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EXECUTIVE SUMMARY

This review has focused on examining current and potential processes for entry to veterinary schools, aspects of curriculum content and trends in veterinary education in Australia and elsewhere. The requirements for Continuing Professional Development and options for improving collaboration between veterinary schools, in ways that will reduce costs and improve the quality of the educational experience, have also been examined.

The objective throughout this review has been to look for ways in which the undergraduate training of veterinarians can be improved in order that they can provide better services to their clients and also have more fulfilling careers. Particular attention has been directed towards identifying ways to improve veterinary services to existing and evolving livestock industries.

There is little doubt that services to the production animal industries will require evolution of service models that focus on improving flock and herd productivity rather than on individual animal medicine. While this subject is not the focus of the review it is fundamental to building viable veterinary services in the country.

It has been concluded, however, that even if viable veterinary services are established in rural areas they may not attract and retain sufficient young veterinarians unless a lot more effort is directed towards improving the transition from veterinary school to practice.

There is little evidence that entry requirements and curriculum structure have an influence on career choices for young veterinarians. It is, however, believed that the work of Professor Trevor Heath and others has demonstrated that the experience of veterinarians in their first years of work is a major determinant of their future career development.

The challenge for the profession, the registration authorities and the other key stakeholders is to work together to develop systems that improve the transition of veterinary graduates into the workforce. This might include such things as:

- Changes in undergraduate curriculum
- Focused CPD requirements for the first few years
- Training for practice principals
- Registration of practices as suitable for new graduates
- Counselling and support services

To achieve improvements in this area it is critical that the issue is considered collectively by the profession, the registration authorities, the schools and the key customers of veterinary services because a piecemeal approach has not, thus far, achieved significant improvement. A workshop involving the above groups was held in Sydney on 3rd of December 2004 to explore these issues and determine whether there was support for a focus on improving the “transition to practice” of new graduates from Australian veterinary schools. It was pleasing to note that there was a high level of agreement that this is the key issue to be addressed and a willingness of all parties to participate in a process of finding solutions.

The Term of Reference that required the review to examine opportunities for collaboration between veterinary schools has been addressed by initiating a discussion between key players from all the schools and it is recommending that a permanent group be set up to progress this work. In May 2005 the Australasian Veterinary Deans Committee decided to adopt a new approach to collaboration and have expressed a desire to take responsibility for improving coordination between the veterinary schools. This approach was discussed by the Steering Committee who considered that it was, potentially, a very good development because the Deans
are in the best position to deliver the desired outcomes. AVBC is prepared to play a facilitating role to assist this development.

In addition, a very helpful comment from the DEST representative at the workshop alerted delegates to the existence of the Collaboration and Structural Reform initiative and has prompted a number of project proposals that have already identified some excellent opportunities for collaboration. There is also a commitment to make the topic of collaboration a theme in an expanding segment on education at the Annual General Meeting of the Australian Veterinary Association.

Funding for Australian veterinary schools is inadequate and the reviewer believes that standards are only being maintained by enrolment of increasing numbers of full fee-paying students and by an extraordinary contribution by academic staff within the veterinary schools.

The funding challenges in the Australian veterinary schools has been noted by the accreditation bodies in the UK (RCVS) and North America (AVMA).

Despite these funding shortcomings the schools are being required to teach additional subject areas such as aquaculture, public health and wildlife medicine. There is also an expectation that students will be taught more about animal production systems and detailed analytical skills that will allow them to extend their competence in flock and herd medicine.

The fundamental issue that is contributing to the under-funding of Australian veterinary schools is a failure of the funding formula used by the Commonwealth Government to recognise the cost of clinical training for veterinary students. It is considered that the funding formula for Cluster 9 disciplines treats veterinary science differently from the other members of this cluster and fails to adequately account for the requirement of veterinary schools to fund clinical training that is covered by other means such as publicly funded hospitals in other disciplines.
RECOMMENDATIONS

1. That DEST review the basis of funding for veterinary science to take account of equity issues with like disciplines and the cost of clinical training.

2. That the Australasian Veterinary Boards Council convene a working group to develop and implement strategies to improve the transition of veterinary graduates from university to practice. This working group should include representatives of the Veterinary Registration Boards, the Australian Veterinary Association, the Veterinary Schools and consumers of veterinary services.

3. That the Veterinary Registration Authorities adopt a uniform timetable for introduction of compulsory CPD for registered veterinary surgeons.

4. That the proposed working group charged with improving the transition to practice give consideration to development of structured modules of compulsory CPD for graduates in the first and, possibly, second years of employment as veterinary surgeons.

5. That consideration be given to developing a system that enables individuals successfully completing structured CPD modules to be given credit towards subsequent professional development aimed at obtaining specialist and/or academic qualifications. Implementation of such a scheme would require involvement of a number of organisations but, in the first instance, it is suggested that it be included in the Terms of Reference of the proposed working group examining the transition to practice.

6. That the Australasian Veterinary Deans Committee be requested to facilitate greater levels of cooperation between veterinary schools in Australia and New Zealand. It is anticipated that this group will report on progress to the AVBC and the profession on an annual basis.

7. That the Australian Veterinary Association encourage debate about veterinary education by, for example, featuring educational topics at Annual Conferences and other events.
1. INTRODUCTION

Frawley Report
The Review of Rural Veterinary Services (Peter Frawley, 2003) investigated concerns that veterinarians are increasingly reluctant to work in rural practices servicing the livestock industries. The report arrived at three general conclusions:

- that Australia’s animal health needs are being met on a day to day basis but the animal health system would need to be enhanced to meet more stringent requirements for international trade in the future;
- there is no current crisis in the availability of veterinarians, however factors such as rising costs, long hours and limited social opportunities for their families impact on their willingness to live in rural areas and could create a shortage of production animal veterinarians; and
- a long term solution is most likely to come from policies that will build up the demand for veterinary services rather than policies which might artificially induce supply.

One recommendation in the report was that the Australasian Veterinary Boards Council (AVBC) initiates a thorough review of veterinary science education and registration requirements. The Review of Veterinary Science Education and Registration Requirements investigation focuses on the following five areas:

1) Entry requirements for veterinary science courses and articulation arrangements between veterinary science and related courses
2) The content and balance of undergraduate veterinary science courses,
3) The efficacy of introducing some forms of post graduation training with specialisations in specific areas of animal health as a precursor to full registration.
4) The efficacy of mandating minimum levels of continuing professional development activity as a condition of maintaining registration.
5) The scope for collaboration between universities, and between schools within universities, in the conduct of veterinary undergraduate courses and veterinary-related postgraduate courses and research.

Veterinary Education in Australia

Veterinary education first started in Melbourne in 1888 at a private Veterinary College in Fitzroy following passage of the Veterinary Surgeons Act in December 1887. This was the first Act passed in Australia to regulate the standards of veterinary education. The course established in 1888 was one of the first in the English speaking world to be given over four years. The veterinary science course was transferred to the University of Melbourne in 1908 and continued to operate until 1928 when training of veterinarians ceased due to lack of students. In 1963, the Veterinary School re-opened in response to requests from Victoria’s animal industries for more locally trained veterinarians

The Faculty of Veterinary Science in the University of Sydney took its first students in March 1910 and has continued training since that time. Training of veterinarians commenced in the University of Queensland in 1936 and, apart from a temporary closure during World War II (1942-46), it has continued to teach veterinary students. The other veterinary school in Australia is at Murdoch University in Western Australia and it has been training veterinary students since 1975. Charles Sturt University has recently been given approval to commence a course in veterinary science and has announced that they will enrol students in 2005.
Accreditation of veterinary schools in Australia and New Zealand

Each of the four existing veterinary schools in Australia is accredited by the Australasian Veterinary Boards Council (AVBC) and a review is conducted by the Veterinary Schools Accreditation Advisory Committee (VSAAC) at least every 6 years to ensure that standards are being maintained. The AVBC has an agreement with the Royal College of Veterinary Surgeons (RCVS) in the United Kingdom “To accept systems of accreditation and visitation in the United Kingdom (carried out by the RCVS) and in Australia and New Zealand (carried out by the Veterinary Schools Accreditation Advisory Committee, reporting to AVBC Inc) as a basis of recognising veterinary qualifications for the purpose of registration. This agreement is subject to a number of conditions that include having an observer from AVBC on visits conducted by the RCVS and a RCVS observer on VSAAC visits. Each party makes its own decision on whether or not to accept the visitation report and the recommendations for each individual school. To date this arrangement has worked well.

Veterinary schools in North America are accredited by the American Veterinary Medical Association (AVMA). The AVMA does not accept the accreditation processes of any other country and this means that it is a very protracted process for veterinary graduates from other parts of the world to be registered in the USA. The AVMA is prepared to accredit schools in other parts of the world and, if the accreditation review is successful, then graduates from that school can be registered as veterinary surgeons in the USA and Canada on the same basis as graduates from accredited schools in North America. This is becoming important for Australian veterinary schools as they are taking increasing numbers of international fee-paying students including substantial numbers from North America. In general, the accreditation processes used in the UK, Australia and New Zealand and in North America are very similar and over the last two years there have been attempts to get a greater degree of mutual agreement and acknowledgement of the different systems. There is agreement that the procedures and standards are very similar but, to date, the AVMA have been reluctant to acknowledge other systems.

To overcome the attitude of the AVMA a number of Australian and New Zealand schools have successfully applied to be accredited by the AVMA (Massey University in NZ and Murdoch University in Western Australia). The Sydney and Melbourne veterinary schools are currently in the process of being accredited by the AVMA. The cost of accreditation by the AVMA is very high and AVBC will continue to work towards getting greater mutual recognition of accreditation systems.

There is a healthy degree of diversity in the approaches to veterinary education being used in the existing Australian veterinary schools but all are currently committed to producing graduates that have basic competencies across the spectrum of veterinary medicine. There is scope for a modest level of streaming in the final year of some courses but AVBC believes that new graduates should have the skills to work in any sector albeit with appropriate levels of supervision in their first few years in the workforce.

Approach adopted for this review

The terms of reference for this review include activities in a broad range of activities that sometimes overlap or, at least, include the same general group of stakeholders. We have elected to consider each of the terms of reference separately and to draw conclusions about each area. In the course of our information gathering we have sought to seek information by questionnaire (Appendix 1.) and, when deemed appropriate, to bring the key people together to discuss the issues. In some instances we have prepared a discussion paper and sought responses from key individuals and groups.
2. ENTRY REQUIREMENTS FOR VETERINARY SCIENCE AND RELATED COURSES

The Review is asked to examine appropriateness of traditional and alternative entry pathways to Veterinary Science. Aspects of these pathways include:

- entry by candidates likely to focus on production animals;
- selection of veterinary students after they have completed a pre-veterinary year in another course such as a Bachelor of Science, Agricultural Science or other related degrees;
- the place of a veterinary science degree as the later half of a double degree in a related science discipline;
- articulation arrangements for veterinary nurses to allow pathways into veterinary science degree courses and
- other related issues.

This review has commissioned a literature review of the subject in an attempt to examine experience in a number of countries. The review was carried out by Dr Tony Charleston and is attached to this report as Appendices 2 and 3.

In many countries including Australasia, North America and the UK there is intense competition for entry into veterinary schools. This competitive pressure provides the veterinary schools with considerable scope to explore selection procedures that will:

- Select students who have the intellectual ability and motivation to complete the demanding veterinary course, preferably in the minimum time;
- To select students who will, after graduation, become successful and effective members of the veterinary profession.

The reviewer has noted that selection procedures generate much debate and this has prompted a substantial number of studies aimed at evaluating selection practices. The majority of the published studies are based on experience in North America. In general, entry to North American Colleges of Veterinary Medicine is complicated and may include some or all of the following requirements:

- The results of pre-veterinary tertiary studies
- Results of a standardised test such as the Graduate Record Examination test
- An application form listing personal and academic details, evidence of veterinary and/or animal experience
- An interview.

The studies that have been published indicate that cognitive selection criteria aimed at assessing academic ability are broadly predictive of subsequent academic performance. The ability to predict academic success on the basis of non-cognitive selection criteria is, however, much less clear and there does not appear to be a clear link between performance at interviews or the content of applications and subsequent undergraduate performance.

In the UK veterinary schools selection is primarily based on academic merit although non-cognitive criteria and interviews are used to varying degrees. In the five existing Australasian schools selection is based on academic merit and cognitive skills. We understand that the new veterinary school to be established by Charles Sturt University will be using interviews and, possibly, other means of assessing non-cognitive criteria in an attempt to select students who will have a greater probability of working in rural practice after they graduate. While the issue of selection criteria is also of considerable interest to the profession and others in the UK we are unaware of detailed studies similar to those that have been conducted in North America.
In Australia, Professor Trevor Heath has undertaken detailed studies on factors influencing the career paths of veterinarians and, in particular, has tracked the details of two cohorts of Queensland graduates over 15 years. In the discussion of this work Professor Heath notes that academic performance is a very reliable predictor of success in the veterinary course. He also concluded that, on the basis of his work in Australia, that there is nothing to support the use of interviews or personal statements, particularly in relation to commitment to a career path, or in assessing communication skills; and little to justify a formal requirement for work experience in a veterinary establishment.

Medical and other Health Professions: There is a vast literature relating to the selection of students into medical schools and other human health professions. This will not be reviewed here but, in general, the same issues have been investigated and discussed with the same mixture of conclusions and opinions (and differences of opinion) reached as in studies relating to veterinary student selection. A recent review (Salvatori 2001) concluded that while the best predictors of academic performance in the course and licensing examination (in North America) were pre-selection GPA and MCAT scores and that ‘much of the variance in academic performance remains unexplained.’ It is suggested that other, perhaps non-cognitive variables are contributing to this but that ‘there is limited evidence that any of the non-cognitive measures currently in use are sufficiently reliable and valid to predict success as a student let alone as a future health professional.’ It is further commented that the value of interviews remains controversial and that there is even less to support the continued use of written measures such as essays and letters of reference. Nevertheless, a brief survey of the literature indicates a widespread concern about reliance on academic criteria for selection and a desire to find ways of broadening the criteria in an attempt to select for ‘desirable’ personal attributes.

Concluding remarks: Research into the relationship between selection criteria and undergraduate performance in courses of veterinary science and medicine has almost exclusively been carried out in North America and in relation to the admission procedures used there. Nevertheless, it is not unreasonable to assume that the conclusions reached are more widely applicable. It seems clear that measures of academic (cognitive) ability made before selection are reasonably reliable predictors of successful completion of the veterinary course. On the other hand, the value of assessments of personality traits and non-cognitive skills as predictors of success remains uncertain and controversial. This is despite the widespread (and possibly correct) belief that there are personal traits and skills that have a direct bearing on success as a student and thereafter. The problem is that there is no agreement about reliable and valid ways by which these characteristics can be measured or, for that matter, about which characteristics are of key importance.

2.1. Current entry requirements for Australian veterinary schools

Entry into an undergraduate degree is highly competitive, with 14 to 15 applicants for each publicly funded place. By way of example, in 2003, students seeking entry to the veterinary school in the University of Queensland needed to have achieved an OP of 1, or a tertiary rank of 99.2 (this equated to a GPA of 5.95 from a Group of 8 University, or of ~6.6 from a non-group of 8 University). Whilst Charles Sturt agrees that high academic capability is required to undertake tertiary education at the level demanded by a veterinary curriculum it is felt that a UAI of 90 (or equivalent TER, GPA) is adequate but that it is important for students to demonstrate a commitment to veterinary science and practice.

The entry pathway at Melbourne University differs from the other three Schools in that only ten of the new fifty places available each year are allocated to students applying directly from secondary
school and who are admitted to a pre-veterinary stream. The other forty places are allocated to entrants who have successfully completed the first year of a Bachelor of Science degree to the required standard in physics, chemistry and biology. At the other Schools, however, a substantial proportion of successful applicants enter by way of completing, in part or full, other tertiary studies.

