasszon 1988);

*The establishment of the first veterinary school in the world – the Veterinary School at Lyon, founded by the French military authorities in 1762 – was the outcome of a desire amongst high officials in the French army to have some definite institution in which instruction and training could be given in the art of treating sick and wounded French cavalry horses (Gunn 1927).*

Veterinarians subsequently became the doctors of animals. Initially, the terms “Veterinary Medicine” and “Veterinary Physician” were applied to the study and exercise of a veterinary education. However, in 1796, the title “Veterinary Surgeon” became the term used to describe qualified veterinary personnel (Smith 1927; Fisher 1994; Parsonson 2005).

Veterinary education: 1888 to 1950

Although livestock arrived with the First Fleet in 1788 and the livestock industries were responsible for the growth and prosperity of Australia in the 19th century, it took 100 years before it was recognised that the services of locally trained veterinary surgeons was needed (Hindmarsh 1960; Fisher 1995).

William Tyson Kendall can claim the title of the “Father of Veterinary Education
in Australia”. Born in England (1851), a graduate of the Royal Veterinary College, London (1873), Kendall practiced for six years before deciding to migrate to New Zealand. During a stop-over in Melbourne, he decided to establish a practice in that city (Anon. 1936c; Albiston 1951; Taylor 1992).

With a colleague (Graham Mitchell), Kendall lobbied, unsuccessfully, for the establishment of a Veterinary School at the University of Melbourne. As a result, he founded a private school, the Melbourne Veterinary College (MVC) in 1888. At his own expense and operated in conjunction with his practice at Fitzroy, Kendall provided a four-year veterinary course that allowed graduates to use the title of Graduate of the Melbourne Veterinary College (GMVC) (Albiston 1951; Pullar 1958; Taylor 1992).

The annual student fee was 50 guineas, but this proved insufficient to cover the cost of the course and Kendall had to make up the short-fall of £1,000 from his own pocket (Caple 2011).

Sixty-one students graduated during the MVC’s 20-year history and they were officially recognized in Victoria by the Veterinary Surgeons’ Act of 1887 (Albiston 1951; Taylor 1992; Arundel 1995).

At Federation, State Governments embarked on the promotion of agriculture through their respective Departments of Agriculture. The need for trained personnel to work in government services led to the establishment of Chairs of Agriculture at the University of Sydney (1910), University of Melbourne (1911) and the University of Western Australia (1914) (Peel 1973; Burvill 1979).

At the same time, Veterinary Schools were established at the Universities of Melbourne and Sydney in 1909 and 1910 respectively (Anon. 1925a and b; Clements 1976). Prior to this, Australians wishing to become Veterinary Surgeons had to travel to Great Britain to gain qualifications (Mylrea 1994).
The Royal Commission on Technical Education in Victoria (1890), stated that a scheme of veterinary education was needed and the Veterinary Board of Victoria moved to make Kendall’s MVC a public, rather than a private concern and, in 1907, the Minister agreed to the establishment of a Faculty of Veterinary Science at the University of Melbourne (Clements 1976).

It was founded for the purpose of educating veterinarians, investigating diseases of animals and assisting the veterinary officers of the Victorian Department of Agriculture by means of laboratory diagnostic services for diseases of animals (Anon. 1925b).

J.A. Gilruth, the Chief Veterinarian with the Department of Agriculture in New Zealand, was invited to occupy the Chair of Veterinary Science and teaching began in 1909. He resigned in 1912 and was replaced by H.W. Woodruff, who continued in that role until undergraduate veterinary education ceased in 1929.

The Veterinary Prospectus of 1909 reported that the course was of five-years duration and the annual student fee was 100 guineas. Students were also required to pay an annual sports fee of 1 guinea (Anon. 1909).

At the conclusion of World War I changes were made, as reported in the veterinary prospectus of 1918 (Anon. 1918). The course was now of four-years duration and two post-graduate degrees (Master of Veterinary Science, MVSc and Doctor of Veterinary Science, DVSc) were approved by the Council and Senate of the University of Melbourne.

One hundred and one individuals graduated with a Bachelor of Veterinary Science (BVSc), from the University of Melbourne Veterinary Faculty, in its short-life of undergraduate education, from 1909 to 1929. So, in Victoria, between 1888 and 1929, there were a total of 162 veterinary graduates, 61 GMVCs and 101 BVScs (Anon. 1929; Albiston 1951).

Subsequently the impact of The Great War and the replacement of the horse as a means of transport by the motor car, were thought to spell the death knell for
the veterinary profession, because many considered veterinarians only useful in treating horses (Hindmarsh 1967; Arundel 1993; Fisher 1994).

In December 1906, the *David Berry Hospital Act* was passed by the NSW Parliament and resulted in the establishment of a Veterinary Faculty at the University of Sydney. J.D. Stewart (MRCVS) was invited to occupy the Chair of Veterinary Science (Anon. 1925b; 1935).

One of the University of Sydney’s original veterinary graduates, Hindmarsh (1960), provided a historical perspective of the school’s origins;

*In March 1909 the Senate decided [that] the chair be offered to Mr. James Douglas Stewart M.R.C.V.S., the Chief Inspector of Stock for New South Wales provided the Government gave its consent...*

*The curriculum as accepted by the senate made provision for a four-year course leading to the issue of a licence in veterinary science and a five-year course to qualify for the degree of bachelor of veterinary science.*

It was estimated that the cost of running the school would be £3,563. In 1912, eight of the original students had qualified for the final year of instruction and all subsequently graduated. Hindmarsh emphasised the importance of Professor Stewart in keeping the school going during the very difficult formative years.

James Douglas Stewart was born in Australia (1869) and received his veterinary education at the Royal Dick College of Veterinary Science Edinburgh, graduating in 1893. He was the son of a qualified veterinary surgeon (John Stewart Jr.). On his return to Australia, he joined the Department of Agriculture as a Veterinary Officer in 1896 and went on to become the Chief Inspector of Stock for NSW.

Stewart occupied the position of Dean during the turbulent years of World War I, the end of the importance of the horse and its replacement by the motor vehicle and the years of the Great Depression. In 1939, after nearly 30 years at the helm, Stewart retired and was succeeded by Ian Clunies Ross (Anon. 1925b; 1935; Stewart 1951; Hindmarsh 1960).
Stewart died in 1955 and, the then Dean of the University of Sydney Veterinary School, paid this tribute;

...for the adoption of a curriculum which was very much more scientific than those in most of the veterinary training centres of those days...it was only due to the persistence and drive of Professor Stewart that the school survived the lean period between 1914 and 1928 (Gunn 1959).

The University of Queensland established a Veterinary School at its Brisbane campus in 1936 and the Director of Veterinary Research in NSW, H.R. Seddon (DVSc), was appointed Professor of Veterinary Science. By 1942, 12 students had graduated, but with the outbreak of World War II, students and staff began enlisting and consequently the school was taken over for war purposes – the US Army occupied the site in 1942 and subsequently it was occupied by the Department of Agriculture and Stock. The school was forced to close and it was not until 1951 that it was re-established (Seddon 1951).

In 1955, the Department of Veterinary Science at the University of Queensland was reorganised to form four separate departments, Animal Husbandry, Preventive Medicine, Veterinary Clinical Studies and Veterinary Anatomy and Parasitology. The school was moved from Yeerongpilly in 1961 to the main campus of the University of Queensland at St Lucia (English 1986).

In the opening address to mark the Silver Jubilee of the University of Queensland’s Veterinary School, Professor Francis divided the historical development of the school into three phases: 1935 to 1942 when established at Yeerongpilly; 1944 to 1960, during which the school was re-established; and, from 1961 when the school relocated to St. Lucia (Francis 1963).

He reported that Professor Ewer was Dean from 1950 to 1954, Professor Francis from 1955 to 1960, and Professor Sprent became Dean in 1961. In this period – 1955 to 1960 – there were 89 graduates, 21 were New Zealand cadets, and some of the others were Department of Agriculture cadets from various Australian States.
During the first half of the 20th century, articles on veterinary education appeared in the pages of the AVJ, expressing differing opinions on what should be taught.

In 1927, the President of the NSW Division of the AVA (Gunn), gave his views. He recounted the short history of veterinary education, including reference to William Dick’s three-month course at the Royal College in London in the 18th century and traced the growth of the course from two to three and then four years.

He thought there were numerous opportunities for graduates with a “broad field offered by private practice” and he considered the main field lay in the area of the prevention of human and animal disease and spoke of the opportunities awaiting graduates in government service, where salaries of “from £400 to £1000 per annum” could be earned. However, he stated that Australian schools were the “most understaffed and poorly financed” with appeals to the government and stockowners falling on deaf ears (Gunn, 1927).

In 1928, at the third annual conference of the AVA, opportunity was provided for members to express their opinion as to the direction veterinary education should take.

L.B. Bull of CSIR proffered the opinion that graduates who had been engaged in professional veterinary work for some time should indicate if their training was adequate for the tasks they had to perform;

*Veterinary science must play a big part in the development of Australia and we cannot look to outside countries to supply us with veterinarians with the particular knowledge that Australia requires. We must have men that have been educated in Australia in the atmosphere of research into conditions as they exist in Australia... The veterinarian of the future will be less concerned than at present with the treatment of minor ailments of stock but more and more concerned with problems of stock management and preventive medicine* (Bull 1928).
Bull considered that there would be a need for individual animal treatment, but this would be;

...developed by those whose work is mainly in the cities or larger towns...however, there will be men who are more concerned with the problems of stock management and preventive medicine. It is probable that these men will be officials of a central Government and that they will be paid a fixed salary. Their services will be available to stock owners free of cost.

H.A. Woodruff, of the University of Melbourne made it clear that education was the concern of all veterinarians, not just educators;

* Australians educated in the atmosphere of research in Australian institutions, knowing the conditions as they exist here, are what is required.*

(Woodruff 1928),

Woodruff made a plea to the AVA for support of the local students attending Australia’s veterinary schools that they should be properly rewarded for their enterprise;

*If we as a profession can take any steps to recruit our ranks with students selected to some extent by reason of aptitude and taste for handling of animals, we shall have taken one important step, but an equally important one is that we should endeavour to secure for the young graduates leaving our schools employment and reasonable salaries and with reasonable security.*

The third to give his views was H.R. Seddon, Director of Glenfield Veterinary Research Station in NSW (Seddon 1928), who reported that, of the total output of veterinary graduates pursuing a professional veterinary career, 68% were in public service and 22% were in private practice with the balance choosing not to enter veterinary service at all, but to go back onto the land.

He considered that the curricula followed in Australia were based on the British model, which was designed for practitioners. However, since World War I, there
was a need, not only for practitioners, but also for administrators of disease control and veterinary research workers.

As a result, he was critical of the current curricula and proposed reforms. He considered that although it was essential to teach medicine and surgery, the time allocated to teaching these subjects was out of proportion to their postgraduate application. He believed there was inadequate teaching of the diseases of economic livestock and more time should be devoted to zootechny (nutrition, breeding and hygiene), with emphasis placed on pathology, parasitology, toxicology and animal husbandry. He recommended students should attend agricultural colleges, veterinary research stations and government farms and spend time with government veterinary officers or stock inspectors.

Later, the Chief Veterinary Officer of the NSW Department of Agriculture, provided his thoughts. He compared university education with teaching at school, “too much time cramming ill-digested facts down the student’s throat”; learning a large number of uninteresting facts which had to be memorised to pass an exam; too little time given to character building and instilling an appreciation of life; all students are required to achieve the same standard without appreciating the diversity of gifts which characterise the human race. He closed with;

*As a step in the right direction, so far as our own profession is concerned, the drive in favour of the five-year course must be continued until it is an accomplished fact...Now, one of the best methods by which the profession can do this is by encouraging the maintenance of the present system of appointing a proportion of external examiners for the general examinations. In so doing, Sydney Veterinary School is but following the very excellent example of Great Britain...An external examiner is not only examining the student: he is examining the school (Henry 1935).*

In 1947, the Director of the Veterinary Research Institute at the University of Melbourne called for the re-opening of the University of Queensland’s Veterinary School;
...provided that the general principles of the Loveday report be adopted, and in particularly (1) that the curriculum is soundly based. And at least equal to that of other Australian University Veterinary Schools: (2) that there is adequate clinical training, and that hospital training includes training in a rural centre. (3) that adequate staff is secured. (Albiston 1947).

He emphasised the vital importance to agriculture of a strong veterinary profession, based on a sound veterinary education and concluded;

_We have a responsibility to see that the status of this degree, and consequently the standing of the veterinarian in the community is not lowered by the adoption of standards of veterinary education which do not measure up to those now considered to be essential._

During the years following the introduction of university courses for the study of veterinary science in Australia, there was considerable variation in opinion regarding the direction being taken with veterinary education. There was little uniformity, no common curricula, there were conflicting views and each school seemed to be pursuing their own agenda.

State control of education was in place for schooling, but not for university education. For those who wished to pursue tertiary education, payment of fees was necessary. This was usually provided by the student’s parents, but some were awarded scholarships, with few students paying their own fees. This meant that the majority of university students were from families who could afford to have their children attend university. Thus, university education was primarily for families of the middle class (James et al 2013).

A number of state governments wanted to secure agricultural and veterinary graduates for their respective Departments of Agriculture, so scholarships, in the form of a cadetship, became available. The university tuition fees were paid by the state and, upon graduating, the veterinarian was contracted (bonded) to the government for up to 5 years with the option of paying out their contract. In this manner, states that did not have a veterinary school (SA, Tasmania and WA)
could ensure a supply of qualified graduates for their state’s Departments of Agriculture.

In 1948, the AVA received a letter stating that veterinary graduates from Australia’s veterinary schools, after paying the appropriate fee, would be placed on “the Colonial List of the Register of Veterinary Surgeons” of the Royal College of Veterinary Surgeons (RCVS) register (Henry 1948).

**Education in the second half of the 20th century**

At the time of World War II, the Curtin Government (1941-45) saw a need to increase the number of people trained at institutions of higher education and subsequent governments followed suit with the establishment of new universities and, the creation, in 1967, of non-university tertiary institutions, called Colleges of Advanced Education (Anon. 2016).

University education was encouraged and students were expected to fund their own education; consequently, it was limited to those who could afford the fees. This was seen as discriminatory and a variety of academic scholarships were provided to assist those who were not able to fund their higher education.

After listening to what rural practitioners had to say about the difficulties faced in servicing livestock producers, Hugh Gordon (1959), of the Veterinary School at the University of Sydney, offered his thoughts in a letter to the editor in the AVJ. Changes in animal production had opened new perspectives for veterinary science. It was no longer sufficient to cure disease, but it was now necessary to prevent disease and promote animal productivity and it followed that practitioners dealing with farm animals must readjust to this. However, he warned;

>This is a serious situation that cannot wait indefinitely to be remedied. Have we been fiddling while our farm market of veterinary services has been burning down?
Suspension of veterinary undergraduate studies at the University of Melbourne remained in place for 33 years (1929 to 1962). However, during the 1950’s, efforts were made to re-open it and D.C. Blood was invited to become Dean in 1962 (Blood 1964; Montgomery and Hughes 1985).

The following was taken from Professor Blood’s book “The University of Melbourne School of Veterinary Science: A Recent History” (Blood 1992).

The course was of five years and the teaching of basic principles was paramount. Students would receive sufficient theoretical detail and practical expertise to be acceptable to both registration authorities and employers.

Emphasis was placed on anatomy, physiology, biochemistry and preventive medicine of livestock, but not at the cost of producing a well-versed graduate in all species to allow for registration. He made the point that it was not appropriate at that time to encourage specialisation in the undergraduate course.

An article, outlining the fortunes of the Veterinary School at the University of Queensland from 1961 to 1986, was published in 1986 (English 1986). In 1965, the Pastoral Veterinary Centre of the Department of Veterinary Clinical Studies was opened at Goondiwindi and in 1967, the first-year enrolment was 128 students with a total number of 427 undergraduate students.

English characterised this phase of the development of the school as “The Lean Years” with major debate provoked by a report into the school’s future. A number of changes were made with the creation of new departments and the closure or amalgamation of others and all this took place at a time of contraction of finances and not all members of the faculty were happy with the new structure.

The school sought to establish a full-time Dean and Dr T.J. Heath was appointed to that role in 1973.
In 1980, he advised the faculty that financial restraints were projected to reduce university staff by 15% over the ensuing 10 years and because of ill-health, he temporarily stood aside and Professor M.A.E. Rex was appointed Acting Dean. Later that same year, Rex also took a period of leave due to ill-health and one can only surmise that this was a time of considerable stress at the school.

Funding continued to reduce and the Senate approved the establishment of the University of Queensland Animal Health and Welfare Trust Fund and the Faculty Board gave approval to a fund-raising project on the occasion of the 50th year of the school’s establishment in 1986.

The Australian Universities Commission in 1968-69 recommended the establishment of a fourth veterinary school and R.N. Farquhar was appointed to report to the Commission on the current status of veterinary education and recommend a suitable site for the fourth school. He suggested establishing the school at the University of New England, which was accepted by the Commission and it was proposed that the school would be established there during the 1970-1972 Triennium (Farquhar 1969).

A fourth school was established in 1973, but not at Armidale, instead it was sited in Perth WA, at the new campus of Murdoch University. The School was opened by Sir Charles Court, the Premier of Western Australia, who declared;

*The whole purpose of this school is to get the best trained surgeons onto farms doing wonderful things for the economy and for the farming industry of WA... He did not want to see vets caught up in the dog and cat syndrome* (Clark and Grandage 2005).

The university appointed R.H. Dunlop as the Foundation Dean. There are records of two talks given by Dunlop outlining his ideas on veterinary education which were to be implemented at that school. The first, given on his arrival, was philosophical;

*In recent years all established institutions have been beset with feelings of uncertainty as to their roles and their adequacy to fill them. The reason is*
that the roles are changing and no one is sure what the future holds. This is an era of very rapid changes and strenuous efforts are required to adapt to these changes (Dunlop 1973-74).

Dunlop considered that the demand for veterinary services outstripped supply, in spite of the fact that the prospectus for the veterinary school included a caveat concerning the over-production of veterinary surgeons in Australia (Dunlop 1973-74; Clark and Grandage 2005).

In his second talk delivered some years later, Dunlop was much more practical;

*The largest employment sector now and is likely to remain small animal practice at least in developed countries. Whether it remains as private enterprise or becomes caught up in private or public insurance programmes remains to be seen.*

*The fluctuating economic pressures on livestock producers generates similar pressures on private veterinarians working in the production sector. Unless farmer’s incomes can be stabilised at a high enough level, it is unlikely that private rural practice will be able to compete with its urban counterpart in the competition for manpower...The government veterinary services are buffered against rural recessions while, at the same time, affording a measure of competition for the private veterinarians in some areas...The problem is world-wide and there is clear evidence that a change is required in the approach used in rural veterinary medicine and in the organisation of rural veterinary and advisory services...The simple fact of the matter is that a majority of livestock producers do not make adequate use of veterinary services for a variety of reasons* (Dunlop 1977).

If the anticipated developments were to occur, then significant changes were needed in the undergraduate curriculum. However, Dunlop warned that in the zeal to introduce new curricula, sight must not be lost of the objective of a university education – the search for the truth, the quest for new knowledge, the ability to think critically and to test results.
The Australian tradition of following Great Britain’s lead was beginning to wane and educators were looking elsewhere. Dunlop had been at the University of Saskatchewan in Canada prior to accepting the position of Head of the Murdoch Veterinary School and perhaps, as a result, a different curriculum and even different degrees were to operate at Murdoch University – BSc, BVMS in place of the traditional BVSc offered at the three other veterinary schools in Australia.

With the re-establishment of the veterinary course at the University of Melbourne, recognition by the RCVS was sought and a visit by its president achieved this. Both Massey University in New Zealand and Murdoch University in Western Australia also sought a visitation by the RCVS to gain recognition of their degrees (Caple 2011).

However, in 1984, the RCVS advised the AVA that it intended to withdraw automatic registration of graduates of Melbourne, Sydney and Queensland schools in five-years, unless suitable inspection procedures were introduced.

In response, an Australian Veterinary School’s Accreditation Committee (AVSAC) was formed and, in 1988, conducted a formal visit to the four Australian veterinary schools for accreditation purposes. All four degrees received accreditation. Subsequent visitations were made at six-yearly intervals and the schools were expected to have responded to the recommendations made at the previous visitation (Pryor and Egerton 1990; Craven and Strous 2004).

In this era university education required the payment of a fee and thus was limited to those that could afford it;

*The genesis of Australia’s tertiary educational sector was unashamedly elitist* (James et al 2013).

All this changed with the election of the Whitlam Labor Government, which abolished university fees in 1974;

*The abolition of tuition fees, the introduction of means-tested Tertiary Education Allowance System (TEAS), and the agreement of the states for the Commonwealth to take over full responsibility for regular recurrent and*
capital funding of universities and CAES were the key features of Whitlam’s reforms (James et al 2013).

Whitlam’s policies proved unpalatable to the electorate and the Liberals, under Malcolm Fraser, achieved a political coup by returning to power. However, Fraser, who was elected to undo Whitlam’s changes, kept most of them including the university payment system.

During the time of the subsequent Hawke Labor Government, a revolutionary series of changes were made to higher education, with one Vice-Chancellor declaring;

Dawkins initiated the single most important change to tertiary education in Australia since the Whitlam government accepted responsibility for funding the sector (Davis 2013).