Table 2.1 Entry Requirements at Australian Veterinary Schools

<table>
<thead>
<tr>
<th></th>
<th>Sydney</th>
<th>Queensland</th>
<th>Melbourne</th>
<th>Murdoch</th>
<th>CSU</th>
</tr>
</thead>
<tbody>
<tr>
<td>HECS</td>
<td>Academic merit</td>
<td>Academic merit via pre-veterinary stream or one year of a science course, prerequisite subjects</td>
<td>Academic merit, English, highly recommended subjects</td>
<td>Academic merit, prerequisite subjects, demonstrated commitment to rural vet science and practice.</td>
<td></td>
</tr>
<tr>
<td>Non-recent school leavers</td>
<td>Previous tertiary study, objective ability and commitment to vet science.</td>
<td>Academic merit - secondary or tertiary</td>
<td>Academic merit, prerequisite subjects</td>
<td>Academic merit, special experience in relevant area (personal statement), mature-age Tertiary Entrance Exam, English, CV.</td>
<td>Academic achievement at university level in addition to above.</td>
</tr>
<tr>
<td>Targeted groups</td>
<td>Within 5 admission points of HECS.</td>
<td>Academic merit - up to 2 OP bands lower than HECS. Up to places 10 places available</td>
<td>From 2005, 20% of students from unrepresented and disadvantaged schools</td>
<td>Motivation, work experience, existing academic skills, residential testing and selection programme.</td>
<td></td>
</tr>
<tr>
<td>Local fee paying</td>
<td>Academic merit up to 5 points below HECS.</td>
<td>Academic merit slightly below HECS.</td>
<td>No domestic fee paying students.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>International fee paying</td>
<td>Academic merit similar to HECS, or recognised Bachelor degree, English IELTS 7 minimum</td>
<td>Academic merit, similar level (99) to HECS or little lower (95-98), English 6.5 IELTS minimum</td>
<td>Academic merit – quota number selected may vary. Relevant work experience conducted in the field IELTS 6.5</td>
<td>Academic merit similar to HECS, or recognised Bachelor degree. English IELTS 7 minimum, other English testing systems recognised</td>
<td></td>
</tr>
</tbody>
</table>

2.2. Other options for entry to veterinary science courses

2.2.1. Sydney University

The University of Sydney aims to attract and support the progress of high-achieving students from diverse backgrounds. The veterinary school aims to attract and support more students from equity target groups and is specifically considering changes to include 5% of students from rural high schools with demonstrated expertise in animal industries and a Universities Admissions Index over 90. The University has developed a shared Animal Science course with the Faculty of Agriculture, Food and Natural Resources and Faculty of Science to increase student intake from diverse, disadvantaged backgrounds. A Koori entry path is also advertised on the Faculty website.
2.2.2. University of Melbourne

From 2005, under the University’s “Melbourne Access” programme, 20% of students selected into every course will be from underrepresented and disadvantaged schools, including rural schools.

2.2.3. University of Queensland

There are up to five ‘forced entry’ places for UQ-Link students. These are students from Schools on a list (supplied by the State Department of Education) who are considered disadvantaged due to location/isolation. There are also up to 5 forced entry places available for students of Aboriginal or Torres Strait Islander descent.

The UQ-Link places are often not filled, and in most years there are no students at all enrolling through the scheme for Aboriginal or Torres Strait Islanders.

2.2.4. Murdoch University

About five places per year are available to Aboriginal and Torres Strait Islander candidates who do not have to fulfil the normal requirements of entry: About five places per year are also available to students who are selected on the basis of motivation, work experience, and existing academic skills.

Suitable applicants are invited to attend a week-long residential Testing and Selection programme in early December. The week is highly intensive and during this time there is a degree of self-selection as the students get a real idea of what it is like to be a veterinary student.

2.2.5. Charles Sturt University

Apart from high academic standards, candidates must demonstrate an interest in, and commitment to, rural Australia, veterinary science and animal production.

2.3. Survey of Veterinary Schools on Alternative Selection Criteria

Options for alternative selection criteria were canvassed by asking veterinary school representatives the following series of questions. The answers have been merged and abridged.

- Should students be selected on their potential to complete the course successfully?

Yes it is critical that students achieve high progress rates, given the high cost and extended time required for veterinary education. Student drop-out wastes resources for the student, the Faculty and society. Faculties are accountable for ensuring appropriate selection and support for students to ensure high progress rates, while maintaining standards required for professional registration.
All students who enter the course must have the capability to succeed, both in their studies (without undue stress) and also in the demanding professional life of a veterinarian in order to uphold professional standards.

In addition students need to have the personal commitment and motivation to become a veterinarian in order to make the necessary sacrifices required to successfully complete the course. These personal attributes are often evident in applicants who can demonstrate extended experience in working with animals in a variety of settings. Students who have had this prior experience have several advantages; they have better background knowledge in many areas and consequently often have better academic performance (e.g. nutrition, animal husbandry), they appreciate the relevance of the preclinical subjects in the course and often bring strong animal handling skills enabling them to gain maximum benefit from practical learning opportunities with animals.

The University of Sydney Faculty has recently gathered data showing major risk factors for poor progression to final year (or failure) are: poor animal handling skills, prior poor academic performance and inconsistent class attendance.

The strong demand for veterinary education ensures there is a large pool of high achieving potential applicants who have the capability to succeed in the veterinary science course.

- **Should students be selected on their potential to excel academically and achieve the highest marks?**

While it is desirable to have some very high academic achievers undertaking veterinary training, outstanding performance is not considered a high priority by employers. Research into employers expectations shows that most veterinary employers believe the Australian veterinary science courses are rigorous and demanding, so they believe new graduates have current, comprehensive veterinary knowledge. Most graduates make a very valuable contribution to introducing new aspects and developments in veterinary science to the workplace, regardless of their class rank. Indeed other personal factors are generally far more important for professional employment and success.

However, most veterinary schools are part of a university that aspires to becoming an internationally ranked institution for both education and research and encourage enrolments from, students who can excel academically. Such institutions recognise that it is these people who are most likely to return to postgraduate study and research in the future, and to go on to make a substantial contribution to the creation of new knowledge and leadership of the profession.

Charles Sturt University comments that there is much more to being a competent veterinarian than academic achievement alone. A range of other factors contribute to a person's ability to fulfil a meaningful role within the profession such as communication skills, attitude, aptitude, commitment to the profession, ability to cope with stressful situations, suitability for the lifestyle, sense of humour and so forth.

- **Should students be selected on their potential to contribute subsequently to society?**

The importance of veterinarians participating and taking leadership roles within their local, national and global communities was emphasised by survey participants. Charles Sturt describes “Well rounded individuals who possess a body of professional knowledge, understanding of ethical and animal welfare issues as well as advanced communication,
leadership and team building skills are best positioned to contribute meaningfully to society."

Graduates have the capacity to make many different types of contribution, depending both on their education, personal factors, motivation and career goals. Diverse and equitable intakes of students contribute to the range of talents and abilities that potential students bring to the Faculty and the profession. While it is important to encourage students to develop leadership aspirations and skills, there is no clear way to select for these characteristics in potential applications, particularly for recent school leavers, with limited life experience. An effective curriculum can provide many opportunities for developing these skills in students, reducing the need to consider this potential in the selection process.

Do you think that it is important that veterinary schools have students from a wide range of backgrounds?

Yes. The breadth and scope of diversity of our incoming students has increased dramatically in the last decade, with the admission of many international students, increasing numbers of mature students with prior tertiary study and work experience and Koori students among others. The student population is far more diverse than it was one or two decades ago when tertiary entrance rank from high school was the only selection criteria, suggesting our current mix has opened up opportunities for many different students. As outlined above, diversity is a strength in any profession facing a rapidly changing and uncertain future.

Regarding rural students there are issues other than selection that severely limit the access of rural students to veterinary study, such as the high cost of living in a metropolitan area and/or accepting a full fee paying place in a course i.e., rural students might be selected and yet not be able to afford to accept the offer of entrance.

If so, should universities choose students partly in order to achieve such a mix?

Yes a balanced mix of selection criteria/intakes is required to maximise diversity. Only the HECS places should be considered when discussing the student intake as it is only these places over which the Government can expect to exert significant influence. It is for the veterinary schools (in concert with the profession) to decide on the appropriate criteria for selecting fee paying students, providing they have sufficient academic merit to complete the course. It must be understood that fee paying students are absolutely crucial to the survival of veterinary schools in Australia and that most schools would not function without the income they bring in to support the undergraduate training programs.

Is it fair for veterinary schools, when they look at an applicant’s examination marks, to consider any obstacles that he or she might have had to overcome, such as illness, attending a low-achieving school, or having a rural background?

Aspects of this system is already in place at the University of Sydney for Non Recent school leavers, Broadway scheme and Koori students. However only a small number of students is admitted to the categories for educational disadvantage each year, and these are not necessarily rural/large animal focussed students. This is done during the interview stage of selection at Melbourne when selecting students for HECS places around the cut-
off. The introduction of the fee option has widened the opportunities for some of these students by creating additional places in the veterinary science course.

In QLD, the OP score awarded to senior students includes a correction factor for the overall performance of their school at a State level. Academics at UQ who have been part of interview processes for selection procedures in overseas faculties strongly believe that each interviewer brings his/her own agenda to such interviews, and this may result in selection of students from certain backgrounds (e.g. he swears that one academic was strongly predisposed to favour rugby playing students!)

Charles Sturt cites a study which demonstrates the inequalities in learning opportunities and outcomes between metropolitan and non-metropolitan regions in Australia (Golding, 2001). They believe that consistently high UAI entry score for veterinary education acts to directly disadvantage non-metropolitan students, who often have unequal opportunity to access the necessary education to meet these entry requirements. A representative of the new veterinary school cites Rose and McCausland (2001) who report that 'of the 56 rural-origin students currently doing the (University of Sydney) veterinary course, one-third received their schooling in Sydney.

Is it fair for a university to offer a place to an applicant who requires lower examination results than those required of other applicants, for these reasons?

The real difficulty would arise in ensuring the transparency of this process if ALL students were admitted considering these factors, given the very large number of applications that would need to be considered. It would be difficult to accurately determine and judge the quality and relevance of applicants rural experience and the strength of their commitment to animal industries and veterinary science.

It is generally agreed that there should be a minimum standard required for entry that is based on the academic needs of the course. Charles Sturt believes that this should not be driven by demand for the course i.e., selecting applicants based only on academic achievement, which drives the UAI higher.

If an applicant’s educational context, for example, type and nature of the school or college attended, is considered in admissions should this extend to offering a place to an applicant which requires lower examination results than those required of other applicants, based on consideration of these factors?

Expert advice is usually provided from outside the Faculty. The difficulty in extending this to the RSL HECS places is that the intense competition for these places means a very large number of additional students may need to be reviewed. We are most concerned about the transparency of this process and the potential for numerous appeals against decisions.

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Decisions would need to be made by Faculty staff who may not have all the expertise or information required to make these qualitative judgements on the extent of disadvantage.

Is it desirable or necessary to consider additional measures of assessment in admissions?

Yes, there is merit in considering alternatives. The University of Sydney Faculty proposes to undertake a review of admission processes during 2005. One area of particular interest is the extent of a students prior experience and expertise in handling a variety of different animals (not only production animals). Whatever, the Faculty decides, measures of assessment will have to be consistent with Academic Board Policies and guidelines.

The 5 Schools were asked would they consider the following methods as additional means of assessment? The “x”s indicate the number of schools who agreed or disagreed with the proposed method.

<table>
<thead>
<tr>
<th>Method</th>
<th>Agree</th>
<th>Disagree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Interviews</td>
<td>x</td>
<td>xxxxx</td>
</tr>
<tr>
<td>Taking school performance into account</td>
<td>xxxx</td>
<td>x</td>
</tr>
<tr>
<td>Taking personal and contextual factors into account (eg family background)</td>
<td>xxx</td>
<td>xx</td>
</tr>
<tr>
<td>Earning credit through additional preparatory programs</td>
<td>xxxxx</td>
<td>x</td>
</tr>
<tr>
<td>Aptitude testing</td>
<td>xxx</td>
<td>xx</td>
</tr>
<tr>
<td>Accreditation of prior experiential learning</td>
<td>xxx</td>
<td>xx</td>
</tr>
</tbody>
</table>

(x= comment from vet school. n=5)

Note that various categories of current admission take into account the factors listed above. Interviews are a matter of concern due to the high cost, lack of transparency and uncertain benefit.

The veterinary schools were also asked if, in the selection process, candidates who have had extended exposure to production animals (eg who have grown up (spent at least two years) on a farm raising animals as a primary source of income) are considered more favourably than those from other backgrounds (all other factors being equal)?

At Sydney, the background and prior experience of students with animals, on farms, is considered for Category B (students who use this experience to demonstrate their commitment to veterinary and animal science. Students with rural experience also benefit from obtaining exemptions for animal husbandry extramural (farm) experience once they enter the course. Also at Murdoch this information is considered relevant for non-school leaver and PEPA applicants but not for direct school leaver entrants and in Melbourne this factor is applicable where two candidates may have equivalent academic backgrounds and performance.

Charles Sturt is much more proactive in the consideration of these factors in that the current cohorts of Australian veterinary undergraduates are skewed towards female students from metropolitan backgrounds who wish to practise small animal medicine. The CSU program will try to redress this imbalance with a bias towards selection of individuals from rural backgrounds with a demonstrated interest in production animals. “It has been shown that students with prior experience of large animal handling and production coupled with experience of a rural lifestyle will have more skills and aptitude for working and living in a rural environment.”
General Comments from the Survey

It was noted that there is considerable merit in combining a reduction in the extramural animal husbandry work during the Veterinary degree with selection requirements for experience in an approved animal industry (e.g. certain number of hours experience in either veterinary practice or on farm). This would increase the base level of skills and knowledge in working with animals so it is consistent across all students entering the course. It would also provide incoming students with a better understanding of the realities of veterinary practice and animal industries.

It is difficult to establish a system that is equitable for all applicants. Selection of students from either a general science degree or after at least one year of university study would assist in identifying weaker students (however very few veterinary students fail). However there is little published evidence to suggest that a student who achieves passes in the veterinary course ends up making a better (or worse) veterinarian.

2.4. Current articulation options

As noted earlier, 80% of entrants into the Melbourne Veterinary School are selected following completion of the first year of a Bachelor of Science. At the other Schools, an increasing proportion of entrants have undertaken or completed other tertiary studies. It has been suggested that formally adopting the Melbourne entry model, whereby nearly all entrants have completed a “pre-vet” year, may improve the chances of students of rural origin, who it is said have less opportunities in the later years of secondary school and are disadvantaged vis-à-vis urban students. While the dramatically declining proportion of males gaining entry into veterinary science is seen by some observers to be evidence of systemic failure of the selection processes to supply graduates with a preference for working in rural and regional Australia there is little evidence to support these arguments. The schools point out that appreciable numbers of graduates have a preference for mixed practice and many of them find their first jobs in this area. There is, however, also a tendency for these young graduates to only stay in these practices for a relatively short time and the reasons are much more complex than gender.

The Frawley Review suggested that an approach to improve the chances for targeted students accessing the course would be to reserve a proportion of places in veterinary science for – or otherwise give some preference to - graduates in related disciplines, specifically, any of the agricultural and animal sciences. Almost by definition, graduates of such disciplines are likely to have a career focus on the agricultural sector and many will be of rural and farm origin, with real intentions of returning to their home communities. In addition, it would provide a stock of rural veterinarians with the “whole of farm” qualifications often suggested as being necessary for the long term viability of rural mixed practices.

One approach, that is being increasingly used in medical education in Australia and veterinary science education in the USA, is to have veterinary science as the latter half of a double degree in a related science–based discipline.

There would be some implementation issues relating, for example, to the application of HECS and eligibility for income support for what would be strictly a second degree. However these issues have been addressed in relation to the current structure of medical degrees and a similar approach could be adopted.
The veterinary schools were asked to consider whether veterinary education should move to a system of post qualification applications.

One school believes that this must be considered, either in the form of postgraduate admission (from any prior science based course) or to articulate with an undergraduate animal-based program.

Others state that the undergraduate system has been shown to be adequate on the national and international level. Postgraduate qualifications for specialisation are acceptable and universities must play an important part in this role.

The Schools were asked to consider the likelihood (%) of their school adding new articulation arrangements in the next 10 years from:

<table>
<thead>
<tr>
<th></th>
<th>Sydney</th>
<th>Queensland</th>
<th>Melbourne</th>
<th>Murdoch</th>
<th>CSU</th>
</tr>
</thead>
<tbody>
<tr>
<td>('Pre-vet' type) Bachelor of Science</td>
<td>20</td>
<td>15</td>
<td>100</td>
<td>already available</td>
<td>0</td>
</tr>
<tr>
<td>('Pre-vet' type) Bachelor of Agriculture</td>
<td>80</td>
<td>5-10</td>
<td>?</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Another degree (specify or state if any degree would be considered)</td>
<td>0</td>
<td>0</td>
<td>?</td>
<td>100 (animal sciences)</td>
<td>0</td>
</tr>
<tr>
<td>Articulation pathway for veterinary nurses</td>
<td>0</td>
<td>0-5</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other (specify)</td>
<td></td>
<td></td>
<td>15</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

An articulated model at CSU was proposed (3 year Bachelor Animal Science (BAnSc)) but after initial investigation was rejected in favour of the 6 year BVSc program. The 6 year program has an exit point at completion of the third year for students who, for reasons beyond their control, cannot continue to complete the BVSc. At this point they may qualify for a BAnSc. Murdoch has a similar double degree programme.

Conclusions

It has been concluded the Australian veterinary schools have a variety of selection procedures and this allows students from a wide variety of backgrounds to apply to study veterinary science. This has now led to a situation where the proportion of veterinary students coming directly into the course from school is steadily diminishing. There are currently opportunities for articulation and our enquiries have found that these opportunities are likely to increase. The opportunities will, however, be primarily from science and agriculture courses because of similarities in knowledge and experience in early parts of the course.
2.5. Relationship between selection procedures and undergraduate performance

Survey Results:

The Schools were asked if there is overt alignment of selection criteria with expected outcomes.

Most of the respondents agreed that students are selected primarily on academic merit because the veterinary course and the work of a veterinary professional require high level intellectual capability, combined with a commitment to ensuring animal health and well being. All but the Charles Sturt University response indicated that these characteristics are found in students selected into all categories of enrolment (above) not only in the students of rural origin.

All currently operational schools would agree with Sydney University’s statement that students entering to HECS places (and more recently the fee paying places) have amongst the highest progression rate in their Universities and have consistently developed into excellent, highly sought after veterinary graduates able to follow any career direction in veterinary science that they choose. Graduates from non rural backgrounds have proven capable in rural/mixed practice and other animal health work (even if they choose not to pursue this for financial or personal reasons). Some spend their whole careers in rural Australia.

In the view of the University of Sydney respondent, the critical factor in developing veterinarians who can succeed in rural practice is provision of a comprehensive, high quality curriculum with adequate large animal/rural learning experience. An excellent education with plenty of practical experience is essential to prepare graduates for all facets of the profession. It must also be recognised that with increasing specialisation post-graduation training is required in most areas to reach full competence. Unfortunately the high costs of teaching students in large animal handling and clinical practice (which are not funded by Government or recognised in University funding models at even the base level required) provide a major barrier limiting achievement of higher standards of competence in new graduates. This is particularly true in teaching using live animals and in large animal clinical training which are currently suffering with unrealistically low levels of funding. It must be recognised that fee paying students are effectively cross subsidising the provision of quality teaching for the HECS students within our veterinary school (and probably others in Australasia).

Charles Sturt University states one of its aims is to produce “Graduate veterinarians that have high employability in regional Australia and the majority of whom are retained in regional Australia” and that its selection process is designed to select students who may have a greater chance of following veterinary careers in rural and regional Australia.

2.6. Relationship between selection procedures and subsequent post-graduate career directions

A literature review of this subject was commissioned as part of this study. The study was undertaken by Dr Tony Charleston and is attached to this report as Appendix 3.
There appears to have been very little research relating directly or indirectly to this topic. What little has been published can be considered under two headings:

- Concerns, expressed in some countries, that selection procedures relying very largely on academic criteria exclude people who would be successful clinicians.
- More widespread concerns about difficulties in attracting and retaining veterinarians in rural production animal practice.

In the preceding section we have discussed the challenges of identifying non-cognitive criteria that give an indication of likely success as undergraduates and it therefore seems logical that it will be even more difficult to find predictors of likely career paths.

Significant difficulties in undertaking such studies include a lack of agreement on the personal qualities that are required for success as a veterinarian (either now or in the future); lack of an objective appraisal of the professional performance after graduation of those that were selected and the impossibility of knowing if those who did not gain entry to veterinary school would have performed as well or better than those who did.

There is some information published that examines the link between admission criteria and the challenges of attracting veterinarians to production animal practice and retaining them there. The trend away from production to companion animal medicine has been evident for over 30 years in the USA and a study carried out at that time indicated that pre-veterinary and veterinary undergraduates who spent their childhood in towns of less than 100,000 people were more likely to be interested in a career in mixed or large animal practice. This same study also showed that a significantly higher proportion of veterinary practitioners in mixed or large animal practice had been raised in smaller towns and cities. We are not aware of any significant US studies that have assessed whether or not there have been changes over the 30 year period.

By far the most informative study of the career paths of veterinarians is that carried out by Professor Trevor Heath, previously Dean of the School of Veterinary Science, University of Queensland. In this, two cohorts of students were followed through their undergraduate programs and up to 10 years after graduation.

Students were surveyed in their first and fifth undergraduate years and in the second year after graduation. Further surveys were carried out five and ten years after graduation. It was found that there were no significant relationships between prior experience with animals and career plans, or success in gaining employment; nor were there any gender differences. On graduation, 61% of the graduates entered mixed practice. However, only 39% of these remained in mixed practice five years later and 18% by ten years. There was a clear tendency for more of those who had lived for two years or more on a livestock farm to enter mixed practice and to be still there five and 10 years after graduation. However, the numbers declined considerably over that period, from 83% to 28% of this sub-group; this compares with a decline from 55% to 14% of graduates who had not lived on a farm or had done so for <2 years employed in mixed practice.

The possibility of using selection procedures to detect a commitment to rural practice is discussed (Heath 2001) in relation to the longitudinal survey statistics but it is concluded from the data obtained from the students as undergraduates that ‘career predictions made at the time of entry to the course are virtually meaningless.’ It was also concluded that the study provides some evidence that having lived on a livestock-raising farm could be a valid selection criterion ‘if one of the objectives of the selection process is to promote a higher retention rate of veterinarians in rural Australia.’ Clearly, however, the relationship is not an absolute one, and the study provided no support for the use of other selection procedures, such as interviews or a requirement for spending time with a veterinarian, as a means of achieving this.
2.7 Conclusions

The comparative lack of information on the relationship between selection criteria and career paths should come as no surprise given the difficulties involved in undertaking investigations of this type. It is difficult to see how the general question of whether broadening selection criteria will result in a higher proportion of graduates having more successful veterinary careers or being ‘better vets’ can be answered objectively. It would require an agreed definition of success, agreement about the stage in a career when ‘success’ should be assessed and some means of making valid comparisons of those selected using different criteria. In addition, the impossibility of making comparisons with those who fail to gain entry into veterinary school remains.

More focussed questions such as that relating to veterinarians in rural practice are more amenable to examination since the issue can be defined and investigated by retrospective longitudinal studies of the kind carried out by Professor Heath. Even so, the myriad factors that influence individual career paths inevitably make it difficult to establish valid and unequivocal relationships with particular selection criteria.
3. THE CONTENT AND BALANCE OF UNDERGRADUATE VETERINARY SCIENCE COURSES IN AUSTRALIA.

3.1 Background

At the present time the aim of veterinary science courses in Australia, NZ, North America, the UK and Europe is to produce veterinarians who have been trained to work in any sphere of veterinary science – “the omni-potential veterinarian”. In all these countries there is recognition that new graduates need more experience and on the job training before they are fully competent. In some jurisdictions such as the RCVS in the UK there is a pilot scheme that attempts to formalise the professional development of new graduates in their first year after graduation.

The reality for the veterinary schools is, however, that they are expected to produce graduates with a broad basic training and, in addition, are under pressure to address the health and production requirements of an ever–increasing number of animal species. The need to accommodate training in all the relevant areas means that the typical veterinary curriculum is very crowded with contact hours that are at much higher levels than in most comparable courses. The challenge of veterinary training also includes a mandatory requirement for graduates to be competent in a large number of technical manipulations and skills.

An alternative approach to accommodate the huge requirements for veterinary teaching is to increase the duration of the veterinary course to six years as has been planned for the new veterinary science course at Charles Sturt University or to make veterinary science a post-graduate course as happens in much of North America. It is relevant to note that there are an increasing number of veterinary students in Australian and New Zealand schools who have completed other degrees.

The cost of training in veterinary science is already very high and most universities are reluctant to increase the length of degree courses and the consequent increase in student debt. This is particularly so in professions like veterinary science where the average starting salaries are relatively low.

The approach being adopted has therefore been to change the emphasis from trying to teach everything to a focus on teaching principles and also to assist students to become very competent in accessing information. A key learning outcome is for students to have the desire and competence to underpin their professional careers by life-long learning practices.

It is, however, still critically important that veterinary students possess a large number of basic technical competencies before they can be registered to practise as veterinary surgeons.

3.2 Core veterinary science subjects and clinical training

Core subjects for the curriculum in Australian veterinary schools are aligned to the attributes required of graduates as stated in the respective University prospectuses and to the accreditation requirements for VSAAC/ AVMA/ RCVS with varying reference points.

In Queensland, all units are compulsory except in the year 5 rotations where students have a choice of elective placements in a variety of practice, wildlife, research and other settings. The University of Queensland Veterinary School has also been guided by the competencies required of veterinary graduates developed by Ontario Veterinary College and the AVA.

The University of Melbourne’s reference point is the core curriculum and how graduates perform in the workforce, and develop in their careers. It also notes how they perform in the North American
Veterinary Licensing Examination (NAVLE) and develop in their careers in North America and the United Kingdom. Feedback is obtained from graduates and employers, particularly academic associates. Professor Caple, Dean of the Melbourne Veterinary School, observed that eradication of Pleuropneumonia, Tuberculosis, and Brucellosis from the Australian Cattle Herd provided more room in the curriculum for animal welfare, food safety, animal behaviour, small animal medicine and surgery, and business and practice management.

In Sydney, the Graduate Attributes guide subject selection. These were used in design of their new curriculum (introduced in 2000, fully implemented 2004). Each unit of study is aligned to develop and achieve some of the attributes. Competency standards are also used to guide the teaching and assessment of practical skills and abilities throughout the course. They are continually under review to ensure their currency.

The Australian Chief Veterinary Officer met with the Australian Veterinary Deans in November 1997 and requested that more aquatic animal health should be introduced into the undergraduate curriculum due to the perceived growth of this industry. This was done from 1998.

The Australian Veterinary Association in 1993 encouraged more teaching of communication skills.

Charles Sturt has developed its curriculum in consultation with the profession and industry via an Interim Curriculum Committee (ICC) (planning phase 2004), which will move to a Course Advisory Committee (CAC) from early 2005.

3.3 Elective subjects in veterinary under-graduate training

From time to time veterinarians express concerns that recent graduates are not adequately prepared for practice and that their preparation could be improved if there was greater opportunity for them to take more elective subjects and to develop a higher level of skill and confidence in a particular area.

Many veterinary schools offer a limited number of electives, usually in final year, that are generally taken by students who wish to achieve greater skills in an area in which they hope to specialise or by students who want extra training in areas in which they are less confident.

The current availability of electives in the Australian veterinary schools is listed below.

Murdoch University
One general elective in first year (12.5% of the year)
One foundation unit in first in first year –a choice of 6 offered by the University
Final year – a three week elective/externship offered (9% of the year)

University of Melbourne
First year – 25% of the first year science subjects
Second, third and fourth years – set course but electives within subjects
Final Semester lecture-free for 4 electives each
of three weeks which may be taken external to the school

University of Sydney
No electives until final year but there are options within subjects
Final year – students select 3 electives of 4 weeks each in a variety of veterinary or professional settings which can include clinical practice, government placements, wildlife work, research, international placements, animal health, applied reproduction

University of Queensland
The current curriculum does not include any electives but the new curriculum will have electives in semester two, year three and in final year. The list of electives is still being developed and is expected to offer a relatively broad range of options.

Charles Sturt University
Electives are intended to be an important part of the course currently being developed but the details have not yet been determined

Veterinary schools appear to be reluctant to develop larger offerings of electives and it is our impression that this is because their work programs are already crowded and the logistics of organising extra electives puts greater pressure on their limited resources. We have also been advised that at least some of the schools believe that VSAAC and other accreditation agencies are not supportive of curriculum formats that include large amounts of electives. The RCVS and the AVMA have also noted a similar reluctance to develop many electives. The concern about the perceived attitude of the accreditation authorities is considered to be misplaced as the EAEVE/RCVS accreditation criteria states that

"the total body of knowledge of veterinary science has grown to such an extent that no one can achieve the desired high level of expertise in all fields within the time allotted for professional training. Therefore, it is desirable to combine the acquisition of basic knowledge in all fields of veterinary science with more advanced training in one given field. This will enable qualified veterinarians to begin their careers with more confidence and autonomy (up to 20% of total training time should be devoted to this aspect."

The VSAAC Policies, Procedures and Guidelines publication is not explicit about how much of the course might be electives but it has been VSAAC policy to maintain alignment with the procedures of EAEVE and the RCVS. The AVMA also has a relaxed attitude to the inclusion of electives in undergraduate veterinary courses and the College of Education (COE) has accepted tracking (electives) for over 25 years. This has led to a situation where there are different approaches being taken by different schools in North America with some having a very traditional program with few electives and standard clinical blocks whereas others offer only electives.

Conclusions.

There seems to be little doubt that there is scope for increasing the amount of electives in veterinary schools in Australia but the extent to which schools decide to offer electives will be determined by their view of the marketplace that will be employing their graduates. The current nature of veterinary practice in Australia is that there are large numbers of mixed practices and that there is a considerable amount of movement by veterinarians between different types of practice. It seems that this view of the marketplace will tend to encourage schools to adopt a conservative approach to the inclusion of electives in their undergraduate curriculum.

3.4 Training in production animal, aquatic species and wildlife health

We have surveyed the amount of curriculum content devoted to production animal, aquatic species and wildlife in the Australian veterinary schools and been suitably impressed both by the amount of material and the innovative ways it has been taught. Production animal medicine is, of course, a core requirement for all veterinary schools and is examined very closely by the VSAAC at all accreditation visits. Some of the schools have experienced challenges in finding enough first
opinion farm animal material in their immediate vicinity but have developed a variety of approaches to ensure that students are exposed to this type of work in practices in other parts of the state in which they operate or elsewhere. There is debate about the amount of time that should be devoted to subjects such as pig and poultry production. It is recognised that not many graduates will work in these industries in Australia but, nonetheless, the students are all expected to be familiar with the operation of these intensive animal industries and the factors that influence diseases. Some of the veterinary schools have had discussions about the possibility of one school developing a high level of competence in teaching and research in specific industries and then being in a position to assist other schools with teaching in this area. It has, however, been pointed out that such an arrangement can only provide part of the training as it is important for all students to have opportunities to learn animal handling skills for the different species and to have opportunities to participate in field investigations. It is anticipated that the schools will continue to have discussions about ways to make better use of limited expertise in subjects involving intensive animal industries... Such arrangements, if they can be organised, may well be a way for the schools to continue to offer first rate courses in different subject areas without all having to employ specialists in these areas.

### 3.5 Attributes of veterinary graduates

There is a growing awareness that the amount of veterinary knowledge is expanding all the time and it is not possible for veterinary undergraduates to achieve high levels of expertise in all areas during the time available. Developments in information technology have the capacity to provide high quality learning resources for people trained to acquire and process information. These and other trends have lead Universities to re-consider how they are teaching veterinary science and a flurry of curriculum development in recent years has, in general, been characterised by a reduction in lecture time, more self-directed learning, lecture-free final years and better preparation for life after graduation. A key driver of these developments has been an awareness that a focus on desired graduate attributes will produce better trained veterinarians than a more traditional approach of trying to cram more and more information into the undergraduate years. Each of the Australian veterinary schools has a set of desired graduate attributes and these are key drivers of curriculum development.

VSAAC has keenly supported the development of graduate attributes as drivers of veterinary school curricula and the VSAAC Policies, Procedures and Guidelines Publication includes a typical set of desired graduate attributes. This list is not intended to be prescriptive as it is believed that each school must work with its key stakeholders to develop its own list of graduate attributes. We have previously considered this topic and the following excerpt was first published in 2004 in the Journal of Veterinary Medical Education.