The editors of the book “The Dawkins Revolution 25 years on” stated;

Dawkins...turned colleges into universities, free education in HECS, elite education into mass education, local focus into international outlook, vice-chancellors into corporate leaders, teachers into teachers and researchers...He remodelled higher education and how it was funded in only a few years (Croucher et al 2013).


...it was only with the creation of the department of Employment, Education and training that the policies for schools, vocational education and training, higher education and employment programs were all brought together...My bargain with the institutions was that in return for increased funding and greater flexibility to determine their own future with the increased resources, we wanted from the institutions more accountability and more emphasis on the changing needs of the workforce. And my bargain with students and parents was that there would be more funding and therefore
more places, if beneficiaries were willing to contribute to the cost of their courses (Dawkins 2013).

Dawkins’ reforms transformed higher education by changing 65 tertiary education institutions (19 Universities and 46 Colleges of Advanced Education) into 38 universities. Tertiary student intake exploded, from 394,000 students in 1987 to 1.22 million in 2012, from 18,000 international students (1988) to 330,000 (2011); from 4,700 completed post-graduate degrees (1986) to 75,499 (2012) and an increased student to staff ratio from 12.9 (1990) to 20.2 (2011) (Marginson and Marshman 2013).

Colleges of Advanced Education were converted into universities, free education was changed into income contingent loans for tuition through the Higher Education Contribution Scheme (HECS), elite education became mass education, local focus was replaced with an international focus and as a result undergraduate student numbers increased dramatically as universities were given economies of scale. Universities had to be managed as businesses and the universities had to compete with one another (Ashenden 2012; Sharrock 2013; Croucher et al 2013).

The “Dumbing-Down” process that began in Australian schools in the 1960’s (Donnelly 2007), flowed onto tertiary education, causing one academic to comment;

The university is in danger of losing sight of its vocation...In the current era the university has been mandated to play the socialising role that was historically associated with schools (Furedi 2017).

In response to Dawkins there followed an avalanche of dissenting responses from all sectors of university education, including veterinary education (Heath 1992; Collins 1994, 1996a and b; Rex 1994). Since the early 1990’s, the AVJ has contained articles, editorial and opinion pieces on the subject of veterinary education.
During this period, efforts were made to develop programs for postgraduate veterinary education. Members of the profession met regularly for fellowship, exchange of ideas and the introduction of new information and technology at meetings of the AVA. These meetings took place at the regional, state and federal levels.

In 2003, the retired Director of the Post-Graduate Foundation in Veterinary Science of the University of Sydney gave an overview of the history of that organisation (Bryden 2003).

A committee was initially formed by the Senate of the University of Sydney when some veterinarians recognised the need for continued learning, especially for those who were relatively isolated from their colleagues. In 1965, it approved the formation of the Post-Graduate Foundation and Tom Hungerford (BVSc) was appointed Technical Director.

Subsequently in 1974, Hungerford was appointed Director of the Foundation and, in 1979, Bryden was appointed Associate Director. By the mid-1980’s the Foundation’s work had become well known and well supported and, in 1987, Bryden was appointed Director.

Another body, the Australian College of Veterinary Scientists, came into existence and went on to become Australia’s specialist training organisation. Whilst other attempts at Continuing Education sought to provide information for all members of the veterinary community, the College sought to establish an elite cadre of specialist within that community (Taylor 2002; Woolcock 2007).

The concept for the college went back to the 1950’s with the suggestion of a change from State and Territory registration to a national system. It was thought that the formation of an Australian College of Veterinary Surgeons would provide a vehicle to achieve this objective.

The inaugural ceremony of the College was held at the Australian Academy of Science, Canberra in 1971. By then the objective had changed to the formation of a body to promote specialisation within the profession. It was decided that the
name should be “The Australian College of Veterinary Scientists” not, as was originally suggested “The Australian College of Veterinary Surgeons”. The decision was made to invite individuals as foundation members, but thereafter all who wanted to gain entry, either at the Membership or Fellowship levels, were required to do so by examination.

During the latter part of the 20th century, concern was expressed as to the quality of Australia’s veterinary graduates and, at the same time, disquiet with veterinary education was being voiced.

At the annual conference of the AVA in 1977, a small animal practitioner asked the question;

*What should a graduate be able to do? Heath et al (1976) said the primary aim of the veterinary school is to produce, with reasonable economy, graduates who can perform with competence those veterinary activities which are of social or economic value to Australia. This definition raises the question of which activities are of social or economic value in the eyes of the Australian public (Smits 1977).*

Smits surveyed 34 small animal practices in his study and reported findings from both practice client’s and practice principal’s ratings of the performance of new graduates.

Regarding client satisfaction, Smits reported a 36% dissatisfaction of clients in the way they were dealt with by veterinary staff, 56% dissatisfaction with the explanation of their pet’s condition and 36% dissatisfaction with instructions they were given regarding their pet. In addition, 69% of clients commented that veterinary staff did not appear concerned with their failure to give satisfaction, 36% were dissatisfied with the manner in which their animal was handled by veterinary staff during the consultation and 24% considered that staff were not concerned with their pet’s plight.

Further, when practice principals were asked to assess the performance of their veterinary staff, similar levels of dissatisfaction were found.
Smits concluded that his survey demonstrated a relatively high level of dissatisfaction with the quality of the new graduates entering small animal practice, dissatisfaction with surgical knowledge, professional bearing and costing ability in new graduates as well as dissatisfaction with their ability to communicate with clients.

In 1999, the Australian Sheep Veterinary Surgeons Special Interest Group of the AVA (ASVS) also surveyed its members to ascertain the competency of new graduates (Anon 1999). Under a variety of headings such as handling skills, husbandry techniques, clinical capabilities, surgery, reproduction and parasite control, questions were asked of practice principals regarding their experience employing new graduates.

Responses were graded into categories relating to awareness, competency of performance and knowledge involved. The results indicated a high level of dissatisfaction: from zero proficiency for performing a list of standard surgical procedures to 50% competency for handling sheep. Zero proficiency with obstetric or reproductive procedures to 70% in performing a clinical procedure acceptably.

Academics from the University of Queensland examined this same issue by asking, “What skills should veterinarians possess on graduation?” (Coleman et al 2000). Questionnaires were sent to all veterinarians enrolled with the Queensland Veterinary Surgeons’ Board.

Approximately two-thirds of respondents who employed recent UQ graduates, expressed satisfaction regarding the new graduates’ ability to communicate with the client, but only 50% satisfaction with their ability to gain the client’s confidence. Forty-four percent were dissatisfied with the new graduates’ ability to solve problems and 41% were dissatisfied with their ability to analyse a situation. Coleman and colleagues, reported that an ability to communicate with clients, work with other staff members and to be able to manage routine conditions were paramount in clinical practice.
The concern with the quality of university veterinary graduates resulted in attention being placed on the veterinary education system itself. Eighty-years after veterinary education began in Australia, the question was being asked “Is our education system producing effective and capable veterinary graduates?”

The century began with two veterinary schools producing graduates capable of dealing with the health problems of all animals. It ended with concern being expressed as to the direction being taken by the four veterinary schools which were now concentrating on producing graduates to service companion animals, almost to the exclusion of livestock (Rose 2000; Heath 2007; Baguley 2011).

In an editorial in the AVJ, a respected veterinary educator (Heath 1992), listed the three major challenges facing veterinary education;

*The political environment is controlled mainly from Canberra, where paymasters and their minders have recently caused major changes in the structure of higher education... At present there is a perception in the ranks that the reward structure is biased towards research, and that it gives inadequate recognition to teaching quality. This must be rectified. The importance of quality is paramount...It is clear that the resources available to promote quality have diminished and are now inadequate;*

Secondly, he pointed out the risk involved when the seeking of funds becomes paramount;

*The professional environment for which the veterinary schools prepare their products is increasing in breadth, depth and complexity. Major developments are occurring in the knowledge and techniques in all facets...The professional perspective of most students is focussed on private practice, but soon after graduation many decide that their careers lie elsewhere. Many, disillusioned and disappointed, leave the profession. Others take a more creative look at their veterinary background, and use it to find – or create – a satisfying niche for themselves.*

Thirdly, he addressed “the educational environment”;

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...developing veterinarians need to acquire underlying principles, and to develop the intellectual and technical skills necessary to build on these principles and to use them to solve practical problems.

This veterinarian, after a long career in academia, challenged the traditional education model, by advocating that what was needed was an environment where students were encouraged to question and analyse the information presented to them;

*Students will learn in a problem-based way if this form of learning is required by the examination system... What is needed is an environment where students are encouraged to question and critically analyse information presented to them.*

This editorial elicited a response from another veterinary educator (Collins 1994), who stated that the traditional approach to education no longer met the needs of veterinary students and he proposed three areas where change was needed;

*These changes involve the relationship between veterinary school and teacher, between the profession and the schools, and between the teacher and the student. What is needed in all three is a change in attitude.*

Collins’ first recommended change involved the veterinary education system itself, where the efforts of good teaching went almost unnoticed, whereas, research was rewarded with promotion and prestige. Secondly, the author called upon the whole profession to become involved in veterinary education and, finally, the author advocated a role for the student;

*Reform of veterinary education is largely dependent on a new role for the student... Our approach to education needs to change so that students have the major responsibility for their learning... This alteration in status is the key to educational reform: students can change from being passive recipients and regurgitators of information to active seekers of knowledge and understanding, if that are given the opportunity.*
Collins (1996a) labelled veterinary education as traditional, old-fashioned, inefficient and in need of a complete overhaul – in need of a “new vision”. He proposed a major change was needed in veterinary education, by pointing out that the prime interest of academics was research, leaving little time or interest in teaching students. In fact, most academics, have little training in teaching;

One of the main problems is the reductionist approach to the curriculum: it is considered out of, and focussed on, the separate sciences that contribute to veterinary science. The teaching is carried out by experts in these sciences – the scientists. These experts, usually without any training in education, have almost complete responsibility for the content, teaching methods and assessments in their courses. The result of the reductionists approach is lack of integration of subjects, overemphasis on factual information, lecturing as the main method of teaching and the written examination as the main test of learning.

Collins went on to become Australia’s most vocal advocate for education reform during the 1990’s;

All aspects of veterinary education need to be challenged – what is taught, how it is taught and how learning is evaluated…it is time for a radical new approach on study of professional veterinary practice rather than the contributory sciences (Collins 1996b).

Collins stated that traditional veterinary education was teacher-centred, producing veterinary scientists, not veterinarians who could function in a practice setting. Although Collins claimed that veterinary education faced an “uncertain future” and characterised it as a “perilous situation”, he concluded that there was little likelihood of significant change.

An ex-Dean at the University of Queensland Veterinary School, expressed his views regarding the changing attitudes to education (Rex 1994);

...there is growing concern about the state of veterinary education and the difficulties we are experiencing in trying to deal with the explosion in
knowledge...The most common approach is to pretend that there is no problem and to put more and more material into the curricula of our schools without taking anything out. The result is that most students do not have any time to think during their veterinary course, so busy are they trying to remember the vast number of ‘facts’ that they will be asked to regurgitate in their examinations. When our graduates go out into the real world they will not be asked to regurgitate knowledge in this way. They will be presented with a problem.

Contemporary veterinary courses were: teacher-based with the course content consisting of what the teacher believed the student should know; essentially assessment driven; and consisted of rote learning for the purpose of passing exams.

Rex (1994) concluded that the ideal curriculum should combine “craftsmanship with academic attitude” and it should develop a “problem-solving approach and allow students to follow their own interests. Examinations should be based on the ability to use information to solve problems rather than “recall facts” and they must be taught in a manner that makes students’ have a “desire to learn, explore and improve.”

The 20th century began with the veterinary profession confident that it had a part to play in Australian society, sure of its role and self-reliant, whereas, 100-years later it was being drawn in different directions, by differing opinions, demands and influences. Administrators of various veterinary organisations, such as university veterinary schools and the AVA seem to have lost sight of the purpose of veterinary education and service.

Belatedly, both universities and the AVA have turned their attention to this issue; for example, Rose (2000 and 2001) at the University of Sydney and the AVA Workforce studies (Porritt 2013; TH’NC Health 2014). However, irrespective of the opinions held by the leaders of the profession, it is the market itself that determines the utility of the veterinary graduate.
The 21st century

Towards the close of the 20th century voices were raised regarding shortcomings with Australia’s veterinary education and the Commonwealth Government responded by establishing a “Review of Rural Veterinary Services” (Frawley 2003).

This review acknowledged that funding of veterinary schools was reducing whilst costs of providing veterinary education were rapidly rising. Whilst stating that Australia’s veterinary schools provided education recognised for its high standard, the review considered that this adverse funding situation could lead to lowering of standards and possible closure of a school. To maintain standards, there had to be an increase in funding and this would likely come from the admittance of more full-fee paying international students. The review considered that the existing four veterinary schools were graduating sufficient numbers of students to meet current needs and concluded that there was no need for the establishment of further veterinary schools in Australia at that time.

In response to a Frawley Review recommendation, the AVBC conducted a “Review of Veterinary Science Education.” This review (Craven 2004), began by emphasizing the need to improve undergraduate education with respect to economic livestock. However, surprisingly there was no mention of economic livestock in any of its recommendations; instead it focused on veterinary school funding, introduction of compulsory continuing professional training, entry conditions to veterinary schools, curriculum content, specialist graduate training, and the promotion of greater cooperation between Australia’s veterinary schools.

Craven acknowledged that funding for the veterinary schools was inadequate and that standards were only being maintained by enrolling an increasing number of full-fee paying students. This underfunding was due to a failure by the Commonwealth Government to appreciate the cost of clinical training of veterinary students. However, for this committee the key issue was to improve the transition of graduates into the workforce.
At this time, the RCVS developed a program entitled “Day One Skills” which became incorporated into its registrational requirements and which was subsequently endorsed by the AVBC (Anon. 2002).

Much was taking place in veterinary education in Australia at the time of the Frawley Review. How did Australia’s Veterinary Schools respond to Frawley? What effect, if any, did it have? In this section, significant changes that have been put in place at Australia’s veterinary schools since the release of Frawley will be considered and in a later chapter, academic opinion of the impact of Frawley will be explored.

Within a couple of years of Frawley, the University of Melbourne Veterinary School undertook a self-evaluation (Anon. 2006).

The first matter of note was the change of the principal objective of the school; from producing veterinary graduates primarily for Australia to producing them for international service. Previously, the University of Melbourne, as was the case with the other Australian veterinary schools, produced graduates to work in this country. This did not mean that foreign students were not admitted, but the goal was to produce graduates capable of working in Australia. However, in the 2006 report, the University of Melbourne Faculty of Veterinary Science now identified itself as an “International Veterinary Educator”;

*The Mission of the Faculty of Veterinary Science is to: Serve Victorian, Australian and international communities by educating world class veterinary science graduates able to solve health, welfare and management problems with a variety of domestic species including feed animal, equine and companion animals;*

Of the total number of undergraduate students at Melbourne in 2006, 286 (71%) were domestic and 118 (29%) were international.

In 2011, the University of Melbourne terminated the BVSc degree, with which it had established veterinary education in Australia 100 years earlier. It changed
the undergraduate five-year BVSc course, to a four-year post-graduate DVM course. The reasons for this change were outlined by staff of the school;

*The DVM provides the option of graduate entry to a veterinary program of four years as well as a six year pathway for school leavers through the BSc (Melbourne)...The DVM has a fully restructured and renewed curriculum which takes the best aspects of the BVSc and combines them with contemporary techniques in teaching and learning* (Hinchcliff and Tudor 2011).

In 2012, a second self-assessment from the University of Melbourne Veterinary School was published (Anon. 2012). The requirement to enrol in the DVM degree was the possession of a BSc degree from the University of Melbourne, and a major in Animal Health and Disease (Veterinary Bioscience specialisation) to progress to an accelerated DVM program was established. Whereas school leavers with an Australian Tertiary Admission Rank (ATAR) score of 98.50 could enter the DVM program after completing the prerequisite Veterinary Bioscience specialisation.

Can it be said that Frawley influenced the Faculty of Veterinary Science at the University of Melbourne to the extent that it underwent two major re-assessments and changed its veterinary qualification from the BVSc to DVM?

Within 10 years of the release of the Dawkins reforms, the University of Sydney Veterinary School was in crisis and Professor Rose took on the role of Dean with a plan for reform (Rose 2001).

The following is taken from the “Roundhouse” Newsletter of the 5 November 2001. Under the heading “Faculty Culture Change and the Future” Rose outlined his plan for reform and stated that it was pleasing to see progress in the eight strategic areas that had been identified for reform. He stated that external financial support had been gained and successful international marketing had secured a number of students from overseas. In addition, a new faculty structure had been created and the Veterinary Science Foundation had been re-launched with a full-time Director.
These changes were introduced prior to the release of the Frawley Review, but had their origins in the issues that led to that review. Since that time, subsequent Deans of the school have continued these reforms, including the replacement of the BVSc with a DVM degree.

Veterinary education and training at the University of Queensland is now conducted at the Gatton campus located to the west of Brisbane in the Lockyer Valley. It is referred to as the Queensland Animal Science Precinct where the UQ Veterinary Medical Centre and Veterinary Teaching Laboratories and a Clinical Studies Centre are located.

The School of Veterinary Science, located within the Faculty of Science, is sited on a 1068-hectare farm and provides education for both domestic and international students, where students from more than 36 countries are currently enrolled (www.uq.edu.au/study/html. Accessed January 2016).

Since its inception, the University of Queensland has emphasised the study of economic livestock and they still do this, in spite of the pronounced shift of current veterinary attention to companion animals. This university also provides a number of degrees related to veterinary science – Animal and Applied Veterinary Science, Biomedical Science, Biophysics, Food Science, Food sciences and Nutrition, Genetics, as well as Veterinary Science (Honours). The course, BVSc (Honours) is a five-year, full-time course conducted at Gatton and, to date, the school has not moved to adopt the DVM degree (Anon. 2016).

Professor Irwin, Head of the College of Veterinary Medicine at Murdoch University was interviewed in 2014 regarding its future direction (Fawcett 2014). Murdoch underwent major changes in 2013 and the School of Veterinary and Biomedical Sciences combined with other schools to form the School of Veterinary and Life Sciences. Within this new complex, the College of Veterinary Medicine was formed and given the responsibility for training veterinarians and operating Murdoch University’s Veterinary Hospital.
Irwin stated that university funding was the greatest challenge; however, as the prospect of deregulation of the tertiary sector appeared imminent, he thought that universities would be able to set their own fees in the future and this would, in large ameliorate the funding problem.

The changes taking place at Murdoch University coincided with the launching of a new veterinary degree, the DVM and Irwin believed that this change would prove beneficial, because of Perth’s proximity to Asia and this new degree would make Murdoch University attractive to international students.

The move to the new degree allowed for the modernisation of the curriculum and Professor Irwin pointed out that the Murdoch program differed from other Australian universities; the course was an accelerated one, in that graduation may be achieved within 5 not 6 years as with the other universities.

He also spoke regarding the concept of “One-Health” that is, the recognition of the link between human and animal health and he considered that with the introduction of the DVM, emphasis would be placed on “One-Health” which would expand non-practice career opportunities for graduates.

Major changes have taken place since 2000 at each of the four Australian veterinary schools that were established in the 20th century. Can we say that these changes have all been due to Frawley? There would be differences of opinion regarding the influence of Frawley on Australia’s veterinary education and that is to be expected. However, you can confidently state that the same conditions that led to the Frawley Review have similarly brought about the significant changes that have taken place in the education sector in Australia.

At the end of the 20th century Australia had four veterinary schools at the Universities of Melbourne, Sydney and Queensland and Murdoch University which had been operating for between 25 and 90-years.

The Frawley Review stated that these four schools were sufficient to meet Australia’s needs at the time. Yet, within five years of its release, three new veterinary schools were established at Charles Sturt University at Wagga Wagga,
a regional centre in New South Wales in 2005, James Cook University at Townsville, a regional centre in Queensland in 2006 and, at the University of Adelaide, with a veterinary campus at Roseworthy in South Australia in 2008.

In addressing the impact of the Frawley Review on veterinary education, the first observation to be made is its failure to restrain growth of veterinary schools and thus the total veterinary graduate output!

The architect of the veterinary school at Charles Sturt University (Abbott 2009), provided the rationale for its establishment, stating that the Frawley Review;

> Recommended that there be an increase in the exposure of undergraduate students to production animal health issue, and that steps be taken to facilitate entry into veterinary courses for applicants who are likely to focus on production animals.

Abbott claimed that although Frawley stated that no further schools be established, its recognition of inadequate education in the field of livestock, actually caused this school to be brought into existence. The school was designed to ensure that a high proportion of the school’s graduates would work in rural Australia with livestock and that this would be achieved by offering students from rural backgrounds the opportunity to study veterinary sciences. This was in spite of the fact that previous research indicated that students from a rural background did not necessarily choose to work or stay in rural practice (Heath 1998).