_In the last decade there has been a major expansion in higher education in Australia and New Zealand and, at the same time, there have been significant changes in the funding sources for universities. These changes have prompted a rise in the variety of modes of course delivery. We believe that there is merit in encouraging innovation in veterinary education but acknowledge that it provides challenges for traditional accreditation procedures. It is not only veterinary school accreditors that are looking for better ways of assessing the quality of graduates but there are also demands from employers and from the community that the system is producing graduates that are suitable for contemporary workplaces. The veterinary profession in Australia and NZ, the veterinary schools and University managers are seeking to have assessment processes modified to move the emphasis to assessing outcomes of veterinary training and to be less concerned about traditional input measures. For some time VSAAC, the veterinary schools and the Australian Veterinary Association have been considering ways to move to a more direct assessment of learning outcomes. Some of the earlier attempts focussed on defining detailed technical..._
competencies that veterinary graduates were expected to possess. Subsequently it has been realized that there are less tangible but, no less important, attributes that are an integral outcome of veterinary education.

In considering how to undertake more outcome based assessment it is important to identify the differences between competencies and attributes of veterinary graduates. For the purpose of qualifications, the vocational educational and training sector defines “competency” as the possession and application of both knowledge and skills to defined standards, expressed as outcomes that correspond to relevant workplace requirements and other vocational needs. The possession of technical competencies is an important attribute of veterinary graduates but, in itself, is not an adequate descriptor of veterinary education. There is an expectation by the veterinary profession and the community that veterinary graduates will have a number of personal and professional attributes that will allow them to continue to engage in the practice of veterinary science throughout their career. It is expected that veterinary graduates will have the personal attributes that will allow them to operate anywhere, in any sphere, at a level of “professionalism” consistent with best international practice, and in ways that embody the highest ethical standards.

In 1996 the National Office for Overseas Skills Recognition (NOOSR) and the Australian Veterinary Association produced a report that provided very detailed Competency Standards for the Australian veterinary profession. This report was widely circulated and has assisted some university teachers to design course material particularly in subject areas requiring students to acquire and demonstrate manipulative skills. This document was not, however, adopted by the Australian and NZ veterinary schools as a basis for curriculum revision or development.

The veterinary schools have moved to a position where they developed a range of desired attributes for veterinary graduates that they believed provided a better basis for curriculum development and assessment. In some cases these attributes and learning outcomes were negotiated with the veterinary community and other key stakeholders. More recently, representatives from all the Australian and NZ veterinary schools worked together to produce a collective set of “Attributes of Australasian Veterinary Graduates”\(^3\). A slightly modified version of these attributes has been included in the “VSAAC Policies, Procedures and Guidelines” as a guide for veterinary schools on the current VSAAC thinking on the higher order objectives of veterinary education. It is the intention of the Australasian accreditation system to move to a greater reliance on outcome based assessment when there is sufficient confidence in the available assessment tools.

The AVMA has used outcome based measures to supplement the existing evaluation\(^4\). This report concluded that the school in question learned much more about itself and its various programs through outcomes assessment than it would have learned from a traditional assessment exercise.

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\(^3\) Collins GH and Taylor RM Attributes of Australasian Veterinary Graduates J Vet Med Educ 29: 71-72, 2002

Moving to an outcome based assessment system has been described by Walsh et al (2002) as a four stage process and VSAAC has used this to consider how we should move forward. The key stages were described as follows:

- getting agreement on the set of attributes expected of all students;
- establishing an internal evaluation process to ensure that graduates have met the agreed criteria;
- an external evaluation that these criteria meet the expectations and needs of the profession;
- an external outcomes assessment to determine whether and, to what extent, graduating students are meeting these expectations.

The last two steps are where accreditation systems need to operate but effectiveness is dependent on schools identifying the attributes they aim to develop and on the development of appropriate assessment tools. Some attributes include a relatively high skill content and it is not difficult for veterinary schools to collect evidence that individual students possess the required level of competency and to demonstrate to accreditation bodies that standards are being maintained. It does, however, become more difficult to identify the evidence to demonstrate that graduates have acquired attributes with a lower content of competencies and technical skills.

We consider that it is possible to incorporate a greater level of outcome based assessment for accreditation purposes where veterinary schools have a well established list of graduate attributes that is guiding their teaching program and where they have identified ways to collect evidence that their graduates possess the desired attributes.

Implementation of an outcome based accreditation system would appear to be an excellent way for veterinary schools and accreditation bodies to engage the veterinary profession and other key stakeholder groups in a productive dialogue on the direction for veterinary education. Some of the veterinary schools in Australia and NZ have engaged their stakeholders in developing a set of attributes that are considered to be important indicators for successful delivery of veterinary services in their communities. In at least one instance a school has supported survey work to explore perceptions of employers about the skills and attributes of new graduates.

The review team sent a questionnaire to all the Australian veterinary schools and at a follow-up meeting of representatives from the schools on 2nd September, 2004 the issue of graduate attributes was discussed. The key outcomes from these discussions are listed below.

- The Australian veterinary schools all have a list of desired attributes for their graduates.
- The desired attributes for veterinary graduates varies between schools but, in general, all focus on the same major issues with varying degrees of detail.
- The schools are moving from a position where there is passive acknowledgement of the attributes towards a position where the attributes become the key drivers of curriculum development. Attributes are now being tracked through the curriculum and underpin student assessment.
- VSAAC is keen to encourage these trends but is reluctant to prescribe lists of attributes for veterinary schools in Australia and NZ because of a strong belief.

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that attributes will only drive the veterinary curriculum if they are developed locally and have a high degree of ownership by the academic staff of the school.

3.6 Curriculum flexibility and international recognition

For the reasons stated in section 3.3 we believe that there are no threats to international recognition of veterinary degrees from Australian or NZ schools on the basis of flexibility within their current curriculum content. Accreditation authorities do not wish to be prescriptive about curriculum content and recognise that there are a number of ways to train veterinarians. These organisations all want to move more towards outcome based assessment procedures and as confidence in this approach increases it is likely that it will open up more opportunities for inclusion of electives in veterinary curricula.

3.7. Funding of veterinary education in Australia

The veterinary schools in Australia receive funds from a number of sources including:

- Commonwealth Government funds that are allocated to Universities according to a formula that links veterinary science with other medical and dental studies in Cluster 9. Funds are then distributed to the veterinary schools on the basis of a formula that varies between universities. These funds are, at best, remaining static and in some cases are decreasing;
- Funds from fee-paying students – again the proportion of fees that flow through to the veterinary school varies between universities;
- Clinic income
- Research funds from outside sources
- Endowments and gifts

It is generally acknowledged that teaching veterinary students is very expensive because of the cost of providing the opportunities for hands-on clinical experience with a wide variety of animal species. This cost is acknowledged in the funding formulas used in the different universities and veterinary science is funded in the highest category along with courses in medicine and dentistry. The proportion of these funds that are allocated to the veterinary schools by University management varies greatly and it is not always clear how much the University is contributing to veterinary education from funds retained centrally. However, even if we are to make a generous assessment of the proportion of these retained funds that are committed to supporting veterinary education, the total allocation is substantially less that the funds allocated to veterinary schools in other comparable countries.

The Deans of the Australian veterinary schools have frequently made the point that veterinary science is much more expensive to teach than medicine because medical schools have access to publicly funded hospitals that provide the clinical resources for teaching. Veterinary schools are required to provide clinical training across a broad range of animal species with intensive attention to, at least, small animals (dogs and cats), horses, farm animal species (sheep, beef and dairy cattle, goats, alpacas etc) as well as intensively managed species such as pigs and poultry. To these basic requirements are being added such things as aquaculture, wildlife, laboratory animals and a greatly increased focus on public health and food safety. All of these specialised areas require specialised teachers and access to adequate clinical material to ensure that all students have adequate hands-on experience to acquire the designated skills. The advent of urban expansion and changes in the structure of rural industries often means that individual schools have
difficulty in providing access to one or more animal species. To overcome these issues the schools have developed a variety of initiatives to ensure that their students have adequate access to all species. In a number of instances this involves making arrangements to teach part of the clinical curriculum in areas distant from the veterinary school. This might involve purchase of a practice or developing contracted arrangements with existing practices. In all cases, the cost of these arrangements adds to the cost of veterinary education. The veterinary schools are caught in a situation where they are expected to provide training with an ever increasing number of animal species but without any increase in funding that is commensurate with providing the training requirements.

It has been made very clear to the Veterinary Schools Accreditation Advisory Committee that veterinary schools cannot maintain internationally accepted staffing and resource standards on the funds provided from Commonwealth Government sources.

It is traditional for veterinary schools to run clinics and hospitals to ensure that students have access to small group and individual teaching in clinical medicine and surgery. Access to clinical case material also provides students with opportunities to interact with animal owners which is an essential element of their training. Veterinary clinics and hospitals do generate income but, because student training takes a great deal of time, it is not realistic to expect clinics to meet their recurrent costs. While clinic income varies greatly between schools in Australia and elsewhere, it does not cover the cost of running a veterinary hospital at the appropriate level of staffing to ensure that teaching standards are maintained.

The only source of income that has been growing in most Australian veterinary schools is the fee income from overseas and local fee-paying students. There has, of course, been an associated increase in costs related to enlarging laboratories and hiring additional staff to teach the larger class sizes particularly in the clinical years where the bulk of the teaching is in small groups. It appears that the Australian schools have managed to attract sufficient fee-paying students to fill the available places without having to compromise entry standards. It is, however, recognised that there are significant risks associated with dependence on income from this source. The trend to enrol fee-paying students in veterinary science is happening in many countries and it seems logical that the Australian veterinary schools will only be able to successfully compete for the most able students if the schools are seen to be superior and the fees are comparable or less expensive than those in competing countries.

Research income is growing in some of the veterinary schools and, while this is a highly desirable trend, it is important to recognise that it does not have a major influence on the funds available for teaching undergraduate veterinary students.

In the course of this review it has become evident that additional funding is essential if Australian veterinary schools are to maintain international standards. The schools have explored options for reducing costs such as sharing resources and developing cooperative teaching initiatives. These initiatives have the potential to improve learning outcomes for students but rarely reduce the cost of veterinary teaching.

The VSAAC process has, thus far, continued to accredit Australian veterinary schools but, in all recent reports, the committee has expressed concern about the sustainability of the schools. In some instances VSAAC has noted that the schools are only maintaining standards by extraordinary and, probably, unsustainable levels of commitment by veterinary school staff. Many academics are teaching for substantially more hours than is desirable and, in some instances, are not maintaining research output and post-graduate training at acceptable levels. In some schools there is also a heavy dependence on adjunct appointments that may or may not be paid for their contribution to the training programs. The input from many of these people has been excellent but the members of VSAAC have serious concerns about the sustainability of these arrangements.
Another consequence of continuing to operate without sufficient funding for extended periods is that facilities and equipment are not adequately maintained and slow replacement schedules can mean that staff are using obsolete equipment. This has been a cause of concern for VSAAC who are continually making recommendations about keeping facilities and equipment up to minimum standards. This aspect of veterinary school funding has also been noted during visits to Australian schools by the American Veterinary Medical Association (AVMA). The AVMA makes a preliminary visit prior to a full accreditation visit and, to date, has required the Australian schools to make significant changes to facilities before they are considered for accreditation at a full visit.

The Royal College of Veterinary Surgeons (RCVS) is the body responsible for accreditation of veterinary schools in the United Kingdom. The AVBC and the RCVS have an agreement to accept the visits of the other organisation and to use their report as the basis for deciding to grant (or withhold) accreditation. The RCVS has expressed concern that funding for Australian veterinary schools is inadequate to maintain contemporary teaching standards. It is relevant to note that the RCVS has been reluctant to accept VSAAC reports from two recent visits to Australian veterinary schools without further examination. The VSAAC reports in question have expressed concern about the sustainability of teaching quality and the Royal College is concerned about the longer term consequences of the low level of funding for veterinary schools in Australia.

It is understood that the Deans of the Australian veterinary schools have been considering the detail of Commonwealth Government funding for veterinary education and believe that there are two key areas where the funding formula warrants further consideration. The first of these areas is the use of the standard 75% retention rate for veterinary science. This is clearly penalising veterinary education because actual retention rates in all Australian schools are to the order of 99%. The other area that warrants further consideration is the lack of an allowance for the cost of providing clinical experience. As mentioned earlier, these costs can be very high because all students are required to have extensive hand-on experience with animals at all stages of the course and, especially, in the clinical years. This experience is required in a large number of animal species.

The funding cluster into which each unit of study is classified is specified in chapter 9 of the Commonwealth Grant Scheme Guidelines and depends on the field of education into which each unit of study falls. Veterinary studies is included in funding cluster 9 which also includes medical and dental studies. It is believed that there are inconsistencies in the way that clinical training is funded in each of these fields of study. Students undertaking medical studies undertake clinical rounds in public and private hospitals before graduation, and the universities receive a loading for this clinical teaching. Medical graduates are required to complete a year’s internship in a recognised training hospital before being registered to practice. The cost of this training and a salary for the intern is provided by the health funding system. Courses in dental studies include clinical training in public-funded dental hospitals. Providers of courses in veterinary studies have to operate a veterinary teaching hospital in a commercial environment or purchase the clinical training from associated hospitals and clinics. It is considered that these variations indicate a lack of equity in the way that different courses in funding cluster 9 are funded and warrant a review of the way clinical training is funded in veterinary studies.

The Deans of the Australian veterinary schools have estimated that the cost of providing this training is to the order of $3000 per student per year for all years of the course. From our experience of accrediting veterinary schools in Australia and in other countries we believe that this figure would allow the schools to deliver a teaching program that is appropriate for Australian circumstances and will maintain the reputation of the Australian schools elsewhere in the world. Failure of the Commonwealth Government to increase the funding available to Australian veterinary schools could lead to a situation where one or more could fail to reach minimum accreditation standards.
3.8 Conclusions

Funding for Australian veterinary schools is inadequate and the reviewer believes that standards are only being maintained by enrolment of increasing numbers of full fee-paying students and by an extraordinary contribution by the academic staff.

The funding challenges within the Australian veterinary schools has been noted by the accreditation bodies in the UK (RCVS) and North America (AVMA).

Despite these funding shortcomings the schools are being required to teach additional subject areas such as aquaculture, public health and wildlife medicine. There is also an expectation that students will be taught more about animal production systems and detailed analytical skills that will allow them to extend their competence in flock and herd medicine.

The fundamental issue that is contributing to the under-funding of Australian veterinary schools is a failure of the funding formula used by the Commonwealth Government to recognise the cost of clinical training for veterinary students. This failure to adequately fund clinical training appears to be in contrast to the way clinical training is funded for other courses (medical and dental studies) in funding cluster 9 and this lack of equity is considered to warrant a review by DEST.

3.9 Recommendation

That DEST review the basis of funding for veterinary science to take account of equity issues with like disciplines and the cost of clinical training
4. EFFICACY OF SPECIALISED POST-GRADUATE TRAINING AS A REQUIREMENT FOR FULL REGISTRATION

4.1 Background

At present, veterinary undergraduates in Australian universities undertake a demanding five year course in an accredited veterinary school and, upon graduation, are eligible to be registered to practice as a veterinary surgeon. Unless their registration is cancelled, veterinarians in most states, are eligible to practice for life. Veterinary Registration Boards are increasingly encouraging veterinarians to undertake Continuous Professional Development (CPD). The Australian Veterinary Association (AVA) has also shown a great deal of interest in veterinarians maintaining CPD and, in May 2004, launched an initiative to encourage and assist veterinarians undertake and record CPD.

In Australia, at the present time, the following processes are designed to maintain quality control on the provision of veterinary services:

- Accreditation of veterinary schools by the Australian Veterinary Boards Council (AVBC) on the recommendation of the Veterinary Schools Accreditation Advisory Committee (VSAAC).
- Disciplinary provisions in the Veterinary Surgeons Acts in the states and territories
- Registration of Specialists
- The CPD scheme administered by the AVA.
- Voluntary CPD by individual veterinary surgeons

These activities are loosely coordinated by AVBC and by cross membership of relevant professional and regulatory committees and Boards. The Frawley report recommended that the AVBC look more closely at the merits and challenges of introducing a period of post-graduate specialisation through further study as a precursor to full registration. This report also suggested that AVBC examine the nature of professional development in relation to specialisation or general veterinary training and the use of professional development to switch streams of specialisation.

The Royal College of Veterinary Surgeons (RCVS) has closely examined these issues for a number of years and, in 2001, they released a consultation paper that proposed a comprehensive quality assurance system entitled “Veterinary Education and Training – A Framework for 2010 and Beyond”.

The key elements of the proposed framework were that the broad based, 5 year veterinary degree should equip graduates at least with the core ‘day one competences’ and that graduates would be required to undertake a professional training phase after graduation to achieve year 1 competences before they achieved a licence to practice in a named area. The framework also proposed that practices be registered to undertake work in particular areas based on the qualifications and experience of the staff and that there should be a statutory requirement for veterinary surgeons to maintain their competence, linked to the periodic renewal of their licence. This paper was widely circulated for comment which was considered by the RCVS Education Strategy Steering Group who reported in 2002 that they had considered many responses from the profession and recommended an education and training framework to the RCVS Council. Council supported the proposed framework in principle and agreed that a period of feasibility testing should begin.
The principles of the veterinary education and training framework are set out below

PRINCIPLES OF THE VETERINARY EDUCATION AND TRAINING FRAMEWORK

a. The broad, science-based 5-year veterinary degree, should equip graduates at least with the core ‘day 1 competencies’.

b. A professional training programme (PTP) should follow graduation.

c. Pre-education differentiation electives could count towards PTP and eventual licence to practise.

d. The new graduate should work in a registered practice until ‘year 1 competencies have been achieved. A licence to practise within a broad named area would be awarded.

e. Self-assessment and appraisal of competence during PTP would be based upon a portfolio approach similar to that used by the dental profession.

f. A network of RCVS Postgraduate Deans would oversee assessment of PTP.

g. There should be a statutory requirement for all veterinary surgeons to maintain their competence, linked to the periodic renewal of their licence to practise.

h. Those who wish to change direction and work in areas other than that covered by their initial licence would need to undergo conversion training leading to a revised licence to practise.

i. By 2010 practices should be registered to undertake work in particular areas, dependent upon the qualifications and experience of the staff.

j. The RCVS Certificate should be restructured to become modular in structure, and more accessible for those in practice.

k. Achievement of a Certificate, or working towards Certificate modules, should become the norm for new practitioners.

l. The RCVS Fellowship should be retained as the highest award of the College, and there should be greater convergence with European Colleges for the award of Diplomas where appropriate.

m. Inclusion on the RCVS Recognised Specialist List should be open to Fellows, RCVS Diploma and European Diploma Holders.

A pilot trial of 10 graduates from each of the UK schools was commenced in 2003 and we understand that another cohort of graduates have agreed to test the system in 2004. The RCVS has just completed work on the second version of the web-based database of year one competencies and clinical skills and are starting to trial this with a further group of new graduates.

Recent feedback from the RCVS has advised that they are only part way through the pilot program and are learning a great deal from the user feedback. There is not currently a commitment to link full registration to successful completion of the Professional Development Phase (PDP) as
feedback from consultation indicated that the time was not yet right. The pilot work on the PDP is seeking to encourage a more formal recognition that new graduates are continuing to learn and that they need support and guidance from their senior colleagues in practice until they have met 'year one competencies'. The RCVS is planning to launch a new Practice Standards Scheme shortly and are seeking to ensure that support for new graduates is an integral part of the standard for approved practices.

Relevance of these Developments for Australia

There has been a long tradition of veterinary graduates from Australia and New Zealand working in the United Kingdom. In 2000 the links between AVBC and the RCVS were strengthened by the signing of an agreement to “accept systems of accreditation and visitation in the United Kingdom (carried out by RCVS) and in Australia and New Zealand (carried out by the Veterinary Schools Accreditation Advisory Committee, reporting to AVBC Inc.) as the basis of recognising veterinary qualifications for the purpose of registration”. The agreement has a number of conditions that describe how accreditation visits will be performed and the nature of the obligations on each party. The practical outcome of this agreement has been a free flow of veterinarians between Australia and the UK. If the RCVS moves to a system where a period of post–graduate training is required before veterinary graduates can be registered to work in a specific area of veterinary science then it would seem likely that such training would be required by Australian and New Zealand veterinarians wishing to work in the UK. It is presumed that graduates undergoing post-graduate training will be paid at a lower rate until they complete this training period. This may make it less attractive for experienced Australian and NZ graduates to work in the UK unless it is possible to work out an agreement where the RCVS recognises prior experience.

These developments also raise the larger issue that, at graduation, veterinarians are lacking in experience and need to work under supervision for about one year before they are considered ready for full registration. The UK scheme also recognises that it is difficult for veterinarians to be sufficiently trained and experienced to practice in all areas of veterinary science. Veterinarians that wish to change their area of practice will be required to undertake further specialist training. If Australian authorities were to adopt these arrangements it could pose difficulties for one-person practices in remote or isolated communities. Presumably there would be scope for individuals working in these situations to obtain training in more than one area of practice.

4.2 Options for Specialised Post-graduation Training in Australia

1. No change – recent veterinary graduates receive full registration.
2. Veterinary graduates are required to demonstrate specified levels of competence before they receive full registration which allows them to practice in any area of veterinary science
3. Adopt the RCVS model which requires a graduate to work in a registered practice until year 1 competencies have been achieved and is then granted a licence to practice within a broad named area of veterinary science
4. Develop a transition to practice program that is based on specialised CPD in the first year or two of practice and is supported by a practice standards initiative that includes a strong emphasis on training and support for new graduates

In considering the merit of these different options it is necessary to consider such things as the benefits to the consuming public, benefits to the veterinary profession and the impact of any changes on our standing with veterinary registration authorities in other countries.

To argue for a change from existing arrangements it is necessary to establish that, at graduation, veterinarians are sufficiently lacking in skills to prejudice the outcome for animals in their care.
If it were to be established that veterinary standards would be improved by introducing a compulsory period of post-graduate training it would then be necessary to consider the nature of such training. The RCVS approach specifies that the training be within “a broad named area of veterinary science” and we have assumed that this is most likely to be along the lines of small animals or production animals. This assumes that the required training is in areas such as medicine, surgery and animal handling rather than in such things as practice management, client relations and communication. If these latter issues are considered to be the most important area for training and experience then it could be concluded that after a year of post-graduate training veterinarians could be registered to practice in all areas. This would allow people to work in mixed practice which is an important feature of the veterinary landscape in Australia. It is assumed that veterinarians that wish to specialise in a particular area of practice will undertake CPD aimed at achieving higher level skills.

4.3 Conclusions

In reviewing the subject we have been impressed by the evidence that the experience of young veterinarians in the first few years of their professional life is a key influence on their subsequent career development. In particular, the experience in these first few years often appears to trigger decisions to leave rural practice. The reason for such decisions varies and there are no simple answers on how to improve the transition from veterinary school to practice. It is our opinion that it is possible to improve this transition process and that this problem can best be approached by the registration authorities, the AVA and consumers of veterinary services working together to achieve better outcomes.

There have been previous attempts to tackle this issue and there have been some modest levels of success. We believe that the profession and the community will only make a significant impact on the transition of graduates from University to practice if there is a coordinated initiative involving the Veterinary Registration Boards, the Australian Veterinary Association, the Veterinary Schools and the consumers of veterinary services. There is also a need to ensure that any system that is developed includes all the states.

4.4 Recommendation

That the Australian Veterinary Boards Council convene a working group to develop and implement strategies to improve the transition of veterinary graduates from university to practice. This working group should include representatives of the Veterinary Registration Boards, the Australian Veterinary Association, the Veterinary Schools and consumers of veterinary services.
5. CONTINUING PROFESSIONAL DEVELOPMENT AS A REQUIREMENT FOR REGISTRATION

Continuing Professional Development (CPD) was first given recognition in Australasia in 1993 when the Veterinary Board of Victoria released an exposure draft of a Guideline issued to become effective from January 1994. The intention was to prepare registered veterinarians for the inevitability that the requirement for undertaking and recording CPD would eventually become mandatory. The CPD guideline has undergone several revisions over the past decade.

5.1. Current Veterinary Registration Boards attitude to Compulsory Professional Development.

In 1999, the Veterinary Boards in eight Australian States and Territories and the Veterinary Council of New Zealand formed the Australasian Veterinary Boards Council Inc. In addition to harmonizing the application of veterinary legislation across jurisdictions, standards for registration for general practitioner and specialists, and overseas qualified veterinarians, the requirements for CPD have become uniformly accepted, but not yet made mandatory in any jurisdiction. The AVBC, which oversees the accreditation of veterinary schools in Australasia, expects that veterinary graduates are equipped with the attributes to be willing and equipped to develop further their knowledge and skills through theoretical and in-service training beginning in the first year after graduation and continuing throughout their professional careers (VSAAC, 2002).

CPD was first given recognition in Australasia in 1993 when the Veterinary Board of Victoria released an exposure draft of a Guideline issued to become effective from January 1994. The intention was to prepare registered veterinarians for the inevitability that the requirement for undertaking and recording CPD would eventually become mandatory. The CPD guideline has undergone several revisions over the past decade.

All registered veterinarians are now expected to record the CPD that they undertake. The level of participation in CPD programmes should be sufficient to maintain the individual's competency in their chosen field of work. Registered veterinary specialists are expected to maintain a superior knowledge of current veterinary practice in their area of specialty, by any of the following means:

- publications in international and local refereed journals
- presentations at international or local veterinary conferences
- supervision and training of registered veterinary practitioners undergoing training programmes or for general skills updating.

One desirable attribute of a professional veterinarian is that they regularly evaluate the development of their knowledge and skills during their careers. While this can be done through the process of self-evaluation, the assistance of a mentor, supervisor or employer is usually the preferred option for most veterinarians no matter where they work. The increased use of private veterinary practitioners in the delivery of government administered programs for disease control, and movement of animals for live export has required that the private veterinarians undertake an accreditation program and maintain their CPD. It is assumed that veterinarians working in organizations such as government and regulatory authorities, including diagnostic laboratories,

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6 Section 5.1 has been extracted from paper Professor Ivan Caple presented at the 11th International Conference of the Association of Institutions for Tropical Veterinary Medicine and 16th Veterinary Association Malaysia Congress 23-27 August 2004, Sunway Pyramic Convention Centre, Petaling Jaya:27 - 30.
who participate in national disease control programmes and certification of animals and animal products for trade purposes are adequately trained, and that the performance of the laboratory is audited and accredited.

Veterinarians working in education and training institutions are also expected to undertake CPD, but simply delivering the same set of lectures and practical instruction to undergraduate students during the course of normal duties may not constitute maintaining an adequate CPD record in some jurisdictions. Veterinarians working for industrial organizations and companies providing therapeutic products, diagnostic equipment, food additives or pet food, must also undertake CPD and often this can be obtained through staff training. Where companies do not have a planned program of development for their employees the individual veterinarian is expected to plan and undertake their own CPD, and record it.

Veterinarians in private practice working as single practitioners usually have difficulty in participating in CPD. There are considerable advantages for working in a multi-person practice, and in specialist and referral practices, where internal or in-house training can be a very effective learning environment when there is leadership and encouragement provided by the senior veterinarians in CPD activities.

**Use of CPD Records in Regulation of Veterinary Standards**

The Veterinary Practioners Registration Board of Victoria which administers the Veterinary Practice Act (1997) has as one of its primary responsibilities to protect the public from the practice of sub-standard veterinary science by registered practitioners. The Board uses two approaches to achieve this aim. The first approach is to take action retrospectively, and either counsel, caution, reprimand, impose conditions on registration or conditions of further education, fine, suspend or de-register veterinary practitioners who are found guilty of unprofessional conduct. The adequacy of CPD is considered as a contributory factor when making determinations about Unprofessional Conduct which is defined in the Act. The second approach is to establish appropriate mechanisms to ensure that registered veterinary practitioners undertake sufficient post-graduate continuing education to enable the provision of highly competent professional veterinary services. These two approaches are not mutually exclusive and are exercised simultaneously.

The approach taken to CPD in Australasia is that the veterinary boards set the minimal standards, and those veterinarians in private veterinary practice who are members of the professional association (AVA, NZVA) practice at an agreed higher standard. One remaining concern for the veterinary profession in Australia is that the standards and CPD requirements for veterinarians employed in the government sector are poorly documented. In some jurisdictions, government employed veterinarians are not required to be registered under veterinary legislation, and are not required to undertake CPD and be accountable to the community.”
5.2. Australian Veterinary Association attitude to Compulsory Professional Development

In May 2004, the Australian Veterinary Association [http://www.ava.com.au](http://www.ava.com.au) launched AVA Vet Ed: *The Continuing Education Scheme of the Australian Veterinary Association*, which is based around members gaining points for their participation in educational activities. This has been done in recognition of the growing need for veterinarians to identify, develop, market, maintain and improve upon their knowledge and skills because the industry sectors and environments in which veterinarians operate are constantly shifting. The AVA has worked closely with the registration authorities to ensure that the AVA standards are in close alignment with registration requirements.

The AVA has set up a recording system for all AVA members – so that members become used to keeping records of their continuing education so they are well-placed when it does become mandatory- a step the organisation supports. The AVA is a minor provider of continuing education at this time, and it would like to see that role expand, probably in partnership with other groups.

5.3. Requirements for Compulsory Professional Development for veterinarians in other countries.

The RCVS considers it to be good professional practice for members to be involved in a regular programme of CPD which is accurately recorded. It introduced a scheme of self-recording of CPD in 1997.

From 2003 onwards, the RCVS intends to monitor up to 10% of its membership, on a random basis, for information on CPD uptake.

Provision has been made on the College’s Membership database for each Member’s annual CPD uptake to be recorded on his/her Membership record, where appropriate, and this will be extended to include all members if CPD becomes mandatory.

In the USA, approximately half the states require veterinarians to attend continuing education courses to maintain their licenses.

Continuing education requirements vary from one jurisdiction to another; some boards require only a specific number of hours, while others mandate continuing education particular subject categories. Some boards have limitations on the number of hours acceptable in certain categories and/or restrictions of certain methods of delivery of continuing education. In some jurisdictions, for example, business management and marketing courses are allowed provided they form only a small part of CE whilst in others, only scientific education is recognised as valid.

There is a national database of approved providers of Continuing Veterinary Education. Each jurisdiction has final approval on any continuing education course from any source on any subject matter category.

5.4. Requirements for Compulsory Professional Development in other professions in Australia.

**Dental Practice Boards**

In Victoria, there was an introductory period prior to the introduction
of a mandatory CPD scheme on 1 January 2005. During this introductory period, CPD hours were able to be accumulated and could be carried over to the commencement of the first two year cycle.

In order for an activity to count towards a practitioner’s CPD requirement, it must be approved by the Board or be run by a provider that is approved by the Board. The Board is establishing an advisory committee to evaluate and approve providers and activities. The Board will then publish a list of approved CPD activity providers and activities.

The Australian Dental Association does not support the mandating of arbitrary levels of CPE through the Dental Registration Acts. The ADA president reports that there is no significant evidence indicating that better health or safety outcomes arise from mandatory CPE rather than through voluntary programs of continuing education.7

This organisation seeks further research into the relationship between CPE and improved quality of patient care. It suggests the possibility that the participation of dentists and other dental personnel in continuing education could achieve some economic savings for the participants through reduced Professional Indemnity premiums, registration fees and perhaps payment of higher benefits through government funded dental schemes and health funds.

The NSW Medical Board (http://www.nswmb.org.au/) believes that all medical practitioners should participate in continuing professional development, relevant to their area of practice and at a level at least equivalent to that of the relevant College program.

Practitioners are required to advise the Board of their participation in CPE. Practitioners who have not done any CPE, should say so in their annual return. Failure to participate in CPE will not impede a practitioner’s registration.

5.5. National Registration

During the course of this review it has become apparent that there are a number of parties that believe there is a pressing need for a system of national registration for veterinarians in Australia. It has been argued that there are a number of reasons for implementing a system of national registration. These include:

- The increasing number of veterinarians, especially specialists, who provide services in different states. In addition, there are an increasing number of large scale animal production organisations with an expectation that their veterinary advisors will be able to operate in all their production units which may be dispersed over a number of states.
- Veterinary employees of a range of national agribusiness organisations that operate nationally.
- The large number of veterinarians employed by the Commonwealth Government who are expected to be able to operate in different states. Many of these veterinarians are not registered but it is reasonable to expect that if there was a simple procedure for national registration that a number of them would become registered.

7 ADA-Policy Statement—“Continuing Professional Education.”
• The need to be able to quickly mobilise a large numbers of veterinarians from around Australia in the event of an outbreak of exotic disease.

While the subject of national registration is not part of the terms of reference for this review we have been aware that our major recommendation of improving the transition of graduates to practice could be facilitated by greater cooperation between the Veterinary Registration Boards. Issues such as an agreed format for CPD in the first one or two years of practice could be facilitated by the boards working in unison.