A six-year, double-degree course, with the first intake of students in 2005, was developed. Selection of students was different from the other university veterinary courses as they needed to be interested in livestock production, to want to live in the country, and to be interested in the financial success of their clients. To achieve this, an initial selection process, which consisted of a written application was implemented. This was followed by an interview and, finally, the student had to demonstrate academic ability. The successful applicant needed to demonstrate that they had sufficient academic abilities to study and complete the veterinary course.
The article devoted considerable space to innovations of the curriculum, such as the development of practical and communication skills, the development of appropriate livestock knowledge, as well as professional knowledge and attitudes and concluded, by stating:

*The curricular innovations at CSU are also untested...it remains to be seen what the outcome of the approach taken at CSU will be.*

The history of the development of a veterinary school at James Cook University in Townsville is found in the publication “Veterinary Science in the Tropics 1969 – 2009” (Campbell 2009).

The need for teaching tropical agriculture was the reason for the establishment of a Graduate School of Tropical Veterinary Science at the University College of Townsville in 1970 and Dr R.S.F. Campbell of the University of Glasgow, accepted the position of Foundation Professor. It was thought that this school would attract Government veterinarians interested in tropical veterinary medicine.

However, lack of funds stunted the development plans and the decision was made to change the name to the Graduate School of Tropical Veterinary and Agricultural Science and a Bachelor of Biomedical Science degree program was initiated. In 1998, another name change became necessary, this time to Department of Biomedical and Tropical Veterinary Science.

In 2005, 35 years after being initially mooted, an undergraduate veterinary science program was introduced, with the creation of the School of Veterinary and Biomedical Sciences and, in 2006, teaching commenced for a five-year Bachelor of Veterinary Science with Associate Professor Lee Fitzpatrick appointed as Foundation Dean.

The number of students applying for Tropical Agricultural Science was low, so 40 places were transferred from this degree program to Veterinary Science and 72 students were accepted into the program in 2006 and subsequent years.

In December 2007, the University of Adelaide appointed Dr Gail Anderson as Head of its new School of Animal and Veterinary Sciences (Anon.2016b). The
The school was developed to address “the serious shortage of vets in South Australia” and was established at the University of Adelaide’s Roseworthy Campus, having its first intake of 40 students in 2008.

The veterinary program comprised two degrees: The Bachelor of Science (Veterinary Bioscience) and a Doctor of Veterinary Medicine (Masters by Coursework (Extended)). To practice as veterinarians, students must complete both degrees (six years in total). This qualification was subsequently accredited by the AVBC (Anon. 2016b).

Within one year of the opening of the first university veterinary school in Australia (Melbourne 1909), a second (Sydney 1910) was established. Twenty-five years later a third veterinary school opened in Queensland (1935). A further 39 years passed before the advent of the fourth veterinary school, at Murdoch University in Western Australia (1974). However, in the first decade of the 21st century three new veterinary schools were established at Charles Sturt University in New South Wales (2005), James Cook University in Queensland (2006) and at the University of Adelaide in South Australia (2008).

Each of these new schools came into existence after the release of the Frawley Review, because there was a perceived shortage of veterinarians who would work with livestock in rural Australia and in South Australia. Time will tell if this was wise.

With the completion of this extensive literature review, the author turned to the research aspects of the thesis and the following chapters deal with that research.
Chapter 4. Research Project 1: Veterinary Service

Introduction

Australia’s veterinarians serve in a variety of roles with the core areas being clinical practice, state disease control, research and education (Seddon 1961).

In 2002, the Frawley Review enquired into the status of veterinary service in Australia and this research project was undertaken to determine if this review influenced Australia’s veterinarians and the services they provide (Frawley 2003).

Materials and Methods

A survey questionnaire of Australia’s veterinarians was designed and submitted to the Human Ethics Research Committee at Murdoch University for approval.

Once sanctioned (Permit 2015/28), the survey was forwarded to each of Australia’s eight Veterinary Boards in the form of an on-line survey in the first half of 2016. Each board was asked to examine the survey and, if it met with their approval, for it to be distributed to the veterinarians listed in their register.

The survey consisted of 40 questions (Appendix I) and was designed for use in the on-line Survey Monkey program (www.surveymonkey.com).

It was designed to be comprehensive, anonymous, for research purposes only and to be answered in approximately 10 minutes. The link to the survey was https://www.surveymonkey.com/r/VET2016.

The resulting data was exported to Excel (2016) and analysed in IBM SPSS Statistics ver. 24. Summary statistics and their 95% confidence interval (CI) were calculated and ANOVA’s, Chi-Square Tests and risk estimates (odds ratios and their 95% CI) used to identify significant associations between factors.
Results

Seven of the eight Australian Veterinary Boards confirmed that the members on their registers had been notified of the survey and provided with the link to the questionnaire.

The total number of registered veterinarians in Australia at 30 June 2016 for the seven participating Veterinary Boards was 9,076 (personal communication AVBC) and 555 or 6.1% (95% CI 5.6, 6.6) responded to the survey with the following distribution of responses: Queensland 50 (9%), New South Wales 100 (18%), Victoria 106 (19%), Tasmania 22 (4%), South Australia 25 (4.5%), Western Australia 206 (37%), Australian Capital Territory 14 (2.5%) and, Northern Territory 5 (1%) with 27 respondents (5%) not specifying where they were registered.

Not all respondents answered all questions, so percentages are given according to the actual number of responses to each question.

The mean age of respondents was 44.7 years (SD 13.14). Female respondents (40 years, SD 10.3) were significantly younger (ANOVA, P <0.001) than males (53 years, SD 13.62) (Table 4.1).

<table>
<thead>
<tr>
<th>Table 4.1 Personal data A</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Option</strong></td>
</tr>
<tr>
<td>Gender of respondent:</td>
</tr>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Male</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Place of birth:</td>
</tr>
<tr>
<td>Australia</td>
</tr>
<tr>
<td>Overseas</td>
</tr>
<tr>
<td>Total</td>
</tr>
<tr>
<td>Background:</td>
</tr>
<tr>
<td>Rural</td>
</tr>
<tr>
<td>Urban</td>
</tr>
<tr>
<td>Total</td>
</tr>
</tbody>
</table>
All 555 participants responded to the question of their gender with 356 (64%) female respondents.

Of 551 respondents, 342 (62%) were raised (grew up) in an urban setting/environment. Of 551 respondents, 405 (74%) were born in Australia (Table 4.1).

<table>
<thead>
<tr>
<th>Option</th>
<th>Number</th>
<th>Percentage (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where qualified:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Australia</td>
<td>499</td>
<td>90.1 (87.2, 94.3)</td>
</tr>
<tr>
<td>Overseas</td>
<td>55</td>
<td>9.9 (9.0, 12.7)</td>
</tr>
<tr>
<td>Total</td>
<td>554</td>
<td>56.5 (52.3, 60.7)</td>
</tr>
<tr>
<td>Basic veterinary degree:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>BVSc</td>
<td>313</td>
<td>36.6 (32.6, 40.8)</td>
</tr>
<tr>
<td>BSc, BVMS</td>
<td>203</td>
<td>18.4 (15.1, 22.1)</td>
</tr>
<tr>
<td>Other</td>
<td>38</td>
<td>0.6 (0.1, 1.7)</td>
</tr>
<tr>
<td>Total</td>
<td>554</td>
<td>22.0 (18.5, 25.9)</td>
</tr>
<tr>
<td>Australian veterinary schools:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>JCU</td>
<td>9</td>
<td>14.2 (11.3, 17.6)</td>
</tr>
<tr>
<td>UQ</td>
<td>71</td>
<td>2.2 (1.1, 3.9)</td>
</tr>
<tr>
<td>Sydney</td>
<td>110</td>
<td>18.4 (15.1, 22.1)</td>
</tr>
<tr>
<td>CSU</td>
<td>11</td>
<td>0.6 (0.1, 1.7)</td>
</tr>
<tr>
<td>Melbourne</td>
<td>92</td>
<td>4.9 (4.9, 9.3)</td>
</tr>
<tr>
<td>Adelaide</td>
<td>3</td>
<td>1.8 (0.8, 3.4)</td>
</tr>
<tr>
<td>Murdoch</td>
<td>203</td>
<td>1.8 (0.8, 3.4)</td>
</tr>
<tr>
<td>Total</td>
<td>499</td>
<td>40.7 (36.3, 45.1)</td>
</tr>
</tbody>
</table>

Of 554 respondents, 499 (90%) graduated from an Australian veterinary school. There were respondents from each of Australia’s seven veterinary schools (Table 4.2).

Of the 55 (10%) overseas graduates, 40% graduated from the UK, 22% from the USA and 13% each from South Africa, NZ and elsewhere.

Of 554 respondents to the question relating to their veterinary degree, 313 (57%) had a BVSc, 203 (37%) had a BSc, BVMS and 38 (7%) had other “undergraduate” veterinary qualifications (DVM, BVMS, BVetMed, VetMB, MVB).
Table 4.3 Type of employment at graduation and at the time of the survey

<table>
<thead>
<tr>
<th>Employment</th>
<th>Time of graduation</th>
<th>Time of survey</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percentage (95% CI)</td>
</tr>
<tr>
<td>Practice</td>
<td>463</td>
<td>87.5 (84.4, 90.2)</td>
</tr>
<tr>
<td>Government</td>
<td>32</td>
<td>6.0 (4.2, 8.4)</td>
</tr>
<tr>
<td>Teaching/research</td>
<td>23</td>
<td>4.3 (2.8, 6.4)</td>
</tr>
<tr>
<td>Other</td>
<td>11</td>
<td>2.1 (1.0, 3.7)</td>
</tr>
<tr>
<td>Total</td>
<td>529</td>
<td></td>
</tr>
</tbody>
</table>

At graduation, 88% of respondents entered clinical practice, but at the time of the survey in 2016, 68% were employed in this area of veterinary science; 6% of respondents initially entered government service, while at the time of the survey 10% of the respondents were employed there; 4% originally became researchers or teachers compared with 9% at the time of the survey and; 2% initially worked in another field compared with 13% when the survey was conducted (Table 4.3).

Table 4.4 Comparison of working in an urban or rural environment at the time of graduation and at the time the survey was conducted

<table>
<thead>
<tr>
<th>Where service provided</th>
<th>Time of graduation</th>
<th>Time of survey</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percentage (95% CI)</td>
</tr>
<tr>
<td>Urban</td>
<td>241</td>
<td>45.5 (41.2, 49.8)</td>
</tr>
<tr>
<td>Rural</td>
<td>289</td>
<td>54.5 (50.2, 58.8)</td>
</tr>
<tr>
<td>Total</td>
<td>530</td>
<td></td>
</tr>
</tbody>
</table>

Of the 530 respondents reporting where they were employed at graduation, 46% initially worked in an urban environment. In 2016, of 519 respondents, 72% were working in an urban environment (Table 4.4).

Significantly more males (P<0.005) commenced work in a rural location (63.1%) than did females (50.1%). However, the percentage of males employed in a rural location (33.3%) at the time of the survey was not significantly different (P=0.109) to that for females (26.7%).
Further, of the males who started work in a rural area, only 43.1% remained there at the time of the survey. In contrast, only 17.6% of those who initially worked in an urban environment, were working in a rural location at the time of the survey (P<0.001).

That is, 80.6% of males who were currently in rural employment started their careers there.

For females who started employment in a rural location only 44.5% remained there at the time of the survey, as opposed to only 8.1% who started in urban practice subsequently moving to a rural position (P<0.001). That is, 84.6% of females, who currently are in rural employment started their careers in a rural location.

Respondents raised in a rural environment were 3.9 (95%CI 2.6,5.7) times more likely to be working in a rural area than a respondent raised in an urban environment. In addition, respondents who started their veterinary career in a rural area were 6.5 (95%CI 4.1,10.4) times more likely to remain in a rural area than a respondent who started employment in an urban area.

Of respondents raised in rural areas, 46.1% were employed in a rural location at the time of the survey, whereas only 18.1% of respondents raised in urban area were employed in rural areas at the time of the survey (P< 0.001).

There was a significant difference (P<0.001) between those raised in a rural or urban environment and their involvement in rural practice (70.4% vs 45.0%), the risk estimate established that a respondent raised in a rural environment was 2.9 times more likely to work in a rural area than a respondent raised in an urban environment.
Table 4.5 Time spent in rural service and companion animal service during their career

<table>
<thead>
<tr>
<th>Time</th>
<th>Rural service</th>
<th>Companion animal service</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percentage (95% CI)</td>
</tr>
<tr>
<td>Full-time</td>
<td>73</td>
<td>13.7 (10.9, 16.9)</td>
</tr>
<tr>
<td>&gt;50%</td>
<td>109</td>
<td>20.4 (17.1, 24.1)</td>
</tr>
<tr>
<td>&lt;50%</td>
<td>183</td>
<td>34.3 (30.2, 38.5)</td>
</tr>
<tr>
<td>No-time</td>
<td>169</td>
<td>31.6 (27.7, 35.8)</td>
</tr>
<tr>
<td>Total</td>
<td>534</td>
<td>31.6 (27.7, 35.8)</td>
</tr>
</tbody>
</table>

Of 534 respondents, 34% spent all or more than half of their career in rural service, whilst the balance spent less than half or no time there. Of 491 respondents, 79% spent all or more than half their career in urban service, whilst the balance spent less than half or no time there (Table 4.5).

There was no significant difference between time spent in rural service between female and male respondents or between those raised in urban or rural environments.

Table 4.6 Comparison of full-time vs part-time and continuous vs discontinuous employment

<table>
<thead>
<tr>
<th>Options</th>
<th>Number</th>
<th>Percentage (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full-time employment:</td>
<td>319</td>
<td>58.2 (54.9, 62.4)</td>
</tr>
<tr>
<td>Part-time employment:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>549</td>
<td>41.8 (37.6, 46.0)</td>
</tr>
<tr>
<td>Continuous employment:</td>
<td>428</td>
<td>78.0 (74.3, 81.4)</td>
</tr>
<tr>
<td>Discontinuous employment:</td>
<td>121</td>
<td>22.0 (18.6, 25.7)</td>
</tr>
<tr>
<td>Total</td>
<td>549</td>
<td></td>
</tr>
</tbody>
</table>

Of 549 respondents, 58.2% worked full-time at the time of the survey (Table 4.6). The proportion of males working full-time (62.6%) was similar (P= 0.125) to that for females (55.8%).
Of 549 respondents, 78% worked continuously at their veterinary career. The proportion of males working continuously (86.3%) was significantly higher (P<0.001) than that for females (73.3%).

When those respondents who had taken time away from veterinary service were asked to give an estimate of the time allocated to veterinary work, 33% devoted most of their time, 54% devoted half or more of their time, and 13% devoted less than half of their time to veterinary service at the time of the survey.

\[
\text{Table 4.7 Mentored when first employed and changes to place of employment}
\]

<table>
<thead>
<tr>
<th>Options</th>
<th>Numbers</th>
<th>Percentages (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Were you mentored:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>186</td>
<td>35.0 (31.0, 39.3)</td>
</tr>
<tr>
<td>No</td>
<td>345</td>
<td>65.0 (60.7, 69.0)</td>
</tr>
<tr>
<td>Total</td>
<td>531</td>
<td></td>
</tr>
<tr>
<td>Changed employment:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>455</td>
<td>85.2 (81.9, 88.1)</td>
</tr>
<tr>
<td>No</td>
<td>79</td>
<td>14.8 (11.9, 18.1)</td>
</tr>
<tr>
<td>Total</td>
<td>534</td>
<td></td>
</tr>
</tbody>
</table>

Thirty-five percent of 531 respondents had received mentoring by an experienced veterinarian when they initially entered veterinary service (Table 4.7).

Eighty-five percent of 534 respondents had changed their employment at least once during their veterinary career (Table 4.7).

\[
\text{Table 4.8 Where do you currently serve and what service do you provide}
\]

<table>
<thead>
<tr>
<th>Options</th>
<th>Numbers</th>
<th>Percentages (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Where do you currently serve:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>On-farm</td>
<td>48</td>
<td>9.4 (7.0, 12.3)</td>
</tr>
<tr>
<td>Clinic</td>
<td>224</td>
<td>44.0 (39.6, 48.4)</td>
</tr>
<tr>
<td>Hospital</td>
<td>152</td>
<td>29.9 (25.9, 34.9)</td>
</tr>
<tr>
<td>Institution</td>
<td>85</td>
<td>16.7 (13.6, 20.2)</td>
</tr>
<tr>
<td>Total</td>
<td>509</td>
<td></td>
</tr>
</tbody>
</table>
At the time of the survey, 9% worked on-farm, that is, they travelled to farms to provide a veterinary service, whilst 74% work in a clinic or hospital within private practice. Also 17% of respondents worked in an institution other than clinical practice (Table 4.8).

Eighty-five percent of 533 respondents provided a clinical or consulting service in practice, 9% worked in government service and 6% provided a teaching and/ or research service (Table 4.8).

### Table 4.9 Time spent with livestock at graduation and at the time of the survey

<table>
<thead>
<tr>
<th>Options</th>
<th>At graduation</th>
<th>At time of survey</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percentage (95% CI)</td>
</tr>
<tr>
<td>Full-time</td>
<td>31</td>
<td>6.3 (4.3, 8.4)</td>
</tr>
<tr>
<td>&gt;50% time</td>
<td>152</td>
<td>31.0 (26.9, 32.3)</td>
</tr>
<tr>
<td>&lt;50% time</td>
<td>178</td>
<td>35.8 (31.6, 40.3)</td>
</tr>
<tr>
<td>No -time</td>
<td>132</td>
<td>26.9 (23.0, 31.0)</td>
</tr>
<tr>
<td>Total</td>
<td>491</td>
<td></td>
</tr>
</tbody>
</table>

At graduation, only 6% of respondents worked full-time with economic livestock. In comparison, 31% spent more than half of their time, 36% spent less than 50% of their time and 27% spent no time at all with economic livestock (Table 4.9).

At the time of the survey, 12% of respondents worked full-time with economic livestock compared with 9% who spent more than half of their time, 21% who spent less than half of their time and 58% who spent no time with economic livestock (Table 4.9).
Table 4.10 Time spent with companion animals at graduation and at the time of the survey

<table>
<thead>
<tr>
<th>Options</th>
<th>At graduation</th>
<th>At time of survey</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percentage (95% CI)</td>
</tr>
<tr>
<td>Full-time</td>
<td>164</td>
<td>32.1 (28.1, 36.3)</td>
</tr>
<tr>
<td>&gt;50% time</td>
<td>235</td>
<td>46.0 (41.6, 50.4)</td>
</tr>
<tr>
<td>&lt;50% time</td>
<td>97</td>
<td>19.0 (15.7, 22.7)</td>
</tr>
<tr>
<td>No-time</td>
<td>15</td>
<td>2.9 (1.7, 4.8)</td>
</tr>
<tr>
<td>Total</td>
<td>511</td>
<td></td>
</tr>
</tbody>
</table>

At graduation, 32% worked full-time and 46% spent more than half of their time with companion animals. At the time of the survey, 57% worked full-time with companion animals compared with 22% who spent more than half of their time with these animals (Table 4.10).

Consequently, at graduation, 73% of respondents spent some time with livestock, however, that reduced to 42% at the time of the survey. In contrast, at graduation, 97% of the respondents spent some time with companion animals, although it had reduced to 86% at the time of the survey (Tables 4.9 and 4.10).

Table 4.11 Satisfaction with undergraduate education, position, income and status

<table>
<thead>
<tr>
<th>Satisfaction</th>
<th>Education n (%)</th>
<th>Position n (%)</th>
<th>Income n (%)</th>
<th>Status n (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Completely</td>
<td>112 (21.0)</td>
<td>97 (18.4)</td>
<td>50 (9.4)</td>
<td>95 (17.8)</td>
</tr>
<tr>
<td>Mostly</td>
<td>269 (50.4)</td>
<td>235 (43.9)</td>
<td>102 (19.1)</td>
<td>182 (34.0)</td>
</tr>
<tr>
<td>Generally</td>
<td>119 (22.2)</td>
<td>116 (21.7)</td>
<td>162 (30.4)</td>
<td>157 (29.3)</td>
</tr>
<tr>
<td>Not Satisfied</td>
<td>34 (6.4)</td>
<td>87 (16.3)</td>
<td>219 (41.1)</td>
<td>101 (18.9)</td>
</tr>
<tr>
<td>Total</td>
<td>534</td>
<td>535</td>
<td>533</td>
<td>533</td>
</tr>
</tbody>
</table>

Twenty-one percent of respondents were completely satisfied with their undergraduate education, 72% were generally or mostly satisfied and only 6.4%
(95% CI 4.4, 8.8) stated that they were dissatisfied with their undergraduate veterinary education (Table 4.11).

Eighteen percent of respondents were completely satisfied, 66% generally or mostly satisfied and 16.3% (95% CI 13.2, 19.7) were not satisfied with their position as a veterinarian (Table 4.11).

Nine percent of respondents were completely satisfied, 49% generally or mostly satisfied and 41.1% (95% CI 36.9, 45.4) were dissatisfied with the income they received as a veterinarian (Table 4.11).

Eighteen percent of respondents were completely satisfied, 63% generally or mostly satisfied and 18.9% (95% CI 15.6, 22.5) were not satisfied with the status they achieved as a veterinarian (Table 4.11).