It is believed that a majority of the Australian Veterinary Registration Boards favour a system of national registration. Those that are opposed to national registration argue that:

• there are relatively few veterinarians wishing to register in a number of states;
• the motivation of people seeking national registration is to save the cost of multiple registrations;
• it is a simple matter to register veterinarians from other states in the event of a national emergency.

The issue of National Registration has been under active consideration by AVBC for some time. The proponents of a system of national registration believe a model developed by medical registration authorities would be suitable for use in the veterinary profession.

Animal Health Committee (AHC) also has a keen interest in promoting a system of national registration and have formed a Working Group that includes representation from AVBC and the AVA.

Conclusions

There is no doubt in the mind of the reviewer that CPD is an essential activity for veterinarians in all areas of employment. The Veterinary Registration Boards all encourage registered veterinary surgeons to record their CPD and the reviewer expects that, in due course, it will become compulsory. One of the difficulties in Australia is that veterinary boards in different states and territories have different approaches to making CPD compulsory. The current initiative to develop a system of national registration could, if it is successful, provide an excellent vehicle for adopting a uniform approach to CPD and a uniform timetable for making it compulsory.

From the point of view of this review it is considered essential that CPD is considered as an integral part of the transition to practice initiative recommended in any earlier part of this report. It is considered that CPD in the early years of a professional career is likely to be more effective if it is structured to achieve specific competencies. Because new graduates will be working in different areas it is considered that this structured CPD would be most effective if it is developed in modules that address specific areas of practice. There are a number of excellent organisations providing professional development courses and other activities for the veterinary profession in Australia and it should be possible to enlist them in structuring and delivering appropriate CPD for new graduates.

Another key player in CPD in Australia is the Australasian College of Veterinary Scientists (ACVSc) and, while this training is generally undertaken at a later stage of a veterinarians career, there seems to be merit in linking early career training to subsequent professional development leading, ultimately, to specialist qualifications.
Recommendations

- The Veterinary Registration Boards adopt a uniform timetable for introduction of compulsory CPD for registered veterinary surgeons.
- That the proposed working group charged with improving the transition to practice give consideration to development of structured modules of compulsory CPD for graduates in the first and, possibly, second years of employment as veterinary surgeons.
- That consideration be given to developing a system that enables individuals successfully completing structured CPD modules to be given credit towards subsequent professional development aimed at obtaining specialist and/or academic qualifications. Implementation of such a scheme would require involvement of a number of organisations but, in the first instance, it is suggested that it be included in the Terms of Reference of the proposed working group examining the transition to practice.
6. THE SCOPE FOR COLLABORATION BETWEEN AND WITHIN UNIVERSITIES TO ENHANCE VETERINARY EDUCATION

Background

The Frawley report noted that the cost of veterinary education is very expensive because of the need to provide small group clinical teaching in a number of disciplines and across a number of animal species and recommended that AVBC examine the scope for collaboration between and within universities to enhance undergraduate and post-graduate education and research.

Our approach to looking at this issue has been to review the current level of collaboration and to discuss the issues with the key players from the Australian veterinary schools.

In our view the potential benefits from increased collaboration fall into the following three categories:

- To reduce costs of undergraduate and post-graduate education
- To enhance the quality of the educational experience for students
- To rationalise the cost of research infra-structure

We will discuss these areas in more detail and, as part of the discussion, will reflect on what is happening currently and identify opportunities for future collaboration. The opportunities to reduce costs and/or improve the educational experience will be discussed together in a framework that is based on the different phases of the undergraduate course. For convenience, these phases are designated pre-clinical, para-clinical and clinical.

Pre-clinical Veterinary Training

Recent curriculum changes in all the Australian veterinary schools have looked closely at the pre-clinical phase of the course and there has been active examination of options to outsource some of the teaching to other parts of the university. While there are some excellent examples of this being very successful it is crucial that the teachers from other faculties or schools have an interest in the veterinary course as a whole and that the planning is thorough in order to reduce the chance of duplication or, worse still, perceived irrelevance. It is also critical to ensure that the course is effectively reviewed both by students and the relevant Curriculum Committee.

One of the attractions of outsourcing pre-clinical training is that it opens opportunities to teach combined classes of veterinary and other undergraduates. The veterinary schools do find, however, that these combined courses are sometimes not taught at sufficient depth for the veterinary students or, if they are meeting the needs of the veterinary students, they may be inappropriate for the other students.

In discussion with veterinary school staff we have been convinced that there is scope for sharing material between schools. The most prospective exchanges appear to include:

- Digitised images of high quality preparations in, for example, anatomy
- High quality material that demonstrates principles in, for example, physiology
- Case history material - particularly cases that demonstrate the relevance of structural and/or functional studies to what the students will be learning in their clinical years.
- Computer assisted learning packages

This short list is not intended to be exhaustive but, rather, to provide several examples of existing and potential opportunities. The main impediments to these sorts of exchanges, to date, has been
lack of awareness of what is being developed elsewhere and issues such as intellectual property rights.

Para-clinical Veterinary Training

In the para-clinical area the new curriculum changes have also led to significant changes in microbiology, pathology and parasitology. In general these subjects are taught by the academic staff of the veterinary school but can be supplemented by people from other faculties and visitors from elsewhere in Australia or other countries.

Areas that lend themselves to collaboration are such things as:  
- Exchange of case history material  
- Exchange of images particularly of diseases that do not occur in the vicinity of one or more schools

Some of the schools have spent significant amounts of money developing innovative teaching materials in one school but, for a variety of reasons, they are not available to the other schools. The reasons may relate to constraints on Intellectual Property or lack of interest or problems with incompatibility of IT platforms used in different locations. There would appear to be scope to work on these projects more prospectively and to think about the potential constraints and the potential scope for collaboration before the projects start.

One of the difficulties being experienced in many veterinary schools is the small amount of clinical material for teaching clinical and gross pathology. One model that has the potential to assist this situation is to have veterinary diagnostic laboratories being co-located with veterinary schools. A commercial veterinary diagnostic laboratory has recently been co-located with the Institute of Veterinary, Animal and Biomedical Sciences (IVABS) at Massey University. This arrangement is considered to be working well and is generating additional material for teaching pathology to undergraduate veterinary students.

Clinical Veterinary Training

While there are some opportunities for collaboration in the earlier years of the course it is in the clinical years that undergraduate training costs rise very steeply because the schools have to provide small group teaching in clinical subjects for a number of animal species.

It is in this clinical area where there are the best prospects for collaboration to both potentially reduce costs and to improve the educational experience. There are a number of initiatives that are being used or planned that provide potential models for collaboration.

One of the recurrent challenges for veterinary schools is to find adequate first opinion case material in farm animals, small animals and horses. One of the techniques being used more frequently by veterinary schools in Australia and NZ is to identify opportunities for collaboration with specialist practitioners who are prepared to take on a teaching role in their own clinics. The practitioner enters into a contract with the veterinary school to provide specified clinical training. In many of these arrangements the practitioners are made associate staff of the university at a level that is determined by normal university appointment procedures. For these arrangements to work well it is very important that the teaching requirements are very well defined and monitored carefully.

While these arrangements may not be reducing costs they can enhance the quality of the educational experience and also provide students with opportunities to experience other aspects of practice.
One of the most challenging aspects of clinical teaching is to provide lectures and practical experience in those areas where there are limited numbers of practitioners involved and it is difficult to get access to clinical material, for example, in intensive pig and poultry production.

One of the major difficulties for veterinary schools throughout the world is to be able to have sufficient expertise in all the major animal species and in the ever increasing number of species and specialist areas that comprise contemporary veterinary medicine.

The funding model for veterinary science in Australian universities is insufficient to cover the cost of teaching in all these areas. The funding allocation for veterinary science is basically the same as for other clinically based courses such as medicine or dentistry. The major difference is that the clinical material for these other disciplines is provided by publicly funded hospitals.

One model for managing this sort of situation is for one or more of the schools to develop expertise in an area and for the expert/s to provide training in the other schools and to develop high quality teaching resources that can be used in all the schools. It is also likely that the expert/s is involved in research and there is the possibility that this sort of arrangement will be supported by the industry involved either directly or indirectly.

There would appear to be scope for developing arrangements for focusing expertise in one or more schools for certain classes of animal or for particular specialised discipline areas. There are a variety of ways that such arrangements could be funded, for example, each school might share the cost of a particular appointment or the cost may be borne by one university and they would charge for the training or the universities might be able to make a case for an industry funding body to cover some or all of the costs.

The key element in bringing about initiatives of this sort is a commitment by the Deans to share resources and to work together on specific projects. Such arrangements do not need to be confined to veterinary schools in Australia or NZ.

One of the challenges in putting together arrangements of this sort is the perception that the schools are competing for international fee-paying students and might be reluctant to collaborate. We believe that this is unlikely to be the case if the opportunities for collaboration are managed by the Deans working collectively.

Post-Graduate Training & Research

To a large extent the veterinary schools have defined research strengths that are acknowledged by the other schools.

Competition for research funds is very keen and the likely situation is that each of the schools will work to define their strengths and aim to consolidate their position by the quality of their work and their level of funding support. There will, no doubt, be opportunities for collaboration but they are likely to be opportunistic and relatively small scale. As we mentioned earlier the key opportunity here is for the Deans to recognise the strengths in their own and the other schools and determine if they present opportunities for collaborative teaching initiatives.

The bigger opportunity for collaboration is for the veterinary schools to identify opportunities to develop closer collaborative arrangements with other research organisations such as Departments of Agriculture, CSIRO or other Universities. The Rural Research Corporations and other research organisations such as Australian Research Council (ARC) and the Cooperative Research Centre program are all looking at ways to consolidate funding into a smaller number of research entities
that have the resources and critical mass to undertake first class research. The Australian veterinary schools seem to be well placed to seize some of these opportunities particularly in the agricultural development and biomedical areas.

6.1 Conclusions

It is believed that there are opportunities to improve the amount of collaboration between the veterinary schools in the following areas:

- Sharing of resources
- Sharing of specialist staff in areas where it is uneconomic for all schools to aim to develop expertise

To capitalize on these opportunities it is important to change from a laissez-faire system to an arrangement where the subject is periodically reviewed and action plans developed and implemented. It is considered that this may most effectively be achieved by the Deans of the Australian Veterinary Schools endorsing the concept and nominating people to serve on a committee that is charged with improving collaboration between the veterinary schools in Australia, NZ and, if appropriate, elsewhere. AVBC is prepared to assist in facilitating these developments and believes success will be heavily dependent on the involvement of enthusiastic participants. It is possible that the convenors of Teaching and Learning Committees in the veterinary schools may be in a good position to contribute. In May 2005 the deans of the Australasian veterinary schools agreed to form the Australasian Veterinary Deans Committee (AVDC) which is to have a broad charter aimed at coordinating and collaborating on issues that influence veterinary education. It is therefore logical to ask this group to facilitate initiatives to improve coordination in veterinary education. The subject of collaboration is of considerable interest to the registration authorities and, indeed, to the profession at large and it therefore seems to be important that the AVDC report to the AVBC and the AVA on initiatives aimed at improving collaboration between the schools.

The veterinary schools, the AVA and others became aware of the DEST collaboration and Structural Reform Fund at the workshop hosted by AVBC to consider the interim findings of this review. Subsequently, there has been a considerable effort by people representing the veterinary schools, the AVA and AVBC to develop initiatives in cooperation and we understand that at least two applications have been submitted to the fund. From an AVBC point of view the energy and enthusiasm involved in developing these applications bodes well for future cooperation between the veterinary schools in Australia.

We also believe that it is very important to lift the profile of veterinary education and provide opportunities for active involvement of the profession and other key stakeholders in discussions about the challenges and triumphs of veterinary education.

One such opportunity would be to increase the educational content of Annual Conferences of the AVA.

6.2 Recommendations

- That the Australasian Veterinary Deans Committee be requested to facilitate greater levels of cooperation between veterinary schools in Australia and New Zealand. It is anticipated that this group will report on progress to the AVBC and the profession on an annual basis.
- That the Australian Veterinary Association encourage debate about veterinary education by, for example, featuring educational topics at Annual Conferences and other events.
Appendix 1: Veterinary School Survey

Review of Veterinary Science Education and Registration Requirements

Please complete this questionnaire in electronic form (if possible) and email to eo@avbc.asn.au and/or bring with you to AVBC Inc, Level 11, 470 Collins St, Melbourne for the meeting on Thursday September 2nd.

1. Entry Requirements for Veterinary Science and Related Courses

This section is aimed at examining the nature and appropriateness of traditional and alternative entry pathways to Veterinary Science. Aspects of these pathways include entry by candidates likely to focus on productions animals, selection of veterinary students after they have completed a pre-vet year in another course such as a Bachelor of Science, Agricultural Science or other related degrees, the place of a veterinary science degree as the later half of a double degree in a related science discipline, articulation arrangements for veterinary nurses to allow pathways into veterinary science degree courses and other related issues.

Personal Statement, Supplemental Personal Statement, veterinary related experience, animal related experience, other career experience (research, lab animal work, business experience, agribusiness experience, etc.), community service/citizenship, leadership, initiative/entreprising activities, any special recognitions (academic, personal or professional), and letters of reference. At this junction a preliminary order of merit list is developed and a determination is made as to which applicants will be offered the opportunity for a personal interview. Once interviews are completed, the final, official, order of merit list designates those who will be offered admission. From University of Illinois Selection Criteria [http://www.cvm.uiuc.edu/admissions/select_crit.html]

What are the current entry requirements for veterinary schools in Australia?

1.1 Do you have an institutional and / or school statement of aims in marketing to students (eg “Attract high achieving students from diverse backgrounds, etc.”)

If so, please paste here.

1.2 Please summarise your veterinary school’s current entry requirements and selection criteria

1.3 Please give overview of Bachelor of Veterinary Science degree expected outcomes (or competencies or attributes)
1.4 Is there overt alignment of selection criteria with expected outcomes?

_Emeritus Professor Trevor Heath:_ This survey provides evidence that growing up (spending at least two years) on a farm on which raising animals was a primary source of income is a valid selection criterion if one of the objectives of the selection process is to promote a higher retention rate of veterinarians in rural Australia.

_Frawley review (Do prospective students have an understanding of large animal practice?):_ long hours, low pay, onerous (and often dangerous) work, (it is said that the perception is often) that veterinary graduates are “animal doctors” rather than animal health experts (thus the) aversion to practice involving “exploitation” of production animals; (perception that) males from farms are ore likely to fit into and stay in rural mixed practices.

1.5 In the selection process, are candidates who have had extended exposure to production animals (eg who have grown up (spent at least two years) on a farm raising animals as a primary source of income) considered more favourably than those from other backgrounds (all other factors being equal)?

The following questions 1.6 to 1.13 are similar to those put to Higher Education Institutions in the UK recently (Schwartz review). They are included as a reference point to canvas a range of opinions rather than as a repeatable statement of veterinary school policy.

1.6 Should students be selected:

- On their potential to complete the course successfully?
  Comment

- On their potential to excel academically and achieve the highest marks?
  Comment

- On their potential to contribute subsequently to society?
  Comment

1.8 Do you think that it is important that veterinary schools have students from a wide range of backgrounds?

If so, should universities choose students partly in order to achieve such a mix?

1.9 Is it fair for veterinary schools, when they look at an applicant’s examination marks, to consider any obstacles that he or she might have had to overcome, such as illness, attending a low-achieving school, or having a rural background?

1.10 Is it fair for a university to offer a place to an applicant which requires lower examination results than those required of other applicants, for these reasons?

1.11 Should an applicant’s educational context, for example, type and nature of the school or college attended, be considered in admissions?
1.12 If so, should this extend to offering a place to an applicant which requires lower examination results than those required of other applicants, based on consideration of these factors?

1.13 Is it desirable or necessary to consider additional measures of assessment in admissions?

If so, should the following be included as additional means of assessment?

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End of Schwartz Questions

Professor Heath’s survey provides no evidence to support the use of interviews or personal statements, especially if the objective is to obtain some indication of commitment to a career path. “The role of interviews in assessing appropriate communication skills is also questioned and found wanting” ibid

While he looks for remedies to take back to the states, he says pre degree interviews have been labelled too expensive.

“It takes five faculty members about two months in Davis in California to go through the interview process with the students,” he said. (Donal Walsh)

Professor Rose says he is not sure if it is worth while.

“The issue about selection is important, but I am not sure if on a cost benefit analysis.

http://www.abc.net.au/landline/stories/s604703.htm

1.14 Should veterinary education move to a system of post qualification applications?

What is the likelihood of your school adding new articulation arrangements in the next 10 years from:

- (‘Pre-vet’ type) Bachelor of Science ...........%
- (‘Pre-vet’ type) Bachelor of Agriculture ..........%
- Another degree (specify or state if any degree would be considered) ..........%
- Articulation pathway for veterinary nurses ..........%
- Other (specify) ..........%

1.15 Do you have any general comments on the list of possible options for veterinary schools to consider in assessing the merit and potential of applicants for their courses?

1.16 Relationship between selection procedures and performance during the course AND post graduate career directions

From Prof Heath’s two cohorts of students (Heath, 2001) evidence for academic performance as a predictor of success in the veterinary course... is that about 6% discontinue the course because of failure and another 8% repeat a year. Unfortunately the instruments that are available to predict success in the veterinary profession are blunt. ... This raises the question of whether veterinary schools have a responsibility to select students who are likely to fill the range of veterinary roles that exist, actually or potentially, across Australia. And whether there is evidence that these roles are not all being filled under the current system.

1.17 Has your school ever analysed data relating graduate outcomes, performance during the course with selection criteria? If yes, please summarise results.

1.18 Do you have any other comments on Entry Requirements for Veterinary Science and related courses?

2. The Content and Balance of Undergraduate Veterinary Science Courses, particularly with respect to production animal health, aquatic species health and wildlife health, whole of farm issues.

2.1 What is the school’s reference point for choosing core subjects for the curriculum?

(eg Always taught these subjects/The VSAAC/RCVS/EAEVE accreditation guidelines/ survey of practitioner requirements/ international best practice, etc)

2.2 Please list the elective subjects and how they may be chosen. How many hours of electives are taught?

2.3 Please paste curriculum outlines for the following subject areas:

(i) Production Animal Health
(ii) Aquatic species health
(iii) Wildlife health
(iv) Whole of farm issues
(v) Practice management

2.4 Nature of practical/ clinical experience and training (inc on farms and in rural practices)

Please paste your policy regarding practical/ clinical experience and training

3. This review has been requested to examine the efficacy of introducing some form of post graduate training with specialisations in specific areas of animal health as a precursor to full registration. Have you considered the desirability of such a process and, if so, what do you think would be the most effective way to implement compulsory post-graduate training.
4. The scope for collaboration between universities, and between schools with universities in the conduct of veterinary courses and veterinary-related post graduate courses and research

4.1 What forms of collaboration are currently occurring between your veterinary school and other veterinary schools?

4.2 What are the main restrictions to collaboration amongst veterinary schools?

4.3 What forms of course collaboration (applicable to veterinary science) amongst higher education institutions are you aware of?
Appendix 2: Selection Procedures: Undergraduate Performance Literature Review

The relationship between undergraduate selection procedures and undergraduate performance in programs of veterinary science and medicine: a literature review.

W.A.G. Charleston

Introduction:
In many countries, the selection of students into courses of Veterinary Science and Medicine is a necessity because far more people would like to become veterinarians than can be accommodated in veterinary programs. In the United Kingdom, North America and Australasia, the numbers of applicants commonly exceeds the number of available places by 3-8 times or even more. While this puts veterinary schools in an enviable position of being able to select ‘good’ students, it also places a considerable burden of responsibility on them in their effective control of who does and who does not enter the veterinary profession, particularly given that the attrition rate in veterinary programs is generally low (e.g. Shane & Talbot 1989; Heath 2001).

Fundamentally, any selection procedure needs to be: fair and transparent; reliable, in the sense that it is repeatable and not subject to internal or external bias or inconsistency; and valid, in the sense that the criteria used actually measure what they are intended to measure and are acceptably predictive of the intended outcomes (see Kogan & McConnell 2001 for a review of the issues involved). Compliance with legal requirements (e.g. concerning discrimination or affirmative action) is a further consideration.

Implicit in the selection process there are two main objectives that operate over different time scales (Heath 1975). The first is the selection of students with the intellectual ability, motivation and stamina to successfully complete the long and demanding undergraduate program, preferably in the minimum time (Cawunder & Tasker 1982; Kogan & McConnell 2001). Few would dispute the importance of this. Veterinary education is expensive and failure is costly both to the student and the school. High cognitive ability and a capacity for study are also needed to cope with the demands of veterinary practice in all its forms and the need to keep up to date with developments.

The second objective, more often implied than stated, is the selection of students who will, after graduation, become successful and effective members of the veterinary profession, i.e. ‘good veterinarian(s)’ (Heath 1975; 2001; Hulland & Ison 1982; Kelman 1982). Achieving this objective is, to say the least, problematical but outside the scope of this review.

Selection procedures are a frequent subject of debate among veterinarians, both practitioners and academics. Although procedures vary, particularly between countries, they are almost always heavily weighted towards pre-entry educational (academic) achievements whether at school leaving examinations or at tertiary level. This concentration on academic ability is most often the focus of the debate, the concern being that this may exclude candidates who could complete the course and who would be ‘good’ or ‘successful’ veterinarians, however that may be defined. Since the difference between those just above or below the cut-off point in the ranking is generally very small, undoubtedly this must happen. In an attempt to address this issue, broadening selection criteria to include assessment of a range of attributes considered ‘desirable’ in addition to academic scores and grades is widely advocated and practiced, particularly in North America (see Ottinger 2003) and, to some extent, in the United Kingdom. To what extent this achieves the intended outcome, however, is by no means universally agreed.
The vast majority of published studies examining the relationship of academic (cognitive) and personal (non-cognitive) attributes used in selection, to undergraduate performance in veterinary medicine, have been carried out in North America. These form the major part of this review and will be dealt with first. This is also appropriate given the distinctive nature of the admissions procedures in North American schools. Consideration of procedures used in United Kingdom and Australasian schools follows. The database searches carried out yielded very few references dealing with veterinary schools in other countries and these have not been considered further. Brief reference will also be made to some studies relating to other health professions such as human medicine. How selection criteria relate to subsequent career paths in veterinary science is the subject of a separate review.

**Selection criteria and undergraduate performance:**

**North American Colleges of Veterinary Medicine:** Gaining entry into colleges of veterinary medicine in North America, in comparison with what happens in the United Kingdom and Australasia, is a complicated procedure. It involves extensive pre-veterinary study at college or university level and a series of other selection hurdles. In the Pew report (Pritchard 1988) it is noted (p. 69) that while most veterinary schools have a minimum requirement of two or three years of pre-veterinary college education, most selected students have spent four to five years (average 4.4 years in 1987) in college education before veterinary school.

The current requirements and procedures for each of the North American Schools are detailed in the publication ‘Veterinary Medical School Admission Requirements’ (Ottinger 2003). Although there is some variation between colleges in the details, in brief, prospective students are generally required:

- to have completed pre-veterinary tertiary level studies that include specified science subjects, and usually English and Humanities subjects; from these a Grade Point Average (GPA) is calculated
- to sit a standardized test such as the Graduate Record Examination test (GRE) (91% of schools), Veterinary College Admissions Test (VCAT), or Medical College Admission Test (MCAT)
- to submit an application including items such as: High School ranking, personal statement, an essay, references and testimonials, statement of extracurricular activities, and employment experience
- to provide evidence of veterinary and/or animal experience; for some schools the requirement is very substantial
- to be interviewed, generally applicants pre-selected on academic grounds.

The weighting of these various selection components, including sub-sets of the tests measuring specific subjects (e.g. biology or chemistry) or attributes (e.g. reading comprehension and quantitative skills), interview, references etc., varies between schools.

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8 In 1974, 94% of schools were reported as requiring an interview (Turnwald et al. 2001), in 2003, 77% (Ottinger 2003).
Various studies have examined the relative ability of these selection criteria, either singly or in combination, to predict academic performance, most commonly as measured by Grade Point Average (GPA) at the end of the first semester or first year. In some instances, performance in later years of the course has been examined. The statistical procedures used most frequently have been simple and multiple correlations and/or stepwise multiple regression analysis.

Comparing and summarizing the results of these studies is difficult. They differ in the criteria used as predictor and dependent variables, in statistical methods, and in scope, e.g. in terms of numbers of cohorts of students and numbers of colleges involved. To complicate matters further, the ‘best’ predictors models have been found to vary between years in longitudinal studies (Confer 1990; Confer et al. 1995) and between schools in comparative studies (Niedzwiedz & Friedman 1976). In addition, there are potential problems in the statistical analysis of this type of data that have been pointed out and these can seriously affect the validity of calculated correlations (Niedzwiedz & Friedman 1976; Kelman 1982; Powers 2004). In particular, range restriction in the population under study (prospective students are self-selected academically high achievers) unreliability of criteria, and compensatory selection, in which a high score in one criterion is used to compensate for a low score in another, can have a marked effect on estimates of the validity of predictor variables (Powers 2004). Lack of independence of variable is another potential problem. Consequently, generalizations need to be made with caution.

In this review, to simplify matters, selection criteria specifically designed to measure academic ability, generally referred to as ‘cognitive skills’ and those designed to measure biographical and personal attributes, generally referred to as ‘non-cognitive skills’ will be dealt with separately. The distinction is somewhat arbitrary as a number of non-cognitive skills can be learned and undoubtedly affect the development and expression of academic abilities, and some studies include both cognitive and non-cognitive parameters. However, they are assessed differently and have different aims.

Cognitive selection criteria: It is clear from numerous studies that various measures of academic ability used in the selection process are broadly predictive of subsequent academic performance, particularly in first year of the veterinary program. Which measures, or combination of measures, were found to be the best predictors of academic performance differs between studies but, in virtually all, the pre-veterinary GPA or equivalent is included in the best predictive model. Often the GPA is coupled in the model with scores from standardized admission tests, such as the GRE or MCAT (or subsets of them) (Layton 1952 cited by Noeth et al. 1974; Halm 1966 cited by Noeth et al. 1974; Noeth et al. 1974; Render & Jackson 1975; Niezwiedz & Friedman 1976; Julius & Kaiser 1978; Cawunder & Tasker 1982; Kelman 1982; Latshaw 1982; Shane & Kearney 1989; Confer 1990; Zachary & Schaeffer 1994; Confer et al. 1995; Powers 2004). Even so, and despite being statistically significant, the amount of variation in first year (and later) GPA’s accounted for by these selection criteria was frequently less than 50% and sometimes less than 30% leaving much to be explained by other factors. To what extent the low correlations in some studies can be attributed to statistical artifacts, as discussed by Powers (2004), is unclear. However, it does appear that correcting for range restriction and criterion unreliability can substantially increase the validity of undergraduate GPA and GRE scores as predictors of first year performance (Powers 2004).

Investigators who have studied the relationship between pre-entry academic scores and performance throughout the veterinary program have noted, in some cases, that it tends to weaken as the course
progresses (Niezdwiedz & Friedman 1976; Julius & Kaiser 1978; Hulland & Ison 1982; Latshaw 1982). Data from other studies show little change, particularly over the preclinical years (Kelman 1982; Confer 1990). Kelman (1982) did find a very sharp decline in the final clinical year but suggested this was largely a statistical artifact resulting from the restricted range of grades used in the assessment of clinic rotations, which in some instances was only in terms of ‘satisfactory’ or ‘not satisfactory’. Range restrictions such as this give rise to spuriously low correlation coefficients (Kelman 1982; Powers 2004).

Non-cognitive criteria: Other components of the selection process are aimed at assessing non-cognitive personal attributes such as: motivation; communication skills; interest in, and awareness of, the veterinary profession; veterinary work experience; experience with animals; non-academic (extracurricular) interests and activities; ethical and other personal qualities and attitudes. These are judged mainly on the basis of written material from the candidate and referees and, in ~77% of colleges, an interview (Ottinger 2003). The assessment is essentially subjective; scores are given and combined, with varying weightings, with academic scores. The extent to which these attributes are predictive of academic or professional success is uncertain but much debated.

The use of non-cognitive criteria in the selection of medical and veterinary students has been reviewed in detail by Kogan & McConnell (2001) and Turnwald et al. (2001).

Some investigators have concluded that at least some of these non-cognitive criteria can add useful predictive value to the selection process, although often expressing caution at the same time (Halm 1966 cited by Niezdwiędz & Friedman 1976; Render & Jackson 1975; Hulland & Ison 1982; Confer et al. 1995).

Render & Jackson (1975) examined various combinations of variables for their correlation with academic performance in first year. They found that, with some combinations, adding personality measures significantly increased the multiple correlation coefficient. However, their data show that simple linear correlations of two of these personality scores with performance were negative although this was not commented on. Hulland & Ison (1982) concluded that some personal attributes such as self-confidence and communication skills were related to student success but found a lack of correlation of interview scores with academic success. Confer et al. (1995) unexpectedly found in their study that both interview score and the score given for other subjective assessments (such as references, essay etc) were among the better predictors of first year grades in some years (though not all). They suggested, however, that these criteria are probably not independent of academic achievement in that those who achieve high academic grades are also likely to display attributes, such as high motivation, commitment and maturity, and so be scored highly in a subjective assessment. It is also suggested that an interviewer’s awareness of scholastic achievement could influence scores given at an interview.

Other investigators have found little or no correlation of assessments of personal data and attributes, or interviews, with academic success. Niezdwiędz & Friedman (1976) examined data from four schools and concluded that neither biographical information, interview assessments or recommendation ratings were predictive of academic performance. Kelman (1982) found a highly significant negative correlation between interview scores and performance in the first three years of the veterinary course and a close to zero correlation in the fourth, clinical, year; no relation between biographical data and performance at any time during the course was found. Another study of six classes also found that interviews and personal evaluations based on the application were not correlated with grades achieved in core courses taught in the first two years of the program.
(Zachary & Schaeffer 1994). They suggested that this should not be surprising given that applicants are ‘very focused’ and well aware that subjective assessments will be used in the selection process, effectively reducing the range of subjective scores so that they are not discriminatory. Nevertheless, while emphasizing that pre-selection academic performance is the most reliable indicator of success in the course, the authors suggest that there are personal traits that are likely to affect success in professional and personal life that would be worth selecting for. However, they conclude that ‘there presently is no justification for placing any weight on subjective interviews and application evaluations until some well-validated and extremely fair alternative is available to admissions committees.’ (Zachary & Schaeffer 1994).

It has been suggested that personality traits of the kind assessed at interviews might be a better predictor of clinical performance (which is often assessed subjectively) (Kogan & McConnell 2001) but there appears to be little evidence to support this. A comparison has been carried out of clinical and personal ratings of two cohorts of veterinary students, only one of which had been interviewed at selection. In the interviewed cohort, no relationship was found between interview scores (based on assessments of communication skills, problem-solving and social responsibility) and later clinicians’ assessment of the same parameters. Comparison of the two cohorts also revealed no evidence that an interview had selected for traits that affected clinical performance (Kelman & Canger 1994).

In spite of the uncertainty of the validity of interviews as predictors of success, as noted earlier they are widely used in North American veterinary college admissions. Those using them consider that they can serve a variety of purposes other than attempting to select for success as a student or beyond. These include: gathering information about non-academic criteria, assisting decision making, verifying application information, recruiting candidates, and promoting public relations (Turnwald et al. 2001). It has been suggested that interviews should be able to assess some variables better than written tests and could be made more reliable and valid by clearly defining their purpose, establishing (by job analysis) the personal traits that are desirable or needed, structuring the interview, training of interviewers and taking steps to avoid bias (Lewis et al. 2004).

An interesting conclusion reached by the authors of a study of medical students’ academic performance vs. cognitive abilities and personality characteristics (Shen & Comrey 1997), was that different personality characteristics are involved in the diverse tasks and circumstances of medical activities. They caution against using one or two personality traits to assess suitability for medical study. This parallels the conclusion of Hulland & Ison (1982) in relation to veterinary students:

‘The search for a small group of student admission characteristics which are predictive of success within the veterinary program or of success in professional careers may be an impossible quest. Success at all levels may have different definitions; nearly all imprecise. It is quite evident that some students respond positively and some negatively to their educational program. The interactions at work may be too complex to be defined in terms of statistical relationships of easily detectable factors.’

There is clearly a widely held view, that there are personal traits that can have a bearing on success as a student and a practicing professional. The problem of how these can be validly assessed at the time of selection remains. Edmondson (2002) has sounded a warning about ignoring reliability and validity in selection criteria, citing the results of a study9 in a North American Medical School with

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a problem-based curriculum and a complex multifaceted selection process. It was shown that two major components of its selection process, a simulated tutorial and a personal interview, bore no relationship to academic or clinical performance, the authors concluding that neither selection procedure was reliable or valid.