### Table 4.12 Occupational hazards and their effects.

<table>
<thead>
<tr>
<th>Options</th>
<th>Numbers</th>
<th>Percentages (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Occupational injuries or illnesses:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>289</td>
<td>54.3 (50.0, 58.6)</td>
</tr>
<tr>
<td>No</td>
<td>243</td>
<td>45.7 (41.4, 50.0)</td>
</tr>
<tr>
<td>Total</td>
<td>532</td>
<td>100.0</td>
</tr>
<tr>
<td>Result of injury or illness:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Impaired veterinary capacity</td>
<td>48</td>
<td>16.6 (12.5, 21.4)</td>
</tr>
<tr>
<td>Cause retirement</td>
<td>43</td>
<td>14.9 (11.0, 19.5)</td>
</tr>
<tr>
<td>No permanent impairment</td>
<td>198</td>
<td>68.5 (62.8, 73.8)</td>
</tr>
<tr>
<td>Total</td>
<td>289</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Just over half (54%) of 532 respondents had suffered a work-related injury or illness during their veterinary careers. Of the affected respondents, 17% reported that their injury or illness had impaired their capacity to perform their duties as a veterinarian with 15% leaving veterinary service as a result of their injury or illness (Table 4.12).
Table 4.13 Changes in caseload and earnings arising from livestock, membership of the AVR and perceived farmer’s needs of veterinary services

<table>
<thead>
<tr>
<th>Options</th>
<th>Numbers</th>
<th>Percentages (95% CI)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase in caseload from livestock since 2000:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>60</td>
<td>13.2 (10.3, 16.7)</td>
</tr>
<tr>
<td>No</td>
<td>393</td>
<td>86.8 (83.3, 89.7)</td>
</tr>
<tr>
<td>Total</td>
<td>453</td>
<td></td>
</tr>
<tr>
<td>Increase in income from livestock since 2000:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>56</td>
<td>12.3 (9.5, 15.7)</td>
</tr>
<tr>
<td>No</td>
<td>398</td>
<td>87.7 (84.3, 90.5)</td>
</tr>
<tr>
<td>Total</td>
<td>454</td>
<td></td>
</tr>
<tr>
<td>Membership of the AVR:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>23</td>
<td>4.3 (2.7, 6.5)</td>
</tr>
<tr>
<td>No</td>
<td>506</td>
<td>95.6 (93.5, 97.2)</td>
</tr>
<tr>
<td>Total</td>
<td>529</td>
<td></td>
</tr>
<tr>
<td>Farmers do not use veterinarians:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Due to inadequate service provided</td>
<td>88</td>
<td>19.5 (15.9, 23.4)</td>
</tr>
<tr>
<td>Veterinary service not required</td>
<td>364</td>
<td>80.5 (76.6, 84.1)</td>
</tr>
<tr>
<td>Total</td>
<td>452</td>
<td></td>
</tr>
<tr>
<td>Do farmers shop-around for a cheap service?</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>363</td>
<td>79.8 (75.8, 83.4)</td>
</tr>
<tr>
<td>No</td>
<td>92</td>
<td>20.2 (16.6, 24.2)</td>
</tr>
<tr>
<td>Total</td>
<td>455</td>
<td></td>
</tr>
<tr>
<td>Farmers treat female veterinarians differently to male veterinarians:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>310</td>
<td>64.6 (60.1, 68.7)</td>
</tr>
<tr>
<td>No</td>
<td>43</td>
<td>9.0 (6.6, 11.9)</td>
</tr>
<tr>
<td>No opinion</td>
<td>127</td>
<td>26.5 (22.6, 30.6)</td>
</tr>
<tr>
<td>Total</td>
<td>480</td>
<td></td>
</tr>
</tbody>
</table>

The majority (87%) of respondents had not experienced an increase in the case load of livestock since 2000. Similarly, 88% had not experienced an increase in income derived from livestock since 2000 (Table 4.13).

Only 23 or 4% of the respondents had joined the AVR (Table 4.13).

Half of the respondents, 49.6% (95%CI 45.2, 54.0) indicated that they would participate in a surveillance program if it was professionally conducted and commercially viable.
The majority (80%) of respondents reported that the problem servicing livestock arose because the farming community did not utilise available veterinary services, i.e. the majority considered it to be a demand problem rather than inadequate services provided by veterinarians (Table 4.13).

Eighty percent of respondents considered that farmers shopped around for the cheapest veterinary services. Sixty-five percent of respondents considered that farmers treated female veterinarians differently from their male counterparts (Table 4.13).

### Table 4.14 Perceived roles of rural practice and government service

<table>
<thead>
<tr>
<th>Options</th>
<th>Is rural practice a small animal practice in the country?</th>
<th>Is government service essentially regulatory?</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>Percentage (95% CI)</td>
</tr>
<tr>
<td>Yes</td>
<td>152</td>
<td>31.7 (27.5, 36.0)</td>
</tr>
<tr>
<td>No</td>
<td>328</td>
<td>68.3 (64.0, 72.5)</td>
</tr>
<tr>
<td>Total</td>
<td>480</td>
<td></td>
</tr>
</tbody>
</table>

Approximately one-third of the respondents (32%) considered that rural practice was essentially a small animal practice located in the country, whilst approximately two-thirds of respondents (69%) considered that government veterinary service was essentially a regulatory service (Table 4.14).

**Discussion**

In this survey, conducted between March and June 2016, 555 responses were received, representing 6% of the veterinarians registered by the seven Veterinary Boards which participated. However, responses were received from veterinarians located in all eight States and Territories of Australia.

Because of the small sample size, bias is likely and the results may not necessarily represent the experience or views of the total Australian veterinary population.
In addition, responses received from WA participants were over-represented (41% of the total number of respondents). The fact that this research was undertaken by a student enrolled at Murdoch university would likely have resulted in this high “local” response rate.

As the mean age of respondents was 45 years, it is likely that the responding cohort was generally older and represented presumably more experienced graduates than non-respondents. The mean age of female respondents (40 years) was significantly younger than for males (53 years). This is not surprising given the change in the gender distribution of veterinary students and graduates that have occurred over the past 20 to 30 years (Frawley 2003; Heath 2007; Maxwell et al 2008).

In this survey, two-thirds of respondents originated from an urban background and it is likely this is partly responsible for their preference to work in urban environs (72% of respondents), in practices predominantly servicing companion animals. The limited attraction of rural service and the change in location from rural to urban environments by veterinarians as they age has been highlighted in the work of Heath (1998).

At the time of graduation, significantly more male survey respondents entered rural service than females, but at the time of the survey there was no significant difference in the proportion of males or females who had remained in rurally based practices. In contrast, and not surprisingly, very few respondents who began their career in urban service, ventured into rural service later in their careers.

Seventy percent of the respondents were born in Australia. Of those veterinarians born overseas (30%) it was not possible to determine from this study if they migrated as children/teenagers prior to studying in Australia or migrated subsequently after graduation from an international veterinary school.

During the 20th century, Australia’s first three university veterinary schools awarded the degree of BVSc. However, the fourth school, established at
Murdoch University, awarded the degrees of BSc, BVMS and this is reflected in the number of survey respondents, particularly those who were registered in WA. Respondents who graduated overseas had a variety of veterinary degrees.

In the 21st century, a number of Australian veterinary schools are adopting the DVM degree and it is likely that the proportion of Australian veterinarians with BVSc’s will decline further in the future (Caple 2011).

At graduation the majority of respondents (88%) entered private practice with the balance distributed between government service, academia, industry and others. This is consistent with the findings of others (Morris et al 1972; Wales 1972; Heath 2007; Maxwell et al 2008) and highlights the change from Government employment to private employment reported during the past 100 years in Australia.

At the time of the survey, 68% of the respondents were in private practice and those who have changed had primarily moved into the “other” categories. This work may be less stressful than private practice and perhaps more interesting, as practice can become routine.

At the time of the survey, slightly more than half (58%) of the respondents worked full-time and approximately three-quarters of these had worked continuously as a veterinarian since graduating. This contrasts with earlier eras where most graduates worked as veterinarians all their working life (Neiderer 1958; Needham 1958; Maxwell et al 2008).

The majority of respondents in this sample, stated that they had changed employment, with a relatively small group (15%) remaining with their initial employer. This may indicate dissatisfaction with their initial terms of employment, restlessness or perhaps cultural or generational change. Similar changes are reported internationally (Andrus et al 2006; Sans et al 2011; Vaala 2016; Wang et al 2014).

Recently, the issue of transition from student to graduate veterinarian has occupied the attention of both veterinary schools and registration organisations;
for example, Craven (2004) with Gilling and Parkinson (2009) referring to the transition as a “Make or Break” period.

Less than half of the survey respondents were mentored when commencing their careers and this agrees with Craven’s findings (2004). This indicates that half of the respondents to this survey had little or no support from experienced colleagues on graduation and had to learn how to function “on-the-job” working with client’s animals.

In this sample, less than 10% of respondents performed veterinary work on-farm, which is in marked contrast to much of the 20th century, when many government veterinary officers and private practitioners functioned on-farm (Seddon 1951; Neiderer 1958; Needham 1958).

Sir Charles Court, the Premier of Western Australia’s goal for the establishment of the veterinary school at Murdoch University – getting “trained surgeons onto farms” and not caught up “in the dog and cat syndrome” – would appear not to have been realised (Clark and Grandage 2005).

The majority of survey respondents provided their service in a clinic or hospital, or within an institution such as a university or diagnostic laboratory with 83% providing service in practice, 11% in government service and 6% in teaching and research. These findings support those of others highlighting the trend during the latter half of the 20th century, away from government and towards private veterinary services (Churchward 1972; Morris et al 1972; Wales 1975).

The study was designed to determine if veterinary services to economic livestock and companion animals have changed with time. These are the two major areas of veterinary activity. However, it does not shed light on those veterinarians who engage with other species, such as wildlife, marine species or others outside the two categories mentioned. The survey did indicate that some moved from servicing livestock and companion animals into “other” activities and there is supporting international literature on this aspect of veterinary medicine (Dierauf et al 2001; McCain and Ramsay 2008; Sungawa 2016: Mullineaux 2016).
From this sample, 27% of respondents spent no time with livestock at graduation, whereas, at the time of the survey, 58% spent no time with them. Regarding companion animals, 3% did not engage with these species at graduation, whereas, at the time of the survey, 14% did not. However, this does not mean that this latter group have transferred their attention to livestock, but rather they have engaged in activities where they deal with other species or they don’t engage with animals at all.

Dissatisfaction with various aspects of veterinary life was canvassed in the survey and 6% were dissatisfied with undergraduate education, 16% with work as a veterinarian, 41% with the income they received, and 21% with the status achieved as veterinarians.

In an earlier study, dissatisfaction with various aspects of their life as students and then as veterinarians, were recorded for WA veterinarians (Maxwell et al 2008). These results need sober reflection, as they indicate a relatively high level of dissatisfaction with life, income and status as a veterinarian in Australia.

More than half of the survey respondents suffered an injury or illness during their career as veterinarians, with 17% of these stating it affected their capacity to function and 15% stating that it would lead to their leaving the occupation of a veterinarian.

In a previous study of WA veterinarians, 50% incurred a major physical injury or disease during their career and of these 59% stated that it had impaired their performance as a veterinarian and 20% considered leaving practice as a result (Maxwell et al 2008).


The Frawley Review was commissioned for a number of reasons, one being because Australia’s animal health system was being directed towards companion animals in lieu of production animals and another being that both government
veterinary services and rural practices were unlikely to be maintained (Frawley 2003). Frawley concluded that this would only be reversed if the earning opportunities for rural practice were improved and a better balance in teaching all animal species could be achieved. There needed to be a significant increase in demand for private practice services by livestock producers and, to stimulate demand, Frawley made recommendations which they considered could be helpful. However, unless there was a significant increase in the demand for rural veterinary services, the situation would not improve.

As relatively few livestock producers utilised veterinary practitioners on a regular basis, from the 1970’s most rural practices turned to servicing companion animals to remain viable (Morris et al 1972; Frawley 2003; Heath 2007). This survey supports those observations.

What has transpired in the time since the release of the Frawley Review?

Data taken from the Annual Veterinary Registrar of Western Australia for the years 2005 and 2014 indicated an increase of 44% in the number of registered veterinarians. During this period there was an increase of 79% for those in small animal urban practice; however, the proportion in mixed rural practice decreased by 5%. It is highly likely that a similar change has occurred throughout the rest of Australia.

The survey respondents reported that since the Frawley Review there had been no increase in either case-load or income from economic livestock. So, it appears that since the time of Frawley, there has been no increase in the use of veterinary services by livestock producers and this has been reported internationally, with one article stating;

*All else equal, female and male veterinarians tend not to locate in rural areas. Aversion to rural areas has remained fixed over time among males, but has strengthened among females (Wang et al 2014).*

This does not apply to those few rural practices in Australia that provide speciality services for livestock.
Thirty-two percent of survey respondents confirmed that rural practice was essentially a small animal practice located in the country. However, when this question was analysed further, 40% of rural respondents agreed with the statement compared with only 27% of urban respondents. This most likely arises from urban practitioners thinking that rural practice is essentially large animal focused when, in fact, most operate as mixed practices (Neiderer 1958; Needham 1958; Maxwell et al 2008).

The establishment of the Australian Veterinary Reserve (AVR) was a major recommendation of the Frawley Review. During its short life, the AVR was only called into use on the occasion of the Equine Influenza outbreak of 2007 and since then has been disbanded.

Although only 4% of respondents were members of the AVR, half of the survey respondents indicated that they would be willing to be part of something similar, providing it was properly financed and operated on sound commercial grounds.

One reason for the establishment of the AVR was to provide emergency back-up of Government veterinarians in the event of an exotic disease incursion into Australia. Critical to this, and highlighted by the Frawley Review, was concern over Australia’s quarantine and surveillance abilities and the outcome of research in this field is discussed in the following chapter.

**Conclusions**

Australian veterinary services have been in a state of flux for some time. In spite of efforts designed to halt the move away from servicing economic livestock, such as the provision of consulting services, rural practices are mainly mixed practices with an increasing dependence on servicing small animals for economic survival.

The majority of today’s graduates are female and they tend to gravitate to companion animal practice in urban Australia.
What has been the result of the release of the Frawley Review?

Urban practice has continued to increase whilst rural veterinary services, both government and private, have continued to deteriorate.
Chapter 5. Research Project 2: Animal Quarantine

Introduction

Australia enjoys a unique reputation in livestock trade, because it is relatively disease-free. However, a number of reviews have raised concerns regarding the vulnerability of our quarantine system (Lindsay, 1988, Nairn, 1996, Frawley 2003).

If animal quarantine is important for Australia’s economy, then suitable means need to be found to ensure it functions effectively and that the system will protect our position as a “Clean and Green” country.

A study was undertaken to investigate if Frawley’s measures to improve quarantine were successful. Oral history interviews of current veterinary leaders of animal quarantine were conducted during 2015 – 2016.

Materials and methods

An oral history questionnaire was designed for the interview of veterinary personnel directly involved in Australia’s animal quarantine and submitted to the Human Ethics Research Committee of Murdoch University for approval (Appendix II).

Once approval was granted (Permit 2015/28), 10 veterinarians who worked in either State or Commonwealth quarantine services/fields were invited to participate.

Each potential participant received an “Introductory Letter” (Appendix III) outlining the object of the project, assuring anonymity and indicating that the interview was for research purposes only. In addition, they received a “Consent Form” (Appendix IV) which was to be signed by those prepared to be interviewed.
The face-to-face interviews were conducted at a time and place convenient for participants and took one to one and a half hours to complete.

Interviews were conducted throughout Australia.

They were digitally recorded and the interviewee received a copy of the interview. The interviews were transcribed and quotes are given in a different font, italicised and indented as per the literature review section of this thesis.

Results

Of the 10 personnel invited to participate in the interviews eight agreed.

All interviewees were male and seven were graduates from Australian veterinary schools.

They were born between 1937 and 1957 and had graduated as veterinarians between 1960 and 1980.

All had spent time working for government in quarantine during their careers, with some allocating most of their working life to quarantine duties.

Is quarantine necessary?

All interviewees responded that quarantine was essential.

Yes, you do need a quarantine system, but you need one that is flexible and one of the big issues is that you can have a program that looks good on paper, but doesn’t deliver an effective outcome. You need people who look where the risks are, not follow rigid guidelines.

There is a good case for biosecurity, but it needs to be well thought out and targeted. What are the important diseases we are trying to keep out and this should be done industry by industry?

It is important to maintain our clean and green image.
It’s essential, not just because of the animal welfare issue, but increasingly we are operating in a global market for our commodities and increasingly you need to have a niche in the market place, and Australia has got the image, so as much as anything else it is a marketing advantage and that will only increase dramatically as the free trade agreements and the TPP come on board.

Definitely, because of a range of things, primarily for our export industries, it is critical, but for human health and animal productivity, to minimise disease and maximize productivity. But number one is definitely export potential. If we don’t have surveillance, we can’t confirm we are free of diseases we are not going to export our product, and I think that is number one.

Is our present system satisfactory?

Interviewees varied in their assessment of Australia’s current state of preparedness to combat an exotic disease incursion.

As to surveillance at this time, it has to be said that passive surveillance has been degraded by the loss of regional government veterinary services across Australia.

I think the emphasis has to shift to prevention rather than detection; try and stop the stuff getting in rather than to flog surveillance. You can do surveillance, but rather try to prevent it which means stopping it off-shore.

The fundamental question will still be that we should be applying good science, good rational thoughts. The people setting policy often do not have a good grounding in the science and they need direction by people who have a sound understanding in these areas such as vets.

Everyone understands that prevention is better than cure, but nobody will try it – look at Ebola. It is easy to get money for curing a problem after the event has started, but it’s a different matter when you try to prevent it. It is not good to start asking the vital question when you already have a problem
Most, if not all emerging diseases come from south-east Asia, and that’s where we should be investing in prevention.

It’s hard to get producers to pay for surveillance and monitoring...the problem will be to know what it is important and what to look for...there are a number of actions that are not really needed.

We give the impression that we have an effective quarantine apparatus in place that can be brought into effect at a moment’s notice, but this is not the case.

There is no veterinarian who is in position to influence government ministers in Australia today...A message the profession needs to hear today is there is a need for leadership and this requires more than an administrator, you have got to have a vision and an ability to build a network of people who can bring about change. Leadership is seriously lacking.

Quarantine people should be flexible. The issue isn’t protocols, but the people who operate these protocols, as was seen in the Equine Influenza outbreak a few years ago. The protocols were ok, but they weren’t followed by the people involved in quarantine. You need competent people as well as competent protocols.

Good risk assessment is not in place and I’m not convinced that we have the expertise to assess these different risks.

Not only is our surveillance and monitoring compromised, the question really is, do we have competent staff to conduct it?

What was your assessment of the Lindsay Review (1988) and Nairn Review (1996)?

Only a few were conversant with these reviews and, as a result, some did not offer an answer to this question.
Basically, the minister, John Kerin, Dave Lindsay and the members of the committee, wanted a hard review...David was good because we asked hard questions like the gross waste of money of the current quarantine system.

I agree that the Nairn Review was the most significant review of the 20th century regarding quarantine and Nairn has every reason to be frustrated about the lack of action that came out of it. He is very practical and has the capacity to engage with people who are on the ground and get information out of them, and a lot of people can’t do that, especially bureaucrats.

The problem in Australia at the moment is that we can’t get the message across to enough urban Australians of the value of agriculture and the major political parties do not consider agriculture critically important anymore.

But the positive thing, I suppose you could say is, Australia has had little devastating incursions and is that because we are isolated or it is because of the effectiveness of our quarantine measures? It’s probably a bit of both.

What was your assessment of the Frawley Review (2003)?

All interviewees recognised the contribution made by Frawley to Australia’s quarantine capability.

I like what was said about surveillance, and agreed with Frawley’s marrying surveillance with veterinary surgeons.

Frawley did not impact on surveillance and monitoring, because it wasn’t given resources.

If the government sponsors a review it is going to have to decide if they will support its recommendations and support it with money.

Frawley wanted private veterinarians to work in partnership with government.
The Frawley Review provided a good opportunity, but in the intervening years the response has been less than adequate. Today professional judgement is based on Google.

In fact, surveillance has probably deteriorated further since Frawley.

I would agree that our quarantine, surveillance and monitoring has degenerated over time. Certainly, surveillance and monitoring, we are far weaker than we have ever been.

The Johnny Depp dog saga could have been used in a positive manner instead of the farce it became.

I think our quarantine and surveillance is more flaky today than when Frawley reported on it, especially in terms of the comprehensiveness of the actual physical surveillance.

I think we are just seeing the beginnings of people using the internet as a proxy for surveillance.

**What was your assessment of the Australian Veterinary Reserve?**

The major recommendation of the Frawley Review regarding quarantine was the formation of the Australian Veterinary Reserve and answers varied regarding its contribution to animal quarantine.

The concept of the veterinary reserve was a good one for training people and getting them skilled in diagnosing exotic disorders.

The major thrust of Frawley was the Australian Veterinary Review. One hundred practitioners signed up and some were involved with equine influenza. Today I’d be surprised if you could get 100 rural vets to sign up for a program of surveillance. I have the impression that today’s graduates are not really interested in rural practice.

Although in the very first cohort of members, I only functioned once during the whole time of the reserve and that was in the 2007 outbreak of Equine
Influenza...the concept came under attack for its performance, but this criticism came from government veterinary officers who had a vested interest in wanting the money made available for the reserve for themselves.

I think the concept that we have centrally the skills and the capacity to deal with a major emergency, particularly an exotic disease incursion was good, but I don’t think the execution of it has led us any closer to where we need to be.

Animal Health Australia was contacted in October 2015, regarding the current status of the AVR. One hundred practitioners were trained for the task of “field surveillance” in two recruitment rounds between 2004 and 2006. However, during the equine influenza outbreak of 2007, “the AVR did not function as originally intended” and “is no longer in existence” (personal communication, Animal Health representative).

**What is your assessment of risk management in animal quarantine?**

*Our whole world as veterinarians is designed around managing risk, evaluating risk, mitigating risk, minimising risk... Our profession has failed to seize the opportunity offered by risk-management. We should be at the forefront.*

*I advocate the adoption of a risk management approach, and veterinarians are the ones who learn about risk from day one, they have it in their DNA. We should be employed to mitigate risk, but the profession has not come to this conclusion yet. We are the champions of risk management and the world needs competent risk management and our profession could play a major role.*

*I think in terms of animals the risk is seen to be in northern Australia, maybe illegal importations, but I do wonder about the importation of exotic species as pets being a bigger threat than the traditional livestock threat. Who tests the introductions of exotic pets into this country and what tests*
are being performed? Good risk assessment is not in place and I’m not convinced that we have the expertise to assess these different risks.

Did quarantine benefit by the Matthews Review on FMD (2011)?

There is a lot of nonsense talked about the threat of foot-and-mouth disease...a lot of exaggeration is bandied about and what it does is make the public aware of the threat, however, a great deal of it is a waste of time.

At the time of the FMD outbreak in the UK there were 50 other countries in the world that had FMD, but we only cleaned shoes from people from the UK.

If there was an outbreak of FMD in Victoria you don’t shut the whole country down.

FMD It is a real threat, but I am not convinced that it is the major threat.

I think it’s real enough and I think it is a major proxy we use when mounting an argument for improved quarantine. I think absolutely it is a real risk. I think information about global animal disease information is essential. However, it is one thing to make recommendations and another thing to implement the recommendations. Ministers and bureaucrats are needed who are committed to expedite the recommendations; this is the failure of Frawley.

Today for government it’s all about maintaining the absence of a problem; if you can do that then it’s no longer a problem that needs immediate attention. You need to frame your recommendations in a way that you know will lead to their implementation. With Frawley, the recommendations were unlikely to be implemented unless they had ministerial support and that wasn’t forthcoming.
What is your assessment of the future of animal quarantine?

We are a victim of our own conservatism. All too often, individually and as a profession, an issue comes along, it is an issue we have expertise in and the wider community would probably agree that we have expertise, but we do nothing and say nothing and a vacuum is created.

Veterinary schools are extremely expensive and someone should do a cost-benefit analysis of their productivity...If I was the paymaster and I was confronted with the prospect of financing veterinary schools to produce dog and cat vets then the answer is I wouldn’t do it.

In my view it all starts with education. If education can teach people to think rather than just assemble stuff, cribbing off each other and getting good on-line assessments. If you can think then the profession has a future, for we need a thinking profession.

At the moment, I can see a risk that something bad will happen from an unexpected quarter. We all are expecting FMD and so are prepared. But something could come from a quarter that is totally unrecognised and not scrutinised and will get away from us. Also, these unlikely sources of disease aren’t going to be detected until well established. It could be a dog, a bird or any of the exotic animal species being introduced, we only seem to think in terms of traditional livestock diseases.

Discussion

The conduct of oral history interviews is an accepted research technique (Moyer 1999; Truesdale 2009). However, it has been used infrequently in veterinary science research. Here it was used to assess the efficacy of animal quarantine in Australia and it did so by interviewing veterinarians involved in the provision of that service.

An aspect of Australia’s future animal health needs is the maintenance of an effective quarantine capability. However, during the last 30 years, there have
been a series of inquiries which indicated disquiet with the system of Australia’s quarantine service (Lindsay 1988; Nairn 1996; Frawley 2003; Beal 2008; Matthews 2011).

Frawley (2003) found that an effective service was unlikely to be maintained and that there was a need for a more integrated system of national surveillance and concluded that rural veterinarians were a key resource in this endeavour.

To examine these concerns, quarantine veterinary personnel were interviewed.

Those interviewed represented a mature and experienced cohort. All interviewees considered an effective animal quarantine system essential for maintaining our animal export income and, like Frawley, saw an ongoing role for veterinarians in this field. Competent, well-trained veterinarians, who had a grounding in risk assessment and management were considered essential.

Interviewees also thought veterinary personnel should have leadership roles and not act purely as technicians. This lack of leadership by veterinarians has led, in their opinion, to the decision-making being in the hands of those with little understanding of the science involved in the conduct of quarantine.

Interviewees emphasised the need for flexible guidelines with the emphasis on well-thought out and targeted measures, focusing on where the potential risks are likely to come from.

They considered that, at present, there were a number of directives that were ineffective with one pointing out that both surveillance and diagnostic infrastructure had fallen behind that which was required.

All agreed that any program of surveillance must emphasise prevention rather than cure and must be properly funded to be effective.

Frawley was critical of Australia’s ability to meet what it termed “stringent requirements of international trade in the future” and the centrepiece of its recommendations was the establishment of the Australian Veterinary Reserve (AVR).
Two million dollars were allocated to establish this body of private practitioners and although 100 practitioners were trained, their effort during the Equine Influenza outbreak of 2007 was considered a failure and the AVR was subsequently disbanded (Callinan 2007; personal communication AHA).

Frawley emphasised that Australia’s capacity for surveillance depended on having skilled veterinary personnel in the field, accompanied by a capable diagnostic infrastructure and an effective system for recording and retrieving data about animal diseases. This was considered unlikely to be met by a government veterinary service that was contracting rapidly, but, was considered possible by utilising those in private rural practice (Gee 1994).

Interviewees agreed that Frawley’s observations were accurate, but, inadequate resourcing resulted in the failure of implementation. Frawley wanted to include private veterinarians in surveillance and monitoring, and interviewees considered this a good idea. However, at present, because veterinary interest was almost entirely on small animal clinical practice, interviewees considered that this was not likely to happen.

Interviewees thought the Beale Review of 2008 added little to the Nairn Review and was a response to the Equine Influenza outbreak. However, Beale made two contributions, namely, changing the name from “Quarantine” to “Biosecurity” and proposing the replacement of the Quarantine Act (1908) (Beale et al. 2008).

Risk evaluation and its management are central to the conduct of quarantine and interviewees considered that a veterinary education provided a greater appreciation of “Risk” than did the education for other professions.

Foot and Mouth Disease is considered the most serious exotic disease for which Australia needs effective quarantine measures. This is in spite of the fact that the only recorded outbreak of this disease occurring in Australia was in 1872 (Fisher, 1994; Bunn, 1998). Interviewees responses ranged from an appreciation of its seriousness to the threat being exaggerated. The Matthews Review (Matthews 2011) addressed our ability to deal with a FMD outbreak and concluded that
there were a number of false assumptions made about Australia’s state of preparedness for this disease.

As to the future of animal quarantine, opinion ranged from condemnation of veterinary conservatism to its failure to remain relevant to changing circumstances.

One stated, that the problem was, “the failure of urban Australia to value agriculture and the perception that the major political parties do not consider agriculture important anymore.”

Now, more than a dozen years since the release of Frawley, what did it achieve?

The AVR accomplished the training of 100 rural private practitioners for the task envisaged, but it is now disbanded.

Opinion indicated that quarantine had deteriorated further since the release of Frawley and the Equine Influenza outbreak in 2007 supported this opinion.

The same applies to the presence of competent surveillance operatives. Government laboratory infrastructure has declined (Richards et al 1993; Gee 1994) and practitioners have not become an integral part of surveillance.

Frawley failed to deliver improvement in the status of Australia’s surveillance and monitoring capability and so, its findings of a system “unlikely to meet the increasing stringent requirements of Australia’s trading partners” remains in place.

Conclusions

Since the time of Frawley’s inquiry, incursions of exotic disease have occurred in Australia, so the conclusion to be reached is that Frawley did not significantly improve Australia’s surveillance and monitoring capability.

The release of the Beale Review (Beale et al 2008), in response to the Equine Influenza incursion, has not significantly improved our capacity to mount an
effective barrier to the introduction of exotic diseases of animals in Australia, as was made clear by the Matthew’s Review (Matthews 2011).

The major implementation of the Frawley Review was the establishment of the AVR and although 100 private practitioners were recruited into this body, it was only called on to act on one occasion, during the 2007 outbreak of Equine Influenza and today, it is inoperative.

The essential question to ask is quarantine necessary? If it is, who and how should it be conducted? Then the question becomes who should receive the data and who should pay for it?

One respondent thought the answer lay in education, concluding, that for the veterinary profession to have a future, it must be a thinking profession.

Now, it is time to think, to consider and produce a practical alternative to that which is currently in place. Critical to this is veterinary education and this is explored in the next chapter.
Chapter 6. Research Project 3: Veterinary Education

Introduction

The Frawley Review was an examination of a number of aspects of veterinary science. This third study examined its effect on veterinary education.

Since the release of the Frawley Review in 2002, a number of changes have occurred within each of the existing four university veterinary schools and, in addition, there has been the establishment of three new schools.

Did the many changes that took place in veterinary education result from the release of the Frawley Review?

To determine if Frawley played a part in these significant changes, a research project was undertaken to determine if this was the case or not.

Materials and method

An oral history questionnaire was designed to examine veterinary education in Australia. This was initially administered to academics at the older four veterinary schools and then to those at the three newer schools (Appendix V).

The questionnaire was submitted to the Human Research Ethics Committee of Murdoch University (Permit 2015/28) for approval and once sanctioned, a number of leading veterinary academics were approached to participate in the research.

To capture knowledge of the circumstances of veterinary education in Australia, both before and after Frawley, professorial academics, who had acted in the capacity of Dean or Head of the older veterinary schools, were invited to participate in the survey.
They were selected because they had been in university veterinary schools for a considerable period of time and had experience in teaching, research, curriculum formation and administration.

Finally, Heads at each of the three newer veterinary schools were interviewed.

All participants were advised that there was total anonymity and they were free to answer or refuse to answer any question posed. All, received an “Introductory letter” outlining the aims and purpose of the interview and all were required to sign a “Consent Form” prior to the interview.

The face-to-face interviews were conducted during the period April 2015 to May 2016, with each being conducted at a time and place chosen by the interviewee and taking between one and a half and two hours to complete.

Interviews were conducted in WA, SA, Victoria, NSW and Queensland.

The interview was digitally recorded and at the completion of the interview a copy of the recording was either immediately given to the interviewee or sent by mail. The digital responses were transcribed and analysed as outlined in the results section of this chapter.

Quotes are presented in italics, indented and in a different font.

Results

Of 17 invited to participate from the four older established veterinary schools, 14 accepted (82%) and for the new schools three of four (75%) invited accepted the invitation to be interviewed. This represented an overall response rate of 81%.

Four of the participants were born in the 1930’s, four in the 1940’s, six in the 1950’s and three in the 1960’s. Twelve were born in Australia and five overseas (four in the United Kingdom and one in New Zealand).

One graduated in the 1950’s, six in the 1960’s, five in the 1970’s, and five in the 1980’s.
Twelve graduated with a BVSc, three with a BVetMed and one with BSc, BVMS.

Sixteen of the 17 were male.

Six began their careers in practice, six in government service and five in academia.

All specialised in an aspect of veterinary science. Five were pathologists, four parasitologists, one microbiologist, two epidemiologists, one biochemist, one anaesthetist and three were clinicians. All acquired a PhD, along with a variety of other higher qualifications, during their careers.

What is the object of a veterinary education?

All interviewees were asked, “What in your opinion is the object of a veterinary education?” All provided opinions as outlined below.

To produce a graduate who understands the process of diagnosis and therapy, rather than remembering isolated facts. Understanding the process will lead to a better understanding of what can be done to correct it.

The purpose is to produce veterinary graduates and that has not changed; however, now it is to produce veterinary surgeons that are day-one competent in animal species such as dog, cat, horse, cow and sheep.

...our key driver is to produce a graduate who can go out there and is registrable and can serve the public in whatever need there is.

The merit of a veterinary education is to train graduates to solve problems. That’s what happened at the beginning; it was the problem-solving capacities that set them apart and that is how the early graduates rose to positions of power.

Veterinary education should be firmly based on science. We should learn to understand how animals work and how they respond to parasites, microbial and otherwise. How these are manifested in a clinical sense and how they are treated.
Inculcate within the student an enquiring mind so that they are prepared and able to question what they are exposed to. Willingness and ability to question the status quo and to ascertain whether it is based on objective scientific data.

**Is the purpose of a veterinary school to produce graduate veterinarians or to preserve itself as an institution?**

When Deans and Heads of Schools were asked if the *raison d’être* of a veterinary school was its own preservation, most declined to answer; however, two offered the following comments.

*Universities create a construct that maximises employment for those people on its staff.*

*Is the school there for the students or for itself? It goes back to that great Australian quote, “Always back the horse named self-interest, son. It’ll be the only one trying”. Vet schools have their own reasons for being…it is interesting to see how insular vet schools are…until I became Dean and realised that we had lost contact with the profession completely and we lived in our own little world…so we become completely insular…it’s always a situation where schools will always look after themselves.*

**Should the teaching of veterinary science be confined exclusively to the university?**

The question was asked “Should veterinary education be the sole province of the university or could it be equally well taught by another means?” This proved difficult for some respondents who chose not to answer, whilst others gave their opinions.

*The short answer is yes, universities need to look after certain things, because such things as discipline, research and advanced knowledge are usually done at universities… But it is also probable with our older models*
of veterinary education, where all the hands-on stuff has got to be done, that are rapidly becoming unsustainable.

No, it shouldn’t be exclusively for universities. Universities are a conditioned construct that society has got used to...a private provider could enter the veterinary market and the extent existing practices can be involved in the training process...and to some extent university veterinary schools already do this by accrediting some practices in their training programs

Oh yes, I think veterinary education should be confined to university training...for universities to continue they must maintain a very high value of time, enquiry and evidence; we don’t want to just produce technicians which would result if taught outside university. Even today there is a strong tendency for veterinary graduates to become technicians... Universities try to do what they can and they certainly don’t do a perfect job of it.

I think it does have to be at the university because of the underpinning of science and that makes the assumptions that only universities can do it. A private veterinary school is out of the question, because of cost.

Education isn’t just telling people how to do things, but how to think about things and university trains people how to think about things and how to solve problems as a foundation...veterinary science is a thinking profession rather than a doing profession...it is a different type of activity than being a trade.

How are veterinary schools funded?

Two questions were asked regarding funding of the university veterinary course. “Should students pay for their own education?” and “Funding has always been cited as a problem for veterinary education. Has that been a problem in your facility and has it gotten better or worse with time?” One being directed to the issue of who should pay, whilst the other was concerned with government funding.
Today, essentially all schools supplement domestic places with international places in order to adequately fund the program; about one third of the students are international and thus full-fee paying students. The Australia schools have sought international recognition to be able to tap into this market.

There is a great cost associated with the establishment and maintenance of a university veterinary school. In most, if not all, cases the rest of the university has to subsidise the veterinary school. The school receives a number of dollars, but spends much more than they earn, hence the need for subsidisation and this causes resistance within the university.

Government funding for veterinary programs is insufficient and has gotten worse...the funding hasn’t kept up proportionally to the cost, but of more importance is the greater emphasis placed on companion animals rather than production animals and the costs consequently associated with servicing these species. Schools now have to have a clinical teaching hospital that has all the modern accoutrements as is required with modern technology and these facilities compete directly with general clinical practice and specialist practice.

Funding to veterinary science was being dramatically reduced, so their effort was to raise this issue and this led to Frawley.

The fundamental problem is that the universities don’t understand the need for clinical teaching or its cost. There are other areas where there is clinical teaching, such as dentistry and medicine and these are heavily funded by the government. Diagnostic facilities and hospital are funded by the government, but with veterinary clinical teaching funds have to be generated and these have to be provided by the veterinary school. The people with the money do not have a clear understanding of the cost of clinical teaching.

The first thing you have to know is that all vet schools lose money. There is no such thing as an Australian veterinary school that doesn’t lose money.

Money is the big problem of vet schools and has been since the beginning. First of all, we all know that without Medicare underpinning veterinary
services we don’t have the benefit of government subsidised teaching hospitals and this is one of the biggest killer blows.

The assessment process dictates what you can do and by continuing to meet these requirements leads to the development of non-sustainable veterinary education. This process has had its day and is not sustainable any longer.

**Should there be a national veterinary curriculum?**

At present there is no common or national curriculum for veterinary science in Australia and this question was asked to gauge interviewees response to such an idea.

_I believe there should be a national veterinary curriculum, if not a national veterinary school, of which all existing veterinary school are all part of it. We don’t have enough specialists across all the disciplines across the board in all the vet. schools in Australia to be running multiple speciality units...At present, each school chases the other schools’ staff. The vet. schools don’t get on with one another and they are all in competition with one another...There is no justification not to have collaboration and a national curriculum to reduce the overall costs of the schools...We are in the electronic age and the travel age so not only is information readily accessible, specialists could travel from one school to another._

_The one thing all schools are highly protective of is its curriculum._

_The issue for the veterinary schools, of course, is that of accreditation. The Australian Veterinary Boards Council has a committee for accreditation of veterinary schools during the development of their curriculum and then periodically afterwards every 6 or 7 years. The accreditation is very closely aligned with the Royal College of Veterinary Surgeons in the United Kingdom, which is also aligned with European accreditation bodies._

_To a large extent as long as we are producing veterinarians that are registrable, the veterinary schools are limited in what they can do to alter the curriculum...veterinary schools can’t divert too far from the standards_
that are prescribed... And this imposes a degree of conservatism on the schools.

I am fundamentally opposed to the idea [national veterinary curriculum]. Even though we have gotten in a mess, the whole story of central planning is marked with failure...which stops innovation and we need universities to innovate a range of different things that are going to work. We now operate in a market place...I have observed vitality in a de-regulated society.

No, I don’t think we should have generic vet schools; you must not forget that you have this registration, accreditation issue...Competition between schools is not unusual...There is no question that universities have been corporatized and there is no question about that and I think many are losing their way; there has been a push to divert money from teaching to research. The biggest challenge we have to face is the changing nature of tertiary education, universities have a number of courses, some of which make money, whilst others don’t and now there are external pressures who teach the cheaper courses and making money and this is against other pressures of prestige and the pressure is on to take in more students. In addition, there are some serious structural issues.

Why set the selection of veterinary students so high?

Student selection for entrance to university veterinary courses is a thorny issue, so two questions were asked on this subject. “Is academic score the only way to select students?” and “Can you give a reason for the very high academic admission requirement of students entering veterinary science?”

The reason we use a high ATAR score is because we can and although I don’t agree with the system, I don’t have an alternative system.

I would prefer a system based on a combination of academic score plus a statement of their intent...We select students based on their ATAR score and a statement explaining why they want to be a veterinarian and they need to show experience and exposure to animal industries.
The top 2% of school leavers are academically selected...I do not advocate an interview procedure...I don’t see that these other procedures are an improvement on academic score.

All decisions about veterinary education should be based on objective facts and so I prefer to use the high ATAR academic score.

Universities have tried a variety of means to select candidates, for example, by interviews, but students can learn to say what the interviewer wants to hear. One of the curious things is that if you ask a veterinary student why they want to be a vet. they almost always say because they love animals. If you ask a medical student, why they want to be a doctor, they never answer because they love humans.

No one claims that you need 98% academic score to do vet. science...The course is much less difficult than it used to be. In the olden days it was much more knowledge intensive course than today. Then you had to learn and be able to regurgitate information...there are probably 50 per cent less lectures than in times past. You don’t have to be extraordinary intelligent to pass the course today.

The method at ***is an interview, which isn’t ideal. It's expensive to do, but we have a particular reason for selecting certain students from rural areas, because of the nature of the course. We don’t get it right all the time, but we end up with some terrific kids, who had no chance of getting into a traditional school. I describe it as a dream factory – people who dreamed of becoming a vet., but never had a chance and now they can.

What was your assessment of the Frawley Review?

All interviewees were given the opportunity to express their opinion of the Review of Rural Veterinary Services (Frawley Review)

The Frawley Review failed completely in restricting the development of other veterinary schools.
I took no notice of it because there was nothing in it for us.

I consider that Frawley brought about significant changes in veterinary education.

Our school has brought in a number of recent changes – changes in which Frawley had no direct effect. However, they did occur after Frawley in response to the problems raised by Frawley.

It became clear fairly early on that the government was not going to run with it and from that point on it became a resource you could use to bolster your case when you wanted to do something by stating that this project was consistent with Frawley.

We don’t teach economic livestock anymore and that is what precipitated Frawley.

My own interest in Frawley was the recommendation about the number of veterinary schools; the reason we should stay at four schools was the lack of demand for veterinary services in the bush and that, to me, was the principle issue Frawley raised.

There was no connection between the Frawley Review and any requirements on the veterinary school or anything requiring the registration bodies to take action. All the various implementing agencies were independent and totally free to pay attention or to pay no attention to any component of the Review and so over all they paid no attention.

The new spate of veterinary schools in Australia, the UK and Canada have come about because that production animals are no longer relevant in established veterinary schools...Frawley has precipitated this change.

Frawley was good because it raised the profile of rural practice and I believe we responded and we are still doing so with our teaching of farm animal medicine... however I have to say that the majority of our students don’t go into food animal practice, they talk about it when they get through, but the pressure of family and debt and one thing or another the majority go into small animal practice.
Since Frawley the big shift has been in government policy toward promoting younger people into higher education...effectually there are no caps on any education program regarding student number; any faculty can take as many students as they like...and now we are seeing the consequences as graduates cannot get jobs.

I came back soon afterwards, while it was still being debated and my impression was that Frawley was regarded more as a token, than a real work document. I know that certain recommendations were not taken on, so I have worries about Frawley in its effectiveness or weight in the big picture.

The other new schools didn’t start because of Frawley or despite Frawley; there were quite different drivers and Frawley was irrelevant to that. The information that was presented by Frawley was very important in the ethos behind the development of the Charles Sturt University school, but Charles Sturt didn’t start a veterinary school to overcome the problems that were described in Frawley, nor did James Cook University start a school for that reason, nor did Adelaide. The three universities decided to start their programs for their own reasons and if Frawley had made no report at all or differently, it would have made no difference.

I think it recommended that no new school be set up, but if you read between the lines, it actually said that there was a shortage; there was a need for veterinarians in rural areas. In addition, abattoirs and public health got a bit more prominence.

I could see at that time that there were significant issues politically. I thought we might be able to get something because there were murmuring about rural issues – rural doctors, rural vets, and rural status... it was realised that the finances of the vet school was an impossible equation...The spin on the story was we needed more vets in the bush, and we needed better management of the vet schools.
What changes have you observed in veterinary education?

Because all interviewees were long serving academics they were asked to comment on the series of changes they had observed in all aspects of education, including administration, teaching, research, philosophy and direction, during their tenure at university.

When I graduated a large number of students were bonded to government service. Most of the others went into rural practice working with farm animals. Today, that is not happening as a very small percentage are working in large animal work.

The main shift I would see would be an increase in focus on urban veterinary practice. Associated with this has been a change in the role of animals in our society. In effect, you can expect the same care for your pet as you will receive in a human hospital. There is a tendency to increase the focus toward clinical management of the individual animal.

All current veterinary schools are concentrating on problem solving skills, but there is a tension between that and the enormous volume of information the students receive and I don’t think any of us do that as well as we could.

Up until the 1990’s there was an emphasis on developing veterinary scientists first, so each student received an awful amount of anatomy, biochemistry, pathology, before they were exposed to clinical material, that is almost universally not the case today. This means that the foundation sciences are now being reduced. This is being promoted as the reason for DVM. Gain an understanding of the scientific subjects by doing an initial science degree and then specialise in veterinary science which is heavily directed to clinical material and this can be accomplished in a postgraduate DVM.

Another change is the concept that the lecture is bad, it is reciting a chapter in a text book to the students who then writes it down. The purpose of the lecture is that somebody who has an understanding of the topic and understands the difficulties of the subject is able to explain and clarify
aspects of the topic so that the student is better able to grasp the whole complexity of the subject...the DVM program has virtually abolished lectures, it doesn’t recognise that the benefit of the lecture is to help the student and give them information they need...Doing away with lectures – today’s dogma – avoids teaching principles.

The new schools have had a focus on training people from rural, regional and even remote regions and they have been relatively successful and I would say we have fulfilled our mission in that regard...The vision was essentially tropical, rural and remote reflected in our selection process of student, and this is the basis why two new schools...were established; they were established as a new sort of enterprise, having rural, regional and remote cutting edge.

The assumption you made regarding who drives the change is incorrect. It’s not the Federal Government and it can’t be, as the only weapon they have got or had is funding university places. They don’t build the universities or colleges or schools and they don’t even have a big say in where they go... a lot of people, including those who should know better, in my opinion, say the Federal Government should stop new schools being built, or they should do this or do that, but government has very little to do with it. It comes down to a regional, local, university decision and that all they have to do is to get the Federal Government to allocate so many funded positions.

The school offered three things that were different...they offered a university environment in an agricultural setting...The veterinary program had a very strong flavour preparing graduates for work in the livestock industries, not just rural practice. It provided everything from epidemiology to production animal medicine. The third thing it had and still has is a selection of students that come from and have rural animal experience before they apply to enter the program and so they are not shocked by the emphasis set by the school.
What is your assessment of the feminisation of the veterinary profession?

One of the many significant changes to occur in veterinary education is the growth in female student enrolment, so the question of this change in demographics was asked of all participants.

The males that apply have gone down dramatically and the females have gone up – the trend has been apparent since 1986.

We reached a 50/50 ratio in 1985 and now we are looking at 85% females. Why? It’s not because they are more successful at getting into the courses, it’s because males don’t want to get into veterinary science, because it is too long and doesn’t pay well enough.

There are female vets. that compare with any man; 5% to 10% of women can hold their place in a man’s world.

People of our vintage went into veterinary science because we enjoyed working with animals, however, a lot of people now go into veterinary science because they love animals; the two things are not totally the same.

I’m not that exercised about the gender imbalance and I think it probably works in the profession’s favour in that quite a lot of women graduates want to work part-time for a period of their lives or maybe a large part of their working lives and if it wasn’t for that the issue of oversupply would be much more front and centre.

I saw the change-over starting as an undergraduate and I saw it happen when I was on staff... We shouldn’t think or worry about that because that what’s happening across a lot of educational spheres. The ‘breadwinner’ male, no matter what the vocation, at some time, says I want to make money and he goes where he can to do that and that is not to be found as a veterinarian.

I don’t know why men are not more interested in doing veterinary science.
We know that men are staying away in their droves and I’m pretty sure its economics, but we don’t understand what is driving the females into the profession.

One of the arguments about us producing too many veterinarians has to be countered with we have a female majority and many of them will take time-out to do other things, have families and do the normal family things. They are not what we call, in the academic world, FTE’s – full-time-equivalents; no they are not and when you take out the 30% foreign graduates where the majority go home, you then have to reconsider and have another look at the figures regarding overproduction...We have to acknowledge that a lot of our graduates will not have careers as veterinarians and using female drop-outs as a means to justify production of graduates is a dangerous one to use because it undermines a lot of things that support veterinary schools.

The guys we have are country boys, who have done another degree and many turn out to be academically very good, but they are also older than students coming straight from school. We know that there is nothing in the profession that the female graduate can’t do. The safety problem is no longer an issue as it used to be and the physical issue is no longer a worry. I really don’t see that there is a problem; I don’t think feminisation is a problem.

What is your opinion regarding the oversupply of veterinary graduates?

A further dramatic change has taken place regarding veterinary output of students from Australia’s universities, so participants were asked to comment upon this phenomenon.

This has been in position for a long time and I think there are too many schools now. Only about half the vet. graduates end up in practice and it is not exactly economic to train vets. to fill other than vet. positions.
I don’t think we have enough data on that; anecdotally people talk about us producing too many vets. I think the AVA’s attempt to determine this is flawed, because it doesn’t appear that the data it is capturing is what happening to veterinarians who aren’t members of the AVA.

Many deny there is a problem. The starting income of graduates is evidence of oversupply - $40 to $50K is not much money for the requirements of a veterinary career – we all understand supply and demand. How are graduates going to pay their HECS?

Yes, there is an oversupply. When we had just the four veterinary schools there was a lot of discussion then that we should cut down to three. Three would be ideal, and seven is ridiculous and if you consider Massey then having eight schools within a population of 25 million or so is way oversupply.

The girls, because they weren’t full-time equivalents, tended to mask oversupply. If we continue to supply more than the market demands, then the unit price will reduce.

My personal view is that we are producing too many vets. I’m very concerned that Melbourne is now going from 120 graduates to 180. I just think it is madness; it was madness to open James Cook, as it was in opening Adelaide, and I am not entirely convinced there is a case for Wagga Wagga either; all are just a waste of money.

I think it is as plain as the nose on my face that we have too many graduates. Basically, the veterinary schools at the moment, the model doesn’t work, funding doesn’t work. Most vet. school lose money so they will do more of the same.

All veterinary schools are competing. Although the profession is changing demographically, poor salary is an issue and I’m convinced that there is an oversupply?

The biggest problem facing the profession will be oversupply, if it hasn’t arrived it soon will.
The AVA is pushing this, however the data the AVA has used has been questionable; in fact, how do you measure this? The graduates coming out of the new schools are all getting jobs, every one of them got a job...I don’t think there is an oversupply, but I don’t think we need more graduates than we have now.

**What is your assessment of the changes in veterinary qualifications?**

Equally significant has been the change at some Australia veterinary schools of a different qualification and this issue was raised with participants.

*The introduction of the BSc BVMS, instead of the traditional BVSc at Murdoch, was the Foundation Dean’s idea. He wanted the students to have some recognition within three years with a science degree and give them the option of leaving with a qualification. For the others, when they complete the final year, they received a veterinary degree. There was no talk of this being construed as a post-graduate degree.*

*I am responsible for introducing the DVM degree. The veterinary program is 5 years long with the first 3 years produce a BSc degree in veterinary biology and the last 2 years a DVM. The curriculum and duration has changed significantly.*

*We introduced the DVM qualification as a post-graduate degree. This helped to increase the market for students. The degree DVM is simply a brand!*

*Emphasis in teaching and thus curriculum has shifted from a balanced approach to economic livestock, to a gross increase in focus on urban small animal practice.*

*Today, the graduating veterinarian see themselves as the equivalent to a specialist in a human hospital and this change is a big one for educationalist. The tendency has been completely towards clinical management of the individual animal.*
We want to produce students that can solve problems and think for themselves. Are we doing that? I suspect we are not.

The main species to be taught in the DVM program are dog, cat, horse, cow and sheep.

We haven’t discussed it here... A lot of people here feel that we would have to change our focus, our vision, to accommodate this change...I don’t get too fussed about it. It is just one of those things we aren’t going to win on and I have other issues that are more important.

We are going to a DVM because of the way universities are funded. The DVM is a post-graduate course-work degree everywhere. The DVM is a post-graduate degree...our graduates do a three-year veterinary bioscience degree and then they do a three-year DVM... the DVM is recognised internationally as a veterinary program, as a veterinary qualification better than BVSc and so there is some appeal to international students.

DVM is being considered and introduced partly out of conformity, but partly as an economic reality. The money flows as a result of the DVM, however, it’s going to become a post-grad degree and will take 7 years to attain...We could have gone DVM, but didn’t; we teach across 12 semesters and we have a research stream. We have everything needed to teach a DVM and by changing half a dozen subjects, we could, but we decided not to for several reasons – one is, as you say, it has become a brand, but the barrier for us, to be perfectly frank, to teach a DVM as the equivalent of a Master’s degree requires that every member of the teaching staff for a DVM has to have a PhD. With established universities that may not be a problem, but if you have clinicians who do not have a PhD, you can’t have them teaching for a DVM, so we made the decision not to.
How do you view the changes in the balance of animal species being taught?

Participants were asked to comment on the shift in teaching from a balance of companion animals and livestock to an emphasis now on companion animals.

I am sympathetic to the view that the reduction in teaching of food animal veterinary work should not be encouraged.

The movement of interest in teaching and research has gone from economic livestock to companion animals.

I regret that the focus of veterinary attention has gone almost completely from production animals to companion animal care.

Today because of the heavy emphasis on companion animal clinical teaching, I think that for veterinary students to undertake farm animal work they would need further training – post graduate – in areas such as consultancy.

The course is now overcrowded with clinical work and we need to get students looking at other things, such as government work, biosecurity, epidemiology, research and in addition farm animal work.

Earlier, the emphasis was placed on veterinary science, which is rapidly changing into emphasis being placed on clinical skills.

The declining number of veterinary students who want to go into large animal practice is due to a number of reasons...there is a smaller number of students exposed to rural life-style or rural animals and they are not used to working with livestock and so they don’t consider it...Inevitably the higher score required is achieved when attending the city school.

There is an upsurge in the popularity of small animal practice as portrayed in the popular media and this becomes very influential. Next, is the financial viability of small animal practice which is quite high compared to rural practice which is under siege by a series of multiple providers producing para-veterinary services...In addition there is the declining social
desirability of rural life as opposed to city life. The young people of today are not like the young people of yesterday.

We are interested in production animals, but most of the work on production animals was done by the government and from the 60’s government veterinary services spiralled down to become almost insignificant.

In the 60’s preventive medicine was promoted, but that was lost in the 80’s and early 90’s with people who were interested in production animals disappearing. Attempts were made to reignite interest but even the diagnostic capacities of government contracted...Today herd health has moved into a specialisation, but all those who have expressed interest in these preventative areas are coming up for retirement and there are no others to take their place.

I regret that the focus of veterinary attention has gone almost completely from production animals to companion animal care. Today it is a different profession from the one I entered.

The difficulty for modern Australian veterinary schools is to provide adequate exposure to production and food animals, whilst at the same time meeting accreditation requirements.

Discussion

Central to the issues raised by the Frawley Review in determining Australia’s future animal health needs and the part to be played by veterinarians is the education of those veterinarians.

Frawley made three things clear regarding veterinary education; firstly, that there was no case for increasing the number of veterinary schools; secondly, rural practice was experiencing difficulties securing and keeping graduates; and thirdly, education of undergraduates in economic livestock was inadequate (Frawley 2003).
Frawley concluded that the four Australian veterinary schools provided education that was of a high standard, nevertheless concerns were raised regarding funding, shortage of livestock specialists, course content and student selection.

The review highlighted the funding problems being faced by veterinary schools and the necessity for admitting full-fee paying students. However, it also considered that the need for constant attention to raising money could have a detrimental effect on the core issues of a veterinary education and could lead to a lowering of standards.

Course content was raised as a concern in the Frawley Review because two things had become apparent – there was no common curriculum between the veterinary courses taught at the different universities and there was concern with the decline in the teaching of production animal species in favour of companion animals.

Furthermore, Frawley highlighted that domestic student selection was based on an extremely high academic entry requirement, labelled “the highest for all courses” and this meant that many capable individuals were being denied entry.

Frawley recommended that a separate review of veterinary education be undertaken by the AVBC. This latter review recommended a mentored transition for new graduates into practice, a need for post graduate specialisation, implementation of a minimum level of continuing education for graduate veterinarians and co-operation between the various schools (Craven 2004). However, from the survey of graduate veterinarians (Chapter 4), it was clear that less than half of the respondents received adequate mentoring on graduation.

Frawley considered that there was a likelihood of a shortage of economic livestock specialist within 10 years. The ANZCVSc and the Veterinary Surgeons’ Board of WA Annual Registers (2006-2014) have confirmed a trend of diminishing numbers of economic livestock specialists. There have been only two livestock fellowships awarded by the ANZCVSc since the release of the Frawley
Review and, in WA only two of 56 registered specialists, were livestock specialist and both were retired (ANZCVSc and WA Annual Register 2014).

The responses from academics summarised in this chapter were relatively consistent. Frawley failed because its recommendations were not enforceable; it offered no benefits to adopt its recommendations, nor punishment for ignoring them. Frawley lacked resources and government support and it failed completely to prevent the establishment of the three new schools.

Interviewees agreed that Frawley did not bring about education reform. However, as Frawley actually represented a response to a series of changes over a considerable period of time, its concerns were genuine, even if its recommendations were ineffective and were ignored.

The defining answer given by interviewees to the purpose of education was to gain registration for its graduates, which was the same position faced by Kendall’s graduates in the late 18th century (Albiston 1951; Taylor 1992).

Although causing discomfort to some interviewees, it would appear that a prime objective of the veterinary school was its self-preservation and others have made similar observations (Heath 2007; Smyth 2016).

Funding was an issue with the initial Australian university veterinary schools and it is still an issue today (Anon, 1925; Clements 1976; Frawley 2003).

In the book, “The Dawkins Revolution” there is a comparison between undergraduate numbers between 1987 and 2011. The proportion of veterinary students of the total number of tertiary enrolments fell from 0.4% to 0.2%, indicating the relative small size and significance of veterinary education in the totality of tertiary education in Australia (Krause and Reid 2013). As universities rationalise in the future, veterinary education may be seen as superfluous to their business models, especially given their high cost.

There isn’t a national veterinary school or a national curriculum in Australia and, as a result, each school produces a different graduate, yet all expect that their
graduates will be registrable and employable. Interviewees considered that accreditation ensured quality control of the student’s competence and for practical purposes this may be correct. However, there is a great deal of variation between the capabilities of new graduates, both between and even within schools (Smits 1978; Coleman et al 2000).

The general answer to why the academic level for entrance into a veterinary school was set so high, was because of the large number of applicants for a limited number of positions within the veterinary courses. Consequently, this generated the belief of “we can set the bar as high as we like”. However, none of the interviewees claimed that this was ideal.

Many of the interviewees expressed their opinion as to why there are so few male veterinary students. Heath has examined this issue of gender in his surveying of the professions series (Heath 1998, Heath and Niethe 2001, Heath 2002, 2005, 2007, 2008). The predominant opinion of respondents was that males are not interested in a veterinary career, primarily because remuneration was not high enough. In the survey, reported in Chapter 4, the high percentage of responses indicating concern with veterinary income supports this conclusion.

Lofstedt (2003) suggested the following as reason why males have lost interest in veterinary medicine;

(1) the reluctance of men to enter careers with low or stagnant incomes (the case in veterinary medicine for some time); (2) loss of autonomy in the profession (associated with the proliferation of corporate practices in the United States and a general decrease in the number of practice owners relative to employed veterinarians); and (3) a “trend effect” (as more women enter the veterinary profession, it decreases the professional prestige as a male occupation) (2,3) (Lofstedt 2003).

There was a varied response to the question of oversupply of veterinarians, from rebuttal to general acceptance of it as a fact. The reason for this is not difficult to determine. Two conflicting forces are at play, namely, the need, as a financial
necessity, for university veterinary schools to take on more and more students, as opposed to the fact that domestic overproduction is leading to the situation where some graduates experience difficulty finding employment and have to accept reduced incomes to obtain that employment (Heath 2007).

This and related matters have been the subject of much discussion recently in Australian veterinary industry magazines, such as Vet Practice; (https://vetpracticemag.com.au Accessed November 2017).

There are perceived advantages in changing the qualification of veterinarians from BVSc to DVM, in Australia. The BVSc has limited application and is confined primarily to Commonwealth countries such as Australia, New Zealand and the UK, whereas, the DVM is considered the international qualification for veterinarians. There is also a financial incentive for Australian universities as the DVM degree will attract full fee paying international students.

The question regarding the decrease in teaching of livestock diseases in favour of companion animals concerned a number of interviewees, most being old enough to remember the central position once held by economic livestock. However, in the future there will be Deans and Heads of Schools who may be unfamiliar with this history and may not be disturbed by the change in emphasis placed on the different species.

What changes, if any, have taken place in the issues raised by Frawley?

Funding remains the central problem for the veterinary schools with each having to develop novel ways of creating revenue streams.

There is no national curriculum and little likelihood of one in the near future and although accreditation criteria define the range of animal species to be taught, the trend away from economic livestock and toward an increasing concentration on companion animals remains.

Some schools have devoted a great deal of attention to a change to a DVM degree with two providing this degree as a post-graduate qualification.
Student selection is biased and debate continues as to the pros- and cons- of introducing subjective selection assessments to the traditional academic score.

Both the number and proportion of economic livestock specialists have declined in the period since the release of Frawley.

Veterinary education problems are not unique to Australia; the same issues are occupying veterinary academics overseas (Vaughan 1978; Halliwell 1999; Blackwell 2001; Eyre 2001; Radostitis 2002).

Conclusions

The conditions that led to the Frawley Review being undertaken have continued. Frawley failed to stop further veterinary schools being established in Australia and other recommendations have also failed to benefit veterinary education.

It can even be claimed that Frawley precipitated the development of three new schools that hope to produce rural veterinarians. Only time will tell if these new schools, with their bias toward rural students and rural service, will prove successful.

Opinion among veterinary educators regarding Frawley varied. However, as its recommendations lacked implementation power, little direct action was taken.

The four central questions regarding Australia’s veterinary education are: what should be taught, who should teach it, who should receive it and who should pay for it?

The research conducted in this thesis examined the status of veterinary services, animal quarantine and veterinary education in Australia during the first 100 years and that now leads to a consideration of alternatives which will be examined in the following chapter.
Chapter 7. Are there alternatives and what are they?

I thought the changes that took place in the last quarter of the 20th century, which resulted in the decline in veterinary services, quarantine and education, could be managed by altering the current models to address and correct the problems. By the completion of the study, my thinking had changed. The current models may no longer be serviceable – that is, they may be obsolete. For there to be a future for veterinarians and their services in Australia, new models may need to be developed.

What is a veterinarian?

Firstly, it is appropriate to examine what it is to be a veterinarian and what society expects and requires of them.

A veterinarian is educated to provide a problem-solving health service to animals in much the same way as the medical professional provides their service to humans. A veterinarian provides health care to animals. They are educated in veterinary science to university standard and, through the process of registration, function professionally.

The purpose of a scientific education is to use the scientific method to discern between truth and falsehood, fact and opinion, veracity and propaganda, when dealing with various alternatives in the natural, material world. As a veterinary graduate, one should exercise the ability to think critically, test results and increase veterinary knowledge (Dunlop 1977).

Veterinary roles include those in practice: a clinical service for companion animals and livestock and a consulting role in the production of meat, milk and fibre. Other roles include diagnostic services, animal quarantine, teaching, research, animal protein production, animal welfare and wildlife.

Veterinarians provide a professional service based on a knowledge and application of veterinary science.
Veterinarians historically were not pharmacists, wholesalers, retailers, bureaucrats, showmen or entertainers. Nor were they purveyors of livestock products, such as dips, drenches, vaccines or dog and cat food. However, in recent times veterinarians have branched out into providing these services and performing other procedures, such as chiropractic, acupuncture, homeopathy and animal behaviour.

What is veterinary service?

The range of veterinary services, enunciated by Seddon (1961) still hold true – Veterinary Practice, Veterinary State Disease Control, Veterinary Research and Veterinary Education.

Veterinarians operate in private clinical practice, government service, teaching and research and the relatively small number of pursuits categorised as “Other or Sundry”.

It is essential to understand that the veterinarian is a service provider, some may opt to value-add by the provision of ancillary services, but essentially the veterinarian provides a service and the knowledge and skill of that service resides within the veterinarian.

The animal-owner seeks the services of a veterinarian because of their education and training in animal health and disease and their ability to use that in resolving problems in their animal. Currently, the most common and obvious employment of a veterinarian is in clinical practice. It is the situation that the general public are familiar with because it resembles that provided to humans by members of the medical profession.

An animal is presented with a problem and the veterinarian, through the means of history taking, physical examination, clinical signs, and the use of diagnostic aids, seeks to identify the cause or causes of the problem and then by therapeutic means, manage the problem. The goal being to return the patient to
health as quickly as possible. In addition, veterinarians in clinical practice routinely undertake preventive medicine procedures such as vaccinating in order to protect presented animals from being exposed to serious infectious diseases.

The veterinary clinical situation involves three entities – the animal (patient), the owner (client) and the veterinarian. The veterinarian provides a service to the patient, but judgement of that service lies with the client. It is the client who determines if a therapeutic regimen will be undertaken or not.

The veterinarian attempts to solve the problem of the patient, within the constraints imposed by the client. No better example of this can be seen than when a solution is available for a presented case, but for which the client cannot or will not finance the therapy.

Those veterinarians in clinical practice establish facilities, provide medication, equipment and staff to service client’s requirements and charge fees for doing so. They deal directly with the animal-owning public. Whereas, those working in institutions, such as government, university or industry, generally are paid a salary and serve the purposes of the institution which employs them. Most of the latter do not deal with the animal owning public, except those who occupy clinical positions.

Today, government veterinary services have primarily contracted to administration, regulatory and diagnostic services and university veterinary schools establish clinical facilities for the purpose of training students, but which compete with their private practitioner colleagues.

**What about specialisation?**

Initially, the veterinary surgeon attended health problems in all animal species presented to them, primarily domestic species, but, using first principles when presented with exotics or wildlife. The imprimatur of a university education
ensured that veterinary graduates were “specialists” in veterinary science and thus animal health.

During the profession’s early development, some individuals focussed on specific aspects of veterinary science and these represented the first attempts at specialisation; for example, some became bacteriologist, whilst others became pathologists or parasitologists. Those that did so usually sought positions in government, university, CSIR/CSIRO or industry.

At the same time, there were those who sought to specialise in the clinical servicing of specific animal species. For example, veterinary surgeons who concentrated on horses, livestock, poultry or small animals. Some developed great skills in the servicing of these species and were recognised as specialists by their veterinary peers. This situation developed over time and was based on merit; they were recognised as possessing extra knowledge or skill resulting from experience in referring cases to them. However, all clinicians were expected to be able to treat by medical, surgical or obstetric means, every case in any animal when presented and this was the position until the last 20 to 30 years of the 20th century in Australia. These developments proceeded gradually and could be considered to have evolved naturally.

Modern specialisation, by post-graduate study, was encouraged within the veterinary profession, because it had been seen to be part of the development of the medical profession.

The establishment of the Australian College of Veterinary Scientists, now known as Australian New Zealand College of Veterinary Scientists (ANZCVS), sought to bring that which had evolved naturally to official status by the formal conferring of specialist qualifications.

Since the 1970’s, individuals have sought to gain college qualifications, so that they could function as specialist, referral veterinarians. Although the number of specialists is relatively small in comparison to the total veterinary population, it has become an established part of the veterinary scene in Australia.
In its publication (Anon. 2017), the Australasian Veterinary Boards Council Inc (AVBC), which administers Australia’s Specialist Registration, listed 27 specialist categories. The qualifications accepted for specialist registration in Australia requires Fellowship standard for Australian and New Zealand candidates and Diplomate standard from American, European and Royal College candidates. The rationale used by the AVBC for registration is;

*A veterinary specialist is a registered veterinarian with an exceptionally high level of skill well above those of general practitioner in the same discipline. A specialist must have undergone extensive advanced supervised training, culminating in the passing of a rigorous set of examinations...to ensure that the public has access to advanced veterinary expertise* (Anon. 2017).

What has been the result? The provision of specialisation has been welcomed. Today’s veterinary graduates qualify as veterinarians, but those in clinical practice are required to inform their client that specialist services are also available. New veterinary graduates today have not been educated or trained to undertake the tasks that require specialist knowledge. This differs completely from the early situation, where those with the qualification of veterinary surgeon were considered capable of dealing with all problems of all species.

Has this come about naturally or has it been forced? Are those possessing the basic veterinary qualification being limited in what they can do?

Veterinarians graduating during most of the 20th century were considered “specialists” in the field of animal care and with varying degrees of competence attempted to resolve all that they were presented with. Not so with those graduating during the latter part of century or with those graduating today. They, like the medical counterpart, have been relegated to the role of General Practice (GP), capable of dealing with the day-to-day issues of general practice, such as vaccinations, simple medical management and limited surgical management. However, for challenging or complicated procedures, the veterinary GP is to
advise the client that specialists services are available and they may prefer a second opinion on or a referral to such services (Rosenthal 2007). Note, the issue is not whether the specialist is more competent or capable; the issue is the possession of a specialist qualification, gained through course-work and recognised by the various Veterinary Boards. This move to specialisation has deprived the veterinarian of utilising the skill that they might have, in deference to the specialist.

The acquiring of a basic or specialist veterinary qualification, are artefacts! They are constructs to facilitate human interaction, put in place to facilitate effective service. Constructs or traditions, that over time, achieved acceptance within a society and are almost entirely self-regulated.

An observation I have made, which may or may not be relevant, is that veterinary specialisation has coincided with the predominance of female graduates. Perhaps the female graduate, who often works part-time and may take time away from their veterinary career to raise a family, welcome the presence of specialist colleagues.

University veterinary schools educate their undergraduates to use specialist services for challenging cases, who, up until the most recent of times, were employed at those same universities in their clinical hospitals.

**What about Animal Welfare?**

Most members of the public would consider the veterinarian a champion of animal welfare and to a degree this may be true, but there are occasions where animal welfare becomes a secondary consideration for the veterinarians.

Animal welfare has become of topic of interest for the general public and veterinarians have responded by advocating a role for veterinarians in the debate between animal protection and rights proponents and animal producers (Ladewig 2008: Berry 2014).
In a communication recently received by this author, the following examples of how veterinarians fail the welfare test were raised;

*Vets. who work on behalf of commercial animal breeding and rearing enterprises often allow commercial viability, and personal income, to take precedence over the humane treatment of animals; caged birds, de-beaking, farrowing pig crates, intensive pig fattening.*

*Extensive animal production – dairy, sheep, pigs etc. – there are a range of activities which, if animal welfare were the prime consideration, would not be sanctioned by the vets. who service these industries: the physical consequences of breeding cows for maximum milk production; de-horning and de-tailing of dairy cows; hot branding, mulesing of sheep, allowing sheep to die during droughts.*

*Greyhound racing – this is primarily a financial enterprise serviced by specialist vets. – the dogs have value only as long as they are racing well; slow or injured animals are destroyed as being of no use...The practice of blooding new dogs using live rabbits and other animals.*

*Horse racing – money determines the fate of thoroughbreds, slow horses end up at the knackers. Euthanasia for injuries. High risk of racing especially over jumps.*

*Oceanaria – dolphins and orcas that normally roam free in the ocean develop abnormal behaviour when confined in small pools.*

*Pedigree breeding of cats, dogs and other pets, breeding for desirable characteristics produce abnormalities in which vets. are complicit. Euthanasia performed on animals that don’t conform. Puppy farms – no veterinary inspection of breeding establishment.*

*Production and use of experimental animals. Export of live cattle and sheep. An activity that should be banned and produces no response from the veterinary profession condemning it.*

*Halal and Kosher slaughter – slaughter practices may be inhumane.*
Conservation – control of feral animals neglected by vets., killing elephants for ivory, rhinos for their horns, sharks for their fins, seals for their pelts (personal communication, retired veterinary academic).

This catalogue of animal welfare failures indicates the disappointing track record of veterinarians as animal welfare “agents”. To balance this, some veterinarians have documented a more positive role for the veterinarian in animal welfare (Ladewig 2008; Berry 2014).

Private Practice: Companion animal practice in urban Australia

Private clinical practice is the major employer of veterinarians in Australia and is divided into urban companion animal practice and rural large animal practice. However, the great majority work in small animal practice located in either urban Australia or major regional centres with Heath (2007) estimating that not more than 12% of Australian veterinary effort is devoted to farm animals.

Dogs and cats were once referred to as pets, but now have achieved the status of members of the family. They occupy a special place in the owner’s affection. Today, the horse has become included in this category as they too are loved. In addition, the horse is utilised for its racing prowess and this introduces gambling and entertainment into the mix, so there is also a financial incentive to seek veterinary attention.

Whilst many veterinarians are employed in small animal practice, there are relatively few employed exclusively with horses.

The demand for companion animal veterinary service is not likely to decline. As a society becomes more affluent it spends more of its disposable income on products and services that are considered non-essential (Dunlop 1977; Knight 1978). However, the rate of growth of companion animal practices is not matched by an increase in the population of these animals. This means that the supply of veterinary services in the future will outstrip demand and unless there is an increase in the amount clients are prepared to spend on their animals that
will lead inevitably to diminished returns (Dunlop 1977; Knight 1978; Frawley 2003; Heath 2007).

It is likely that this will affect certain practices more than others. Already, we are seeing many practices adopting merchandising to support practice revenue.

A recent innovation in Australia has been the establishment of corporate practices as an alternative to the traditional owner-operated practice and this represents an entirely new business model which can offer economies of scale. In a half-page advertisement in the November 2015 issue of the veterinary industry magazine, “Vet Practice”, Glencross Vets, a corporate organisation, announced that they were to open a series of clinics housed within City Farmers pet retail stores in Western Australia. Similarly, in a full-page advertisement in the January 2017 issue of the veterinary industry magazine “The Veterinarian”, the veterinary corporate entity, PETstockVet, solicited veterinarians and veterinary nurses to work for them in their practices “located within PETstock stores”.

In a similar same vein, organisations where veterinarians group together to benefit financially by bulk-purchasing of veterinary and other items have formed to further reduce the overall cost of such items; for example, “UnitedVetsGroup”.

**Private Practice: Rural practice**

Traditional rural practice involving on-the-farm servicing of individual livestock still exists, but not on the scale of previous years (Needham 1958; Niederer 1958).

The finding in the survey reported in this thesis that less than 10% of veterinarians, service livestock on-farm, confirms this trend. Today, rural practice is increasingly dependent upon servicing dogs and cats for its survival (Morris et al 1972, Heath 2007; Maxwell et al 2008).
Although only one-in-three respondents to the survey agreed that rural practice was essentially a small animal practice, almost all of these same respondents acknowledged that there had been no increase in caseload or remuneration from servicing livestock since 2000 (Chapter 4). As a result, maintenance of practice income and viability has required the development of alternative veterinary services, such as servicing small animals, as well as merchandising veterinary and other products.

The realisation, during the first half of the 20th century, of the limitations of the traditional therapeutic approach to economic livestock led to the search for alternative means to service livestock producers (Cole 1958; Osborne 1958; Taylor 1958; Johnstone 1964). The resulting change to a consulting or contract practice was seen as the means to achieve this and, in today’s language, could be seen as “best practice”. However, the uptake of this type of veterinary service by livestock owners has not been widespread (Abbott 1988; Bell 1988).

Rural Consulting practice employs essentially the same methodologies as the therapeutic practice, but uses different technologies. A collection of animals is presented with a health or production problem. Through various diagnostic techniques, such as autopsies, research trials and other procedures, an attempt is made to determine the cause or causes of the problem and by manipulating the husbandry and management of animals and perhaps by administering anthelmintics, vaccines, or nutritional supplements, etc. attempts to return the group of animals to that which is considered acceptable health or productivity. This process requires considerable investment in time and so charging is not usually on a fee-for-service basis, but rather on a contract basis. This differs significantly from the therapeutic time-line and requires patience on the part of both the veterinarian and the client. The lack of instant gratification may contribute to the tardy uptake of Contract Practice (Osborne 1958; Johnstone 1965; Maxwell 1978).

The employment of veterinary surgeons by Australian agricultural enterprises has been tried on a number of occasions since the 1930’s, such as butter
factories and stock firms, but has not resulted in a substantial source of stable employment (Barker 1935; Carroll 1941; Cole 1962).

If there is no significant change in the provision of rural practice or alternative forms of employment and if agriculture continues its decline as a significant contributor to the Australian economy, rural practice will most likely continue to be a companion animal practice in rural Australia.

**Government veterinary services**

Early in the 20th century governments dominated the provision of veterinary service to livestock producers in Australia. All State and Territory governments, as well as the Commonwealth provided a comprehensive service via field officers and diagnostic specialists.

This changed when state-sponsored scholarships ceased in the 1970's and the number and proportion of government veterinarians in Australia subsequently dropped dramatically (Morris et al 1972; Widdows 1976).

This decline may have ceased, as there appears to have been a levelling out of the number of veterinarians working in government as seen in the data presented in the survey questionnaire and by the AVA (Neutz 2015). However, those working are predominantly focussed on the areas of administration and regulation, with nearly 70% of survey respondents agreeing that government veterinary service is now essentially regulatory.

The situation as seen in 1950, where the number of government veterinarians equalled the number of practitioners no longer exists and is unlikely to be seen again in the future.
Veterinary Quarantine

Australia has seen incursions of major exotic diseases, which have either failed to establish in the domestic animal population or were eliminated by eradication measures.

Since its inception, quarantine was seen as a function of government. At Federation, with the passing of the Quarantine Act (1908), quarantine was allocated to Commonwealth, States and Territory Governments and private practitioners were excluded from this activity and this prevailed throughout the 20th century.

Numerous reviews of quarantine have taken place and recommendations made to strengthen the quarantine capacity of Australia; however, in-spite of these measures, disease incursions still occur. With the trend to globalisation with greater and faster movement of people and goods between countries, the risks have increased substantially (Beale 2008)

One of the major quarantine reviews of the 20th century, the Nairn Review (1996), stated that surveillance and monitoring were essential components in fulfilling Australia’s international obligations and veterinarians had a central role to play in that work. However, with the reduction in government service throughout Australia during the latter half of the 20th century, the veterinary components of quarantine deteriorated and thus became a concern. Frawley declared that Australia’s quarantine system was under question and needed improving and since then other reviews have made further recommendations to this end. However, today, we have a system which gives the appearance of functioning, but, could fail if an exotic disease did enter Australia’s livestock population (Matthews 2011). Frawley’s answer was to establish the Australian Veterinary Reserve, but as time has demonstrated, this was not a successful solution.
Not only is the question, can our current system stand up to a disease incursion challenge, but also, does quarantine work? Could our good fortune in keeping out exotic animal diseases be serendipitous rather than due to our vigilance?

Quarantine has been practiced in Australia since the mid-18th century and consensus is that it is an essential method for maintaining our “clean and green” image; however, 80 years after the introduction of the Quarantine Act (1908), the Lindsay Review asked “Does quarantine work?” Today, nearly 30 years later, that question remains unanswered.

If quarantine is important to Australia, then an effective system of surveillance and monitoring must become a priority. Unless this takes place then it is only a matter of time before the next animal disease incursion strikes.

It appears that two matters need to be addressed. Firstly, should quarantine be the sole province of government? Perhaps the conduct, control and recording of quarantine data should be vested in a non-government entity.

Secondly, are veterinarian’s essential for the conduct of the surveillance and monitoring component of quarantine? Quarantine personnel were unanimous in stating that veterinarians were necessary and some decried the fact that in the past, veterinarians functioned more as technicians than as decision makers and leaders. If this is the case, then veterinarians should be effectively trained in this discipline.

The Frawley committee visited WA towards the end of their enquiry, when they had already decided to implement the AVR. When I presented the committee with an alternative program utilising dedicated private practitioners, it was dismissed. This program should be revisited and as the survey questionnaire indicated (Chapter 4), a significant proportion of veterinarians would be willing to participate if certain conditions were met.

A question in the survey asked “If a surveillance program of livestock was professionally conducted and commercially viable, would you be willing to participate?” and 50% of respondents replied that they would. Animal Health
Australia manages the National TSE Surveillance Project (NTSESP) to ensure that Australia remains free from transmissible spongiform encephalopathies and can call upon the co-operation of livestock producers as well as rural veterinary practitioners to participate.

The argument could be made that the Tuberculosis and Brucellosis schemes succeeded and could be duplicated here. It is true, these schemes achieved a desired outcome for the government which sponsored the program, but many private practitioners were critical of the conditions imposed upon them. There was discontent with remuneration, as there was with the logistics used for the campaign and the failure of government to work with practitioners in a partnership, instead imposing an employer/ employee relationship (National Brucellosis and Tuberculosis Eradication Scheme BTEC).

The conditions imposed during the 1970’s, would not be acceptable today. Equitable remuneration would have to be ensured and an arrangement with a long-term future would be necessary for this type of project to succeed.

In 2016, the Quarantine Act (1908) was repealed and replaced by the Biosecurity Act (2015). However, quarantine is still seen as a government responsibility.

**Accreditation and Registration**

Prior to the establishment of university veterinary education in Australia, an apprenticeship system operated (Caple 2011).

Accreditation was put in place ostensibly to ensure the quality of veterinarians graduating from Australia’s veterinary schools (Pryor and Egerton 1990).

Has this been achieved? Those who administer the system would most likely say yes. However, there is a great variation in the competence of veterinary graduates and as the accreditation process has been in place for a number of years, it could be seen to have failed to ensure the standard achieved by veterinary graduates.
As only those who have gone through the process of a university education can be registered, perhaps a good question would be to ask is accreditation in the public interest? For a veterinarian to be registered they must graduate from an accredited school and accredited schools award the degree for the purpose of registration. This constitutes a circular argument.

Accreditation is a regulatory requirement and as there is no national curriculum with each school pursuing its own agenda and conforming to their own interpretation of accreditation, does this constitute effective quality control?

A system has been put in place that is considered effective; every six years, a school advises the AVBC of its status and the board attends the school for a week to conduct its accreditation procedure (Crave and Strous 2004).

As a result of this arrangement, the accreditation committee approves curricula that differ substantially. This situation is open to criticism and possibly abuse. In the future, accreditation may be challenged or even abandoned.

In my opinion, veterinary registration may also be legally challenged in the future. With the release of the Hilmer Report in 1993 and the development of Australia’s National Competition Policy, veterinary registration could be viewed as anti-competitive and as a restriction to trade and may come under legal challenge.

If such a challenge was presented that the current registration procedure prevents individuals possessing skill comparable to university graduates, but who have received their education and training outside of the university system from practicing, it may succeed.

There is already the precedent where complementary alternative human health practitioners have gained acceptance by society and, in some cases, Australian universities have established courses for the teaching of these alternatives such as chiropractic and acupuncture.
Neither accreditation or registration assures competence. Both are artefacts that appear to ensure the quality of the graduate. However, as was attested to during the late 20th century, graduating from an accredited veterinary school and attaining registration does not ensure that the public receives competent service from all veterinarians (Smits 1977; Anon 1999; Coleman et al 2000).

**Veterinary Education**

The first matter to be considered is should education for veterinary service be confined to the university?

For most of the history of the practice of the veterinary art – some 4,000 years – education and training were provided on-the-job with the budding veterinarian serving an apprenticeship (Caple 2011).

Evidence that attending university for five or more years is necessary to ensure competent veterinary practitioners is not available. One could mount a case that the teaching of theory at university is adequate, but the acquiring of practical skill, is often lacking. I recently enquired of a new graduate their experience of castration of the stallion. The reply was enlightening. Theory of the procedure had been taught, but, during the five-years spent at university, this student had not observed or performed a castration of a stallion.

A finding of the survey was that less than half of the respondents (35%) were mentored by an experienced veterinarian upon graduating, instead they had to learn while working on client’s animals. That is, their further education and training had to be completed with on-the-job experience!

Since the release of the Frawley Review (2003) and the Craven Review (2004), interest has been expressed in a mentoring scheme for new veterinary graduates in Australia and the AVA has implemented such a program (AVA Graduate Mentoring Program) and this may prove helpful.
Therefore, an alternative to the present university education for the discipline of veterinary science is to return it to the work place, as was the case prior to 1762, when university education for the veterinarian began.

Resulting from the Dawkins’ Reforms of 1988, the primary focus for Australia’s universities is to achieve ongoing viability via the conduct of a successful business and this has led to serious questioning of the capabilities of veterinary graduates (Smits 1977; Coleman et al 2000; Maxwell et al 2008).

Today’s veterinary education model has been in place for 100 years and although many of those employed in this sector consider it satisfactory, it could have outlived its usefulness. It may happen that private entrepreneurs will enter the field of veterinary education as was the case with Kendall’s MVC. However, this will only occur, if it is profitable to do so.

This is pertinent with the funding of university veterinary courses by government diminishing and the cost of providing the course increasing significantly. This could mean that attention will be directed not only to the cost of university education, but what disciplines should be retained and what should be dispensed with. As previously indicated veterinary student output is extremely small when considering the total tertiary student output. However, its costs to the university are considerable, so for economic reasons alone, veterinary studies at some universities could be terminated.

In the past, government funding for veterinary education was seen as a public benefit, because agriculture was the major component of Australia’s economy. Therefore, veterinary attention to the country’s economic livestock could be seen to directly benefit all Australians by increasing our agricultural productivity. However, today, most veterinary graduates work in urban practice servicing the needs of dog and cat owners and the argument of “public good” may no longer be valid. However, recently the benefits of having a pet and human health has been promoted (McNicholas et al 2005) at the same time as warnings of zoonotic disease are being given (Kahn 2006; Reaser et al 2008).
Complicating this is the overproduction of veterinary graduates in Australia. Although some challenge that there actually is an oversupply, it has existed since the 1970’s and with the advent of the three new schools it will inevitably accelerate, unless some new avenue for employment for veterinarians emerges. Simple economic theory tells us that when supply outstrips demand, income declines (Heath 2002: Lofstedt 2003).

Could it be concluded that veterinary practice, animal quarantine and veterinary education are no longer sustainable and are, in effect, out-of-date?

There are four questions that need asking regarding Australia’s future veterinary education: what should be taught, who should teach it, who should receive it and, who should pay for it?

What should be taught? Writing on the impact of the Dawkins reforms a quarter of century after they were introduced, one vice-chancellor stated;

*That lack of success derives significantly from a deep uncertainty and division among Australian universities as to what they are and do, or should be and should do...a large number of academics and a significant number of universities do not believe that a large number of other institutions really are universities, or their occupants really academics... the central paradox of the Unified National System, a theoretically unified block of like bodies with like interests, which is in fact a disunited collection of very diverse institutions with correspondingly diverse interests* (Craven 2013).

This could apply equally to veterinary education. Each school stands alone conducting its own agenda, operating its own curriculum, its own teaching and training program, with its emphasis on certain animal species and the awarding of different degrees. This *ad-hoc* approach has led to the present chaos, which was highlighted in an article, written 20 years ago, which demonstrated great variation between the four existing veterinary schools (Caple 1997).

Education in companion animals and economic livestock, provided “in a practice setting” is what is required for a basic veterinary education. Education, using
modern technologies should be available and graduates wishing to specialise can do so at the post-graduate level.

Who should teach it? Anyone who has attended university can attest to the variable quality of teaching and this has been mentioned in the literature (Heath 1992; Collins 1994; Rex 1994).

Veterinary education should be administered by those who want to teach and bring on the next generation of veterinarians. This would be facilitated within the current university system if teachers, as well researchers, were recognised and promoted. Alternatively, this may best be achieved outside of the current university veterinary school model.

Who should receive it? Entrance to a university veterinary course is restricted to a small group of applicants, with most institutions using a high academic score achieved at school as the primary determinant. That is, the selected veterinary student, demonstrated an ability to gain good marks at school. The issue of introducing other criteria in the student selection mix has been proposed by some and condemned by others, as was seen in the responses by academics in Chapter 6. Justification for the establishment of some of the new schools was on the basis of discrimination toward those with a rural background or who promised to go into rural veterinary service once they graduated.

Is there evidence that school students, who have talent in exam technique, will become competent and effective veterinarians or that rural students will stay in rural Australia?

Who should pay for it? The student is the main beneficiary of a university education and it is they who should be responsible for funding it. During their post-graduate careers, they can expect to command a professional’s income, therefore the university veterinary course should be fully funded by the student either by their family or by a loan arrangement. Every young Australian aspires to own their own home and they achieve this by securing a mortgage. Why should it be different regarding their future career?
It could be argued that veterinary students upon graduating will benefit society by providing an animal health service to economic livestock as well as companion animals and more recently to a society that has become concerned with welfare for a wide variety of animal species, including birds, which has extended to exotic pet species and wildlife. However, for such services, the majority of animal-owners seem prepared to pay for veterinary services.

Taxpayer-funded veterinary university education rests on the argument that it is a “Public Good” and this may have been true in the past, when veterinarians supported our agricultural economy by servicing livestock producers and protected our “Clean and Green” image. However, today, the majority of veterinary graduates seek positions servicing dogs and cats (Chapter 4).

Should Australia’s taxpayer be encumbered with educating small animal practitioners? The veterinary graduate themselves are the principal beneficiary of their education and it is they who should fund their education.

**End of the professions**

Whilst I am questioning the future of Australia’s veterinarian profession, others are questioning the future of all professions.

Recently, Oxford University academics presented a case for the termination of the position occupied by all of today’s professions (Susskind 2015). They categorised the professions as “gatekeepers of special information” enjoying the privilege of having a “Grand Bargain” that provides them with a “monopoly of expertise”. These authors foresee the end of the professions by future generations adopting technology, specifically that provided via the Internet. As machines become increasingly capable and with the expansion of artificial intelligence, this will result in “technological unemployment” of the professional class;

*The professions are not immutable...As we progress into the technology-based Internet society...the professions in their current form will no longer*
be the best answer to those trends...we cannot afford them, they are often antiquated, the expertise of the best is enjoyed only by a few, and their workings are not transparent. For these and other reasons, we believe today’s professions should be and will be displaced by feasible alternatives (Susskind 2015).

The professions will not continue because, “we cannot afford them”. These authors, father and son, assume society cannot afford them, failing to recognise that individuals decide what goods and services they will exchange their money for. The authors envisage a socialist utopia, where “clever machines” conduct the work of the professions at little or no cost.

They further assume that increased information equals increased knowledge. Knowledge, especially scientific knowledge, is derived from objective observation, evidence, hypothesis testing, induction, repetition and verification, which results in general acceptance.

I began by considering how the Australian veterinary community reacted to the release of the Frawley Review, or more correctly, how it reacted to the series of changes that precipitated the review. My goal was to see what could be salvaged and how to go about putting Australia’s veterinary “ship” back on-course.

The models for each area under discussion have been in place in Australia for approximately 100 years and although some may consider them satisfactory, others do not. Concerns exists for the future viability of practice, government services, quarantine and education.

As I complete this investigation, I am contemplating a different question, “Are the present models of veterinary service, animal quarantine and education obsolete?”

When academics were asked why males were not choosing a veterinary career, the reply was, “Because there is not enough money in it.” After hearing this ad nauseam, I remembered the minor part money played in my decision to become
a veterinarian. Money certainly wasn’t my driver, being a veterinarian was what I wanted to be.

Recently, a book predicted the death of traditional historiography;

In this environment, the prospect of a new, younger generation being attracted to empirical history dwindle all the time. The shrinking rewards on offer today to academics in the humanities are going elsewhere. Empirical work is a visibly deteriorating path to research grants, publications, conferences and academic development. Unless all this changes dramatically, the retirement dinners given to the current generation of traditional historians, now mostly middle-aged and older, will represent the funeral of their discipline (Windshuttle 1996).

The same could be said regarding traditional veterinary service. The current veterinary predicament was prophesied by Hugh Gordon, as long ago as 1958 and, more recently by Trevor Heath, in 2007.

Could it simply be that todays’ males view veterinary service as a caricature of what it once was and they have concluded that the current female stereotype is not for them? This is a more plausible explanation than not enough money. After all, it is well known that being a veterinarian is not the way to make a lot of money!
Chapter 8. Conclusions

The veterinary art has been practiced for approximately 4,000 years. During almost all of that time, it was conducted as a trade, predominantly by males, who served a form of apprenticeship. It was provided to livestock, such as cattle, sheep, goats and pigs, but also to the horse, which served in the capacity of transport or in the military. No doubt, small animals, such as dogs and cats were also attended to. It is only in the last 250 years that it became a university discipline and, in addition to clinical practice, veterinarians became involved in teaching, research and government service.

In Australia, up until 50 years ago, the animal species that primarily occupied veterinary attention were livestock, but now that attention has been transferred, to a great extent, to dogs and cats. Further, it is only within the last 30 years, that the gender of practitioners has changed from predominantly male to predominantly female. Australian veterinary service, which began approximately 100 years ago, has changed from being a male, full-time, occupation, to a female, part-time avocation.

Resulting from a series of significant changes during the second half of the 20th century, a Commonwealth Government Review examined the impact these changes had on veterinary services, livestock quarantine and veterinary education. This review – the Frawley Review – provided a platform to re-assess the provision of the whole gamut of veterinary activities in this country. Unfortunately, that opportunity was not embraced. Frawley’s analysis of the state of affairs of Australia’s veterinary services proved accurate; however, its recommendations were ineffective and the conditions that existed have continued and deteriorated further in the years since it was conducted.

Frawley’s failure was in its recommendations and implementation. Its recommendations were ineffective and there was no incentive for any interested party to take direct action. There was no substantial support from government that established the review or from the various consultative groups involved in the review.
The first failure was the Australia Veterinary Reserve, which was called upon on one occasion only, the Equine Influenza outbreak of 2007. Although 100 private practitioners were trained for the role, the effort in this breakdown in quarantine was assessed a failure and the program has since been terminated.

The second failure was its inability to directly assist rural veterinary services. Both, government veterinary services and private practice in rural Australia have continued to contract, with government veterinarians being reduced to providing limited diagnostic service, little or no field work and functioning mainly as a regulator. On the other hand, rural practice has had to resort to servicing small animals to remain viable.

The third failure was its inability to prevent the establishment of further veterinary schools in Australia. Within five-years of its release, the Commonwealth Government, allowed the development of three new veterinary schools. As a result, Australia, with a population of approximately 24 million has seven veterinary schools; more veterinary schools per capita than any comparable nation and we are overproducing veterinarians at an alarming rate.

The changes that precipitated the decline in veterinary service, animal quarantine and veterinary education, have not been corrected and we are still living with their consequences.

The research undertaken in this thesis supports Frawley's assessment and confirms its failure. Surveillance and monitoring for the purpose of animal quarantine have deteriorated and Australia is waiting for the next exotic disease incursion.

Rural veterinary practice continues to wither and rural government service has all but disappeared.

Veterinary education is now provided by seven schools, all competing with one another for funds and students, pursuing different curricula, course duration and degrees. All with the intent of securing registration for their graduates via the current mechanism of accreditation.
Alternatives have been canvassed in this thesis and unless the issues are faced and effective measures taken, further deterioration in veterinary services, animal quarantine and veterinary education will continue.

The question, “What needs to be implemented to ensure survival of veterinary service”, may need to be changed to, “What models can be designed that ensure there is a future for veterinarians in Australia?”

The author recognises that even though the current state is precarious, there is little likelihood of a quick or successful outcome to this significant problem facing the veterinary profession.
Appendices

I. Survey questionnaire of registered Australian Veterinarians.

In 2015, a survey questionnaire was designed and submitted to the Human Ethics Committee at Murdoch University. Once sanctioned (Permit 2015/028) it was forwarded to the eight veterinary boards in Australia with a request that they contact their membership to participate.

The survey was in the Survey Monkey format and the link was www.surveymonkey.com/r/VET2016

Survey: Australian Veterinarians 2016
1. Gender? Male / Female
2. Year born? ------
3. Where? Australia / Overseas
4. Where did you spend your childhood? City / Country
5. Year graduated? -----------
6. Which university? -----------
7. What degree? -----------
8. When and where registered? ----------- State -----------
9. Where you initially employed in the City / Country?
10. Where did you work initially? – practice; government service; academia; industry; or, other.
11. Where are you employed now? – practice, government service; academia; industry; or, other.
12. Are you employed five or more days per week? Yes/ No
13. Have you been continuously engaged in veterinary work during your graduate life? Yes/ No
14. If No, what per cent of your time has been devoted to veterinary work ---- -----------% 
15. Were you satisfied with your undergraduate education? Yes; mostly; not at all.
16. Have you enjoyed job satisfaction? Yes; mostly; not at all
17. Have you enjoyed income satisfaction? Yes; mostly; not at all.
18. Have you enjoyed status satisfaction? Yes; mostly; not at all.
19. How much of your working life has been spent in rural Australia? -----%
20. Where are you currently employed? City/ Country
21. Have you changed employment? Yes/ No
22. How often? ------
23. Were you mentored when your career began? Yes/ No
24. Time spent with various animal species Initially? – livestock ------%;
   companion animals ----%
25. Time spent with various animal species Now? – livestock ----%;
   companion animals ----%
26. Where do you perform your veterinary service? On-farm/ in a clinic/ in a
   hospital/ in a laboratory/ in an institution.
27. What type of service do you provide? Clinical/ consulting/ government/
   teaching/ research.
28. Has there been an increase in the caseload of livestock since 2000? Yes/ No
29. Has there been an increase in the income derived from livestock since
   2000? Yes/ No
30. Did you become a member of the Australian Veterinary Reserve? Yes/ No
31. If a surveillance program of livestock was professionally conducted and
   commercially sustainable would you be willing to participate? Yes/ No
32. Have you incurred an injury/illness from your pursuit of a veterinary
   career? Yes/ No
33. If yes, has this impaired your veterinary capability? Yes/ No
34. Will you leave veterinary service as a result? Yes/ No
35. In 2003, a report stated that most farmers choose not to use veterinary
   services. Is this because veterinarians do not supply the right type of
   service or is it because farmers don’t demand veterinary services? Supply
   problem/ Demand problem?
36. Do farmers shop around to secure the cheapest veterinary service? Yes/ No
37. Do farmers treat female veterinarians differently than male
   veterinarians? Yes/ No
38. If yes, in what way?
39. Do you agree that rural practice is essentially a small animal practice
   located in the country? Yes/ No.
40. Do you agree that government veterinary services is essentially
   regulatory? Yes/ No
II. Oral History Interviews: Quarantine personnel

Undertaken in 2015 and 2016 and directed at those employed by governments that have had experience in the quarantine either at State or Commonwealth level.

A. Personal and institutional information

Personal details:
When and where were you born?
Gender?
When and where did you graduate?
Did you receive a cadetship to study?
Have you acquired higher qualification?
Have you had experience in other areas of veterinary activity such as private practice or academia?

Work details:
State or Commonwealth Government?
Did you enter quarantine work initially or have you spent time working in other government areas?

Frawley Review:
The priority recommendation of the Frawley Review (Recommendation 3) was the establishment of the Australian Veterinary Reserve.
Do you agree that this body was the priority at that time?
What has this body achieved?
How often has it been utilised since being introduced?
Is it still relevant today?
Is it still being utilised or has it ceased to exist?
Were you one the 100 initial private practitioners signed up?

Quarantine:
What Quarantine System operated when you joined this service: provide details?
What Quarantine System changes have taken place during your time in the service: provide details?
What are the essential components of a Quarantine program?
What do you consider to be the major weaknesses of the current quarantine program?
What is the major weakness?
How do you think it could be improved?
Did quarantine benefit by the Lindsay Review (1988)? How?
Did quarantine benefit by the Nairn Review (1996)? How?
Did quarantine benefit by the Frawley Review (2003)? How?
Did quarantine benefit by the Beale Review (2008)? How?
Did quarantine benefit by the Matthew’s Review of FMD preparedness (2011)?
If quarantine has benefitted by these various Reviews, why is Australia still vulnerable to introduction of exotic disease states?
How important is the maintenance of our special status as a country relatively free from the major exotic livestock disease?
What system changes do you directly attributable to the releases of the Frawley Review (2003)?
Is the system now in place satisfactory?
How could it be improved?
III. Introductory letter for Oral History Interviews for both Animal Quarantine and Veterinary Education personnel

1 May 2015


I am enrolled in a DVetMedSc doctorate at Murdoch University to investigate the impact of the Review of Rural Veterinary Services (Frawley Review 2003) on the veterinary profession. The Review, commissioned by the Commonwealth Government, sought to improve rural veterinary services and economic livestock surveillance and monitoring in Australia.

As it is now more than 10 years since its recommendation were implemented, it is an appropriate time to examine the results of its release. To do this I have commenced a research project under the banner of this new degree at Murdoch University Veterinary School.

I propose to examine, by oral history interviews and survey questionnaires:
1. Australia’s veterinary education;
2. Australia’s quarantine of economic livestock; and
3. Rural veterinary service, both private and government.

As to the investigation of veterinary education I have designed an oral history interview which has been accepted by the Human Ethics Research Committee of Murdoch (Permit 2015/028) and I am approaching you as a significant contributor to Australia’s veterinary education to enquire if you would be willing to participate.

The interview will take up to one and half hours and will be conducted at a place and time convenient and suitable to you. It will be digitally recorded and a copy will be given to you at the time of the interview. You will not be personally identified.

If you agree to participate in this project would you indicate when an interview would not be suitable (time, day, week, month)?

I am required to attach an explanatory note and a Consent Form for your signature which I can retrieve when the interview is conducted.

Yours sincerely,

John A.L. Maxwell, BVSc, MVS, PhD, MACVSc, MRCVS.
IV. Consent Form

Murdoch Consent Form.

... Australia’s Veterinarians and the Frawley Review of 2002....

I have read the participant information sheet, which explains the nature of the research and the possible risks. The information has been explained to me and all my questions have been satisfactorily answered. I have been given a copy of the information sheet to keep.

I am happy to be interviewed and for the interview to be audio recorded as part of the project examining Australia’s veterinary education and training. I understand that I do not have to answer particular questions if I do not want to and that I can withdraw at any time without needing to give a reason and without consequences to myself.

I agree that research data from the results of the study may be published provided my name or any identifying data is not used. I have also been informed that I may not receive any direct benefits from participating in this study.

I understand that all information provided by me is treated as confidential and will not be released by the researcher to a third party unless required to do so by law.

Participant’s name: ________________________

Signature of Participant: ________________________ Date: ......./......./.......

I confirm that I have provided the Information Letter concerning this study to the above participant; I have explained the study and have answered all questions asked of me.

Signature of researcher: ________________________ Date: ......./......./.......
V. Oral History Interviews: Education personnel

Oral History interviews of veterinary academics at the Dean or Head of School level. Undertaken in 2015 and 2016 by interviewing academics involved in the process of formulating education policy at the seven veterinary schools in Australia.

A. Personal and institutional information

**Personal details including work experience:**

When and where were you born?
When and where did you graduate?
Where did you begin your career – practice, government, academia, or other?
Have you acquired post graduate qualifications? If so what are they?
Did you teach, conduct research or administer?
How long were you in academia?
What academic positions have you held?
What subjects did you teach and what research did you conduct?
What is your opinion regarding university veterinary teaching and research today?
Do you have any further comments you’d like to make regarding your personal details?

**Institutional information:**

Which universities have you been on staff?
What departments have you served in?
What was your capacity within these departments; administration, teaching, research?
What is your opinion of the quality of teaching and training offered at each institution where you served?
What in your opinion was good about it and what was wasn’t?
Have you observed significant change during your academic career in the institution’s administration, teaching, research, philosophy and direction?
What changes did you implement?
B. What is your opinion of the Review of Rural Veterinary Services of 2003 (Frawley Review)?

Has your school (its administration, philosophy, selection criteria, staff, quality of graduates) been changed by the release of Frawley? If so, how?
Has the impact of Frawley been beneficial or detrimental to your institution? In what way?
What changes have taken place at your school since the turn of the century?
Have these been made in response to Frawley?
Do you have any other comment to make regarding the release of the Frawley Review?

C. What in your opinion are the most significant issues of Australia's first 100 years of university veterinary education and training?

**Funding** – Should students pay for their own education?

**Curriculum** – Should there be a common curriculum?

**Selection** of students – Is academic score the only way to select student?

**Animal Species** – Should companion animal medicine only be taught today?

**Supply** of graduates – from too few to too many.

**Feminisation** – from a male to a female occupation.

**No longer a veterinary profession** – initially a profession, now an industry.

**General questions**

I would like your reaction to some general questions regarding veterinary teaching institutions.

1) Should veterinary education be the sole province of the university or could it be equally well taught by another means?
2) What does a university lecturer hope to achieve with their students – a problem-solver, an independent thinker, a technician?

3) Is veterinary education set in stone or does it change with the fashions or trends?

4) In Australia’s veterinary history have the various schools adopted a common syllabus, a uniform curriculum or has each school followed its own agenda?

5) Do veterinary schools co-operate or compete?

6) Is the purpose of a veterinary school to produce graduate veterinarians or to preserve itself as an institution?

7) Is the dean the responsible person in a veterinary school?

8) What in your opinion is the object of a veterinary education?

9) How is the curriculum established and who determines its content?

10) Can you give a reason for the very high academic admission requirement of students entering veterinary science?

11) Doesn’t having a clinical facility within the veterinary school produce conflict with local practices?

12) Doesn’t training graduates to refer cases to the veterinary school represent a conflict of interest?

13) Why and when did your school decide to gain international accreditation?

14) Do you agree with the teaching of pseudo-sciences, such as acupuncture and chiropractic in university veterinary courses?

15) Funding has always been cited as a problem for veterinary education. Has that been a problem in your facility and has it gotten better or worse with time?

16) What legacy do you personally want to leave?


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