**United Kingdom & Australasian Veterinary Schools:** The process of selecting students for entry into these veterinary schools is quite different from that operating in North America and entry requirements and procedures are much simpler. It is still highly competitive.

The following general summary for the United Kingdom schools is based on information given in their respective web sites and relates only to applicants who are UK residents. Most students apply directly after completion of secondary education and sitting General Certificate of Education (GCE) A-level examinations. Application forms indicating preferred schools, educational and personal records and referees are submitted through the Universities and Colleges Admission Service (UCAS) to the nominated school(s). Requirements vary somewhat between schools but, in general: selection is based on performance in A-level examinations (or Scottish equivalent) including required subjects; performance in earlier examinations may be considered; generally there is a (variable but moderate) requirement for work experience with animals and/or a veterinarian; other supportive information e.g. references or other personal data may be used. Three of the six schools require applicants to sit a standardized test, the Bio-Medical Admissions Test. In all schools, students short-listed for entry on academic grounds are interviewed.

In Australian schools, most students apply to enter a veterinary program directly after completion of Secondary Education. The selection of resident students (as opposed to overseas applicants) is based on academic merit indicated by ranking of Higher School Certificate Examination (HSCE) results for which particular subjects may be recommended or required. Selection of students who have undertaken other university courses is also based primarily on academic achievement. In the Melbourne school, entry into the four-year veterinary course is conditional on the successful completion of one year of basic science subjects at the university. Interviews are not used in any of the Australian schools.

In the New Zealand school, there are two main routes of entry for New Zealand resident applicants. Students, mainly those who have just completed Secondary Education, can be selected on the basis of performance in a first semester of specified science subjects at university level. Applicants who have taken other university courses (which must include the specified subjects or their equivalent) are assessed on their grades. All applicants are required to sit a standardized test, the Standard Tertiary Admission Test, administered through the Australian Council for Educational Research. This tests problem-solving ability and comprehension of written material. Evidence of time spent with a veterinarian (5 working days minimum) is required. Interviews are not used.

In summary, in UK schools, selection is primarily based on academic merit although non-cognitive criteria and interviews are used to varying degrees. In the Australasian schools selection is entirely based on academic merit and cognitive skills.

Studies comparable with those described in relation to North American Schools of the relationship between selection criteria and subsequent academic performance in veterinary programs do not appear to have been carried out in the UK or Australasia.
From time to time the selection process in the UK has been criticized for its reliance on academic criteria (e.g. Michell 1990). As succinctly put by Lord Soulsby: ‘The main complaint seems to be that the wrong cohort is being admitted, namely those with very high academic achievement at school. The corollary is that lower academic achievements would produce a ‘better’ practicing veterinarian.’ He points out that while entrants with lower grades could complete the course, there is ‘no evidence whatsoever that the three ‘A’s’ perform poorly in practice or in any other branch of the profession.’ (Soulsby 1993). Others have supported the view that any reduction in the academic ability of the student intake would be undesirable (Spurdens 1993; Blackwell 1993) with the implication that if other attributes are to be included in the selection process, this should not be at the expense of cognitive ability. Michell (1990), while recognizing that the emphasis on academic ability has served the profession well, argued that it results in the wrong people being rejected. He advocated a broadening of selection criteria with the objective of increasing the chances of those with a wider range of attributes than indicated by A-level results being selected, the implication being that these individuals may be better suited to clinical practice. In the absence of any objective evidence, this can only be conjectural. However, the UK schools do take account of non-academic factors in their selection procedures and it has been reported from one that the vast majority of selected students are both highly qualified academically and highly motivated (Holmes 1983), presumably as judged from applicants’ biographical data and the interview.

Similar concerns about the reliance on academic merit for student selection have also been raised from time to time in Australia and New Zealand. In his discussion of the subject, Heath (2001) concluded, primarily on the basis of his own research in Australia, that there is nothing to support the use of interviews or personal statements, particularly in relation to commitment to a career path, or in assessing communication skills; and little to justify a formal requirement for work experience in a veterinary establishment. Interestingly, this is in line with the urging in the Pew Report (p.157) that admission requirements in North American schools should be made as simple as possible and requirements for pre-selection work experience with a veterinarian be abolished (Pritchard 1988).

**Medical and other Health Professions:** There is a vast literature relating to the selection of students into medical schools and other human health professions. This will not be reviewed here but, in general, the same issues have been investigated and discussed with the same mixture of conclusions and opinions (and differences of opinion) reached as in studies relating to veterinary student selection. A recent review (Salvatori 2001) concluded that while the best predictors of academic performance in the course and licensing examination (in North America) were pre-selection GPA and MCAT scores ‘much of the variance in academic performance remains unexplained.’ It is suggested that other, perhaps non-cognitive variables are contributing to this but that ‘there is limited evidence that any of the non-cognitive measures currently in use are sufficiently reliable and valid to predict success as a student let alone as a future health professional.’ It is further commented that the value of interviews remains controversial and that there is even less to support the continued use of written measures such as essays and letters of reference. Nevertheless, a brief survey of the literature indicates a widespread concern about reliance on academic criteria for selection and a desire to find ways of broadening the criteria in an attempt to select for ‘desirable’ personal attributes.

**Concluding remarks:** Research into the relationship between selection criteria and undergraduate performance in courses of veterinary science and medicine has almost exclusively been carried out

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10 Referring to three A-grade passes in Advanced level GCE that the top students could have: the minimum for entry is usually 2 A’s and a B.
in North America and in relation to the admission procedures used there. Nevertheless, it is not unreasonable to assume that the conclusions reached are more widely applicable. It seems clear that measures of academic (cognitive) ability made before selection are reasonably reliable predictors of successful completion of the veterinary course. On the other hand, the value of assessments of personality traits and non-cognitive skills as predictors of success remains uncertain and controversial. This is despite the widespread (and possibly correct) belief that there are personal traits and skills that have a direct bearing on success as a student and thereafter. The problem is that there is no agreement about reliable and valid ways by which these characteristics can be measured or, for that matter, about which characteristics are of key importance.

It was noted earlier that with many predictive models of selection criteria, much of the variance in academic performance remains unexplained. While some of this may be attributable to non-cognitive variables as they are usually thought of, there are other potential influences to be considered. Interestingly, it appears that there has been no formal investigation of ‘circumstantial’ variables that might account for a substantial amount of the variance in performance not predicted by selection criteria. This would be difficult to investigate but perhaps one may venture a personal opinion based on experience and suggest that there are many factors that can affect the academic performance of individual students that could not possibly be predicted by any selection process. These include such things as: financial difficulties, trying to hold down a job while studying, family relationship or health problems, bereavement, personal relationship breakdowns, personal health problems, substance abuse, (over-)commitment to sport or other extracurricular activities, accommodation difficulties, dislike of or difficulty with certain subjects or teachers, difficulty coping with work pressure and stress. Another matter not to be overlooked is that over the five years of the course students mature, particularly those entering directly from school, and their perspectives on veterinary science, career options and life in general change in response to their academic and life experiences over that period. Generally, students are remarkably consistent in their performance throughout the course, and ‘high flyers’ can often (though not always) be predicted from their entry ranking. However, it also seems likely that a significant part of the ‘unexplained’ variance in performance in cohorts of students is attributable to the wide range of unanticipated influences and events that can affect academic performance of individuals at particular times.

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Appendix 3: Selection Procedures: Career Paths Literature Review

The relationship between undergraduate selection procedures in programs of veterinary science and career paths after graduation: a literature review.

W. A. G. Charleston

Introduction:
There appears to have been very little research relating directly or indirectly to this topic. What little has been published can be considered under two headings:

1. Concerns, expressed in some countries, that selection procedures that rely very largely on academic criteria exclude people who would be successful clinicians.
2. More widespread concerns about difficulties in attracting and retaining veterinarians in rural production animal practice.

Selecting for success as a veterinarian:
Michell (1990), considering the UK system, recognized that the reliance on A-level results as the primary selection criteria has served the profession well; he notes that it is reasonably objective, results in highly qualified students and ‘brings into the profession some of the cream of scientific talent – a wonderful asset for the future of veterinary science and education and for the ability of our profession to compete effectively in the politics of modern public debate.’ He then argues, somewhat paradoxically it would seem, that while this narrow approach to selection does not result in the wrong people being chosen, it does result in the wrong people being rejected and suggests that selection criteria should be broadened to put more weight on other, implicitly more subjective, criteria. The objective would be to increase the chances of those who have a broader range of attributes than indicated by A-levels to achieve selection and, in due course enter the profession, the implication being that these individuals may be better suited to clinical veterinary practice.

Currently all UK schools include in the selection process, interviews and appraisal of information provided in the standard application forms and other written material and, in some cases, require applicants to sit a standard aptitude test (see Charleston 2004). To what extent the use of these criteria post-dates the recommendations of Michell (1990), the British Veterinary Association (BVA) and others is unclear but interviews have been used at least in some schools for many years before this, e.g. the Glasgow school (Holmes 1983)11. The problem of reliability and validity of such criteria in relation to undergraduate performance has been discussed elsewhere (Charleston 2004) and will not be repeated here. However, while citing similar views on selection (including those of the BVA) and current selection practices in UK Medical Schools, no objective evidence is offered in Michell’s (1990) article as to the beneficial effect that broadening selection criteria would have on subsequent professional careers. Indeed, it is difficult to see how this could be assessed objectively.

There are several problems with all such debates, which have by no means been restricted to the United Kingdom. At present there is no general agreement as to the personal qualities required for success as a veterinarian (either now or in the future). There is also a need for reliable and valid ways by which such personal characteristics can be assessed (Heath 1975; Michell 1990; Heath et al. 1996b). Another problem is the lack of an objective appraisal of the professional performance after graduation of those who were selected and more importantly, the impossibility of knowing if those who did not gain entry to veterinary school would have performed as well as or better than those who did (Heath 2001). This is an insoluble problem but, despite the evidence that the selection of students largely on academic criteria, while doubtless

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11 The author was interviewed for a place in the Bristol school in 1954!
not perfect, has proved highly successful for the profession overall (Michell 1990; Soulsby 1993; Heath 2001), the debate continues, and not only in relation to veterinary programs.

Attracting and retaining veterinarians in production animal practice:

The only published information found to date relating admission criteria to specific career paths concerns the difficulty of attracting veterinarians to production animal practice and retaining them there. This is not new, nor is it confined to Australasia.

A trend away from production animal to companion animal practice was evident and causing concern in the USA thirty years ago (Snizek & Bryant 1975). A one-year study of pre-veterinary students (n=66), veterinary students from two schools (n=417) and practitioners (n=182) revealed that interest in large animal or mixed practice was high in pre-veterinary students but declined throughout the course with a concomitant increase in interest in small animal medicine. There was, however, a significantly greater likelihood of individuals whose childhood residence was in towns of <100,000 population to be more interested in mixed or large animal practice as pre-veterinary and veterinary students than those from larger cities. Similarly, a significantly higher proportion of veterinary practitioners in mixed or large animal practice had been raised in smaller towns and cities. The authors suggested that selectively recruiting students from rural backgrounds might increase the likelihood of attracting students interested in large animal medicine (Snizek & Bryant 1975). Factors that may affect the level of interest in large animal practice are also discussed.

Barron et al. (1977) noted the similar concerns about numbers of rural veterinarians in the state of Tennessee and proposed a teaching strategy in their then new College of Veterinary Medicine aimed at increasing interest in production animal practice: selection criteria were not discussed.

Concerns about a relative shortage of food animal practitioners continue in the USA although Elmore (2003) concluded that there is probably a large enough number of students interested in large animal practice admitted to North American colleges to meet the need. However, he notes, a large number of these do not ultimately go into this kind of practice. Almost all accredited veterinary schools in the USA have a requirement for animal experience in their admission process. A survey of first year veterinary students in 17/27 of these schools showed that almost all have owned animals, 36% having owned food animals (Elmore 2003); approximately 48% of the students surveyed had either been raised on farms or in towns of <1000 inhabitants (16%) or were from towns of 1000-25,000 inhabitants (32%). Of those raised on farms or from small towns (<25,000), 43% indicated an intention to enter practices with a food animal component; more than 50% of both male and female students from farms did so. Extrapolated to include all accredited schools, it was estimated that the student population included approximately 700 potential large animal veterinarians; this was compared with 107 positions advertised in the Journal of the American Veterinary Medical Association over a nine-month period. However, it should be borne in mind that the students surveyed were all first year students and their intentions might change as the course progresses as found in an earlier study by Snizek & Bryant (1975).

It was suggested that there are a number of possible factors that might adversely affect the numbers of graduates entering large animal practice including student debt and relatively low incomes in large animal practice, and a perception of a lack of positions given the relatively small numbers advertised (Elmore 2003). Clearly, there was nothing to suggest that it could be blamed on the selection process.

By far the most informative study of the career paths of veterinarians is that carried out by Professor Trevor Heath, previously Dean of the School of Veterinary Science, University of Queensland. In this, two cohorts of students were followed through their undergraduate programs and up to 10 years after graduation. Details of this investigation were published in a series of papers between 1991 and 1998 and more recently the findings have been brought together in a single publication (Heath 2001). While the study did not specifically set out to relate admission requirements to career decisions or subsequent careers, some of the...
results are discussed in relation to selection criteria used elsewhere. For this reason it was felt that aspects relating to rural practice should be included in this review.

Students were surveyed in their first and fifth undergraduate years and in the second year after graduation. Further surveys were carried out five and ten years after graduation. It was found that there were no significant relationships between prior experience with animals and career plans, or success in gaining employment; nor were there any gender differences (Heath & Western 1991; Heath et al. 1996a & 1996c; Heath 2001). On graduation, 61% of the graduates entered mixed practice. However, only 39% of these remained in mixed practice five years later (Heath 1996; 1998) and 18% by ten years (Heath 2001). There was a clear tendency for more of those who had lived for two years or more on a livestock farm to enter mixed practice and to be still there five and 10 years after graduation. However, the numbers declined considerably over that period, from 83% to 28% of this sub-group; this compares with a decline from 55% to 14% of graduates who had not lived on a farm or had done so for <2 years employed in mixed practice (Heath 2001). Reasons for the change in career paths were explored in the study and in Heath & Niethe (2001) but are not reviewed here.

The results of a survey of the opinions of veterinary practitioners in Australia (Heath & Niethe 2001) indicated a number of personal and technical attributes considered to be important qualities for a veterinarian in rural practice, in the light of which suggestions for curriculum changes were also made. Factors for and against rural practice were also explored. With regard to selection, a significant number of respondents (21%) also suggested that more students should be recruited from rural backgrounds. Some respondents also suggested that those with a farm background were better able to relate to farmers and their problems. However, the authors point out, many veterinarians with farm backgrounds leave mixed practice relatively soon after graduation as noted above (Heath & Niethe 2001).

The possibility of using selection procedures to detect a commitment to rural practice is discussed (Heath 2001) in relation to the longitudinal survey statistics but it is concluded from the data obtained from the students as undergraduates that ‘career predictions made at the time of entry to the course are virtually meaningless.’ It was also concluded that the study provides some evidence that having lived on a livestock-raising farm could be a valid selection criterion ‘if one of the objectives of the selection process is to promote a higher retention rate of veterinarians in rural Australia.’ Clearly, however, the relationship is not an absolute one, and the study provided no support for the use of other selection procedures, such as interviews or a requirement for spending time with a veterinarian, as a means of achieving this (Heath 2001).

Concluding remarks: The comparative lack of information on the relationship between selection criteria and career paths should come as no surprise given the difficulties involved in investigating it. It is difficult to see how the general question of whether broadening selection criteria will result in a higher proportion of graduates having more successful veterinary careers or being ‘better vets’ can be answered objectively. It would require an agreed definition of success, agreement about the stage in a career when ‘success’ should be assessed and some means of making valid comparisons of those selected using different criteria. In addition, the impossibility of making comparisons with those who fail to gain entry into veterinary school remains.

More focussed questions such as that relating to veterinarians in rural practice are more amenable to examination since the issue can be defined and investigated by retrospective longitudinal studies of the kind carried out by Heath (2001). Even so, the myriad factors that influence individual career paths inevitably make it difficult to establish valid and unequivocal relationships with particular selection criteria.

References:


