A cross-sectional study of mental health and well-being and their associations in the UK veterinary profession

Thesis submitted in accordance with the requirements of

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ABSTRACT

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David James Bartram

Introduction: Veterinary surgeons are at elevated risk of suicide, with a proportional mortality ratio around four times that of the general population and approximately twice that of other healthcare professions. There has been much speculation regarding possible mechanisms underlying increased suicide risk in the profession but little empirical research. This cross-sectional study aims to assess the contribution of mental health and well-being to the elevated risk, through a postal questionnaire survey of a large stratified random sample of veterinary surgeons practising in the UK.

Method: A questionnaire was mailed twice to 3200 veterinary surgeons (approximately 20% of the membership of the Royal College of Veterinary Surgeons, excluding those practising overseas or retired). Anxiety and depressive symptoms, alcohol consumption, suicidal ideation, positive mental well-being, perceptions of psychosocial work characteristics, and work-home interaction were assessed using valid and reliable existing instruments. Potential veterinary work-related stressors were assessed using a series of bespoke items developed through focus group input and refined following pre- and pilot- testing.

Results: Evaluable questionnaires were returned by 1796 participants, a response rate of 56.1%. The demographic and occupational profile of respondents was fairly representative of the UK veterinary profession. The prevalence of anxiety, depression, and co-morbid anxiety and depression 'probable cases' (i.e. HADS sub-scale score ≥ 11) was 26.3% (95% CI: 24.3 to 28.4%), 5.8% (95% CI: 4.8 to 7.0%) and 4.5% (95% CI: 3.6 to 5.6%) respectively. The 12-month prevalence of suicidal thoughts was 21.3% (95% CI: 21.0 to 23.6%). Number of hours worked; making professional mistakes; and the possibility of client complaints or litigation were the main reported contributors to stress. Good clinical outcomes; relationships with colleagues; and intellectual challenge/learning were the greatest sources of satisfaction. Mental health and well-being are associated with a variety of demographic and occupational variables including age, gender, type of work, and employment status.

Conclusions: Compared to the general population, veterinary surgeons are estimated to report higher levels of anxiety and depressive symptoms; higher 12-month prevalence of suicidal thoughts; less favourable psychosocial working conditions in relation to demands and managerial support; lower levels of positive mental well-being; and higher levels of negative work-home interaction. They drink more frequently than the general population, but consume less on a typical drinking day and a have a prevalence of daily and weekly binge-drinking that is similar to the general population. The levels of psychological distress reported suggest ready access to and knowledge of lethal means is probably not operating in isolation to increase suicide risk within the profession. The level of alcohol consumption does not appear to be a negative influence on mental health within the profession as a whole. The results are used to propose a portfolio of interventions, for both organisations and individuals, which have the potential to improve mental health and well-being in the veterinary profession.

DECLARATION

I do hereby declare that,

A cross-sectional study of mental health and well-being and

their associations in the UK veterinary profession

submitted in part fulfilment of the requirements for the RCVS Diploma of Fellowship by

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May 2009

has not been submitted for any other degree or comparable qualification and is the result mainly of my own original observations and research and I have not been awarded a degree or diploma by any university or other body in respect of the major part of the work incorporated into this thesis.

Candidate's signature:

Date:

PUBLICATIONS AND CONFERENCE PRESENTATIONS

The following publications and conference presentations are based on work incorporated into this thesis:

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To each one of you the practice of medicine will be very much as you make it – to one a worry, a care, a perpetual annoyance; to another, a daily joy and a life of as much happiness and usefulness as can well fall to the lot of man.

Osler ([1905] 1984, p. 423)

Osler, W. ([1905] 1984) The Student Life. In *Aequanimitas: With Other Addresses to Medical Students, Nurses and Practitioners of Medicine*. 3rd edn. London, McGraw-Hill

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ATTRIBUTIONAL STYLE	An individual's habitual pattern of explanation of why events happen, i.e. internal or external causes.
AUDIT-C	The alcohol consumption questions of the Alcohol Use Disorders Identification Test.
CASENESS	A clinically significant level of symptoms which exceeds a defined threshold and categorises an individual as possibly having a disorder. It is not a diagnosis.
CI	Confidence interval
HADS	Hospital Anxiety and Depression Scale. A tool for measuring anxiety and depressive symptoms.
-A	Anxiety sub-scale
-D	Depression sub-scale
-T	Total of anxiety and depression sub-scales
HSE MANAGEMENT STANDARDS INDICATOR TOOL (HSE MSIT)	A tool for measuring psychosocial working conditions. Comprises seven stressor domains: demands, control, managerial support, peer support, relationships, role, and change.
IQR	Interquartile range
MENTAL WELL-BEING	A construct comprising both optimal psychological functioning and the experience of happiness and life satisfaction.
NEGATIVE AFFECTIVITY	A personality trait linked to neuroticism and described as a tendency to perceive negative emotions.

Continued overleaf

OR	Odds ratio
PMR	Proportional Mortality Ratio. A ratio of how more or less likely a death in a particular occupation is to be from suicide as opposed to other causes, than a death of someone of the same age and gender in the general population as a whole.
PSYCHOSOCIAL	Psychological processes within the context of a social environment.
PSYCHOSOCIAL WORK CHARACTERISTICS†	Risk factors involved with psychological processes linked to the social environment of work that may be important in the causation of illness.
RCVS	Royal College of Veterinary Surgeons
SD	Standard deviation
SUICIDAL IDEATION	Thoughts about suicide including feelings that life is not worth living and wishing you were dead.
SWING	Survey Work-home interaction – Nijmegen scale. A tool for measuring work-home interaction.
WEMWBS	Warwick-Edinburgh Mental Well-being Scale. A tool for measuring positive mental well-being at a population level.
WHI	Work-home interaction
_N	Negative work-home interaction
_P	Positive work-home interaction

† The concepts of 'work characteristics' and 'working conditions' are used interchangeably in the text and have equivalent meaning

CHAPTER 1: INTRODUCTION

1.0 Context

Mortality due to suicide is higher in the veterinary profession than in the general population, the proportional mortality ratio for suicide being around four times that of the general population and twice that of other healthcare professions. This pattern of excess mortality from suicide relative to other causes of death appears to have remained fairly stable across recent decades. The relative risk of suicide across occupational groups is often explained by differences in demographic factors but veterinary surgeons have higher risk of suicide even when these are taken into account (Charlton 1995).

Little is known regarding the mechanisms of increased suicide risk in the profession. It is uncertain whether the increased risk derives from the characteristics of individuals entering the profession, the work environment, or other factors known to influence suicide. In common with other high risk occupational groups, veterinary surgeons have ready access to effective means of suicide which may play an important aetiological role.

Suicide rate is sometimes used as an imperfect proxy indicator of population mental health status (Bray and Gunnell 2006). The increased suicide risk among veterinary surgeons may be an indicator of increased psychological morbidity within the profession. Initiatives to provide mental health support to members of the profession have been established but there has been no attempt to measure the nature and extent of psychological morbidity among veterinary surgeons in the UK. Studies of the profession in other countries are limited in their generalisability to the UK and the questionnaires employed were mainly self-formulated with limited or no use of instruments with established psychometric properties.

Research into suicide among veterinary surgeons is important, not only with a view towards enhancing the well-being of individuals within the profession, but also to help mitigate the potentially deleterious impact of any mental ill-health among practitioners on the health and welfare of animals under their care, and the additional

insight that research in this professional group might provide into influences on mental health and well-being in other occupations. Moreover, mental ill-health can have financial implications for the affected individual, their employer and healthcare provider.

1.1 Aims and objectives

- To assess psychological symptoms and mental well-being in the UK veterinary profession, including psychosocial working conditions and work-home interaction and identify key self-perceived stressors.

- To explore the relationship of mental health and mental well-being with demographic and occupational factors.

- To compare the estimated population parameters against normative data for the UK general population (and other professions where possible).

- To use the results to inform proposals for interventions which have the potential to improve mental health and well-being in the veterinary profession.

1.2 Hypotheses

Null hypothesis 1 ($H_0 1$). Self-reported measures of mental ill-health, mental well-being and psychosocial working conditions show no significant associations with demographic factors (such as age, gender) and occupational factors (such as type of work, employment status, and hours worked in a typical week).

Study hypothesis 1 ($H_1 1$). Self-reported measures of mental ill-health, mental well-being and psychosocial working conditions differ significantly with demographic factors (such as age, gender) and occupational factors (such as type of work, employment status, and hours worked in a typical week).

Null hypothesis 2 ($H_0$2). The veterinary profession does not differ from the general population on self-reported measures of mental ill-health, mental well-being and psychosocial working conditions.

Study hypothesis 2 ($H_1$2). The veterinary profession has higher levels of mental ill-health, lower levels of mental well-being and less favourable psychosocial working conditions, when compared to the general population.

1.3 Approach

Mental health is more than just the absence of mental illness (Parkinson 2006). It also comprises mental well-being: positive elements of mental health such as life satisfaction, positive relationships with others and purpose in life. The World Health Organisation (WHO 2001) describes mental health as:

> … a state of well-being in which the individual realises his or her own abilities, can cope with the normal stresses of life, can work productively and fruitfully, and is able to make a contribution to his or her community. (p. 1)

In keeping with this broad definition, the current study adopts a comprehensive approach to the assessment of mental health in the veterinary profession, complementing indicators of psychological morbidity with measures of mental well-being and work-home interaction and seeking to identify sources of pleasure in veterinary work.

A questionnaire was mailed to a stratified random sample of 3200 practising veterinary surgeons in the UK (approximately 20% of the current Royal College of Veterinary Surgeons (RCVS) membership [excluding those who are practising overseas or retired]). A second copy of the questionnaire was mailed to all members of the sample three weeks later. The paper-based questionnaire was designed to enable automated data entry using an electronic optical reading system to scan the returned questionnaires.

1.4 Contributions

- Development of a hypothetical model to explain suicide risk in veterinary surgeons.

- Measurement of the nature and extent of psychological morbidity among veterinary surgeons in the UK.

- Provides empirical insight into possible mechanisms underlying suicidal behaviour within the veterinary profession.

- A baseline of measures from which to monitor future change and trends in mental health and well-being among veterinary surgeons in the UK.

- Informs the development and targeting of evidence-based interventions with the potential to improve mental health within the veterinary profession.

- Contributes to the general body of knowledge on occupation and suicide and features of the psychosocial work environment that may influence mental health and well-being.

1.5 Scope

Inferential statistics are limited to examination of associations between the outcome measures for a specific scale and demographic or occupational factors such as gender, age, type of work, employment status and number of hours worked and on-call.

Examination of associations between measures on different scales is outside the scope of this thesis.

Evaluation of the psychometric properties (validity and reliability) of the scales in the sample population of veterinary surgeons is limited to Cronbach's alpha (internal consistency). Evaluation of other properties is outside the scope of this thesis.

1.6 Document structure

Chapter One presents a brief background to the research and its importance for the veterinary profession. Relevant literature relating to suicidal behaviour and questionnaire research is reviewed in Chapters Two and Three respectively. Chapter Four describes the study methodology. The results are presented in Chapter Five. Chapter Six provides a discussion of the results and makes recommendations for further research and possible interventions. The study conclusions are described in Chapter Seven. Supplementary documentation such as copies of the questionnaire and publications relating to the study are included in the Appendices.

CHAPTER 2: UNDERSTANDING SUICIDAL BEHAVIOUR

2.0 Introduction

There have been concerns for many years that mortality due to suicide is higher in the veterinary profession than in the general population (Mellanby 2005).

This chapter reviews the published data on suicide risk in the veterinary profession and compares it with that in other healthcare professions and the general population. Published studies across different time periods in the UK consistently report that the veterinary profession has around four times the proportion of all deaths certified as suicide than would be expected from the proportion for the general population, and around twice that for other healthcare professionals. This observation of increased risk is supported by studies in other countries.

The relative risk of suicide across occupational groups is often explained by differences in demographic factors but veterinary surgeons have higher risk of suicide even when these demographic factors are taken into account (Charlton 1995).

There has been much speculation regarding possible mechanisms underlying increased suicide risk in the profession, but little empirical research.

This chapter presents a narrative synthesis of the central themes reported in the literature as possible influences on the increased suicide risk. A review of current knowledge about possible influences on the suicide rate among veterinarians and factors elevating the risk in other occupations and in the general population is used to propose a hypothetical model to explain suicide risk in veterinary surgeons. Based on testable constructs, it attempts to clarify a complex interaction of possible mechanisms across the career life course and thereby facilitate a more systematic approach to research in this field.

The chapter ends with a summary of current initiatives to support mental health in the UK veterinary profession.

2.1 Literature search methodology

Papers relevant to mental health among veterinary surgeons were identified by searching PubMed (which includes MEDLINE) and Google Scholar for articles published after 1970. Search terms included but were not limited to: veterinary and depression, suicide, stress, burnout, distress, abuse, alcohol drinking, substance-related disorders, psychosocial working conditions, coping or psychiatry. Additional articles were identified by scrutinising the reference lists of relevant articles, hand searching of conference proceedings, examining regular automatic customised e-mail alerts for relevant new articles in journals (Ovid Autoalert), and by consulting experts. The search strategy excluded non-English language records. Articles were included as appropriate to provide a comprehensive structured review of the evidence of increased suicide risk among veterinary surgeons and possible influences on the increased risk, including evidence from other occupational groups. Themes were integrated to inform the development of a hypothetical explanatory model based on testable constructs.

2.2 Suicide statistics

2.2.1 United Kingdom

2.2.1.1 General population

The Office for National Statistics defines ‘suicide’ as deaths given an underlying cause of intentional self-harm and deaths due to self-injury or poisoning of undetermined intent. The latter are included as there is evidence that most injuries and poisonings of undetermined intent (‘open verdicts’) are cases where the harm was self-inflicted but there was insufficient evidence to prove that the deceased deliberately intended to kill themselves. Suicide rates based on suicide verdicts alone are an underestimate of the true rate (Linsley and others 2001, Brock and others 2006).

Suicides represent almost 1 percent of the total of all deaths for ages 15 years and over in the UK: almost 6000 people killed themselves in 2004, a fall of 7 percent from the 1991 total (Brock and others 2006). Almost three-quarters of suicides in 2004 were of men and this division between the sexes is broadly similar from 1991

onwards. Suicide is reported to be the most common cause of death among men aged 15 to 44 years in the general population (Brock and Griffiths 2003, Griffiths and others 2005, General Register Office for Scotland 2007) and, although suicide rates in young men have declined markedly and are at their lowest level for almost 30 years (Biddle and others 2008), suicide remains the most common cause of death among men in this age range (A. Brock, personal communication).[1]

2.2.1.2 Veterinary surgeons and other high risk occupations

Several studies from a number of countries have found that members of some occupational groups are at greatly increased risk of suicide (Agerbo and others 2007), this elevated risk being seen in healthcare professionals including doctors (Hawton and others 2001, Schernhammer and Colditz 2004, Torre and others 2005), pharmacists (Kelly and Bunting 1998), dentists (Alexander 2001) and nurses (Hawton and Vislisel 1999). Farmers are also at increased risk (Malmberg and others 1999).

In Great Britain the standard method used to make comparisons between the death rates by suicide in different occupations and the general population is by calculation of the proportional mortality ratio (PMR). The PMR is a ratio of how more or less likely a death in a particular occupation is to be from suicide as opposed to other causes, than a death of someone of the same age and gender in the general population as a whole. A PMR of 100 indicates that there is no difference in the ratio of suicide deaths to all deaths in the occupation compared with the general population, while a PMR for suicide of 200 indicates that twice the expected proportion of suicide deaths to all deaths was recorded in that occupational group (Kelly and Bunting 1998).

While PMR is a widely used measure, it should be acknowledged that PMR is affected by the relative frequency of other causes of death. A high PMR can indicate lower mortality from other causes, as well as higher mortality from the cause being

[1] Anita Brock, Senior Research Officer, Mortality Statistics, Office for National Statistics, London. 10 Mar 2008 [E-mail]. Using mortality data for deaths registered in England and Wales in the calendar year of 2006, the most common cause of death among men aged 15 to 44 was suicide and injury or poisoning of undetermined intent (1760 deaths). The second most common cause of death for this group was land transport accidents (1453 deaths).

examined. Lower mortality from other causes may account for the high PMRs for suicide identified for some high social class occupational groups, including healthcare professionals (Kelly and others 1995, Kelly and Bunting 1998, Hawton and others 2001, Meltzer and others 2008). Moreover, lower mortality from other causes may also explain the apparent paradox between high PMRs for suicide identified for some high social class occupational groups and robust evidence of an inverse relationship between occupational social class and risk of suicide; the lower the social class, the higher the risk (Platt and Hawton 2000). However, Meltzer and others (2008) reported a high standardised mortality ratio (SMR) for suicide – a population risk statistic unaffected by the frequency of other causes of mortality – for female veterinarians, indicating significantly higher suicide mortality than the general population.[2]

The absolute number of suicides by veterinary surgeons is low due to the small size of the profession (approximately 16,000 veterinary surgeons practising in the UK), but there is a substantial literature indicating that the profession is at increased risk compared to other occupations and the general population. Awareness of the increased risk has existed for many years. For example, a survey of the causes of mortality in veterinarians resident in Britain followed up from 1949-1953 to 1975 reported a two-fold increase in mortality from suicide (Kinlen 1983).

On the basis of proportional mortality ratios (PMRs) in England and Wales (Charlton and others 1993, Kelly and others 1995, Kelly and Bunting 1998, Mellanby 2005, Meltzer and others 2008) and Scotland (Stark and others 2006a), veterinary surgeons appear to be at particularly high risk of suicide. In this occupational group the chances of a death being due to suicide are around four times that of the general population, and around twice that of other healthcare professionals.

PMRs for the highest risk occupations for men are included in Table 2.1 (England and Wales) and Table 2.2 (Scotland). The PMR for veterinary surgeons is consistently one of the highest.

[2] SMR=431, 95% CI: 140 to 1005 (England and Wales, 2001-2005)

Table 2.1: High risk occupational groups for suicide (suicide and open verdicts), men aged 16 to 64 years 1979-1990, men aged 20 to 64 years 1982-1987, 1991-1996 and 2001-2005, England and Wales

	PMR	95% confidence interval
1979-1990 [1]		
Veterinarians	364	NR
Pharmacists	217	NR
Dentists	204	NR
Farmers	187	NR
Medical practitioners	184	NR
1982-1987 [2]		
Veterinarians	349	203 to 559
Farmers, horticulturalists, farm managers	202	180 to 226
Librarians, information officers	226	140 to 345
Pharmacists	214	140 to 313
Medical practitioners	175	138 to 218
Dental practitioners	192	117 to 296
1991-1996 [2]		
Dental practitioners	249	161 to 367
Veterinarians	324	148 to 615
Farmers, horticulturalists, farm managers	144	124 to 166
Medical practitioners	147	115 to 185
Garage proprietors	155	112 to 208
Pharmacists	171	111 to 252
2001-2005[§, 3]		
Dental practitioners	292	173 to 461
Farmers	189	157 to 227
Beauticians and related occupations	297	143 to 547
Medical practitioners	165	125 to 214
Artists	171	124 to 229

Within each year range, occupations are listed in descending order of lower confidence interval so that those most significantly different from the general population appear at the top.

[§] Note: The lower 95 percent confidence level of suicide PMR for veterinarians 2001-2005 did not exceed 100 and is therefore not reported by Meltzer and others (2008).

Sources: [1] Charlton and others (1993); [2] Kelly and Bunting (1998); [3] Meltzer and others (2008)

NR, Not reported

Table 2.2: Suicide and undetermined intent deaths for men aged 16 to 45 years and 46 to 64 years in Scotland in 1981-1999

	16- to 45-year old men		46- to 64-year old men	
	PMR	95% confidence interval	PMR	95% confidence interval
1981-1999				
Veterinarians	293	80 to 749	301	36 to 1088
Medical practitioners	180	118 to 265	205	109 to 351
Dentists	128	26 to 374	235	76 to 548
Pharmacists	43	1 to 238	118	14 to 242

Note: When the 95 percent confidence interval includes 100, the difference between the PMR for an occupation and the general population is not statistically significant ($p<0.05$)

Source: Stark and others (2006a)

Mellanby (2005) undertook a detailed analysis using PMRs for deaths by suicide in England and Wales among veterinarians, medical practitioners and dental practitioners. The results are summarised in Table 2.3. For both time periods, the PMR was markedly higher for veterinarians. The PMR for suicide among male veterinarians remained stable over time. By contrast, the PMR for suicide among females increased considerably but this must be interpreted with caution due to the small absolute number of deaths involved. Meltzer and others (2008) also reported a high PMR for suicide among women veterinarians in 2001-2005 (PMR=609, 95% CI: 198 to 1422).

Mellanby (2005) was unable to complete a detailed analysis of the age, background, previous health history and type of veterinary work undertaken due to restrictions imposed to protect individuals' privacy. However, suicides by veterinary surgeons do not appear to be confined to a restricted age range (Mellanby 2005, Stark and others 2006a) as the age group distribution of suicides is not substantially different from all occupations combined (Kelly and others 1995).

Table 2.3: Mortality from suicide in male veterinarians, medical practitioners and dental practitioners, and in female veterinarians and medical practitioners, aged 20 to 74 years, in England and Wales in 1979-1990 (excluding 1981)[¤] and 1991-2000

	PMR	95 percent confidence interval
1979 -1990 (excluding 1981)		
Male		
Veterinarians	361	252 to 503
Medical practitioners	162	106 to 262
Dental practitioners	194	137 to 266
Female		
Veterinarians	414	166 to 853
Medical practitioners	193	143 to 254
1991- 2000		
Male		
Veterinarians	374	244 to 548
Medical practitioners	175	147 to 206
Dental practitioners	227	162 to 309
Female		
Veterinarians	1240	446 to 2710
Medical practitioners	462	339 to 614

[¤] Excluded because the data were incomplete for that year

Source: Mellanby (2005)

There are many difficulties when comparing the risk of suicide across occupational groups. These include the effects of different socio-demographic factors both between occupations and within occupational specialisms. It is important that confounding by such factors is adequately controlled (Wilhelm and others 2004). While most differences in suicide risk between occupations are accounted for by differences in income and employment status, the most striking exceptions are for veterinary surgeons, doctors, nurses and pharmacists, all having significantly higher rates of suicide even when demographic factors are taken into account (Charlton 1995, Stack 2001, Agerbo and others 2007). Charlton (1995) linked data from death certificates and characteristics of the electoral ward of the deceased individuals' usual residence to undertake a case-control analysis of suicide risk. Table 2.4 shows the relative risk of suicide among veterinarians and other high risk occupational groups after controlling for demographic factors in the reference group. The risk of suicide relative

to death from other causes, among male veterinarians aged 16 to 44 years and 45 to 64 years and female veterinarians aged 16 to 64 years, is elevated by 4.6, 5.6 and 7.6 times respectively, in comparison with individuals in the general population with similar demographic characteristics.

Table 2.4: Relative risk (RR)[†] of suicide in high risk occupational groups for men aged 16 to 44 years and 45 to 64 years and females aged 16 to 64 years, in England and Wales in 1990-1992, compared with reference groups[§]

	Men aged 16-44		Men aged 45-64		Women aged 16-64[‡]	
	RR	95% confidence interval	RR	95% confidence interval	RR	95% confidence interval
Veterinarians	4.61	1.49 to 14.25*	5.62	1.60 to 19.74*	7.62	1.04 to 55.94*
Pharmacists	1.15	0.37 to 3.52	4.15	2.00 to 8.58**	1.21	0.27 to 5.35
Dentists	2.26	0.93 to 5.47	5.19	2.29 to 11.76**	-	-
Farmers	0.88	0.60 to 1.30	1.93	1.48 to 2.51**	-	-
Medical practitioners	1.50	0.90 to 2.50	2.22	1.35 to 3.65*	4.54	2.54 to 8.13**

[†] Risk is relative to deaths from other causes

[§] Reference groups are married; UK-born; corresponding age range; not in the 10 highest occupational groups; in urban wards with owner occupancy >85%; unemployment <5%; <6.5% of occupants changing address per year; <9% of adults below pensionable age living alone

[‡] No significant model differences for women under and over age 45

* $p<0.01$; ** $p<0.001$

Source: Charlton (1995)

Table 2.5 shows for men and women the distribution of suicides by method for veterinary surgeons and all occupations combined. Deliberate self-poisoning is the most common method of suicide in male and female veterinarians, accounting for 76 and 89 percent of suicides respectively, compared to 20 and 46 percent respectively of suicides in the general population of England and Wales (Kelly and Bunting 1998). Veterinary surgeons and pharmacists have the highest proportions of suicides using this method for all occupational groups; medical practitioners also have an increased risk of this specific method of suicide (Kelly and Bunting 1998, Hawton and others 2000, Agerbo and others 2007). There are many reports of the use of medicines for

veterinary anaesthesia and euthanasia as suicide agents (for example, Clark and Jones 1979, Cordell and others 1986, Smith and Lewis 1989, Stowell 1998, Elliott and Hale 1999, Résière and others 2001, Kintz and others 2002, Romain and others 2003, Elejalde and others 2003, Sterken and others 2004). Barbiturates are the drugs most commonly used for suicide by doctors (Hawton and others 2000) and were used by at least half of male veterinary surgeons who died by suicide by deliberate self-poisoning between 1982 and 1996 in England and Wales (Kelly and others 1995). Firearms are the second most common method of suicide by male veterinary surgeons which is also raised relative to the general population, accounting for 16 percent and 5 percent of suicides respectively (Kelly and Bunting 1998).

Table 2.5: Percentage distribution of suicides by method for veterinarians and combined suicides for all occupations, for males aged 20 to 64 years and for females aged 20 to 59 years, in England and Wales, 1982 to 1996

	Suicide method					
	Poisoning by solid or liquid substances	Poisoning by other gases and vapours	Hanging and suffocation	Drowning	Firearms and explosives	Other
Male						
Veterinarians	76	3	5	0	16	0
All men	20	27	27	6	5	16
Female						
Veterinarians	89	11	0	0	-	0
All women	46	10	17	9	-	18

Note: Percentages may not add to 100 due to rounding

Source: Kelly and Bunting (1998)

2.2.2 Rest of the world

International comparisons of suicide risk by occupation are hindered by variation between countries in the classification and recording of suicides (Andriessen 2006) and the use of a range of different measures of suicide risk across the literature.

A study of mortality patterns among US veterinarians from 1947 to 1977 showed significantly elevated mortality from suicide relative to death from other causes for

males (PMR=170), particularly for those in small animal practice (PMR=357), and with a higher proportion of self-poisonings compared with the general population (Blair and Hayes 1980, Blair and Hayes 1982). Barbiturates were the drugs most commonly used for suicide. In a separate study in California, male and female veterinarians had significantly elevated mortality from suicide of, respectively, 2.5 times and 5.9 times the rate in the general population of that state. Mortality from suicide was significantly elevated for veterinarians who had worked in the profession for fewer than 30 years (Miller and Beaumont 1995). Elevated mortality from suicide relative to death from other causes is also reported for male (PMR=197) and female (PMR=180) veterinarians in Washington State, from 1950 to 1999 and 1974 to 1999 respectively (Milham and Ossiander 2001).

In a large study in Norway which examined suicide deaths by occupation over a 40-year period (Hem and others 2005), the highest rate was among male veterinarians with a suicide rate approaching twice that in the general population. Suicide rates for different healthcare professions are summarised in Table 2.6.

Table 2.6: Suicide rates for men aged over 20 years per 100,000 person years in Norway in 1960-2000

	Suicide rate per 100,000 person years	95% confidence interval
Veterinarians	44	25 to 75
Physicians	43	35 to 53
Dentists	33	23 to 46
Pharmacists	29	13 to 64
General population	23	23 to 24

Source: Hem and others (2005)

Using a similar method, a suicide rate among veterinary surgeons of 45 per 100,000 person years (95% CI: 25 to 82 per 100,000) was reported for two Australian states combined, approximately four times the rate in the general population for the states concerned (Fairnie 2005, Jones-Fairnie and others 2008). The principal method of suicide was self-poisoning by drugs, mainly injectable barbiturates, and the suicides were not confined to a restricted age range; the age distribution of suicides for

veterinary surgeons was not substantially different from the Australian general population.

2.3 Risk factors for suicide and suicidal behaviour

Suicide and suicidal behaviour is thought to result from a complex interplay of risk and protective factors that are biological, psychological, and social in nature. Mental health disorders play the strongest role in the aetiology of suicidal behaviour. Psychological autopsy studies report that around 90 percent of those dying by suicide or making serious suicide attempts have a mental health disorder, most frequently depression and/or alcohol misuse (Cavanagh and others 2003). However, while a mental health disorder is generally a necessary condition for suicide, it is not sufficient. Most psychiatric patients do not die by suicide (Mann and others 1999). Additional risk and protective factors are also involved.

An understanding of risk factors for suicide and suicidal behaviour in the general population provides a foundation for elaborating possible mechanisms to explain suicidal behaviour within a specific occupational group.

The risk factors for suicide act either distally ('upstream'), or proximally ('downstream'). Distal risk factors affect the threshold for suicide and indirectly increase an individual's risk when they experience a proximal risk factor. Proximal or trigger factors are temporally closer to the suicidal behaviour and often act as precipitants (Mościcki 1997). The risk factors for suicide and suicidal behaviour can be broadly categorised into social and demographic, psychiatric, situational, biological and psychological and are summarised in Tables 2.7 to 2.11 respectively.

Table 2.7: Social and demographic risk factors for suicide and suicidal behaviour

Social and demographic	
Age	The highest suicide rates in the UK are among young men aged 15-44 years. Among women, the highest rates are for those aged 75 years and over (Brock and others 2006)
Gender	Almost three-quarters of suicides in the UK are of men (Brock and others 2006). Women are twice as likely to experience major depression but their greater inclination to consult friends, readiness to accept help and willingness to change their minds helps protect against suicide (Murphy 1998). Women are more likely to make non-fatal suicide attempts (Miller and others 2004)
Marital status	The suicide rate for divorced, widowed or single (never married) men and women is around three times higher than for married men and women (Griffiths and others 2008)
Education	Risks are elevated among individuals who have poor or limited education (Gould and others 1996)
Religion	Risks are elevated among those without religious affiliation (Neeleman 1998)
Socio-economic status	Risks are inversely related to social class (the lower the class, the higher the rate) (Platt and Hawton 2000)
Unemployment	Risks are higher among the unemployed (Platt and Hawton 2000)
Occupational group	Risk is higher for those working in medical and allied professions, farmers and nurses (Platt and Hawton 2000)
Rural location	Greater risk of male suicide in remote rural areas relative to urban areas and lower risk of female suicide in accessible rural areas (Levin and Leyland 2005). Rural location may create geographic, psychological, and socio-cultural barriers to treatment of suicide (Hirsch 2006)
Ethnic origin	Suicide rate varies between countries and between ethnic groups within countries (McKenzie and others 2003)

Table 2.8: Psychiatric risk factors for suicide and suicidal behaviour

Psychiatric	
Mood disorders	Mood disorders are the mental health disorders most commonly associated with suicide. Risk of suicide is increased twenty-fold for those with major depression (Harris and Barraclough 1997)
Substance misuse	Alcohol misuse predisposes to suicidal behaviour through its depressogenic and disinhibitory effects and promotion of adverse life events (Brady 2006)
Anxiety disorders	Anxiety disorders are an independent risk factor for subsequent onset of suicidal ideation and attempts (Sareen and others 2005). Co-morbid anxiety disorders amplify the risk of suicidal behaviour in persons with mood disorders (Sareen and others 2005, Hawgood and De Leo 2008)
Schizophrenia	Risk of suicide is increased thirty- to forty-fold for those with schizophrenia (Harris and Barraclough 1997)
Personality disorders	Personality disorders are associated with increased risk of suicide and suicide attempt, independently and co-morbidly with other mental health disorders (Schneider and others 2006)
Co-morbidity	Co-existence of multiple mental health disorders is associated with increased suicide risk (Cavanagh and others 2003)
Previous suicidal behaviour	Individuals who make non-fatal suicide attempts are at higher risk of further suicide attempts and completed suicide (Hawton and others 2003)

Table 2.9: Situational risk factors for suicide and suicidal behaviour

Situational	
Stigma	Stigma associated mental illness can reduce help-seeking behaviour (Dinos and others 2004)
Lack of social support	The association between poor family and/or social integration and suicide is robust and largely independent of the presence of mental health disorders (Duberstein and others 2004)
Influence of others	Direct or indirect exposure to the suicidal behaviour of others can in some circumstances influence attitudes and increase vulnerability to suicide (Maris and others 2000)
Adverse life events	Suicidal behaviour is often preceded by exposure to stressful life events (Baca-Garcia and others 2007)
Access to lethal means	Accessibility of lethal means has a strong influence on suicide rate (Hawton 2007)
Major physical illness	There is an association between suicidal behaviour and physical illnesses including AIDS, pulmonary disease, cancer and neurological disorders such as stroke, multiple sclerosis and some forms of epilepsy (Druss and Pincus 2000, Verrotti and others 2008)
Imprisonment	There is a five-fold excess of suicides in the prison population of England and Wales (Fazel and others 2005)

Table 2.10: Biological risk factors for suicide and suicidal behaviour

Biological	
Family history of suicidal behaviour	Suicidal behaviour is highly familial and, on the basis of twin and adoption studies, heritable (Brent and Mann 2005)
Neurotransmitter system dysregulation	Neurotransmitter system dysregulation, especially serotonin, is associated with increased risk of suicidal behaviour (Mann 2003)
Menstrual cycle	The risk of suicide attempt may increase in phases of the menstrual cycle which have lower oestrogen levels (Saunders and Hawton 2006)

Table 2.11: Psychological risk factors for suicide and suicidal behaviour

Psychological	
Personality characteristics	The personality traits of hopelessness, neuroticism, and extroversion are associated with suicidality (Brezo and others 2006)
Perfectionism	There is considerable evidence that aspects of perfectionism are associated with suicidality (O'Connor 2007)
Cognitive style	Suicide is associated with a constriction in cognitive style which leads to impairments in problem-solving and positive future cognitions (Sheehy and O'Connor 2008)
Over-general autobiographical memory	Depressed and suicidal individuals show a reduced ability to be specific in recalling personal memories (Williams and Broadbent 1986)

2.4 Protective factors against suicide and suicidal behaviour

Protective factors are those which are thought to buffer against suicidal behaviour during periods of risk such as adverse life events. Empirical evidence on risk factors for suicide and suicidal behaviour is far more abundant than that on protective factors, which remain largely at a theoretical level of discussion (Bertolote 2004).

Those protective factors which are not merely positive configurations of the risk factors outlined above are listed in Table 2.12 below.

Table 2.12: Protective factors against suicide and suicidal behaviour

Protective factors
Reasons for living (e.g. parenthood)
Good emotional relationship
Survival and coping skills and beliefs
Family and social connectedness
Problem-solving confidence
Internal locus of control
Fear of social disapproval
Moral objections to suicide
Religious participation
Physical activity and health

Sources: Malone and others (2000), Donald and others (2005), McLean and others (2008)

2.5 Towards a hypothetical model to explain suicide risk in veterinary surgeons

The stress-diathesis model of suicidal behaviour (Mann and others 1999) posits that suicidal behaviour results from the interaction between stressful life events and individual predisposition or vulnerability. This vulnerability, itself the product of psychobiological factors, genetics and past life events, influences how the individual perceives, interprets and reacts to adverse life events. It is a dynamic system in which stress and diathesis influence each other (van Heeringen 2002).

The relationship between occupation and suicide can be conceptualised as a model comprising four components contributing to differential occupational suicide risk: demographics (the demographic composition of people in the occupation); internal

occupational stress (stress associated with the nature of the work); pre-existing psychiatric morbidity (the psychological profile of those attracted to the occupation); and opportunity factors (opportunities available for access to lethal means of suicide) (Stack 2001).

A review of current knowledge about possible influences on the suicide risk among veterinarians and factors elevating the risk in other occupations and in the general population has been used to develop a comprehensive hypothetical model[3] to explain suicide risk in veterinary surgeons. The model is congruent with the stress-diathesis and differential occupational risk models of suicide described above.

Based on specific testable constructs, the model attempts to clarify a complex interaction of possible mechanisms across the career life course and may serve as a useful heuristic to facilitate a more focused and systematic approach to research. Research is required to validate or disprove the component hypotheses.

Studies with findings relevant to mental health in veterinary surgeons are summarised in Table 2.13.

[3] Development of the model is reported in the following publications:
BARTRAM, D.J. & BALDWIN, D.S. (2008) Veterinary surgeons and suicide: influences, opportunities and research directions. *Veterinary Record* **162**, 36-40
BARTRAM, D.J. & BALDWIN, D.S. (2008) Veterinary surgeons and suicide: a hypothetical model to explain risk. Proceedings of 12th European Symposium on Suicide and Suicidal Behaviour, 27-30 August, 2008. Glasgow, Scotland. pp 57-58

Table 2.13: Summary of included studies with findings relevant to mental health in veterinarians

Study and year	Design	Sample	Location	*n*	Response rate (%)	Key findings
Connolly 2003	Cross-sectional	Veterinary surgeons	Ireland	46	26	Workload reported as main source of stress
Brown 1994	Cross-sectional	Veterinary students	USA	207	96	Students deploy a range of both problem- and emotion-focused coping styles with relatively equal frequency
Fairnie 2005	Cross-sectional	Veterinary surgeons	Australia	419	43	Proportion of highly distressed respondents was double that of the general population. Distress highest for those <35 years old
Fishbain 1986	Case-series	Veterinary surgeons	USA	4	-	Pethidine by intramuscular injection was principal drug abused; history of drug abuse in veterinary school; veterinary-sourced
Fogle and Abrahamson 1990	Cross-sectional	Veterinary surgeons	UK	167	56	Animal deaths provoke severe short- and long-term emotional reactions in veterinarians (76 percent and 20 percent)
Fritschi and others 2009	Cross-sectional	Veterinary surgeons	Australia	2125	37	One third reported poor psychological health but levels of distress, anxiety and depression similar to other professions
Gardner and Hini 2006	Cross-sectional	Veterinary surgeons	NZ	927	49	Those working in small animal practice, women and younger veterinarians reported the highest levels of stress
Hafen and others 2006, 2008	Cohort	Veterinary students	USA	93 78	T1: 90 T2: 84	One third of first year students report clinical levels of depressive symptoms. Predictors include academic concerns
Hansez and others 2008	Cross-sectional	Veterinary surgeons	Belgium	216	9	Mean job strain and job engagement levels not higher than other professions, but greater negative work-home interaction
Harling and others 2009	Cross-sectional	Veterinary surgeons	Germany	1136	53	Work-related stress mainly attributable to workload, after-hours on-call duties and difficult clients. High alcohol consumption.
Heath 2007	Cross-sectional	Veterinary surgeons	Australia	134	98	Only 52 percent would opt for the veterinary profession if they could start their career again
Herzog and others 1989	Cross-sectional†	Graduating veterinary students	US	24	-	Distress was associated with prolongation of animal suffering, procedures causing pain to animals, and euthanasia
Hesketh and Shouksmith 1986	Cross-sectional	Veterinary surgeons	NZ	411	59	Decision latitude protective of mental health; lack of control over speed of work and discretion are associated with anxiety
Johnson and others 2005	Cross-sectional	Veterinary surgeons	UK Ireland	262	36[4]	Low psychological well-being, intermediate job satisfaction and good physical health compared to 25 other occupations
Kinsella 2006	Cross-sectional	Veterinary surgeons	Ireland	14	44	Unsociable hours and workload ranked highest as stressors
Kirwan 2005	Cross-sectional†	Veterinary surgeons, nurses and receptionists	UK	15	-	93 percent have favourable inclination towards euthanasia of humans

Continued overleaf

[4] The response rate for veterinarians is not reported in Johnson and others (2005). Figure obtained from the original source: Connolly, N. (2002) An exploratory study of stress in the veterinary profession in the UK and Ireland. [MSc Thesis] University of Manchester Institute of Science and Technology, UK

Study and year	Design	Sample	Location	*n*	Response rate (%)	Key findings
Kogan and others 2005	Cross-sectional	Veterinary students	USA	233	44	Non-academic stressors include additional employment, relationship concerns and poor self-care habits
Martin and others 2003	Cross-sectional	Veterinary students	USA	146	NR	Human-animal bond influences decisions to become veterinarians, especially for women
Martin and Taunton 2005	Cross-sectional	Veterinary surgeons	USA	415	26	81 percent indicated that the human-animal bond was important to their decisions to become veterinarians, especially for women
Mellanby and Herrtage 2004	Cross-sectional	Recent graduates	UK	108	27	Poor supervision, minimal support, many mistakes result in distress to veterinarians
Paul and Podberscek 2000	Cross-sectional	Veterinary students	UK	319	NR	Females have higher emotional empathy with animals which is sustained throughout course for females but declines for males
Phillips-Miller and others 2000, 2001	Cross-sectional	Veterinary surgeons	USA	305	54	Women report greater effects of marital and family stress and lower spousal support
Ptacek and others 2004	Cross-sectional[†]	Veterinary surgeons	USA	62	-	Communicating bad news is stressful and, for some individuals, the feelings of stress are prolonged
Reijula and others 2003	Cross-sectional	Veterinary surgeons	Finland	785	67	Those working in towns or involved in education and research reported the most stress
Robinson and Hooker 2006	Cross-sectional	Veterinary surgeons	UK	9671	47	Work is perceived as stressful by 80 percent of profession Only 53 percent would choose veterinary career again
Routly and others 2002	Cross-sectional	Recent graduates Senior partners	UK	58 34	54 59	Main difficulties for new graduates are being on call, financial aspects of the role, and lack of surgical competence
Serpell 2005	Cross-sectional	Veterinary students	USA	302	92	Females have greater concern for animal welfare/rights Interactions with animals influences attitudes and career choice
Trimpop and others 2000a, b	Cross-sectional	Veterinary surgeons Support staff	Germany	494 284	NR	Stress associated with long working hours was a predictor of traffic accident rates
Unpublished 2002[5]	Cross-sectional	Veterinary surgeons Support staff	Australia	313 183	34 20	Euthanasia, specific client behaviours or characteristics, and long working hours were important stressors
Williams and others 2005	Cross-sectional	Veterinary students	USA	57	41	Narrow range of effective coping strategies
Zenner and others 2005	Cross-sectional	Veterinary students	USA	61	80	Psychological characteristics similar to other high-achieving populations

NR: Not reported

[†] Interview-based; all other included studies are questionnaire-based

[5] News. 'Survey details stress factors that influence Australian vets'. *Australian Veterinary Journal* **80**, 522-524, September 2002. Available at www.ava.com.au/avj/0209/02090513.pdf [Accessed 04 Mar 2008]

2.5.1 Possible influences on suicide risk among veterinary surgeons

Risk factors for suicide include depression, alcohol and drug misuse, inherited factors, certain personality traits, and environmental factors such as chronic major difficulties, and undesirable life events (Goldney 2005). Several circumstances may elevate risk in specific occupations and, although the reasons are unclear, an interplay between various potentially malign influences is suggested for the veterinary profession.

The interrelations of work, personality and mental health are well documented (Stansfeld 2002) but reports specific to the veterinary profession (such as Halliwell and Hoskin 2005) have tended to simply present the observations and opinions of concerned individuals. These commentaries offer *prima facie* compelling concepts, but there is a paucity of research to test their veracity. Little is known about the scope and magnitude of problematic outcomes, possible predisposing factors, or effective interventions in veterinarians.

2.5.1.1 Access to means of suicide

Suicidal impulses are often brief and, at the point at which a person feels hopeless and suicidal, ready access to means of suicide may be the key factor that influences translation of suicidal thoughts into an actual suicide act (Hawton 2007). Access to potentially lethal means has a strong influence on suicide rate: decreases in rate have been associated with changes to non-toxic domestic gas from coal gas, installation of catalytic converters in cars, smaller over-the-counter pack sizes of paracetamol, and installation of barriers on high bridges (Bennewith and others 2007, Hawton 2007). Availability and knowledge of medicines is likely to contribute to the suicide risk in doctors (Hawton and others 2000). Veterinary surgeons also have ready access to medicines as they are typically stored in practice premises, and knowledge of medicines for self-poisoning, offering possible contributory factors for the high suicide risk. Veterinary surgeons are also less supervised in their use of medicines than are doctors (Fishbain 1986).

Methods of suicide for occupational groups are described in Section 2.1.1.2 and Table 2.5. Deliberate self-poisoning is the most common method of suicide in both male and female veterinarians, accounting for 76 and 89 percent of suicides respectively, compared to 20 and 46 percent respectively of suicides in the general population (Kelly and Bunting 1998). Veterinary surgeons and pharmacists have the highest proportions of suicides using this method for all occupational groups; medical practitioners also have an increased risk of this specific method of suicide (Kelly and Bunting 1998, Hawton and others 2000, Agerbo and others 2007). Even when deaths by medicines were excluded, suicide rates in doctors remained slightly elevated (Agerbo and others 2007), suggesting that ready availability of lethal means is not the only factor operating to increase their occupational suicide risk (Reichenberg and MacCabe 2007).

Firearms are the second most common method of suicide by male veterinary surgeons which is also raised relative to the general population, accounting for 16 percent and 5 percent of suicides respectively (Kelly and Bunting 1998). Veterinary surgeons working in equine, farm animal and mixed practice have ready access to firearms for euthanasia of large animals.

Farmers who die by suicide also tend to use methods to which they have easy access, especially firearms (Hawton and others 1998, Stark and others 2006b).

2.5.1.2 Attitudes to death and euthanasia

Veterinary surgeons are frequently responsible for ending the lives of animals, either directly in the case of euthanasia, or indirectly in the case of slaughter of meat-producing livestock. The emotional intensity of the relationships that often develop between people and their pets is such that it is the veterinary profession's routine experience to discuss, justify the legitimacy of, and ultimately administer euthanasia to animals that are considered by their owners to be virtual persons (Sanders 1995). Familiarity with death and dying may affect attitudes within the profession in regard to the expendability of human life (Charlton and others 1993). Ninety-three percent of veterinary healthcare workers interviewed in a small-scale study indicated a

favourable inclination towards euthanasia of humans (Kirwan 2005). This is a higher proportion than reported in the general population (Clery and others 2007) and contrasts with prevailing medical opinion (Seale 2009), although comparison of these studies is confounded by dissimilar research methods. Positive associations have been demonstrated between tolerance of suicide (more permissive attitudes towards euthanasia, physician-assisted suicide and unassisted suicide) and suicidal thoughts and behaviour (Neeleman and others 1997, Etzersdorfer and others 1998, Zemaitiene and Zaborskis 2005, Gibb and others 2006, Joe and others 2007).

The theory of cognitive dissonance (Harmon-Jones and Harmon-Jones 2007) – that psychological discomfort arising from conflicting thoughts or beliefs motivates the modification of existing, or the acquisition of new, thoughts and beliefs to reduce the inconsistency and discomfort – may offer an explanation for any effect of euthanasia attitudes on suicide risk. Veterinary surgeons may experience uncomfortable tensions between their desire to preserve life and an inability to treat a case effectively, which could be ameliorated by modifying attitudes to preserving life to perceive euthanasia as a positive outcome. This altered attitude to death may then facilitate self-justification and lower inhibitions towards suicide as a rational solution to their own problems.

2.5.1.3 Suicide 'contagion'

Direct or indirect exposure to the suicidal behaviour of others can in some circumstances influence attitudes and increase vulnerability to suicide (Maris and others 2000). Knowledge of individual suicides can travel readily through the social networks of a small profession and awareness of specific members of the profession who have completed suicide, or of high levels of suicide in professional peers generally, may normalise suicide and be a contributory risk factor for suicidal behaviour in veterinary surgeons, creating a suicide 'contagion' effect among vulnerable individuals within this high-risk occupational group.

2.5.1.4 Cognitive and personality factors

Cognitive and personality factors are relevant in the understanding of psychological distress and may be important in the prediction of suicide risk (Sheehy and O'Connor 2008). These factors include problem-solving deficits, memory and thinking biases, negative cognitive style, neuroticism, impulsivity, hopelessness, self-criticism and rumination (Williams and Pollock 2002, O'Connor 2007, O'Connor and Noyce 2008).

The relationship between personality factors and vocational interest is well documented (Mount and others 2005). Individuals may have a preference for, or be preferentially selected into, certain occupations based on their personality or life experiences, which could render them either more vulnerable or resilient to the work environment (Kohn and Schooler 1982, Stansfeld 2002, Wilhelm and others 2004). Personality profiles of medical students (Meit and others 2007) and doctors (Clack and others 2004) differ from those of the general population and there are associations between personality factors and choice of medical speciality (Borges and Savickas 2002): for example, mental health workers are more likely to have early experiences of childhood trauma and family dysfunction than other professions (Elliott and Guy 1993); and women psychiatrists are more likely than women in other medical specialities to report personal or family histories of psychiatric disorder (Frank and others 2001). It is possible that such self-selection operates in the veterinary profession. The choice of a veterinary career may be subconsciously influenced by factors such as a preference for working with animals rather than people: previous interactions with animals may play a critical role in guiding veterinary students into their chosen career (Martin and others 2003, Martin and Taunton 2005, Serpell 2005).

The profession may be particularly vulnerable to suicide because of selection based on the very high academic entry requirements into veterinary schools (Halliwell and Hoskin 2005). Admission requirements lead to an undergraduate cohort in which students with a history of outperforming their peers are grouped with similarly high academic achievers to create an environment in which some students chronically question their own abilities and fear that they will be exposed as intellectual frauds (Zenner and others 2005). Similar sentiments were expressed frequently by US

veterinary students during counselling (Kogan and others 2005). This situation also applies in students of other health professions and predisposes to psychological problems among those who do not adjust and ensure their expectations of their performance are realistic (Henning and others 1998).

Psychometric evaluations demonstrated that first-year students at a US veterinary school possessed psychological characteristics consistent with other high-achieving competitive performance populations such as professional athletes (Zenner and others 2005): students had elevated anxiety levels, placed significant value on positive comparisons with the competence of peers, and harboured a fear of failure. Certain dimensions of perfectionism – high personal standards and perception of parental expectations – were elevated in this student population. There is considerable evidence that aspects of perfectionism including socially prescribed perfectionism (a belief that others hold unrealistic and exaggerated expectations of us which must be met in order to gain acceptance and approval), self-criticism, concern about mistakes, and doubts about action, are associated with suicidality (O'Connor 2007).

Voracek (2004) reported a positive association of intelligence with suicide, but others (such as Gunnell and others 2005, Andersson and others 2008) have reported inverse associations. Cognitive performance in childhood appears to be significantly and inversely related to morbidity and mortality in adulthood, even at the higher end of the intelligence continuum and independent of childhood socio-economic status (Martin and Kubzansky 2005).

Halliwell and Hoskin (2005) conjectured that the highly demanding veterinary undergraduate course has the potential to stifle the development of communication skills and emotional maturity, possibly more so than in the medical curriculum. The considerable volume and pace of learning at veterinary school is a stressor for students (Gelberg and Gelberg 2005). Rice (2008) speculated that a factor influencing the elevated suicide risk could be that undergraduate admission criteria based on high academic achievement might select a greater proportion of students with low 'emotional intelligence' (EI), described as the ability to perceive emotions in oneself and others, integrate emotions into thought processes, understand emotions, and

moderate emotions in oneself and others (Mayer and Salovey 1997). However, there is a strong positive correlation between several dimensions of EI and academic achievement (for example, Parker and others 2004, Petrides and others 2004, Austin and others 2005) so it seems unlikely that the current admissions procedure inevitably selects a high proportion of students with low EI. A recent meta-analysis of 44 studies demonstrated that EI is positively associated with mental health (Schutte and others 2007). Although the methodologies of the meta-analysis and the studies on which it is based do not provide evidence regarding causality, it may be that the better perception, understanding, and management of emotion among individuals with higher EI make it less likely that they will experience mental health problems. Fostering EI may have a place in veterinary education to improve the veterinary surgeon-client relationship and act as a buffer against stress in the profession (Gelberg and Gelberg 2005, Timmins 2006). However, Timmins (2006) cautions that the concept of EI is relatively new and is not without controversy. There are disagreements regarding the definition of the term and the reliability and validity of available instruments for measuring it and no direct evidence that improving the EI of students or veterinarians will result in specific outcomes that have been identified as desirable for the profession.

Personality traits of hopelessness, neuroticism and extraversion may be major influences on suicide (Brezo and others 2006). A longitudinal study of a large cohort of UK medical graduates showed that career stress, burnout and satisfaction were predicted by trait measures of personality assessed five years earlier as medical students (McManus and others 2004). A six-year longitudinal and nationwide study of Norwegian medical students demonstrated that the traits of neuroticism and high conscientiousness are risk factors for stress (Tyssen and others 2007). Tyssen and others (2001a, 2001b, 2004) have shown that specific personality traits and depression are common predictors of mental health problems and suicidal ideation and behaviours among medical students and young doctors, and demonstrated the utility of screening final year medical students to identify a sub-group suitable for intervention.

Little is known about the coping strategies used by veterinary surgeons. Brown (1994) demonstrated that students at a US veterinary school perceived themselves as

deploying a range of both problem- and emotion-focused coping styles with relatively equal frequency. By contrast, Australian veterinary students did not consistently employ a range of effective coping strategies to deal with the stressors they encountered during their course of study (Williams and others 2005). Veterinary surgeons in New Zealand have been shown to make good use of their social networks to seek information and assistance in times of work-related stress, especially from informal sources such as friends, family and colleagues, rather than from resources such as health professionals, counsellors and telephone helplines (Gardner and Hini 2006). It is reported anecdotally that veterinary surgeons overuse problem-focused coping strategies,[6] although this has not been investigated empirically. The importance of deploying both problem- and emotion-focused strategies to cope with the stresses of veterinary work has been emphasised (Bartram and Gardner 2008).

2.5.1.5 Work-related stressors

The demand-control model (Karasek 1979) and the subsequent demand-control-support model (Karasek and Theorell 1990) of job strain predict that the combination of high job demands, low decision latitude and low social support is associated with mental and physical illness. Decision latitude includes decision authority (or control over the working environment) and skill discretion (or variety of work and opportunity for use of skills). High levels of decision latitude have been found to be protective of mental health in cross-sectional studies of veterinarians (Hesketh and Shouksmith 1986). The central tenet of a complementary job stress model, the effort-reward imbalance model (Siegrist 1996), is that the lack of contractual reciprocity in working conditions characterised by high effort in combination with low reward (financial and career-related rewards, esteem and job security) has adverse mental and physical health consequences, especially in individuals characterised by a motivational pattern of overcommitment to their work.

[6] In his address to British Veterinary Association Congress, Belfast, 29 Sep 2007, Dr. Raj Persaud, speaking at a session entitled 'Improving the mental wellbeing of the veterinary profession', described his clinical experience in psychiatry that veterinary surgeons tend to use problem-solving beyond the point at which the problem is solvable and suggested that failing to use emotion-focused coping for unsolvable problems could compromise mental health and may be a possible influence on the high suicide rate in the profession (News and Reports, BVA Congress, 'Emotionally focused coping': an alternative approach for stressed vets, *Veterinary Record* **161**, 578-579 (2007)).

Work factors associated with psychological ill-health in staff are work demands (long hours worked, work overload and pressure) and the associated effects on personal lives; lack of control over work; lack of participation in decision-making; low occupational social support; and unclear management and work role (Michie and Williams 2003). There is robust, consistent evidence that the combination of high psychological demands and low decision latitude and the combination of high effort at work and low reward are prospective risk factors for common mental disorders (Stansfeld and Candy 2006, Bonde 2008, Netterstrøm and others 2008).

There is an association between work stress and rates of depression and anxiety: individuals, without any pre-employment history of psychiatric disorders, exposed to high psychological job demands have a two-fold risk of onset of new depression and anxiety compared to those with low job demands (Melchior and others 2007). Lack of support from colleagues and supervisors and deterioration in work characteristics are also associated with onset of depression (Waldenström and others 2008).

One putative mechanism underlying associations between work characteristics and mental ill-health is neuroendocrine disturbance, mediated or moderated through psychological pathways including self-esteem and feelings of mastery over work (Stansfeld and Candy 2006).

Veterinary graduates typically move abruptly from the university environment to the relative professional and social isolation of general private practice. Being on-call, financial aspects of the role, and lack of surgical competence are identified as main initial difficulties, and staff turnover is high with one in three leaving their first job within two years (Routly and others 2002). Many work with little supervision, do not always have access to assistance from colleagues and make professional mistakes which can have a considerable emotional impact and may be significant in the development of suicidal thoughts (Mellanby and Herrtage 2004). Reactivation of latent negative cognitive schemas (unfavourable core beliefs about oneself that are derived from prior experience and can be activated by specific circumstances),

established during adverse experiences at veterinary school or in the early stages of an individual's career, may play a causative role in later depressive episodes.

Veterinary work is perceived as stressful by over 80 percent of UK veterinary surgeons (Robinson and Hooker 2006). Using a short validated stress evaluation tool to measure and compare a number of work-related stressors and stress outcomes across 26 different occupations in the UK, Johnson and others (2005) have shown that veterinary surgeons reported lower psychological well-being than workers in most other occupations. A large cross-sectional survey of work-related stress in the veterinary profession in New Zealand showed that those working in small animal practice, female and younger veterinarians reported the highest levels of stress, primarily associated with long working hours, client expectations and unexpected clinical outcomes. Respondents were also stressed by the need to keep up their knowledge and technical skills, and by personal relationships, finances and their expectations of themselves. At some stage during their lifetime, 2 percent of all respondents had made a suicide attempt and 16 percent of respondents had seriously thought about suicide (Gardner and Hini 2006).

A cross-sectional study of veterinary surgeons in Belgium reported only a moderate level of job strain, no higher than reports using the same method of measurement for other professional groups, but higher negative work-home interaction, especially for respondents in bovine or mixed practice (Hansez and others 2008). Veterinarians were highly engaged in their work which may have buffered against job strain. However, the results must be interpreted with great care owing to the very low response rate.

Financial debt is a risk factor for mental disorder and suicidal behaviour in the general population (for example, Hatcher 1994, Hintikka and others 1998, Yip and others 2007, Jenkins and others 2008). Twenty-nine percent of working doctors who died by suicide in England and Wales had significant financial problems in the year before death (Hawton and others 2004). There may be an association between rising student debts and suicide among veterinary surgeons (Williams 2006). The length of the veterinary course and the requirement for extramural studies means that debt is a particular issue for veterinary students. In 2008, the average debt faced by a final year

first-degree veterinary student in the UK was over £20,000 and 35 percent of final year students reported their financial problems as either difficult or severe (British Veterinary Association [BVA] and Association of Veterinary Students [AVS] 2008).

Veterinary practice occupies a difficult and complex moral position because it serves both animal and human interests which may conflict (Tannenbaum 1993, de Graaf 2005). Ethical challenges are commonplace as veterinary surgeons seek to balance obligations to ensure the welfare of their patients while accommodating the owners' expectations or demands, often within strict economic constraints, the views of professional peers, the wider interests of society as a whole, and the commercial interests of private practice (Rollin 2006). Examples of conflict abound: the sick animal whose monetary value is less than the cost of treatment; the owner who presses for continuing and potentially painful intervention for a dying pet; the owner who demands euthanasia for a healthy animal; the owner who cannot afford the cost of the most appropriate treatment. The 'moral stress' of the caring-killing paradox experienced by animal-shelter workers involved with the euthanasia of unwanted animals is associated with increased levels of work-related stress, work-to-family conflict, poor physical health, substance misuse and lower levels of job satisfaction (Rollin 1987, Reeve and others 2005, Rogelberg and others 2007). Rohlf and Bennett (2005) demonstrated that different levels of euthanasia-related stress symptoms are not associated with the occupational context in which euthanasia occurs; stress symptoms can be reported regardless of the reasons for euthanasia.

Interviews with US veterinary graduates revealed that the most common upsetting experiences involved procedures the students felt were unnecessary, such as when an animal's suffering was prolonged because its owner did not accept that its disease was incurable and that death was inevitable (Herzog and others 1989). Procedures causing pain to animals, such as castration of calves without anaesthesia, were also considered stressful to the students and 25 per cent found euthanasia of animals personally distressing.

A survey of veterinary surgeons in Finland reported high levels of work-related stress, particularly among those working in urban areas and academia (Reijula and others 2003).

An unpublished survey of stress among Australian veterinarians and their support staff[7] reported that euthanasia, specific client behaviours or characteristics, and long working hours were important stressors. The strongest predictor of work-related stress was the extent to which veterinarians felt unappreciated at work.

In a cross-sectional study of the occupational health of veterinary surgeons in Australia, the proportion of respondents with high levels of psychological distress was double that of the general population: significant predictors of high levels of distress included being less than 35 years old and having taken non-prescription drugs in the past 12 months. Working long hours and being on-call after hours were major contributory factors for stress. Veterinary surgeons working in general practice were significantly more stressed than those in other roles (Fairnie 2005).

In a survey of UK veterinary surgeons, animal deaths caused by illness and euthanasia were reported to provoke significant short- and long-term emotional reactions in a substantial proportion of veterinarians, which may be relevant to the genesis of depression (Fogle and Abrahamson 1990). A study of US veterinarians demonstrated that communicating bad news to clients is stressful and, for some individuals, the feelings of stress are prolonged (Ptacek and others 2004).

A large cross-sectional study of veterinary surgeons in Germany also recorded high levels of work-related stress, mainly attributable to workload and after-hours on-call duties (Harling and others 2009). Small surveys of veterinary surgeons in Ireland have recorded similar outcomes (Connolly 2003, Kinsella 2006). Trimpop and others (2000a, b) demonstrated that stress associated with long working hours was a predictor of traffic accident rates in German veterinary surgeons: those who worked

[7] News. 'Survey details stress factors that influence Australian vets'. *Australian Veterinary Journal* **80**, 522-524, September 2002. www.ava.com.au/avj/0209/02090513.pdf [Accessed 04 Mar 2008]

over 48 hours per week reported significantly higher levels of work stress and driving accidents.

Suicide risk is raised in occupations in which those employed are directly dependent upon clients for their income (Stack 2001). An exploratory study of 36 occupations found that the suicide rate was over 1.5 times higher for persons in client-dependent occupations (such as physicians, dentists and retail proprietors) in comparison with those in non-client-dependent occupations and it was assumed that this increased risk is mediated by client-dependency being a major source of stress (Labovitz and Hagedorn 1971). Veterinary surgeons in private practice work in a client-dependent environment.

Robinson and Hooker (2006) reported that 53 percent of UK veterinary surgeons would still opt for the veterinary profession if they could start their career again, 20 percent would not, and the remaining 27 percent are unsure. Similar figures are reported for veterinary surgeons in Australia (52 percent, 32 percent and 17 percent respectively) (Heath 2007). The apparent disenchantment of a substantial proportion of veterinary surgeons with their chosen career may have a negative impact on their mental health.

The concept of 'compassion fatigue', a form of secondary traumatic stress due to the emotional demands experienced by workers in caring professions, has received some attention in the veterinary literature (Mitchener and Ogilvie 2002, Cohen 2007) but there are no published reports of any measurements of the concept within the profession.

Major incidents concerning animal health, such as the 2001 foot-and-mouth disease outbreak in the UK, can elevate levels of psychological morbidity in affected communities (Peck 2005), potentially including veterinary surgeons through their involvement in large-scale slaughter and disposal, provision of emotional support to farmers, and the economic effects on private practices. Veterinary surgeons were turned to for emotional support during this outbreak by 40 percent of farmers surveyed and were the second most-cited source of support after family, friends and

other farmers (Peck and others 2002, Peck 2005). Calls from the veterinary profession to Vet Helpline[8] increased during the outbreak and decreased to pre-outbreak levels by mid-2002 (Peck 2005). Nusbaum and others (2007) reported a number of negative psychological reactions in veterinarians involved with the outbreak and advocated training in 'psychologic first aid' for public health professionals involved in such incidents to limit emotional distress in the rural community and themselves.

Seventy-one percent of working doctors who died by suicide in England and Wales between January 1991 and December 1993 had significant problems at work in the year before death: over one-third of those were facing complaints, which in most cases appeared to have been a key factor leading to suicide, although most were also facing other problems at work and at home. Other common occupational problems included feeling overloaded by the volume of work, working long hours and feeling unable to cope with the responsibility of the job (Hawton and others 2004).

The number of complaints received by the Royal College of Veterinary Surgeons from the general public increases steadily each year; the main category being alleged inadequate care (RCVS 2007).

2.5.1.6 Effects of gender

The PMR for suicide among veterinary surgeons is greater in women than in men (Mellanby 2005), but this may simply reflect the small absolute number of women concerned. This parallels the situation in the medical profession in which female doctors are consistently reported to have higher suicide risk compared to the general population than their male colleagues (Baldwin and Rudge 1995, Hawton and others 2001, Schernhammer and Colditz 2004, Petersen and Burnett 2008). In marked contrast to the general population in which the suicide rate for men is around three times the suicide rate for women (Brock and others 2006), the absolute suicide rate among doctors is similar for both genders (Lindeman and others 1996, Hawton and others 2001). This differential increase in risk between the sexes requires particular

[8] Vet Helpline is a peer-support telephone helpline providing emotional support and signposting to the veterinary profession (see Section 2.7)

monitoring in view of the large increase in the number of women entering the veterinary profession. There are various theories to explain why women in some professions have an increased risk of suicide including: participation in such disciplines may compete with some of the personality characteristics that are proposed as protective for women, or a relative lack of such characteristics might predispose women to choose careers in these fields; the professions concerned are action-oriented and recruit similarly oriented women; and women may be less able to cope with the social isolation inherent in these professions (Murphy 1998, Bhugra 2006). The theory of status integration suggests that persons in statistically infrequent occupation-based role sets have higher suicide rates than their counterparts (Gibbs 2000) and is supported by studies (such as Evans and Steptoe 2002) which indicate that when men and women occupy jobs in which they are in the cultural and numerical minority, there may be adverse psychological and other health effects that are gender-specific. Accordingly, Hawton and others (2001) suggested that that the risk among female doctors might be expected to decline as they progressively become the majority in a traditionally male-dominated occupation. This may also apply within the veterinary profession.

Women have a greater preference for self-poisoning as a method of suicide than men, a pattern that is more pronounced in female doctors and veterinarians than in the general population (Kelly and Bunting 1998), so it is possible that in an occupational context of ready access and knowledge, as in the medical and veterinary professions, the risk of suicide may increase more for women than for men. However, male doctors and veterinarians also use self-poisoning for suicide more often than men in general (Kelly and Bunting 1998) so this is unlikely to be the sole explanation for the gender difference. The particular stresses affecting women in these professions are likely to contribute to the difference (Gross 1997, Hawton and others 2001). By far the largest and most frequent gender-related source of stress for female junior doctors is the conflict they feel between their career and their marital and family life and this is strongly linked to depression (Firth-Cozens 1990). Other sources identified in the survey included a lack of senior female role models and prejudice from patients.

Female veterinary students report higher levels of emotional empathy with animals (Paul and Podberscek 2000), greater concerns for the welfare or rights of animals (Serpell 2005), and attach greater importance to the human-animal bond (Martin and others 2003, Martin and Taunton 2005), than their male counterparts, and this is reflected in gender differences in veterinary surgeons' reported emotional responses to treatment failure and carrying out euthanasia (Fogle and Abrahamson 1990), and in attitudes to pain control in animals (Capner and others 1999, Raekallio and others 2003, Hugonnard and others 2004). It may affect the ability of women to cope with the emotional stresses and moral conflicts inherent in veterinary practice (Paul and Podberscek 2000).

Phillips-Miller and others (2000, 2001) surveyed married or partnered US veterinarians about work satisfaction, work-related stress, marital and family stress, and perceived level of spousal support for their career. Men and women reported similar levels of work satisfaction and work-related stress but women reported significantly greater levels of effect of marital and family stress on career and lower levels of spousal support than their male counterparts. Areas of greatest work dissatisfaction for both genders were income and long working hours. Emergency calls outside office hours and unwillingness of clients to agree to diagnostic or treatment procedures were also cited as being particularly stressful.

2.5.1.7 Perceived stigma

The stigma associated with mental illness is increasingly recognised as an important factor influencing the accessing of mental healthcare by the general population (Sartorius 2007). Mental illness may be particularly stigmatising for those working in professions where vulnerabilities are not readily tolerated and viewed as a form of weakness with negative career implications. Stigma is recognised as an important factor influencing the accessing of mental health care by doctors (White and others 2006, Worley 2008) and suicide risk may be greater in higher income earners who develop mental illness as they may feel more stigmatised than others with lower income (Agerbo and others 2001). Similar stigma may apply within the veterinary profession with a consequent reduction in help-seeking behaviour.

2.5.1.8 Psychiatric illness

The importance of psychiatric disorders as a risk factor for suicide in the general population is described in Section 2.2, Table 2.8.

A large, case-controlled study showed that the risk of psychiatric diagnosis with affective and stress-related disorders is elevated for human service professions relative to all other occupations, after adjustment for an extensive range of socio-demographic variables (Wieclaw and others 2005, 2006a). Specific professions contribute differentially to the magnitude of this increased risk: for example, teaching and social services display the highest risk of stress-related disorders and health professionals have an elevated risk of depression. The authors suggested that the elevated risk in human service professions may be associated with factors including: job characteristics such as irregular working hours and exposure to distressing events; high and conflicting job demands; self-selection of individuals into occupations who are inclined to display a high degree of commitment; and men and women occupying occupations in which the opposite gender predominates.

Agerbo and others (2007) explored the impact of psychiatric factors on the relative risk of suicide across 55 occupations. Only modest associations between suicide and occupation were observed among individuals who had been previously hospitalised for psychiatric illness. This implies that mental disorder lies on the causal pathway between occupation and suicide or that occupational differences are less important once a person suffers from a psychiatric illness. However, doctors were a notable exception, at almost four-fold greater risk than other occupations of dying by suicide if they had been previously hospitalised for a psychiatric disorder. Thus the increased risk of suicide among doctors may be related to both an increased risk of psychiatric disorder and the increased risk of those with a psychiatric disorder to die by suicide. Although no cases of suicide among veterinary surgeons were identified in the cohort of suicides examined by Agerbo and others (2007) it is possible that this dual effect seen in doctors may apply similarly in the veterinary profession.

The principal psychological problems experienced by doctors are depression and alcoholism, and these are more frequent than in the general population (Firth-Cozens 2001). Pre-existing psychiatric disorders were present in over 86 percent of doctors completing suicide, mainly depressive illness and alcohol or drug dependence (Hawton and others 2004), and over 90 percent of nurses (Hawton and others 2002). In a study of UK healthcare professionals referred to a specialist drug and alcohol treatment service, around one-third had previously received treatment for depression and about one-fifth had previously taken an overdose (Gossop and others 2001). No such data are available for veterinary surgeons but it is reasonable to speculate that psychiatric disorders may be a similar factor in suicides by veterinary surgeons. A ready opportunity exists in both professions for misuse of prescription medications. Among UK veterinary surgeons referred to a health support programme, the order of substance misuse preference is alcohol, ketamine, benzodiazepines, opiates, street drugs (cannabis, heroin, cocaine and ecstasy) and nitrous oxide, and about half of those treated admit to having had suicidal thoughts (Veterinary Benevolent Fund [VBF] 2007). Substance misuse is also reported among Australian veterinarians (Jeyaretnam and others 2000).

Harling and others (2009) explored the use of psychotropic substances among German veterinary surgeons. The prevalence of smoking and drug use among veterinarians was respectively lower than and similar to the general population. However, alcohol consumption was elevated, and the prevalence of dangerous levels of alcohol consumption was markedly elevated among female veterinarians.

Hafen and others (2006, 2008) reported that one-third of first-year students at a US veterinary school had symptoms of depression associated with both academic and non-academic stressors, but it is not clear to what extent these findings can be generalised to veterinary undergraduates elsewhere.

Fishbain (1986) compared the characteristics of four US veterinary surgeons with psychiatric illness with those of published descriptions of psychiatrically impaired doctors. Similarities included the type of drug selected for misuse (mainly opiates); the number of drugs used by an individual (multiple); and source of supply (self-

prescribed rather than street-sourced). The veterinary surgeons misusing drugs considered that overwork, fatigue, situational stress, and problems with significant others were precipitating factors. The outcomes must be interpreted very cautiously, however, due to the small number of veterinarians concerned.

2.5.2 Schematic representation

A hypothetical model to explain suicide risk in veterinary surgeons was developed (Figure 2.1). The model attempts to clarify the complex interaction of possible influences, is based on specific testable constructs, and may facilitate a more focused and systematic approach for suicide research and the development of prevention strategies within the profession.

The principal component hypotheses within this model are that the following factors elevate suicide risk in veterinary surgeons:

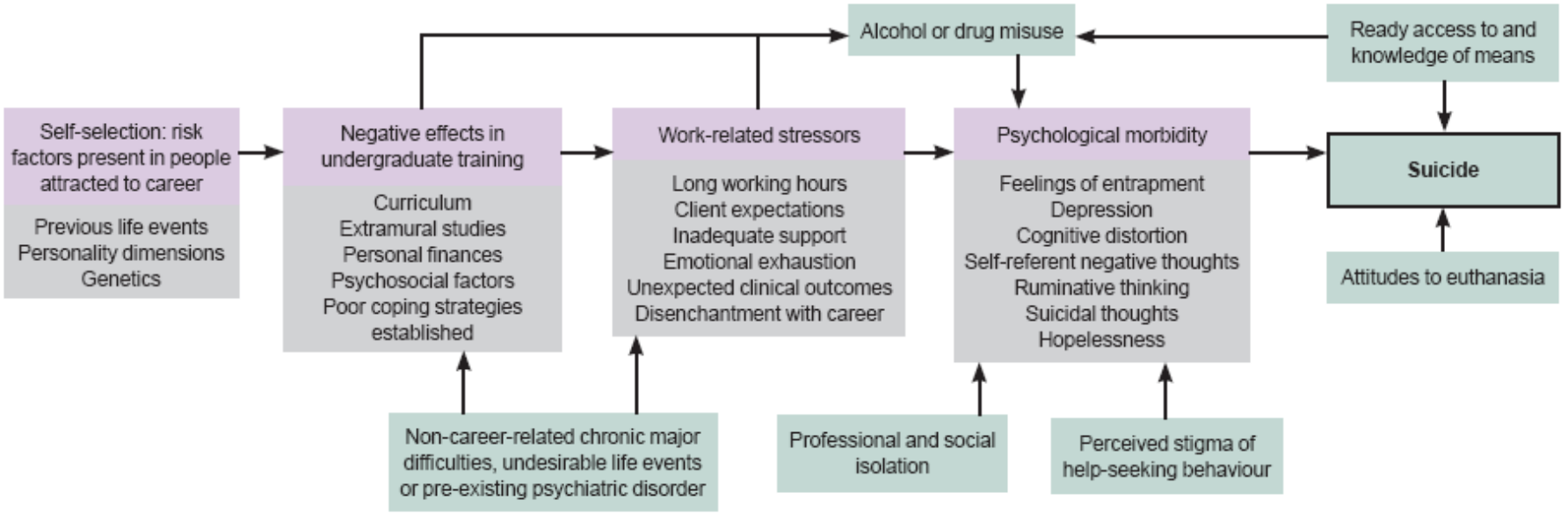
- Personality characteristics of individuals entering the profession confer a predisposition or vulnerability

- Psychological morbidity attributable to psychosocial factors during undergraduate training and in the workplace

- Familiarity with animal euthanasia leads to more permissive attitudes towards suicide

- Access to and knowledge of means of harm

Figure 2.1: Schematic representation of a hypothetical model to explain the risk of suicide in veterinary surgeons



Source: Bartram and Baldwin (2008)

2.6 Summary of shortfalls in existing published work

The increased risk of suicide among veterinary surgeons is well established (see Section 2.1). However, the extant literature that seeks to explain this observation has many shortfalls. These can be summarised as follows:

- The questionnaire instruments are mainly self-formulated and do not use measures with established psychometric properties (such as Gardner and Hini 2006)

- A number of reports are based largely on conjecture (such as Halliwell and Hoskin 2005)

- The generalisability of the results is limited by small sample size and/or low response rates (such as Connolly 2003, Kirwan 2005, Kinsella 2006, Hansez and others 2008, Fritschi and others 2009) or the study was completed outside the UK (such as Reijula and others 2003, Gardner and Hini 2006, Hansez and others 2008, Fritschi and others 2009)

- The prevalence of any psychological characteristics which might create a predisposition or vulnerability in individuals entering the profession has not been evaluated

- There has been little attempt to evaluate the prevalence of psychiatric factors such as depression or substance misuse among practising veterinary surgeons

- Attitudes to suicide and the potential influence of the acceptability of animal euthanasia within the profession on those attitudes have not been evaluated

2.7 Existing initiatives to support mental health in the UK veterinary profession

Brief details of existing initiatives to provide mental health support to the veterinary profession are listed below, classified by the name of the organisation responsible.

Veterinary Benevolent Fund

- Vet Helpline: a 24-hour peer-support telephone helpline service staffed by trained volunteers; established in 1992; received 179 calls in 2006, mainly concerning depression- and employment-related problems (Veterinary Benevolent Fund [VBF] 2007).

- Veterinary Surgeons' Health Support Programme: professional help for addiction disorders; established in 1999; received 39 new referrals in 2006, mainly for alcohol-, stress- and drugs-related problems (Veterinary Benevolent Fund [VBF] 2007).

- www.vetlife.org.uk: a dedicated portal website for information related to mental health support, launched in 2007.

- There are plans for a programme of mental health seminars in veterinary schools.

British Veterinary Association

- Recent Graduate Support Scheme and Young Vet Network: launched in 2007; incorporate a range of different elements including regional meetings and an online forum to support graduates in their first five to eight years in practice.

Royal College of Veterinary Surgeons

- Professional Development Phase (PDP): a compulsory initiative introduced in 2007 to provide support during the development of professional skills in the first year following graduation.

- The new modular postgraduate certificate scheme includes a compulsory module on professional key skills, which incorporates elements on communication, decision-making and support networks.

University of Exeter

- 'Practice Imperfect':[9] a touring interactive theatre project developed within the university's Department of Drama to promote mental health awareness to the veterinary profession (Short and Lane 2007, Short and Somers 2007).

Society of Practising Veterinary Surgeons

- A telephone support and advice service for recent graduates, operated by experienced practitioners.

Veterinary Defence Society

- Graduate Reunion Seminars: facilitate maintenance of relationships formed as students and provide a structured forum for exchange of professional concerns, advice and support.

[9] 'Practice Imperfect' is an interactive theatre programme on stress in the veterinary profession, offered as a means of raising issues which are difficult to discuss in a personal context. The play was written and developed by John Somers and students at the Department of Drama, University of Exeter following extensive research and input from a range of individuals and organisations within the veterinary profession. It was performed by Exstream Theatre Company at the Royal Veterinary College, London and locations in Devon in 2006/2007.

CHAPTER 3: QUESTIONNAIRE RESEARCH

3.0 Introduction

Questionnaire surveys are useful and well-established tools in medical research to collect primary quantitative data about various aspects of health and disease including the attitudes and behaviour of a defined population. The aim is to gather valid, reliable, unbiased and discriminatory data from a representative sample of respondents. However, the information yielded is subject to error and bias from a range of sources. Close attention to questionnaire design and method of survey administration can reduce these errors (Aday and Cornelius 2006). According to Boynton and Greenhalgh (2004):

> Anybody can write down a list of questions and photocopy it, but producing worthwhile and generalisable data from questionnaires needs careful planning and imaginative design. (p. 1312)

This chapter reviews the approach to the selection of constructs of mental health and well-being for evaluation, the selection of suitable existing survey instruments to measure these constructs, and provides an outline of the instruments selected.

A high response rate to a survey maximises the likelihood that the data will be representative of the entire population (Aday and Cornelius 2006). Techniques to maximise questionnaire response rates are described.

The chapter concludes with a short review of the demographic and occupational profile of the veterinary profession in the UK, identifies sources of possible sampling frames, and outlines the assessment of sampling frame suitability.

3.1 Modes of administration

The two principal modes of administration are self-completion (postal mail surveys and surveys on the internet) and interviewer administration (face-to-face and telephone) (McColl and others 2001).

In choosing a mode of questionnaire administration, consideration needs to be given to the availability of an appropriate sampling frame, anticipated response rate, the potential for bias from sources other than non-response, acceptability to the target population, the time available, the financial budget, and the availability of other resources (e.g. skills or equipment) (McColl and others 2001).

3.2 Criteria for selecting existing survey instruments

There are many questionnaires in the public domain that are available for use by researchers, with a diverse range of intended purpose and content. The popularity of questionnaire methods of research is founded on the speed with which data can be obtained, usually without significant capital investment. However, discipline should be applied to their development and selection (Mandal and others 2000).

Fitzpatrick and others (1998) advocate eight criteria investigators should apply to evaluate candidate patient-based outcome measures for research: appropriateness; reliability; validity; responsiveness; precision; interpretability; acceptability; and feasibility. The authors acknowledge however that there may be ‘clear limitations in the evidence available’ (p. 45) on which to base selection decisions.

- Appropriateness requires that investigators consider the match of an instrument to the specific purpose and objectives of a trial.

- Reliability requires that an instrument yields consistent results from repeated samples and different researchers over time.

- Validity is involved in judging whether an instrument measures what it purports to measure.

- Responsiveness addresses whether an instrument is sensitive to clinically important changes over time.

- Precision is concerned with the number and accuracy of distinctions made by an instrument.

- Interpretability is concerned with how meaningful the scores from an instrument are.

- Acceptability addresses how acceptable an instrument is for respondents to complete.

- Feasibility is concerned with the extent of effort, burden and disruption arising from use of an instrument.

The following additional criteria were also considered in the selection of suitable instruments for incorporation into this study of mental health and well-being in the UK veterinary profession:

- Availability of normative data for subjects with broad similarity to the study population (preferably UK healthcare professionals)

- Any requirement to pay a licensing fee for use of an instrument subject to copyright

- Suitability for self-administration to avoid the requirement for an interviewer

- Contemporary, i.e. used in recently published studies

In the context of this study the priority was to ensure that, where possible, the instruments selected had previously established psychometric properties (validity and reliability), were short (in order to minimise the time taken for respondents to complete a questionnaire comprising multiple instruments) and likely to have minimal potential to cause distress to respondents.

It is generally acceptable in medical research to develop a short series of bespoke questions for use alongside one or more standard instruments in a questionnaire if suitable standard instruments cannot be identified to meet all of the study objectives, but it is important to ensure that such questions are adequately pre-tested and piloted (Boynton and Greenhalgh 2004).

3.3 Elemements of mental health and well-being for investigation in the study

A key premise of the hypothetical model to explain the elevated risk of suicide in veterinary surgeons (Figure 2.1) is the mediating role of work-related stressors and psychological symptoms. Analysing risk factors for suicidal behaviour and ideation may be a valuable way of clarifying possible reasons for completed suicide and has methodological advantages over studying factors associated with completed suicide: for example, suicidal thoughts are more common in the population and the individual can be asked about them directly. Empirical testing of the study hypotheses (Section 1.2) requires the selection of appropriate features of mental health and well-being which can be operationalised using suitable survey instruments.

It is not possible to evaluate all aspects of mental health and well-being in a questionnaire study as the burden on respondents would have ethical implications and may also reduce response rates. Features of mental health were selected for evaluation on the basis of existing evidence for association with suicidal behaviour and completed suicide and the likely prevalence in a population in paid employment.

Key aspects of mental health and well-being known to be associated with suicidal behaviour and completed suicide include: depressive and anxiety disorders (Harris and Barraclough 1997, Sareen and others 2005), alcohol misuse (Brady 2006), and recurrent suicidal thoughts (Bronisch and Wittchen 1994).

3.4 Review and selection of existing instruments

Instrument evaluation and selection was informed through reference to a structured review which assesses the evidence for different measures (McDowell 2006) and electronic literature searches. Information was not available on all the selection

criteria for some of the instruments considered for inclusion in the study questionnaire and consequently evaluation against the selection criteria inevitably involved an element of subjectivity. Section 3.3 provides an outline of the instrument review and selection process for each dimension of mental health and well-being measured in the study.

3.4.1 Depression

Many screening and case finding instruments for depression are available (Gilbody and others 2005). The following scales were considered for inclusion in the questionnaire:

- Patient Health Questionnaire (PHQ-9) (Kroenke and others 2001)
- Hospital Anxiety and Depression Scale (HADS) (Zigmond and Snaith 1983)
- Beck Depression Inventory II (BDI-II) (Beck and Ward 1961)

An outline of the evaluation of these instruments against the selection criteria described in Section 3.2 is provided in Table 3.1.

Table 3.1: Evaluation of depression instruments against selection criteria

Instrument	Appropriateness	Psychometrics established	Responsiveness	Precision	Interpretability	Acceptability (short length and minimum distress)	Feasibility	Normative data	No fee payable	Self- administration	Contemporary
PHQ-9	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
HADS	✓	✓	✓	✓	✓	✓	✓	✓	x	✓	✓
BDI-II	✓	✓	✓	✓	✓	x	✓	✓	x	✓	✓

HADS is a brief (14-item), self-report measure of anxiety and depression developed for use in general medical out-patient clinics and now extensively validated and widely used in clinical practice and research (Zigmond and Snaith 1983, Herrmann 1997, Snaith 2003). Seven items reflect anxiety and seven reflect depression. Each item is answered on a four point (0-3) response category so the possible scores range from 0 to 21 for anxiety and 0 to 21 for depression. The two sub-scales, for anxiety and depression, are separate measures. In an extensive review of the use of HADS, Bjelland and others (2002) confirmed an optimal balance between sensitivity and specificity for HADS as a screening instrument at a cut-off score of 8+ for both HADS-A and HADS-D, giving sensitivities and specificities for both sub-scales of approximately 0.80, and concluded that HADS:

> … was found to perform well in assessing the symptom severity and caseness of anxiety disorders and depression in both somatic, psychiatric and primary care patients and in the general population. (p. 69)

There is abundant evidence that the presence of an anxiety disorder is the single strongest risk factor for development of depression (Baldwin and others 2002). Current or lifetime co-morbidity is very common, and the implications of this are significant, with increased social and psychological impairment and poorer clinical outcomes and prognosis (Baldwin and others 2002). It is therefore appropriate that, by the selection of HADS for use in the current study, both anxiety and depressive symptoms can be evaluated.

3.4.2 Mental well-being

Existing instruments for the measurement of mental well-being include the following:

- Positive And Negative Affect Scale (PANAS) (Watson and others 1988)
- Satisfaction With Life Scale (SWLS) (Diener and others 1985)
- Scale of Psychological Well-Being (SPWB) (Ryff and Keyes 1995)

- Short Depression-Happiness Scale (SDHS) (Joseph and others 2004)

- WHO Wellbeing Index (WHO-5) (Bech 2004)

- Warwick-Edinburgh Mental Well-being Scale (WEMWBS) (Tennant and others 2007)

An outline of the evaluation of these instruments against the selection criteria described in Section 3.2 is provided in Table 3.2.

Table 3.2: Evaluation of mental well-being instruments against selection criteria

Instrument	Appropriateness	Psychometrics established	Responsiveness	Precision	Interpretability	Acceptability (short length and minimum distress)	Feasibility	Normative data	No fee payable	Self- administration	Contemporary
PANAS	✓	✓	x	✓	✓	✓	✓	x	✓	✓	x
SWLS	✓	✓	x	✓	✓	✓	✓	x	✓	✓	x
SPWB	✓	✓	x	✓	✓	x	x	x	✓	✓	✓
SDHS	✓	✓	x	✓	✓	✓	✓	x	✓	✓	✓
WHO-5	✓	✓	x	✓	✓	✓	✓	✓	✓	✓	✓
WEMWBS	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

WEMWBS is a new and psychometrically robust measure for assessing population positive mental health. The scale comprises 14 positively phrased items which measure positive affect (i.e. hedonic aspects of well-being: feelings of optimism, cheerfulness, relaxation), psychological functioning (i.e. eudaimonic aspects of well-being: energy, clear thinking, self-acceptance, personal development, competence and autonomy) and interpersonal relationships (Tennant and others 2007). Unlike other commonly-used measures which show 'ceiling effects' in general population samples, with most people scoring the optimum level, WEMWBS is better able to distinguish average from good mental health and may have potential for documenting overall improvements in population mental well-being (Tennant and others 2007). Each item

is scored on a 5-point Likert-style scale from 1-5. The overall score for WEMWBS is calculated by summating the scores for each item, giving a minimum score of 14 and a maximum score of 70. A higher score indicates a higher level of mental well-being.

3.4.3 Alcohol use

Several questionnaires have been developed to detect individuals with alcohol dependence, alcohol misuse or high levels of alcohol consumption (Rumpf and others 2002).

- CAGE questionnaire (Ewing 1984)
- Alcohol Use Disorders Identification Test (AUDIT) (Saunders and others 1993)
- AUDIT Alcohol Consumption Questions (AUDIT-C) (Bush and others 1998)

An outline of the evaluation of these instruments against the selection criteria described in Section 3.2 is provided in Table 3.3.

Table 3.3: Evaluation of alcohol use instruments against selection criteria

Instrument	Appropriateness	Psychometrics established	Responsiveness	Precision	Interpretability	Acceptability (short length and minimum distress)	Feasibility	Normative data	No fee payable	Self- administration	Contemporary
CAGE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	x
AUDIT	x	✓	✓	✓	✓	x	✓	✓	✓	✓	✓
AUDIT-C	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

The AUDIT-C is a popular short version of the AUDIT consisting solely of its 3 consumption items (measuring frequency of drinking, typical quantity consumed and frequency of heavy drinking) and is approximately equal in accuracy to the full

AUDIT (Reinert and Allen 2007). It performs well in screening for alcohol use disorders and risk drinking. The use of different cut-off points for men and women improves its sensitivity and specificity (Dawson and others 2005). The AUDIT-C has been recommended as a simple and reliable tool for routine assessment of risky drinking (Wallace 2001). Each question is scored on a 5-point Likert scale (0-4), resulting in a range of 0-12. AUDIT-C cannot differentiate between at-risk drinkers and dependent drinkers but several authors consider that it is more important in terms of public health to consider at-risk drinkers because at this stage most consequences of alcohol use are still reversible (Bush and others 1998, Bradley and others 2003, Rumpf and others 2002, Dawson and others 2005).

3.4.4 Suicidal ideation

There are many screening instruments for suicidal ideation and behaviour available (Hawton 1989). The following scales were considered for inclusion in the questionnaire:

- Scale for Suicide Ideation (SSI) (Beck and others 1979)
- Modified Scale for Suicidal Ideation (MSSI) (Miller and others 1986)
- Beck Scale for Suicide Ideation (BSS) (Beck and Steer 1991)
- Suicidal ideation questions from the second National Survey of Psychiatric Morbidity (NSPM) (Singleton and others 2001)

An outline of the evaluation of these instruments against the selection criteria described in Section 3.2 is provided in Table 3.4.

Table 3.4: Evaluation of suicidal ideation instruments against selection criteria

Instrument	Appropriateness	Psychometrics established	Responsiveness	Precision	Interpretability	Acceptability (short length and minimum distress)	Feasibility	Normative data	No fee payable	Self- administration	Contemporary
SSI	x	✓	✓	✓	✓	x	✓	✓	✓	x	✓
MSSI	x	✓	✓	✓	✓	x	✓	✓	✓	x	x
BSS	x	✓	✓	✓	✓	x	✓	✓	x	✓	✓
NSPM	✓	✓	?	✓	✓	✓	✓	✓	✓	✓	✓

The three suicidal ideation questions from NSPM address a spectrum of suicidality from 'tiredness of life', to 'death wishes', through to 'suicidal thoughts', during the previous week, the last year, or at any other time and are sourced from the 5-item questionnaire developed by Paykel and others (1974). Normative data are available for Great Britain (Meltzer and others 2002, Dennis and others 2007). The other scales are unsuitable as they are either interviewer-administered and/or only relate to the day of interview.

3.4.5 Work-related stress and working conditions

A number of job-specific measures have been developed for assessing occupational stress or psychosocial factors in the work environment (Tabanelli and others 2008). The following were considered for inclusion in the questionnaire:

- Job Content Questionnaire (JCQ) (Karasek and others 1998)
- Effort-Reward Imbalance Questionnaire (ERI) (Siegrist and others 2004)
- A Shortened Stress Evaluation Tool (ASSET) (Faragher and others 2004)

- Health and Safety Executive Management Standards Indicator Tool (HSE MSIT) (Cousins and others 2004)

- Items derived from the Whitehall II study questionnaire,[10] based on JCQ (Whitehall II) (for example, Stansfeld and others 2002)

An outline of the evaluation of these instruments against the selection criteria described in Section 3.2 is provided in Table 3.5.

Table 3.5: Evaluation of work-related stress and working conditions instruments against selection criteria

Instrument	Appropriateness	Psychometrics established	Responsiveness	Precision	Interpretability	Acceptability (short length and minimum distress)	Feasibility	Normative data	No fee payable	Self- administration	Contemporary
JCQ	✓	✓	✓	✓	✓	x	✓	✓	✓	✓	✓
ERI	✓	✓	✓	✓	✓	x	✓	✓	✓	✓	✓
ASSET	✓	✓	?	✓	✓	x	✓	✓	x	✓	✓
HSE MSIT	✓	✓	✓	?	✓	x	✓	✓	✓	✓	✓
Whitehall II	x	✓	✓	✓	✓	x	✓	✓	✓	✓	✓

HSE MSIT was developed as a work-related stress risk assessment tool to help reduce stress in the UK working population (MacKay and others 2004), is derived from the JCQ and Whitehall II instruments (Cousins and others 2004), and has robust psychometric properties (Edwards and others 2008). It comprises 35 questions grouped into seven key stressor domains – *demands* (workload and working patterns), *control* (the extent to which individuals can control the way they do their work), *managerial support* (level of support from the organisation and line management in terms of encouragement, sponsorship and resources), *peer support* (level of encouragement and support from peers), *relationships* (the quality of relationships

[10] Available at http://www.ucl.ac.uk/whitehallII/data_sharing/index.htm [Accessed 24 Jul 2008]

between colleagues), *role* (understanding of duties and responsibilities), and *change* (management and communication of organisational changes) – which have the potential to have a negative impact on employee mental health and well-being (Cousins and others 2004). Recent normative data are available for the UK working general population (Edwards and others 2008) and the nursing profession (Royal College of Nursing 2006). Some instruments, such as HSE MSIT and JCQ, capture *features* of the work environment whereas others, such as ERI and ASSET, attempt to capture the *consequences* of the work environment on the worker. No single questionnaire is sufficient to assess all the risks associated with psychosocial working conditions (Rick and others 2001). HSE MSIT was selected as it includes measures for multiple dimensions of the workplace environment, UK normative data for the working general population are updated annually (*Psychosocial Working Conditions in Britain* survey, e.g. Webster and others 2007), and software for analysing scores is readily available[11] to any employers who might wish to use the tool to assess the psychosocial characteristics of their workplace for review against the baseline measurements provided by the current study.

3.4.6 Work-home interaction

Although work-life balance is a more commonly used term, a body of research prefers the term work-home interaction (WHI) (Loretto and others 2005). Work and home roles can interact to have both negative and positive effects on mental health depending on the demands an individual encounters in their work and family situation. Negative effects can arise through competing demands for time and energy; positive effects can arise through the provision of a greater number of resources (e.g. social support, higher self-esteem and financial income) which may buffer against distress in another role (Voydanoff 2004, Oomens and others 2007).

Many instruments have been developed for the measurement of work-home interaction (reviewed in Geurts and others 2005). The following were considered for inclusion in the questionnaire:

[11] HSE Management Standards Analysis Tool.
Available at http://www.hse.gov.uk/stress/standards/pdfs/analysistool.xls [Accessed 24 Jul 2008]

- Work-Family Conflict and Family-Work Conflict Scales (WFC/FWCS) (Netemeyer and others 1996)

- Survey Work-home Interaction – Nijmegen Scale (SWING) (Geurts and others 2005)

An outline of the evaluation of these instruments against the selection criteria described in Section 3.2 is provided in Table 3.6.

Table 3.6: Evaluation of work-home interaction instruments against selection criteria

Instrument	Appropriateness	Psychometrics established	Responsiveness	Precision	Interpretability	Acceptability (short length and minimum distress)	Feasibility	Normative data	No fee payable	Self- administration	Contemporary
WFC/FWCS	x	✓	?	✓	✓	✓	✓	x	✓	✓	x
SWING	✓	✓	?	✓	✓	x	✓	✓	✓	✓	✓

The SWING questionnaire was developed from the item content of 17 existing instruments and a number of newly developed items to develop a comprehensive, 22-item scale for the measurement of time-based and strain-based elements of negative and positive work-home and home-work interaction (Geurts and others 2005). Each of the four sub-scales may be used separately (S. Geurts, personal communication).[12]

3.5 Maximising response rates to postal questionnaires

The response rate of a questionnaire survey can be defined as the proportion of people selected and deemed eligible for a study who actually complete the questionnaire

[12] Dr. Sabine Geurts, Associate Professor in Work and Organizational Psychology, Radboud University, Nijmegen, Netherlands. 21 Jun 2007 [E-mail]

(Aday and Cornelius 2006). A high response rate from any sample is required to maximise the likelihood that the data will representative of the entire population. While a universal standard for response rates has not been established for self-administered surveys, it is generally accepted that response rates below 50 percent are inadequate (Reisbig and others 2007). Non-response to postal questionnaires reduces the effective sample size and can introduce bias. Non-response bias occurs when a significant number of people in the survey sample fail to respond and have relevant characteristics that differ from those who do respond.

Because non-response can affect the validity of epidemiological studies, the use of effective methods to increase response rates is an important dimension of health research. Recent Cochrane reviews considered many different methods to increase response rates to postal questionnaires. The reviews identified several factors that were associated with increased response rates, including monetary incentives; sending the questionnaire by recorded delivery; short questionnaires; pre-notification; follow-up contact; a more interesting questionnaire topic; and sending a second copy of the questionnaire (Edwards and others 2002, Edwards and others 2007). However, the generalisability of the results of this review into the healthcare setting has been questioned as the studies reviewed were not restricted to medical surveys and included any questionnaire topic in any population (Smeeth and Fletcher 2002).

A systematic review to identify effective methods of improving response to postal questionnaires in patient populations recruited to healthcare research activities (Nakash and others 2006), concluded that repeat mailing strategies and/or telephone reminders had most effect on response rates. Making the questionnaire shorter may also improve response rates but there was no evidence to suggest that incentives are useful.

In a systematic review of efforts to improve response rates in physician surveys (VanGeest and others 2007), small financial incentives, postal and telephone rather than web-based approaches, short questionnaires, and endorsement from legitimising professional associations were likely to be effective in improving response.

There is little in the literature about improving response rates to surveys in the veterinary profession. A survey of health and occupational factors among female veterinarians in the US yielded a high response rate (90 percent) using a self-administered mailed questionnaire followed by telephone interview of those who failed to respond by mail (Wilkins and others 1997). The authors concluded that conventional survey techniques may be successfully employed in health studies of health professionals, particularly if issues of great concern to the target population are addressed. A longitudinal study of mental health in US veterinary students achieved high response rates (the two data collection periods yielded 90 percent and 76 percent response rates respectively with a matching rate of participants between the two periods of 88 percent) by designing the protocol to ensure anonymity and ensuring the ability to track students longitudinally through the use of anonymous longitudinal identifiers (Reisbig and others 2007).

Reviews of response rates and non-response bias reported in published articles for questionnaires mailed to physicians (Asch and others 1997, Cummings and others 2001) have shown that while response rates for large sample surveys average around 53 percent, the amount of response bias is minimal. These results suggest that for homogeneous professional groups like physicians, less than optimal response rates may not necessarily mean excessive levels of response bias (Cull and others 2005).

Levine and others (2003) emphasised the importance of conducting anonymous assessments of medical students, particularly when assessing sensitive psychological states, in order to improve response rates and reduce the number of responses omitted or intentionally misrepresented due to mistrust in assurances of confidentiality and fear of repercussions.

3.6 Checklist for developing a questionnaire

Boynton and Greenhalgh (2004) recommend use of the checklist[13] in Table 3.7 to help ensure that no important criteria are overlooked when developing a questionnaire.

Table 3.7: Checklist for developing a questionnaire

Section	Quality criterion
Title	Is it clear and unambiguous? Does it indicate accurately what the study is about? Is it likely to mislead or distress participants?
Introductory letter or information sheet	Does it provide an outline of what the study is about and what the overall purpose of the research is? Does it say how long the questionnaire should take to complete? Does it adequately address issues of anonymity and confidentiality? Does it inform participants that they can ask for help or stop completing the questionnaire at any time without having to give a reason? Does it give clear and accurate contact details of whom to approach for further information? If a postal questionnaire, do participants know what they need to send back?
Overall layout	Is the font size clear and legible to an individual with 6/12 vision? (Retype rather than photocopy if necessary) Are graphics, illustrations and colour used judiciously to provide a clear and professional overall effect? Are the pages numbered clearly and stapled securely? Are there adequate instructions on how to complete each item, with examples where necessary?
Demographic information	Has all information necessary for developing a profile of participants been sought? Are any questions in this section irrelevant, misleading or superfluous? Are any questions offensive or otherwise inappropriate? Will respondents know the answers to the questions?
Measures (main body of questionnaire)	Are the measures valid and reliable? Are any items unnecessary or repetitive? Is the questionnaire of an appropriate length? Could the order of items bias replies or affect participation rates (in general, put sensitive questions towards the end)?
Closing comments	Is there a clear message that the end of the questionnaire has been reached? Have participants been thanked for their co-operation?
Accompanying materials	If the questionnaire is to be returned by post, has a stamped addressed envelope (with return address on it) been included? If an insert (e.g. leaflet), gift (e.g. book token) or honorarium is part of the study protocol, has this been included?

Source: Boynton and Greenhalgh (2004) on bmj.com

[13] Supplementary information provided on bmj.com for Boynton and Greenhalgh (2004). Table C. Checklist for developing a questionnaire. http://www.bmj.com/cgi/content/full/328/7451/1312/DC1 [Accessed 23 Mar 2008]

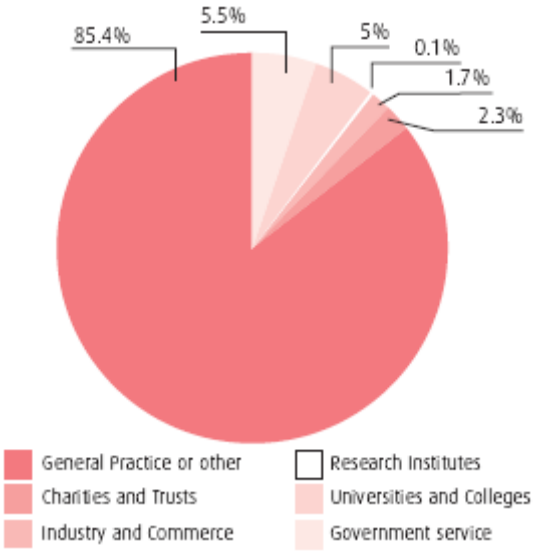
3.7 Sampling frame

3.7.1 Profile of the veterinary profession

There are 15,671 veterinary surgeons practising in the UK (RCVS 2007). The term 'practising' is not limited to those working in general practice or involved in clinical work, but includes members using their professional qualification in any way.

The breakdown by employment type is illustrated in Figure 3.1.

Figure 3.1: Breakdown of veterinary surgeons practising in the UK by employment type



n=15,671
Source: RCVS (2007, p. 27)
Reproduced with permission of the RCVS

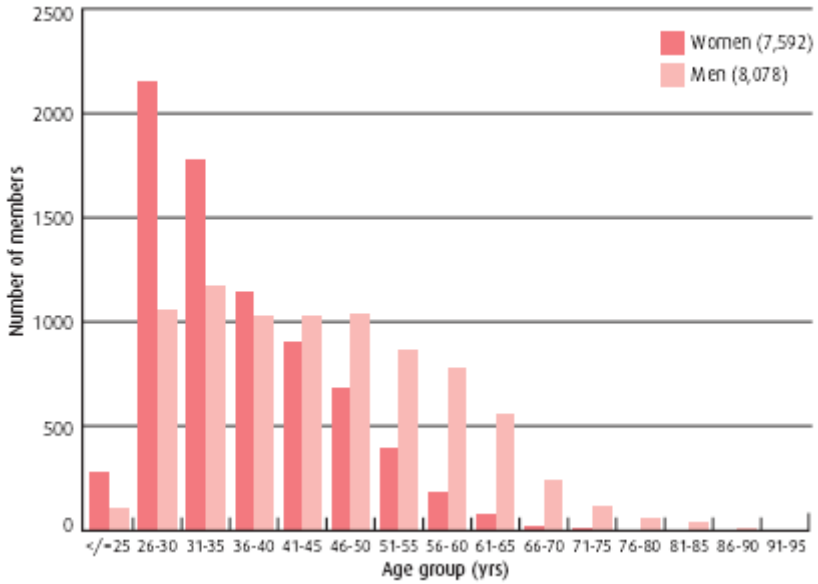
Of the total RCVS membership, over 73 percent have a recognised UK veterinary qualification; the balance graduated overseas.

There are six veterinary schools in the UK – Bristol, Cambridge, Edinburgh, Glasgow, Liverpool, London, and Nottingham[14] – with a total of around 590 graduates obtaining a veterinary degree each year.

[14] The veterinary school at Nottingham University opened in 2006; the first students graduate in 2011.

Fifty-two percent of the veterinary surgeons practising in the UK are male, but the proportion of females entering the profession is increasing considerably (in 2006, 74 percent of UK veterinary graduates and 78 percent of admissions to the first year of the veterinary course were female). The distribution of members by age and gender is illustrated in Figure 3.2.

Figure 3.2: Distribution of veterinary surgeons practising in the UK by age and gender



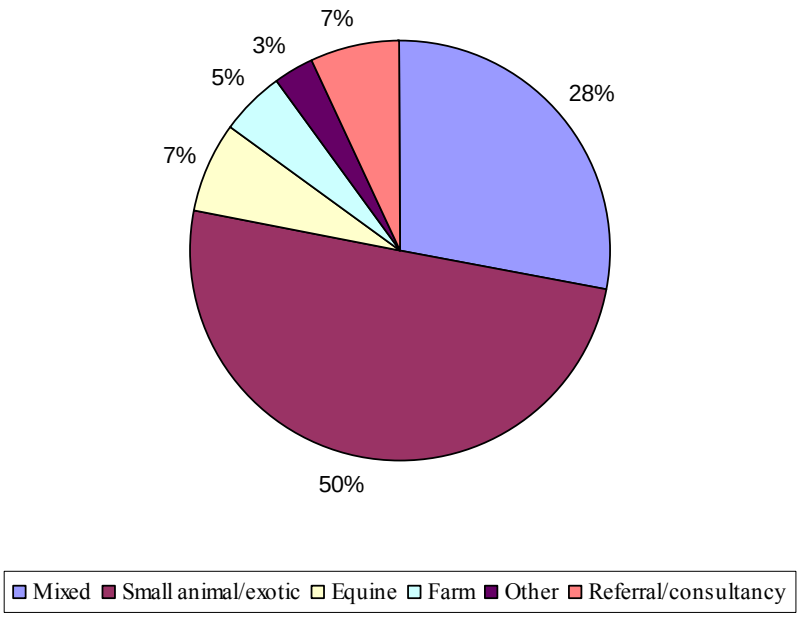
Source: RCVS (2007, p. 31)

Reproduced with permission of the RCVS

Only 1 percent of veterinary surgeons are unemployed (Robinson and Hooker 2006).

For the veterinary surgeons working in general practice, the breakdown by type of work is illustrated in Figure 3.3. There are 3932 veterinary practice premises in the UK (RCVS 2007).

Figure 3.3: Breakdown of veterinary surgeons in general practice in the UK by type of work



n=8607

Source: Robinson and Hooker (2006, p. 16)

3.7.2 Possible sources of sampling frame

A sampling frame is a list of the target population from which a sample can be selected (Aday and Cornelius 2006).

Possible sources of sampling frame for the UK veterinary profession include:

- Royal College of Veterinary Surgeons (RCVS) database of members
- Society of Practising Veterinary Surgeons (SPVS) database of members
- British Veterinary Association (BVA) database of members
- Vetfile® database (owned and maintained by Veterinary Business Development Ltd., Peterborough, part of Wolters Kluwer, a global information services and publishing company)

3.7.3 Selection of sampling frame

The following criteria were used to assess the suitability of possible sampling frames:

- Adequacy: whether it covers the entire population of a unit to be sampled (for example, veterinary surgeons working in private practice) and includes sufficient details to inform selection (segmented by employment type: for example, small animal practice; equine practice; farm animal practice etc.)

- Completeness: whether it includes all units of the population to be sampled (for example, veterinary surgeons working in industry, government or academia, outside private practice)

- Accuracy: the details of each member of the target population must be up-to-date

- Convenience: availability and cost for use

- No duplication: the sampling frame should not include any member of the target population more than once

The Vetfile® database was selected as it is the only sampling frame which fulfils all the criteria (see Table 3.8).

Table 3.8: Assessment of suitability of sources of sampling frame against selection criteria

Source	Adequacy		Completeness	Accuracy	Convenience	No duplication
	Coverage	Segmentation				
RCVS	✓	x	✓	✓	✓	✓
SPVS	x	✓	x	✓	✓	✓
BVA	x	x	✓	✓	✓	✓
Vetfile	✓	✓	✓	✓	✓	✓

CHAPTER 4: MATERIALS AND METHODS

4.0 Introduction

The structure and development of the questionnaire used in this study is described. Existing instruments with known psychometric properties were used when possible. A series of questions relating to work stressors pertinent to the veterinary profession was formulated with input from an informal focus group and refined following pre- and pilot-testing.

Steps were taken to help ensure the well-being of those participating in the study, which included voluntarily submitting details of the study for review by an NHS Research Ethics Committee and incorporating the recommendations.

A copy of the final questionnaire is included in Appendix I.

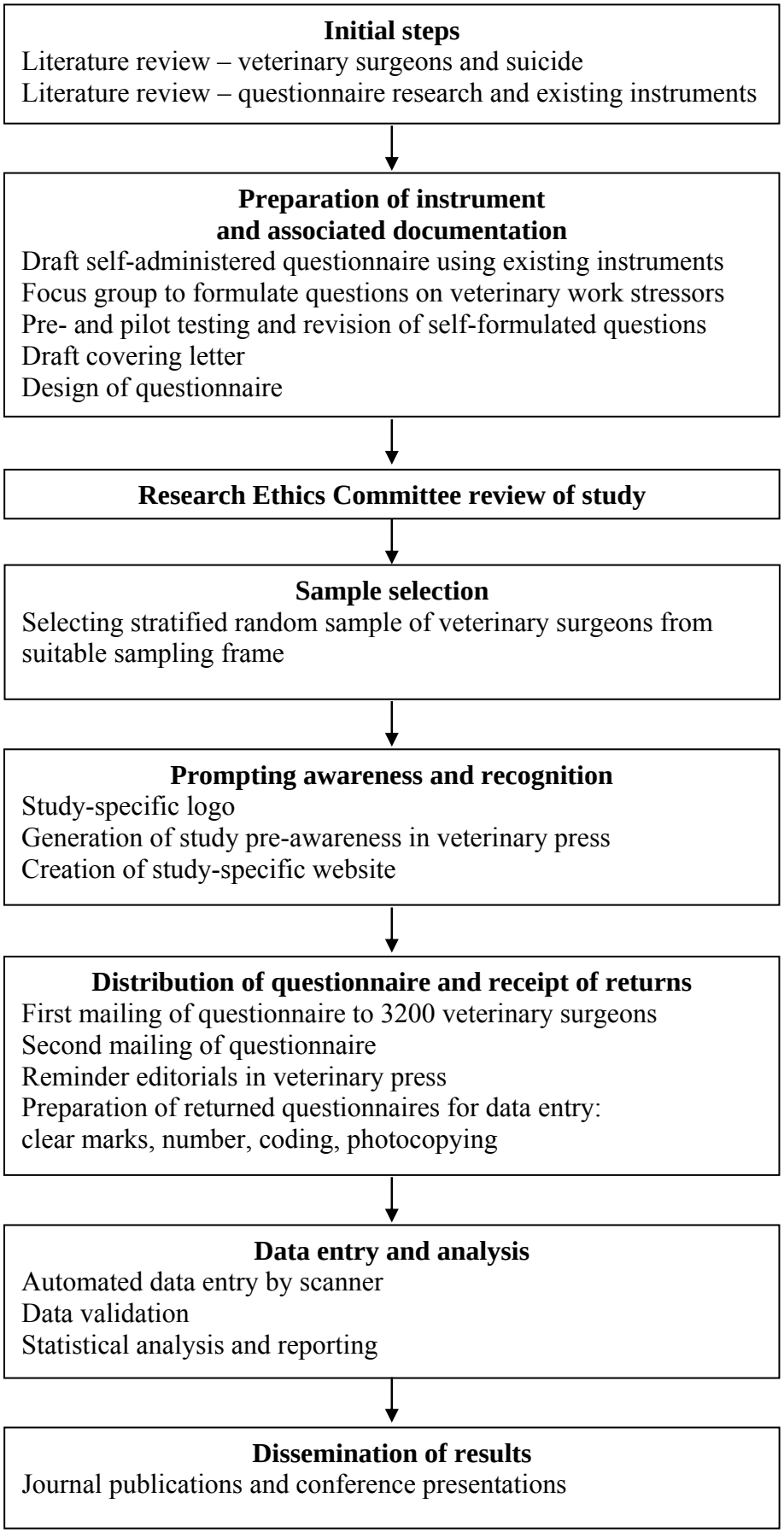
Details of the selection of a stratified random sample of veterinary surgeons and distribution and receipt of questionnaires are supplied.

Initiatives to increase pre-awareness of the study, aid recognition of study-related materials, and remind potential respondents to complete the questionnaire are also described.

The data entry process is outlined and the chapter concludes with details of the methods used for the treatment of missing data and statistical analysis.

The chronological process of the study is illustrated schematically in Figure 4.1.

Figure 4.1: Schematic representation of the chronological process of the study



4.1 Self-administered questionnaire

The questionnaire was divided into eight sections and comprised a total of 120 items. Sections B to G comprised standardised instruments with known psychometric properties. The reasons for their selection are outlined in Section 3.4. No modifications were made to these instruments for the purpose of the study as this could affect their psychometric properties. Some of the questions in Section A and all of the questions in Section H were self-formulated.

The checklist created by Boynton and Greenhalgh (2004) for developing a questionnaire (described in Section 3.6) was used to help ensure that no important aspects were overlooked in the development of the instrument used in this study.

Section A: Demographics

- Gender†
- Age†
- Year of qualification†
- Veterinary school
- Main type of work†
- Current employment status†
- Position in the practice†
- Ownership of practice†
- RCVS Certificate or Diploma holder
- Number of hours worked in a typical week†
- Number of hours on call in a typical week†

† Items and item options sourced from *RCVS Survey of the Profession 2006* (Robinson and Hooker 2006)

SECTION A: DEMOGRAPHICS

1	Gender	○ Male	○ Female	
2	Age (years)		2a Which year did you qualify?	
3	At which veterinary school did you qualify?			
	○ Bristol	○ Overseas (EU or EEA Countries)	○ Liverpool	○ Edinburgh
	○ Cambridge	○ Overseas (Non-EU / EEA Countries)	○ London	○ Glasgow
4	What is your main type of work?			
	○ Small animal practice	○ Farm animal practice	○ Equine practice	○ Mixed practice
	○ Other speciality practice	○ Charity	○ Government	○ University – non-clinical
	○ University – clinical	○ Working outside the veterinary profession	○ Industry	
5	What is your current employment status?			
	○ Full-time	○ Part-time	○ Unemployed	
	○ Taking career break	○ Partially retired	○ Fully retired	
6	What is your position in the practice that you work in?			
	○ Sole principal	○ Partner/director (of limited company)	○ Consultant	○ Other
	○ Partner	○ Full-time assistant (or employee of limited company)	○ Locum	○ Not applicable
	○ Salaried partner	○ Part time assistant (or employee of limited company)		
7	Who owns the practice that you work in?			
	○ Sole principal	○ Partnership	○ Limited company	○ Corporate concern
	○ Charity	○ Other	○ Not applicable	
8	Are you an RCVS Certificate or Diploma holder?	○ Yes	○ No	
9	How many hours do you work in a typical week? [1]		Hours per-week	
10	How many hours on call in a typical week? [2]		Hours on-call per-week	

1 Note: "Hours worked" should be the hours you attend at your practice (including university practice) or place of work during "open hours" (e.g. 8.30am to 7.30pm) when clients can visit the practice or when outside visits are made by appointment. If the practice or place of work is normally "open" during Saturdays or Sundays and you are on duty, include your attendance as hours worked. Please include overtime above your contractual hours.

2 Note: "Hours on call" are the hours that you are required to be available for emergencies. Please include all time "on-call" regardless of how the time is spent. It is important that "on-call" time spent on veterinary or administrative work is not double counted as hours worked.

Section B: Anxiety and depression

- Hospital Anxiety and Depression Scale (HADS) (Zigmond and Snaith 1983)

SECTION B: ANXIETY AND DEPRESSION [i]

Read each item below and choose one response from each of the four options which comes closest to how you have been feeling in the past week. Don't take too long over your replies; your immediate response to each item will probably be more accurate than a long thought-out response.

11	I feel tense or 'wound up':	○ Most of the time	○ A lot of the time	○ From time to time, occasionally	○ Not at all
12	I still enjoy the things I used to enjoy:	○ Definitely as much	○ Not quite so much	○ Only a little	○ Hardly at all
13	I get a sort of frightened feeling as if something awful is about to happen:	○ Very definitely and quite badly	○ Yes, but not too badly	○ A little, but it doesn't worry me	○ Not at all
14	I can laugh and see the funny side of things:	○ As much as I always could	○ Not quite so much now	○ Definitely not so much now	○ Not at all
15	Worrying thoughts go through my mind:	○ A great deal of the time	○ A lot of the time	○ From time to time but not too often	○ Only occasionally
16	I feel cheerful:	○ Not at all	○ Not often	○ Sometimes	○ Most of the time
17	I can sit at ease and feel relaxed:	○ Definitely	○ Usually	○ Not Often	○ Not at all
18	I feel as if I am slowed down:	○ Nearly all the time	○ Very often	○ Sometimes	○ Not at all
19	I get a sort of frightened feeling like 'butterflies' in the stomach:	○ Not at all	○ Occasionally	○ Quite Often	○ Very Often
20	I have lost interest in my appearance:	○ Definitely		○ I don't take as much care as I should	
		○ I may not take quite as much care		○ I take just as much care as ever	
21	I feel restless as if I have to be on the move:	○ Very much indeed	○ Quite a lot	○ Not very much	○ Not at all
22	I look forward with enjoyment to things:	○ As much as I ever did	○ Rather less than I used to	○ Definitely less than I used to	○ Hardly at all
23	I get sudden feelings of panic:	○ Very often indeed	○ Quite often	○ Not very often	○ Not at all
24	I can enjoy a good book or radio or TV programme:	○ Often	○ Sometimes	○ Not often	○ Very seldom

Section C: Alcohol intake

- AUDIT Alcohol Consumption Questions (AUDIT-C) (Bush and others 1998)

SECTION C: ALCOHOL INTAKE

25	How often do you have a drink containing alcohol?	○ Never	○ Monthly or less	○ Two to four times a month	○ Two to three times a week	○ Four or more times a week
26	How many units of alcohol do you have on a typical day when you are drinking? [3]	○ 1 or 2	○ 3 or 4	○ 5 or 6	○ 7 to 9	○ 10 or more
27	How often do you have six or more units on one occasion? [3]	○ Never	○ Less than monthly	○ Monthly	○ Weekly	○ Daily or almost daily

3 Note: A small glass of wine, half a pint of beer or one measure of spirit are each classed as one unit. With some strong beers and ciders, a pint is equivalent to three units or more. A large (175 ml) glass of red or white wine contains over two units of alcohol.

Section D: Negative thoughts about your life

- Suicidal ideation questions from the second National Survey of Psychiatric Morbidity (NSPM) (Singleton and others 2001)

SECTION D: NEGATIVE THOUGHTS ABOUT YOUR LIFE

There may be times in anyone's life when they become miserable and depressed and have negative thoughts about living. Please answer the following questions based on your experience of each over the last 12 months.

28	Have you felt that life was not worth living?	○ Yes	○ No
29	Have you wished that you were dead?	○ Yes	○ No
30	Have you thought of taking your life, even if you would not really do it?	○ Yes	○ No

Section E: Mental well-being

- Warwick-Edinburgh Mental Well-being Scale (WEMWBS) (Tennant and others 2007)

SECTION E: MENTAL WELL-BEING

Below are some statements about your feelings and thoughts. Please select the answer that best describes your experience of each over the last 2 weeks.

		None of the time	Rarely	Some of the time	Often	All of the time
31	I've been feeling optimistic about the future	○	○	○	○	○
32	I've been feeling useful	○	○	○	○	○
33	I've been feeling relaxed	○	○	○	○	○
34	I've been feeling interested in other people	○	○	○	○	○
35	I've had energy to spare	○	○	○	○	○
36	I've been dealing with problems well	○	○	○	○	○
37	I've been thinking clearly	○	○	○	○	○
38	I've been feeling good about myself	○	○	○	○	○
39	I've been feeling close to other people	○	○	○	○	○
40	I've been feeling confident	○	○	○	○	○
41	I've been able to make up my own mind about things	○	○	○	○	○
42	I've been feeling loved	○	○	○	○	○
43	I've been interested in new things	○	○	○	○	○
44	I've been feeling cheerful	○	○	○	○	○

The Warwick-Edinburgh Mental Well-being Scale was funded by the Scottish Executive National Programme for improving mental health and well-being, commissioned by NHS Health Scotland, developed by the University of Warwick and the University of Edinburgh, and is jointly owned by NHS Health Scotland, the University of Warwick and the University of Edinburgh.

Section F: Work-related stress

- Health and Safety Executive Management Standards Indicator Tool (HSE MSIT) (Cousins and others 2004)

SECTION F: WORK-RELATED STRESS *		Never	Seldom	Sometimes	Often	Always
45	I am clear what is expected of me at work	○	○	○	○	○
46	I can decide when to take a break	○	○	○	○	○
47	Different groups at work demand different things from me that are hard to combine	○	○	○	○	○
48	I know how to go about getting my job done	○	○	○	○	○
49	I am subject to personal harassment in the form of unkind words or behaviour	○	○	○	○	○
50	I have unachievable deadlines	○	○	○	○	○
51	If work gets difficult, my colleagues will help me	○	○	○	○	○
52	I am given supportive feedback on the work I do	○	○	○	○	○
53	I have to work very intensively	○	○	○	○	○
54	I have a say in my own work speed	○	○	○	○	○
55	I am clear what my duties and responsibilities are	○	○	○	○	○
56	I have to neglect some tasks because I have too much to do	○	○	○	○	○
57	I am clear about the goals and objectives for my department	○	○	○	○	○
58	There is friction or anger between colleagues	○	○	○	○	○
59	I have a choice in deciding how I do my work	○	○	○	○	○
60	I am unable to take sufficient breaks	○	○	○	○	○
61	I understand how my work fits into the overall aim of the organisation	○	○	○	○	○
62	I am pressured to work long hours	○	○	○	○	○
63	I have a choice in deciding what I do at work	○	○	○	○	○
64	I have to work very fast	○	○	○	○	○
65	I am subject to bullying at work	○	○	○	○	○
66	I have unrealistic time pressures	○	○	○	○	○
67	I can rely on my line manager to help me out with a work problem	○	○	○	○	○
		Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
68	I get help and support I need from colleagues	○	○	○	○	○
69	I have some say over the way I work	○	○	○	○	○
70	I have sufficient opportunity to question managers about change at work	○	○	○	○	○
71	I receive the respect at work I deserve from my colleagues	○	○	○	○	○
72	Staff are always consulted about change at work	○	○	○	○	○
73	I can talk to my line manager about something that has upset or annoyed me about work	○	○	○	○	○
74	My working time can be flexible	○	○	○	○	○
75	My colleagues are willing to listen to my work-related problems	○	○	○	○	○
76	When changes are made at work, I am clear how they will work out in practice	○	○	○	○	○
77	I am supported through emotionally demanding work	○	○	○	○	○
78	Relationships at work are strained	○	○	○	○	○
79	My line manager encourages me at work	○	○	○	○	○

Section G: Work-home interaction

- Survey Work-home Interaction – Nijmegen Scale (SWING). Positive and negative work-home interaction sub-scales (Geurts and others 2005).

SECTION G: WORK-HOME INTERACTION [xi]		Never	Sometimes	Often	Always
80	You are irritable at home because your work is demanding	○	○	○	○
81	You find it difficult to fulfil your domestic obligations because you are constantly thinking about work	○	○	○	○
82	You have to cancel appointments with your spouse/family/friends due to work-related commitments	○	○	○	○
83	Your work schedule makes it difficult for you to fulfil your domestic obligations	○	○	○	○
84	You do not have the energy to engage in leisure activities with your spouse/family/friends because of your job	○	○	○	○
85	You have to work so hard that you do not have time for any of your hobbies	○	○	○	○
86	Your work obligations make it difficult for you to feel relaxed at home	○	○	○	○
87	Your work takes up time that you would have liked to spend with your spouse/family/friends	○	○	○	○
88	After a pleasant working day/working week, you feel more in the mood to engage in activities with your spouse/family/friends	○	○	○	○
89	You fulfil your domestic obligations better because of the things you have learned on your job	○	○	○	○
90	You are better able to keep appointments at home because your job requires this as well	○	○	○	○
91	You manage your time at home more efficiently as a result of the way you do your job	○	○	○	○
92	You are better able to interact with your spouse/family/friends as a result of the things you have learned at work	○	○	○	○

Section H: How much does each of the following contribute to the stress you feel?

- The process for developing these questions is outlined in Section 4.1.2.

SECTION H: HOW MUCH DOES EACH OF THE FOLLOWING CONTRIBUTE TO THE STRESS YOU FEEL?						
PERSONAL		Not at all	Not very much	Moderate	Quite a lot	Very much
93	Personal relationships outside work	○	○	○	○	○
94	Managing my finances	○	○	○	○	○
95	Any addictive behaviours such as gambling, alcohol or drugs	○	○	○	○	○
GENERAL WORK-RELATED						
96	Number of hours worked	○	○	○	○	○
97	Workplace relationships	○	○	○	○	○
98	Availability of suitable employment	○	○	○	○	○
99	Keeping up personal levels of skills or expertise, including CPD	○	○	○	○	○
100	Making professional mistakes	○	○	○	○	○
101	Administrative and clerical tasks	○	○	○	○	○
102	The financial expectations of the organisation	○	○	○	○	○
103	Non-financial business management such as staff-related matters, health and safety, practice accreditation	○	○	○	○	○
104	Physical demands of work such as moving or handling animals or equipment, standing for long stretches of time, or risk of personal injury	○	○	○	○	○
105	Communication with clients	○	○	○	○	○
106	Client expectations	○	○	○	○	○
107	Availability of professional support	○	○	○	○	○
108	Work-related travelling	○	○	○	○	○
If you treat clinical cases, please answer Questions 109 to 119. Otherwise please go to Question 120.						
CLINICAL WORK-RELATED						
109	After hours on call duties	○	○	○	○	○
110	Euthanasia of animals	○	○	○	○	○
111	Being responsible for animals' lives	○	○	○	○	○
112	Times when you have sole charge	○	○	○	○	○
113	Clinical decision-making	○	○	○	○	○
114	Resources available to you such as equipment, range of medicines and diagnostic tests	○	○	○	○	○
115	Time available for each case	○	○	○	○	○
116	Dealing with client grief	○	○	○	○	○
117	The possibility of client complaints or litigation	○	○	○	○	○
118	Unexpected clinical outcomes	○	○	○	○	○
119	My understanding of legal and RCVS membership responsibilities such as prescribing, confidentiality or certification	○	○	○	○	○

120 Which three aspects of your job are the greatest sources of pleasure and/or satisfaction? (in decreasing order of importance)
Please PRINT. DO NOT write anything in the boxes.

1. _____ ☐☐ 2. _____ ☐☐ 3. _____ ☐☐

A statement was included at the start of the questionnaire to inform potential respondents that by returning the completed questionnaire, they are giving their consent to the use of the information supplied, together with an assurance that individual data will not be identifiable:

IMPORTANT NOTES

1. All responses are anonymous.
2. Participation is voluntary: you can decide not to return the questionnaire or omit answers to any particular questions if you choose.
3. By returning the completed questionnaire, you are giving consent to the use of the information supplied.
4. Please provide completely open and honest answers and shade the one circle per question which most accurately reflects your own opinion using a BLUE or BLACK ball-point, like this ● .
5. If you make a mistake, cross through the answer you DO NOT want ⊗ and make your selection as before.
6. Although some questions are similar, there are differences between them and you should treat each one as a separate question.

Respondents were invited to supply their contact details if they were willing in principle to be considered to participate in a possible subsequent phase of the research, beyond the scope of the current study:

A possible subsequent phase of this research may comprise confidential interviews of selected individuals to further explore their positive or negative experiences of mental health and well-being. If you are in principle willing to be considered to participate, please PRINT your details below :

for office use only

Initials _____ Surname _____ Contact telephone number _____

Please note that your questionnaire responses will no longer be anonymous. However, strict confidentiality is assured.

A minority of participants may become distressed immediately after participation in psychiatric research but there appear to be no long-term adverse effects; positive reactions to participation are more common than negative reactions (Jorm and others 2007). The following debriefing statement was included at the end of the questionnaire inviting respondents whose participation may have raised concerns about their well-being to contact specified support agencies:

THANK YOU FOR YOUR PARTICIPATION IN THIS RESEARCH

We have tried to ensure that the questions in this survey do not cause distress to you. However, if completion of the questionnaire has raised any upsetting concerns about your well-being, you may wish to discuss these concerns with your GP or other healthcare professional, Vet Helpline (Tel: 07659 811 118) or Samaritans (Tel: 08457 909 090, www.samaritans.org.uk).

NOW PLEASE RETURN THE COMPLETED QUESTIONNAIRE IN THE REPLY-PAID ENVELOPE PROVIDED

4.1.2 Development of questions on veterinary work-related stressors

The first draft of the Section H questions was inspired by item options[15] from the questionnaire used in a study to investigate sources of work-related stress in the veterinary profession in New Zealand (Gardner and Hini 2006). After seeking approval from the Veterinary Council of New Zealand, a co-sponsor of the study, a copy of the questionnaire used was obtained from the first author of the publication.[16]

The questions were used as the basis for discussion in an informal focus group of 5 veterinary surgeons working in general practice in the UK. Additional sources of work-related stress were identified and the questions were revised and pre-tested within the same informal focus group. After feedback was incorporated, the draft version of Section H of the questionnaire was then pilot-tested by e-mail with a convenience sample of 16 veterinary surgeons who had not participated in the previous informal focus group.

Veterinary surgeons participating in the pilot-test were asked to consider at least the following quality control questions for each of the items in the draft version of Section H:

- Is the question one which can be easily answered based on your experience?
- Is the question simple enough and sufficiently well defined that all respondents are likely to interpret it in the same way?
- Does the question contain any words or phrases which could bias respondents to answer one way or another?
- Is the question relevant to you in the context of stressors in veterinary work?
- Do these questions provide comprehensive coverage of the main stressors?

---

[15] Survey of factors affecting stress in veterinarians. Question: 14. The following is a list of personal factors that may contribute to the amount of stress you feel. Please indicate how much each of these factors affect how stressed you feel: Personal/family relationships; My personal health; My family's health; Family needs; Self-esteem; Debt/Student loans; Disposable income; Managing my finances; Any addictive behaviours (such as gambling, alcohol, drugs etc); Not meeting my own expectations; Unavailability of suitable employment.

[16] Dr. Dianne H. Gardner, School of Psychology, Massey University, Auckland, New Zealand

All suggested amendments were considered, and the content of Section H was revised.

Revisions included the following:

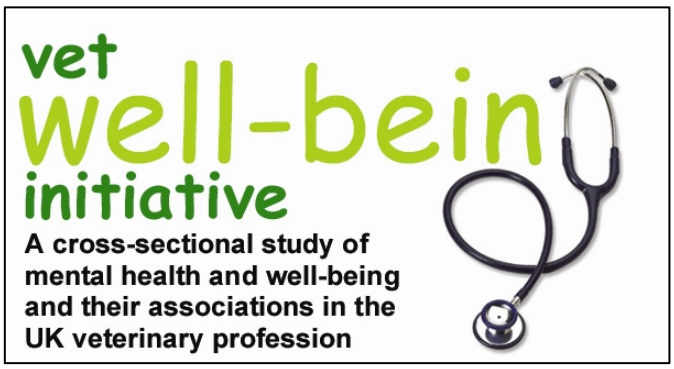
- Standing for long periods was added as an example of a physical demand
- Work-related travelling, non-financial business management, and dealing with client grief were incorporated as additional possible stressors
- Wording of some questions was amended to reduce possible response bias. For example: 'long working hours' was changed to 'number of hours worked'; 'lack of availability of professional support' was abbreviated to 'availability of professional support'

The final version comprised a series of 27 items (a domain of 9 items referred to clinical work and were only for completion by respondents to whom this domain was relevant). Respondents scored on a 5-point Likert scale (0-4; from '*not at all'* to '*very much'*) how much each item contributed to the stress they experienced.

4.2 Study logo

In order to facilitate recognition of study-related documentation by participating veterinary surgeons, a logo was designed (Figure 4.2) to be printed on the envelope for mailing study-related materials to veterinary surgeons in the study sample, the letterhead of the covering letter and the questionnaire.

Figure 4.2: Vet well-being initiative logo



4.3 Covering letters

An explanatory letter was drafted for mailing with the questionnaire to veterinary surgeons selected for participation in the study. The letter included the following content:

- Outline of study and purpose of research
- How long the questionnaire should take to complete
- Assurances regarding anonymity and confidentiality
- Statement to inform participants that participation is voluntary
- Details of whom to approach for further information
- Deadline for returning the completed questionnaire
- Encouragement to participate regardless of any past or present experience of stress or mental health problems

A second version of the letter was drafted for the follow-up mailing of the questionnaire.

Copies of both versions of the letter are included in Appendix II.

4.4 Design of questionnaire

A draft layout of the questionnaire was developed in Microsoft® Word (Version 2002) and supplied to Data Management, Information and Computing, School of Medicine, University of Southampton. The draft was used as a template to design the questionnaire in TeleForm® (Verity Inc., Sunnyvale, CA) software to enable automated data entry using an electronic optical reading system with related software to scan the returned questionnaires.

The questionnaire was designed for printing as a double-sided A3-size document to be single folded to A4-size to create a two-page, four-side, A4 final document.

4.5 Research ethics approval of study

The principal ethical concerns for this study were the response burden of a 120-item questionnaire and the potential impact of the sensitive nature of the questions on respondent mental health and well-being.

The purpose of a Research Ethics Committee in reviewing the proposed study is to protect the dignity, rights, safety, and well-being of actual or potential research participants.[17]

The study had no connection with National Health Service (NHS) patients, premises or staff and was therefore outside the remit of the Governance Arrangements for NHS Research Ethics Committees (GAfREC) paragraph 3.1 and did not require ethical review by an NHS Research Ethics Committee.

However, GAfREC paragraph 3.2 allows applicants to apply for a review of the research ethics on a voluntary basis.

The study was reviewed on this basis by Southampton and South West Hampshire Research Ethics Committee (B) in August 2007. The Committee gave a 'favourable ethical opinion' of the research (REC reference number: 07/H0504/122). A number of minor amendments to the study documentation were suggested by the Committee and the study documentation was amended accordingly.

Amendments included: rewording the covering letter to make it less coercive; removing the researcher's (DJB) personal telephone number from the covering letter and questionnaire for his safety; deleting the word 'entirely' from a proposed statement in the Important Notes section of the questionnaire asserting 'All responses are entirely anonymous', as it may have been possible to identify some respondents from their demographic data; emphasis in the covering letter that participation is

[17] Governance Arrangements for NHS Research Ethics Committees, July 2001, paragraph 2.2. London, Department of Health. p. 6

voluntary; and checking arrangements for insurance to meet the potential legal liability arising from harm to participants.

4.6 Sample size

The survey was conducted using a sample comprising 3200 practising veterinary surgeons in the UK. This number represents approximately 20% of the RCVS membership, excluding those who are practising overseas or retired (RCVS 2007). Calculation of the required sample size is complicated by a lack of knowledge on which to base estimates of the prevalence of the multiple parameters to be measured and the intention to compare multiple sub-populations within the sample.

Assuming an estimated response rate of 50% (1600 completed questionnaires), point estimates of prevalence ranging from 5 percent to 50 percent would have confidence intervals (CIs) of ± 1.07 to ± 2.45 respectively at 95 percent confidence level.[18] This level of precision was considered acceptable.

4.7 Selecting a stratified random sample of veterinary surgeons

The Vetfile® database used as the sampling frame (Sections 3.6.2 and 3.6.3) includes details of the type of work performed for each of the veterinary surgeons listed. It is therefore possible to identify a sample of veterinary surgeons, stratified by type of work with proportions of each type of work that are representative of the wider population of veterinary surgeons practising in the UK. Veterinary surgeons included in the Vetfile® database were grouped according to type of work. The work-type groupings within the database differ from those identified in the *RCVS Annual Report 2007* (RCVS 2007) and the *RCVS Survey of the Veterinary Profession 2006* (Robinson and Hooker 2006). The differences and the treatment of differences in order to develop the stratified sample are specified in Table 4.1.

[18] 95% CI width= $1.96 \times \sqrt{p \times (100 - p)/n}$
n= number of observations, i.e. number of completed questionnaires; p= proportion

Table 4.1: Differences between published and Vetfile® database work-type groupings and their treatment to develop a stratified sample

Difference	Treatment
Database includes an additional category which includes veterinary surgeons working in combined small animal and equine practice	This category was incorporated into the 'Mixed' work-type of general practice
Database does not specifically identify individuals working in 'Referral/consultancy' or 'Other' but includes them in the other categories	The percentage of individuals working in these categories determined from the published sources was allocated across the other groups in proportion to the size of each of the other groups
Database identifies individuals working as a 'Locum' but does not include details of the type of work that each performs in general practice	6 percent of the number of individuals in the sample working in general practice were selected from the 'Locum' work-type grouping of the database

Details of the structure of the stratified sample are specified in Table 4.2.

Table 4.2: Use of published sources of the proportions of veterinary surgeons in different types of work to stratify the random sample selected from the Vetfile® database

Type of work	Type of work† (%)	Type of general practice‡ (%)	Number of vets in random sample
General practice	85		
Mixed*		28	795
Small animal/exotic		50	1421
Equine		7	199
Farm		5	142
Referral/consultancy**		7	
Other**		3	
Locum		6§	163
Charities/Trusts	2		64
Industry/Commerce	2		64
Universities/Colleges	5		160
Government	6		192
Total	**100**		**3200**

† Source: RCVS (2007)

‡ Source: Robinson and Hooker (2006)

* Mixed includes the Vetfile® category which contains veterinary surgeons involved with both small animal and equine work

** These categories are included in the other general practice categories of the Vetfile® database

§ Locums comprise 6 percent of veterinary surgeons in general practice and work across all the sub-types of general practice work. Consequently this column does not add to 100 percent

When the number of individuals required in each work-type ('stratum') was calculated, individuals were selected from the database at random within each work-type by selecting or rejecting them at appropriate predetermined intervals and then repeating the process on those remaining within that work-type until the required number was obtained (systematic random sampling).

The gender and decade of qualification profile of the entire study cohort was compared with RCVS membership data for veterinary surgeons practising in the UK (RCVS 2007) to check the degree of representativeness of the sample.

4.8 Generation of pre-study awareness

The following editorials were published in the veterinary press to generate pre-study awareness among potential respondents as such pre-notification has been demonstrated to improve response rates (See Section 3.4 Maximising response rates to postal questionnaires):

- Letter to the Editor, *Veterinary Record*
  (Vol 161, No 10, 8 September 2007, p. 360) (Bartram and Baldwin 2007)

- Editorial in *Veterinary Times*[19]
  (Vol 37, No 36, 24 September 2007, p. 30)

- Editorial in *UK Vet Livestock*
  (Vol 12, No 6, October 2007, p. 32)

Copies of the above items are included in Appendix III.

[19] *Veterinary Times* is a weekly news journal mailed free-of-charge to all veterinary surgeons practising in the UK, including all those whose names and addresses are in the Vetfile® database. It is published by Veterinary Business Development Ltd., Peterborough, which owns and maintains the Vetfile® database.

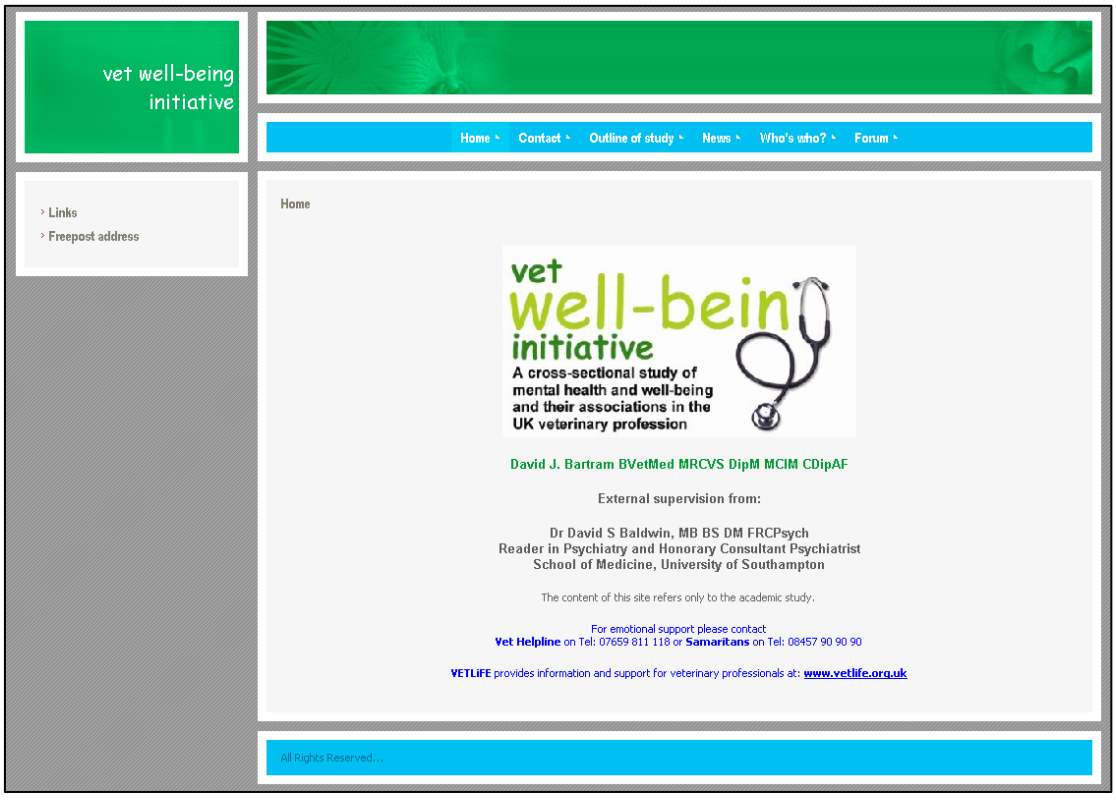
4.9 Creation of study-specific website and e-mail address

The domain name vetwellbeing.co.uk was registered and a 10-page website created with hosting provided by 123-reg.co.uk.

The purpose of the website was to provide study-related information and updates to study participants and other interested parties. The website address was included in pre-study awareness editorials and letterheads.

The home page of the website is illustrated in Figure 4.3.

Figure 4.3: Home page of www.vetwellbeing.co.uk website



A dedicated e-mail address (vetwellbeing@btinternet.com) was established for study-related correspondence with study participants and any other interested parties.

4.10 Distribution of questionnaires

A questionnaire, covering letter and reply-paid envelope was mailed to the sample of 3200 veterinary surgeons by second-class post in mid-October 2007.

A second letter with identical enclosures was mailed to the entire sample three weeks later (in November 2007) as a reminder to those who had not already responded, inviting them to return the completed questionnaire by the end of November. This follow-up mailing was sent to all veterinary surgeons in the sample as it was not possible to identify those who had already responded anonymously.

4.11 Reminder editorials in the veterinary press

The following editorials were published in the veterinary press after the mailing of questionnaires to remind those who had not already responded to return the completed questionnaire.

- Letter in *Veterinary Times*
  (Vol 37, No 44, 19 November 2007, p. 35)

- Editorial in *UK Vet Companion Animal*
  (Vol 12, No 8, November 2007, p. 55)

- Letter in *Veterinary Times*
  (Vol 37, No 48, 17 December 2007, p. 26)

Copies of the above items are included in Appendix IV.

4.12 Receipt and preparation of returned questionnaires prior to data entry

Questionnaires were returned in reply-paid envelopes to Veterinary Business Development Ltd., Peterborough, where they were stored unopened and then forwarded in batches to the author (DJB) for processing.

The covering letter sent with each of the two mailings of the questionnaire requested that the completed questionnaire was returned by the end of November 2007. The deadline was extended to the end of December 2007 in a reminder letter published in

Veterinary Times in mid-December (see Section 4.11) but all questionnaires returned by mid-March, before the completion of data entry, were eligible for inclusion.

The returned questionnaires were manually checked for completeness. If the respondent's intended response to an item was unambiguous but not recorded according to the instructions, in a manner suitable for recognition by the optical scanner during automated data entry, the entry was amended accordingly. For example: a number of respondents did not complete the questionnaire in blue- or black-coloured ink; responses were marked with a tick in or next to the circle rather than shaded; responses were incompletely shaded or merely marked with a dot in the circle. If there was any doubt whatsoever about a respondent's intended response then the entry was not altered.

For the first 300 returned questionnaires received, the free-text responses to question number 120 – *Which three aspects of your job are the greatest sources of pleasure and/or satisfaction?* – were copied verbatim into an Excel® spreadsheet. The content of the responses was examined and grouped according to themes which were then used to inform the development of a coding frame to describe the thematic content. The coding frame was used to allocate to each of the free-text responses a numeric identification code which was handwritten on the questionnaire in the appropriate place for automated optical recognition, next to the corresponding free-text entries. A copy of the coding frame with examples of the free-text responses allocated to each code is included in Appendix V.

The names and contact details of those respondents who reported their willingness in principle to be considered for participation in a possible subsequent phase of the research were entered into a separate Excel spreadsheet. A unique numeric identification code was allocated to each of these respondents and the code was handwritten on the questionnaire in the appropriate place for automated optical recognition, next to the corresponding free-text entry of contact details.

Late respondents can be used as a proxy for non-respondents in estimating non-response bias in surveys (Groves 2006). Consequently questionnaires received from mid-December were allocated a code to identify them as originating from late

respondents in order that statistical assessment could be made of whether the response profile of this sub-population of respondents was different from earlier respondents.

A unique identification number was handwritten on the top of all returned questionnaires. Questionnaires were then photocopied. The copies were placed in archive boxes for safe storage and the originals were supplied to Data Management, Information and Computing, School of Medicine, University of Southampton for automated data entry.

Questionnaires received after completion of data entry and closure of the dataset for earlier responses (mid-March 2008) were not processed (*n*=3, see Table 5.1).

4.13 Automated data entry

Questionnaires were scanned using a Fujitsu fi-5650c document scanner and associated TeleForm (Verity Inc., Sunnyvale, CA) software. The system includes an automated quality control facility which highlights the illegible and invalid entries for operator attention and verification. The dataset was created in Microsoft Excel® (Microsoft Corporation) and Statistical Package for the Social Sciences (SPSS®) version 16.0 for Windows (SPSS Inc.) formats for statistical analysis. The dataset was validated by checking entries against a random sample of questionnaires and reviewing descriptive statistics and graphical display of key variables.

4.14 Scoring of scales and treatment of missing data in study questionnaire

The direction of scale varies between questions within Sections B and F (HADS and HSE MSIT respectively). Direction of scale refers to whether the response options to a particular question are scored in the direction of, for example, from 0 to 3 or in the reverse direction, from 3 to 0, as the response options are read from left to right across the page so that, for all questions within a section of the questionnaire, 0 always represents the least severe response and 3 always represents the most severe response. Care was taken to ensure the response options recorded in the dataset were scored in the appropriate direction for each question.

Missing data occur in cross-sectional studies when a respondent accidentally or deliberately omits to respond to an item in a questionnaire (item non-response). In this study, respondents were advised that participation was voluntary and that they could choose to omit answers to any questions. Missing data are problematic because incomplete datasets may lead to results that are different from those that would have been obtained if the dataset was complete. Missing values can be replaced by imputation using the technique which best minimises these differences. Alternatively, cases with missing data can be deleted from the analysis, but this reduces the sample size. There is a wealth of missing data techniques available to researchers (reviewed by Abraham and Russell 2004). Hawthorne and Elliott (2005) examined several procedures for handling missing data in the context of research in psychiatry and advocated the technique of person mean substitution (whereby the imputed value for a variable with missing data is derived from the non-missing items for that person) when data are missing from instrument scales, if at least half the items of a scale are present.

The 'randomness' of missing data was checked to ensure that certain items were not being systematically missed by respondents or certain demographic groups of respondents.

Section A: Demographics (Q1-Q10)

These questions were not scored. No missing data were imputed, except for Q10: *How many hours on call in a typical week?* A value of zero hours was assigned if the field was left blank.

Section B: Anxiety and depression (Q11-Q24)

Hospital Anxiety and Depression Scale (HADS) (Zigmond and Snaith 1983)

Each question scores 0 to 3. There are two sub-scales: anxiety (HADS-A) and depression (HADS-D). The score for each sub-scale is calculated by summation of the scores of the component questions. There is a maximum score of 21 for each of the two sub-scales.

HADS-A comprises 7 questions: 11, 13, 15, 17, 19, 21, 23.

HADS-D comprises 7 questions: 12, 14, 16, 18, 20, 22, 24.

If a score for a single item within a sub-scale was missing then this was substituted by imputation using the mean of the remaining six items. If more than one item from a sub-scale was missing then the sub-scale was judged as invalid and the case was not included in the analysis. This is a more conservative approach to missing data than is advocated in a number of recent publications where missing values were estimated by assuming that the missing item(s) had a value equal to the average of those in existence (person mean substitution), provided that no more than two (Kleppa and others 2008, Stordal and others 2008) or three items (Jörngården and others 2006) of a HADS sub-scale were missing. There is less likelihood of a significant *p*-value with the more conservative approach because fewer cases are included in the analysis (*n* is lower than if cases with >1 missing value were also included) and there is less attenuation of dispersion (measures of variance, such as SD, are likely to be higher than if cases with >1 missing value were also included as each of these cases would have >1 missing value replaced by the mean of the non-missing values).

The score for each sub-scale was interpreted as follows, as recommended by Snaith (2003): Non-case: score 0 to 7; Possible case: score 8 to 10; Probable case: ≥ 11.

Section C: Alcohol intake (Q25-Q27)

AUDIT alcohol consumption questions (AUDIT-C) (Bush and others 1998)

Each question scores 0 to 4. The scores for each question are summated to give a single summary score for alcohol intake with a maximum score of 12.

The summary score is interpreted as follows, as recommended by Gual and others (2002): Non-drinkers: score 0; Low-risk drinkers: score 1 to 3 for women and 1 to 4 for men; At-risk drinkers: score ≥ 4 for women and ≥ 5 for men.

AUDIT-C screens for hazardous drinking or active alcohol abuse or dependence (Bush and others 1998). 'At-risk' drinkers have an increased risk of: harmful consequences for their physical and mental health; and dependence. The cut-off values of AUDIT-C score chosen for the diagnosis of at-risk drinkers in this study correspond to the optimal operating point in terms of sensitivity and specificity for men and women (Gual and others 2002, Rumpf and others 2002, Bradley and others 2003).

If Q25 was answered 'never' (score 0), a score of 0 was substituted for any missing response(s) to Q26 and/or Q27. Otherwise, if an item from the scale was missing, the scale was judged as invalid and the case was excluded from the analysis.

Section D: Negative thoughts about your life (Q28-Q30)

These questions were not scored. No missing data were imputed.

Section E: Mental well-being (Q31-Q44)

Warwick-Edinburgh Mental Well-being Scale (WEMWBS) (Tennant and others 2007)

Each of the 14 questions scores 1 to 5. The scores for each question were summated to give a single summary score for mental well-being with a maximum score of 70 and a minimum score 14.

For up to 3 missing responses, the missing scores were imputed using the mean of the remaining items. If more than 3 of the 14 possible responses were missing, the scale was judged as invalid for that individual and the case was excluded from the analysis. There was no reference in the literature at the time of data analysis to the handling of missing data in WEMWBS but the above approach was endorsed by two leading members of the team that developed the scale (S. Platt, personal communication; S. Stewart-Brown, personal communication)[20, 21] and has become the preferred method

[20] Professor Stephen Platt, Research Unit in Health, Behaviour and Change, University of Edinburgh. 04 Jan 2008 [E-mail]

for the treatment of missing values in WEMWBS (Stewart-Brown and Janmohamed 2008).

Section F: Work-related stress (Q45-Q79)

Health and Safety Executive Management Standards Indicator Tool (Cousins and others 2004).

The questions are grouped into the following seven stressor domains: *demands*, *control*, *managerial support*, *peer support*, *relationships*, *role*, and *change*.

Stressor domain	Question number in study questionnaire
Demands	47, 50, 53, 56, 60, 62, 64, 66
Control	46, 54, 59, 63, 69, 74
Managerial support	52, 67, 73, 77, 79
Peer support	51, 68, 71, 75
Relationships	49, 58, 65, 78
Role	45, 48, 55, 57, 61
Change	70, 72, 76

Each question scores 1 to 5. Across all domains, 1 always represents the most unfavourable working conditions (most risk of stress at work); 5 always represents the most favourable working conditions (least risk of stress at work).

The overall score for each of the seven stressor domain scales was calculated for each respondent by adding the item scores for each question answered in that scale and dividing by the total number of questions answered in that scale. In this way a mean score standardised to a range between 1 and 5 was derived for each of the seven stress component domain scales. This has the effect of standardisation of scale scores regardless of the number of items in the scale and treating missing items as being the equivalent of the mean of other items in the scale for that individual respondent.

[21] Professor Sarah Stewart-Brown, Chair of Public Health, Warwick Medical School, University of Warwick. 04 Jan 2008 [E-mail]

A domain scale was treated as invalid for an individual if fewer than the following number of questions was answered in a given domain, i.e. 66 percent of questions per domain:

Stress domain	Minimum number of questions answered for domain scale to be treated as valid
Demands	6 of a possible 8
Control	4 of a possible 6
Managerial support	4 of a possible 5
Peer support	3 of a possible 4
Relationships	3 of a possible 4
Role	4 of a possible 5
Change	2 of a possible 3

That is, a domain was considered invalid for a respondent if two or more responses were missing from that domain, except for *demands* and *control* domains, for which a domain was considered invalid for a respondent if three or more responses were missing from the domain concerned. There is no reference in the extant literature to the handling of missing data in this scale but the above approach was advocated by the lead author of the report – Webster and others (2007) – which provides normative data for this instrument for the UK general population (S. Webster, personal communication).[22]

Section G: Work-home interaction (Q80-Q92)

The scales are derived from the SWING questionnaire (Geurts and others 2005).

This section comprises two separate scales:

negative work-home interaction (WHI_N) (Q80-Q87) and,

positive work-home interaction (WHI_P) (Q88-Q92).

Each question scores 0 to 3.

[22] Simon Webster, Statistician, Health and Safety Executive, Bootle, Merseyside. 17 Jan 2008 [E-mail]

The overall score for each of the two separate scales was calculated for each respondent by summating the item scores for each of the questions answered in that scale and dividing by the total number of questions answered in that scale. In this way a mean score standardised to a range between 0 and 3 was derived for each of the two scales. This had the effect of treating missing items as being the equivalent of the mean of other items in the scale for that individual respondent.

If a respondent answered fewer than 5 out of 8 items in the WHI_N scale, the scale was considered invalid for that individual; if fewer than 3 out of 5 items were answered in the WHI_P scale, the scale was considered invalid for that individual. Cases with scales defined in this way as being invalid were not included in the analysis. There is no reference in the literature to the handling of missing data in these scales but the above approach was advocated by the lead author of the paper – Geurts and others (2005) – in which the scales are first described (S. Geurts, personal communication).[23]

Section H: How much does each of the following contribute to the stress you feel? (Q93-Q119)

Each question scores 0 to 4. No missing data were imputed.

Which three aspects of your job are the greatest sources of pleasure and/or satisfaction? (Q120)

The free-text responses to this open question were coded from 01 to 19 inclusive according to theme using a coding frame (Appendix V). Each respondent could supply up to three responses to this question. No missing data were imputed.

[23] Dr. Sabine Geurts, Associate Professor in Work and Organizational Psychology, Radboud University, Nijmegen, Netherlands. 07 Jan 2008 [E-mail]

4.15 Statistical analysis

Statistical analyses are limited to testing the study hypotheses (Section 1.2) and involve within-sample comparison of outcome measures across a range of demographic and occupational factors, and comparison of estimated study population parameters of mental health and well-being with those for the general population. Examination of associations between measures on different scales and evaluation of the psychometric properties (validity and reliability) of the scales (other than Cronbach's alpha test of internal consistency) is outside the scope of this thesis.

Descriptive statistics including mean, standard deviation (SD), median, interquartile range (IQR) and proportions were used to describe the data. Graphical illustration, cross tabulation and frequency tables were also applied. Histograms were plotted to estimate the normality of distribution of study variables. Differences among groups were explored using *t*-test and one-way analysis of variance (one-way ANOVA) or the non-parametric equivalents, Mann-Whitney *U* and Kruskal-Wallis tests. Chi-square (χ^2) test was employed to compare proportions. To investigate the effect of independent variables on dependent variables, multiple linear regression and logistic regression were applied to continuous and binary outcome variables respectively. 95% confidence intervals (CIs) were computed for odds ratios (ORs) and regression coefficients and other key study variables.

Analysis of the study dataset involved multiple analyses of subgroups of respondents defined by their demographic and occupational characteristics, across several dependent variables to assess the heterogeneity of the results. This increased the likelihood of finding statistically significant associations by chance (Type I error). Over 700 predefined subgroup analyses were planned and consequently over 35 statistically significant interaction tests ($p<0.05$) would be expected on the basis of chance alone. No formal statistical adjustments were made to *p*-values to account for the multiplicity. In view of the potential magnitude of the problem, statistical significance was defined as a *p*-value of <0.01 for interpreting study results, thereby reducing the number of expected false positive differences or associations to seven. Statistical observations between $p=0.010$ and $p=0.049$ were regarded as marginal to

avoid missing potential true differences or associations which did not meet the $p<0.01$ significance threshold. Any such tentative differences or associations identified in this exploratory study should be interpreted cautiously until their veracity has been tested by replication in future studies.

Statistical significance was defined as a *p*-value of <0.05 for comparison of dependent variables with those for the general population and other normative groups as these data were not re-used to test multiple hypotheses.

Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS®) version 16.0 for Windows (SPSS Inc.). Some confidence intervals were computed using Confidence Interval Analysis (CIA) software version 2.1.2.[24]

[24] BRYANT, T.N. (2000) Computer software for calculating confidence intervals (CIA). In *Statistics with confidence*. Eds D.G. Altman, D. Machin, T.N. Bryant, M.J. Gardner. 2nd edition. London, BMJ Publishing Group. pp 208-213 [CIA software accompanies the book and is also available at http://som.soton.ac.uk/cia/]

CHAPTER 5: RESULTS

5.0 Introduction

This chapter begins by reporting the response rate for the study and the demographic and occupational profile of respondents. Reporting of results is structured around the study aims and hypotheses in the following order: outcome measures for the study population; tests for differences across demographic and occupational factors (study hypothesis 1); and comparison with normative data (study hypothesis 2). The chapter ends with analyses to estimate non-response bias.

5.1 Returned questionnaires

5.1.1 Response rate

A total of 1808 questionnaires were returned from the 3200 veterinary surgeons mailed. Twelve of the questionnaires were non-evaluable for the reasons listed in Table 5.1.

Table 5.1: Non-evaluable returns

Reason for exclusion	*n*
Defaced	2
Retired - no questions answered	4
Maternity leave - no questions answered	1
Duplicate - respondent returned two questionnaires[†]	1
'Too depressed to complete' - no questions answered	1
Late - received after scanning was completed	3
Total	12

[†] This respondent completed and returned the questionnaire for both the original and follow-up mailings. This was detected because the respondent had provided name and contact details on both copies in order to be considered to participate in a subsequent phase of the research.

Almost two-thirds of the questionnaires returned were received before the second mailing, i.e. within 3 weeks of the first mailing (see Table 5.2). An overall response rate of 56.1% was achieved (the number of usable returns as a proportion of the

number of questionnaires distributed). This is a crude measure which may underestimate the 'true' response rate as it fails to account for questionnaires that were undelivered due to inaccurate or outdated addresses. However, it is not possible to adjust the response rate accordingly as this information is not available.

Table 5.2: Response rate

	Total mailed	Returned after first mailing		Returned after second mailing		Non-evaluable returns	Number of usable returns	Response rate
	n	*n*	% of total returns	*n*	% of total returns	*n*	*n*	%
Main sample	3200	1132	62.6	676	37.4	12	1796	56.1

A total of 956 of the respondents supplying usable returns provided their contact details as they were willing to be considered for a possible subsequent phase of research involving confidential interviews of selected individuals. This figure represents 53.2 percent of the number of usable returns.

5.1.2 Respondent demographic and occupational profile

Demographic and occupational data for the study respondents is of interest as it can be:

i) compared with RCVS membership demographic and occupational data to judge the extent to which respondents are representative of the wider population of veterinary surgeons practising in the UK, and

ii) used to establish whether there are associations between demographic and occupational factors and measures of mental health and well-being.

5.1.2.1 Age and year of qualification

The age and gender distribution of study respondents is presented in Table 5.3 and is very similar to that for RCVS home-practising members. In total, 50.0 percent of respondents are male (*n*=896); 50.0 percent of respondents are female (*n*=895). The

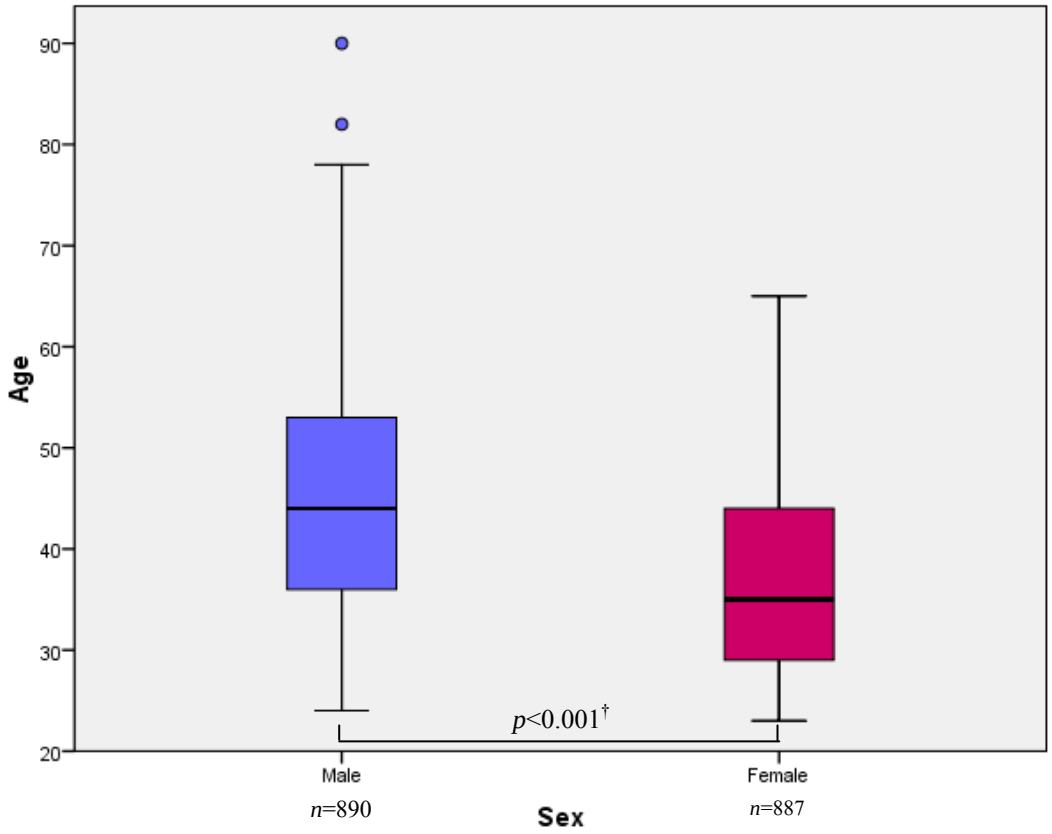
age range of respondents is 23 to 90 years (mean=40.9, SD=11.0; median=40, IQR=32-49) [male respondents (*n*=890): range=24-90, mean=44.9, SD=11.3, median=44, IQR=36-53; female respondents (*n*=887): range=23-65, mean=36.8, SD=9.1, median=35, IQR=29-44]. The age distribution of respondents is displayed as box plots in Figure 5.1.

Table 5.3: Age and gender distribution of study respondents and RCVS home-practising members

	Male		Female		Total		RCVS[§]
Age	*n*	%	*n*	%	*n*	%	%
≤ 25	18	22.2	63	77.7	81	4.6	2.4
26-30	76	26.0	216	73.9	292	16.4	20.4
31-35	127	39.8	192	60.2	319	18.0	18.8
36-40	103	47.0	116	53.0	219	12.3	13.8
41-45	148	53.8	127	46.2	275	15.5	12.3
46-50	136	59.1	94	40.9	230	12.9	11.0
51-55	106	67.1	52	32.9	158	8.9	8.0
56-60	99	81.1	23	18.9	122	6.9	6.1
61-65	55	93.2	4	6.8	59	3.3	4.0
66-70	8	100.0	0	-	8	0.5	1.7
71-75	9	100.0	0	-	9	0.5	0.8
76-80	3	100.0	0	-	3	0.2	0.4
81-85	1	100.0	0	-	1	0.1	0.3
86-90	1	100.0	0	-	1	0.1	0.1
Total	890	50.1	887	49.9	1777	100	-
RCVS[§]	-	51.6	-	48.4	-	-	100

[§] Source: RCVS (2007, p. 31), *n*=15,670

Figure 5.1: Box plots of age distribution of male and female respondents



† *t*(1775)=16.7, p<0.001

Error bars represent the age range of respondents excluding outliers. Circles (•) represent outliers. Outliers are defined as data points >1.5 IQR above the third quartile (i.e. >80 years for males). Age outliers were included in the statistical analysis as RCVS data on the age of home-practising members (Table 5.3) suggest that their values are possible within the target population.

The year of qualification distribution of study respondents is presented in Table 5.4.

Table 5.4: Year of qualification distribution of study respondents

Year of qualification	Male		Female		Total	
	n	%	*n*	%	*n*	%
1940-1949	1	100.0	0	-	1	0.1
1950-1959	9	100.0	0	-	9	0.5
1960-1969	56	93.3	4	6.7	60	3.4
1970-1979	194	72.3	74	27.6	268	15.1
1980-1989	273	59.0	190	41.0	463	26.1
1990-1999	221	44.1	280	69.8	501	28.2
2000-2007	130	27.6	340	72.3	470	26.5

5.1.2.2 Veterinary school of qualification

The veterinary school of qualification distribution of study respondents is presented in Table 5.5. The percentage of overseas graduates for respondents (16.8%) is lower than that for RCVS membership (34%). However, the figure cited for the latter includes members practising overseas, a group which was excluded from the original sample.

Table 5.5: Veterinary school of qualification distribution of study respondents

Veterinary school	n	%	RCVS[†]
Bristol	212	11.8	-
Cambridge	193	10.3	-
Edinburgh	261	14.6	-
Glasgow	248	13.9	-
Liverpool	242	13.5	-
London	334	18.7	-
Overseas (EU or EEA countries)	169	9.4	-
Overseas (Non-EU/EEA countries)	131	7.3	-
Total overseas	300	16.8	34
Total UK	1490	83.2	66

[†] Robinson and Hooker (2006, p. 2) Includes overseas-practising, non-practising, and Republic of Ireland, *n*=21,619

5.1.2.3 Type of work

The type of work distribution of study respondents is presented in Table 5.6. The percentage of respondents in general practice (84.0%) and each other type of work is similar to that for RCVS home-practising members (RCVS 2007). The percentage of respondents in each type of general practice is similar to that determined in the *RCVS Survey of the Profession 2006* (Robinson and Hooker 2006) except that fewer study respondents identified their type of work as mixed practice (12.6% of study respondents vs. 27% of respondents to *RCVS Survey of the Profession 2006*). However, study respondents were asked to identify their 'main type of work' whereas respondents to the *RCVS Survey of the Profession 2006* were asked about the 'type of organisation(s) in which [they] work'. Consequently, study respondents working in mixed practice may have selected farm animal, equine or small animal as their *main type of work* within their mixed practice workload rather than selecting the mixed

practice response option. This would lead to an apparent under-reporting of mixed practice in comparison with the *RCVS Survey of the Profession 2006*.

Table 5.6: Type of work distribution of study respondents and RCVS members

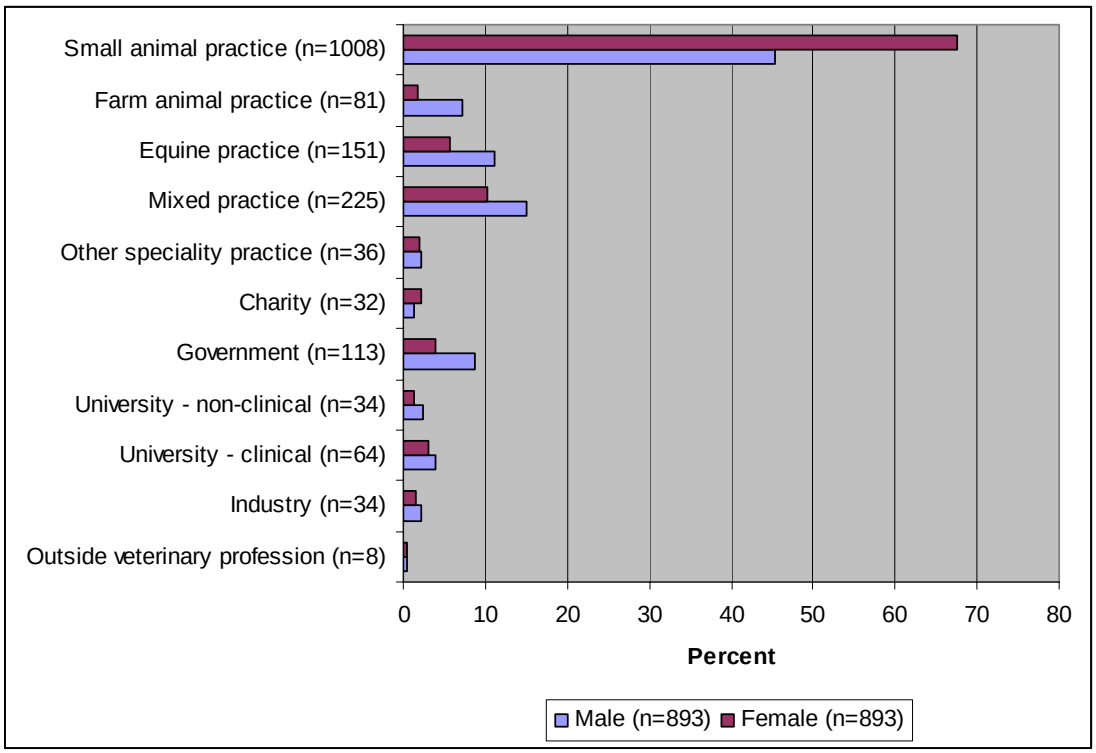
Type of work	*n*	%	RCVS[§]	RCVS[†]
General practice				
Small animal practice	1011	56.4	-	49
Farm animal practice	81	4.5	-	4
Equine practice	151	8.4	-	6
Mixed practice	225	12.6	-	27
Other speciality practice	36	2.0	-	3
Total general practice	1504	84.0	85.4	89
Charity	33	1.8	2.3	-
Government	113	6.3	5.6	-
University – non-clinical	34	1.9	5.0	-
University – clinical	65	3.6		-
Industry	34	1.9	1.7	-
Outside the profession	8	0.4	-	-

[§] Source: RCVS (2007, p. 27), *n*=15,671

[†] Robinson and Hooker (2006, p. 12, p. 16), *n*=9671. The category 'Referral practice/consultancy' (6%) is distributed across each of the other categories of general practice in direct proportion to their percentage contribution to the total for general practice

Figure 5.2 illustrates the type of work distribution for male and female respondents.

Figure 5.2: Type of work distribution of study respondents by gender



The difference in gender distribution across each type of work is significant (χ^2=115.4, df=10, p<0.001)

5.1.2.4 Employment status

The employment status distribution of study respondents is presented in Table 5.7. The relative proportions of each category of employment status are broadly similar for study respondents and RCVS membership. The figures cited for the latter include non-practising members which distort the distribution for RCVS membership in favour of those partially retired or fully retired or taking a career break.

Table 5.7: Employment status distribution of study respondents and RCVS members

Employment status	Male		Female		Total		RCVS[†]
	n	%	*n*	%	*n*	%	%
Full-time	812	90.6	655	73.3	1467	81.6	68
Part-time	60	6.7	223	24.9	283	15.8	14
Unemployed	0	-	1	0.1	1	0.1	1
Taking career break	0	-	9	1.0	9	0.5	2
Partially retired	21	2.3	5	0.6	26	1.5	4
Fully retired	3	0.3	1	0.1	4	0.2	12

[†] Robinson and Hooker (2006, p. 7), *n*=9671. Includes overseas-practising, non-practising, and Republic of Ireland

5.1.2.5 Position in practice

The position in practice distribution of study respondents is presented in Table 5.8.

Table 5.8: Position in practice distribution of study respondents

Position in practice	*n*	%	RCVS[†]
Sole principal	143	8.0	11
Partner	310	17.4	10
Salaried partner	13	0.7	2
Partner/director (of limited company)	154	8.6	16
Full-time assistant (or employee of limited company)	653	36.6	40
Part-time assistant (or employee of limited company)	180	10.1	11
Consultant	28	1.6	1
Locum	74	4.1	6
Other	77	4.3	2
Not applicable	153	8.6	-

[†] Robinson and Hooker (2006, p. 16), *n*=8697. Respondents not working in practice are excluded

5.1.2.6 Ownership of practice

The ownership of practice distribution of study respondents is presented in Table 5.9. The distribution of respondents is very similar to that for RCVS members.

Table 5.9: Ownership of practice distribution of study respondents

Ownership of practice	*n*	%	RCVS[†]
Sole principal	418	23.6	29
Partnership	755	42.6	50
Limited company	264	14.9	15
Corporate concern	48	2.7	2
Charity	54	3.0	3
Other	47	2.7	2
Not applicable	187	10.5	-

[†] Robinson and Hooker (2006, p. 17), *n*=8697. Respondents not working in practice are excluded

5.1.2.7 RCVS Certificate or Diploma holder

The proportion of study respondents holding an RCVS Certificate or Diploma is presented in Table 5.10.

Table 5.10: Respondents holding an RCVS Certificate or Diploma

RCVS Certificate or Diploma holder	*n*	%	RCVS[§]
Yes	290	16.2	11.5
No	1497	83.8	88.5

[§] Source: RCVS (2007, p. 31), *n*=15,671. Percentage assumes all Certificate or Diploma holders are home-practising

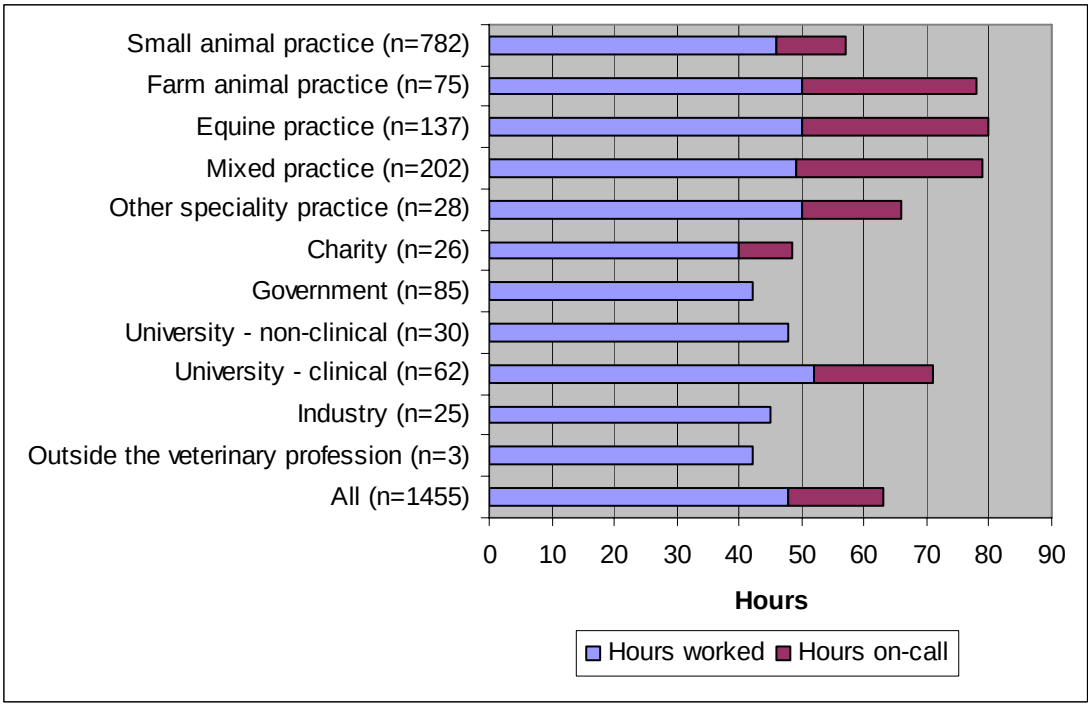
5.1.2.8 Hours worked and on-call in a typical week

The median number of hours worked and on-call in a typical week for study respondents working full-time (*n*=1458) is 48 hours (IQR: 42-50 hours; mean=47.8, SD=8.8) and 15 hours (IQR: 0-28 hours; mean=20.1, SD=24.9) respectively.

Men working full-time (*n*=805) report a greater number of hours worked in a typical week (median=48 hours, IQR: 42-53 hours) than women working full-time (*n*=649) (median=45 hours, IQR: 40-50 hours), Mann-Whitney *U* test: *U*=227,032.5, *Z*= -4.32, $p<0.001$. Similarly, men working full time (*n*=802) report a greater number of hours on-call in a typical week (median=17 hours, IQR: 0-30 hours) than women working full-time (*n*=645) (median=14 hours, IQR: 0-26 hours), Mann-Whitney *U* test: *U*=240,816.5, *Z*= -2.20, *p*=0.028.

The median number of hours worked and on-call in a typical week for each type of work for study respondents working full-time is illustrated in Figure 5.3. Respondents working in farm animal, equine and mixed practice have the longest total working and on-call hours. This is in keeping with the results of the *RCVS Survey of the Profession 2006* (Robinson and Hooker 2006, p. 13).

Figure 5.3: Median number of hours worked and on-call in a typical week for each type of work for study respondents working full-time

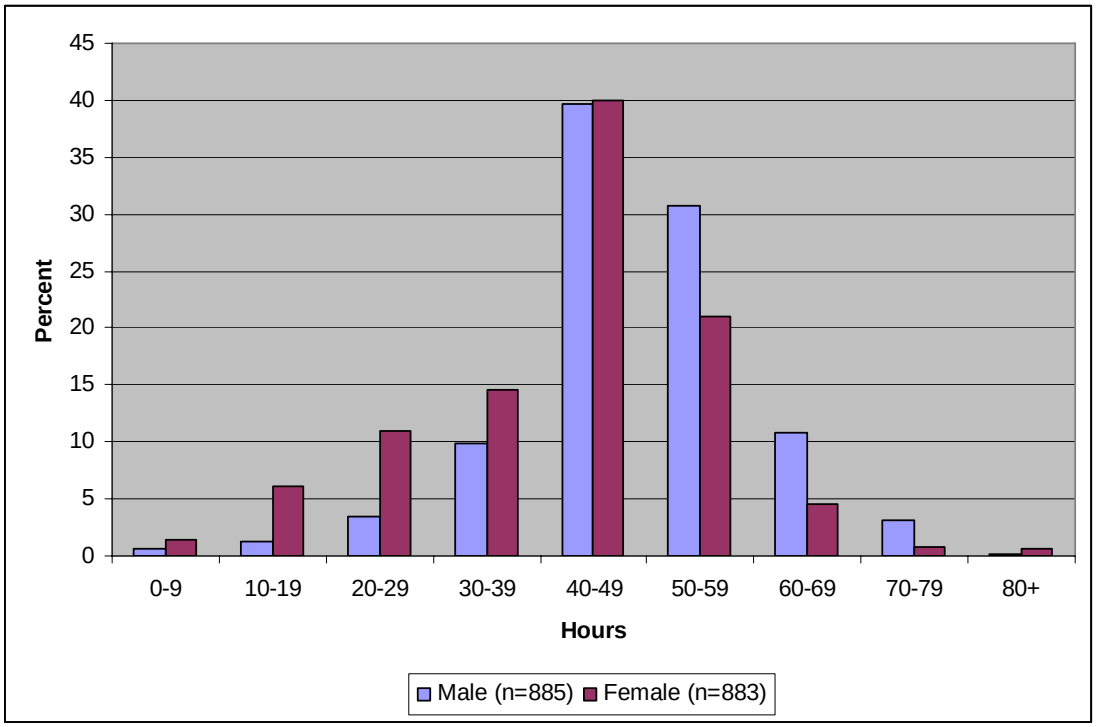


The difference in median number of hours worked across each type of work is significant. (Kruskal-Wallis test: χ^2=126.5, df=10, p<0.001).

The difference in median number of hours on-call across each type of work is significant. (Kruskal-Wallis test: χ^2=449.9, df=10, p<0.001).

Women veterinary surgeons work fewer hours in a typical week (men, median=48, IQR: 40-52 hours vs. women, median=43, IQR: 34-50 hours; Mann-Whitney *U* test: U=286,402.0, Z= -9.75, p<0.001), a reflection of the greater proportion of women working part-time (24.9% vs. 6.7%, χ^2=111.9, df=1, p<0.001). Figure 5.4 illustrates the number of hours worked in a typical week for male and female study respondents. The gender difference across number of hours worked in a typical week is statistically significant (χ^2 =125.5, df=8, p<0.001).

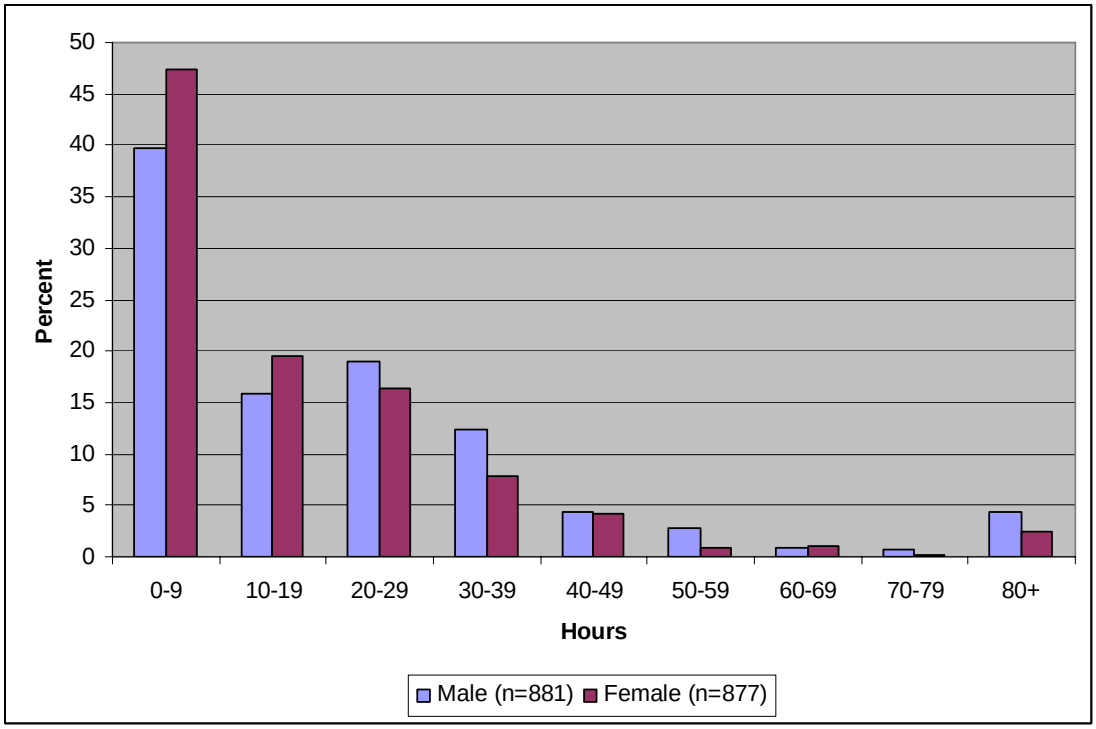
Figure 5.4: Number of hours worked in a typical week for male and female study respondents



Note: includes full- and part-time workers

Similarly, women veterinary surgeons have fewer hours on-call in a typical week (men, median=15, IQR: 0-30 hours vs. women, median=12, IQR: 0-24 hours; Mann-Whitney *U* test: U=337,989.5, Z= -4.47, p<0.001). Figure 5.5 illustrates the number of hours on-call for male and female study respondents. The gender difference across number of hours on-call in a typical week is statistically significant (χ^2 =36.4, df=8, p<0.001).

Figure 5.5: Number of hours on-call in a typical week for male and female study respondents



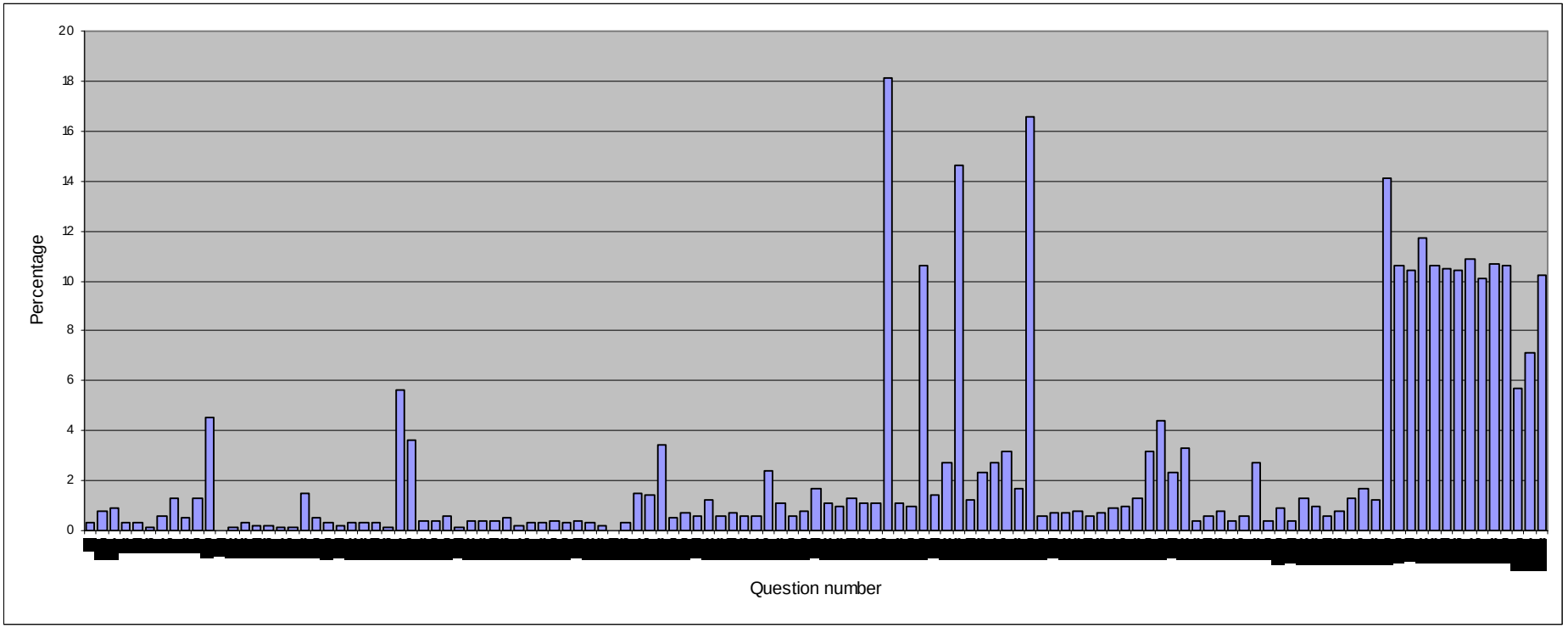
Note: includes full- and part-time workers

5.1.3 Frequency and distribution of missing data

The percentage of missing data for each of the items in the questionnaire prior to imputation (Figure 5.6), ranged from 0 to 5.6%, with the exception of the following: items 67, 73 and 79 (three of the items in the *managerial support* scale for working conditions, see Section 5.6) which had 14.6% to 18.1% missing data; item 70 (an item in the *change* scale for working conditions); and items 109-120 inclusive which did not require responses from all participants.

The overall level of missing data prior to imputation was 1.5% (2957 from 195,764 items). There were no missing data for 53.6% of respondents (n=963) and ≤ 4 items of missing data for 90.8% of respondents (n=1630). These figures exclude items 109-120 inclusive which did not require responses from all participants.

Figure 5.6: Percentage of missing data for each item prior to imputation



Notes:

- Q26 refers to alcohol consumption and was not answered by non-drinkers
- Q67, Q73 and Q79 are three of the items in the *managerial support* scale for working conditions which refer to a 'line manager' (see Section 5.6)
- Q70 is an item in the *change* scale for working conditions which refers to 'managers'
- Q109-Q119 refer to clinical work-related stressors and respondents who do not treat clinical cases were requested to omit these questions
- Q120a-c is an open question regarding sources of satisfaction. Respondents were invited to cite up to three sources

5.1.4 Summary

- Response rate of 56.1% (1796 usable returns).
- The first mailing yielded almost two-thirds of the total questionnaires returned.
- The demographic and occupational profile of study respondents is generally in close alignment with that of RCVS membership which suggests that study respondents are fairly representative of the wider population of veterinary surgeons practising in the UK. Veterinary surgeons in mixed practice may be under-represented but this may be associated with differences in question wording on the classification of the type of work between study respondents and respondents to the *RCVS Survey of the Profession 2006.*

5.2 Hospital Anxiety and Depression Scale (HADS)

HADS scores and prevalence of anxiety and depression caseness are presented in Table 5.11. Mean scores for the total sample are: HADS-A, 7.9, 95% CI: 7.7 to 8.1; HADS-D, 4.6, 95% CI: 4.5 to 4.8; and HADS-T (sum of HADS-A and HADS-D scores), 12.6, 95% CI: 12.3 to 12.9.

HADS-A and HADS-T scores are nearly normally distributed but slightly positively skewed; HADS-D scores are not normally distributed (Figures 5.8, 5.9 and 5.10 respectively). As HADS-D scores are skewed, the statistical significance of the difference in mean scores was assessed by both one-way ANOVA and Kruskal-Wallis tests. The outcomes of each test are similar so only the results of the one-way ANOVA test are reported. Possible or probable clinically significant depressive and anxiety symptoms (i.e. possible or probable presence of the respective disorder) are defined by a cut-off score of ≥ 8 on the HADS-A and HADS-D scales (Snaith 2003).

Table 5.11 shows that, in contrast to HADS-D scores, HADS-A scores differ significantly between genders and across age groups. Female veterinary surgeons have significantly higher HADS-A mean score (male, 7.3 vs. female, 8.6; difference=1.3, 95% CI of difference: 0.9 to 1.7; $F(1, 1755)=45.8$, $p<0.001$) and proportion of HADS-A cases (male, 45.4% vs. female, 57.7%; difference=12.4%, 95% CI of difference: 7.7 to 16.9%; $\chi^2=26.9$, df=1, $p<0.001$). HADS-A mean score ($F(5, 1742)=14.8$, $p<0.001$) and the proportion of HADS-A cases ($\chi^2=46.0$, df=10, $p<0.001$) differ significantly across age groups. The differences in HADS-A mean scores between genders and across age groups are reflected in the similar pattern exhibited for HADS-T mean scores.

The prevalence of anxiety, depression, and co-morbid anxiety and depression caseness among veterinary surgeons is illustrated in Figure 5.7.

Analysis of HADS-A case categories across different demographic and occupational variables demonstrates the following significant differences: across type of work ($\chi^2=37.5$, df=20, $p=0.010$); across position in practice ($\chi^2=40.2$, df=18, $p=0.002$).

Analysis of HADS-D case categories across different demographic and occupational variables demonstrates the following marginally significant differences: across type of work (χ^2=36.6, df=20, p=0.013); across number of hours worked in a typical week (χ^2=30.4, df=16, p=0.016).

The prevalence of anxiety, co-morbid anxiety and depression, and depression caseness for different types of work is illustrated in Figure 5.11.

As HADS outcomes differ significantly between genders and across age groups, a logistic regression analysis was performed to determine the estimated odds of HADS-A or HADS-D caseness (score ≥ 8) after adjusting for the variables of gender and age. The results are presented in Tables 5.12 and 5.13.

Females are at 38% greater odds of HADS-A caseness after adjustment for age (OR: 1.38, 95% CI: 1.12 to 1.69, p=0.002). There is no significant difference between genders for HADS-D caseness after adjustment for age (OR: 1.14, 95% CI: 0.89 to 1.47, p=0.300).

Gender adjusted ORs for age groups indicate a linear decline in HADS-A caseness with increasing age in comparison with the youngest age group (20-29 years), i.e. the odds of HADS-A caseness decreases with increasing age. Age was entered into the logistic regression model as a continuous variable to assess the dose-response relationship between age and HADS-A. The gender adjusted predicted overall age response relationship with HADS-A is OR: 0.98, 95% CI: 0.97 to 0.99, p<0.001, i.e. for every one year increase in age the odds of HADS-A caseness decreases by 2%. There is no association between age and HADS-D caseness after adjustment for gender (OR: 1.00, 95% CI: 0.99 to 1.01, p=0.767).

For veterinary surgeons graduating in the previous 5 years (2003 to 2007 inclusive), graduates of Liverpool (n=45) have the highest estimated odds of HADS-A caseness (score ≥ 8) and odds are significantly lower for graduates of EU or EEA countries (n=26) (OR: 0.35, 95% CI: 0.13 to 0.99, p=0.049) and Glasgow (n=25) (OR: 0.35, 95% CI: 0.13 to 0.99, p=0.047). Graduates of Edinburgh (n=38) have the highest

estimated odds of HADS-D caseness (OR: 2.25, 95% CI: 0.78 to 6.50) compared to graduates of Liverpool (the reference group) but there is no significant difference in the odds of HADS-D caseness for recent graduates between veterinary schools.

Veterinary surgeons working in university – non-clinical roles have significantly lower estimated odds of HADS-A caseness than those in small animal practice (OR: 0.27, 95% CI: 0.12 to 0.63, p=0.003). Those working in government have marginally significant higher estimated odds of HADS-D caseness than those in small animal practice (OR: 1.63, 95% CI: 1.04 to 2.55, p=0.033). The odds ratios for HADS-A and HADS-D caseness across employment types are illustrated in Figures 5.12 and 5.13.

Veterinary surgeons working in non-specified positions in practice (Other) have marginally significant higher estimated odds of HADS-A caseness than sole principals (OR: 1.86, 95% CI: 1.03 to 3.37, p=0.039) but otherwise the odds of HADS-A or HADS-D caseness does not differ significantly across employment status, position in practice, ownership of practice, RCVS certificate or diploma holders, or hours worked or on-call in a typical week.

The HADS results for the sample of veterinary surgeons are compared with normative data for a non-clinical sample of the UK adult general population in Table 5.14. The HADS-A, HADS-D and HADS-T mean scores for veterinary surgeons are higher than for the general population (HADS-A: 7.9, 95% CI: 7.7 to 8.1 vs. 6.1; HADS-D: 4.6, 95% CI: 4.5 to 4.8 vs. 3.9; HADS-T: 12.6, 95% CI: 12.3 to 12.9 vs. 9.8) and the differences are statistically significant (p<0.001). The prevalence of HADS-A and HADS-D probable cases is also higher among veterinary surgeons (HADS-A: 26.3%, 95% CI: 24.3 to 28.4% vs. 12.6%, χ^2=106.3, df=1, p<0.001; HADS-D: 5.8%, 95% CI: 4.8 to 7.0% vs. 3.6%, χ^2=9.3, df=1, p=0.002). There is a significant difference between the distribution of the respective populations across HADS-A (χ^2=113.77, df=2, p<0.001) and HADS-D (χ^2=43.6, df=2, p<0.001) case categories.

The two HADS sub-scales demonstrated high internal consistency in the study sample (HADS-A: Cronbach's α=0.85; HADS-D: Cronbach's α=0.79).

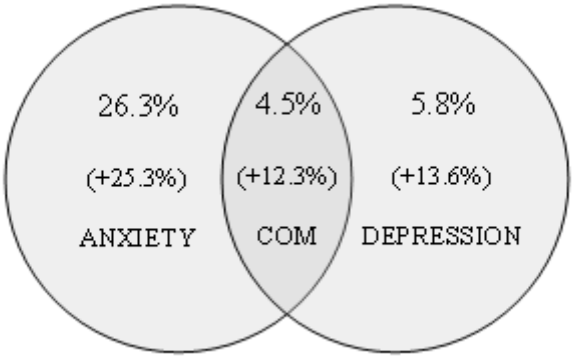
Table 5.11: HADS sub-scale and total scores, and prevalence of anxiety and depression caseness for the total sample, by gender and by age group

		HADS-A			HADS-D			HADS-T†			HADS-A Anxiety sub-scale			HADS-D Depression sub-scale			Co-morbid anxiety and depression
											Non-case	Possible case	Probable case	Non-case	Possible case	Probable case	
Characteristic	*n*	mean	SD	median	mean	SD	median	mean	SD	median	0-7 (%)	8-10 (%)	11+ (%)	0-7 (%)	8-10 (%)	11+ (%)	Probable D and Probable A
Total	1757	7.9	4.1	8	4.6	3.4	4	12.6	6.8	12	48.4	25.3	26.3	80.6	13.6	5.8	4.5
Gender																	
Male	881	7.3	4.0	7	4.6	3.4	4	11.8	6.6	11	54.5	24.3	21.1	81.6	13.0	5.5	4.0
Female	876	8.6	4.1	8	4.7	3.5	4	13.3	6.9	13	42.3	26.3	31.4	79.7	14.3	6.1	5.0
Age																	
20-29	297	8.7	4.0	8	4.5	3.2	4	13.2	6.4	12	40.1	28.3	31.6	81.8	13.1	5.1	4.7
30-39	554	8.4	4.1	8	4.7	3.4	4	13.1	6.8	12	44.5	26.6	28.9	81.7	11.6	6.7	5.2
40-49	501	8.0	4.1	8	5.0	3.6	4	13.0	7.0	13	47.9	25.0	27.1	77.2	16.4	6.4	5.2
50-59	299	7.1	3.9	7	4.5	3.5	4	11.6	6.6	11	57.7	21.5	20.8	80.3	15.4	4.3	2.7
60-69	82	5.5	3.4	5	3.6	2.9	3	9.1	5.8	9	70.7	20.7	8.5	85.4	13.4	1.2	-
70+	15	4.3	3.4	4	3.0	1.7	3	7.3	4.4	6	73.3	20.0	6.7	100	-	-	-

† HADS-T is the summated total of the item scores for each of the sub-scales. It may be used as a global measure of psychological distress (Crawford and others 2001, Pallant and Tennant 2007)

Significant difference between male and female HADS-A mean scores (one-way ANOVA, $F(1, 1755)=45.8$, $p<0.001$; difference=1.30, 95% CI of difference: 0.92 to 1.68)
No significant difference between male and female HADS-D mean scores (one-way ANOVA, $F(1, 1755)=1.2$, $p=0.268$; difference=0.10, 95% CI of difference: -0.42 to 0.22)
Significant difference between male and female HADS-T mean scores (one-way ANOVA, $F(1, 1755)=21.2$, $p<0.001$; difference=1.50, 95% CI of difference: 0.87 to 2.13)
Significant difference in HADS-A mean scores across age groups (one-way ANOVA, $F(5, 1742)=14.8$, $p<0.001$)
Significant difference in HADS-D mean scores across age groups (one-way ANOVA, $F(5, 1742)=3.3$, $p=0.005$)
Significant difference in HADS-T mean scores across age groups (one-way ANOVA, $F(5, 1742)=8.9$, $p<0.001$)
Significant difference between male and female across HADS-A case categories ($\chi^2=32.0$, df=2, $p<0.001$)
No significant difference between male and female across HADS-D case categories ($\chi^2=1.0$, df=2, $p=0.598$)
No significant difference between male and female prevalence of co-morbid probable anxiety and depression ($\chi^2=1.13$, df=1, $p=0.288$; difference=1.1, 95% CI of difference: -0.9 to 3.0)
Significant difference between HADS-A case categories across age groups ($\chi^2=46.0$, df=10, $p<0.001$)
No significant difference between HADS-D case categories across age groups ($\chi^2=15.2$, df=10, $p=0.125$)
No significant difference between prevalence of co-morbid probable anxiety and depression across age groups (Fishers exact test, $p=0.120$)

Figure 5.7: Prevalence of anxiety, co-morbid anxiety and depression, and depression caseness



COM: Co-morbid anxiety and depression

Prevalence of HADS-A or HADS-D score ≥ 11 (probable case)

Figures in parentheses represent prevalence of HADS-A or HADS-D score 8-10 (possible case)

95% CIs: HADS-A probable case 24.3 to 28.4%; HADS-A possible case 23.3 to 27.4%; HADS-D probable case 4.8 to 7.0%; HADS-D possible case 11.8 to 15.0%; COM probable cases 3.6 to 5.6%; COM possible cases 11.1 to 14.2%

Figure 5.8: Distribution of HADS-A scores

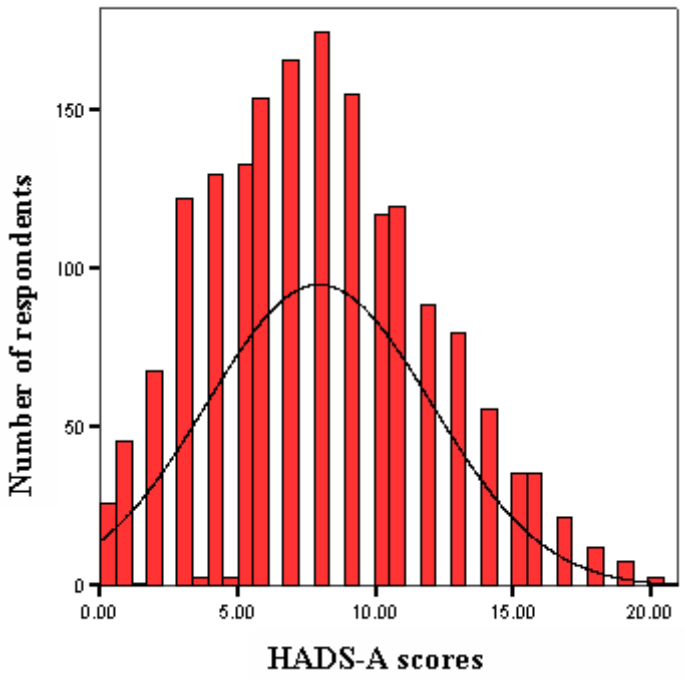


Figure 5.9: Distribution of HADS-T scores

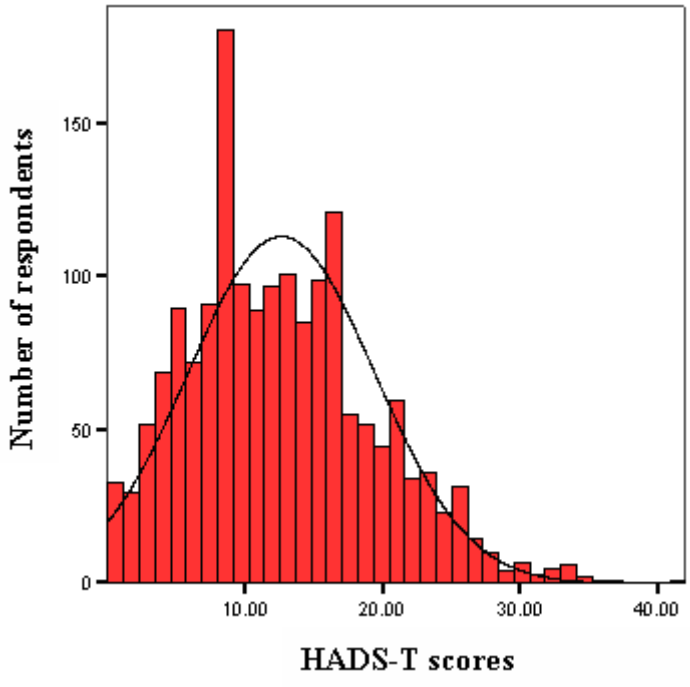


Figure 5.10: Distribution of HADS-D scores

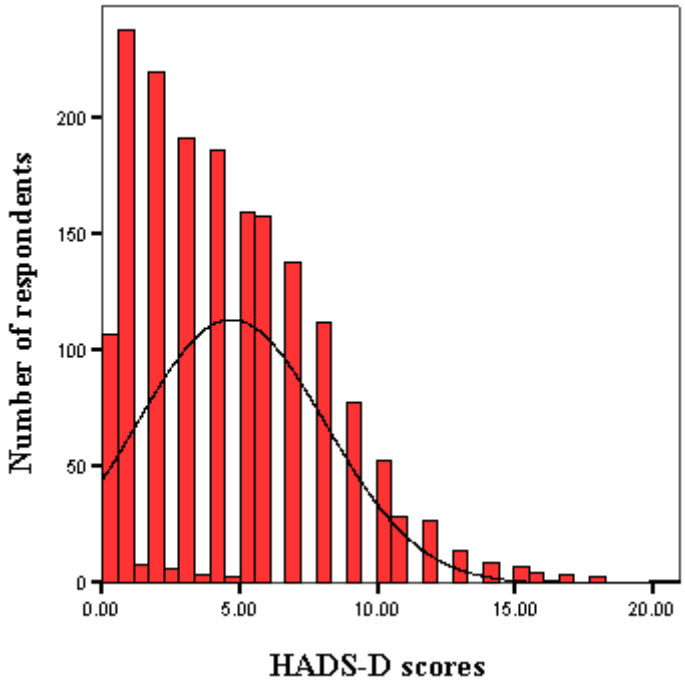


Figure 5.11: Prevalence of anxiety, co-morbid anxiety and depression, and depression caseness (score ≥ 8) for different types of work

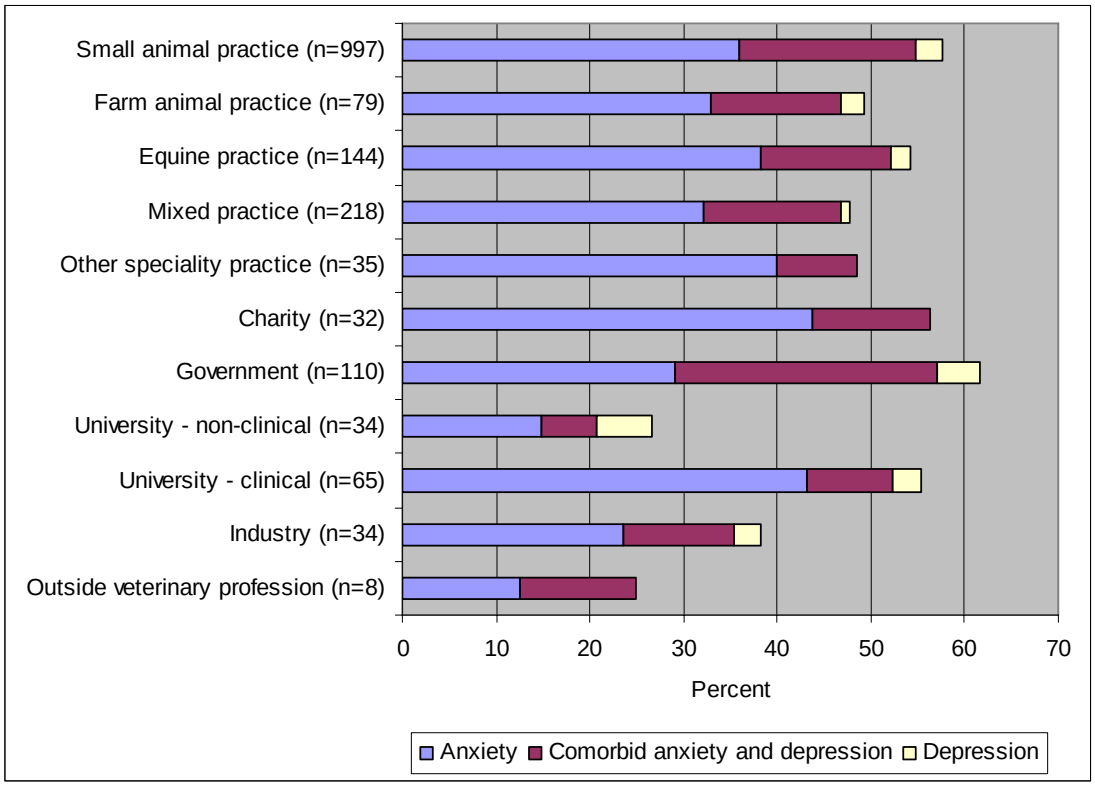


Table 5.12: Estimated odds of HADS-A and HADS-D caseness (score ≥ 8) for gender after adjustment for age, and for age after adjustment for gender

Independent variable	HADS-A Score ≥ 8			HADS-D Score ≥ 8		
	OR	95% CI	*p*-value†	OR	95% CI	*p*-value†
Gender						
Male	1	-	-	1	-	-
Female	1.38	1.12 to 1.69	**0.002**	1.14	0.89 to 1.47	0.300
Age						
20-29	1	-	-	1	-	-
30-39	0.88	0.66 to 1.18	0.398	1.03	0.71-1.48	0.889
40-49	0.79	0.59 to 1.07	0.129	1.37	0.95 to 1.99	0.094
50-59	0.57	0.41 to 0.80	**0.001**	1.16	0.76 to 1.78	0.492
60-69	0.34	0.20 to 0.59	**<0.001**	0.84	0.42-1.70	0.635
70+	0.31	0.10 to 1.00	0.05	-	-	-

n=1743 (HADS-A); *n*=1728 (HADS-D)

Separate multivariable analyses adjusting for age and gender only

† Adjusted *p*-value from multiple logistic regression; significant *p*-values ($p<0.010$) are in boldface font

Table 5.13: Estimated odds of HADS-A and HADS-D caseness (score ≥ 8) adjusted for gender and age

Independent variable		HADS-A Score ≥ 8			HADS-D Score ≥ 8		
		OR	95% CI	*p*-value†	OR	95% CI	*p*-value†
Veterinary school§	*n*=278						
Liverpool		1	-	-	1	-	-
London		0.75	0.31 to 1.78	0.509	1.14	0.40 to 3.31	0.806
EU or EEA countries		0.35	0.13 to 0.99	***0.049***	0.67	0.15 to 2.91	0.590
Non-EU/EEA countries		0.33	0.11 to 1.03	0.056	-	-	-
Glasgow		0.35	0.13 to 0.99	***0.047***	0.90	0.24 to 3.43	0.877
Edinburgh		0.58	0.23 to 1.47	0.247	2.25	0.78 to 6.50	0.133
Cambridge		0.40	0.14 to 1.12	0.080	0.95	0.25 to 3.62	0.940
Bristol		0.70	0.27 to 1.85	0.475	1.46	0.45 to 4.73	0.527
Main type of work	*n*=1738						
Small animal practice		1	-	-	1	-	-
Farm animal practice		0.87	0.55 to 1.40	0.577	0.76	0.41 to 1.41	0.385
Equine practice		0.97	0.68 to 1.39	0.870	0.74	0.46 to 1.19	0.207
Mixed practice		0.74	0.55 to 1.00	0.050	0.72	0.49 to 1.07	0.107
Other speciality practice		0.73	0.37 to 1.45	0.368	0.35	0.11 to 1.15	0.083
Charity		1.13	0.54 to 2.39	0.729	0.41	0.12 to 1.36	0.145
Government		1.28	0.85 to 1.93	0.234	1.63	1.04 to 2.55	***0.033***
University – non-clinical		0.27	0.12 to 0.63	**0.003**	0.51	0.18 to 1.48	0.219
University – clinical		0.97	0.58 to 1.62	0.907	0.54	0.25 to 1.14	0.105
Industry		0.57	0.28 to 1.18	0.129	0.65	0.25 to 1.70	0.374
Outside the profession		0.31	0.06 to 1.60	0.163	0.53	0.06 to 4.32	0.551
Employment status	*n*=1741						
Full-time		1	-	-	1	-	-
Part-time		0.95	0.72 to 1.26	0.740	0.93	0.65 to 1.31	0.667
Unemployed		-	-	-	-	-	-
Career break		0.34	0.08 to 1.37	0.128	1.94	0.48 to 7.86	0.352
Partially retired		0.70	0.30 to 1.68	0.428	0.70	0.23 to 2.11	0.529
Fully retired		0.58	0.06 to 5.71	0.637	-	-	-

Continued overleaf

Independent variable		HADS-A Score ≥ 8			HADS-D Score ≥ 8		
		OR	95% CI	*p*-value†	OR	95% CI	*p*-value†
Position in practice	*n*=1732						
Sole principal		1	-	-	1	-	-
Partner		1.08	0.71 to 1.63	0.812	0.93	0.54 to 1.57	0.774
Salaried partner		0.87	0.27 to 2.78	0.813	0.38	0.05 to 3.06	0.362
Partner/director		1.55	0.97 to 2.48	0.070	1.49	0.84 to 2.65	0.169
Full-time assistant		1.09	0.72 to 1.65	0.692	1.06	0.62 to 1.80	0.828
Part-time assistant		1.03	0.64 to 1.65	0.916	0.99	0.54 to 1.80	0.960
Consultant		0.83	0.35 to 1.98	0.679	1.24	0.45 to 3.39	0.680
Locum		1.07	0.59 to 1.94	0.812	1.14	0.55 to 2.36	0.726
Other		1.86	1.03 to 3.37	***0.039***	1.41	0.70 to 2.82	0.338
Not applicable		0.73	0.45 to 1.18	0.197	1.03	0.56 to 1.87	0.936
Ownership of practice	*n*=1721						
Sole principal		1	-	-	1	-	-
Partnership		0.86	0.67 to 1.11	0.242	0.88	0.65 to 1.20	0.426
Limited company		0.97	0.71 to 1.33	0.847	0.94	0.64 to 1.39	0.763
Corporate concern		1.18	0.63 to 2.20	0.604	0.90	0.42 to 1.94	0.796
Charity		1.28	0.70 to 2.33	0.423	0.50	0.21 to 1.21	0.126
Other		1.83	0.95 to 3.52	0.070	1.21	0.59 to 2.49	0.603
Not applicable		0.72	0.50 to 1.03	0.071	1.00	0.65 to 1.55	0.985
RCVS certificate or diploma	*n*=1734						
Yes		1	-	-	1	-	-
No		0.91	0.70 to 1.19	0.493	1.16	0.83 to 1.63	0.390

Continued overleaf

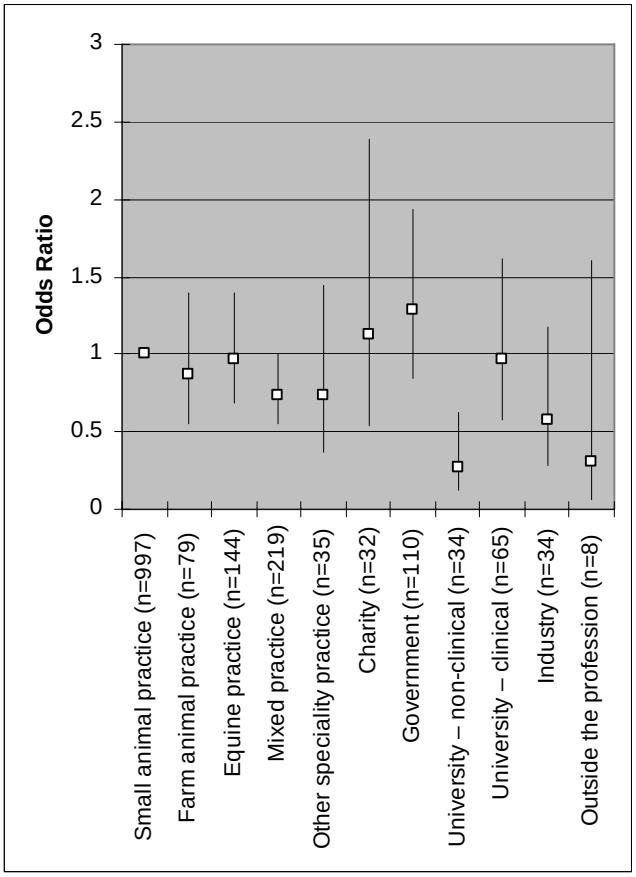
Independent variable	HADS-A Score ≥ 8			HADS-D Score ≥ 8		
	OR	95% CI	*p*-value[†]	OR	95% CI	*p*-value[†]
Hours worked in a typical week *n*=1720						
0-9	1	-	-	1	-	-
10-19	0.78	0.26 to 2.28	0.644	0.33	0.10 to 1.09	0.069
20-29	1.13	0.41 to 3.13	0.810	0.45	0.15 to 1.32	0.144
30-39	1.05	0.39 to 2.83	0.924	0.43	0.15 to 1.24	0.118
40-49	1.13	0.43 to 2.98	0.807	0.46	0.17 to 1.25	0.127
50-59	1.47	0.55 to 3.91	0.440	0.65	0.23 to 1.79	0.402
60-69	1.46	0.53 to 4.06	0.464	0.55	0.19 to 1.62	0.276
70-79	3.03	0.91 to 10.07	0.070	0.92	0.26 to 9.54	0.888
80+	1.32	0.22 to 7.91	0.759	1.59	0.26 to 9.54	0.615
Hours on call in a typical week *n*=1743						
0-9	1	-	-	1	-	-
10-19	0.81	0.62 to 1.06	0.126	0.94	0.67 to 1.32	0.735
20-29	1.14	0.87 to 1.50	0.350	0.79	0.56 to 1.13	0.200
30-39	0.76	0.54 to 1.07	0.117	0.72	0.46 to 1.13	0.156
40-49	0.93	0.56 to 1.54	0.785	0.82	0.43 to 1.56	0.536
50-59	1.44	0.69 to 3.02	0.329	0.96	0.38 to 2.38	0.922
60-69	0.74	0.27 to 2.04	0.555	0.55	0.12 to 2.44	0.431
70-79	3.05	0.60 to 15.46	0.177	1.33	0.26 to 6.64	0.733
80+	0.93	0.54 to 1.58	0.769	1.42	0.78 to 2.59	0.252

[§] Only for veterinary surgeons graduating in the previous 5 years (2003 to 2007 inclusive)

Separate multivariable analyses adjusting for age and gender only

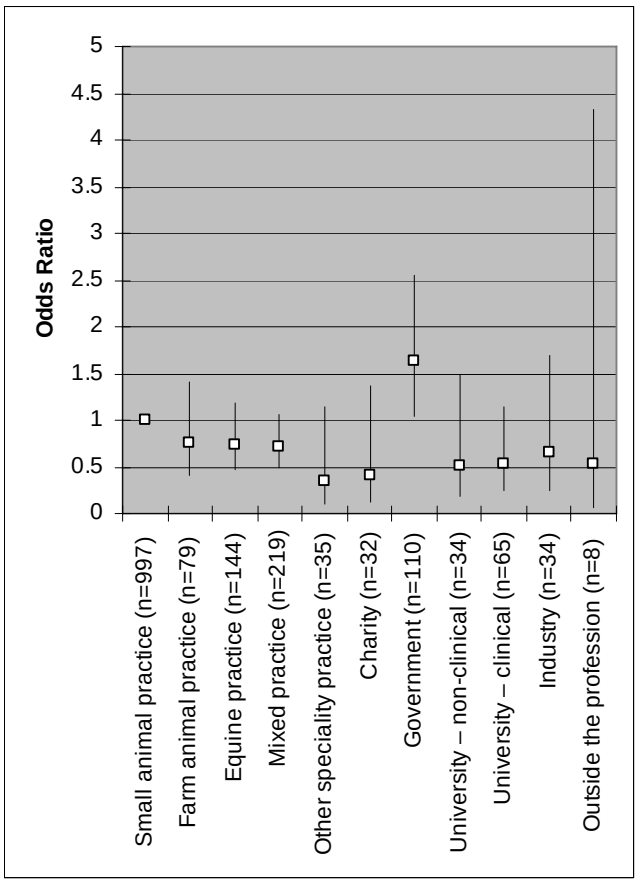
[†] Adjusted *p*-value from multiple logistic regression; significant *p*-values ($p<0.010$) are in boldface font; marginally significant *p*-values ($p=0.010$ to $p=0.049$) are in boldface italicised font

Figure 5.12: Estimated odds of HADS-A caseness (score ≥ 8) and 95% CI adjusted for gender and age across type of work



Error bars represent 95% CI

Figure 5.13: Estimated odds of HADS-D caseness (score ≥ 8) and 95% CI adjusted for gender and age across type of work



Error bars represent 95% CI

Table 5.14: Comparison between HADS results for total sample of veterinary surgeons and normative data for UK adult general population

		HADS-A			HADS-D			HADS-T			HADS-A Anxiety sub-scale			HADS-D Depression sub-scale		
											Non-case	Possible case	Probable case	Non-case	Possible case	Probable case
	n	mean	SD	median	mean	SD	median	mean	SD	median	0-7 (%)	8-10 (%)	11+ (%)	0-7 (%)	8-10 (%)	11+ (%)
Veterinary surgeons	1757	7.9	4.1	8	4.6	3.4	4	12.6	6.8	12	48.4	25.3[a]	26.3[b]	80.6	13.6[c]	5.8[d]
General population[§]	1792	6.1	3.8	6	3.9	3.1	3	9.8	6.0	9	61.4	26.0[a]	12.6[b]	88.6	7.8[c]	3.6[d]
Statistical test		$t(3547)=13.6$, $p<0.001$[†]			$t(3547)=6.4$, $p<0.001$[†]			$t(3547)=13.0$, $p<0.001$[†]			$\chi^2=113.77$, df=2, $p<0.001$[‡]			$\chi^2=43.6$, df=2, $p<0.001$[‡]		

[§] UK adult general population. Source: Crawford and others (2001)

[†] Comparison of means: Two-sample *t*-test with equal variances

[‡] Comparison of case distribution across sub-scales: χ^2 test

[a] $\chi^2=0.2$, df=1, $p=0.644$

[b] $\chi^2=106.3$, df=1, $p<0.001$

[c] $\chi^2=31.2$, df=1, $p<0.001$

[d] $\chi^2=9.3$, df=1, $p=0.002$

5.2.1 Summary

- The prevalence of anxiety, co-morbid anxiety and depression, and depression caseness (HADS sub-scale score ≥ 8) is 51.6% (95% CI: 49.3 to 54.0%); 16.8% (95% CI: 15.1 to 18.6%); and 19.4% (95% CI: 17.6 to 21.3%) respectively.

- Female veterinary surgeons have significantly higher HADS-A mean score (male, 7.3 vs. female, 8.6; difference=1.3, 95% CI of difference: 0.9 to 1.7; $F(1, 1755)=45.8$, $p<0.001$) and proportion of HADS-A cases (male, 45.4% vs. female, 57.7%; difference=12.4%, 95% CI of difference: 7.7 to 16.9%; $\chi^2=26.9$, df=1, $p<0.001$). Females are at 38% greater odds of HADS-A caseness after adjustment for age (OR: 1.38, 95% CI: 1.12 to 1.69, $p=0.002$).

- There is a significant difference between HADS-A mean score ($F(5, 1742)=14.8$, $p<0.001$) and HADS-A case categories ($\chi^2=46.0$, df=10, $p<0.001$) across age groups. After adjustment for gender, for every one year increase in age the odds of HADS-A caseness decreases by 2% (OR: 0.98, 95% CI: 0.97 to 0.99, $p<0.001$).

- There is no significant difference between genders for HADS-D caseness after adjustment for age (OR: 1.14, 95% CI: 0.89 to 1.47, $p=0.300$) and no association between age and HADS-D caseness after adjustment for gender (OR: 1.00, 95% CI: 0.99 to 1.01, $p=0.767$).

- For veterinary surgeons graduating in the previous 5 years, the estimated odds of HADS-A caseness is highest among Liverpool graduates and marginally significantly lower for graduates of EU or EEA countries (OR: 0.35, 95% CI: 0.13 to 0.99, $p=0.049$) and Glasgow (OR: 0.35, 95% CI: 0.13 to 0.99, $p=0.047$).

- Veterinary surgeons working in university – non-clinical roles have significantly lower estimated odds of HADS-A caseness than those working in

small animal practice (OR: 0.27, 95% CI: 0.12 to 0.63, *p*=0.003).

- Veterinary surgeons working in government have a marginally significant higher estimated odds of HADS-D caseness than those working in small animal practice (OR: 1.63, 95% CI: 1.04 to 2.55, *p*=0.033).

- The prevalence of anxiety and depressive symptoms is significantly higher than among a non-clinical sample of the UK general population.

5.3 AUDIT Alcohol Consumption Questions (AUDIT-C)

The distribution of responses across each AUDIT-C question is presented in Table 5.15.

Table 5.15: Distribution of responses across each AUDIT-C question

Alcohol consumption/AUDIT-C	Score	Male (*n*=849-881) %	Female (*n*=819-876) %	Total (*n*=1668-1757) %	(95% CI)
Frequency of drinking: *How often do you have a drink containing alcohol?*		*	*		
Never	0	4.2	6.7	5.5	(4.5 to 6.6)
Monthly or less	1	7.4	11.6	9.5	(8.2 to 11.0)
2-4 times a month	2	17.7	22.1	19.9	(18.1 to 21.9)
2-3 times a week	3	32.6	35.2	33.9	(31.7 to 36.1)
4 or more times a week	4	38.1	24.3	31.3	(29.1 to 33.5)
Typical quantity: *How many units of alcohol do you have on a typical day when you are drinking?* †		**	**		
1-2	0	37.9	53.4	45.5	(43.1 to 47.9)
3-4	1	37.6	34.2	35.9	(33.6 to 38.2)
5-6	2	14.7	9.2	12.0	(10.5 to 13.6)
7-9	3	5.8	2.1	4.0	(3.1 to 5.0)
10 or more	4	4.0	1.2	2.6	(2.0 to 3.5)
Frequency of binge drinking: *How often do you have six or more units on one occasion?*		***	***		
Never	0	21.4	33.6	27.4	(25.4 to 29.6)
Less than monthly	1	31.5	34.9	33.2	(31.0 to 35.4)
Monthly	2	22.5	20.1	21.3	(19.4 to 23.3)
Weekly	3	21.2	10.6	15.9	(14.3 to 17.7)
Daily or almost daily	4	3.3	0.9	2.2	(1.6 to 3.0)

* χ^2 =45.7, df=4, p<0.001

** χ^2 =60.6, df=4, p<0.001

*** χ^2 =68.3, df=4, p<0.001

† A small glass of wine, half a pint of beer or one measure of spirit are each classed as one unit. With some strong beers and ciders, a pint is equivalent to three units or more. A large (175 ml) glass of red or white wine contains over two units of alcohol.

Figure 5.14 summarises the distribution of AUDIT-C total scores among male and female veterinary surgeons. The gender difference across AUDIT-C scores is significant (χ^2=96.3, df=12, p<0.001).

Figure 5.14: Distribution of AUDIT-C total scores among male and female veterinary surgeons

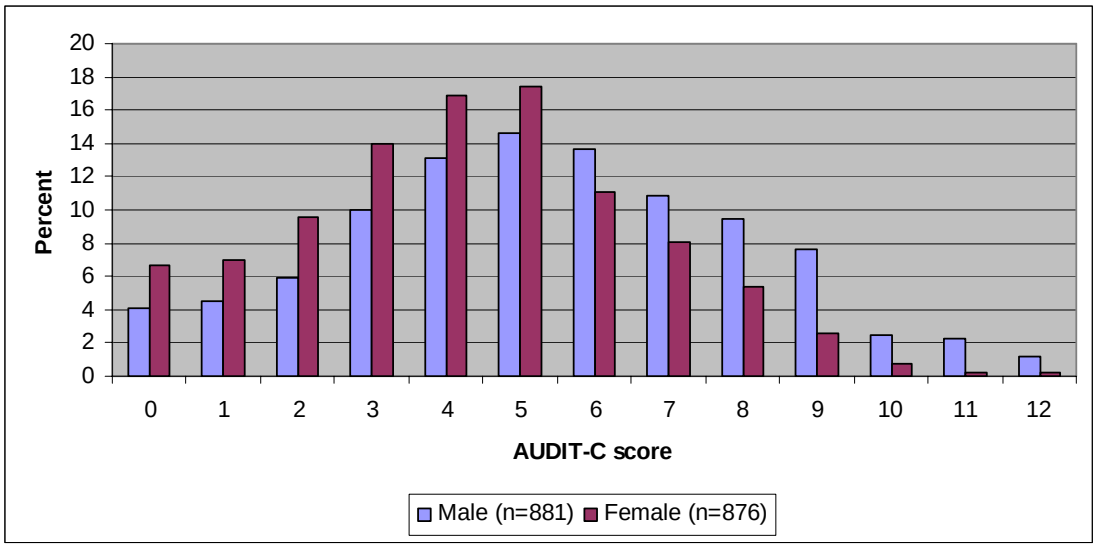


Figure 5.15 summarises the frequency of drinking among veterinary surgeons. Almost two-thirds of veterinary surgeons (total, 65.1%, 95% CI: 62.9 to 67.3%; men, 70.7%, 95% CI: 67.6 to 73.6%; women, 59.5%, 95% CI: 56.2 to 62.7%) drink more than twice a week, and 38.1% (95% CI: 35.0 to 41.4%) of men and 24.3% (95% CI: 21.6 to 27.3%) of women drink four or more times a week. The gender difference across drinking frequencies is significant (χ^2=45.7, df=4, p<0.001).

Figure 5.15: Frequency of drinking among veterinary surgeons

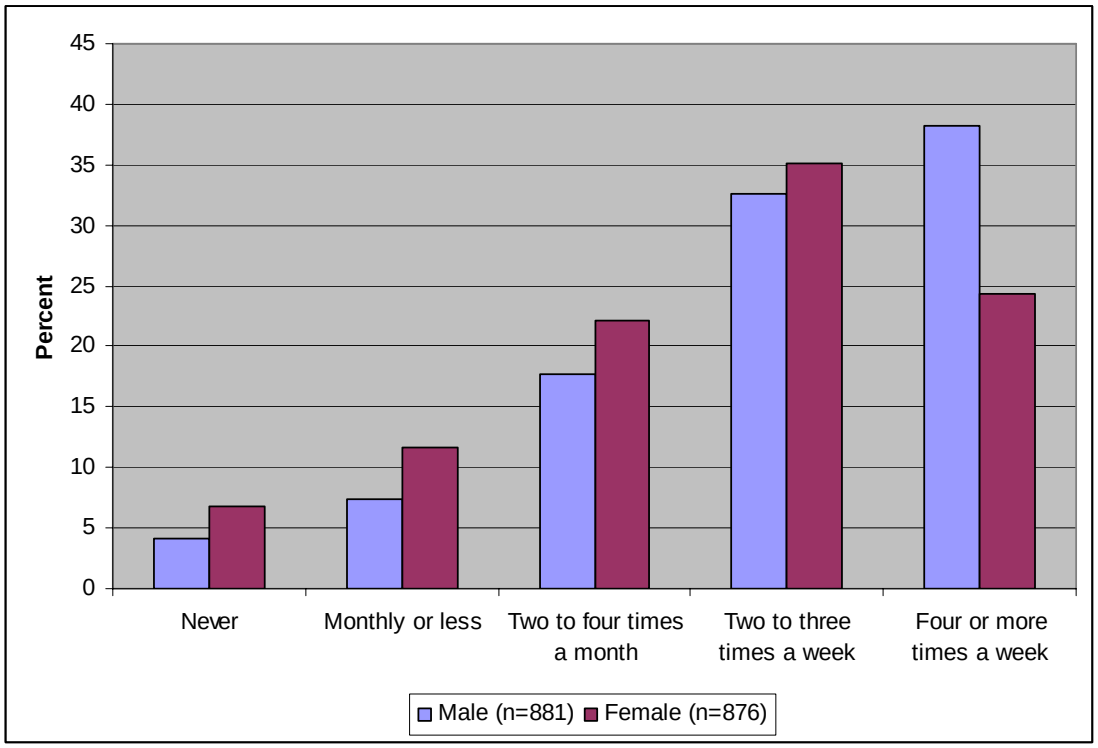


Figure 5.16 summarises the typical quantity consumed by veterinary surgeons on days when drinking. One in four men (24.5%, 95% CI: 21.7 to 27.5%) and one in eight women (12.5%, 95% CI: 10.4 to 14.9%) who drink consume 5 or more units of alcohol on a typical day when drinking. The gender difference across the typical quantities consumed on days when drinking is significant (χ^2=60.5, df=4, p<0.001).

Figure 5.16: Typical quantity consumed by veterinary surgeons on days when drinking

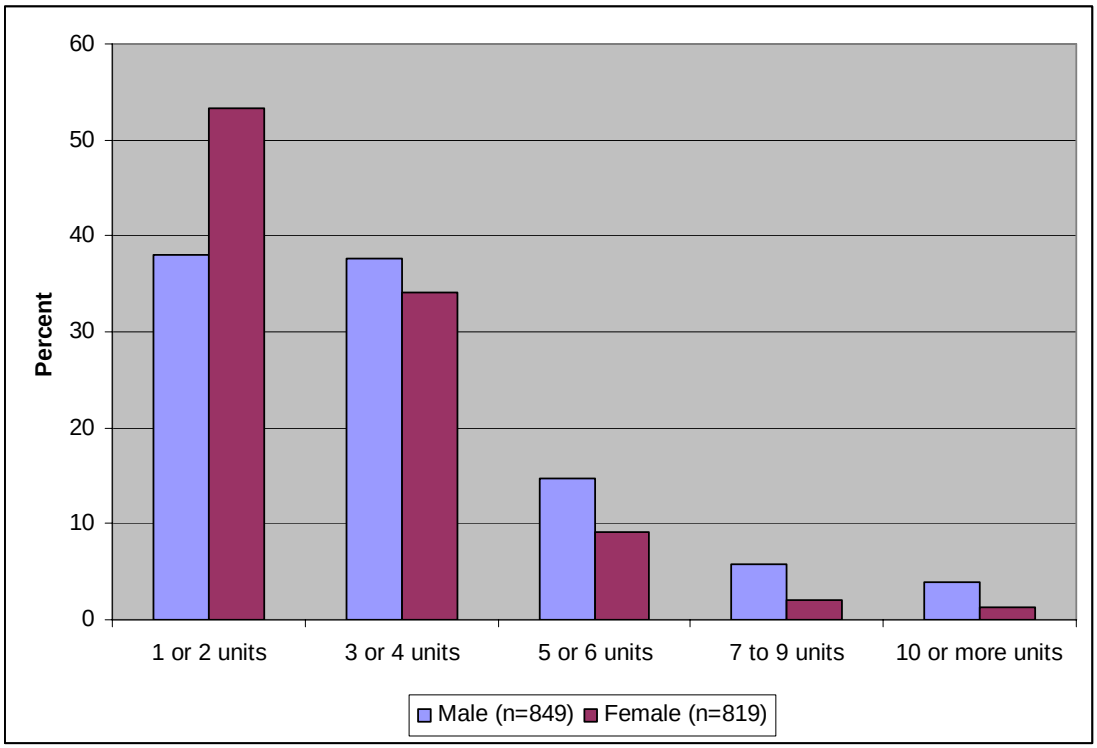
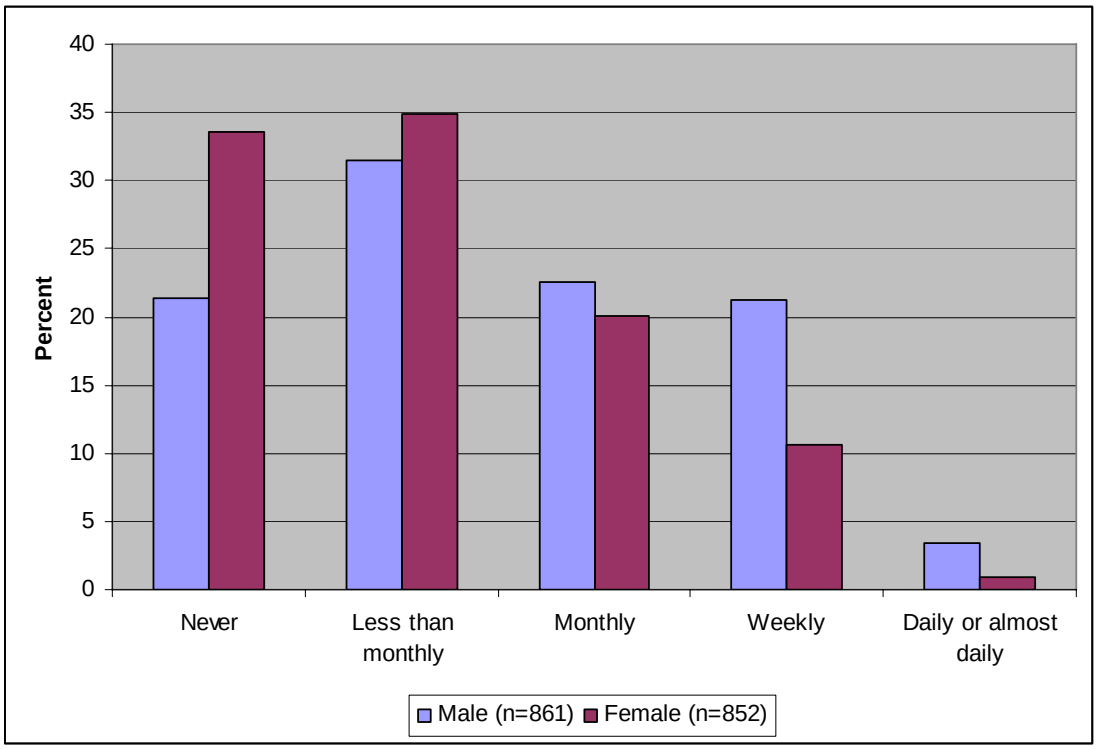


Figure 5.17 summarises the frequency of drinking 6 or more units on one occasion. For 2.2% (95% CI: 1.6 to 3.0%) of veterinary surgeons (men 3.4%, 95% CI: 2.4 to 4.8%; women 0.9%, 95% CI: 0.4 to 1.7%) this is a daily or almost daily occurrence and for 15.9 % (95% CI: 14.2 to 17.7%) (men 21.3%, 95% CI: 18.7 to 24.1%; women 10.6%, 95% CI: 8.7 to 12.8%) it is a weekly occurrence. The gender difference across the frequencies of drinking 6 or more units on one occasion is significant (χ^2=68.3, df=4, p<0.001).

Figure 5.17: Frequency of drinking 6 or more units on one occasion



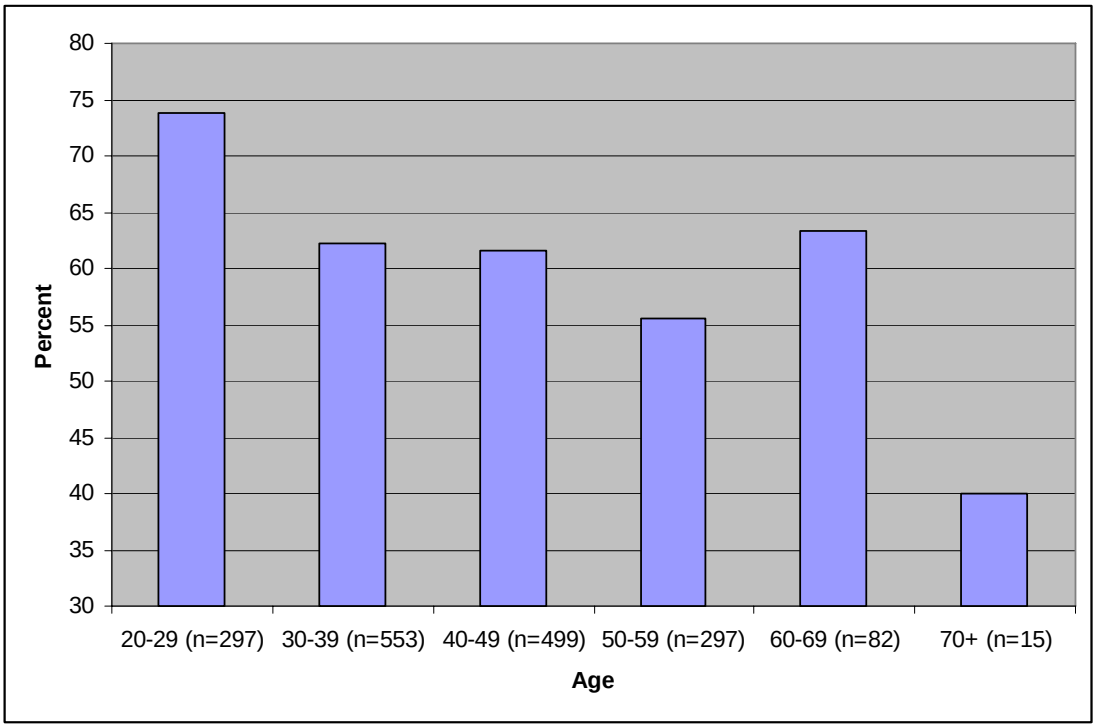
The proportion of veterinary surgeons in each AUDIT-C drinking category is presented in Table 5.16. The difference between males and females is across categories is marginally significant (χ^2=6.9, df=2, p=0.033). Around one in 20 veterinary surgeons (5.4%, 95% CI: 4.4 to 6.6%) report not drinking alcohol. Women are more likely than men to be non-drinkers (women, 6.7% vs. men, 4.1%, difference=2.6%, 95% CI of difference: 0.5 to 4.8%, χ^2=6.0, df=1, p=0.014). There is no significant difference in the prevalence of at-risk drinking between men and women (women 62.7% vs. men 62.4%, difference=0.2%, 95% CI of difference: -4.8 to 4.3%, χ^2=0.01, df=1, p=0.916).

Table 5.16: Proportion of veterinary surgeons in each AUDIT-C drinking category

	n	Non-drinkers % (95% CI) score 0	Low-risk drinkers % (95% CI) score 1 to 4 for men score 1 to 3 for women	At-risk drinkers % (95% CI) score ≥ 5 for men score ≥ 4 for women
Total	1757	5.4 (4.4 to 6.6)	32.0 (29.9 to 34.3)	62.6 (60.3 to 64.8)
Male	881	4.1 (3.0 to 5.6)	33.5 (30.4 to 36.7)	62.4 (59.2 to 65.6)
Female	876	6.7 (5.3 to 8.6)	30.6 (27.6 to 33.7)	62.7 (59.4 to 65.8)

The prevalence of at-risk drinkers in different 10-year age groups is illustrated in Figure 5.18. The highest prevalence of at-risk drinkers (73.7%, 95% CI: 68.5 to 78.4%) is in the 20-29 years age group (*n*=297). The difference in the prevalence of at-risk drinkers across 10-year age groups is significant (χ^2=25.6, df=5, p<0.001).

Figure 5.18: Prevalence of at-risk drinkers in different 10-year age groups



The high prevalence of at-risk drinking in the 20-29 years age group is in keeping with the results for a cohort of final year veterinary students[25] (*n*=55): non-drinkers 3.6% (95% CI: 0.1 to 12.3%); low-risk drinkers; 29.1% (95% CI: 18.8 to 42.1%); at-risk drinkers 67.3% (95% CI: 54.1 to 78.2%) (D.J. Bartram, unpublished data).

For veterinary surgeons graduating in the previous 5 years (2003 to 2007 inclusive), graduates of Bristol (*n*=35), London (*n*=57) and Liverpool (*n*=46) have the highest prevalence of at-risk drinkers (82.9%, 95% CI: 67.3 to 91.9%; 80.7% 95% CI: 68.7 to 88.9%; and 80.4%, 95% CI: 66.8 to 89.3% respectively) and the lowest prevalence of non-drinkers (2.9%, 95% CI: 0.5 to 14.5%; 1.8%, 95% CI: 0.3 to 9.3%; and 0.0%, 95% CI: 0.0 to 7.7% respectively). Graduates of EU/EAA countries (*n*=29) have the lowest prevalence of at-risk drinkers (27.6%, 95% CI: 14.7 to 45.7%). The differences across AUDIT-C drinking categories between recent graduates from different veterinary schools is significant (χ^2=55.1, df=14, p<0.001).

The prevalence of at-risk drinkers is highest in equine practice (*n*=144) (70.8%, 95% CI: 62.9 to 77.6%) and mixed practice (*n*=219) (68.5%, 95% CI: 62.1 to 74.3%), and lowest among veterinary surgeons working outside the profession (*n*=8) (25.0%, 95% CI: 7.1 to 59.1%) and government (*n*=110) (50.0%, 95% CI: 40.8 to 59.2%) but the difference across AUDIT-C drinking categories between types of work is not significant (χ^2=28.3, df=20, p=0.102).

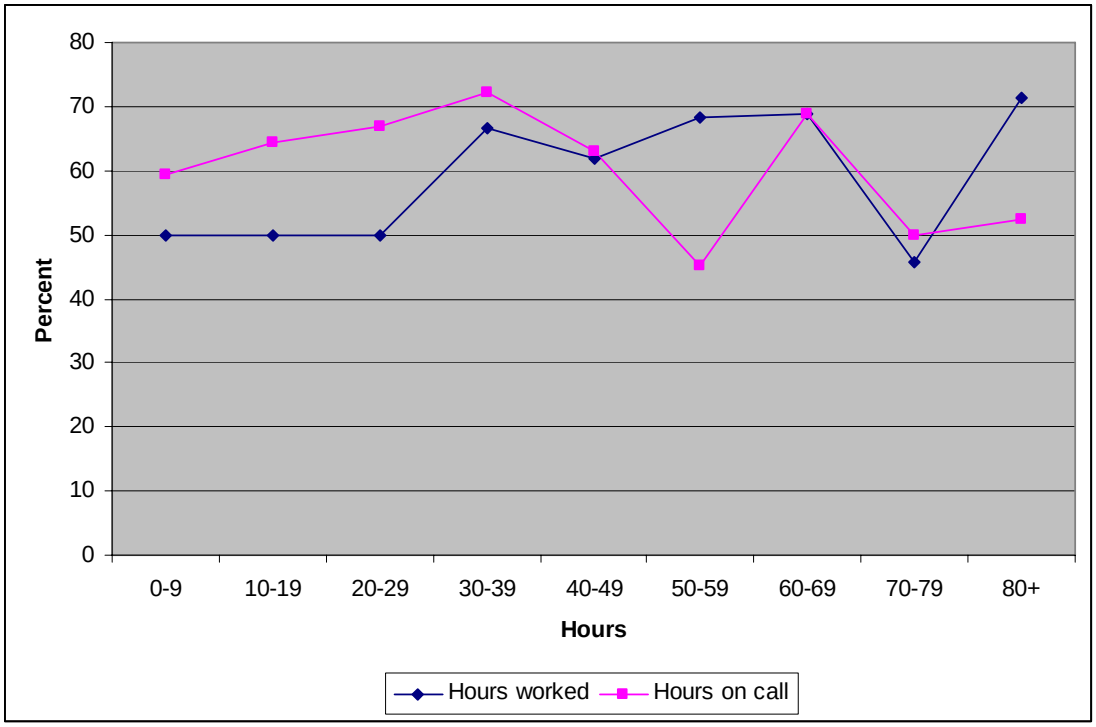
The prevalence of at-risk drinkers is higher among full-time (*n*=1435) (64.5%, 95% CI: 62.0 to 67.0%) and part-time workers (*n*=281) (55.2%, 95% CI: 49.3 to 60.9%) than those who are partially retired (*n*=26) (46.2%, 95% CI: 28.8 to 64.5%), on a career break (*n*=9) (44.4%, 95% CI: 18.9 to 73.3%) or fully retired (*n*=4) (25.0%, 95% CI: 4.6 to 69.9%). The difference across AUDIT-C drinking categories between types of employment status is marginally significant (χ^2=22.3, df=10, p=0.014).

The prevalence of at-risk drinkers for across number of hours worked and on-call in a typical week is displayed in Figure 5.19. There is a significant difference across

[25] Class of final year veterinary students, University of Liverpool, 29 Apr 2008. Response rate: 100% (62.0% of those registered). AUDIT-C: mean=4.7; SD=2.2; *n*=55; 18 ♂, 37 ♀; age range: 22-31 years.

AUDIT-C drinking categories between different 10-hour groups of number of hours worked (χ^2=34.6, df=16, p=0.005), and a marginally significant difference between different 10-hour groups of number of hours on-call (χ^2=31.7, df=16, p=0.011).

Figure 5.19: Prevalence of at-risk drinkers across number of hours worked or on-call in a typical week



As some AUDIT-C outcomes differ significantly between genders and across age groups, a multiple logistic regression analysis was performed to determine the estimated odds of at-risk drinking after adjusting for the variables of gender and age. The results are presented in Table 5.17. For veterinary surgeons graduating in the previous 5 years, compared to Liverpool graduates (the reference group), the estimated odds of at-risk drinking is significantly lower for graduates of EU/EEA countries (OR: 0.12, 95% CI: 0.04 to 0.37, p<0.001) and marginally significantly lower for graduates of non-EU/EEA countries (OR: 0.29, 95% CI: 0.09 to 0.91, p=0.034). Part-time assistants have a marginally significant lower estimated odds of at-risk drinking than sole principals (OR: 0.56, 95% CI: 0.35 to 0.91, p=0.019). Respondents of practices owned by a charity have a marginally lower odds of at-risk drinking than those owned by a sole principal (OR: 0.53, 95% CI: 0.30 to 0.96, p=0.035).

Table 5.17: Estimated odds of AUDIT-C at-risk drinking after adjustment for gender and age

Independent variable		At-risk drinkers score ≥ 5 for men score ≥ 4 for women		
		OR	95% CI	*p*-value[†]
Veterinary school[§]	*n*=278			
Liverpool		1	-	-
London		1.03	0.38 to 2.78	0.950
EU or EEA countries		0.12	0.04 to 0.37	**<0.001**
Non-EU/EEA countries		0.29	0.09 to 0.91	***0.034***
Glasgow		0.89	0.28 to 2.89	0.849
Edinburgh		0.95	0.33 to 2.74	0.933
Cambridge		0.88	0.27 to 2.84	0.833
Bristol		1.17	0.37 to 3.72	0.791
Main type of work	*n*=1738			
Small animal practice		1	-	-
Farm animal practice		0.86	0.53 to 1.38	0.527
Equine practice		1.35	0.92 to 1.99	0.129
Mixed practice		1.22	0.89 to 1.69	0.205
Other speciality practice		0.75	0.38 to 1.49	0.416
Charity		0.70	0.34 to 1.44	0.330
Government		0.67	0.44 to 1.00	0.050
University – non-clinical		0.88	0.43 to 1.79	0.724
University – clinical		1.00	0.59 to 1.69	0.991
Industry		0.21	0.04 to 1.07	0.060
Outside the profession		1.20	0.58 to 2.48	0.619
Employment status	*n*=1741			
Full-time		1	-	-
Part-time		0.77	0.58 to 1.01	0.067
Unemployed		0.42	0.11 to 1.58	0.198
Career break		-	-	-
Partially retired		0.67	0.30 to 1.49	0.280
Fully retired		0.28	0.03 to 2.78	0.476
Position in practice	*n*=1732			
Sole principal		1	-	-
Partner		1.22	0.80 to 1.87	0.360
Salaried partner		1.07	0.31 to 3.73	0.911
Partner/director		1.18	0.72 to 1.93	0.510
Full-time assistant		0.76	0.50 to 1.17	0.212
Part-time assistant		0.56	0.35 to 0.91	***0.019***
Consultant		1.19	0.50 to 2.81	0.699
Locum		0.63	0.34 to 1.14	0.124
Other		0.63	0.35 to 1.13	0.121
Not applicable		0.69	0.43 to 1.11	0.126
Ownership of practice	*n*=1721			
Sole principal		1	-	-
Partnership		1.06	0.82 to 1.37	0.680
Limited company		0.82	0.59 to 1.14	0.233
Corporate concern		0.78	0.42 to 1.45	0.426
Charity		0.53	0.30 to 0.96	***0.035***
Other		0.93	0.49 to 1.76	0.827
Not applicable		0.66	0.46 to 0.95	***0.024***
RCVS certificate or diploma	*n*=1734			
Yes		1	-	-
No		1.02	0.78 to 1.33	0.887

Continued overleaf

Independent variable	At-risk drinkers score ≥ 5 for men score ≥ 4 for women		
	OR	95% CI	*p*-value[†]
Hours worked in a typical week *n*=1720			
0-9	1	-	-
10-19	1.00	0.35 to 2.86	0.996
20-29	0.98	0.36 to 2.65	0.970
30-39	1.78	0.67 to 4.72	0.245
40-49	1.39	0.53 to 3.59	0.495
50-59	1.82	0.70 to 4.75	0.219
60-69	2.08	0.76 to 5.69	0.154
70-79	0.75	0.24 to 2.37	0.621
80+	2.10	0.32 to 13.89	0.441
Hours on call in a typical week *n*=1743			
0-9	1	-	-
10-19	1.14	0.86 to 1.51	0.353
20-29	1.26	0.95 to 1.67	0.114
30-39	1.64	1.14 to 2.37	0.008
40-49	1.02	0.61 to 1.70	0.939
50-59	0.53	0.26 to 1.10	0.088
60-69	1.52	0.52 to 4.45	0.449
70-79	0.63	0.16 to 2.55	0.518
80+	0.74	0.44 to 1.26	0.269

[§] Only for veterinary surgeons graduating in the previous 5 years (2003 to 2007 inclusive)
Separate multivariable analyses adjusting for age and gender only

[†] Adjusted *p*-value from multiple logistic regression; significant *p*-values ($p<0.010$) are in boldface font; marginally significant *p*-values ($p=0.010$ to $p=0.049$) are in boldface italicised font

There is no significant difference in the estimated odds of at-risk drinking for males and females after adjusting for age (OR: 0.89, 95% CI: 0.70 to 1.13, $p=0.346$). However, at-risk drinking is significantly associated with age after adjustment for gender: a one year increase in age is associated with a 2% reduction in the risk of at-risk drinking (OR: 0.98, 95% CI: 0.97 to 0.99, $p=0.001$).

The proportion of veterinary surgeons in each AUDIT-C category and normative data for the general population of Great Britain is presented in Table 5.18. There is a significant difference between the distribution of veterinary surgeons and the general population across drinking categories ($\chi^2=150.4$, df=2, $p<0.001$). The proportion of veterinary surgeons who are non-drinkers is lower than among the general population (5.4%, 95% CI: 4.4 to 6.6% vs. 12.3%; $\chi^2=70.1$, df=1, $p<0.001$) and the proportion of veterinary surgeons who are at-risk drinkers is higher than for the general population (62.6%, 95% CI: 60.3 to 64.8% vs. 47.7%; $\chi^2=128.7$, df=1, $p<0.001$).

Table 5.18: AUDIT-C drinking categories for veterinary surgeons and normative data for the general population in Great Britain

	n	Non-drinkers % (95% CI) score 0	Low-risk drinkers % (95% CI) score 1 to 4 for men score 1 to 3 for women	At-risk drinkers % (95% CI) score ≥ 5 for men score ≥ 4 for women
Veterinary surgeons				
Total	1757	5.4 (0.4 to 6.6)	32.0 (29.9 to 34.3)	62.6 (60.3 to 64.8)
Male	881	4.1 (3.0 to 5.6)	33.5 (30.4 to 36.7)	62.4 (59.2 to 65.6)
Female	876	6.7 (5.3 to 8.6)	30.6 (27.6 to 33.7)	62.7 (59.4 to 65.8)
General population[†]				
Total	8575	12.3 (11.6 to 13.0)	39.9 (38.9 to 40.9)	47.7 (46.6 to 48.8)
Male	3849	9.3 (8.4 to 10.3)	37.0 (35.5 to 38.5)	53.6 (52.0 to 55.2)
Female	4726	14.8 (13.8 to 15.9)	42.3 (40.9 to 43.7)	42.9 (41.5 to 44.3)

[†] Figures are derived from the *Psychiatric Morbidity among Adults living in Private Households, 2000* survey (Singleton and others 2001), a cross-sectional study of a nationally representative sample of adults in households in Great Britain. The dataset used to make these calculations was sourced from: Office for National Statistics, Psychiatric Morbidity among Adults Living in Private Households, 2000 [computer file]. Colchester, Essex: UK Data Archive [distributor], May 2003. SN: 4653. The age range of the sample was 16-74 with a mean age of 45.4 years (SD=15.6) and 55.1% were female.

Frequency of drinking, typical quantity consumed and frequency of binge drinking for veterinary surgeons is compared with normative data for the general population of Great Britain in Table 5.19. In comparison with the corresponding gender in the general population, male and female veterinary surgeons drink more frequently, consume fewer units of alcohol on a typical drinking day and have a similar frequency of binge drinking.

The AUDIT-C scale demonstrated moderate internal consistency in the study sample (Cronbach's α=0.70).

Table 5.19: Frequency of drinking, typical quantity consumed and frequency of binge drinking for veterinary surgeons and the GB general population

Alcohol consumption/AUDIT-C	Male veterinary surgeons %	Male general population† %	χ^2	Female veterinary surgeons %	Female general population† %	χ^2
	n=881	*n*=3852		*n*=876	*n*=4728	
Frequency of drinking						
Never	4.2	9	χ^2=22.2, df=1, p<0.001	6.7	14	χ^2=34.8, df=1, p<0.001
> 2 times a week	70.7	57	χ^2=55.9, df=1, p<0.001	59.5	38	χ^2=140.4, df=1, p<0.001
≥ 4 times a week	38.1	21	χ^2=114.8, df=1, p<0.001	24.3	12	χ^2=93.7, df=1, p<0.001
	n=849	*n*=3492		*n*=819	*n*=4028	
Quantity on typical drinking day						
≥ 5 units	24.5	39	χ^2=62.0, df=1, p<0.001	12.5	18	χ^2=14.8, df=1, p<0.001
	n=861	*n*=3852		*n*=852	*n*=4728	
Frequency of binge drinking (≥ 6 units on one occasion)						
Weekly	21.3	24	χ^2=3.0, df=1, p=0.084	10.6	9	χ^2=2.1, df=1, p=0.150
Daily or almost daily	3.4	3	χ^2=0.3, df=1, p=0.584	0.9	1	χ^2=0.02, df=1, p=0.881

† Source: Coulthard and others 2002 (findings from the *Psychiatric Morbidity among Adults living in Private Households, 2000* survey)

5.3.1 Summary

- 5.4% (95% CI: 0.4 to 6.6%) of veterinary surgeons are non-drinkers, 32.0% (95% CI: 29.9 to 34.3%) are low-risk drinkers and 62.6% (95% CI: 60.3 to 64.8%) are at-risk drinkers.

- Male veterinary surgeons are more likely to drink, to drink more often, and to drink more heavily on each occasion than female veterinary surgeons ($p<0.001$).

- 65.1% (95% CI: 62.9 to 67.3%) of veterinary surgeons drink at least twice a week; 45.5% (95% CI: 43.1 to 47.9%) consume only one or two drinks when drinking; 15.9% (95% CI: 14.2 to 17.7%) drink 6 or more units on one occasion on a weekly basis and 2.2% (95% CI: 1.6 to 3.0%) on a daily basis.

- There is no significant difference between the estimated odds of at-risk drinking for males and females after adjustment for age (OR: 0.89, 95% CI: 0.70 to 1.13, $p=0.346$).

- At-risk drinking is significantly associated with age after adjustment for gender: a one year increase in age is associated with a 2% reduction in the risk of at-risk drinking (OR: 0.98, 95% CI: 0.97 to 0.99, $p=0.001$).

- For veterinary surgeons graduating in the previous 5 years, the estimated odds of at-risk drinking is highest among Bristol and Liverpool graduates and significantly lower than Liverpool graduates for graduates of EU or EEA countries (OR: 0.12, 95% CI: 0.04 to 0.37, $p<0.001$)

- The estimated odds of at-risk drinking does not differ significantly across RCVS certificate or diploma holders, or hours worked or on-call in a typical week.

5.4 Suicidal ideation

The proportion of veterinary surgeons giving a positive response to each of the three questions regarding negative thoughts about their life in the previous 12 months is presented in Table 5.20. The 12-month prevalence of any suicidal ideation is 29.4% (95% CI: 27.3 to 31.5%) (life was not worth living: 23.0%, 95% CI: 21.1 to 25.0%; death wishes: 15.0%, 95% CI: 13.4 to 16.8%; suicidal thoughts: 21.3%, 95% CI: 19.5 to 23.3%). Women are more likely than men to think that life is not worth living (20.6% vs. 25.4%, difference=4.8%, 95% CI of difference: 0.9 to 8.7%, χ^2= 5.7, df=1, p=0.017) but there is otherwise no statistically significant difference between genders or the age groups examined.

The associations between the 12-month prevalence of suicidal thoughts (a positive response to the question: '*Have you thought of taking your life, even if you would not really do it?*') was examined. The results are presented in Table 5.21. Veterinary surgeons in mixed practice (OR: 0.48, 95% CI: 0.31 to 0.72, p<0.001) and university – clinical (OR: 0.32, 95% CI: 0.13 to 0.74, p=0.008) roles have significantly lower odds of reporting suicidal thoughts in comparison with veterinary surgeons in small animal practice (the reference group). There are few significant differences for any other demographic or occupational variables. After adjustment for age and gender, veterinary surgeons in mixed practice (OR: 0.50, 95% CI: 0.31 to 0.80, p=0.004) have significantly lower odds of reporting suicidal thoughts in comparison with veterinary surgeons in small animal practice; and full-time assistants (OR: 2.35, 95% CI: 1.27 to 4.35, p=0.007) have significantly higher odds of reporting suicidal thoughts in comparison with sole principals. There is no significant difference between males and females in the estimated odds of reporting having experienced suicidal thoughts in the previous 12 months after adjustment for age (OR: 0.98, 95% CI: 0.73 to 1.31, p=0.891).

Hours worked and hours on-call in a typical week were subsequently entered into the logistic regression model as continuous variables to assess the dose-response relationship between hours worked or on-call and reporting having experienced suicidal thoughts in the previous 12 months. A 1-hour increase in hours worked in a

typical week increases the odds of suicidal thoughts by 1.8% (OR: 1.02, 95% CI: 1.00 to 1.03, p=0.013). By contrast, odds are unaffected by an increase in the number of hours on-call in a typical week (OR: 1.00, 95% CI: 1.00 to 1.01, p=0.455).

Results for the current study are compared to published normative data for the general population in Great Britain and Norwegian physicians in Table 5.22. The estimated 12-month prevalence of suicidal thoughts (21.3%, 95% CI: 19.5 to 23.3%) among veterinary surgeons is significantly higher than among the general population (95% CI of difference: 15.5 to 19.4%, χ^2=691.6, df=1, p<0.001) and Norwegian physicians (95% CI of difference: 7.4 to 12.9%, χ^2=45.9, df=1, p<0.001).

The three items regarding suicidal ideation demonstrated high internal consistency in the study sample (Cronbach's α=0.85).

Table 5.20: Twelve-month prevalence of suicidal ideation

Independent variable	Life not worth living[1]					Wished you were dead[2]					Suicidal thoughts[3]					Any suicidal ideation[4]				
	n	%	OR	95% CI	$p^{\dagger}$	*n*	%	OR	95% CI	$p^{\dagger}$	*n*	%	OR	95% CI	$p^{\dagger}$	*n*	%	OR	95% CI	$p^{\dagger}$
Total	1751	23.0	-	-		1751	15.0	-	-		1749	21.3	-	-		1757	29.3	-	-	
Gender																				
Male	878	20.6	1	-		879	13.5	1	-		878	20.2	1	-		881	27.4	1	-	
Female	873	25.4	1.31	1.05-1.64	***0.017***	872	16.5	1.26	0.97-1.64	0.082	871	22.5	1.15	0.92-1.45	0.232	876	31.2	1.20	0.98-1.48	0.077
Age																				
20-29	296	22.6	1	-	-	296	13.5	1	-	-	296	20.3	1	-	-	297	29.0	1	-	-
30-39	552	24.3	1.09	0.78-1.53	0.592	553	17.0	1.31	0.88-1.96	0.185	550	24.9	1.31	0.93-1.84	0.128	554	32.1	1.32	0.94-1.87	0.112
40-49	499	23.4	1.05	0.74-1.47	0.793	499	15.4	1.17	0.77-1.76	0.461	499	21.6	1.09	0.76-1.55	0.647	501	28.5	1.12	0.78-1.60	0.552
50-59	298	22.5	0.99	0.68-1.46	0.965	297	13.8	1.03	0.64-1.64	0.918	298	17.4	0.83	0.55-1.26	0.380	299	27.1	0.85	0.55-1.30	0.446
60-69	82	14.6	0.59	0.30-1.15	0.118	82	4.9	0.33	0.11-0.95	***0.039***	82	13.4	0.61	0.30-1.22	0.163	82	23.2	0.64	0.31-1.30	0.220
70+	15	6.7	0.24	0.03-1.89	0.117	15	13.3	0.99	0.21-4.53	0.984	15	20.0	0.98	0.27-3.60	0.980	15	20.0	1.04	0.28-3.85	0.955

[1] A positive response to the question: '*Have you felt that life was not worth living?*'

[2] A positive response to the question: '*Have you wished that you were dead?*'

[3] A positive response to the question: '*Have you thought of taking your life, even if you would not really do it?*'

[4] A positive response to any of the three questions above; an extended definition of suicidal thoughts used by Gunnell and Harbord (2003)

OR, Odds ratio

CI, Confidence interval

[†] Adjusted *p*-value from simple logistic regression; significant *p*-values ($p<0.010$) are in boldface font; marginally significant *p*-values ($p=0.010$ to $p=0.049$) are in boldface italicised font

Table 5.21: Associations between demographic and occupational factors and 12-month prevalence of suicidal thoughts

Independent variable	*n*	%	Suicidal thoughts[1]					
			Crude			Adjusted		
			OR	95% CI	*p*-value[†]	OR	95% CI	*p*-value[†]
Veterinary school[§]								
Liverpool	44	25.0	1	-	-	1	-	-
London	55	12.7	0.39	0.14 to 1.08	0.069	0.70	0.41 to 1.19	0.186
EU or EEA countries	26	19.2	0.57	0.18 to 1.84	0.350	1.23	0.78 to 1.96	0.372
Non-EU/EEA countries	19	15.8	0.49	0.12 to 1.96	0.309	0.81	0.50 to 1.34	0.414
Glasgow	25	24.0	0.96	0.33 to 2.85	0.945	0.94	0.58 to 1.52	0.801
Edinburgh	38	26.3	0.92	0.35 to 2.43	0.861	0.84	0.54 to 1.32	0.459
Cambridge	27	18.5	0.75	0.25 to 2.30	0.614	0.99	0.58 to 1.68	0.966
Bristol	34	11.8	0.36	0.10 to 1.22	0.100	1.35	0.80 to 2.31	0.263
	268	19.0	-	-	-	-	-	-
Main type of work								
Small animal practice	992	24.4	1	-	-	1	-	-
Farm animal practice	78	21.8	0.86	0.50 to 1.51	0.606	0.96	0.52 to 1.79	0.904
Equine practice	144	21.5	0.85	0.56 to 1.30	0.452	0.86	0.52 to 1.40	0.535
Mixed practice	218	13.3	0.48	0.31 to 0.72	**<0.001**	0.50	0.31 to 0.80	**0.004**
Other speciality practice	35	17.1	0.64	0.26 to 1.56	0.328	0.48	0.17 to 1.33	0.156
Charity	32	37.5	1.86	0.90 to 3.86	0.096	3.75	0.83 to 16.89	0.085
Government	109	16.5	0.61	0.36 to 1.04	0.068	1.11	0.38 to 3.22	0.853
University – non-clinical	34	8.8	0.30	0.09 to 0.99	***0.048***	0.59	0.15 to 2.32	0.449
University – clinical	65	9.2	0.32	0.13 to 0.74	**0.008**	0.35	0.10 to 1.19	0.093
Industry	34	26.5	1.12	0.51 to 2.42	0.782	1.61	0.45 to 5.80	0.466
Outside the profession	8	0	-	-	-	-	-	-
Employment status								
Full-time	1431	21.6	1	-	-	1	-	-
Part-time	282	21.6	1.00	0.74 to 1.37	0.989	1.08	0.52 to 2.25	0.843
Unemployed	1	100	-	-	-	-	-	-
Career break	9	11.1	0.45	0.57 to 3.64	0.457	0.75	0.07 to 7.64	0.809
Partially retired	26	7.7	0.30	0.71 to 1.29	0.106	0.53	0.10 to 2.73	0.444
Fully retired	4	0	-	-	-	-	-	-

Continued overleaf

Independent variable			Suicidal thoughts[1]					
			Crude			Adjusted		
	n	%	OR	95% CI	*p*-value[†]	OR	95% CI	*p*-value[†]
Position in practice								
Sole principal	139	18.7	1	-	-	1	-	-
Partner	300	17.3	0.91	0.54 to 1.53	0.727	1.50	0.71 to 3.14	0.285
Salaried partner	13	23.1	1.30	0.34 to 5.07	0.702	1.37	0.33 to 5.74	0.666
Partner/director	153	21.6	1.20	0.67 to 2.12	0.543	1.46	0.61 to 3.49	0.393
Full-time assistant	632	25.3	1.47	0.93 to 2.34	0.101	2.35	1.27 to 4.35	**0.007**
Part-time assistant	179	22.3	1.25	0.72 to 2.17	0.428	1.20	0.61 to 2.36	0.593
Consultant	28	10.7	0.52	0.15 to 1.86	0.316	2.12	0.88 to 5.10	0.093
Locum	73	26.0	1.53	0.78 to 3.00	0.217	2.49	0.70 to 8.83	0.159
Other	76	21.1	1.16	0.58 to 2.33	0.678	0.81	0.42 to 7.79	0.425
Not applicable	150	14.0	0.71	0.38 to 1.33	0.280	2.32	0.85 to 6.32	0.100
Ownership of practice								
Sole principal	409	23.0	1	-		1	-	-
Partnership	731	21.3	0.91	0.68 to 1.22	0.520	1.00	0.70 to 1.44	0.996
Limited company	261	21.5	0.92	0.63 to 1.33	0.644	0.87	0.54 to 1.40	0.559
Corporate concern	47	27.7	1.28	0.65 to 2.53	0.475	1.18	0.57 to 2.46	0.653
Charity	53	30.2	1.45	0.77 to 2.72	0.249	0.65	0.17 to 2.47	0.532
Other	46	19.6	0.82	0.38 to 1.75	0.600	0.78	0.25 to 2.47	0.675
Not applicable	185	13.5	0.52	0.32 to 0.85	**0.008**	0.32	0.10 to 1.05	0.060
RCVS certificate or diploma								
Yes	282	22.0	1	-		1	-	-
No	1463	21.2	0.95	0.70 to 1.29	0.765	0.81	0.56 to 1.17	0.257
Hours worked in a typical week								
0-9	18	16.7	1	-		1	-	-
10-19	64	12.5	0.71	0.17 to 3.03	0.648	0.51	0.11 to 2.39	0.394
20-29	128	25.8	1.74	0.47 to 6.38	0.406	1.59	0.40 to 6.31	0.514
30-39	214	20.1	1.26	0.35 to 4.54	0.727	0.98	0.24 to 4.05	0.977
40-49	687	19.8	1.23	0.35 to 4.32	0.742	0.98	0.23 to 4.14	0.977
50-59	445	24.0	1.58	0.45 to 5.57	0.475	1.41	0.33 to 6.04	0.640
60-69	133	19.5	1.22	0.33 to 4.51	0.771	1.18	0.26 to 5.28	0.831
70-79	35	22.9	1.48	0.34 to 6.44	0.600	1.49	0.28 to 7.80	0.639
80+	8	50.0	5.00	0.78 to 32.10	0.090	4.94	0.59 to 41.20	0.140

Continued overleaf

Independent variable			Suicidal thoughts[1]					
			Crude			Adjusted		
	n	%	OR	95% CI	*p*-value[†]	OR	95% CI	*p*-value[†]
Hours on call in a typical week								
0-9	789	21.8	1	-		1	-	-
10-19	304	23.4	1.09	0.80 to 1.50	0.580	1.00	0.70 to 1.42	0.979
20-29	302	21.5	0.98	0.71 to 1.36	0.921	1.08	0.75 to 1.56	0.693
30-39	173	12.7	0.52	0.32 to 0.84	**0.008**	0.58	0.34 to 0.99	***0.044***
40-49	70	24.3	1.15	0.65 to 2.04	0.631	1.50	0.79 to 2.84	0.214
50-59	31	19.4	0.86	0.35 to 2.13	0.746	0.89	0.34 to 2.34	0.813
60-69	16	25.0	1.20	0.38 to 3.75	0.759	1.56	0.45 to 5.39	0.485
70-79	8	25.0	1.20	0.24 to 5.98	0.828	1.30	0.22 to 7.72	0.772
80+	61	24.6	1.17	0.64 to 2.15	0.613	1.40	0.70 to 2.80	0.346

[§] Only for veterinary surgeons graduating in the previous 5 years (2003 to 2007 inclusive)

OR, Odds ratio

CI, Confidence interval

[1] A positive response to the question '*Have you thought of taking your life, even if you would not really do it*?'

Adjusted figures are from separate multivariable analyses adjusting for age and gender only

[†] Adjusted *p*-value from logistic regression; significant *p*-values ($p<0.010$) are in boldface font; marginally significant *p*-values ($p=0.010$ to $p=0.049$) are in boldface italicised font

Table 5.22: Twelve-month prevalence of suicidal thoughts among UK veterinary surgeons, the GB general population and Norwegian physicians

	Suicidal thoughts[§]							
	General population		Statistical test	Veterinary surgeons		Statistical test	Norwegian physicians[c]	
Independent variable	*n*	%		*n*	% 95% CI		*n*	%
Total	8572	3.9[a]	χ^2=691.6, df=1, *p*<0.001	1749	21.3 19.5-23.3	χ^2=45.9, df=1, *p*<0.001	1014	11.1
Gender								
Male	3848	3.6[a]	χ^2=698.0, df=3, *p*<0.001	878	20.2	χ^2=48.7, df=3, *p*<0.001	726	10.7
Female	4724	4.1[a]		871	22.5		288	11.8
Age[*]								
< 35	NR	5.3[b]		610	22.8		NR	NR
35-54	NR	4.0[b]		909	20.9		NR	NR
55-74	NR	1.5[b]	-	216	19.4	-	NR	NR
75+	NR	-		-	-		NR	NR

[§] A positive response to the question '*Have you thought of taking your life, even if you would not really do it?*'

[*] Age categories selected to enable comparison with published data for the general population [b]

NR, Not reported

Source: [a] Meltzer and others (2002); [b] Dennis and others (2007); [c] Hem and others (2000)

5.4.1 Summary

- The 12-month prevalence of any suicidal ideation among veterinary surgeons is 29.4% (95% CI: 27.3 to 31.5%). The prevalence for women is slightly higher than for men (31.3% vs. 27.4%, difference=3.9%, 95% CI of difference: 8.1 to -0.4%) but the difference is not statistically significant (χ^2=3.1, df=1, *p*=0.076).

- There is no statistical difference in the 12-month prevalence of any suicidal ideation between age groups.

- The 12-month prevalence of suicidal thoughts is 21.3% (95% CI: 19.5 to 23.3%).

- After adjustment for age and gender, veterinary surgeons in mixed practice (OR: 0.50, 95% CI: 0.31 to 0.80, p=0.004) have significantly lower odds of reporting suicidal thoughts in comparison with veterinary surgeons in small animal practice; and full-time assistants (OR: 2.35, 95% CI: 1.27 to 4.35, p=0.007) have significantly higher odds of reporting suicidal thoughts in comparison with sole principals.

- A 1-hour increase in hours worked in a typical week increases the odds of suicidal thoughts by 1.8% (OR: 1.02, 95% CI: 1.00 to 1.03, p=0.013).

- The estimated prevalence of suicidal thoughts among veterinary surgeons is around 5 times higher than among the general population.

5.5 Warwick-Edinburgh Mental Well-being Scale (WEMWBS)

Score distribution for the sample is near normal with a slight negative skew (Figure 5.20).

Figure 5.21 shows the proportion of respondents giving each response to each WEMWBS question.

Mean and median scores for veterinary surgeons are compared across different demographic and occupational factors in Table 5.23.

The mean WEMWBS score for the sample of veterinary surgeons is 48.85 (SD=9.06) and the mean score is significantly higher for men than for women (49.86 vs. 47.83, difference=2.03, 95% CI of difference: 1.19 to 2.87, $F(1, 1755)=22.3$, $p<0.001$).

Differences are also observed across age groups ($F(5, 1742)=6.6$, $p<0.001$), with higher scores observed for veterinary surgeons aged ≥ 60 years.

Differences are observed across type of work ($F(10, 1746)=2.3$, $p=0.012$), with higher scores observed for veterinary surgeons working outside the profession and in university – non-clinical roles; the lowest scores are observed for those working in charity and government roles.

Multiple linear regression was applied to identify the factors that are associated with WEMWBS score after adjusting for age and gender (Table 5.24).

There is a significant relationship between WEMWBS and age adjusted for gender: the score increases by 0.05 for every one year increase in age (Coef. 0.05, 95% CI: 0.01 to 0.09, $p=0.012$). There is also a significant difference in mean WEMWBS between genders adjusted for age: the mean score for females is 1.65 units lower than the mean score for males (Coef. -1.65, 95% CI: -2.55 to -0.74, $p<0.001$).

There is no significant difference in mean score between recent graduates of different veterinary schools in comparison with Liverpool graduates after adjusting for age and gender.

The mean scores for veterinary surgeons working in university – non-clinical and university – clinical roles are higher in comparison with those working in small animal practice after adjusting for age and gender (university – non-clinical: Coef. 3.50, 95% CI: 0.37 to 6.62, p=0.029; university – clinical: Coef. 2.76, 95% CI: 0.48 to 5.03, p=0.018).

There are no significant differences in mean score between different employment statuses, positions in practice, ownership of practice, holders and non-holders of an RCVS certificate or diploma, hours worked in a typical week or hours on-call in a typical week after adjusting for age and gender.

Figure 5.20: WEMWBS score distribution for sample population of veterinary surgeons

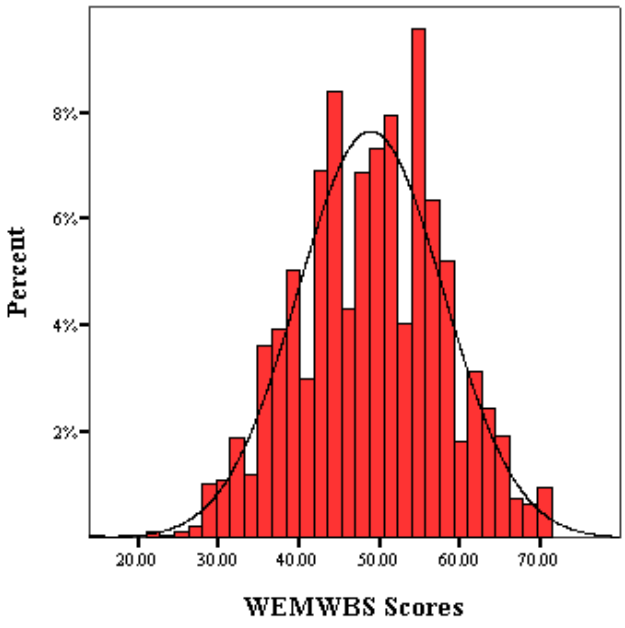
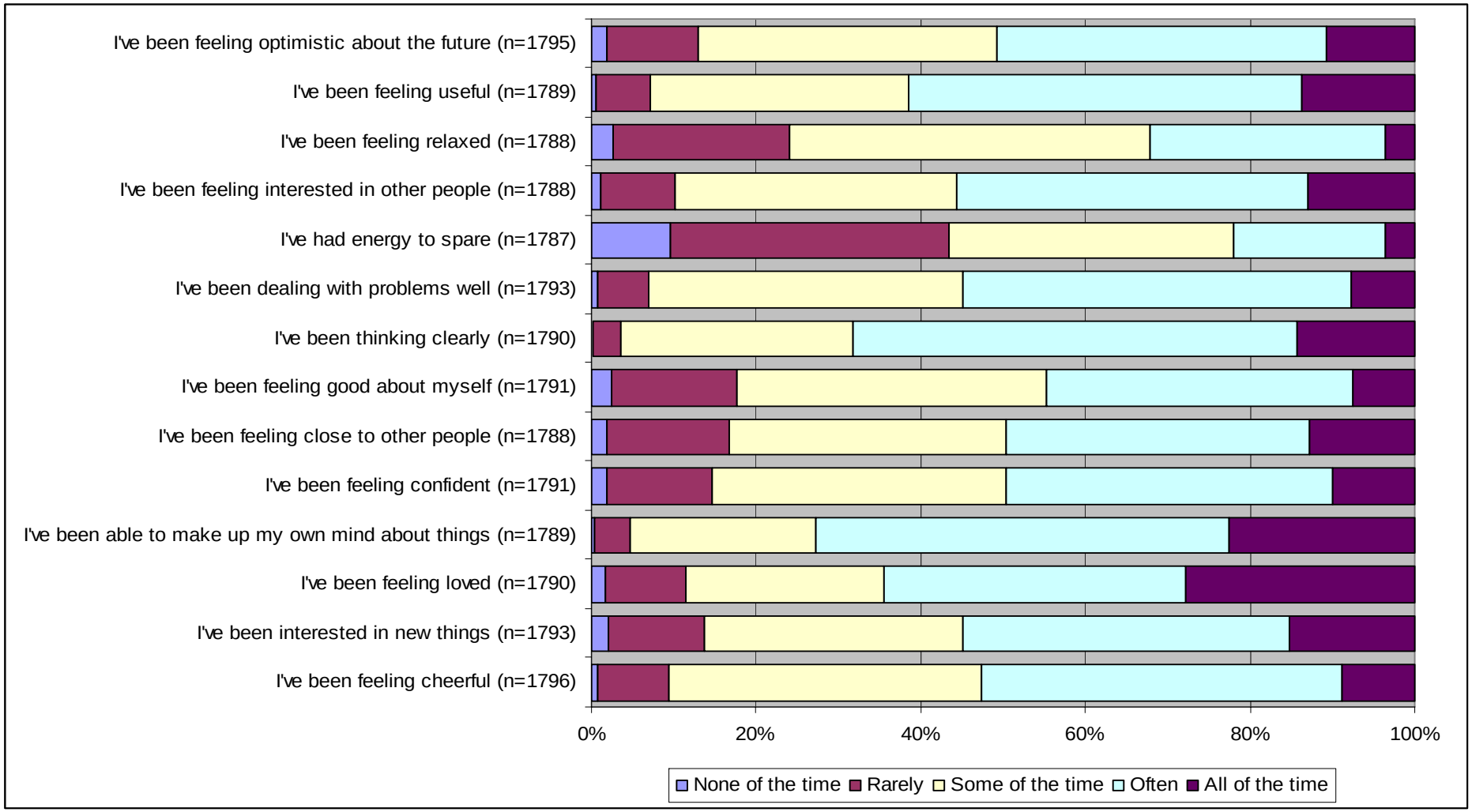


Figure 5.21: Proportion of respondents giving each WEMWBS question response



Excludes imputed values

Table 5.23: WEMWBS scores across demographic and occupational factors

Independent variable	WEMWBS score					Statistical test[†]
	n	median	mean	95% CI	SD	
Total	1757	49	48.85	48.43 to 49.28	9.06	
Gender						
Male	881	50	49.86	49.27 to 50.46	8.99	$F(1, 1755)=22.3$, $p<$**0.001**
Female	876	48	47.83	47.24 to 48.43	9.02	
Age						
20-29	297	49	48.31	47.33 to 49.30	8.63	$F(1, 1742)=6.6$, $p<$**0.001**
30-39	554	48	48.27	47.52 to 49.02	8.99	
40-49	501	49	48.56	47.76 to 49.36	9.14	
50-59	299	49	49.42	48.36 to 50.49	9.36	
60-69	82	54	53.24	51.46 to 55.20	8.50	
70+	15	54	55.56	52.48 to 58.65	5.57	
Veterinary school[§]						
Liverpool	45	48	47.98	45.14 to 50.82	9.45	$F(7, 261)=0.9$, $p=0.506$
London	55	49	48.49	46.39 to 50.59	7.76	
EU or EEA countries	26	52	51.51	48.59 to 54.43	7.24	
Non-EU/EEA countries	19	49	50.50	45.69 to 55.30	9.97	
Glasgow	25	50	46.68	45.22 to 52.14	8.39	
Edinburgh	38	49.5	47.23	43.54 to 50.92	11.22	
Cambridge	27	53	50.49	47.44 to 53.55	7.72	
Bristol	34	45	47.65	44.65 to 50.65	8.60	
Total	269	50	48.77	47.71 to 49.84	8.88	
Main type of work						
Small animal practice	997	48	48.27	47.70 to 48.84	9.21	$F(10, 1476)=2.3$, $p=$***0.012***
Farm animal practice	79	50	49.86	48.08 to 51.65	7.97	
Equine practice	144	51	49.58	48.25 to 50.91	8.08	
Mixed practice	219	50	49.48	48.30 to 50.65	8.82	
Other speciality practice	35	49	50.54	47.17 to 53.90	9.79	
Charity	32	46.5	46.74	43.10 to 50.37	10.09	
Government	110	47.5	47.96	46.09 to 49.83	9.88	
University – non-clinical	34	52.5	52.55	50.08 to 55.01	7.06	
University – clinical	65	51	51.40	49.28 to 53.52	8.55	
Industry	34	49	48.82	45.82 to 51.82	8.60	
Outside the profession	8	53	51.50	43.79 to 59.21	9.23	
Employment status						
Full-time	1439	49	48.80	48.33 to 49.27	9.08	$F(5, 1755)=1.2$, $p=0.334$
Part-time	282	49	48.72	47.65 to 49.78	9.09	
Unemployed	1	65	65.00	-		
Career break	9	47	49.67	43.61 to 55.72	7.87	
Partially retired	26	53	51.18	47.93 to 54.42	8.04	
Fully retired	4	54	52.50	43.00 to 62.00	5.97	
Position in practice						
Sole principal	140	50	50.05	48.47 to 51.63	9.46	$F(9, 1741)=2.3$, $p=$***0.015***
Partner	302	50	50.23	49.25 to 51.22	8.71	
Salaried partner	13	53	49.31	43.61 to 55.01	9.44	
Partner/director	153	49	48.36	46.91 to 49.82	9.11	
Full-time assistant	636	48	47.90	47.19 to 48.60	9.07	
Part-time assistant	179	49	48.66	47.39 to 49.93	8.64	
Consultant	28	53	49.72	45.85 to 53.59	9.98	
Locum	73	48.5	48.64	46.27 to 51.01	10.15	
Other	76	47	47.74	45.75 to 49.72	8.68	
Not applicable	151	40	49.88	48.44 to 51.31	8.92	
Ownership of practice						
Sole principal	412	49	48.53	47.64 to 49.40	9.04	$F(6, 1733)=1.0$, $p=0.435$
Partnership	735	50	49.16	48.50 to 49.82	9.08	
Limited company	261	49	48.36	47.24 to 49.47	9.14	
Corporate concern	47	45	47.15	44.24 to 50.06	9.92	
Charity	53	47	47.67	45.17 to 50.18	9.09	
Other	46	47	48.74	45.70 to 51.78	10.25	
Not applicable	186	50	49.58	48.35 to 50.81	8.51	

Continued overleaf

Independent variable	WEMWBS score					Statistical test[†]
	n	median	mean	95% CI	SD	
RCVS certificate or diploma						
Yes	284	50	49.06	48.00 to 50.11	9.00	$F(1, 1751)=0.2$, $p=0.650$
No	1469	49	48.79	48.32 to 49.25	9.08	
Hours worked in a typical week						
0-9	18	50	47.52	42.60 to 52.45	9.91	$F(8, 1730)=1.5$, $p=0.141$
10-19	64	53	50.24	48.02 to 52.47	8.91	
20-29	128	49	48.90	47.34 to 50.45	8.88	
30-39	214	49.5	49.59	48.42 to 50.76	8.71	
40-49	689	50	49.29	48.62 to 49.96	8.93	
50-59	448	48	48.04	47.17 to 48.91	9.39	
60-69	135	49	48.68	47.12 to 50.23	9.13	
70-79	35	50	48.51	45.97 to 51.05	7.41	
80+	8	45.5	42.84	35.66 to 50.01	8.58	
Hours on call in a typical week						
0-9	792	49	48.82	48.16 to 49.48	9.41	$F(8, 1753)=0.7$, $p=0.728$
10-19	306	49	48.75	47.71 to 49.79	9.24	
20-29	304	49	48.87	47.90 to 49.84	8.60	
30-39	173	49	49.77	48.55 to 50.99	8.12	
40-49	70	47.5	48.07	46.34 to 49.81	7.28	
50-59	31	49	48.41	45.23 to 51.58	8.66	
60-69	16	50.5	48.44	43.71 to 53.17	8.87	
70-79	8	43.5	43.50	37.41 to 49.60	7.29	
80+	62	49	48.69	46.03 to 51.35	10.47	

[§] Only for veterinary surgeons graduating in the previous 5 years (2003 to 2007 inclusive)

[†] One-way ANOVA, significant *p*-values ($p<0.010$) are in boldface font; marginally significant *p*-values ($p=0.010$ to $p=0.049$) are in boldface italicised font

Table 5.24: The effect of demographic and occupational factors on WEMWBS scores after adjustment for age and gender

Independent variable	WEMWBS score regression		
	Coef.	95% CI	*p*-value[†]
Veterinary school[§]			
Liverpool	1	-	-
London	0.41	-3.05 to 3.87	0.815
EU or EEA countries	3.54	-0.69 to 7.77	0.100
Non-EU/EEA countries	3.09	-1.59 to 7.76	0.195
Glasgow	0.63	-3.58 to 4.84	0.768
Edinburgh	-0.07	-3.84 to 3.70	0.971
Cambridge	2.42	-1.79 to 6.63	0.258
Bristol	-0.71	-4.64 to 3.22	0.722
Main type of work			
Small animal practice	1	-	-
Farm animal practice	0.78	-1.31 to 2.87	0.464
Equine practice	0.87	-0.73 to 2.47	0.285
Mixed practice	0.95	-0.38 to 2.28	0.161
Other speciality practice	1.71	-1.32 to 4.75	0.269
Charity	-1.61	-4.87 to 1.66	0.334
Government	-1.20	-3.02 to 0.61	0.193
University – non-clinical	3.50	0.37 to 6.62	***0.029***
University – clinical	2.76	0.48 to 5.03	***0.018***
Industry	-0.28	-3.37 to 2.81	0.857
Outside the profession	2.72	-3.54 to 8.97	0.394
Employment status			
Full-time	1	-	-
Part-time	0.27	-0.97 to 1.51	0.667
Unemployed	17.19	-0.47 to 34.84	0.056
Career break	2.07	-3.85 to 7.98	0.494
Partially retired	0.87	-2.73 to 4.48	0.634
Fully retired	2.05	-6.85 to 10.95	0.652
Position in practice			
Sole principal	1	-	-
Partner	0.00	-1.82 to 1.83	0.999
Salaried partner	-0.47	-5.62 to 4.68	0.857
Partner/director	-1.71	-3.80 to 0.38	0.109
Full-time assistant	-1.26	-3.12 to 0.60	0.183
Part-time assistant	-0.40	-2.51 to 1.72	0.712
Consultant	-0.13	-3.86 to 3.60	0.944
Locum	-0.82	-3.44 to 1.81	0.542
Other	-1.99	-4.56 to 0.58	0.128
Not applicable	-0.20	-2.30 to 1.89	0.851
Ownership of practice			
Sole principal	1	-	-
Partnership	0.45	-0.66 to 1.54	0.427
Limited company	-0.53	-1.94 to 0.88	0.460
Corporate concern	-1.31	-4.04 to 1.42	0.345
Charity	-0.73	-3.36 to 1.90	0.587
Other	-0.06	-2.81 to 2.69	0.966
Not applicable	0.33	-1.27 to 1.93	0.689
RCVS certificate or diploma			
Yes	1	-	-
No	0.10	-1.06 to 1.27	0.863

Continued overleaf

Independent variable	WEMWBS score regression		
	Coef.	95% CI	*p*-value[†]
Hours worked in a typical week			
0-9	1	-	-
10-19	3.19	-1.50 to 7.88	0.182
20-29	1.62	-2.80 to 6.04	0.472
30-39	2.27	-2.05 to 6.59	0.302
40-49	1.82	-2.40 to 6.03	0.397
50-59	0.39	-3.87 to 4.64	0.859
60-69	0.56	-3.88 to 4.99	0.805
70-79	0.27	-4.85 to 5.39	0.919
80+	-5.18	-13.01 to 2.64	0.194
Hours on call in a typical week			
0-9	1	-	-
10-19	0.10	-1.11 to 1.31	0.874
20-29	0.09	-1.13 to 1.30	0.891
30-39	0.82	-0.68 to 2.32	0.283
40-49	-0.58	-2.80 to 1.65	0.612
50-59	-0.99	-4.23 to 2.26	0.550
60-69	-0.54	-4.99 to 3.92	0.814
70-79	-5.78	-12.05 to 0.50	0.071
80+	-0.24	-2.61 to 2.13	0.842

[§] Only for veterinary surgeons graduating in the previous 5 years (2003 to 2007 inclusive)

Separate multivariable analyses adjusting for age and gender only

[†] Adjusted *p*-value from multiple linear regression; significant *p*-values ($p<0.010$) are in boldface font; marginally significant *p*-values ($p=0.010$ to $p=0.049$) are in boldface italicised font

The mean WEMWBS scores for the total sample of veterinary surgeons, and for male and female veterinary surgeons separately, are significantly lower than the corresponding means for a representative general population sample from Scotland (Braunholtz and others 2007) (Table 5.25).

Table 5.25: WEMWBS scores for veterinary surgeons and the general population of Scotland

	Veterinary surgeons				General population†				
	n	mean (95% CI)	SD	median	*n*	mean	SD	median	Statistical test§
Total	1757	48.85 (48.43-49.28)	9.06	49	973	51.05	8.54	52	$t(2728)=-6.20$, $p<$**0.001**
Gender									
Male	881	49.86 (49.27-50.46)	8.99	50	529	51.21	8.40	52	$t(1404)=-2.80$, $p=$**0.005**
Female	876	47.83 (47.24-48.43)	9.02	48	687	50.92	8.66	52	$t(1561)=-6.84$, $p<$**0.001**

† Source: The Third National Scottish Survey of Public Attitudes to Mental Health, Mental Wellbeing and Mental Health Problems (Braunholtz and others 2007)

§ Comparison of means: Two sample *t*-test with equal variances

The mean WEMWBS scores for veterinary surgeons (and male and female veterinary surgeons separately) are also lower in comparison with a combined national dataset for Scotland[26] (Stewart-Brown and Janmohamed 2008) [Total (*n*=1749): mean=50.7, 95% CI: 50.3 to 51.1; males (*n*=783): mean=51.3, 95% CI: 50.6 to 51.9; females (*n*=966): mean=50.3, 95% CI: 49.7 to 50.3] and the 95% confidence intervals for the respective populations do not overlap, indicating that the differences are significant.

The WEMWBS demonstrated high internal consistency in the study sample (Cronbach's α=0.94).

[26] Combines the WEMWBS data reported by Braunholtz and others (2007) with WEMWBS data from Health Education Population Survey (HEPS) 2006 (wave 12) (NHS Scotland).

5.5.1 Summary

- There is a significant relationship between WEMWBS and age after adjustment for gender: the score increases by 0.05 for every one year increase in age (Coef. 0.05, 95% CI: 0.01 to 0.09, p=0.012).

- There is a significant difference in mean WEMWBS between males and females after adjustment for age: the mean score for females is 1.65 units lower than the mean score for males (Coef: -1.65, 95% CI: -2.55 to -0.74, p<0.001).

- The mean scores for veterinary surgeons in university – non-clinical and university – clinical are marginally significantly higher in comparison with small animal practice after adjusting for age and gender (university – non-clinical: Coef. 3.50, 95% CI: 0.37 to 6.62, p=0.029; university – clinical: Coef. 2.76, 95% CI: 0.48 to 5.03, p=0.018).

- The estimated mean WEMWBS scores for the population of veterinary surgeons and for male and female veterinary surgeons separately, are significantly lower than the corresponding means for the general population of Scotland.

5.6 HSE Management Standards Indicator Tool: Working conditions

For each of the seven scales within the Health and Safety Executive Management Standards Indicator Tool, a low score indicates less favourable working conditions (i.e. more risk of stress at work); a high score indicates more favourable working conditions (i.e. less risk of stress at work). The scores derived for each scale cannot be compared across scales (Webster and others 2007).

The distribution of scores for each of the scales is presented in Figure 5.22.

Mean and median scores for each of the scales for the veterinary profession are presented in Table 5.26. Men report significantly higher scores than women on the scales for *control* ($F(1, 1747)=165.2$, $p<0.001$), *relationships* ($F(1, 1741)=9.3$, $p=0.002$), *role* ($F(1, 1735)=18.1$, $p<0.001$) and *change* ($F(1, 1709)=108.6$, $p<0.001$).

Percentiles for the mean scores for each stressor domain of are presented in Table 5.27 to enable employers to compare their organisational means against national benchmarks.

Mean scores for veterinary surgeons for each scale are compared across different demographic and occupational factors in Tables 5.28 to 5.36. Shaded cells identify the demographic or occupational factors with the highest and lowest scores (most favourable and least favourable working conditions respectively) for each of the seven scales. The *p*-values refer to the significance of differences between mean scores within a stress domain across the demographic or occupational factor concerned (one-way ANOVA).

The response rate was lowest for the *managerial support* domain: 16% of respondents failed to answer at least 4 of the 5 questions (for the other six domains 0.5% to 2.6% failed to answer the requisite number of questions). Respondents who identified their position in the practice as sole principal or partner were least likely to answer (respectively, 46% and 37% failed to respond to at least 4 of the 5 questions) (see Figure 5.6).

Figure 5.22: Distribution of psychosocial working conditions stressor domain scores

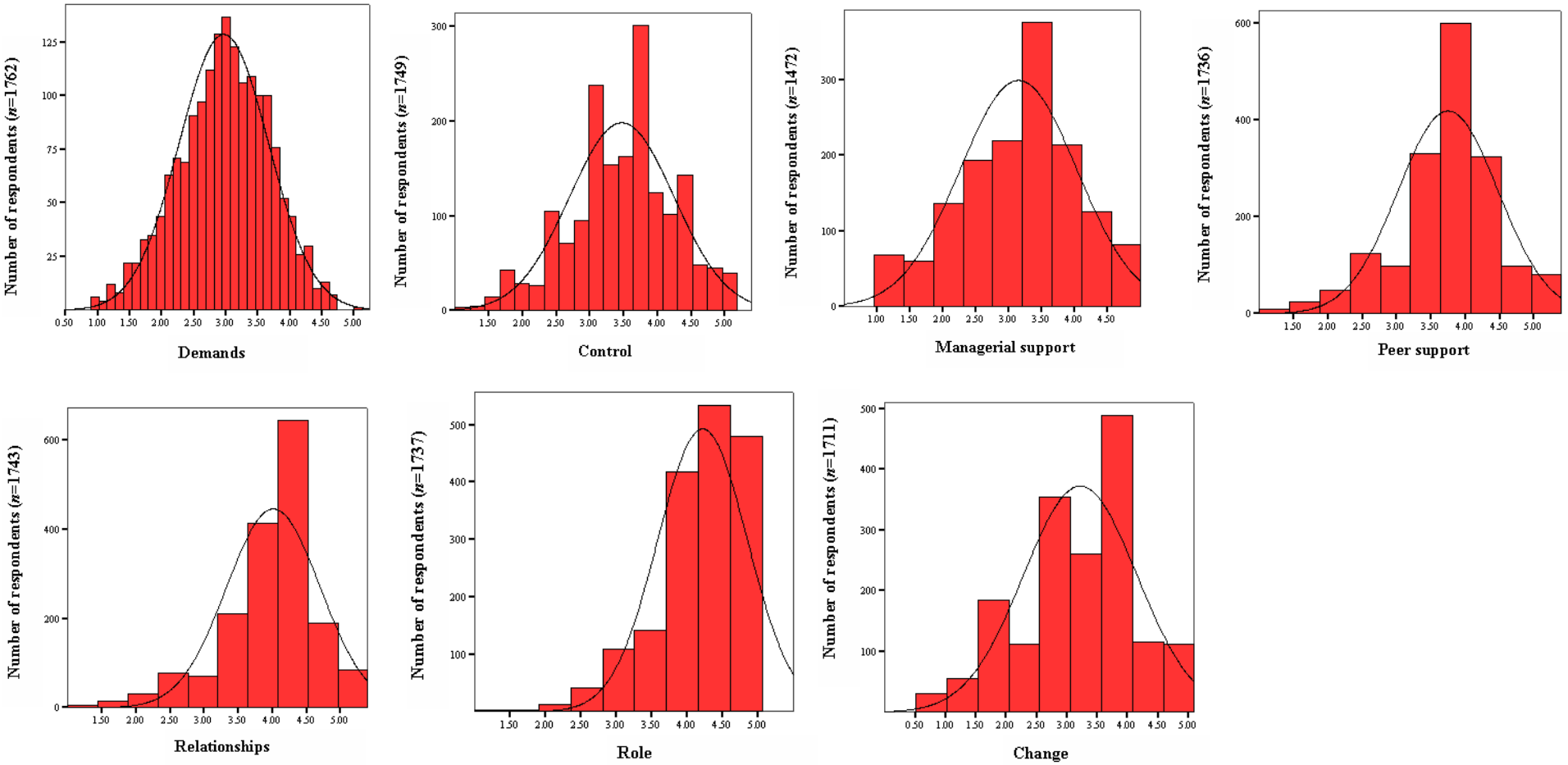


Table 5.26: Stressor domain scores for the sample of veterinary surgeons

	Demands					Control					Managerial support					Peer support				
	n	mean	95% CI	SD	median	*n*	mean	95% CI	SD	median	*n*	mean	95% CI	SD	median	*n*	mean	95% CI	SD	median
Total	1747	2.96	2.93-3.00	0.70	3.00	1749	3.47	3.43-3.51	0.78	3.50	1472	3.14	3.09-3.18	0.89	3.2	1736	3.75	3.71-3.78	0.73	3.75
Gender																				
Male	876	2.96	2.91-3.00	0.71	3.00	878	3.70[†]	3.65-3.74	0.72	3.67	681	3.17	3.10-3.24	0.90	3.2	868	3.74	3.69-3.79	0.73	3.75
Female	871	2.97	2.92-3.01	0.69	3.00	871	3.24	3.19-3.29	0.76	3.33	791	3.11	3.05-3.17	0.88	3.2	868	3.75	3.70-3.80	0.73	3.75

	Relationships					Role					Change				
	n	mean	95% CI	SD	median	*n*	mean	95% CI	SD	median	*n*	mean	95% CI	SD	median
Total	1743	4.01	3.98-4.04	0.69	4.25	1737	4.21	4.18-4.24	0.63	4.20	1711	3.22	3.17-3.26	0.94	3.33
Gender															
Male	875	4.06[§]	4.02-4.11	0.66	4.25	873	4.28[‡]	4.23-4.32	0.62	4.40	858	3.44[¤]	3.39-3.50	0.89	3.67
Female	868	3.96	3.91-4.01	0.71	4.00	864	4.15	4.10-4.19	0.65	4.20	853	2.99	2.92-3.05	0.93	3.00

[†] one-way ANOVA, $F(1, 1747)=165.2$, $p<0.001$

[§] one-way ANOVA, $F(1, 1741)=9.3$, $p=0.002$

[‡] one-way ANOVA, $F(1, 1735)=18.1$, $p<0.001$

[¤] one-way ANOVA, $F(1, 1709)=108.6$, $p<0.001$

Table 5.27: Percentiles for the mean scores for each stressor domain

Percentiles	Demands *n*=1752	Control *n* =1754	Management support *n* =1477	Peer support *n* =1741	Relationships *n* =1748	Role *n* =1742	Change *n* =1716
5	1.75	2.00	1.60	2.50	2.75	3.00	1.33
10	2.00	2.50	2.00	2.75	3.00	3.40	2.00
25	2.50	3.00	2.60	3.33	3.75	3.80	2.67
50	3.00	3.50	3.20	3.75	4.25	4.20	3.33
75	3.50	4.00	3.80	4.25	4.50	4.80	4.00
90	3.88	4.50	4.25	4.75	4.75	5.00	4.33
95	4.04	4.67	4.60	4.75	4.75	5.00	4.67

Table 5.28: Mean stressor domain scores across age groups

	Age						
	20-29	30-39	40-49	50-59	60-69	70+	*p*-value[†]
Demands	3.01	2.91	2.91	3.02	3.25	3.55	**<0.001**
Control	3.01	3.31	3.62	3.77	4.12	4.31	**<0.001**
Managerial support	3.17	3.08	3.10	3.22	3.42	3.52	***0.027***
Peer support	3.81	3.71	3.70	3.76	3.98	4.05	**0.006**
Relationships	3.88	3.95	4.06	4.12	4.17	4.46	**<0.001**
Role	3.99	4.18	4.26	4.32	4.45	4.69	**<0.001**
Change	2.89	3.06	3.37	3.50	3.55	3.75	**<0.001**
n	283-295	509-553	393-499	206-298	64-80	10-15	

Least favourable working conditions Most favourable working conditions

[†] One-way ANOVA

Table 5.29: Mean stressor domain scores across veterinary schools[§]

	Liverpool	London	Overseas (EU or EEA countries)	Overseas (Non-EU/EEA countries)	Glasgow	Edinburgh	Cambridge	Bristol	Total: graduated ≤ 5 years	*p*-value[†]
Demands	2.93	3.07	3.12	3.19	3.07	2.95	3.08	2.91	3.02	0.702
Control	2.99	3.06	3.41	3.34	2.99	2.92	2.84	3.05	3.05	***0.042***
Managerial support	3.25	3.29	3.39	3.22	3.20	3.11	3.30	3.04	3.22	0.836
Peer support	3.82	3.88	4.23	3.93	3.79	3.75	3.94	3.77	3.88	0.213
Relationships	3.88	3.96	3.81	3.80	3.97	3.86	3.87	3.83	3.88	0.982
Role	3.85	4.13	4.03	3.92	4.15	4.01	3.87	4.11	4.02	0.317
Change	2.86	2.98	3.04	2.86	2.85	2.86	3.04	2.90	2.92	0.972
n	45	53-55	25-26	17-19	23-25	36-38	26-27	33	258-268	

Least favourable working conditions Most favourable working conditions

[†] One-way ANOVA

[§] Only for veterinary surgeons graduating in the previous 5 years (2003 to 2007 inclusive)

Table 5.30: Mean stressor domain scores across type of work

	Small animal practice	Farm animal practice	Equine practice	Mixed practice	Other speciality practice	Charity	Government	University – non-clinical	University – clinical	Industry	Outside the profession	*p*-value†
Demands	2.99	3.00	2.96	2.96	2.93	2.75	3.02	3.23	2.53	2.78	3.33	**<0.001**
Control	3.39	3.74	3.65	3.43	3.96	2.89	3.63	3.91	3.36	3.96	3.48	**<0.001**
Managerial support	3.09	3.13	3.20	3.16	3.27	3.12	3.33	3.50	3.06	3.10	3.20	0.138
Peer support	3.74	3.85	3.84	3.76	3.97	3.56	3.70	3.85	3.65	3.52	3.68	0.121
Relationships	4.03	4.10	4.11	3.92	4.10	3.87	3.91	4.24	3.91	3.76	4.46	**0.004**
Role	4.28	4.23	4.29	4.13	4.40	4.08	3.88	4.20	3.98	3.86	4.31	**<0.001**
Change	3.23	3.48	3.34	3.24	3.36	3.04	2.94	3.38	2.85	2.86	3.43	**<0.001**
n	835-994	55-79	114-144	168-219	27-35	31	108	34	64-65	33-34	6-7	

Least favourable working conditions Most favourable working conditions

† One-way ANOVA

Table 5.31: Mean stressor domain scores across current employment status§

	Full-time	Part-time	Partially retired	*p*-value†
Demands	2.89	3.28	3.67	**<0.001**
Control	3.47	3.43	3.98	**0.004**
Managerial support	3.14	3.14	3.04	0.901
Peer support	3.75	3.75	3.71	0.869
Relationships	4.00	4.06	4.36	0.046
Role	4.21	4.23	4.41	0.530
Change	3.26	3.04	3.16	**0.011**
n	1190-1436	258-282	18-25	

Least favourable working conditions Most favourable working conditions

† One-way ANOVA

§ Excludes unemployed, taking a career break and fully retired

Table 5.32: Mean stressor domain scores across position in the practice

	Sole principal	Partner	Salaried partner	Partner/director	Full-time assistant	Part-time assistant	Consultant	Locum	Other	Not applicable	*p*-value†
Demands	2.88	2.84	2.72	2.92	3.00	3.30	3.26	3.15	2.74	2.78	**<0.001**
Control	4.06	3.82	3.60	3.74	3.10	3.24	4.22	3.23	3.50	3.74	**<0.001**
Managerial support	2.97	3.27	3.21	3.32	3.11	3.03	3.12	2.90	3.25	3.23	**0.007**
Peer support	3.79	3.84	3.65	3.74	3.74	3.65	3.81	3.64	3.61	3.79	0.139
Relationships	4.27	4.12	4.06	4.04	3.89	3.98	4.22	3.98	3.74	4.16	**<0.001**
Role	4.56	4.41	4.09	3.97	4.10	4.18	4.29	4.14	3.95	4.41	**<0.001**
Change	3.87	3.81	3.31	3.04	2.87	2.88	3.23	2.85	3.05	3.79	**<0.001**
n	75-140	187-301	12-13	144-146	613-634	172-179	23-28	63-73	76	101-153	

Least favourable working conditions Most favourable working conditions

† One-way ANOVA

Table 5.33: Mean stressor domain scores across practice ownership

	Sole principal	Partnership	Limited company	Corporate concern	Charity	Other	Not applicable	*p*-value†
Demands	3.02	2.99	2.90	2.92	2.92	2.55	2.95	**0.001**
Control	3.44	3.47	3.57	3.15	3.03	3.40	3.64	**<0.001**
Managerial support	3.02	3.14	3.17	3.23	3.38	3.03	3.27	***0.021***
Peer support	3.74	3.77	3.78	3.74	3.72	3.50	3.70	0.278
Relationships	3.98	4.02	4.10	4.07	3.90	3.80	3.98	0.071
Role	4.27	4.24	4.29	4.11	4.19	3.90	3.96	**<0.001**
Change	3.17	3.27	3.43	2.99	3.22	2.80	2.99	**<0.001**
n	334-411	596-734	202-260	47	53	46	178-181	

Least favourable working conditions Most favourable working conditions

† One-way ANOVA

Table 5.34: Mean stressor domain scores for RCVS Certificate or Diploma holders

	RCVS Certificate or Diploma holder		
	Yes	No	*p*-value†
Demands	2.81	3.00	**<0.001**
Control	3.65	3.44	**<0.001**
Managerial support	3.16	3.14	0.736
Peer support	3.72	3.75	0.502
Relationships	4.03	4.01	0.572
Role	4.19	4.21	0.604
Change	3.31	3.20	0.062
n	231-283	1237-1462	

Least favourable working conditions Most favourable working conditions

† One-way ANOVA

Table 5.35: Mean stressor domain scores across hours worked in a typical week

	0-9 hours	10-19 hours	20-29 hours	30-39 hours	40-49 hours	50-59 hours	60-69 hours	70-79 hours	80+ hours	*p*-value†
Demands	3.82	3.48	3.31	3.24	3.04	2.70	2.53	2.44	2.42	**<0.001**
Control	3.74	3.52	3.41	3.56	3.47	3.40	3.54	3.64	3.23	0.093
Managerial support	3.22	3.14	3.17	3.35	3.19	3.04	2.97	2.75	2.76	**<0.001**
Peer support	3.71	3.77	3.80	3.85	3.78	3.71	3.60	3.56	3.34	***0.022***
Relationships	4.28	4.16	4.07	4.03	4.02	3.98	3.91	4.03	3.88	0.232
Role	4.36	4.23	4.24	4.28	4.21	4.16	4.21	4.37	4.08	0.249
Change	3.25	3.03	3.01	3.30	3.25	3.18	3.34	3.38	3.13	0.068
n	13-17	58-64	115-127	196-214	579-688	361-446	102-135	28-35	7-8	

Least favourable working conditions Most favourable working conditions

† One-way ANOVA

Table 5.36: Mean stressor domain scores across hours on-call in a typical week

	0-9 hours	10-19 hours	20-29 hours	30-39 hours	40-49 hours	50-59 hours	60-69 hours	70-79 hours	80+ hours	*p*-value†
Demands	3.02	2.96	2.93	2.95	2.86	2.94	2.88	2.66	2.74	0.060
Control	3.49	3.39	3.34	3.53	3.46	3.59	3.94	3.67	3.87	**<0.001**
Managerial support	3.15	3.09	3.14	3.18	3.14	3.28	3.01	3.04	3.09	0.969
Peer support	3.72	3.81	3.75	3.75	3.80	3.80	3.78	3.56	3.61	0.660
Relationships	4.04	4.01	3.98	3.92	3.95	4.04	4.23	3.91	4.18	0.217
Role	4.22	4.17	4.16	4.24	4.19	4.29	4.23	4.25	4.47	0.072
Change	3.22	3.19	3.17	3.20	3.19	3.36	3.65	3.21	3.52	0.226
n	689-780	253-306	268-304	135-173	60-70	22-31	9-16	5-8	36-60	

Least favourable working conditions Most favourable working conditions

† One-way ANOVA

Mean scores for the veterinary profession, the working general population (Edwards and others 2008) and nurses (Royal College of Nursing 2006) are compared in Figure 5.23, with higher scores reflecting more favourable conditions.

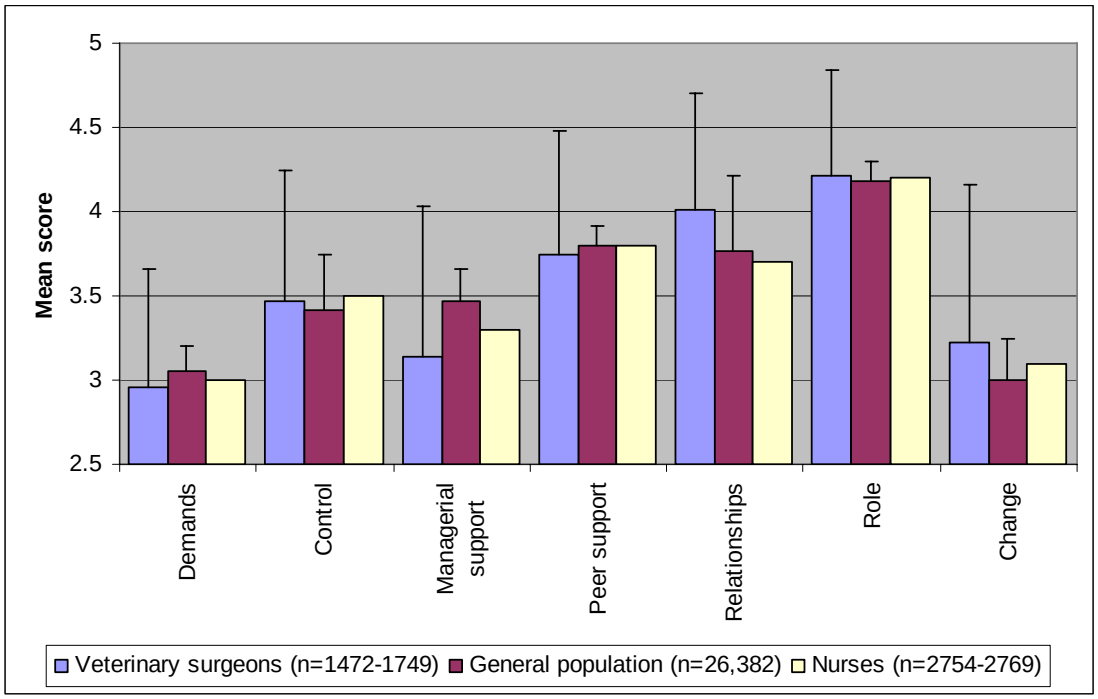
Veterinary surgeons self-report less favourable working conditions (higher risk of work-related stress) than the general population for the *demands*, *managerial support* and *peer support* stressor domains. The mean domain scores for the sample of veterinary surgeons can be compared with the corresponding percentile scores for organisations in the general population sample: *demands*, 10th-25th percentile; *control*, 50th-75th percentile; *managerial support*, 5th-10th percentile; *peer support*, 25th-50th percentile; *relationships*, 75th-90th percentile; *role*, 50th-75th percentile; *change*, 75th-90th percentile (Edwards and others 2008). This indicates that, for example, *managerial support* is as favourable as or better than only 5-10% of the organisations in the general population sample; *relationships* are as favourable as or better than 75-90% of the organisations in the general population sample. The sample self-reports more favourable working conditions than the general population for *relationships*, *role* and *change*. The difference between the mean scores for veterinary surgeons and

the general population for each stressor domain is statistically significant ($p<0.001$) (Table 5.37).

Psychometric analysis has indicated that although the seven sub-scales of HSE MSIT measure distinct concepts, there is evidence consistent with a single underlying construct, suggesting it may be possible to use the scale to derive a single measure of work-related stress (Edwards and others 2008). The difference between the mean score of the overall scale for veterinary surgeons (n=1466, mean=3.45, 95% CI: 3.42 to 3.48) and the mean score of the overall scale for the general population is statistically significant ($p<0.001$) (Table 5.37) which suggests that, when all the stressor domains are taken into consideration, veterinary surgeons report less favourable working conditions. The mean score of the overall scale for veterinary surgeons is in the 25^{th}-50^{th} percentile of organisations in the general population sample (Edwards and others 2008).

Insufficient data are available in the report on the nursing profession to make valid comparisons with the mean scores for the veterinary profession. However, if the assumption is made that the standard deviation of the mean for each of the stressor domains among nurses is the same as among veterinary surgeons, then the results suggest that veterinary surgeons report significantly less favourable working conditions for *managerial support* ($t(4494)=5.9$, $p<0.001$) and more favourable working conditions for *relationships* ($t(4495)=14.8$, $p<0.001$) and *change* ($t(4463)=4.0$, $p<0.001$) than nurses.

Figure 5.23: Mean stressor domain scores for veterinary surgeons and normative data for UK general population‡ and nurses†



Error bars represent SD

‡ Source: Edwards and others (2008). Data from 39 different UK organisations

† Source: Royal College of Nursing (2006). SD is not reported

Table 5.37: Difference between mean stressor domain scores for veterinary surgeons and the general population

HSE MSIT stressor domain	Mean		Difference	95% CI of difference	Statistical test
	Veterinary surgeons *n*=1466-1749	General population‡ *n*=26,382			
Demands	2.96	3.05	0.09	0.08 to 0.10	$t(28,127)=16.1$, $p<0.001$
Control	3.47	3.42	-0.05	-0.07 to -0.03	$t(28,129)=5.5$, $p<0.001$
Managerial support	3.14	3.47	0.33	0.32 to 0.34	$t(27,852)=44.7$, $p<0.001$
Peer support	3.75	3.80	0.05	0.04 to 0.06	$t(28,116)=9.6$, $p<0.001$
Relationships	4.01	3.77	-0.24	-0.22 to -0.26	$t(28,123)=21.1$, $p<0.001$
Role	4.21	4.18	-0.03	-0.02 to -0.04	$t(28,117)=6.5$, $p<0.001$
Change	3.22	3.00	-0.22	-0.20 to -0.24	$t(28,091)=26.9$, $p<0.001$
Overall scale	3.45	3.53	0.08	0.07 to 0.09	$t(27,846)=23.0$, $p<0.001$

Shading indicates stressor domains for which the mean score for veterinary surgeons is lower (higher risk) than for the general population.

‡ Source: Edwards and others (2008)

The internal consistency of each of the component sub-scales of HSE MSIT was assessed as satisfactory using Cronbach's alpha reliability coefficient. The coefficient exceeded 0.6 for all scales (*demands* α = 0.84; *control* α = 0.81; *managerial support* α = 0.84; *peer support* α = 0.79; *relationships* α = 0.79; *role* α = 0.78; *change* α = 0.62).

5.6.1 Summary

- Male veterinary surgeons report more favourable working conditions in *control*, *relationships*, *role* and *change* domains than females.

- Veterinary surgeons working for charities and in university – clinical roles report the least favourable working conditions associated with *demands* and *control*; those working in government roles report the least favourable working conditions associated with *relationships* and *role*.

- Veterinary surgeons in full-time employment report less favourable working conditions associated with *demands*; those in part-time employment report less favourable working conditions associated with *control* and *change.*

- Younger veterinary surgeons (< 49 years) report the least favourable working conditions across all stressor domains. Scores for all domains generally increase (more favourable working conditions) with increasing age group.

- Reported working conditions for *demands*, *managerial support* and *peer support* domains are least favourable for those working the longest hours.

- Locums and full-time assistants report less favourable working conditions across more stressor domains than other positions in veterinary practices.

- Less favourable working conditions are reported for *demands*, *managerial support* and *peer support* than among the UK working general population, and more favourable working conditions for the other stressor domains.

5.7 Work-home interaction

5.7.1 Negative work-home interaction (WHI_N)

The mean WHI_N score for the total sample (*n*=1749) is 1.19 (95% CI: 1.16 to 1.21, SD=0.57).

The distribution of responses for each of the questions relating to WHI_N is presented in Figure 5.24.

Multiple linear regression was applied to identify the factors that are associated with WHI_N score after adjusting for age and gender.

There is no significant association between WHI_N score and gender after adjusting for age (Coef. 0.01, 95% CI: -0.05 to 0.07, p=0.684), although the mean is significantly higher for women prior to adjustment for age (1.23 vs. 1.14, $F(1, 1747)$, p=0.001). There is a significant relationship between mean WHI_N score and age after adjustment for gender: the score decreases by 0.010 for every one year increase in age (95% CI: -0.012 to -0.007; p<0.001).

The mean score WHI_N for recent graduates of non-EU/EEA countries is lower in comparison with Liverpool after adjusting for age and gender (Coef. -0.36, 95% CI: -0.69 to -0.04, p=0.028).

Veterinary surgeons working in government and university – non-clinical roles have lower mean WHI_N score than those working in small animal practice after adjusting for age and gender (Government: Coef. -0.13, 95% CI: -0.25 to -0.02, p=0.021; University – non-clinical: Coef. -0.23, 95% CI: -0.43 to -0.04, p=0.019).

Part-time and partially retired veterinary surgeons have lower mean WHI_N scores than those in full-time employment after adjusting for age and gender (Part-time: Coef. -0.39, 95% CI: -0.46 to -0.32, p<0.001; Partially retired: Coef. -0.38, 95% CI: -0.59 to -0.16, p=0.001).

Most positions in practice have a lower mean WHI_N score than sole principals after adjusting for age and gender (Full-time assistant: Coef. -0.16, 95% CI: -0.28 to -0.05, *p*=0.005; Partner: Coef. -0.12, 95% CI: -0.23 to -0.01, *p*=0.036; Part-time assistant: Coef. -0.55, 95% CI: -0.68 to -0.42, *p*<0.001; Partner/director: Coef. -0.28, 95% CI: -0.41 to -0.16, *p*<0.001; Consultant: Coef. -0.27, 95% CI: -0.50 to -0.05, *p*=0.017).

Veterinary surgeons working in practices owned by charities have a lower mean WHI_N score than those working in practices owned by a sole principal, after adjustment for age and gender (Coef. -0.18, 95% CI: -0.34 to -0.01, *p*=0.034).

The mean WHI_N score increases progressively as number of hours worked in a typical week increases, after adjustment for age and gender (Table 5.38).

Table 5.38: Association between hours worked in a typical week and negative work-home interaction after adjustment for age and gender

	Coef.	95% CI	*p*-value[†]
Hours worked in a typical week			
0-9	1	-	-
10-19	0.14	-0.13 to 0.41	0.318
20-29	0.39	0.14 to 0.65	**0.003**
30-39	0.48	0.23 to 0.73	**<0.001**
40-49	0.67	0.43 to 0.92	**<0.001**
50-59	0.92	0.67 to 1.17	**<0.001**
60-69	1.04	0.78 to 1.30	**<0.001**
70-79	1.22	0.92 to 1.52	**<0.001**
80+	1.53	1.08 to 1.99	**<0.001**

n=1716

Multivariable analysis adjusting for age and gender only

[†] Adjusted *p*-value from multiple linear regression; significant *p*-values (*p*<0.010) are in boldface font

The mean WHI_N score is also associated with number of hours on-call in a typical week, after adjustment for age and gender (Table 5.39).

Table 5.39: Association between hours on-call in a typical week and negative work-home interaction after adjustment for age and gender

	Coef	95% CI	*p*-value†
Hours on call in a typical week			
0-9	1	-	-
10-19	0.04	-0.04 to 0.11	0.302
20-29	0.12	0.04 to 0.19	**0.002**
30-39	0.15	0.06 to 0.24	**0.001**
40-49	0.24	0.10 to 0.37	**0.001**
50-59	0.10	-0.10 to 0.30	0.323
60-69	0.21	-0.07 to 0.48	0.319
70-79	0.70	0.31 to 1.08	**<0.001**
80+	0.33	0.18 to 0.47	**<0.001**

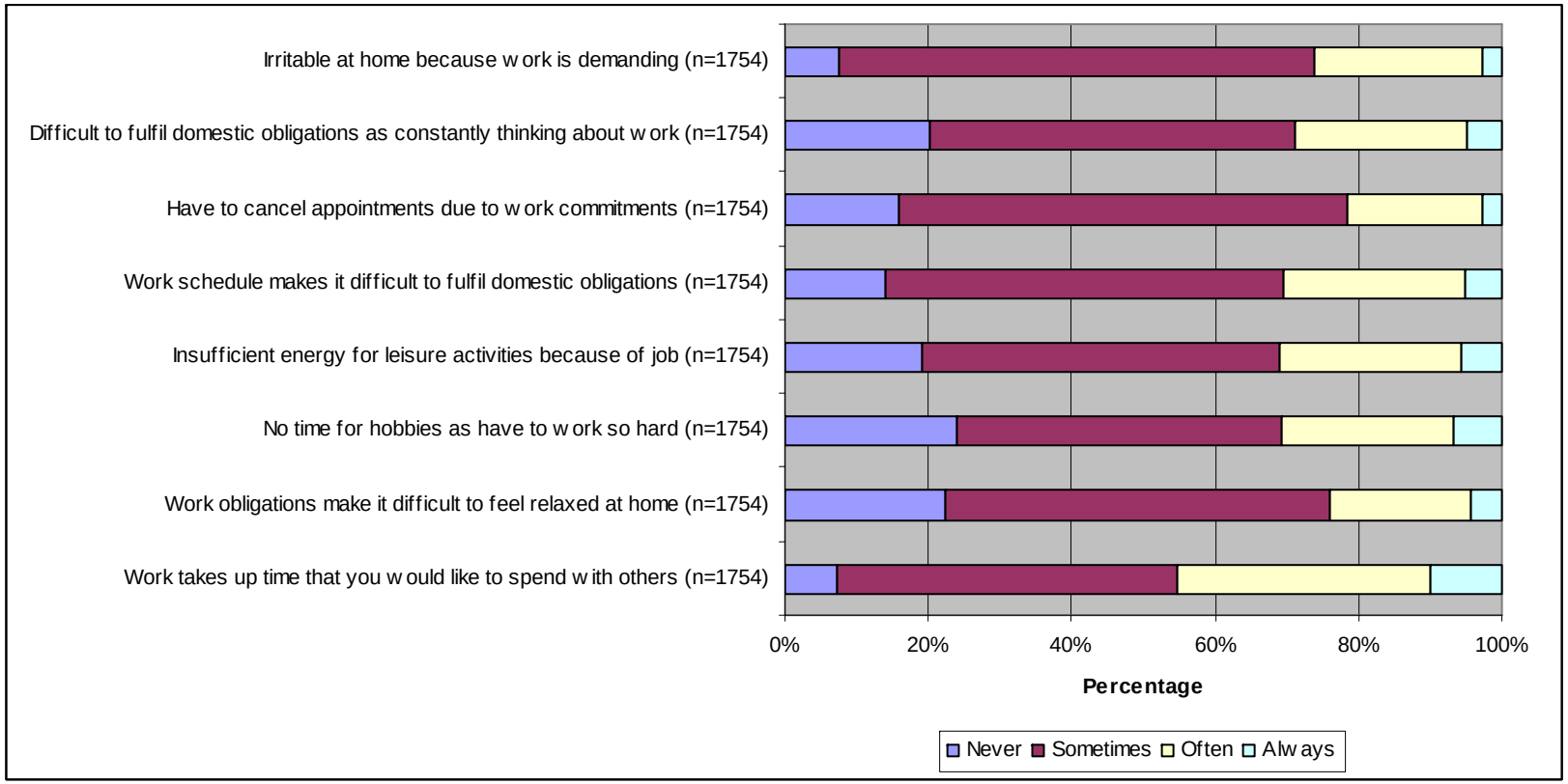
n=1735

Multivariable analysis adjusting for age and gender only

† Adjusted *p*-value from multiple linear regression; significant *p*-values ($p<0.010$) are in boldface font

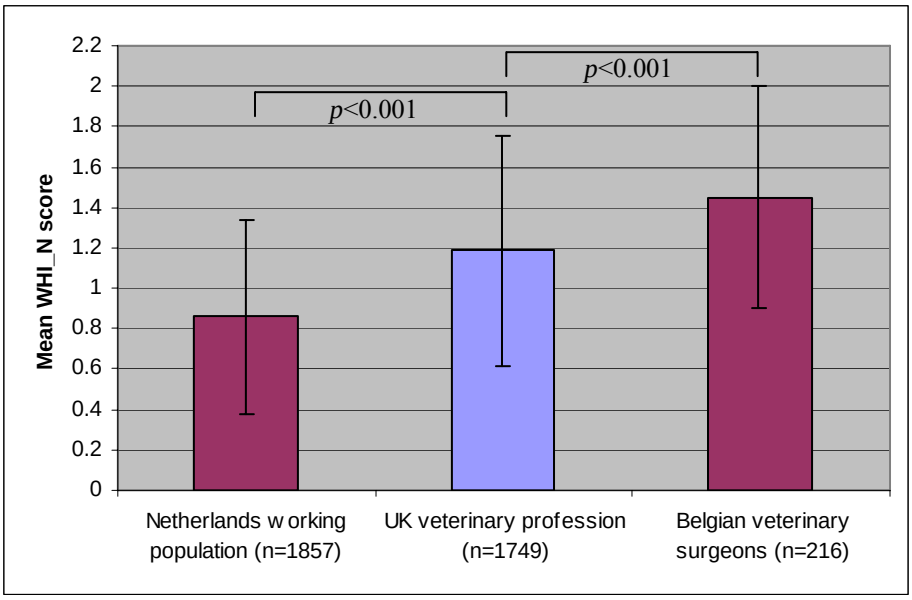
The WHI_N scale demonstrated satisfactory internal consistency in the study sample (Cronbach's $\alpha=0.89$).

Figure 5.24: Distribution of responses for questions relating to negative work-home interaction



The mean WHI_N score for the sample is higher than for a sample of the working population from the Netherlands (Geurts and others 2005), $t(3604)=18.7$, $p<0.001$, and lower than for Belgian veterinary surgeons (Hansez and others 2008), $t(1963)=6.4$, $p<0.001$ (Figure 5.25).

Figure 5.25: Negative work-home interaction mean score for veterinary surgeons vs. normative data



Error bars represent SD

5.7.1.1 Summary

- The mean WHI_N score for the total sample is 1.19 (95% CI: 1.16 to 1.21, SD=0.57).

- There is no significant difference between mean WHI_N score for men and women after adjustment for age (Coef. 0.01, 95% CI: -0.05 to 0.07, $p=0.684$).

- There is a significant relationship between mean WHI_N score and age after adjustment for gender: the score decreases by 0.010 for every one year increase in age (95% CI: -0.012 to -0.007, $p<0.001$).

- The estimated mean WHI_N score among veterinary surgeons is higher than among the Netherlands working population.

5.7.2 Positive work-home interaction (WHI_P)

The mean WHI_P score for the total sample (*n*=1716) is 0.97 (95% CI: 0.94 to 0.99, SD=0.56).

The distribution of responses for each of the questions relating to WHI_P is presented in Figure 5.26.

Multiple linear regression was applied to identify the factors that are associated with WHI_P score after adjusting for age and gender only.

There is no significant difference between mean WHI_P score for men and women after adjusting for age (Coef. 0.05, 95% CI: -0.11 to 0.01, *p*=0.075), although the mean is significantly lower for women prior to adjustment for age (0.92 vs. 1.01, $F(1, 1714)=10.9$, *p*=0.001). There is a significant relationship between mean WHI_P score and age after adjustment for gender: the score increases by 0.005 for every one year increase in age (Coef. 0.005, 95% CI: 0.002 to 0.007, *p*<0.001).

There is no significant difference between mean WHI_P score for recent graduates of different veterinary schools after adjustment for age and gender.

The mean WHI_P score for veterinary surgeons working in farm animal practice is marginally significantly higher than for those working in small animal practice after adjustment for age and gender (Coef. 0.16, 95% CI: 0.03 to 0.29, *p*=0.015).

The mean WHI_P score for veterinary surgeons in partial retirement is higher than for those working full-time after adjustment for age and gender (Coef. 0.29, 95% CI: 0.06 to 0.53, *p*=0.015).

The mean WHI_P score for veterinary surgeons working as consultants is higher than for sole principals after adjustment for age and gender (Coef. 0.28, 95% CI: 0.05 to 0.51, *p*=0.019).

There are no significant differences between mean WHI_P scores across ownership of practice, RCVS certificate or diploma holder, hours worked in a typical week or hours on-call in a typical week, after adjustment for age and gender.

The mean WHI_P score for the sample is higher than for the sample of the working population from the Netherlands (Geurts and others 2005), $t(3571)=7.2$, $p<0.001$, and lower than for Belgian veterinary surgeons (Hansez and others 2008), $t(1930)=5.1$, $p<0.001$ (Figure 5.27). The results suggest that veterinary surgeons report higher levels of both negative and positive work-home interaction than the working general population of the Netherlands. However, comparative data must be interpreted cautiously due to possible cultural differences in interpretation of the scale items and the small size of the sample of Belgian veterinary surgeons.

The WHI_P scale demonstrated satisfactory internal consistency in the study sample (Cronbach's $\alpha=0.75$).

Figure 5.26: Distribution of responses for questions relating to positive work-home interaction

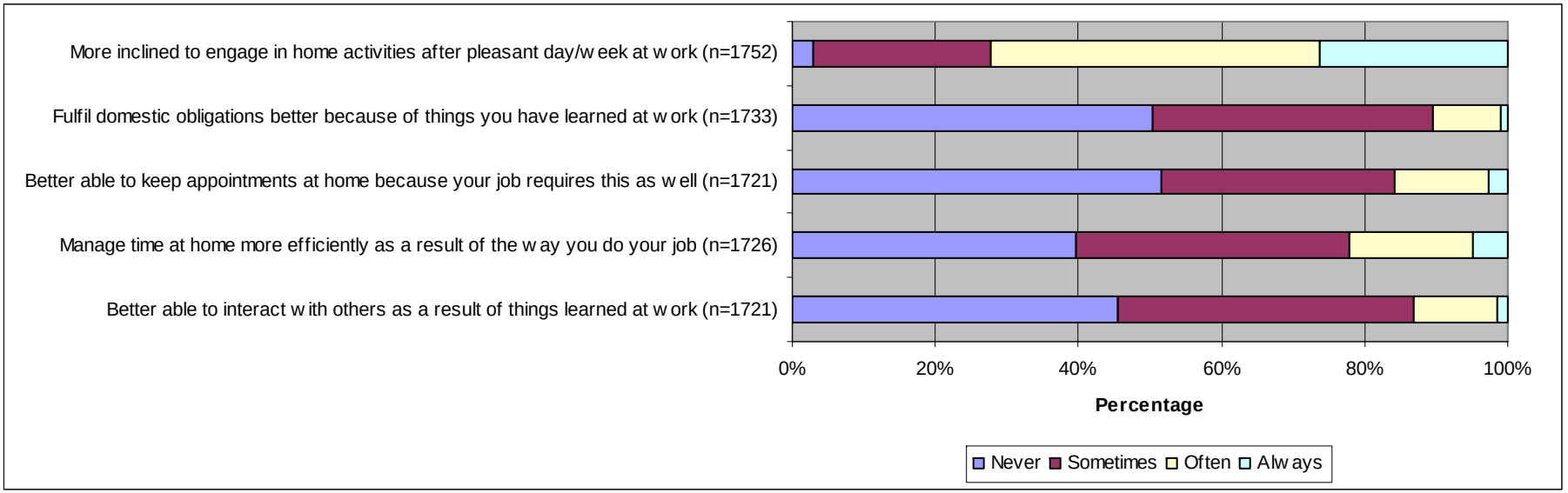
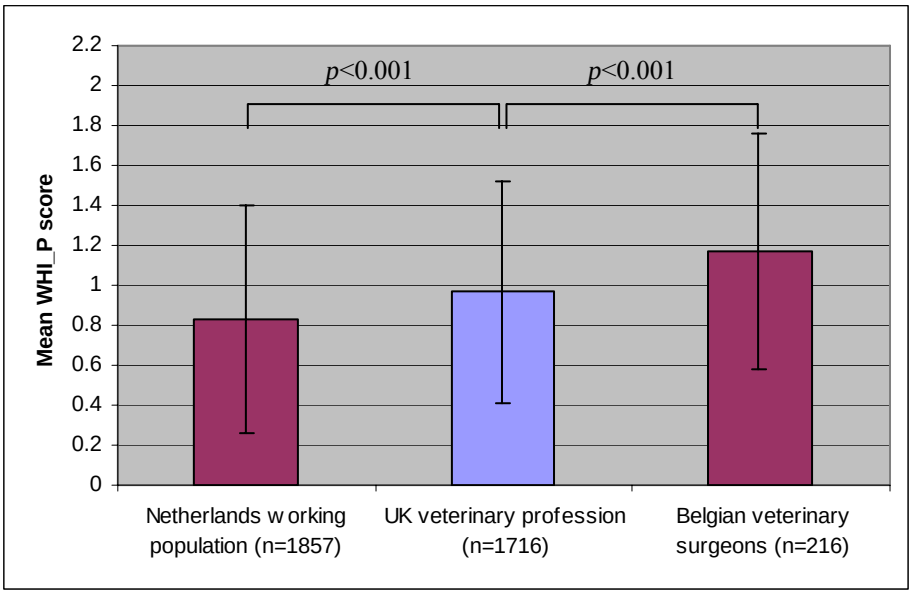


Figure 5.27: Positive work-home interaction mean score for veterinary surgeons vs. normative data



Error bars represent SD

5.7.2.1 Summary

- The mean WHI_P score for the total sample is 0.97 (95% CI: 0.94 to 0.99, SD=0.56).

- There is no significant difference between mean WHI_P score for men and women after adjustment for age (Coef. 0.05, 95% CI: -0.11 to 0.01, p=0.075).

- There is a significant relationship between mean WHI_P score and age after adjustment for gender: the mean score increases with increasing age (Coef. 0.005, 95% CI: 0.002 to 0.007, p<0.001).

- The estimated mean WHI_P score among veterinary surgeons is higher than among the Netherlands working population.

5.8 Contributors to stress

5.8.1 Personal and general work-related

Number of hours worked, making professional mistakes, client expectations, and administrative and clerical tasks are reported as the greatest contributors to stress for the sample population of veterinary surgeons (mean scores: 2.24; 2.22; 2.12; 1.83 respectively) (Figure 5.28). The percentage of respondents reporting that these stressors contribute *quite a lot* or *very much* to their stress is 42.9%, 40.4%, 38.0% and 27.9% respectively (Figure 5.29).

For making professional mistakes (PM) and client expectations (CE), unadjusted mean scores are higher for women than men (PM: $F(1, 1740)=196.2$, $p<0.001$; CE: $F(1, 1733)=37.4$, $p<0.001$); decrease with increasing age group (PM: $F(5, 1728)=39.9$, $p<0.001$; CE: $F(5, 1720)=24.3$, $p<0.001$); vary significantly across type of work (PM: $F(10, 1733)=7.8$, $p<0.001$; CE: $F(10, 1725)=14.9$, $p<0.001$) with small animal, mixed, equine and charity work having the highest mean scores; and vary across position in the practice (PM: $F(9, 1726)=22.5$, $p<0.001$; CE: $F(9, 1713)=17.5$, $p<0.001$) with full-time assistants having the highest mean scores.

Figure 5.28: Mean score and SD for personal and work-related stressors

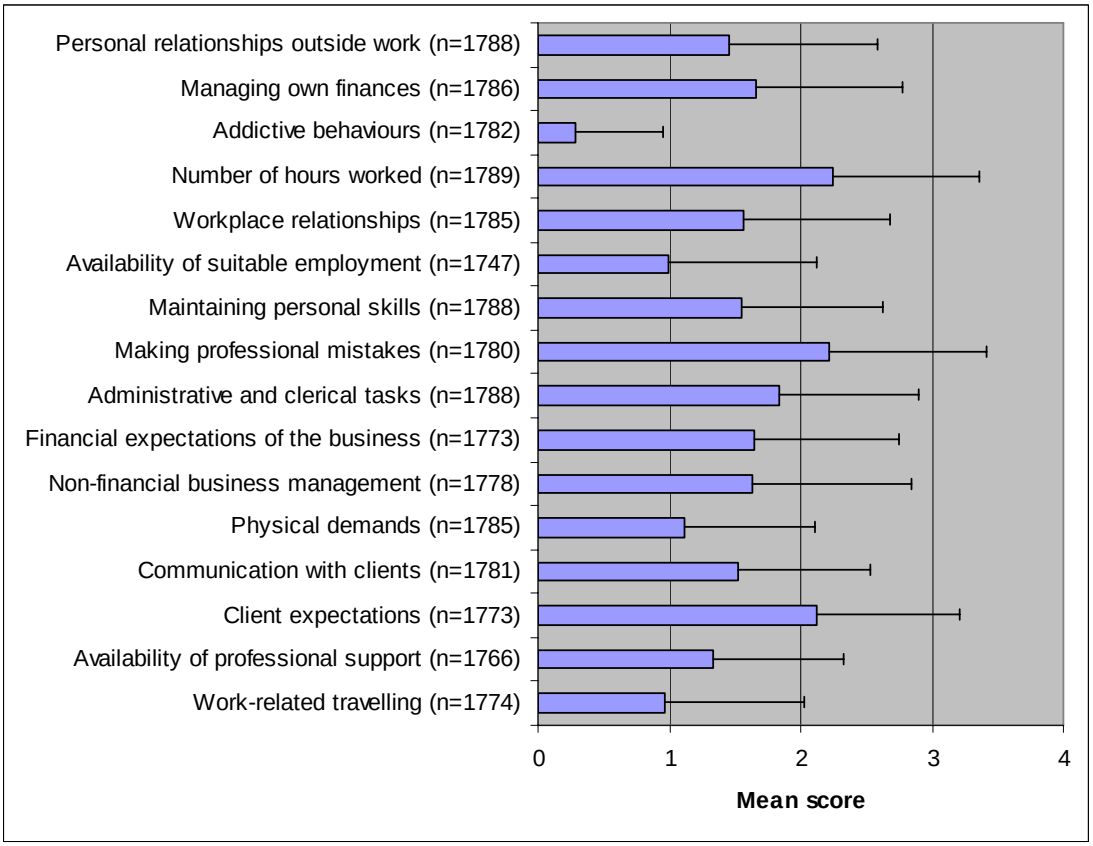
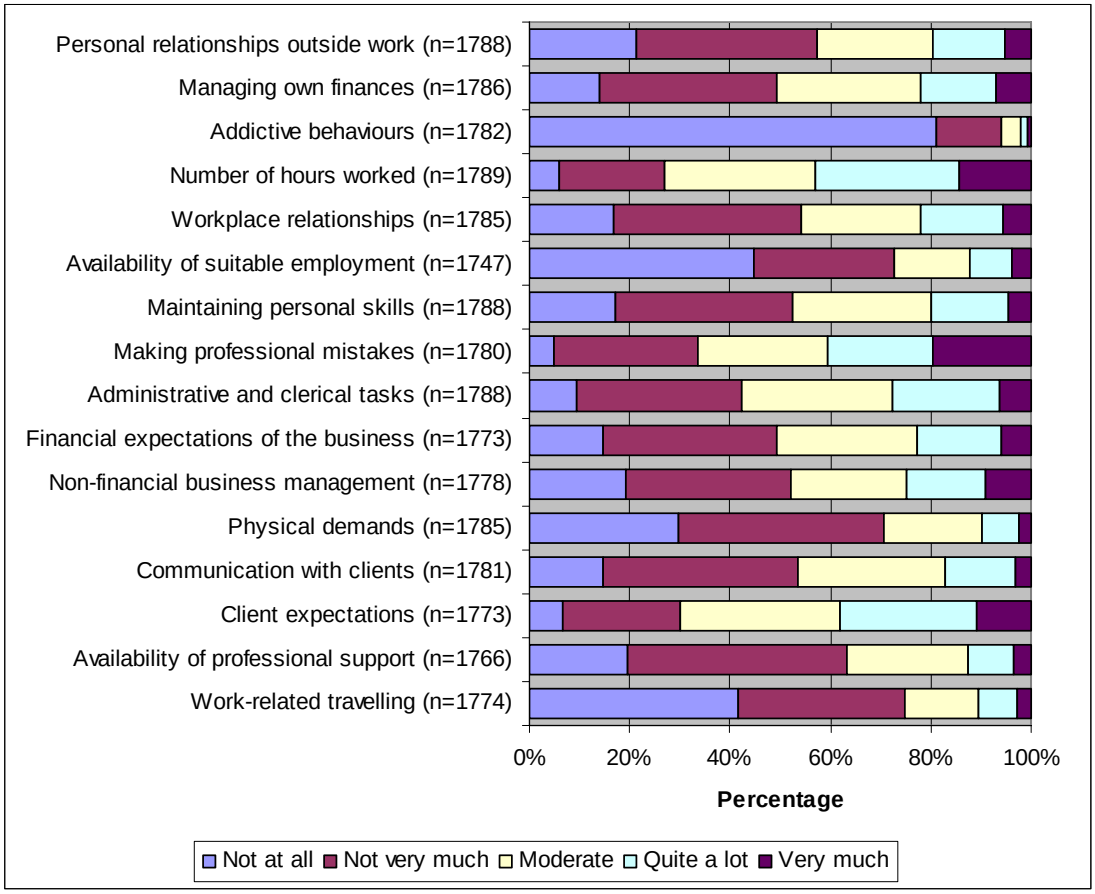


Figure 5.29: Distribution of responses for personal and work-related stressors



For respondents who graduated within the previous 5 years (2003 to 2007 inclusive) (n=266-269) making professional mistakes, number of hours worked, client expectations and managing their own finances are reported as the greatest contributors to stress (mean scores: 2.81; 2.67; 2.35; 1.93 respectively). Unadjusted mean scores for recent graduates are higher than for respondents who have been graduated for over 5 years for all personal and work-related stressors (p<0.001), except addictive behaviours, administrative and clerical tasks, financial expectations of the business, and non-financial business management.

5.8.2 Clinical work-related

The possibility of client complaints or litigation, unexpected clinical outcomes and out-of-hours on-call duties are reported as the greatest contributors to stress for respondents treating clinical cases (mean scores: 2.19; 1.98; 1.93 respectively). The

percentage of respondents reporting that these stressors contribute *quite a lot* or *very much* to their stress is 42.9%, 40.4% and 38.0% respectively (Figures 5.30 and 5.31).

For the possibility of client complaints or litigation (CL), and unexpected clinical outcomes (UO), unadjusted mean scores are higher for women than men (CL: $F(1, 1576)=80.2$, $p<0.001$; UO: $F(1, 1565)=77.4$, $p<0.001$); decrease with increasing age group(CL: $F(5, 1566)=25.5$, $p<0.001$; UO: $F(5, 1555)=10.7$, $p<0.001$); vary significantly across type of work (CL: $F(10, 1568)=5.6$, $p<0.001$; UO: $F(10, 1557)=5.3$, $p<0.001$) with small animal, mixed, equine and charity work having the highest mean scores for complaints or litigation and small animal and farm animal work having the highest mean scores for unexpected outcomes; and vary across position in the practice (CL: $F(9, 1569)=15.4$, $p<0.001$; UO: $F(9, 1588)=6.5$, $p<0.001$) with full-time assistants having the highest mean scores.

Figure 5.30: Mean score and SD for clinical work-related stressors

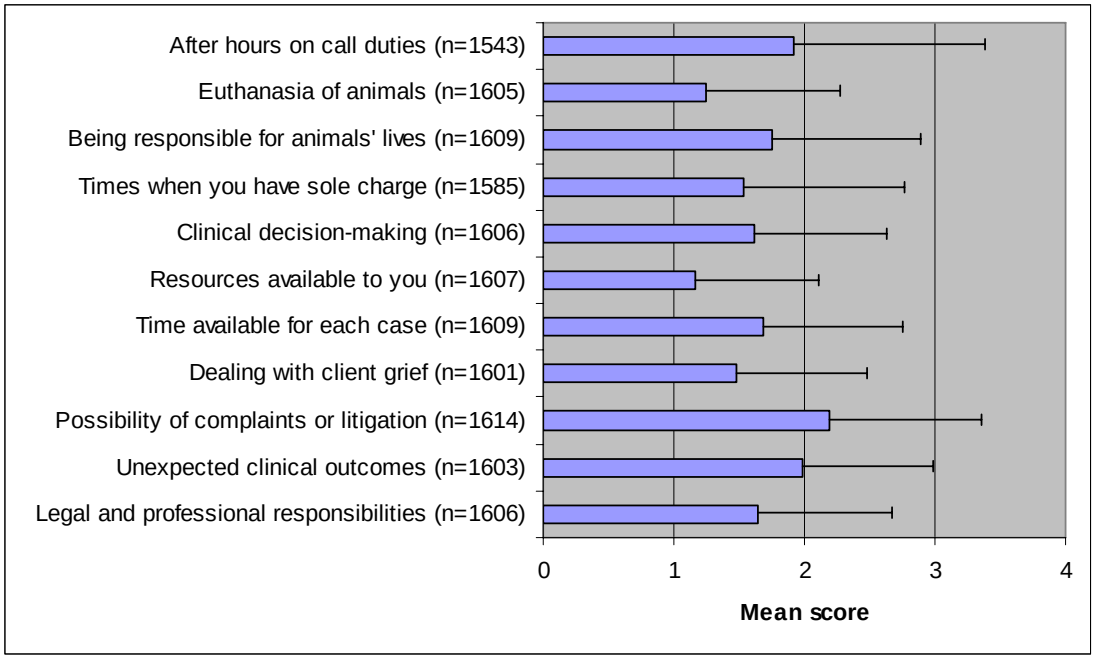
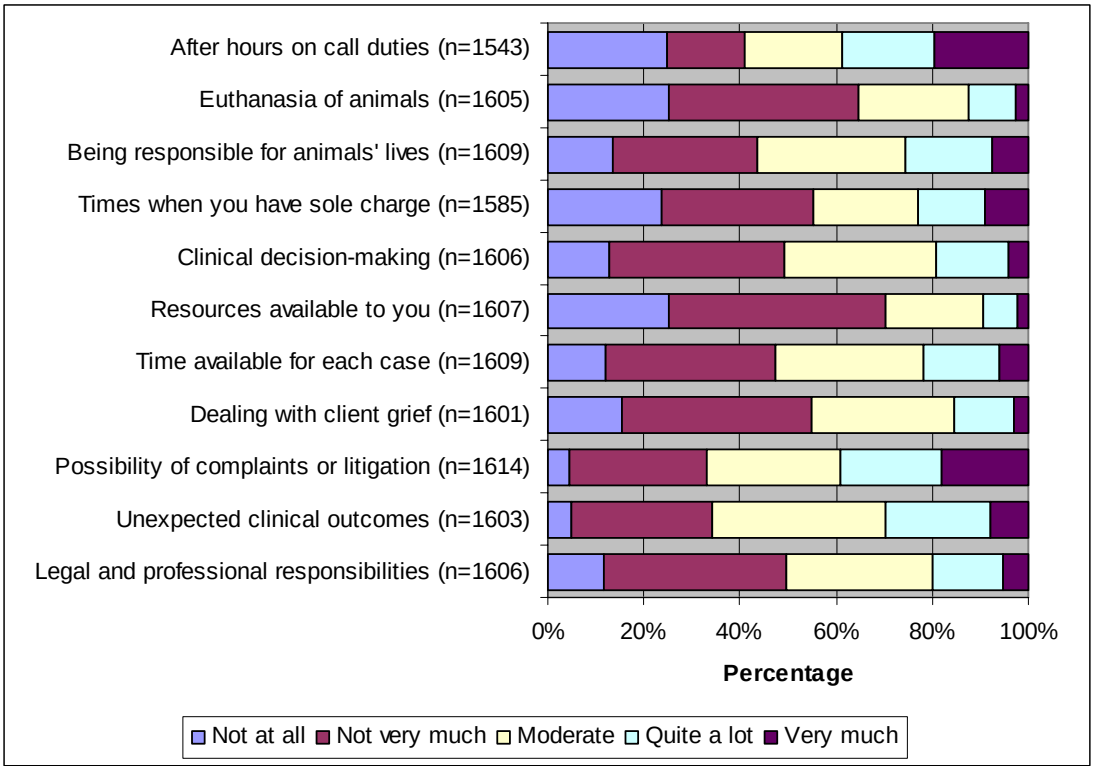


Figure 5.31: Distribution of responses for clinical work-related stressors



For respondents who graduated within the previous 5 years (2003 to 2007 inclusive) (n=256-264), the possibility of complaints or litigation, out-of-hours on-call duties, times of sole charge and unexpected clinical outcomes are reported as the greatest contributors to stress (mean scores: 2.63; 2.48; 2.27; 2.17 respectively). Mean scores are higher for all clinical work-related stressors (p<0.001), than for respondents who have been graduated for over 5 years.

5.8.3 Summary

- Number of hours worked, making professional mistakes, client expectations, and administrative and clerical tasks are reported as the greatest contributors to stress for the sample population of veterinary surgeons.

- The possibility of client complaints or litigation, unexpected clinical outcomes and out-of-hours on-call duties are reported as the greatest contributors to stress for respondents treating clinical cases.

5.9 Sources of satisfaction and/or pleasure

The greatest sources of satisfaction and/or pleasure reported in open responses were grouped according to theme using a coding frame as described in Section 4.12. Each respondent reported up to three sources. The ten most frequently identified themes are listed in Table 5.40. There are gender differences in the frequency of reporting some themes.

Table 5.40: Frequency of reporting each source of satisfaction theme

	%[§] 95% CI			
Satisfaction theme	Total *n*=1793	Male *n*=895	Female *n*=893	χ^2
Good clinical outcomes	38.8 36.6-41.1	36.5 33.4-39.7	41.2 38.0-44.5	χ^2=4.1, df=1, ***p*=0.043**
Relationships with colleagues	31.1 29.0-33.3	27.5 24.7-30.5	34.6 31.6-37.8	χ^2=10.6, df=1, ***p*=0.001**
Intellectual challenge/learning	30.1 28.0-32.3	28.5 25.6-31.5	31.6 28.6-34.7	χ^2=2.0, df=1, *p*=0.154
Client satisfaction	28.6 26.6-30.7	25.9 23.2-28.9	31.2 28.3-34.4	χ^2=6.2, df=1, ***p*=0.013**
Relationships with clients	27.3 25.3-29.4	25.7 22.9-28.7	29.1 26.2-32.2	χ^2=2.6, df=1, *p*=0.105
Improving animal health and welfare	15.8 14.2-17.5	12.6 10.6-15.0	19.0 16.6-21.7	χ^2=13.8, df=1, ***p*<0.001**
Surgical work	14.2 12.7-15.9	13.3 11.2-15.7	14.8 12.6-17.3	χ^2=0.8, df=1, *p*=0.366
Working with animals	13.3 11.8-15.0	11.3 9.4-13.5	15.3 13.1-17.9	χ^2=6.4, df=1, ***p*=0.012**
Financial rewards	11.9 10.5-13.5	16.5 14.2-19.1	7.3 5.8-9.2	χ^2=36.5, df=1, ***p*<0.001**
Management	9.0 7.7-10.4	13.6 11.5-16.0	4.4 3.2-5.9	χ^2=47.2, df=1, ***p*<0.001**

[§] The percentage of respondents identifying each theme. The percentages do not sum to 100 as each respondent cited up to three sources of satisfaction.

Note: Themes are listed in descending order of frequency of reporting for the total sample. Others and Not specified are not included.

Significant *p*-values ($p<0.010$) are in boldface font; marginally significant *p*-values ($p=0.010$ to $p=0.049$) are in boldface italicised font

5.10 Estimation of non-response bias

The demographic and occupational profiles of respondents were compared with those for the original sample to give an indication of any non-response bias arising from differences in response rates (Tables 5.41 and 5.42).

Table 5.41: Response rate by gender and for each decade of qualification

	Respondents	Original sample	Response rate
	n	*n*	%
Gender[§]			
Male	899	1731	51.9
Female	897	1469	61.1
Year of qualification[†]			
1940-1949	1	-	-
1950-1959	9	22	40.9
1960-1969	61	126	48.4
1970-1979	272	480	56.7
1980-1989	471	795	59.2
1990-1999	505	953	53.0
2000-2007	477	824	57.9
Total	1796	3200	56.1

[§] The number of males and females is adjusted by allocating the number whose gender is unknown (respondents *n*=5; original sample *n*=64) in equal proportion to male and female.

[†] The number in each decade of qualification is adjusted by distributing the number whose year of qualification is unknown (respondents *n*=53; original sample *n*=158) across each of the decades of qualification in direct proportion to the number whose age is known in that decade of qualification.

The difference in response rate between males and females is statistically significant (males 51.9% vs. females 61.1%, difference=9.1%, 95% CI of difference=5.7 to 12.5%; χ^2=26.9, df=1, p<0.001). The difference in response rate across years of qualification pre-1979, 1980-1989, 1990-1999 and 2000-2007 is marginally significant (χ^2=8.6, df=3, p=0.036). The latter may be associated with: i) the difference in response rate between males and females as the number of women in the profession has steadily increased over recent decades (Robinson and Hooker 2006); and ii) a greater proportion of retired veterinary surgeons in the pre-1979 cohort who considered that the survey was not relevant to them.

Table 5.42: Response rate for each type of work

Type of work	Respondents[§]	Original sample[†]	Response rate
	n	*n*	%
Small animal practice	1018	1511	67.4
Farm animal practice	81	151	53.6
Equine practice	148	212	69.8
Mixed practice	224	846	26.5
Other speciality practice	36	-	-
Total general practice	1507	2720	55.4
Charity	32	64	50.0
Government	113	192	58.8
University – non-clinical	35	160	63.1
University – clinical	66		
Industry	35	64	67.2
Outside the profession	8		
Total	1796	3200	56.1

[†] The category 'Locum' (*n*=163) is distributed across each of the categories of general practice in direct proportion to the number in the original sample in each category of general practice

[§] The number of respondents whose type of work is unknown (*n*=44) is distributed across each of the types of work in direct proportion to the number of respondents in each type of work

There is no statistically significant difference in response rate across work types: general practice, charity, government, university and industry/outside the profession (χ^2=8.5, df=4, *p*=0.075).

Non-response bias occurs when respondents and non-respondents differ in outcome variables. Estimates of non-response bias based on comparison of response rates across exposure variables such as demographic and occupational factors is not particularly informative as outcome variables may also influence the likelihood of participation and have potential to yield better estimates of non-response bias (Groves 2006). Late respondents can be used as a proxy for non-respondents in estimating non-response bias in surveys (Groves 2006). A comparative analysis was conducted to identify any significant differences between outcome measures for late responders and all earlier responders. Late responders comprised 15.4% (*n*=272) of respondents in the analysis. The analysis compared 12-month prevalence of suicidal thoughts, mean HADS-A and HADS-D scores and WEMWBS score (Table 5.43). The mean

HADS-D score is significantly higher for late responders than for earlier responders (mean difference=0.54, 95% CI of the difference: 0.10 to 0.98, p=0.017). The 12-month prevalence of suicidal thoughts and mean HADS-A score are higher for late responders and the mean WEMWBS score is lower for late responders but these differences are not statistically significant.

Table 5.43: Comparative analysis of late responders and earlier responders for HADS-A, HADS-D, WEMWBS and 12-month prevalence of suicidal thoughts

	Late responders n=272		Earlier responders n=1490		Statistical test
Dependent variable	mean	SD	mean	SD	Independent samples t-test[§]
HADS-A	8.29	3.86	7.86	4.12	$t(1760)=1.58$, $p=0.114$
HADS-D	5.11	3.43	4.57	3.42	$t(1760)=2.40$, $p=$***0.017***
WEMWBS	47.88	9.07	49.02	9.05	$t(1760)=1.90$, $p=0.058$
	%		%		χ^2 test
12-month prevalence of suicidal thoughts	24.0		20.8		$\chi^2=1.4$, df=1, $p=0.245$

[§] Equal variances assumed (Levene's test: variances are not significantly different, p>0.05)

Note: Significant p-values (p<0.010) are in boldface font; marginally significant p-values (p=0.010 to p=0.049) are in boldface italicised font

5.10.1 Summary

- There is evidence that there may be non-response bias associated with a higher response rate among women and differences in response rates across years of qualification.

- The higher mean HADS-D score among late responders suggests that non-responders may have higher levels of depressive symptoms. Thus population estimates based on survey respondents may underestimate the true prevalence of psychological morbidity.

CHAPTER 6: DISCUSSION

6.0 Introduction

The overarching objective of this study was to explore the mental health and well-being of the UK veterinary profession to provide empirical evidence to assess their contribution to the elevated suicide risk and inform the development of strategies to improve psychological health and attenuate suicide risk.

Specifically, the study aimed to estimate a range of psychological health parameters for the population of veterinary surgeons in the UK, investigate possible differences across demographic and occupational factors, compare population parameter values with published data for the general population and other normative groups, and propose potentially effective interventions.

This chapter is structured around the study aims and hypotheses. It includes critical assessment of the strength of evidence in support of the hypotheses, provides commentary on the relevance of the findings to understanding suicide risk in the profession and discusses the results in the context of previously published findings. The chapter concludes with a discussion of the strengths and limitations of the study and the implications of the study for research and the profession. Proposals for interventions which have potential to improve psychological health and attenuate suicide risk are included in the discussion of the implications of the study for the profession.

6.1 Assessment of study population parameters

6.1.1 Generalisability of results

The demographic and occupational profile of study respondents is generally in close alignment with that of RCVS membership which suggests that study respondents are fairly representative of the wider population of veterinary surgeons practising in the UK. Veterinary surgeons in mixed practice may be under-represented but this may be associated with differences in question wording on the classification of the type of

work between study respondents and respondents to the *RCVS Survey of the Profession 2006.*

Comparison of the demographic and occupational profiles of study respondents with those of the original sample provides evidence that there may be a degree of non-response bias associated with a higher response rate among women and differences in response rates across years of qualification. Response rates to surveys are typically higher among women (Wilkins and others 1997). The gender difference in response rate may explain in part the lower response rates for graduates of 1950-1959 and 1960-1969, as the gender balance among older members of the profession favours men (see Figure 3.2). There is no statistical difference in response rate across the broad work types: general practice, charity, government, university and industry/outside the profession.

The analysis to identify any differences between outcome measures for late responders and all earlier responders showed that the mean HADS-D score is significantly higher for late responders than for earlier responders, which suggests that non-responders may have higher levels of depressive symptoms. The mean HADS-A score and 12-month prevalence of suicidal thoughts are also higher for late responders and the mean WEMWBS score is lower for late responders but these differences are not statistically significant. Consequently, population estimates based on survey respondents may underestimate the true prevalence of psychological morbidity. The reliability of using late respondents as a proxy for non-respondents in estimating non-response bias is uncertain. According to Groves (2006), the weakness of this method is that it offers no direct information about the non-respondents, instead relying on the notion of a 'continuum of resistance' (p. 656) in which non-respondents should be most similar to those respondents measured after a longer elapse of time and greater efforts to remind them to respond. However, non-responders to surveys generally have a higher prevalence of psychiatric disorders (Kessler and others 1994, Hansen and others 2001), which supports the suggestion that estimates of the prevalence of psychological morbidity in the current study are likely to be conservative.

Overall, in view of the degree of representativeness of respondents and the caveats regarding possible non-response bias considered above, the results are considered cautiously generalisable to the wider population of UK veterinary surgeons.

6.1.2 Precision of population parameter estimates

Confidence intervals (CIs) provide a measure of the precision of sample statistics as estimates of true values in the wider target population. They represent a plausible range of values for the population parameter. In the current study point estimates of prevalence ranging from, for example, 5.5% (non-drinkers) to 48.4% (anxiety non-cases) have CIs of ± 1.1 to ± 2.3 respectively at 95% confidence level. This means that there is a 95% confidence that the true value of a population parameter lies within the estimated range of values bound by the CI for each sample statistic. This level of precision was considered acceptable.

6.2 Differences across the study population

> *Study hypothesis 1 ($H_1 1$). Self-reported measures of mental ill-health, mental well-being and psychosocial working conditions differ significantly with demographic factors (such as age, gender) and occupational factors (such as type of work, employment status, and hours worked in a typical week).* (Section 1.2)

The study results suggest that veterinary surgeons are not a homogeneous group in regard to the population parameters estimated. There is strong evidence ($p<0.01$) in support of the study hypothesis that there are differences in reported measures of mental ill-health and well-being among different age, gender and occupational groups within the profession.

6.2.1 Demographic factors

Female veterinary surgeons have significantly higher HADS-A mean score and proportion of HADS-A cases, and are at greater odds of HADS-A caseness after adjustment for age. Moreover, the mean WEMWBS score is significantly lower for

females than males after adjustment for age and female veterinary surgeons report less favourable psychosocial working conditions in *control*, *relationships*, *role* and *change* domains and higher scores for the key perceived veterinary-work-related stressors. However, the differences between men and women in HADS-D mean score and caseness, the 12-month prevalence of suicidal thoughts, and the mean score for negative work-home interaction are not statistically significant. The higher levels of psychological symptoms reported among women is consistent with the findings of recent reports of psychological symptoms among the general population of Great Britain (Singleton and others 2001, Singleton and Lewis 2003) and veterinary surgeons in Australia (Fritschi and others 2009), New Zealand (Gardner and Hini 2006) and Finland (Reijula and others 2003). The gender difference in perception of psychological working conditions, especially in regard to *control*, is in keeping with other studies that consider gender-related differences in stress which also demonstrate higher prevalence of stress or related outcomes in women (such as, de Smet and others 2005). In common with the general population (Coulthard and others 2002, Farrell and Marshall 2006), male veterinary surgeons are more likely to drink, to drink more often, and to drink more heavily on each occasion than females.

After adjustment for gender, the odds of HADS-A caseness and at-risk drinking both decrease and the WEMWBS score increases significantly with increasing age. A similar pattern of declining prevalence of hazardous drinking with increasing age occurs in the general population (Coulthard and others 2002). However, the relationship among veterinary surgeons between WEMWBS score and age adjusted for gender (the score increases with increasing age) is not apparent in the general population sample reported by Braunholtz and others (2007). Scores for each of the psychosocial working conditions stressor domains generally increase (more favourable working conditions) with increasing age group. The mean score for negative work-home interaction decreases with increasing age. For veterinary-work-related stressors, mean scores for recent graduates are higher than for respondents who have been graduated for over 5 years for all personal and general work-related stressors (except addictive behaviours, administrative and clerical tasks, financial expectations of the business, and non-financial business management) and all clinical work-related stressors. Similar findings of higher levels of psychological distress among younger veterinary surgeons have been reported previously (Reijula and others

2003, Gardner and Hini 2006, Fritschi and others 2009). Two possible explanations are offered. First, skills for coping develop with age-related experience of both work and life. The level of work-related autonomy in the veterinary profession is relatively high and this affords the opportunity to develop skills for dealing with job stressors. A second possible explanation is that self-selection processes may mean that older veterinary surgeons who found work stressful have left the profession and are not represented in the study sample. However, only 3% of respondents to a recent survey of the profession in the UK reported that they planned to leave the profession prematurely within the next year; albeit mainly due to dissatisfaction with the work hours or stress (Robinson and Hooker 2006). There is no association between age and HADS-D caseness or the 12-month prevalence of suicidal thoughts between age groups. The latter is in common with Norwegian physicians (Hem and others 2000), but in contrast to the statistically significant decline in prevalence with increasing age observed in the general population in Great Britain (Meltzer and others 2002, Dennis and others 2007).

6.2.2 Occupational factors

After adjustment for gender and age, veterinary surgeons working in non-clinical roles in universities have significantly lower estimated odds of HADS-A caseness than those working in small animal practice. Part-time assistants have marginally significant lower estimated odds of at-risk drinking than sole principals and respondents of practices owned by a charity have marginally significant lower odds of at-risk drinking than those owned by a sole principal. Veterinary surgeons in mixed practice have significantly lower odds of reporting suicidal thoughts than those in small animal practice; and full-time assistants have significantly higher odds than sole principals. The mean WEMWBS scores for veterinary surgeons working in clinical and non-clinical roles in universities are significantly higher than those working in small animal practice, and there is variation in the mean psychosocial working condition score for the majority of stressor domains across occupational factors.

There were few associations in the study results between hours worked or on-call in a typical week and psychological health. An increase in the number of hours worked in a typical week is associated with a small but statistically significant increase in the

odds of reporting suicidal thoughts. The odds are not associated however with an increase in the number of hours on-call in a typical week. Reported working conditions for *demands*, *managerial support* and *peer support* domains are least favourable for those working the highest number of hours and the mean negative work-home interaction score increases progressively as number of hours worked in a typical week increases.

None of the occupational factors in the study is consistently associated with mental health or well-being across the outcomes measured. However, small animal practice is associated with significantly higher levels of anxiety symptoms (HADS-A) and 12-month prevalence of suicidal thoughts, and lower positive mental well-being (WEMWBS) than some of the other work types. This is consistent with the perceptions of New Zealand veterinary surgeons that small animal practice is more stressful than other types of work (Gardner and Hini 2006). By contrast, there was no relationship between type of practice and the psychological health parameters measured in a study of Australian veterinary surgeons and the authors' explanation was that individuals probably chose the type of practice within which they are most comfortable working (Fritschi and others 2009). There was no association between HADS scores and hours worked or on-call in the current study. Kleppa and others (2008) reported an association between long work hours (over 40 hours per week) and increased levels of anxiety and depressive symptoms, with an apparent dose-response relationship between work hours and symptoms. Studies among young doctors have also failed to show an association between working long hours and mental ill-health (Tyssen and Vaglum 2002). By contrast, increasing hours of work was associated with a small increase in anxiety and depressive symptoms in the Australian study (Fritschi and others 2009).

6.3 Comparison with normative groups

> *Study hypothesis 2 ($H_1 2$). The veterinary profession has higher levels of mental ill-health, lower levels of mental well-being and less favourable psychosocial working conditions, when compared to the general population.* (Section 1.2)

There is strong evidence ($p<0.01$) in support of the study hypothesis that the veterinary profession has higher levels of mental ill-health and lower levels of mental well-being than the general population. There is further strong evidence that psychosocial working conditions are less favourable in *demands* and *support* stressor domains. However, veterinary surgeons are estimated to report more favourable working conditions for the other stressor domains (including *control* and *relationships*), and this direction of difference does not support the study hypothesis.

6.3.1 Anxiety and depressive symptoms

The prevalence of anxiety and depressive symptoms reported in the current study is significantly higher than among a non-clinical sample of the UK general population (Crawford and others 2001). Different types of occupation are associated with different risks for common mental disorders (Stansfeld and others 2003). Sanne and others (2003) demonstrated in a Norwegian population-based study that HADS-A and HADS-D scores differed significantly between occupational groups. HADS scores showed a distinct and inverse relationship with skill levels, most strongly observed for HADS-D scores among men. Manual occupations (such as labourers in agriculture, construction and manufacturing) consistently showed higher-than-average HADS scores. The clinical significance of the differences was established by demonstrating a strong association between skill level and HADS-D caseness (score ≥ 8) for both genders. Although anxiety symptoms showed a similar association with skill levels, the patterns were weaker and may not be clinically relevant.

Depression (Harris and Barraclough 1997), anxiety (Sareen and others 2005) and co-morbid depression and anxiety (Sareen and others 2005, Hawgood and De Leo 2008) amplify the risk of suicide and suicidal behaviours. The current study provides evidence that these disorders may play a role in the elevated suicide rate among the veterinary profession.

6.3.2 Alcohol consumption

Veterinary surgeons are more likely to be drinkers, and drink more frequently than the general population, but consume less on a typical drinking day and have a prevalence

of daily and weekly binge drinking (6 or more units on one occasion) that is similar to the general population (Coulthard and others 2002, Farrell and Marshall 2006). A greater proportion of veterinary surgeons are at-risk drinkers than among the general population. The magnitude of the difference between the prevalence of at-risk drinkers in the veterinary profession and the general population is more marked for women than for men. While employed men generally drink more than employed women, women's drinking is known to increase with certain types of employment (Ames and Rebhun 1996).

Among the general population, income and higher educational level are generally associated with higher rates of reported hazardous drinking (Coulthard and others 2002) so it is possible that the proportion of at-risk veterinary surgeons may be no higher than a general population sample of similar socio-economic status. However, no appropriate data has been identified to validate this hypothesis.

The similarity in the prevalence of daily binge drinking between veterinary surgeons and the general population may imply that the rates of alcohol dependence are similar. However the use of a more comprehensive instrument for measurement of alcohol-related problems – such as the full AUDIT (Saunders and others 1993) or the Severity of Alcohol Dependence Questionnaire (SAD-Q) (Stockwell and others 1983) – would be required to validate this. The PMRs for alcohol-related deaths among male and female veterinary surgeons aged 20-64 years in England and Wales 1993-2005 are lower than for the general population, although the differences are not statistically significant (Mellanby and others 2008). This is supportive of the suggestion that the rates of alcohol dependence may be similar.

Self-report measures of alcohol consumption demonstrate reasonable levels of reliability and validity (Del Boca and Darkes 2003). However, some caution must be exercised in comparing the current study's AUDIT-C results with those for the general population. The surveys differ in mode of administration: both involved self-completion of responses but the *Psychiatric Morbidity among Adults living in Private Households, 2000* survey used computer-assisted personal interviewing (CAPI), in which the respondents entered their responses to the alcohol-related questions directly into a laptop computer in the context of a face-to-face interview with a researcher

(Coulthard and others 2002). This may lead to greater under-reporting than in a postal survey but higher response rates associated with the face-to-face interview may reduce selective non-response among heavier drinkers (Knibbe and others 2006).

Levels of alcohol consumption among doctors are generally reported to be high: for example, a recent survey of Swiss doctors demonstrated a lower prevalence of non-drinkers and a higher prevalence of at-risk drinkers than among the general population (Sebo and others 2007). However, there is some evidence to suggest that doctors' alcohol consumption is declining (Baker 2008, Rosta 2008).

Alcohol has a well-established role in suicidal behaviour through its induction of negative affect, promotion of adverse life events, impairment of problem-solving skills, disinhibitory effects and the social disintegrative effects of abuse (Brady 2006). The quantity of alcohol consumed per drinking day is positively associated with increased risk of suicide (Mukamal and others 2007). However, although alcohol consumption is elevated among veterinary surgeons relative to the general population as a whole, it is possible that the proportion of at-risk veterinary surgeons may be no higher than a general population sub-group of similar socio-economic status and not contribute to an explanation of the elevated suicide rate.

6.3.3 Suicidal thoughts

The estimated 12-month prevalence of suicidal thoughts among veterinary surgeons is significantly higher than among the general population of Great Britain (Meltzer and others 2002) and Norwegian physicians (Hem and others 2000), in cross-sectional studies which asked identical suicidal ideation questions.

Suicidal thoughts are a key stage in the pathway leading to suicide (Gunnell and Harbord 2003). Two possible explanations are offered for the higher prevalence of suicidal thoughts among veterinary surgeons. First, ready access to means of suicide is posited as a key factor that influences the translation of suicidal thoughts into an actual suicide act (Hawton 2007), but it may also act more distally in the suicide process and account for the high prevalence of suicidal thoughts among veterinary surgeons, if the ease at which a suicide can be completed cues the consideration of

suicide as a possible solution. Second, the high prevalence of suicidal ideation among veterinary surgeons may be associated with the profession's acceptance of and familiarity with animal euthanasia which may change attitudes to suicide as a possible solution to their own problems. Positive associations have been demonstrated between favourable attitudes towards suicide (the degree to which an individual views suicide as an acceptable option under some circumstances) and levels of suicidal thoughts (Etzersdorfer and others 1998, Gibb and others 2006). Favourable attitudes towards suicide appear to increase the attractiveness of suicide should situational cues arise, placing an individual at increased risk of suicidal ideation.

6.3.4 Mental well-being

The estimated mean WEMWBS scores for veterinary surgeons and for male and female veterinary surgeons separately, are significantly lower than the corresponding means for representative general population samples from Scotland (Braunholtz and others 2007, Stewart-Brown and Janmohamed 2008).

For the Scottish general population, WEMWBS score is positively associated with higher socio-economic status and higher age at leaving full-time education, (Braunholtz and others 2007, Tennant and others 2007, Stewart-Brown and Janmohamed 2008). Veterinary surgeons comprise an occupational cohort of relatively homogeneous high socio-economic status so lower scores for this group are unexpected.

A possible explanation for lower WEMWBS scores among veterinary surgeons is the higher levels of parameters of mental ill-health in this population, as WEMWBS score showed significant moderate-sized negative correlations with measures of mental ill-health among the general population (Tennant and others 2007, Stewart-Brown and Janmohamed 2008).

6.3.5 Psychosocial working conditions

Veterinary surgeons self-reported less favourable working conditions (higher risk of work-related stress) than the UK working general population (Edwards and others

2008) for the *demands* (workload and working patterns), *managerial support* (level of support from the organisation and line management in terms of encouragement, sponsorship and resources) and *peer support* (level of encouragement and support from peers) stressor domains of HSE MSIT. The size of the difference is greatest for *demands* and *managerial support*; scores are in the 10^{th}-25^{th} and 5^{th}-10^{th} percentiles of organisations in the general population sample respectively. The score for the *managerial support* stressor domain also appears lower than among the UK nursing profession (Royal College of Nursing 2006) but insufficient data are available in the report on the nursing profession to make a valid comparison. By contrast, more favourable working conditions than the general population were self-reported by veterinary surgeons for the other stressor domains of HSE MSIT. The size of the difference is greatest for *relationships* (the quality of relationships between colleagues) and *change* (management and communication of organisational changes); both scores are in the 75^{th}-90^{th} percentile of organisations in the general population.

The mean score of the overall scale for veterinary surgeons is significantly lower than the mean score of the overall scale for the general population and the score is in the 25^{th}-50^{th} percentile of organisations in the general population sample which suggests that, when all the stressor domains are taken into consideration, veterinary surgeons report less favourable working conditions. However the interpretation of a single global measure of working conditions derived from the aggregated sub-scales requires some caution as current evidence does not support the implicit assumption that each of the component domains carries equal weight in terms of potential health effects.

The stressor domains relating to job *content* (demands, support, and control) have a more substantial evidence base for health effects than the others which relate to job *context* (MacKay and others 2004, Mustard 2004). When work is characterised by a combination of high demands and high control, as reported by veterinary surgeons relative to the general population in the current study, Karasek (1979) defines the job as 'active' (p. 288) and postulates that the effect of demands on work-related stress is buffered by the opportunity for significant use of discretion and judgement. An active job setting is thought to promote learning and development of new behavioural patterns leading to increased feelings of mastery and confidence which may 'help the person to cope with the inevitable strain-inducing situations of the job' resulting in

'increased capacity to accept still more challenging situations, which promote still more learning and positive personality change' (Karasek and Theorell 1990, p. 103). The two separate components of job strain, high demands and low control, can each have adverse health effects in the absence of the other, though the effects of high demands are weaker than those of low control, and when the two components occur in combination their effects seem to be additive rather than multiplicative, in contrast to Karasek's original hypothesis (Stansfeld and Candy 2006, Siegrist 2008). Low occupational social support exacerbates stressful experience whereas higher levels buffer against adverse health effects. It is possible that any buffering of high demands by the high control reported in the current study is attenuated by the low levels of occupational social support perceived.

Psychosocial working conditions may be important risk factors contributing to suicidal behaviours (Ostry and others 2007) and studies have demonstrated a causal association between work stress and rates of depression and anxiety (Melchior and others 2007, Waldenström and others 2008). HADS-A and HADS-D scores have been shown to increase with increasing demands, decreasing support and decreasing control, independently (Sanne and others 2005). The risk extends beyond mental health – findings from the Whitehall studies of British civil servants linked psychological distress to a subsequent higher risk of coronary heart disease, especially among men (Stansfeld and others 2002).

Caution must be exercised in comparing the current study's results with those for the general population and nurses due to the possible influence of, for example, socio-demographic factors. Demographic information is not available for the general population sample (Edwards and others 2008), and the gender balance of the nursing workforce is predominantly female (Royal College of Nursing 2006). In addition, the majority of the organisations in the general population sample are public sector (Edwards and others 2008). Most veterinary surgeons in the UK work in the private sector and working conditions within private sector organisations may be substantially different from the general population sample.

The evidence of higher psychological demands and lower social support at work than among the general population suggests that these elements of the psychosocial work

environment may play a role in the aetiology of elevated psychological symptoms and suicide among veterinary surgeons.

6.3.6 Work-home interaction

The mean WHI_N score is significantly higher than for the working population from the Netherlands (Geurts and others 2005) and significantly lower than for Belgian veterinary surgeons (Hansez and others 2008); the mean WHI_P score is higher than for the working population from the Netherlands and lower than for Belgian veterinary surgeons. The results suggest that veterinary surgeons report higher levels of both negative and positive work-home interaction than the working general population, but comparisons must be interpreted very cautiously due to possible cultural differences in interpretation of the scale items and the small size of the Belgian sample.

The WHI_N and WHI_P scales use only self-reported information which may be biased. Future research could take this limitation into account by using multiple sources of information (for example, the respondent's family) to obtain a wider perspective of the interaction between work and home.

6.4 Critique of study instruments in the context of study aims and hypotheses

Candidate instruments were carefully reviewed and evaluated against selection criteria to optimise the operationalisation of the elements of mental health and well-being relevant to the study aims and hypotheses (Sections 3.2, 3.3 and 3.4). It is considered that the instruments selected performed this function well. However, it is important to recognise that there may be relevant elements of mental health and well-being that the selected instruments were unable to explore adequately.

Although depression and anxiety are among the most important antecedents of suicide and HADS can indicate caseness in a variety of settings (Bjelland and others 2002), the scale does not reflect the prevalence of more severe mental disorders known to increase suicide risk which may be relevant in this population. Moreover, HADS does not include somatic symptoms of anxiety and depression (such as fatigue and

insomnia). Inadequate sleep is associated with psychological ill-health among doctors (Firth-Cozens 2001) and insomnia is a risk factor for the development of anxiety and depressive symptoms (Neckelmann and others 2007) and for suicide in the context of major depressive disorder (McGirr and others 2007).

The AUDIT-C cannot differentiate between at-risk drinkers and dependent drinkers; the use of a more comprehensive instrument for measurement of alcohol-related problems would be required to determine the proportion of dependent drinkers.

The current study could have been improved by asking respondents who reported suicidal thoughts what they thought may have influenced those thoughts and offering them a number of possible work-related and non-work-related problems as response options. Hem and others (2000) used this approach and identified that physicians attributed their suicidal thoughts to mainly non-work-related problems. The causal attribution of suicidal thoughts among veterinarians could be explored through semi-structured interviews in a possible subsequent qualitative phase of the study.

The HSE MSIT is termed an 'indicator tool' to reflect its ability to provide only a broad indication of perceptions of working conditions in the context of risks associated with work-related stress (Cousins and others 2004). Follow-up with qualitative studies would provide a greater depth of understanding. Demands are diverse in nature; the *demands* scale used measures psychological demands (i.e. workload) but may not have captured the emotional demands (such as dealing with death, illness, and grief) or physical demands (such as constrained standing, and handling animals or equipment) in the complex work setting of the veterinary profession. There is some evidence that these specific aspects of demands relate to different outcomes for common mental disorders among healthcare professionals (de Jonge and others 1999). In the current study, physical demands and dealing with client grief were reported to contribute *quite a lot* or *very much* to the stress felt by 9.8 percent and 15.4 percent of respondents respectively (see Section 5.8).

Similarly, the other stressor domains of the HSE MSIT may also fail to capture relevant elements of veterinary work milieus. For example, the *control* scale used captures the decision authority (control over the working environment) element of

decision latitude but does not capture skill discretion (variety of work and opportunity for use of skills). Additional risk factors for mental ill-health that are not captured by any of the domain scales include job insecurity (Stansfeld and others 2008) and exposure to work-related violence and threats (Wieclaw and others 2006b). However, neither is reported in the literature as a stressor of veterinarians (see Section 2.4.1.5) so the impact of omitting their measurement may be minimal. Furthermore, security of tenure is generally high within the veterinary profession as most jobs are permanent positions and unemployment is low. The concept of organisational justice, especially the relational component (respect from and fairness of treatment by supervisors), is another important dimension of the psychosocial work environment not captured by scales based on the established theoretical models and may predict minor psychiatric morbidity independently of other measures (Ferrie and others 2006, Kivimäki and others 2007). However, there may be some overlap between relational justice and measures of *relationships* and *managerial support* used in the current study. The inclusion of measurements of effort-reward imbalance in the study would have provided a more comprehensive assessment of psychosocial work characteristics as it has been shown to contribute to the risk of mental disorder independently of other dimensions of the psychosocial work environment (Dragano and others 2008).

The low frequency of complete responses for the *managerial support* domain among respondents who identified their position in the practice as sole principal or partner/director was probably because the questions were perceived as irrelevant due to the seniority of their positions and their scores may therefore be unreliable.

The demand-control-support (Karasek 1979, Karasek and Theorell 1990) and effort-reward imbalance (Siegrist 1996) models of work-related stress consider only key aspects of the psychosocial work environment and do not capture other dimensions of life which may influence workers' mental health, such as the family with whom they live and the society within which they are embedded (Loretto and others 2005, Wang 2006). The current study attempted to adopt a comprehensive perspective by examining, in addition to psychosocial working conditions, the influence of interactions between work and home on mental health and well-being. A study of the psychological health of employees within the UK National Health Service followed a similar approach (Loretto and others 2005). However there is scant suitable normative

data available for scales measuring work-home interaction and the SWING scale (Geurts and others 2005) used in the current study is no exception.

Potential veterinary work-related stressors were assessed using a series of bespoke items developed through focus group input and refined following pre- and pilot-testing. The psychometric properties of this instrument have not been examined.

6.5 Strengths and limitations of the study

6.5.1 Strengths

The study is based on a large nationwide sample of veterinary surgeons in a range of different types of employment.

The response rate of 56.1% is less than optimal but compares favourably with other postal surveys of the veterinary profession (cf. Hansez and others 2008, Gardner and Hini 2006, Mellanby and Herrtage 2004), which may reflect a high level of personal salience of the subject of mental health to the sample population. The response rate was achieved despite intermittent disruption to the national postal service due to industrial action around the time of questionnaire distribution and return. The demographic and occupational profile of respondents is broadly representative of the UK veterinary profession. Consequently weighting factors to adjust for differences between the composition of the sample and the target population were not applied in statistical analyses. Comparison of the demographic and occupational profile of respondents with that of the original sample and comparison of key mental health variables between late and earlier responders (see Sections 5.10 and 6.1.1), suggests that there may be a degree of non-response bias but overall the results are considered cautiously generalisable to the wider population of veterinary surgeons practising in the UK.

The study adopts a comprehensive approach by including measures of *positive* mental health and work-home interaction and identifying the greatest sources of pleasure in veterinary work, in addition to indicators of psychological morbidity.

The questionnaire uses standard instruments with known psychometric properties to help ensure the validity and reliability of the results and availability of normative data. The short series of bespoke questions on stressors pertinent to the veterinary profession was developed with input from a focus group and pre- and pilot- tested to help ensure relevance, comprehensiveness and absence of bias.

The study makes a number of important findings which provide evidence in support study hypotheses 1 and 2 (Section 1.2). The veterinary profession is a heterogeneous group in terms of mental health and well-being with differences associated with a variety of demographic and occupational variables including age, gender, type of work, and employment status. The main reported contributors to stress are: the number of hours worked; making professional mistakes; the possibility of client complaints or litigation; client expectations; unexpected clinical outcomes; and out-of-hours on-call duties. Compared to the general population, veterinary surgeons report higher levels of anxiety and depressive symptoms; higher 12-month prevalence of suicidal thoughts; less favourable psychosocial working conditions in regard to *demands* and *managerial support*; lower levels of positive mental well-being; and higher levels of negative work-home interaction.

The study has also helped to explore elements of the proposed hypothetical model to explain the increased risk of suicide among veterinary surgeons, described in Section 2.4.2. The evidence that veterinary surgeons report higher levels of psychological distress suggests that their higher suicide risk is not entirely associated with access to and knowledge of means of harm. The reporting of less favourable psychosocial working conditions in the domains of *demands*, *managerial support* and *peer support* suggests that workplace factors may play a role in the higher levels of psychological distress reported and the increased occupational risk of suicide. The elevated prevalence of anxiety symptoms among veterinary surgeons suggests that anxiety may play a role in the increased risk of suicide within the profession and it should therefore be incorporated into the hypothetical model. The level of alcohol consumption does not appear to be a negative influence on mental health within the profession as a whole.

The study has achieved all the objectives listed in Section 1.1.

6.5.2 Limitations

The data are limited by the cross-sectional design which allows investigation of associations but does not allow conclusions to be drawn about the direction of causality. Cross-sectional studies measure risk factors and disease status contemporaneously. It is therefore possible that concurrent psychiatric disorder might distort an individual's reporting of factors such as work-related demands and social support, leading to biased estimates of their association with mental health and well-being. Prevalence-incidence bias may occur when possible risk factors such as the quality of relationships and current employment status may result from, rather than cause, psychiatric disorder (Gunnell and Harbord 2003). For example, some of the veterinary surgeons surveyed may have altered their career trajectory by electing to take early retirement, work part-time or change their type of work within the profession for reasons relating to their mental health and well-being, thereby distorting patterns of association in the data. Psychological distress can select people into increasingly disadvantaged working conditions over their life course (Stansfeld and others 2008).

In addition, unhealthy individuals are generally excluded from the workforce and consequently morbidity in the workforce is usually lower than in the general population (the 'healthy worker effect') (Li and Sung 1999). Any attrition from the veterinary profession for reasons related to mental health may have biased the results as these individuals will not necessarily have been included in the population sampled. Questionnaires were mailed to the veterinary surgeons' preferred mailing address for receipt of mailings from the database; those sent to work rather than home addresses may have led to a bias towards healthy workers, omitting those absent from work at the time through illness. These effects would lead the study to under-report the prevalence of psychological morbidity.

A further limitation in the study methodology is bias related to the self-reporting of symptoms and working conditions. Mental health can influence perceptions of work characteristics (Stansfeld and Candy 2006). Social desirability response bias (a tendency to overestimate desirable traits and underestimate undesirable traits when using self-report measures) can also distort results, although self-administered

questionnaires are less prone to the latter than face-to-face interviews (Bowling 2005). Associations between symptoms and working conditions may be overstated as measures of both exposure and outcome are based on individuals' perceptions (common method variance) (Theorell and Hasselhorn 2005). For practical and economic reasons it was not possible to validate self-reported perceptions and symptoms with objective independent measures of exposure and outcome such as assessments of the work environment using external observer-rated work analysis, or structured clinical interview measures of psychiatric disorder, respectively. Most previous studies in this research area have also relied on subjective accounts of work stressors and symptoms of mental disorders (Stansfeld and Candy 2006, Waldenström and others 2008).

The content of the questionnaire may have led to some selection bias. Veterinary surgeons with mental health problems may have been disinclined to respond due to their symptoms or concerns that they might be identified, or conversely those without mental health problems may have considered that the questionnaire was not relevant to them. The time constraints of a demanding workload might reduce the likelihood of responding, or conversely those dissatisfied with their working conditions might be more inclined to respond in order to express their opinion. Knowledge of a colleague with mental health problems might also increase the likelihood of response. In order to help militate against selection bias, the covering letters accompanying mailed copies of the questionnaire encouraged completion and return the questionnaire '*regardless* of … any past or present experience of stress or mental health problems' (see Appendix II).

The sequential order of presentation of composite measurement scales within a questionnaire may influence the pattern of responses (Lucas 1992). The possibility of an order effect requires caution in the comparison of results across studies in which the scales may not have been presented in the same order or context. No attempt was made to control for any possible order or contextual effects in the current study by, for example, systematically rotating the order of instruments within the questionnaire and counterbalancing the order of completion across participants.

Care was taken during pilot testing of the bespoke questions on veterinary work-related stressors to attempt to avoid any leading words or phrases which could bias respondents to answer one way or another (Section 4.1.2). However, it is possible that some of the self-developed section headings used on the final questionnaire may have influenced responses. For example, 'Work-related stress' (Section F) may have been more appropriately titled 'Working conditions'.

The use of multiple scales in the questionnaire, each requesting responses based on a different time frame, may have caused some confusion. For example, HADS responses are required to be based on *the past week*; suicidal thoughts on *the last twelve months*; WEMWBS on *the last two weeks*; and no time frame was specified for the batteries of work-related stress and work-home interaction questions. However, the time frames were deliberately not standardised as this would potentially influence the psychometric properties of the scales and reduce comparability of the results with normative data.

The survey did not collect information on some potentially relevant mediating or moderating variables such as marital status, adverse work and life events, attitudes to euthanasia and suicide, history of any previous psychological distress, family history of affective disorder, use of prescribed or non-prescribed psychotropic medication, duration of exposure to possible explanatory variables (e.g. length of time in current job), social network size and perceived social support outside work, or personality factors such as negative affectivity, attributional style and social desirability response bias, which may have confounded associations without adjustment for them (model misspecification). Another potential source of residual confounding in the current study is the nature and extent of social and leisure activities outside work, which have been shown to be protective of mental health among veterinarians with unfavourable work characteristics (Shouksmith and Hesketh 1986).

In addition, comparison of measures of mental health and well-being with those for the general population must be undertaken with great care due to the possible influence of variables including socio-demographic factors.

6.6 Implications for research

A qualitative in-depth interview study using a relatively open interview schedule with participants purposively selected from those respondents in the current study sample who confirmed their willingness to participate in further research could further explore the findings. The sample could be selected on the basis of discrepant patterns between work characteristics and mental health (for example, high work-related stress and good mental health or low work-related stress and poor mental health). Interviews would provide an opportunity for in-depth exploration of the personal experiences and perceived contexts of veterinary surgeons' working lives and to develop explanations for the observed discrepant patterns. This method may also uncover new and unanticipated themes which are relevant to the study hypotheses. Interviews of respondents reporting suicidal ideation may identify trends in factors considered to have influenced those thoughts and could explore help-seeking behaviours and perceived barriers to help-seeking. Over 53.2 percent of all respondents provided their names and contact details in order that they might be considered to participate in a possible subsequent interview. Such mixed methods research, integrating qualitative and quantitative data, holds potential for a more comprehensive understanding of mental health and well-being in the profession.

Prospective longitudinal studies would help to determine whether the cross-sectional associations identified in the current study are causal. The mental health and well-being of the cohort of respondents who voluntarily identified themselves in the current study could be followed up over time for this purpose. A multiphase design with cause and effect variables measured at each phase would help to determine the rate of change of possible causal relationships and allow for the examination of reciprocal effects (Taris and Kompier 2003).

The current study focuses on practising veterinary surgeons. However, each stage of the veterinary career path – from the characteristics of applicants to veterinary schools, undergraduate training, subsequent employment, and through to retirement – requires examination, to identify early predisposing factors and later triggers for suicidal behaviour in the profession. This 'life course' approach to studying suicide (Gunnell

and Lewis 2005) will enable multiple points on the career continuum to be targeted with appropriate interventions.

Research with veterinary students could help identify if there is a predilection towards mental health problems in applicants to veterinary school, whether there are negative influences on mental health during undergraduate training, and whether individual-specific maladaptive coping strategies might play a role in the development of mental ill-health.

An investigation based on examination of coroners' records on veterinary surgeons' deaths which received a verdict of suicide or undetermined cause is planned (Mellanby 2008). This will provide insight into the circumstances of suicides in the profession and help to identify proximal risk factors.

The role of attitudes towards suicide should be considered when investigating differences in suicide rates between population groups (Etzersdorfer and others 1998). It has been suggested that attitudes towards suicide (the degree to which an individual views suicide as an acceptable option under some circumstances) may moderate the link between hopelessness and depressive symptoms and levels of suicidal ideation (Gibb and others 2006). Attitudes can also influence help-seeking behaviour. The veterinary profession's role in the provision of animal euthanasia and the facilitation of a 'good death' may normalise suicide, with death perceived as a rational solution to intractable problems. There has been no rigorous examination of this hypothesis to date. Data on attitudes towards suicide could be collected using, for example, items from the Suicide Opinion Questionnaire (Domino and others 1982).

Consideration should be given to developing an occupation-specific instrument to measure psychosocial working conditions within the veterinary profession which can be incorporated into some form of risk management framework.

The development of international research collaborations may help to identify countries in which suicide risk among veterinary surgeons is not elevated compared to the general population. Exploration of the possible reasons may inform the development of interventions for those countries in which the risk is higher.

There is scope for further research in the veterinary profession on the relationship between objectively measured job stressors and common mental disorders, on the mediating and moderating pathways between work characteristics and mental disorders, and the pathways from prior mental health to current work conditions and mental disorders.

Translational research is required to develop interventions which will then need to be piloted and their effectiveness and utility evaluated across the range of different veterinary work settings.

6.7 Implications for the profession

The current study demonstrates that, relative to the general population, the veterinary profession reports higher levels of anxiety and depressive symptoms; higher 12-month prevalence of suicidal thoughts; less favourable psychosocial working conditions in relation to demands and managerial support; lower levels of positive mental well-being; and higher levels of negative work-home interaction.

These observations have numerous implications for the veterinary profession and ongoing advocacy will be required across a range of stakeholders within the profession to demonstrate the need for and encourage the development and implementation of suitable interventions. The establishment of a single collaborative body with a mandate from all the key veterinary professional organisations to provide direction to and co-ordination and integration of initiatives which attempt to improve psychological health within the veterinary profession would help to ensure a unified strategy and maximise effectiveness.

Interventions to improve psychological health have been implemented effectively in a variety of different work settings (Michie and Williams 2003). An occupation-specific suicide prevention programme implemented in the US Air Force – aimed at decreasing stigma, enhancing social networks, facilitating help seeking, and enhancing understanding of mental health – reported success in lowering suicide rates (Knox and others 2003).

Studies suggest that poor mental health among doctors is associated with, for example, being irritable with patients, taking short-cuts and not following procedures, which may markedly reduce standards of patient care (Firth-Cozens 2001, Taylor and others 2007). Given similarities between medical and veterinary practice, intervention is important, not only for the well-being of individual members of the veterinary profession, but also to safeguard veterinary public health and the health and welfare of animals committed to veterinary care.

The structure of the UK veterinary profession is highly fragmented. Most practices are small businesses without the benefit of dedicated human resource staff or occupational health professionals to advance improvements in working conditions and the management and health of employees. Employers have ethical and legal duties to assess the risk of stress-related ill-health arising from work activities and take measures to control that risk. However, a balance must be achieved between personal and organisational responsibility for mental health and well-being; a comprehensive programme of interventions including both individual-oriented and work environment-oriented elements delivers the most favourable outcomes (Bond 2004, LaMontagne and others 2007).

Rose ([1992] 2008) observed that the prevalence of many diseases in a population is directly related to the population mean of the underlying risk factors: when there is a small shift in the mean of a normal distribution there is a large shift in the tails of the distribution. Consequently, shifting the mean of the risk factors in a population by population-level interventions leads to a decline in the prevalence of the disease. The prevalence of psychiatric disorder in a population is linearly related to the mean number of psychiatric symptoms in that population (Anderson and others 1993, Whittington and Huppert 1996). Anderson and others (1993) concluded:

> Populations thus carry a collective responsibility for their own mental health and well-being. This implies that explanations for the differing prevalence rates of psychiatric morbidity must be sought in the characteristics of their parent populations; and control measures are unlikely to succeed if they do not involve population-wide changes. (p. 475)

It is important therefore that interventions within the veterinary profession are directed at the level of the entire occupational population, rather than merely targeting those in psychological distress.

The cross-sectional nature of the current study precludes inference of causality but the results suggest a number of primary (preventive), secondary (ameliorative) and tertiary (reactive) interventions, for both organisations and individuals, which have the potential to reduce psychological distress in the profession. Consideration is given to the concept of 'countervailing interventions' – those focused on increasing the positive experience of work rather than decreasing the negative aspects – by incorporating some of the sources of satisfaction identified in the current study as these may help counteract the effects of workplace stressors (Kelloway and others 2008, p. 56). Proposed interventions are summarised in Tables 6.1 and 6.2. Research is required to assess the effectiveness of these proposed interventions on the dual outcomes of veterinary surgeons' mental health and work performance in terms of animal and client care (for example, reduction in complaints and litigation). This approach applies the precautionary principle in recognising the need for further research on interventions while simultaneously advocating that there is adequate evidence from outside the veterinary profession to justify prompt concerted action, and is in accordance with the assertions of Rose ([1992] 2008):

> Certainty is not a prerequisite for action. …that action may then proceed alongside continuing research and evaluation, recognising that new evidence may mean a change of policy. (p. 145)

Employee participation in the process of introducing interventions can help to refine interventions to optimise their fit within the context of a specific workplace and may in itself help to diminish some dimensions of work-related stress (LaMontagne and others 2007).

The following are possible areas for intervention to improve the mental health and well-being of veterinary surgeons, based on evidence of need within the profession and efficacy of such interventions in other fields.

6.7.1 Mental health promotion

Educational initiatives to improve mental health and well-being[27] should be integrated into the early undergraduate curriculum and made accessible to those already working in the profession. Topics could include evidence-based techniques to: enhance intra- and inter-personal adaptive coping skills; enable early recognition of mental ill-health in oneself and others; recognise and engage suicidal colleagues and help them to stay safe and seek further assistance; increase awareness of the dangers of alcohol misuse; challenge stigma and discrimination; and enhance help-seeking behaviours. Peer-led tuition could be provided by a national network of suitably trained veterinary surgeons. Primary interventions at undergraduate level are likely to have the greatest long-term benefit and be among the easiest to implement (Gerrity 2001). Timely intervention with young people who show early signs of mental ill-health is important as younger age of onset of depression is associated with greater suicidal intent, irrespective of the age of onset of suicidal thoughts (Thompson 2008).

Consideration should be given to the production of a short educational video for use in veterinary schools and conferences as part of an outreach campaign to raise awareness of suggested measures to reduce the levels of psychological distress in the profession.[28]

6.7.2 Monitoring of trends

The study provides a baseline of measures from which to monitor future change and trends in mental health and well-being. The *RCVS Survey of the Profession* could provide a suitable medium for such monitoring as it is mailed to the entire membership and achieves a response rate of around fifty percent (Robinson and

[27] Based on, for example, the protective behaviours training programme developed by Protective Behaviours (UK), Worcestershire, England; and suicide alertness skills (safeTALK) and intervention skills (ASIST) training programmes developed by LivingWorks Inc., Alberta, Canada.

[28] The American Foundation for Suicide Prevention developed a public television documentary (*Struggling in Silence*) (broadcast in May 2008) and two educational videos for use within the medical profession as part of an outreach campaign to help reduce physician depression and suicide. Available at http://www.afsp.org/index.cfm?fuseaction=home.viewPage&page_ID=A8913D2A-B133-78B0-E7ADEB9D84C8B34B [Accessed 29 May 2008]. This is one of a series of initiatives to implement the recommendations of a workshop convened to devise a strategy to address mental health issues within the medical profession (Center and others 2003).

Hooker 2006).[29] WEMWBS would be an appropriate instrument for inclusion in the questionnaire as it is designed as a measure to capture population-level changes in mental well-being and the current study demonstrates that the score is correlated with other measures including anxiety and depressive symptoms, suicidal thoughts and psychosocial working conditions. A shorter 7-item version of WEMWBS is also available and benefits from brevity and more robust scaling properties than the full scale (Stewart-Brown and others 2009). Monitoring would help in evaluating the effectiveness of any interventions introduced.

6.7.3 Accessible and appropriate support services

There is a need to evaluate the effectiveness of existing initiatives to support mental health in the UK veterinary profession (see Section 2.6) to determine whether modification or additional provision is required. Consideration could be given to the introduction of a telephone counselling service, possibly as part of an employee assistance programme provided by individual veterinary employers or associated with membership of a veterinary professional organisation, such as the British Veterinary Association. Similarly, a conciliation service, using the skills and experience of those with an intimate knowledge of the profession, may help resolve employment-related disputes.

6.7.4 Working conditions

Veterinary surgeons self-report less favourable psychosocial work characteristics than the working general population in relation to *demands* and *managerial support*. There is consistent evidence from a number of cross-sectional and longitudinal studies that high psychological demands, low decision latitude (control) and low social support at work are predictive of mental ill-health (Stansfeld and Candy 2006, Bonde 2008, Netterstrøm and others 2008). Working conditions are potentially modifiable and improvements can enhance mental health and well-being. Successful interventions that improve psychological health use training and organisational approaches to

[29] The next *RCVS Survey of the Profession* is scheduled for the first quarter of 2010. Personal communication [e-mail] Gemma Robertson-Smith, Research Officer, Institute of Employment Studies, University of Sussex Campus, Brighton, UK. 04 May 2009.

increase participation in decision-making, increase support and feedback, and improve communication (Michie and Williams 2003).

Veterinary surgeons should be provided with a manageable workload in relation to the agreed hours of work with tasks matched to an individual's skills and abilities, and any concerns about their work environment addressed. Appropriate involvement in management, decision-making and in the development of workplace policies is likely to benefit employee mental health.

The development of a workplace culture in which there is regular constructive feedback and problems are addressed sensitively should generate a more supportive work environment. Opportunities for clinical supervision, mentorship and review could be expanded and collaborative team-working encouraged. Deficiencies in people-management skills, including supervision, team leadership and competence in strategies for the prevention and reduction of work-related stress among employees, could be identified and addressed in veterinary practices. Meetings to discuss stressful work experiences appear to protect against suicidal ideation among female physicians (Fridner and others 2009) which suggests that regular implementation of such meetings may have similar value among veterinary surgeons. In the current study, relationships with colleagues and clients are reported as important sources of work-related satisfaction. Consequently, encouraging both formal and informal supportive relationships between work colleagues and with clients has the potential to improve mental health and well-being. The importance of workplace relationships has been recently underscored by research associating poor team climate at work with depressive disorders and subsequent antidepressant use (Sinokki and others 2009). High levels of job satisfaction have been shown to protect doctors' mental health against the harmful effects of job stress (Taylor and others 2005). Interpersonal relationships are a central theme of mental health promotion programmes (Stewart-Brown 2005). Durkheim ([1897] 2006) observed over a century ago that the frequency of suicide varied inversely with social cohesion:

> …we might observe that since the strength of the collective is one of the obstacles that best limits suicide, this cannot weaken without suicide rising. (p. 225)

> …in a coherent and vital community, there is a continual exchange of ideas and feelings from all to each and from each to all which is like mutual moral support, so that the individual, instead of being reduced to his resources only, participates in the collective energy and draws on it when his own is exhausted. (pp. 225-226)

While it may be facile to suggest that measures to improve social support within the veterinary profession would make suicide less likely, the possibility should not be discounted.

The structure of the veterinary profession is presently undergoing considerable changes, including increasing numbers of women graduates, increasing numbers of practices in corporate ownership, a decline in traditional mixed practice in favour of specialisation, and a trend towards consolidation of farm animal practices into fewer units covering larger geographical regions. Higher perceived amounts of workplace change have negative effects on psychological health (e.g. Loretto and others 2005). Perceived co-worker support and accurate information about impending change can reduce the impact on health (Platt and others 1999). Organisations should provide employees with timely information to enable them to understand the reasons for proposed changes and ensure adequate employee consultation on changes and opportunities for employees to influence proposals.

All employers have a legal responsibility under existing UK health and safety at work legislation to ensure the health, safety and welfare of their employees and are required to undertake risk assessments and take reasonably practicable steps to address the risks identified, but failings in active health risk management systems in UK small-animal veterinary practices have been reported (D'Souza and others 2009). The legal responsibility includes minimising the risk of stress-related illness.[30] There is a need to ensure that attention to mental health, and not merely physical health, is recognised by veterinary employers as an integral requirement of the legislation. The introduction of mechanisms for measuring and monitoring psychosocial work characteristics using standard instruments such as the HSE MSIT in the work environments of veterinary surgeons would enable identification of workplace-specific opportunities to improve

[30] Further advice on compliance with legislation concerning work-related stress is available at http://www.hse.gov.uk/stress/furtheradvice/legalresponsibility.htm [Accessed 22 Apr 2009]

working conditions. Workplace-specific mean scores for each HSE MSIT stressor domain can be compared with those estimated for the UK veterinary profession in the current study (Tables 5.26 and 5.27). The incorporation of formalised procedures for surveillance of psychosocial risks, and the development and implementation of suitable plans for their mitigation, into the requirements for accreditation under the RCVS Practice Standards Scheme is worthy of consideration, especially in view of the potential effects of the mental health and well-being of veterinary surgeons on animal care. Practices rely heavily on health and safety guidance produced by veterinary professional bodies (D'Souza and others 2009) and consequently, by the omission of any reference to work-related stress in the standards scheme requirements relating to health and safety of employees,[31] the RCVS may be inadvertently reinforcing any perception among employers that health and safety legislation only relates to physical risks.

Materials should be developed which present a compelling business case for psychological health and safety at work, beyond ethical and legal obligations, and inform veterinary businesses on how to create and sustain working environments which optimise the mental health of employees. Workplaces implementing specific measures to improve veterinary surgeons' mental health and well-being should be identified and publicised as models of best practice.

The RCVS Professional Development Phase (PDP) aims to support new graduates during their attainment of clinical skills in their first year in practice. The incorporation of elements of emotional reflection into this phase would give recognition to the importance of psychological health and encourage new graduates to consider their emotional needs and development opportunities early in their careers.

6.7.5 Other personal and work-related stressors

The total number of hours worked and out-of-hours on-call duties are reported by study respondents to be major contributors to stress although, in keeping with studies

[31] RCVS Practice Standards Scheme Manual (March 2009). Section 9: Safety Procedures. London, RCVS. pp 36-43. Available at http://www.rcvs.org.uk/Shared_ASP_Files/UploadedFiles/rcvs/367B0F5A-2251-4D47-B2DA-21B318CB4415_pss_manual_310309.pdf [Accessed 22 Apr 2009]

among doctors (Tyssen and Vaglum 2002), the current study failed to show an association between working long hours and mental health and well-being. Nevertheless, the requirements of the Working Time Regulations (1998)[32] – which prescribe maximum working hours and minimum rest periods – should be observed. The related issue of whether inactive periods during on-call duties contribute towards the total number of hours worked requires prompt resolution.

Making professional mistakes, the possibility of client complaints and/or litigation, and client expectations are reported to be major contributors to stress. Consultation skills training focused on improving competencies in communication to manage client expectations and deal with complaints may help to mitigate these stressors. The curricula of some UK veterinary schools contain elements of professional communication skills training (Gray and others 2006) but there is scope for this to be greatly expanded. The RCVS and professional indemnity insurance providers should give consideration to how to improve veterinary surgeons' access to appropriate advice and support when cases are referred to them. There is a general consensus on a need to update the RCVS complaints and disciplinary procedures[33] in the interests of both the public and the profession. Efforts to improve veterinary surgeons' respect for and confidence in the procedures could relieve some of their associated concerns.

In the current study, managing personal finances is self-reported as an important stressor for respondents who graduated in the previous five years. It is likely that concerns will rise among future graduates given the introduction of tuition fees in 2006 and the prospect that fees will be increased. The provision of debt management guidance during undergraduate training has the potential to help reduce the stress associated with the repayment of student loans after graduation. Consideration should be given to lobbying government to allow students' costs associated with compulsory extramural studies to be incorporated into the tuition fee loan structure.

[32] The Working Time Regulations (1998) require that employees should not have to work more than an average of 48 hours per week unless they choose to opt out. Available at http://www.opsi.gov.uk/si/si1998/19981833.htm [Accessed 01 Aug 2008]
[33] House of Commons Environment, Food and Rural Affairs Committee (2008) *Veterinary Surgeons Act 1966: Sixth Report of Session 2007-08*. London, The Stationery Office. http://www.publications.parliament.uk/pa/cm200708/cmselect/cmenvfru/348/348.pdf [Accessed 22 May 2008]

6.7.6 Work-home interaction

The results of the current study suggest that some veterinary surgeons experience high levels of negative work-home interaction. Renewed attention to existing policies and practices is recommended to address the extent to which work and home life are in conflict for both men and women in the profession. This may be achieved through flexible working hours, reduced working and on-call hours, or job sharing as negative work-home interaction is associated with the number of hours worked and on-call. The formation of out-of-hours co-operatives with local practices or the use of dedicated providers of out-of-hours veterinary care has potential to reduce negative work-home interaction.

6.7.7 Crisis intervention and return to work

Attempts should be made to facilitate the early identification of signs of psychological distress at work and enable appropriate and supportive intervention, which may involve making reasonable adjustments to the work environment to enable an individual to continue working. Screening workers for early signs of depression and encouraging effective treatment can improve clinical outcomes and work performance (Wang and others 2007). Associated initiatives to help break the stigma of mental health as a character weakness would be complementary.

Employers should create a positive culture of acceptability of sickness absence which enables veterinary surgeons to take time off work without excessive feelings of guilt, encourages them to recover sufficiently before returning to work, and manages the consequences of individual absences for their colleagues in a fair and equitable way.

The levels of psychological distress reported in the current study suggest the ready availability of lethal means is probably not operating in isolation to increase suicide risk within the profession. However, in view of the overwhelming evidence of an association between suicide prevalence and availability of lethal means (Hawton 2007), and the effectiveness of restrictions on access to lethal means as an approach to suicide prevention (Daigle 2005, Mann and others 2005, Hawton 2007), consideration should be given to mechanisms to moderate the opportunity for veterinary surgeons to

use certain medicines for suicide at times of high risk, notwithstanding the immediate implications for dispensing and administration of medicines. In other professions where access to lethal means is inevitable, such as the use of firearms by the military, at times of high risk, restrictions are placed on the opportunity to use lethal means for suicide (e.g. solitary armed duty), as distinct from imposing blanket restrictions on access (Mahon and others 2005). This model may have application in the veterinary profession: for example, restriction of unsupervised access to injectable barbiturates at times of high risk to minimise opportunity to remove them from the workplace for self-administration.

Placement of signage at geographical suicide 'hot spots', displaying details of accessible sources of emotional support, can be an effective suicide prevention measure (e.g. King and Frost 2005). Signage is a low cost intervention which capitalises on existing services, can be promptly implemented and is based on robust evidence of effectiveness. Signs encouraging individuals to seek help and displaying helpline telephone numbers, positioned in close proximity to practice medicine stores, might have a similar effect on individuals considering suicide and could also serve to increase awareness among all practice employees of sources of support.[34]

Consideration should be given by veterinary employers and professional bodies to the development and implementation of policies to facilitate the reintegration of veterinary surgeons with respect and sensitivity back into the workplace following a mental health crisis.

Consideration should also be given to the development of a protocol for effective suicide postvention to provide guidance to veterinary employers on communication to employees of information relating to a colleague's completed suicide and provision of support to all those affected.

[34] This recommendation was adopted by Veterinary Benevolent Fund and A5-sized, full-colour signs displaying telephone numbers for Vet Helpline and Samaritans were distributed to veterinary surgeons as an enclosure with accompanying editorial in *Veterinary Times* Vol 39, No 16, 27 Apr 2009, p. 3.

Table 6.1: Proposed individual-oriented interventions with potential to help alleviate psychological distress among veterinary surgeons

Primary	Secondary	Tertiary
Enhanced assessments at undergraduate level to inform the development, timing and targeting of educational interventions to improve resilience during subsequent career	Improving help-seeking behaviour, including encouragement to use existing support initiatives	Counselling and psychotherapy
Consider screening undergraduates to identify at-risk individuals and provide appropriate levels of support	Support during complaints and disciplinary proceedings	
Mental health promotion: techniques to improve mental well-being, enhance adaptive coping skills, increase awareness of the dangers of alcohol misuse, reduce perceived stigma	Provision of conciliation service to help resolve employment-related disputes	
Education to facilitate early recognition of psychological problems in self and others	Litigation under employment law	
Consultation skills training to improve communication and thereby help to manage client expectations and handle complaints effectively		
Introduction of emotional reflection into PDP		
Increase awareness of existing support initiatives: Vet Helpline, VSHSP		

Table 6.2: Proposed organisation-oriented interventions with potential to help alleviate psychological distress among veterinary surgeons

Primary	Secondary	Tertiary
Regular population-level monitoring of mental health and well-being of the veterinary profession using valid and reliable instruments	Provision of accessible and appropriate support services, e.g. counselling, cognitive behavioural therapy, telephone helplines	Policies to facilitate rehabilitation and reintegration back into the workplace
Regular monitoring of psychosocial work characteristics of individual workplaces. Iterative process of measurement and modification	Reduce discriminatory work-practices	Consider controlling access to specific medicines
Providing a safe means of recognising and discussing concerns about colleagues	Adjustments to the work environment to enable an individual to continue working	Signage positioned in close proximity to medicine stores
Improving management skills for senior veterinary surgeons: better supervision skills, recognition of risk, team leadership, regular staff appraisals, improved communication of change		Postvention to support those affected and reduce the risk of contagion
Increase management support, including mentoring programmes to assist new graduates to gain confidence		
Increase participation in decision-making		
Changing work practices: reduction in working hours, use of dedicated providers of veterinary care, regular breaks, adequate clerical support		
Evaluation of the effectiveness of existing initiatives to support mental health		
Provide opportunities to enhance inter-personal relationships with colleagues and clients		
Opportunities for improved work-home interaction e.g. flexible work options		
Establish well-being as an essential value of the organisation to create the appropriate culture		
Restoration of confidence in RCVS complaints and disciplinary processes		

CHAPTER 7: CONCLUSIONS

The demographic and occupational profile of respondents and assessments of non-response bias allow cautious confidence in the reliability and generalisability of the study findings to the wider population of veterinary surgeons practising in the UK.

The veterinary profession is a heterogeneous group in terms of mental health and well-being with differences associated with a variety of demographic and occupational variables including age, gender, type of work, and employment status. For example, veterinary surgeons working in mixed practice and in clinical and non-clinical roles in universities report a significantly lower 12-month prevalence of suicidal thoughts than those working in small animal practice; those working in clinical and non-clinical roles in universities report the highest levels of positive mental well-being; female veterinary surgeons have a higher risk of anxiety caseness; and the risk of anxiety caseness decreases with increasing age. However, cross-sectional methodology makes the casual direction between work stressors and mental health uncertain, particularly in view of the reciprocal relationships which exist between work characteristics and mental health.

Reported important contributors to stress include: making professional mistakes; the possibility of client complaints or litigation; client expectations; and unexpected clinical outcomes. Good clinical outcomes, relationships with colleagues, and intellectual challenge/learning are the main themes reported as the greatest sources of professional satisfaction.

Compared to the general population, the sample of veterinary surgeons reported higher levels of anxiety and depressive symptoms; higher 12-month prevalence of suicidal thoughts; less favourable psychosocial working conditions in regard to demands and managerial support; lower levels of positive mental well-being; and higher levels of negative work-home interaction. They drink more frequently than the general population, but consume less on a typical drinking day and have a prevalence of daily and weekly binge-drinking that is similar to the general population. The numbers of hours worked and on-call are reported as major contributors to stress; the

study showed associations with negative work-home interaction but not mental health or positive mental well-being.

The high levels of psychological distress reported suggest ready access to and knowledge of lethal means is probably not operating in isolation to increase suicide risk within the veterinary profession. The level of alcohol consumption does not appear to be a negative influence on mental health within the profession as a whole.

The results are used to propose a portfolio of interventions, for both organisations and individuals, which have potential to reduce psychological distress in the veterinary profession. However, there is a need for intervention studies to test whether modifying work-related stressors leads to better mental health in the working population, which is ultimately the goal of this research in the veterinary profession.

The study has contributed to research in the field of occupational health psychology by: development of a hypothetical model to explain suicide risk in veterinary surgeons based on a review of related literature; measurement of the nature and extent of psychological morbidity among veterinary surgeons in the UK; provision of empirical insight into possible mechanisms underlying suicidal behaviour within the veterinary profession; establishing a baseline of measures from which to monitor future change and trends in mental health and well-being among veterinary surgeons in the UK; informing the development and targeting of evidence-based interventions to help promote mental health within the veterinary profession; and contributing to the general body of knowledge on occupation and suicide and features of the psychosocial work environment that may influence mental health and well-being.

A qualitative study based on in-depth interviews with participants purposively selected from respondents to the current study could further explore the findings and may identify novel relevant themes. Further research could explore other stages of the veterinary career life course, such as the personality characteristics of students and elements of the undergraduate training environment, to identify possible influences on the development of subsequent mental ill-health and suicidal behaviours. Although the current study suggests that euthanasia of animals is perceived by the majority of veterinary surgeons to contribute minimally to occupational stress, the possible

contextual influence of the familiarity with and acceptability of animal euthanasia on attitudes towards the expendability of human life and the extent to which this might mediate the elevated risk of suicidal ideation and behaviours in the profession requires investigation.

The mental health and well-being of the veterinary profession is both an individual and a collective responsibility. There is potential for positive change through initiatives including education on protective behaviours and recognition of mental ill-health in oneself and others, redesign of the psychosocial work environment to reduce demands and increase managerial and peer support, and improving the quality of social relations in work and home life. This thesis provides an evidence base which underscores the need for intervention and should serve as a call to action for employees, employers and the profession's representative bodies to advance the changes required.

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APPENDICES

Appendix I:
Questionnaire

Survey of Mental Health and Well-Being in the UK Veterinary Profession

David J Bartram BVetMed MRCVS
External supervision through the School of Medicine, University of Southampton

vet well-being initiative
A cross-sectional study of mental health and well-being and their associations in the UK veterinary profession

IMPORTANT NOTES

1. All responses are anonymous.
2. Participation is voluntary: you can decide not to return the questionnaire or omit answers to any particular questions if you choose.
3. By returning the completed questionnaire, you are giving consent to the use of the information supplied.
4. Please provide completely open and honest answers and shade the one circle per question which most accurately reflects your own opinion using a BLUE or BLACK ball-point, like this ●.
5. If you make a mistake, cross through the answer you DO NOT want ⊗ and make your selection as before.
6. Although some questions are similar, there are differences between them and you should treat each one as a separate question.

SECTION A: DEMOGRAPHICS

1 Gender ○ Male ○ Female

2 Age (years) [ ][ ] 2a Which year did you qualify? [ ][ ][ ][ ]

3 At which veterinary school did you qualify?
○ Bristol ○ Overseas (EU or EEA Countries) ○ Liverpool ○ Edinburgh
○ Cambridge ○ Overseas (Non-EU / EEA Countries) ○ London ○ Glasgow

4 What is your main type of work?
○ Small animal practice ○ Farm animal practice ○ Equine practice ○ Mixed practice
○ Other specialty practice ○ Charity ○ Government ○ University – non-clinical
○ University – clinical ○ Working outside the veterinary profession ○ Industry

5 What is your current employment status?
○ Full-time ○ Part-time ○ Unemployed
○ Taking career break ○ Partially retired ○ Fully retired

6 What is your position in the practice that you work in?
○ Sole principal ○ Partner/director (of limited company) ○ Consultant ○ Other
○ Partner ○ Full-time assistant (or employee of limited company) ○ Locum ○ Not applicable
○ Salaried partner ○ Part time assistant (or employee of limited company)

7 Who owns the practice that you work in?
○ Sole principal ○ Partnership ○ Limited company ○ Corporate concern
○ Charity ○ Other ○ Not applicable

8 Are you an RCVS Certificate or Diploma holder? ○ Yes ○ No

9 How many hours do you work in a typical week? [1] [ ][ ][ ] Hours per-week

10 How many hours on call in a typical week? [2] [ ][ ][ ] Hours on-call per-week

1 Note: "Hours worked" should be the hours you attend at your practice (including university practice) or place of work during "open hours" (e.g. 8.30am to 7.30pm) when clients can visit the practice or when outside visits are made by appointment. If the practice or place of work is normally "open" during Saturdays or Sundays and you are on duty, include your attendance as hours worked. Please include overtime above your contractual hours.

2 Note: "Hours on call" are the hours that you are required to be available for emergencies. Please include all time "on-call" regardless of how the time is spent. It is important that "on-call" time spent on veterinary or administrative work is not double counted as hours worked.

SECTION B: ANXIETY AND DEPRESSION [1]

Read each item below and choose one response from each of the four options which comes closest to how you have been feeling in the past week. Don't take too long over your replies; your immediate response to each item will probably be more accurate than a long thought-out response.

11 I feel tense or 'wound up':
○ Most of the time ○ A lot of the time ○ From time to time, occasionally ○ Not at all

12 I still enjoy the things I used to enjoy:
○ Definitely as much ○ Not quite so much ○ Only a little ○ Hardly at all

13 I get a sort of frightened feeling as if something awful is about to happen:
○ Very definitely and quite badly ○ Yes, but not too badly ○ A little, but it doesn't worry me ○ Not at all

14 I can laugh and see the funny side of things:
○ As much as I always could ○ Not quite so much now ○ Definitely not so much now ○ Not at all

15 Worrying thoughts go through my mind:
○ A great deal of the time ○ A lot of the time ○ From time to time but not too often ○ Only occasionally

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PLEASE TURN OVER

16 I feel cheerful:
○ Not at all ○ Not often ○ Sometimes ○ Most of the time

17 I can sit at ease and feel relaxed:
○ Definitely ○ Usually ○ Not Often ○ Not at all

18 I feel as if I am slowed down:
○ Nearly all the time ○ Very often ○ Sometimes ○ Not at all

19 I get a sort of frightened feeling like 'butterflies' in the stomach:
○ Not at all ○ Occasionally ○ Quite Often ○ Very Often

20 I have lost interest in my appearance:
○ Definitely ○ I don't take as much care as I should
○ I may not take quite as much care ○ I take just as much care as ever

21 I feel restless as if I have to be on the move:
○ Very much indeed ○ Quite a lot ○ Not very much ○ Not at all

22 I look forward with enjoyment to things:
○ As much as I ever did ○ Rather less than I used to ○ Definitely less than I used to ○ Hardly at all

23 I get sudden feelings of panic:
○ Very often indeed ○ Quite often ○ Not very often ○ Not at all

24 I can enjoy a good book or radio or TV programme:
○ Often ○ Sometimes ○ Not often ○ Very seldom

SECTION C: ALCOHOL INTAKE [3]

25 How often do you have a drink containing alcohol?
○ Never ○ Monthly or less ○ Two to four times a month ○ Two to three times a week ○ Four or more times a week

26 How many units of alcohol do you have on a typical day when you are drinking? [3]
○ 1 or 2 ○ 3 or 4 ○ 5 or 6 ○ 7 to 9 ○ 10 or more

27 How often do you have six or more units on one occasion? [3]
○ Never ○ Less than monthly ○ Monthly ○ Weekly ○ Daily or almost daily

3 Note: A small glass of wine, half a pint of beer or one measure of spirit are each classed as one unit. With some strong beers and ciders, a pint is equivalent to three units or more. A large (175 ml) glass of red or white wine contains over two units of alcohol.

SECTION D: NEGATIVE THOUGHTS ABOUT YOUR LIFE [3]

There may be times in anyone's life when they become miserable and depressed and have negative thoughts about living. Please answer the following questions based on your experience of each over the last 12 months.

28	Have you felt that life was not worth living?	○ Yes	○ No
29	Have you wished that you were dead?	○ Yes	○ No
30	Have you thought of taking your life, even if you would not really do it?	○ Yes	○ No

SECTION E: MENTAL WELL-BEING [3]

Below are some statements about your feelings and thoughts. Please select the answer that best describes your experience of each over the last 2 weeks.

		None of the time	Rarely	Some of the time	Often	All of the time
31	I've been feeling optimistic about the future	○	○	○	○	○
32	I've been feeling useful	○	○	○	○	○
33	I've been feeling relaxed	○	○	○	○	○
34	I've been feeling interested in other people	○	○	○	○	○
35	I've had energy to spare	○	○	○	○	○
36	I've been dealing with problems well	○	○	○	○	○
37	I've been thinking clearly	○	○	○	○	○
38	I've been feeling good about myself	○	○	○	○	○
39	I've been feeling close to other people	○	○	○	○	○
40	I've been feeling confident	○	○	○	○	○
41	I've been able to make up my own mind about things	○	○	○	○	○
42	I've been feeling loved	○	○	○	○	○
43	I've been interested in new things	○	○	○	○	○
44	I've been feeling cheerful	○	○	○	○	○

SECTION F: WORK-RELATED STRESS [3]	Never	Seldom	Sometimes	Often	Always
45 I am clear what is expected of me at work	○	○	○	○	○
46 I can decide when to take a break	○	○	○	○	○
47 Different groups at work demand different things from me that are hard to combine	○	○	○	○	○
48 I know how to go about getting my job done	○	○	○	○	○
49 I am subject to personal harassment in the form of unkind words or behaviour	○	○	○	○	○
50 I have unachievable deadlines	○	○	○	○	○
51 If work gets difficult, my colleagues will help me	○	○	○	○	○
52 I am given supportive feedback on the work I do	○	○	○	○	○
53 I have to work very intensively	○	○	○	○	○
54 I have a say in my own work speed	○	○	○	○	○
55 I am clear what my duties and responsibilities are	○	○	○	○	○
56 I have to neglect some tasks because I have too much to do	○	○	○	○	○
57 I am clear about the goals and objectives for my department	○	○	○	○	○
58 There is friction or anger between colleagues	○	○	○	○	○
59 I have a choice in deciding how I do my work	○	○	○	○	○
60 I am unable to take sufficient breaks	○	○	○	○	○
61 I understand how my work fits into the overall aim of the organisation	○	○	○	○	○
62 I am pressured to work long hours	○	○	○	○	○
63 I have a choice in deciding what I do at work	○	○	○	○	○
64 I have to work very fast	○	○	○	○	○
65 I am subject to bullying at work	○	○	○	○	○
66 I have unrealistic time pressures	○	○	○	○	○
67 I can rely on my line manager to help me out with a work problem	○	○	○	○	○
	Strongly disagree	**Disagree**	**Neutral**	**Agree**	**Strongly agree**
68 I get help and support I need from colleagues	○	○	○	○	○
69 I have some say over the way I work	○	○	○	○	○
70 I have sufficient opportunity to question managers about change at work	○	○	○	○	○
71 I receive the respect at work I deserve from my colleagues	○	○	○	○	○
72 Staff are always consulted about change at work	○	○	○	○	○
73 I can talk to my line manager about something that has upset or annoyed me about work	○	○	○	○	○
74 My working time can be flexible	○	○	○	○	○
75 My colleagues are willing to listen to my work-related problems	○	○	○	○	○
76 When changes are made at work, I am clear how they will work out in practice	○	○	○	○	○
77 I am supported through emotionally demanding work	○	○	○	○	○
78 Relationships at work are strained	○	○	○	○	○
79 My line manager encourages me at work	○	○	○	○	○

SECTION G: WORK-HOME INTERACTION [4]	Never	Sometimes	Often	Always
80 You are irritable at home because your work is demanding	○	○	○	○
81 You find it difficult to fulfil your domestic obligations because you are constantly thinking about work	○	○	○	○
82 You have to cancel appointments with your spouse/family/friends due to work-related commitments	○	○	○	○
83 Your work schedule makes it difficult for you to fulfil your domestic obligations	○	○	○	○
84 You do not have the energy to engage in leisure activities with your spouse/family/friends because of your job	○	○	○	○
85 You have to work so hard that you do not have time for any of your hobbies	○	○	○	○
86 Your work obligations make it difficult for you to feel relaxed at home	○	○	○	○
87 Your work takes up time that you would have liked to spend with your spouse/family/friends	○	○	○	○
88 After a pleasant working day/working week, you feel more in the mood to engage in activities with your spouse/family/friends	○	○	○	○
89 You fulfil your domestic obligations better because of the things you have learned on your job	○	○	○	○
90 You are better able to keep appointments at home because your job requires this as well	○	○	○	○
91 You manage your time at home more efficiently as a result of the way you do your job	○	○	○	○
92 You are better able to interact with your spouse/family/friends as a result of the things you have learned at work	○	○	○	○

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PLEASE TURN OVER

SECTION H: HOW MUCH DOES EACH OF THE FOLLOWING CONTRIBUTE TO THE STRESS YOU FEEL?

	PERSONAL	Not at all	Not very much	Moderate	Quite a lot	Very much
93	Personal relationships outside work	○	○	○	○	○
94	Managing my finances	○	○	○	○	○
95	Any addictive behaviours such as gambling, alcohol or drugs	○	○	○	○	○
	GENERAL WORK-RELATED					
96	Number of hours worked	○	○	○	○	○
97	Workplace relationships	○	○	○	○	○
98	Availability of suitable employment	○	○	○	○	○
99	Keeping up personal levels of skills or expertise, including CPD	○	○	○	○	○
100	Making professional mistakes	○	○	○	○	○
101	Administrative and clerical tasks	○	○	○	○	○
102	The financial expectations of the organisation	○	○	○	○	○
103	Non-financial business management such as staff-related matters, health and safety, practice accreditation	○	○	○	○	○
104	Physical demands of work such as moving or handling animals or equipment, standing for long stretches of time, or risk of personal injury	○	○	○	○	○
105	Communication with clients	○	○	○	○	○
106	Client expectations	○	○	○	○	○
107	Availability of professional support	○	○	○	○	○
108	Work-related travelling	○	○	○	○	○

If you treat clinical cases, please answer Questions 109 to 119. Otherwise please go to Question 120.

	CLINICAL WORK-RELATED					
109	After hours on call duties	○	○	○	○	○
110	Euthanasia of animals	○	○	○	○	○
111	Being responsible for animals' lives	○	○	○	○	○
112	Times when you have sole charge	○	○	○	○	○
113	Clinical decision-making	○	○	○	○	○
114	Resources available to you such as equipment, range of medicines and diagnostic tests	○	○	○	○	○
115	Time available for each case	○	○	○	○	○
116	Dealing with client grief	○	○	○	○	○
117	The possibility of client complaints or litigation	○	○	○	○	○
118	Unexpected clinical outcomes	○	○	○	○	○
119	My understanding of legal and RCVS membership responsibilities such as prescribing, confidentiality or certification	○	○	○	○	○

120 Which three aspects of your job are the greatest sources of pleasure and/or satisfaction? (in decreasing order of importance)
Please PRINT. DO NOT write anything in the boxes.

1. _____ ☐☐ 2. _____ ☐☐ 3. _____ ☐☐

A possible subsequent phase of this research may comprise confidential interviews of selected individuals to further explore their positive or negative experiences of mental health and well-being. If you are in principle willing to be considered to participate, please PRINT your details below :

for office use only

Initials _____ Surname _____ Contact telephone number _____ ☐☐☐☐

Please note that your questionnaire responses will no longer be anonymous. However, strict confidentiality is assured.

THANK YOU FOR YOUR PARTICIPATION IN THIS RESEARCH

We have tried to ensure that the questions in this survey do not cause distress to you. However, if completion of the questionnaire has raised any upsetting concerns about your well-being, you may wish to discuss these concerns with your GP or other healthcare professional, Vet Helpline (Tel: 07659 811 118) or Samaritans (Tel: 08457 909 090, www.samaritans.org.uk).

NOW PLEASE RETURN THE COMPLETED QUESTIONNAIRE IN THE REPLY-PAID ENVELOPE PROVIDED

Sources of published scales used in this questionnaire:

i. Hospital Anxiety and Depression Scale (HADS), copyright © R.P. Smaith and A.S. Zigmond, 1983, 1992, 1994. Record form items originally published in Acta Psychiatrica Scandinavica, 67, 361-70, copyright © Munksgaard International Publishers Ltd, Copenhagen, 1983. Published by nferNelson Publishing Company Ltd, The Chiswick Centre, 414 Chiswick High Road, London W4 5TF, UK. All rights reserved. nferNelson is a division of Granada Learning Ltd, part of Granada plc. ii. AUDIT alcohol consumption questions (AUDIT-C) (Bush et al 1998). iii. Psychiatric morbidity among adults living in private households, 2000: Technical Report. London: Office for National Statistics iv. The Warwick-Edinburgh Mental Well-being Scale was funded by the Scottish Executive National Programme for improving mental health and well-being, commissioned by NHS Health Scotland, developed by the University of Warwick and the University of Edinburgh, and is jointly owned by NHS Health Scotland, the University of Warwick and the University of Edinburgh. v. Health and Safety Executive Indicator Tool for Work-Related Stress. vi. From the SWING questionnaire (Geurts et al 2005)

External supervisor : Dr David S. Baldwin MB BS DM FRCPsych, Reader in Psychiatry, School of Medicine, University of Southampton

IF YOU HAVE ANY QUESTIONS PLEASE CONTACT:

David J Bartram BVetMed MRCVS, 43 Leafy Lane, Whiteley, Fareham, PO15 7HL
E-mail: vetwellbeing@btinternet.com

- OCTOBER 2007-

Appendix II:
Covering letters mailed with questionnaires

David J. Bartram
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43 Leafy Lane
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E-mail: vetwellbeing@btinternet.com
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External supervisor:
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Reader in Psychiatry
Division of Clinical Neurosciences
School of Medicine
University of Southampton

vet well-being initiative
A cross-sectional study of mental health and well-being and their associations in the UK veterinary profession

October 2007

Dear Colleague

Survey of mental health and well-being in the UK veterinary profession

You are one of 3,200 veterinary surgeons in the UK selected at random and invited to participate in this survey; an independent, academic research initiative with external supervision through the School of Medicine, University of Southampton.

The study is prompted by the statistic that a disproportionately high number of veterinary surgeons die by suicide: one of the highest rates of any occupation.

The purpose of this survey is to identify some of the variables associated with work-related stress and inform the development of strategies to help improve mental health within the veterinary profession. The measured parameters will be compared against normative data for the UK population (and other professions where possible) and provide a baseline from which to monitor change and future trends. The results will be available to the British Veterinary Association and the Royal College of Veterinary Surgeons and submitted for publication in peer-reviewed veterinary and medical journals.

Participation is voluntary. You are encouraged to complete and return the questionnaire regardless of whether you have any past or present experience of stress or mental health problems. It takes around 20 minutes to complete. Your answers are needed to help ensure that the results are representative and can be generalised to the whole profession. A high response rate is critical to the success of the survey.

Your responses are anonymous. The source of individual data cannot be identified so confidentiality is assured. The study has been reviewed by an NHS Research Ethics Committee to help protect the interests of participants.

The survey-based research expertise of Veterinary Business Development Ltd. is used to distribute the questionnaire and receive the envelopes containing the responses. The study is otherwise completely independent of the company and is entirely non-commercial.

I hope that you will be able to assist in this key initiative and thank you in advance for your response. Please try to return the completed questionnaire as soon as possible, or before the end of November at the latest, in the enclosed reply-paid envelope.

If you have any questions or would like to know more about the study please contact me, preferably by sending an e-mail to the following address: vetwellbeing@btinternet.com

Yours faithfully

David J. Bartram BVetMed MRCVS

David J. Bartram
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External supervisor:
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Reader in Psychiatry
Division of Clinical Neurosciences
School of Medicine
University of Southampton

vet well-being initiative
A cross-sectional study of mental health and well-being and their associations in the UK veterinary profession

November 2007

Dear Colleague

REMINDER: Survey of mental health and well-being in the UK veterinary profession

In October you should have received an invitation by post to participate in this survey, as one of 3,200 UK veterinary surgeons selected at random. As all responses are anonymous, it is not possible to identify who has already returned a completed questionnaire. This is a reminder letter with identical enclosures inviting you to respond if you have not yet done so. **PLEASE COMPLETE AND RETURN THE QUESTIONNAIRE AS SOON AS POSSIBLE, OR BEFORE THE END OF NOVEMBER AT THE LATEST, IN THE ENCLOSED REPLY-PAID ENVELOPE**.

THE SURVEY RELATES TO ALL TYPES OF WORK, INCLUDING VETERINARY SURGEONS NOT WORKING IN CLINICAL PRACTICE OR WORKING OUTSIDE THE PROFESSION.

If you have already responded, thank you for participating and please accept my apologies for this reminder letter which you can now ignore.

The study, an academic research initiative supervised by the School of Medicine, University of Southampton, is prompted by the statistic that a disproportionately high number of veterinary surgeons die by suicide: one of the highest rates of any occupation.

The purpose of this survey is to identify some of the variables associated with work-related stress and inform the development of strategies to help improve mental health within the veterinary profession. The measured parameters will be compared against normative data for the UK population (and other professions where possible) and provide a baseline from which to monitor change and future trends. The results will be available to the British Veterinary Association and the Royal College of Veterinary Surgeons and submitted for publication in peer-reviewed veterinary and medical journals.

Participation is voluntary. You are encouraged to complete and return the questionnaire regardless of whether you have any past or present experience of stress or mental health problems. It takes around 20 minutes to complete. Your answers are needed to help ensure that the results are representative and can be generalised to the whole profession. A high response rate is critical to the success of the survey.

The source of individual data cannot be identified so confidentiality is assured. The study has been reviewed by an NHS Research Ethics Committee to help protect the interests of participants.

The survey-based research expertise of Veterinary Business Development Ltd. is used to distribute the questionnaire and receive the envelopes containing the responses. The study is otherwise completely independent of the company and is entirely non-commercial.

I hope that you will be able to assist in this key initiative and thank you in advance for your response. If you have any questions or would like to know more about the study please contact me, preferably by sending an e-mail to the following address: vetwellbeing@btinternet.com

Yours faithfully

David J. Bartram BVetMed MRCVS

Appendix III:
Pre-study awareness editorials

Mental health and wellbeing survey

SIR, – We should like to bring to the attention of colleagues a forthcoming independent, academic research project, the Vet Wellbeing Initiative, a cross-sectional study of mental health and wellbeing and their associations in the UK veterinary profession.

A total of 3200 veterinary surgeons will be selected at random and invited to participate in the study, which aims to identify some of the variables associated with mental health and wellbeing, and inform the development of strategies to help improve mental health within the veterinary profession. This number represents approximately 20 per cent of the current RCVS membership (excluding those who are practising overseas or non-practising).

A paper-based questionnaire with associated covering letter and reply-paid envelope will be mailed to each of the participants during October, and the completed questionnaire should be returned before the end of November.

All participants are encouraged to take time to return the completed questionnaire regardless of whether they feel they have or have not experienced mental health problems in the past and even if they lack the energy or time. This is needed to help to ensure that the results are unbiased and can be generalised to the whole profession. A high response rate is critical to the success of this survey.

The questionnaire uses a number of published, validated psychological scales and a series of original questions on stressors more specific to the veterinary profession. The latter were developed and pilot tested using informal focus groups of colleagues within the profession. All responses are entirely anonymous – the source of individual data is not identifiable in any way – so confidentiality cannot be breached.

The results will be used to provide evidence-based conclusions and proposals for further work. It is intended that papers will be submitted for publication to appropriate medical and veterinary peer-reviewed journals.

The RCVS and BVA are aware of the study and an analysis of the results will be made available to them, but the study is independent of these organisations.

The study has been reviewed by an NHS research ethics committee to help protect the interests of participants.

Veterinary Business Development will distribute the questionnaire and receive the responses. The research is, however, otherwise completely independent of this company and is entirely non-commercial. Data entry and statistical analysis will be performed at the University of Southampton.

A forum on the study website (www.vetwellbeing.co.uk) provides a medium for all visitors to share and promote best practice in achieving emotional wellbeing in the veterinary profession. Qualitative analysis of the comments posted may help inform the study's recommendations for possible interventions.

Any questions regarding the study can be addressed to David Bartram by e-mail: vetwellbeing@btinternet.com

David Bartram, *43 Leafy Lane, Whiteley, Fareham, Hampshire PO15 7HL*
David Baldwin, *Clinical Neuroscience Division, School of Medicine, University of Southampton, RSH Hospital, Southampton SO14 0YG*

Veterinary Record Vol 161, No 10, 8 September 2007, p. 360

VET SURVEY INTO UNDERSTANDING MENTAL HEALTH AND WELL-BEING

DAVID BARTRAM
BVetMed, DipM MCIM, CDipAF, MRCVS

outlines the research initiative he conceived and is now leading to investigate mental health within the veterinary profession in the UK

WITH a disproportionately high number of veterinary surgeons dying by suicide – one of the highest suicide rates of any occupation – possible causes and remedial strategies are now being carefully explored.

The Vet Well-being Initiative is an independent, academic research project. It is a cross-sectional study of mental health and well-being and their associations in the UK veterinary profession. External supervision for the study is provided by David Baldwin, reader in psychiatry and honorary consultant psychiatrist at the School of Medicine, University of Southampton.

The proportion of deaths by suicide, relative to the number of deaths by other causes (proportional mortality rate) in the veterinary profession, is around four times higher than in the general population, and around twice that of other high-risk occupations, including farmers, pharmacists and medical and dental practitioners.

The RCVS survey of the UK veterinary profession in 2006 revealed that more than 80 per cent of veterinary surgeons agreed, or strongly agreed, with the statement that "veterinary work was stressful".

A total of 3,200 veterinary surgeons practising in the UK will be selected at random and invited to participate in this important study, which aims to identify some of the variables associated with mental health and well-being and inform the development of strategies to help improve mental health within the veterinary profession. This number represents approximately 20 per cent of the current RCVS membership (excluding those practising overseas or retired). The profile of the study cohort will be compared with RCVS membership demographic factors to judge the representativeness of the sample.

Objectives

The objectives of the survey are:

- to assess psychological symptoms and well-being in the UK veterinary profession, including work-related stress and work/life balance;
- to compare the measured parameters against normative data for the UK population (and other professions where possible) and provide a baseline from which to monitor change and future trends;
- to explore the relationship between mental health/well-being and demographic factors including age, gender, work conditions and type of practice; and
- to identify key stressors and use these to suggest possible targeted interventions to help mitigate negative outcomes of work-related stress.

A paper-based questionnaire with an associated covering letter and reply-paid envelope will be mailed to each of the participants during October and the completed questionnaire should be returned before the end of November 2007.

All participants are encouraged to take time to return the completed questionnaire – regardless of whether they have or have not experienced mental health problems in the past and even if they lack the time or energy. This is needed to help ensure that results are unbiased and can be generalised over the whole profession. A high response rate is critical to the success of this survey.

The questionnaire will comprise questions within the following domains:

- demographic factors, such as age, gender, work conditions, and type of practice;
- depression and anxiety;
- well-being;
- work-related stress; and
- work/life balance: positive and negative work/home interaction.

The questionnaire uses a number of published, validated psychological scales and a series of original questions on stressors specific to the veterinary profession. The latter were developed and pilot-tested using informal focus groups of colleagues within the profession.

David Bartram.

All responses will be entirely anonymous – the source of individual data is not identifiable in any way, so confidentiality cannot be breached.

The results will be used to provide evidence-based conclusions and proposals for further work. It is intended that papers will be submitted for publication to appropriate medical and veterinary peer-reviewed journals.

The RCVS and BVA are supportive of the study and an analysis of results will be made available to them, but the study is independent of these organisations. The study has been reviewed by an NHS Research Ethics Committee to help protect the interests of participants.

The study uses the survey-based research expertise of Veterinary Business Development, publishers of *Veterinary Times*, to distribute the questionnaire and receive the responses. The research is, however, otherwise completely independent of the company and is entirely non-commercial. Data entry and statistical analysis will be performed at the University of Southampton.

A forum on the study website (www.vetwellbeing.co.uk) provides a medium for all visitors to share and promote best practice in achieving emotional well-being in the veterinary profession. Qualitative analysis of the comments posted may help inform the study's recommendations for possible interventions.

- If you have any questions regarding the Vet Well-being Initiative, please contact David Bartram, the study investigator, by email at vetwellbeing@btinternet.com.

The initiative will invite 3,200 vets at random throughout the UK to participate in the survey.

Veterinary Times Vol 37, No 36, 24 September 2007, p. 30

NEWS RELEASES

SURVEY OF MENTAL HEALTH AND WELL-BEING IN THE VETERINARY PROFESSION

The Vet Well-being Initiative is an independent, academic research project on mental health and well-being in the UK veterinary profession, lead by David Bartram BVetMed MRCVS, with external supervision through the School of Medicine, University of Southampton.

The study is prompted by the statistic that a disproportionately high number of veterinary surgeons die by suicide: one of the highest rates of any occupation.

The purpose of this psychological survey is to identify some of the variables associated with work-related stress and inform the development of strategies to help improve mental health within the veterinary profession. The measured parameters will be compared against normative data for the UK population (and other professions where possible) and provide a baseline from which to monitor change and future trends. The results will be available to the British Veterinary Association and the Royal College of Veterinary Surgeons and submitted for publication in peer-reviewed veterinary and medical journals.

Questionnaires will be mailed to a random sample of 3,200 veterinary surgeons in October. Anyone receiving a questionnaire is encouraged to complete and return it in the reply-paid envelope regardless of whether they have or have not experienced mental health problems in the past, and even if they lack the energy or time. Their answers are needed to help ensure that the results are representative. A high response rate is critical to the success of the survey.

All responses are entirely anonymous – the source of individual data is not identifiable in any way – so confidentiality cannot be breached.

The study uses the survey-based research expertise of Veterinary Business Development Ltd to distribute the questionnaire and receive the responses. The research is otherwise completely independent of the company and is entirely non-commercial. All data entry and analysis will be completed at the University of Southampton.

Further information regarding the study can be obtained from David Bartram by e-mail to vetwellbeing@btinternet.com.

UK Vet Livestock Vol 12, No 6, October 2007, p. 32

Appendix IV:
Reminder editorials

NEWS RELEASES

SURVEY OF MENTAL HEALTH AND WELL-BEING IN THE VETERINARY PROFESSION

The Vet Well-being Initiative is an independent, academic research project on mental health and well-being in the UK veterinary profession, lead by David Bartram BVetMed MRCVS, with external supervision through the School of Medicine, University of Southampton.

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Questionnaires were mailed to a random sample of 3,200 veterinary surgeons in October. Anyone receiving a questionnaire is encouraged to complete and return it in the reply-paid envelope regardless of whether they have or have not experienced mental health problems in the past, and even if they lack the energy or time. Their answers are needed to help ensure that the results are representative. A high response rate is critical to the success of the survey.

All responses are entirely anonymous – the source of individual data is not identifiable in any way – so confidentiality cannot be breached.

The study uses the survey-based research expertise of Veterinary Business Development Ltd to distribute the questionnaire and receive the responses. The research is otherwise completely independent of the company and is entirely non-commercial. All data entry and analysis will be completed at the University of Southampton.

Further information regarding the study can be obtained from David Bartram by e-mail to vetwellbeing@btinternet.com.

UK Vet Companion Animal Vol 12, No 8, November 2007, p. 55

High response critical to survey success

Dear Editor,

In October, questionnaires were mailed to 3,200 randomly selected, UK-based veterinary surgeons with an invitation to participate in an academic study of mental health and well-being. At the beginning of November, a second copy of the questionnaire was sent to all participants to remind those who had not already responded. The survey relates to all types of employment, including veterinary surgeons not working in clinical practice and those working outside the profession.

A high response rate is critical to the success of the survey to ensure that the results are representative and can be generalised to the whole profession. We hope that anyone who has not yet responded will participate in this initiative and return the completed questionnaire in the reply-paid envelope as soon as possible, preferably before the end of November.

Thank you to everyone who has returned a completed questionnaire to date. Further details of the survey are available on the study website (www.vetwellbeing.co.uk). Any questions about the study can be addressed to David Bartram by email via vetwellbeing@btinternet.com

Yours faithfully,

DAVID BARTRAM, BVetMed, DipM, MCIM, CDipAF, MRCVS,
43 Leafy Lane,
Whiteley,
Fareham PO15 7HL.

DAVID S BALDWIN, MB, BS DM, FRCPsych,
Clinical neuroscience division, school of medicine,
University of Southampton,
RSH hospital,
Southampton SO14 0YG.

Veterinary Times Vol 37, No 44, 19 November 2007, p. 35

Many responses, but we'd still like more

Dear editor,

In October, questionnaires were mailed to 3,200 randomly selected, UK-based veterinary surgeons with an invitation to participate in an academic study of mental health and well-being. A second copy of the questionnaire was sent in November as a reminder to all participants. The response rate to date is 54 per cent. More than half of these respondents volunteered to be considered for interview in a possible subsequent phase of the research.

A high response rate is critical to the success of the survey to ensure that the results are representative and can be generalised to the whole profession. We hope that anyone who has not yet responded will participate in this initiative and return the completed questionnaire in the reply-paid envelope as soon as possible and before the end of December. Anyone in the sample who has mislaid his or her questionnaire can obtain another copy by emailing vetwellbeing@btinternet.com

We would like to thank everyone who has already returned a completed questionnaire.

Yours faithfully,

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Appendix V:
Coding frame for sources of satisfaction

Coding frame to describe thematic content of responses to Question 120.

Code	Satisfier	Examples
01	Improving animal health and welfare	Fixing sick pets, curing pets, animal welfare, improving ill/injured animals, making a difference to a patient's life, helping animals, making animals better, happy patients, making animals better and alleviating animal suffering, knowing I have improved quality of life of a pet, easing suffering, prevent suffering, satisfying a need, worthwhile job, reducing pain, euthanasia, stray re-homing, animal care, privilege of dealing with sick and injured animals with compassion, a good euthanasia, rehabilitating welfare cases, allowing animals to die without pain when terminally ill, treating animals, making really poorly animals better, mending animals, healing animals, healing, helping animals
02	Variety	Job variation, every day is different, variety of work, clinical variety, never the same, range of work, diversity of work, never boring, lack of boredom, daily different challenge
03	Financial rewards	Income, good pay, good salary, wage, financial independence, profit, economic, earning a good living, getting paid, financial security, making money, keeping roof over head, salary, paying mortgage, pay, making ends meet financially, pocket money, takings, turnover-related bonus, rising income, pension, remuneration, earning potential, financial independence, payment, reach bonus, counting the money
04	Surgical work	Surgery, surgical work, operating, performing surgery, interesting surgery, unusual surgery
05	Good clinical outcomes	Good outcome, successful case outcome, saving a life, successfully treating cases, positive clinical outcome, treatment success, cure animal, good clinical performance, successful clinical work, successful surgery, patient recovery, successful cases, seeing healthy patients post-treatment, successful caesareans, successful case management, doing a good job, clinical case successes, achieving clinical results, critical care successes, fixing problems, fixing things, satisfactory results
06	Working outdoors	Working outdoors, outdoors, being outdoors, outdoor life, outdoor/farm environment, working in nice countryside, being outside, rural environment, lovely scenery, location, working/living in very pleasant part of UK
07	Working with animals	Puppies, kittens, spending time with horses, handling animals, animal contact, working with animals, animal interaction, bonding with pets, animals, patients, stroking animals, greeted by dogs with a wag and lick, working with cats, petting animals, working with exotics, the pets
08	Relationships with clients	Assisting farmers, interaction with clients, knowing clients, client bond, meeting people, meeting public, dealing with the public, client relationships, communication with clients, vet/client bond, client rapport, part of community, meeting people, dealing with clients, nice clients, interaction with farmers, working with people

Continued overleaf

Code	Satisfier	Examples
9	Relationships with colleagues	Work colleagues, work social, friends at work, team support, colleagues, contact with colleagues, interaction with colleagues, talking with fellow staff, getting on well with support staff, communication with colleagues, pleasant colleagues, banter with staff, colleagues, fun in the office, the other members of staff, teamwork, nice staff, good team at work, tea and cake with colleagues, good working relationships, happy working environment, happy atmosphere, camaraderie with colleagues, working with mates, humour at work
10	Client satisfaction	Appreciation for problems resolved, client satisfaction, good feedback from clients, satisfied and thankful clients, respect from clients, happy clients, making clients happy, clientele positive response, client gratitude, being thanked, client recommendation, positive client feedback, respect
11	Intellectual challenge/ learning	Gaining new people or clinical skills, CPD, personal achievement, problem solving, making new diagnoses, solving a clinical puzzle, mental challenge, intellectual stimulation, using new techniques, clinical decision-making, knowledge, undertaking new procedures, science of medicine, reaching a diagnosis, keeping work up to date, learning, gaining my qualification for my own satisfaction, reading, learning a new technique, interesting work, acquiring new skills, working up a difficult case, a good diagnosis, intellectual freedom, problem solving, solving puzzles, correct diagnosis, strategic thinking, clinical accuracy, case discussion, performing a new/difficult procedure, diagnosis, maintaining competence, using your brain, solving clinical problems from referring practices, challenge and change, challenging cases, improving, mentally stimulating, clinical discussion, investigation, new cases, personal growth, learning new things, an interesting case, discovery, working up cases in insured animals, using my brain, stimulation, learning from professional colleagues, gaining RCVS certificate, mental stimulation, solving complicated medical cases
12	Teaching	Teaching others, helping young vets, doing teaching well, development of colleagues, nurse training, clerking students, colleagues turning to me for advice, training staff, supporting new graduates, educating clients, sharing knowledge, supporting others, training and mentoring others, lecturing
13	Time off	Job finish, annual leave/time off in lieu, holidays, finish on time, time off, going home, getting to the end of the day, completing of day's work, half days, going home, day off each week for hobby, pending retirement, finishing on time, not being there, good time off, leave, quiet weekend on call, no night duty, weekends off, time off in week, Friday afternoon

Continued overleaf

Code	Satisfier	Examples
14	Management	Happy staff, running a good practice, managing staff well, tidy surgery, expansion-building the practice, running own company, project management, merging with neighbouring practice, leadership, own boss, influencing staff job satisfaction, seeing the office work effectively, success of the business, happy practice, thriving practice, keeping staff happy and motivated, developing staff, staff morale, organising things, staff satisfaction, in control, business, building up practice, building a good working environment, improving health and safety, running a successful business, owning a successful and respected business, contended and proactive staff, managing staff well, management, managing change in the practice, practice success, practice development, business planning, personnel management, financial management
15	Other	Case continuity at my own branch, well-equipped practice, data analysis, pathology, excelling, sense of achievement, ultrasound, travelling, public perception of vets, efficient working days, little paperwork, satisfaction of job, independence, companionship, self determination, my Christian faith, being good at what I do, respect, other peoples' disasters, escaping from domestic situation, profession itself, autonomy, practical nature of the job, positive feedback from boss, doing my best, client continuity, car, continuity of care, medicine, following cases through to conclusion, consults, status in society, admin project, success, efficiency, support, parturition, births, clinical freedom, professional recognition, doing a job well, being good at what I do, respected, profession, fulfilling lifelong ambition, admin, managing cases, orthopaedics, working environment, being efficient, avoiding paperwork, preventative e.g. vaccination/flea treatments, being 'needed' using high tech equipment, travelling, well equipped clinic, fulfilling my calling, practical, orthopaedics, imaging, working at favourite branch surgery, boss happy, good work/home balance, enjoying God's creation, positive feedback from colleagues, nursing care, driving, not behind desk, getting in bad debts, keeping up with appointments list, IT work, manual skills, *illegible*
16	Not specified	BLANK, who knows – too numb to know!, nothing!
17	Research	Research, improving others' experimental designs, successful research results, statistics, getting a paper published, publishing
18	Flexibility	Flexible hours, flexibility, flexibility of working, flexible time, being part time, working hours, short working hours, reasonable hours, suitability in family situation, flexi-time
19	Helping people	Reducing client suffering, helping people, helpful to people, helping clients, helping others, assisting farmers, social worth, making people happy, managing complex decisions for clients, feel useful

Appendix VI

Selected study-related publications

BARTRAM, D.J. & BALDWIN, D.S. (2008) Veterinary surgeons and suicide: influences, opportunities and research directions. *Veterinary Record* **162**, 36-40

Veterinary surgeons and suicide: influences, opportunities and research directions

D. J. BARTRAM, D. S. BALDWIN

Veterinary surgeons are at high risk of suicide, with a proportional mortality ratio approximately four times that of the general population and around twice that of other health care professions. It is uncertain whether this derives from the characteristics of individuals entering the profession, the nature of the work environment, or other factors known to influence suicide. In this article, David Bartram and David Baldwin present a hypothetical model to explain suicide risk in veterinary surgeons, and argue that research is required to validate the model and to inform the development of appropriate interventions.

SEVERAL studies have found that members of some occupations are at greatly increased risk of suicide (Agerbo and others 2007), with reports of an elevated risk for health care professionals including doctors (Hawton and others 2001, Schernhammer and Colditz 2004), pharmacists (Kelly and Bunting 1998), dentists (Alexander 2001) and nurses (Hawton and Vislisel 1999). On the basis of proportional mortality ratios (PMRs) in England and Wales (Kelly and Bunting 1998, Mellanby 2005) and Scotland (Stark and others 2006), and similar estimates in the USA (Miller and Beaumont 1995), Australia (Jones-Fairnie and others 2008), and Norway (Hem and others 2005), veterinary surgeons appear to be at particularly high risk, around four times more likely to die of suicide than the general population and around twice as likely than other health care professionals. While PMR is a widely used measure, it should be acknowledged that the ratio is affected by the relative frequency of other causes of death. An increased PMR can indicate lower mortality from other causes as well as higher mortality from the cause being examined.

There are a number of problems in comparing the risk of suicide across occupational groups. These include the effects of different sociodemographic factors both between occupations and within occupational specialisms. It is important that confounding by such factors is adequately controlled (Wilhelm and others 2004). While most differences in suicide risk between occupations are accounted for by differences in income and employment status, the most striking exceptions are veterinary surgeons, doctors, nurses and pharmacists, who have significantly higher rates of suicide even when demographic factors are taken into account (Charlton 1995, Agerbo and others 2007).

These observations have prompted many investigations to aid understanding of the causes of the elevated suicide risk in the human health care professions and the development of suitable interventions. Although there has been much speculation regarding mechanisms of increased suicide risk in the veterinary profession, to date, there is a dearth of empirical research.

The risk factors for suicide are well known, including depression, alcohol and drug abuse, inherited factors, personality factors, and environmental factors, including chronic major difficulties and undesirable life events such as separation or divorce (Goldney 2005). Several circumstances may elevate the risk in specific occupations and, although the reasons are unclear, an interplay between various potentially malign influences is suggested for the veterinary profession.

POSSIBLE INFLUENCES ON THE SUICIDE RATE AMONG VETERINARIANS

The interrelations between work, personality and mental health are well documented (Stansfield 2002), but reports specific to the veterinary profession (such as Halliwell and Hoskin 2005) have tended simply to present the observations and opinions of concerned individuals. These commentaries offer prima facie compelling concepts, but there has been little research to test their veracity. Little is known about the scope and magnitude of problematic outcomes, possible predisposing factors, or effective interventions for veterinarians.

Access to means of suicide

Suicidal impulses are often brief and, at the point at which a person feels hopeless and suicidal, ready access to means of suicide may be the key factor that influences the translation of suicidal thoughts into an actual suicide act (Hawton 2007). Access to lethal means has a strong influence on the suicide rate; for example, decreases in the rate have been associated with changes to non-toxic domestic gas from coal gas, the use of catalytic converters in cars, smaller over-the-counter pack sizes of paracetamol, and the installation of barriers on high bridges (Hawton 2007). Veterinary surgeons have ready access to medicines, as they are typically stored in practice premises, and knowledge of medicines for self-poisoning, which together offer a possible contributory factor for their high suicide rate. Deliberate self-poisoning is the most common method of suicide by both male and female veterinarians, accounting for 76 and 89 per cent of suicides, respectively, compared with 20 and 46 per cent, respectively, of suicides in the general population (Kelly and Bunting 1998). Veterinary surgeons and pharmacists have the highest proportions of suicides using this method for all occupational groups; medical practitioners also have an increased risk of this specific method of suicide (Kelly and Bunting 1998).

Attitudes to death and euthanasia

Veterinary surgeons are frequently responsible for ending the lives of animals, either directly in the case of euthanasia, or indirectly in the case of the slaughter of meat-producing livestock. The emotional intensity of the relationships that often develop between people and their pets is such that it is the veterinary profession's routine experience to discuss, justify the legitimacy of and ultimately administer euthanasia to animals that are considered by their owners to be virtual persons (Sanders 1995). The effects of this 'culture of death' may affect attitudes within the profession with regard to the expendability of human life: 93 per cent of veterinary health care workers interviewed in a small-scale study indicated a favourable inclination towards euthanasia of humans (Kirwan 2005). This is a higher proportion than reported for the general population (Clery and others 2007) and is counter to prevailing medical opinion (Seale 2006), but comparison of these studies is confounded by dissimilar research methods. Positive associations have been demonstrated between tolerance of suicide (more permis-

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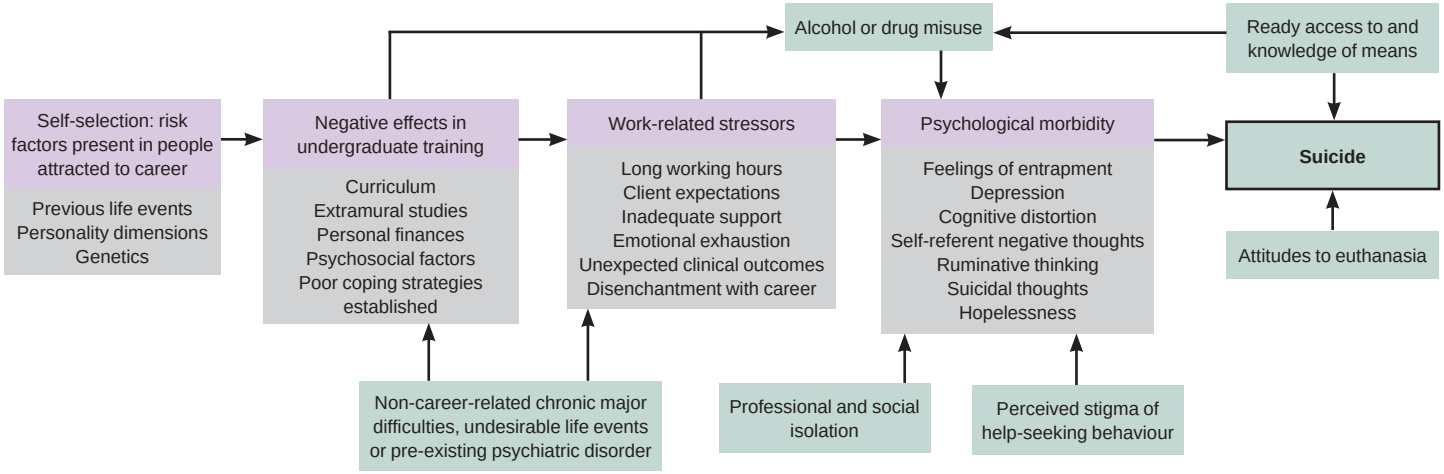

FIG 1: Schematic representation of a hypothetical model to explain the risk of suicide in veterinary surgeons

sive attitudes towards euthanasia, physician-assisted suicide and unassisted suicide) and suicidal thoughts and behaviour (Neeleman and others 1997, Etzersdorfer and others 1998, Zemaitiene and Zaborskis 2005, Gibb and others 2006, Joe and others 2007).

The theory of cognitive dissonance (Harmon-Jones and Harmon-Jones 2007) – that psychological discomfort arising from conflicting thoughts or beliefs motivates the modification of existing, or the acquisition of new, thoughts and beliefs to reduce the inconsistency and discomfort – offers a possible explanation for any effect of attitudes to euthanasia on the suicide rate. Veterinary surgeons may experience uncomfortable tensions between their desire to preserve life and their inability to treat a case effectively, which may be ameliorated by adapting their attitudes to preserving life to perceive euthanasia as a positive outcome. This altered attitude to death may then facilitate self-justification and lower inhibitions towards suicide as a rational solution to their own problems.

Suicide 'contagion'

A growing body of evidence suggests that direct or indirect exposure to the suicidal behaviour of others can, in some circumstances, influence attitudes and increase vulnerability to suicide (Maris and others 2000). Knowledge of individual suicides can travel readily through the social networks of a small profession. It is possible that knowledge of specific members of the profession who have completed suicide or awareness of high levels of suicide in professional peers generally may be a contributory risk factor for suicidal behaviour in veterinary surgeons, creating a suicide 'contagion' effect among vulnerable individuals within this high-risk occupational group.

Cognitive and personality factors

Individuals may have a preference for certain occupations or specialisms based on their personality or life experiences, which could render them more vulnerable or, alternatively, more resilient to the work environment. For example, mental health workers are more likely to have early experiences of childhood trauma and family dysfunction than members of other professions (Elliott and Guy 1993). It is possible that the choice of a veterinary career is subconsciously influenced by factors such as a preference for working with animals rather than people, with consequential influences on the risk of depressive illness through relative social isolation.

Halliwell and Hoskin (2005) suggested that the profession may be particularly vulnerable to suicide because of selection based on the very high academic entry requirements into veterinary schools. However, the association of suicide with intelligence is unclear. Voracek (2004) reported a positive association, Gunnell and others (2005) have reported inverse associations. Furthermore, cognitive performance in childhood appears to be significantly and inversely related to morbidity and mortality in adulthood, even at the higher end of the intelligence continuum and independent of childhood socioeconomic status (Martin and Kubzansky 2005). Halliwell and Hoskin (2005) further conjectured that the highly demanding veterinary degree course has the potential to stifle the development of communication skills and emotional intelligence, possibly more so than in the medical curriculum.

Work-related stressors

Most new veterinary graduates move abruptly from the university environment to the relative professional and social isolation of general private practice. Many work with little supervision, do not always have access to assistance from other veterinary colleagues, and make professional mistakes, which have a considerable emotional impact on themselves and may be a significant factor in the development of suicidal thoughts (Mellanby and Herrtage 2004). Reactivation of latent negative cognitive schemas (unfavourable core beliefs about oneself that are derived from prior experience and can be activated by specific circumstances), established during adverse experiences at veterinary school or in the early stages of an individual's career, may play a causative role in later depressive episodes.

In a prospective study, Melchior and others (2007) demonstrated an association between work stress and rates of depression and anxiety: working in high-demand jobs was associated with the onset of new depression and anxiety in individuals without any pre-employment history of psychiatric disorders. Veterinary work is perceived as stressful by over 80 per cent of UK veterinary surgeons (Robinson and Hooker 2006). Using a short, validated stress evaluation tool to measure and compare a number of work-related stressors and stress outcomes across occupations in the UK, Johnson and others (2005) showed that veterinary surgeons reported lower psychological wellbeing than workers in most other occupations. A cross-sectional survey of work-related stress in the veterinary profession in New Zealand (Gardner and Hini 2006) showed that those working in small animal and mixed practice, women and younger veterinarians reported the highest levels of stress, primarily associated with long working hours, client expectations and unexpected clinical

outcomes. Other possible sources of stress include after-hours on-call duties; relationships with peers, managers and clients; lack of resources; emotional exhaustion or 'compassion fatigue' (due to, for example, euthanasia of animals and dealing with clients' grief); inadequate professional support; travelling for ambulatory duties; concerns about maintaining skills; personal finances; making professional mistakes; and the possibility of client complaints and litigation.

Robinson and Hooker (2006) reported that 53 per cent of UK veterinary surgeons would still opt for the veterinary profession if they could start their career again, 20 per cent would not and the remaining 27 per cent were unsure. The apparent disenchantment of a substantial proportion of veterinary surgeons with their chosen career may have a negative impact on their mental health.

The PMR for suicide among veterinary surgeons is greater in women than in men (Mellanby 2005), but this observation must be interpreted cautiously due to the small absolute number of women concerned. This contrasts with the general population, but parallels the situation in the medical profession, in which there is a higher rate of suicide in female doctors (Baldwin and Rudge 1995). This difference between the sexes requires particular monitoring in view of the large increase in the number of women entering the veterinary profession. However, it may be due to poor status integration into a traditionally male-dominated occupation: accordingly, as female veterinary surgeons progressively become the majority, their risk of suicide might be expected to decline.

Major incidents concerning animal health, such as the 2001 foot-and-mouth disease outbreak in the UK, can elevate levels of psychological morbidity in affected communities (Peck 2005), potentially including veterinary surgeons through their involvement in large-scale slaughter, provision of emotional support to farmers, and the economic effects on private practices.

Perceived stigma

The stigma associated with mental illness is increasingly recognised as an important factor influencing the accessing of mental health care by the general population. Mental illness may be particularly stigmatising for those working in professions where vulnerabilities are not readily tolerated and viewed as a form of weakness, with negative career implications. Stigma is recognised as an important factor influencing the accessing of mental health care by doctors (White and others 2006), and suicide risk may be greater in higher-income earners who develop mental illness, as they may feel more stigmatised than others with lower income (Agerbo and others 2001). Increased stigma may apply within the veterinary profession, with a consequential reduction in help-seeking behaviour and better planning of suicide.

Psychiatric factors

Pre-existing psychiatric disorders were present in over 80 per cent of doctors completing suicide, mainly depression and alcohol or drug dependence (Hawton and others 2004). No such data are available for veterinary surgeons, but it is reasonable to speculate that psychiatric disorders may similarly be a factor in suicides by veterinary surgeons. A ready opportunity exists in both professions for misuse of prescription medications. Among UK veterinary surgeons referred to a health support programme, the order of substance misuse preference is alcohol, ketamine, benzodiazepines, opiates, street drugs (cannabis, heroin, cocaine and ecstasy) and nitrous oxide, and approximately half of those treated admit to having had suicidal thoughts (Veterinary Benevolent Fund [VBF] 2007).

Hafen and others (2006) reported that one-third of students at a US veterinary school had symptoms of depression, associated with both academic and non-academic stressors, but it is not clear to what extent these findings can be generalised to veterinary undergraduates elsewhere.

A hypothetical model to explain suicide risk in veterinary surgeons is presented in Fig 1. The model attempts to clarify the complex interaction of possible influences, is based on specific testable constructs, and may facilitate a more focused approach for research into suicide and the development of prevention strategies within the profession.

OPPORTUNITIES FOR INTERVENTION

The VBF provides a number of mental health support mechanisms to the profession, including a 24-hour peer-support telephone helpline service staffed by trained volunteers; professional help for addiction disorders; a dedicated portal website for related information; and has plans for a programme of mental health seminars in veterinary schools. The British Veterinary Association runs a support scheme for recent graduates, and the Royal College of Veterinary Surgeons (RCVS) has recently introduced a one-year Professional Development Phase to support new graduates. The RCVS's new modular postgraduate certificate scheme includes a compulsory module on professional key skills, which incorporates elements on communication, decision-making and support networks.

Veterinary students at US and Canadian veterinary schools have access to a variety of programmes to help enhance life-skill competencies such as teamwork, emotional intelligence and communication. The curricula of the UK veterinary schools also contain some elements based on this model (Gray and others 2006), but the current focus is on professional communication skills; the scope could be widened to incorporate training in, for example, the use of effective coping strategies, which may enhance existing and future emotional wellbeing more directly. A recent survey of stress and coping at an Australian veterinary school showed that students were not consistently employing a range of effective coping strategies to deal with the stressors that they encountered during their course of study (Williams and others 2005). In a nationwide prospective study in Norway, Tyssen and others (2001a, b, 2004) demonstrated the utility of screening final-year medical students to predict mental health problems, including suicidal behaviours, in the first postgraduate years, and to identify a subgroup of students suitable for intervention.

Studies tend to indicate that many individuals have a preference for a given means of suicide, which would limit the possibility of method substitution if that means was not readily available (Daigle 2005). However, in the veterinary profession, restricting access to potential sources of self-poisoning is difficult, as veterinarians require access to medicines for immediate treatment and practices generally dispense the medicines they prescribe.

Health promotion initiatives designed to enhance personal and interpersonal skills for managing stress are important in occupations with a high risk of suicide, and it has been highlighted that there is a need for veterinarians to recognise mental health problems in themselves and to seek help before the problems become chronic and potentially destabilising (Platt and Hawton 2000).

Occupational stress can be reliably measured and is potentially modifiable. This presents an opportunity for prevention by avoiding appointing the most vulnerable individuals to the most stressful jobs, the early detection of psychiatric disorder in the workplace and changing the exposure of individuals to stressors by modifying aspects of their work. When the specific stressors in the professional occupational milieu are clearly identified, potential mechanisms

for their mitigation could be developed. The workplaces of the profession should give consideration to the development and implementation of a mental health policy to encompass raising awareness, prompt recognition, effective treatment and facilitate a working environment conducive to the prevention of mental illness. Regular assessment of employee attitudes and work-related stress using validated measurement tools would help to tailor a policy to the specific needs of an organisation.

FUTURE DIRECTIONS

Due to the relatively small size of the profession (approximately 16,000 veterinary surgeons practising in the UK), the absolute number of suicides by veterinary surgeons is low compared with other health care professions. However, the high PMR for suicide, one of the highest for any occupation, warrants dedicated research to expand the presently limited evidence base for informing the development and implementation of suitable interventions. Such research would be important not only for the wellbeing of individual members of the profession, but also in view of the potentially deleterious impact of practitioners' mental ill health on the welfare of animals under their care, and the additional insight that research in this professional group might provide into influences on suicide in other occupations.

Each stage of the veterinary career path – from the characteristics of applicants to veterinary schools, undergraduate training, subsequent employment, and through to retirement – should be examined, to identify both the early predisposing factors and the later triggers for suicidal behaviour in members of the profession. This 'life course' approach to studying suicide (Gunnell and Lewis 2005) will enable multiple points on the career continuum to be targeted with appropriate interventions.

A cross-sectional study to determine the prevalence of psychological morbidity and substance misuse, using reliable and valid standard instruments, and to identify the psychosocial risk factors in the profession's work environments, is under way (Bartram and Baldwin 2007). A qualitative in-depth interview study using a relatively open interview schedule with purposively selected participants from the veterinary profession, and a 'psychological autopsy' study (an investigation of the circumstances preceding individual suicides using medical records and interviews with relatives or friends of the deceased) could further explore the findings. Longitudinal studies could evaluate the effectiveness of proposed interventions.

Research with veterinary students could help identify whether there is a predilection towards mental health problems in applicants to veterinary school, whether there are negative influences on mental health during undergraduate training, and whether individual-specific maladaptive coping strategies might play a role in the development of ill health. This, in turn, could lead to the development of enhanced assessments for course entry, and inform the development and timing of educational interventions at a systemic or individual level to improve both the wellbeing of students and resilience during their subsequent careers.

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ORIGINAL PAPER

A cross-sectional study of mental health and well-being and their associations in the UK veterinary profession

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Abstract
Background Veterinary surgeons are at elevated risk of suicide, with a proportional mortality ratio around four times that of the general population and approximately twice that of other healthcare professions. There has been much speculation regarding possible mechanisms underlying increased suicide risk in the profession but little empirical research. We aimed to assess the contribution of mental health and well-being to the elevated risk, through a postal questionnaire survey of a large stratified random sample of veterinary surgeons practising within the UK.
Methods A questionnaire was mailed twice to 3,200 veterinary surgeons. Anxiety and depressive symptoms, alcohol consumption, suicidal ideation, positive mental well-being, perceptions of psychosocial work characteristics, and work–home interaction were assessed using valid and reliable existing instruments and a series of bespoke questions previously developed through informal focus groups.
Results Evaluable questionnaires were returned by 1,796 participants, a response rate of 56.1%. The demographic and occupational profile of respondents was representative of the UK veterinary profession. The prevalence of 'caseness' (i.e. HADS subscale score $\geq$8) for anxiety, depression, and co-morbid anxiety and depression was 26.3, 5.8 and 4.5%. 5.4% of respondents were non-drinkers, 32.0% low-risk drinkers, and 62.6% 'at-risk' drinkers (i.e. AUDIT-C score $\geq$4 for women, $\geq$5 for men). The 12-month prevalence of suicidal thoughts was 21.3%.
Conclusions Compared to the general population, the sample reported high levels of anxiety and depressive symptoms; higher 12-month prevalence of suicidal thoughts; less favourable psychosocial work characteristics, especially in regard to demands and managerial support; lower levels of positive mental well-being; and higher levels of negative work–home interaction. The levels of psychological distress reported suggest ready access to and knowledge of lethal means is probably not operating in isolation to increase suicide risk within the profession.

Keywords Mental health · Veterinary surgeon · Depression · Anxiety · Well-being

Introduction

Members of some occupational groups are at greatly increased risk of suicide [1], this elevated risk being seen among healthcare professionals including doctors [22, 40, 48] pharmacists [29], dentists [2], and nurses [23]. Farmers are also at increased risk [30].

The absolute number of suicides by veterinary surgeons is low due to the small size of the profession (approximately 16,000 veterinary surgeons practising in the UK), but the profession is at increased risk of suicide when compared to other occupations and the general population. Proportional mortality ratios (PMRs) in England and Wales [29, 32, 34] and Scotland [45], and

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similar estimates in the USA [36], Australia [26] and Norway [25], indicate that the veterinary profession has around four times the proportion of all deaths certified as suicide than would be expected from the proportion for the general population, and around twice that for other healthcare professionals. While most differences in suicide risk between occupations are accounted for by differences in income and employment status, the most striking exceptions are for vets, doctors, nurses and pharmacists, all having significantly higher rates of suicide, even when demographic factors are taken into account [1, 9, 43]. Lower mortality from other causes may account for the high PMRs for suicide identified for some high social class occupational groups, including healthcare professionals [29].

There has been much speculation regarding possible mechanisms underlying increased suicide risk in the profession but little empirical research. A hypothetical model postulates an interplay between various potentially malign influences [3]. Such influences include the characteristics of individuals entering the profession, negative effects during undergraduate training, work-related stressors, ready access to and knowledge of lethal means, stigma associated with mental illness, professional and social isolation, alcohol or drug misuse, and veterinary surgeons' attitudes to death and euthanasia. These occupation-specific factors are assumed to act in association with other variables known to be more widely associated with completed suicide, including male gender and single status [29], the presence of anxiety or depressive symptoms and the presence of recurrent suicidal thoughts [7].

We aimed to assess the contribution of mental ill health and well-being to the elevated risk, through a postal questionnaire survey of a large stratified random sample of veterinary surgeons practising within the UK. Our primary hypothesis was that the veterinary profession has higher levels of mental ill health, lower levels of mental well-being and less favourable psychosocial working conditions, when compared to the general population. The secondary hypothesis was that self-reported measures of mental ill health, mental well-being and psychosocial working conditions differ significantly with demographic factors and occupational factors within the profession.

Research into suicide among veterinary surgeons is important, not only with a view towards enhancing the well-being of individuals within the profession, but also to help mitigate the potentially deleterious impact of any mental ill health among practitioners on the health and welfare of animals under their care, and the additional insight that research in this professional group might provide into influences on mental health and well-being in other occupations.

Methods

The study was reviewed and approved by Southampton and South West Hampshire Research Ethics Committee (B) (REC reference number: 07/H0504/122).

Sample

A random stratified sample of 3,200 veterinary surgeons practising in the UK was identified. This number represents approximately 20% of the membership of the Royal College of Veterinary Surgeons (RCVS), excluding those practising overseas or retired. Veterinary surgeons listed in the sampling frame (Vetfile®, Veterinary Business Development Ltd) were stratified according to type of work within the profession and selected at random within each stratum in proportion to the number of veterinary surgeons in each type of work practising in the UK. The gender and decade of qualification profile of the entire study cohort was then compared with RCVS membership data for veterinary surgeons practising in the UK to check the representativeness of the sample. Assuming a response rate of 50% (1,600 completed questionnaires), point estimates of prevalence ranging from 10 to 50% would have confidence intervals of ± 1.39 to ± 2.32, respectively at 95% confidence level.

Data collection

Questionnaires were mailed with a covering letter and stamped addressed envelope for return to each member of the sample (in October and November 2007). The follow-up mailing was sent to all veterinary surgeons in the sample, as it was not possible to identify those who had already responded anonymously. Data entry was automated by using an electronic optical reading system with related software TeleForm® (Verity Inc., Sunnyvale, CA) to scan the returned questionnaires.

Measures

The 4-page questionnaire comprised a total of 120 items which included:

- Background information consisting of brief demographic and occupational details, including age, sex, main type of work in the profession, position in the practice (if applicable), hours of work and hours on call in a typical week.
- The hospital anxiety and depression scale (HADS): this is a 14-item self-report measure of the prevalence and severity of both anxiety (HADS-A; 7 items) and depressive (HADS-D; 7 items) symptoms separately,

developed for use in general medical outpatient clinics and now extensively validated and widely used in clinical practice and research [42, 52]. Items in both subscales are scored on a 4-point Likert scale (0–3), resulting in a range of 0–21. A cutoff score of ≥8 is used as an indicator of 'caseness', with score 8–10 indicating *possible* case and score ≥11 indicating *probable* case [4, 42]. The two subscales demonstrated high internal consistency in our sample (HADS-A, Cronbach's $\alpha = 0.85$; HADS-D, Cronbach's $\alpha = 0.79$).

- The alcohol use disorders identification test alcohol consumption questions (AUDIT-C) [8]: this grades reported alcohol consumption, measuring frequency of drinking, typical quantity consumed and frequency of heavy drinking. Each question is scored on a 5-point Likert scale (0–4), resulting in a range of 0–12. Cutoff scores of ≥4 for women and ≥5 for men are used as an indicator of 'at-risk' drinking [18]. The scale demonstrated moderate internal consistency in our sample (Cronbach's $\alpha = 0.70$).
- Three questions on suicidal ideation derived from the second *National Survey of Psychiatric Morbidity* [41]. These were originally sourced from the 5-item questionnaire developed by Paykel and others [38] and referred to the previous 12 months (yes/no): *Have you felt that life was not worth living?; Have you wished that you were dead?; Have you thought of taking your life, even if you would not really do it?* The scale demonstrated high internal consistency in our sample (Cronbach's $\alpha = 0.85$).
- The Warwick-Edinburgh mental well-being scale (WEMWBS) [47]. This is a 14-item measure for assessing population positive mental health which captures a wide conception of mental well-being including affective–emotional aspects, cognitive–evaluative dimensions and psychological functioning. Each item is answered on a 5-point Likert scale (1–5), giving a minimum score of 14 and a maximum score of 70; a higher score indicates a higher level of mental well-being. The scale demonstrated high internal consistency in our sample (Cronbach's $\alpha = 0.94$).
- The Health and Safety Executive management standards indicator tool (HSE MSIT) [11]. This measures perceptions of psychosocial work characteristics and comprises 35 questions grouped into seven key stressor domains: *demands* (8 items), *control* (6 items), *managerial support* (5 items), *peer support* (4 items), *relationships* (4 items), *role* (5 items), and *change* (3 items), which have the potential to have a negative impact on employee mental health and well-being. Each question scores 1–5 from the least favourable working conditions (high risk of stress at work) to the most favourable working conditions (low risk of stress at work), respectively. The overall score for each of the seven stressor domain scales is calculated for each respondent by adding the item scores for each question answered in that scale and dividing by the total number of questions answered in that scale. Cronbach's alpha reliability coefficient demonstrated satisfactory internal consistency in our sample for each stressor domain (*demands* $\alpha = 0.84$; *control* $\alpha = 0.81$; *managerial support* $\alpha = 0.84$; *peer support* $\alpha = 0.79$; *relationships* $\alpha = 0.79$; *role* $\alpha = 0.78$; *change* $\alpha = 0.62$).
- Negative and positive work–home interaction (WHI_N and WHI_P) subscales of the SWING instrument [16]. This comprises a total of 13 items (WHI_N: 8 items; WHI_P: 5 items), each scored on a 4-point Likert scale from 0–3. The overall score for each subscale is calculated for each respondent by summating the item scores for each of the questions answered and dividing by the total number of questions. The two subscales demonstrated satisfactory internal consistency in our sample (WHI_N, Cronbach's $\alpha = 0.89$; WHI_P, Cronbach's $\alpha = 0.75$).
- A series of 27 original items specifically focusing on potential sources of stress in the veterinary profession (a domain of 9 items referred to clinical work and was only completed by respondents to whom this domain was relevant). Examples include: client expectations, euthanasia of animals, dealing with client grief, administrative and clerical tasks. These were developed in collaboration with informal focus groups and revised following pre- and pilot testing. Respondents scored on a 5-point Likert scale (0–4; from '*not at all*' to '*very much*') how much each item contributed to the stress they experienced.
- An open question inviting respondents to identify in free text up to three main sources of pleasure and/or satisfaction in practice. Responses were grouped according to themes and a coding frame was developed to describe the thematic content.

Statistical analysis

Mean imputation was used to replace missing scale or subscale scores provided that no more than one (HADS subscale; HSE MSIT subscales, except *demands* and *control*), two (*demands* and *control* subscales of HSE MSIT) or three (WEMWBS) values were missing. If greater than the specified number of values was missing, then the scale or subscale was judged as invalid for that respondent and not included in the analysis.

Descriptive statistics including mean, standard deviation, median and proportions were used to describe the data. To

explore the data initially, means were compared using *t* test and one-way analysis of variance (one-way ANOVA) or the non-parametric equivalents, Mann–Whitney *U* and Kruskal–Wallis tests. Chi-square test was employed to compare proportions. To investigate the effect of predictor variables on response variables, multiple linear regression and logistic regression were applied to continuous and binary outcome variables, respectively. Odds ratios (ORs) and regression coefficients were accompanied by 95% confidence intervals (CIs). Statistical significance was defined as $P < 0.05$. Statistical analysis was performed using Statistical Package for the Social Sciences (SPSS®) version 15.0 (SPSS Inc.) and STATA® version 9.0 (StataCorp LP).

Results

Evaluable questionnaires were returned by 1,796 participants, a response rate of 56.1%.

Demographic characteristics of respondents

The mean age of respondents was 40.9 years (SD = 11.0), and 50.0% were male. 83.9% of respondents worked in general practice, of which 69.2% reported small animal practice as their main type of work. The median duration of hours worked and on call in a typical week for study respondents working full-time ($n = 1458$) is 48 h (mean = 47.8, SD = 8.8) and 15 h (mean = 20.2, SD = 24.9), respectively.

The demographic and occupational profile of study respondents was generally in close alignment with that of RCVS membership which suggests that study respondents are representative of the wider population of veterinary surgeons practising in the UK.

HADS

Table 1 shows that, in contrast to HADS-D scores, HADS-A scores differ significantly between genders and across age groups. Female veterinary surgeons have significantly higher HADS-A mean score ($F = 45.8$, $P < 0.001$) and proportion of HADS-A cases ($\chi^2 = 32.0$, $P < 0.001$). HAD-A mean score ($F = 19.6$, $P < 0.001$) and the proportion of HADS-A cases ($\chi^2 = 37.1$, $P < 0.001$) decline in higher age groups. The HADS-A, HADS-D and HADS-T mean scores for veterinary surgeons are significantly higher than for the general population [12] (HADS-A, 7.9 vs. 6.1 [$t(3547) = 13.57$, $P < 0.001$]; HADS-D, 4.6 vs. 3.9 [$t(3547) = 6.41$, $P < 0.001$]; HADS-T, 12.6 vs. 9.8 [$t(3547) = 13.01$, $P < 0.001$]). Possible or probable clinically significant depression and anxiety are defined by a cutoff score of ≥8 on the HADS-A and HADS-D scales

Table 1 HADS-subscale and -total scores, and prevalence of anxiety and depression caseness for the total sample, by gender and by age group

Characteristic	*n*	HADS-A			HADS-D			HADS-T[a]			HADS-A Anxiety subscale			HADS-D Depression subscale			Co-morbid anxiety and depression Probable D and Probable A
		Mean	SD	Median	Mean	SD	Median	Mean	SD	Median	Non-case 0–7 (%)	Possible case 8–10 (%)	Probable case 11+ (%)	Non-case 0–7 (%)	Possible case 8–10 (%)	Probable case 11+ (%)	
Total	1,757	7.9	4.1	8	4.6	3.4	4	12.6	6.8	12	48.4	25.3	26.3	80.6	13.6	5.8	4.5
Gender																	
Male	881	7.3	4.0	7	4.6	3.4	4	11.8	6.6	11	54.5	24.3	21.1	81.6	13.0	5.5	4.0
Female	876	8.6	4.1	8	4.7	3.5	4	13.3	6.9	13	42.3	26.3	31.4	79.7	14.3	6.1	5.0
P value		$P < 0.001$			$P = 0.268$			$P < 0.001$			$P < 0.001$			$P = 0.598$			$P = 0.288$
Age																	
<35	613	8.6	4.0	8	4.5	3.3	4	13.1	6.6	12	42.2	27.6	30.2	82.2	12.2	5.5	4.9
35–54	913	7.9	4.1	8	4.8	3.5	4	12.7	6.8	12	48.9	24.5	26.6	78.6	15.2	6.1	4.6
55–74	217	6.3	3.9	6	4.2	3.4	3	10.5	6.7	10	63.1	22.1	14.7	83.4	12.9	3.7	2.3
≥75	5	2.6	1.1	3	2.4	1.1	2	5.0	2.0	6	100	–	–	100	–	–	–
P value		$P < 0.001$			$P = 0.019$			$P < 0.001$			$P < 0.001$			$P = 0.367$			$P = 0.218$

[a] HADS-T is the summated total of the item scores for each of the subscales. It may be used as a global measure of psychological distress [12]

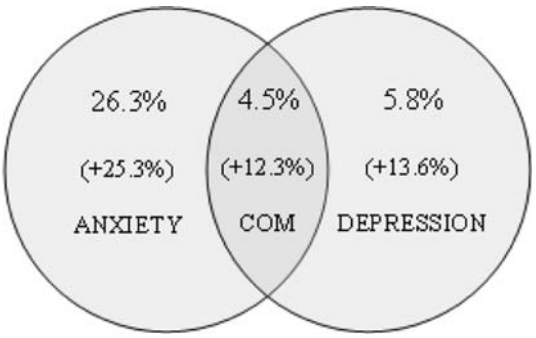

Fig. 1 Prevalence of anxiety, co-morbid depression and anxiety, and depression caseness. *COM* co-morbid depression and anxiety. Prevalence of HADS-A or HADS-D score ≥11 (probable case). *Figures in parentheses* represent prevalence of HADS-A or HADS-D score 8–10 (possible case)

[43]. The prevalence of anxiety, depression, and co-morbid anxiety and depression caseness among veterinary surgeons is illustrated in Fig. 1. The prevalence of HADS-A probable cases is 2.1 times higher and the prevalence of HADS-D probable cases is 1.6 times higher than for the UK adult general population (HADS-A, 26.3% (95% CI: 24.3–28.4%) vs. 12.6%; HADS-D, 5.8% (95% CI: 4.8–7.0%) vs. 3.6%) and the difference between the distribution of veterinary surgeons and the general population across HADS-A and HADS-D case categories is significant ($\chi^2 = 113.8$, $P < 0.001$).

As HADS outcomes differed significantly between genders and across age groups, a logistic regression analysis was performed to determine the estimated relative risk of HADS-A or HADS-D caseness (score ≥ 8) after adjusting for the variables of gender and age. Females are at 38% greater risk of HADS-A caseness after adjustment for age (OR = 1.38, 95% CI: 1.12–1.69, $P = 0.002$). There is no significant difference between genders for HADS-D caseness after adjustment for age (OR = 1.14, 95% CI: 0.89–1.47, $P = 0.300$). Gender adjusted ORs for age groups indicate a linear decline in the risk of HADS-A caseness with increasing age in comparison with the youngest age group (20–29 years). As a linear trend is seen, age was entered into the logistic regression model as a continuous variable to assess the dose–response relationship between age and HADS-A. The gender adjusted predicted overall age response relationship with HADS-A is 2% decline for each additional year (OR = 0.98, 95% CI: 0.97–0.99, $P < 0.001$). There is no association between age and HADS-D caseness after adjustment for gender (OR = 1.00, 95% CI: 0.99–1.01, $P = 0.767$). Veterinary surgeons working in university-based non-clinical roles have significantly lower estimated risk of HADS-A caseness than those working in small animal practice (OR = 0.27, 95% CI: 0.12–0.63, $P = 0.003$).

AUDIT-C

The proportion of veterinary surgeons in each AUDIT-C category is displayed in Table 2. There is a significant difference between males and females across AUDIT-C categories ($\chi^2 = 6.85$, $P = 0.033$). Around one in 20 veterinary surgeons (5.4%, 95% CI: 4.4–6.6%) report not drinking alcohol. Women are more likely than men to be non-drinkers (6.7 vs. 4.1%, $\chi^2 = 6.03$, $P = 0.014$). Almost two-thirds of veterinary surgeons (total 65.1%; men 70.7%, women 59.5%) drink more than twice a week, and 38.1% of men and 24.3% of women drink four or more times a week. The difference between males and females across drinking frequencies is significant ($\chi^2 = 45.65$, $P < 0.001$). One in four men (24.5%) and one in eight women (12.5%) who drink consume five or more units of alcohol on a typical day when drinking. The difference between the typical quantities consumed by males and females is significant ($\chi^2 = 60.54$, $P < 0.001$). For 2.2% of veterinary surgeons (3.4% of men and 0.9% of women) drinking six or more drinks on one occasion is a daily or almost daily occurrence and for 15.9% (21.3% of men and 10.6% of women) it is a weekly occurrence. The difference between males and females in the frequency of drinking six or more units on one occasion is significant ($\chi^2 = 68.33$, $P < 0.001$). The highest prevalence of at-risk drinkers (73.7%) and lowest prevalence of non-drinkers (3.7%) is in the 20–29 years age group ($n = 297$). The prevalence of at-risk drinkers falls to 40.0% for the oldest age group (70+ years). At-risk drinking is significantly associated with age after adjustment for gender: a 1-year increase in age is associated with a 2% reduction in the risk of at-risk drinking (OR = 0.98, 95% CI: 0.97–0.99, $P = 0.001$).

In comparison with alcohol consumption figures for the general population [10], veterinary surgeons in our sample

Table 2 Proportion of veterinary surgeons in each AUDIT-C drinking category

	n	Non-drinkers (%) Score 0	Low-risk drinkers (%) Score 1 to 4 for men score 1 to 3 for women	At-risk drinkers (%) Score ≥5 for men score ≥4 for women
Total	1,757	5.4	32.0	62.6
Male	881	4.1	33.5	62.4
Female	876	6.7	30.6	62.7

Table 3 Twelve-month prevalence of suicidal ideation

Characteristic	Life not worth living[a]				Wished you were dead[b]				Suicidal thoughts[c]				Any suicidal ideation[d]			
	n	%	OR	95% CI	*n*	%	OR	95% CI	*n*	%	OR	95% CI	*n*	%	OR	95% CI
Total	1,751	23.0	–	–	1,751	15.0	–	–	1,749	21.3	–	–	1,750	29.4	–	–
Gender																
Male	878	20.6	1	–	879	13.5	1	–	878	20.2	1	–	878	27.4	1	–
Female	873	25.4	1.31*	1.05–1.64	872	16.5	1.26	0.97–1.64	871	22.5	1.15	0.92–1.45	872	31.3	1.20	0.98–1.48
Age																
<35	611	23.7	1	–	611	15.5	1	–	610	22.8	1	–	611	30.4	1	–
35–54	910	22.3	0.92	0.72–1.18	911	14.9	0.95	0.72–1.27	909	20.9	0.90	0.70–1.15	909	28.3	0.90	0.72–1.13
55–74	216	23.1	0.97	0.67–1.40	215	12.6	0.78	0.49–1.23	216	19.4	0.82	0.56–1.20	216	31.0	1.03	0.73–1.44
≥75	5	0	–	–	5	0	–	–	5	0	–	–	5	0	–	–

OR odds ratio, *CI* confidence interval

* $P = 0.017$

[a] A positive response to the question: '*Have you felt that life was not worth living?*'

[b] A positive response to the question: '*Have you wished that you were dead?*'

[c] A positive response to the question: '*Have you thought of taking your life, even if you would not really do it?*'

[d] A positive response to any of the three questions above; an extended definition of suicidal thoughts used by Gunnell and Harbord [19]

are less likely to be non-drinkers (5 vs. 12%), drink more frequently than the general population (65 vs. 48% drink more than twice per week), but consume less on a typical drinking day and a have a prevalence of daily and weekly binge-drinking that is similar to the general population.

Suicidal ideation

The proportion of veterinary surgeons giving a positive response to each of the questions regarding negative thoughts about their life in the previous 12 months is displayed in Table 3. The 12-month prevalence of any suicidal ideation is 29.4% (life was not worth living, 23.0%; death wishes, 15.0%; suicidal thoughts, 21.3%). Women are more likely than men to think that life is not worth living (OR = 1.31, 95% CI: 1.05–1.64, $P = 0.017$) but there is otherwise no statistically significant difference between genders or the age groups examined. Logistic regression analysis with adjustment for age and gender was used to identify demographic and occupational risk factors for suicidal thoughts. Veterinary surgeons working in mixed practice (OR = 0.46, 95% CI: 0.29–0.71, $P = 0.001$) and in university-based clinical roles (OR = 0.29, 95% CI: 0.09–0.94, $P = 0.039$) are at reduced risk of suicidal thoughts than those working in small animal practice (the reference category). Veterinary surgeons employed as full-time assistants are at increased risk of suicidal thoughts (OR = 2.07, 95% CI: 1.15–3.73, $P = 0.016$) than those working as sole principals. Longer working hours is also a risk factor: a 1-h increase in hours worked in a typical week increases the risk of suicidal thoughts by 1.9% (OR = 1.02, 95% CI: 1.01–1.03, $P = 0.007$). By contrast, risk is unaffected by an increase in number of hours on call in a typical week (OR = 1.00, 95% CI: 1.00–1.01, $F = 10.9$, $P = 0.527$).

A 1-unit increase in HADS-A score is associated with a 15% higher estimated relative risk of reporting having experienced suicidal thoughts in the previous 12 months (OR = 1.15, 95% CI: 1.09–1.20, $P < 0.001$); a 1-unit increase in the *relationships* domain score for HSE MSIT is associated with a 22% lower risk (OR = 0.78, 95% CI: 0.62–0.99, $P = 0.045$); and a 1-unit increase in WEMWBS score is associated with a 7% lower risk (OR = 0.93, 95% CI: 0.90–0.96, $P < 0.001$).

In the second *National Survey of Psychiatric Morbidity* [41] of adults in Great Britain, which used identical suicidal ideation questions, the 12-month prevalence of suicidal thoughts was 3.9% (4.1% of women, 3.6% of men) [35]; the prevalence was three or more times higher among younger people and the middle-aged than among older people [14]. The 12-month prevalence (21.3%, 95% CI: 19.5–23.3) of suicidal thoughts in this sample is around 5.5 times higher than among the general population. Although the gender difference in 12-month prevalence of suicidal thoughts among veterinary surgeons is not statistically significant, the higher prevalence among women is consistent with the gender difference in this parameter among the general population in Great Britain [35]. The 12-month prevalence of suicidal thoughts among veterinary surgeons is similar across all the age groups examined, in contrast to the decline in prevalence with increasing age observed in the general population in Great Britain [14].

WEMWBS

The mean WEMWBS score for the sample of veterinary surgeons is 48.85 (SD = 9.06) and the score is significantly higher for men than for women (49.86 vs. 47.83, $P < 0.001$). There is a significant relationship between WEMWBS and age adjusted for gender: the score increases by 0.05 for every 1-year increase in age ($\beta = 0.05$, 95% CI: 0.01–0.09, $P = 0.012$). There is also a significant difference in mean WEMWBS between genders adjusted for age: the mean score for females is 1.65 less than the mean score for males ($\beta = -1.65$, 95% CI: −2.55 to −0.74, $P < 0.001$). The mean scores for veterinary surgeons working in university-based non-clinical university-based clinical roles are higher in comparison with those working in small animal practice after adjusting for age and gender (university–non-clinical: $\beta = 3.50$, 95% CI: 0.37–6.62, $P = 0.029$; university–clinical: $\beta = 2.76$, 95% CI: 0.48–5.03, $P = 0.018$).

The mean WEMWBS scores for the total sample of veterinary surgeons, and for male and female veterinary surgeons separately, are significantly lower than the corresponding means for a representative general population sample from Scotland [6] (48.85 vs. 51.05 [$t(2728) = -6.20$, $P < 0.001$]; 49.86 vs. 51.21 [$t(1408) = -2.80$, $P = 0.003$]; 47.83 vs. 50.92 [$t(1561) = -6.84$, $P < 0.001$], respectively).

Psychosocial work characteristics

Mean and median scores for each of the HSE MSIT scales for the veterinary profession are displayed in Table 4. A low score indicates less favourable working conditions (high risk of stress at work). The scores derived for each scale cannot be compared across scales [51].

Veterinary surgeons self-report less favourable psychosocial work characteristics than the general population across all of the seven stressor domains of HSE MSIT [51] and the differences are statistically significant (except for the *control* domain). The greatest differences between the mean scores for the veterinary profession and the general population are for the *demands* [2.96 vs. 3.57; $t(2267) = 16.50$, $P < 0.001$] and *managerial support* [3.14 vs. 3.76; $t(2252) = 13.74$, $P < 0.001$] scales. In keeping with other studies that consider gender-related differences in stress, e.g. [13], male veterinary surgeons report more favourable working conditions associated with *control*, *relationships*, *role* and *change* than female veterinary surgeons. Younger veterinary surgeons (<49 years) report the least favourable working conditions across all stressor domains. Reported working conditions for *demands*, *managerial support* and *peer support* domains are least favourable for those working the longest hours. Reported working conditions for the seven stressor domains vary with other occupational factors. For example, veterinary surgeons working for charities and in university-based clinical roles report the least favourable working conditions related to *demands* and *control*; those working in government roles report the least favourable working conditions related to *relationships* and *role*.

Work–home interaction

The mean WHI_N score for the total sample ($n = 1{,}749$) is 1.19 (SD = 0.57). Multiple linear regression indicated that there is no significant difference between mean score for

Table 4 Stressor domain scores for the veterinary profession

	Demands				Control				Managerial support				Peer support			
	n	Mean	SD	Median	*n*	Mean	SD	Median	*n*	Mean	SD	Median	*n*	Mean	SD	Median
Total	1,762	2.96	0.70	3.00	1,749	3.47	0.78	3.50	1,472	3.14	0.89	3.2	1,736	3.75	0.73	3.75
Gender																
Male	876	2.97	0.71	3.00	878	3.70[†]	0.72	3.67	681	3.17	0.90	3.2	868	3.74	0.73	3.75
Female	871	2.96	0.69	3.00	871	3.24	0.76	3.33	791	3.11	0.88	3.2	868	3.75	0.73	3.75
	Relationships				Role				Change			
	n	Mean	SD	Median	*n*	Mean	SD	Median	*n*	Mean	SD	Median
Total	1,743	4.01	0.69	4.25	1,737	4.21	0.63	4.20	1,711	3.22	0.94	3.33
Gender												
Male	875	4.06[§]	0.66	4.25	873	4.28[†]	0.62	4.40	858	3.44[†]	0.89	3.67
Female	868	3.96	0.71	4.00	864	4.15	0.65	4.20	853	2.99	0.93	3.00

[§] $P < 0.01$, one-way ANOVA; [†] $P < 0.001$, one-way ANOVA

men and women after adjusting for age, although the mean is significantly higher for women prior to adjustment for age (1.23 vs. 1.14, $F = 11.3$, $P = 0.001$). There is a significant relationship between mean score and age after adjustment for gender; the score decreases by 0.010 for every one year increase in age (95% CI: −0.012 to −0.007, $P < 0.001$). Veterinary surgeons working in government and university-based non-clinical roles have lower mean WHI_N score than those working in small animal practice after adjusting for age and gender (Government: $\beta = -0.13$, 95% CI: −0.25 to −0.02, $P = 0.021$; University non-clinical: $\beta = -0.23$, 95% CI: −0.43 to −0.04, $P = 0.019$).

The mean WHI_P score for the total sample ($n = 1{,}716$) is 0.97 (SD = 0.56). Multiple linear regression indicated that there is no significant difference between mean score for men and women after adjusting for age, although the mean is significantly lower for women prior to adjustment for age (0.92 vs. 1.01, $F = 10.9$, $P = 0.001$). There is a significant relationship between mean score and age after adjustment for gender: the score increases by 0.005 for every 1-year increase in age (95% CI: 0.002–0.007, $P < 0.001$).

The mean WHI_N score for the sample is higher than for a sample of the working population from the Netherlands [16] and lower than for Belgian veterinary surgeons [20]. The mean WHI_P score for the sample is higher than for the sample of the working population from the Netherlands [16] and lower than for Belgian veterinary surgeons [20]. The results suggest that veterinary surgeons report higher levels of both negative and positive work–home interaction, but comparative data must be interpreted cautiously due to possible cultural differences in interpretation of the scale items and the small size of the Belgian sample.

Contributors to stress

Number of hours worked, making professional mistakes, client expectations, and administrative and clerical tasks are reported as the greatest contributors to stress for the sample population of veterinary surgeons. The percentage of respondents reporting that these stressors contribute *quite a lot* or *very much* to their stress is 42.9, 40.4, 38.0 and 27.9%, respectively. Respondents who treated clinical cases were asked a further set of questions regarding possible stressors. The possibility of client complaints or litigation, unexpected clinical outcomes and out-of-hours on-call duties are reported as the greatest contributors to stress for respondents treating clinical cases.

Sources of satisfaction

The greatest sources of satisfaction cited included: good clinical outcomes (41.5%), relationships with colleagues (33.7%) and intellectual challenge/learning (32.4%).

Non-response bias

The demographic and occupational profile of study respondents was generally in close alignment with that of the original sample. A comparative analysis to identify any differences between outcome measures for late responders ($n = 272$) and earlier responders showed that the HADS scores and 12-month prevalence of suicidal thoughts were higher and WEMWBS score lower among late responders, but the difference was only significant for HADS-D (mean = 5.11 vs. 4.57, $t(1760) = -2.40$, $P = 0.017$).

Discussion

Main findings

Compared to the general population, the sample of veterinary surgeons reported high levels of anxiety and depressive symptoms; higher 12-month prevalence of suicidal thoughts; less favourable psychosocial working characteristics, especially in regard to demands and managerial support; lower levels of positive mental well-being; and higher levels of negative work–home interaction. The levels of psychological distress reported suggest ready access to and knowledge of lethal means is probably not operating in isolation to increase suicide risk within the profession.

The prevalence of possible co-morbid anxiety and depression among this sample of veterinary surgeons [defined by coexisting probable and possible cases (scores ≥ 8)] is 16.8%. The presence of co-morbid anxiety disorders increases the risk of suicidal behaviour in people with depression [21, 39], and there is evidence to suggest that co-morbidity, and not depression itself, is a risk factor for suicide attempts [17] and completed suicide [46].

Alcohol has a well-established role in suicidal behaviour through its induction of negative affect, promotion of adverse life events, impairment of problem-solving skills, disinhibitory effects and the social disintegrative effects of abuse [5]. However, the level of alcohol consumption does not appear to be a negative influence on mental health within the profession as a whole.

Suicidal thoughts are a key stage in the pathway leading to suicide [19]. Positive associations have been demonstrated between favourable attitudes towards suicide (the degree to which an individual views suicide as an acceptable option under some circumstances) and levels of suicidal thoughts [15, 17]. Favourable attitudes towards suicide appear to increase the attractiveness of suicide should situational cues arise, placing an individual at increased risk of suicidal ideation. The high prevalence

of suicidal ideation among veterinary surgeons may be associated with the profession's acceptance of and familiarity with animal euthanasia which may change attitudes to suicide as a possible solution to their own problems [2]. Ready access to means of suicide is posited as a key factor that influences the translation of suicidal thoughts into an actual suicide act [24]. Ready access to lethal means may also act more distally in the suicide process and account for the high prevalence of suicidal thoughts among veterinary surgeons, if the ease at which a suicide can be completed cues the consideration of suicide as a possible solution.

Psychosocial working conditions may be important risk factors contributing to suicidal behaviours [37] and studies have demonstrated a causal association between work stress and rates of depression and anxiety [31, 49]. A recent meta-analysis provided robust evidence that a combination of high demands and low decision latitude, effort–reward imbalance, and low social support at work from co-workers and supervisors are risk factors for common mental disorders [44]. The less favourable psychosocial working characteristics reported in comparison with the general population suggest that high demands and low managerial support may be important contributors to work-related stress among veterinary surgeons, in keeping with the demand–control–support model of work-related stress [27, 28].

Strengths

Our study has several strengths. First, it is based on a large nationwide sample of veterinary surgeons in a range of different types of employment and the demographic and occupational profile of respondents is broadly representative of the UK veterinary profession which gives some confidence in the generalisability of the results. Second, the questionnaire uses standard instruments with known psychometric properties to help ensure the validity and reliability of the results and availability of normative data. The short series of bespoke questions on stressors pertinent to the veterinary profession was developed using focus groups and subsequently pre- and pilot-tested to help ensure relevance, comprehensiveness and absence of bias. The response rate of 56% is less than optimal but compares favourably with other postal surveys of the veterinary profession (e.g. Mellanby and Herrtage [33]), which may reflect a high level of personal salience of the subject of mental health to the sample population. The study adopts a comprehensive approach to the assessment of mental health in the veterinary profession, seeking to identify sources of pleasure in veterinary work and complementing indicators of psychological morbidity with measures of mental well-being and work–home interaction. The latter may be important in the aetiology of mood disorders among the working population [50].

Limitations

The data are limited by the cross-sectional design which allows investigation of associations, but does not allow conclusions to be drawn about the direction of causality. A further limitation in the study methodology is bias related to the self-reporting of symptoms and working conditions. The difference between outcome measures for late and earlier responders suggests that the reported prevalence of mental ill-health may have been higher if the study response rate was higher. The content of the questionnaire may have led to some selection bias. Veterinary surgeons with mental health problems may have been disinclined to respond due to their symptoms or concerns that they might be identified, or conversely those without mental health problems may have considered that the questionnaire was not relevant to them. The survey did not collect information on some potentially relevant mediating or moderating variables such as marital status, adverse work and life events, attitudes to euthanasia and suicide, history of any previous psychological distress, family history of affective disorder, use of prescribed or non-prescribed psychotropic medication, duration of exposure to possible explanatory variables (e.g. length of time in current job), social network size and perceived social support outside work, and personality factors such as negative affectivity and attributional style, which may have confounded associations without adjustment for them. Comparison of measures of mental health and well-being for the study sample with those for the general population must be undertaken with great care due to the possible influence of variables including socio-demographic factors.

Future research

There is scope for further research to explore the results of the current study with, for example, qualitative interviews with a purposive sample of respondents, and longitudinal studies would help to determine whether the cross-sectional associations identified in the current study are causal. Research is also required to develop interventions and evaluate their effectiveness and utility.

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Conflict of interest statement The authors declare that they have no competing interests.

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MD08

REPORTED ALCOHOL CONSUMPTION, DEPRESSIVE AND ANXIETY SYMPTOMS, AND MENTAL WELL-BEING AMONG UK VETERINARY SURGEONS: CROSS-SECTIONAL QUESTIONNAIRE SURVEY

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Veterinary surgeons are at high risk of suicide, with a proportional mortality ratio around four times that of the general population and approximately twice that of other healthcare professions. Although there has been much speculation regarding mechanisms of increased suicide risk in the profession, there is scant empirical research, and the contribution of alcohol misuse, anxiety and depression is uncertain. We wished to examine relationships between alcohol consumption, depressive and anxiety symptoms, and overall mental well-being through a questionnaire survey of a large stratified sample of veterinary surgeons practising within the UK. The questionnaire was mailed to 3,200 veterinary surgeons (approximately 20% of the membership of the Royal College of Veterinary Surgeons). Reported alcohol consumption was graded through completion of the Alcohol Use Disorders Identification Test alcohol consumption Questions (AUDIT-C), individuals being classified into non-drinkers, low-risk drinkers (score 1-3 for women and 1-4 for men) and at-risk drinkers (score ≥4 for women and ≥5 for men). Depressive and anxiety symptoms were assessed through completion of the Hospital Anxiety and Depression Scale (HADS) and mental well-being through the Warwick Edinburgh Mental Well-being Scale (WEMWBS). 1796 participants returned the completed questionnaire, a response rate of 56.1%: after imputation of minor omissions, valid data was available for 1757 individuals (881 men, 876 women). There were 95 non-drinkers (5.4%), 563 low-risk (32.0%) and 1099 (62.5%) at-risk drinkers. Mean scores on the HADS anxiety (HADS-A) and depression (HADS-D) sub-scales in the overall sample were 7.92 and 4.65, respectively. Mean HADS sub-scale scores and WEMWBS did not differ significantly (One-way ANOVA and Kruskal-Wallis tests) between non-drinkers, low-risk and at-risk drinkers: HADS-A, 7.96 vs 7.69 vs 8.04; HADS-D, 5.02 vs 4.67 vs 4.61; WEMWBS, 47.27 vs 49.42 vs 48.79. In this population, self-reported depressive and anxiety symptom severity did not differ significantly across three levels of reported alcohol consumption. The high prevalence of at-risk alcohol consumption and the HADS-A score indicating anxiety symptoms of possible clinical significance require further exploration and, if substantiated, would cause some concern if this sample is representative of the UK veterinary profession. Sources of funding: Veterinary Business Development printed and mailed the questionnaires; BUPA Giving provided financial support for the project.

MD09

ETHANOL AND PERFORMANCE IN THE LABORATORY AND EVERYDAY LIFE

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Most research on the effects of ethanol on performance is carried out in the laboratory, with epidemiological studies confirming the significance of performance impairment in domains such as driving. There is increasing interest in assessment in an everyday life setting, using methods such as the internet, handheld PCs and mobile phones. Using the same volunteers, we compared assessments of the effects of ethanol on performance, in a controlled laboratory study and in normal life using mobile phones. 38 healthy volunteers (20 male) aged 18-54 years (mean 22.8) took part. They were asked not to alter their drinking habits. Text (SMS) messages were sent twice a day to the mobile phones at different times over 14 days. The application collected information on ethanol consumed, visual analogue ratings, and administered tests of memory, attention, and reaction time. 26 of the volunteers took part in the lab study. They received ethanol and placebo on separate days in random order and completed the same assessments at intervals up to 2h after the drink. Thirty volunteers reported consuming at least five units of ethanol in the previous 6h at least once during the two week period. Performance was compared to similar times with no ethanol in the past 24h in the same volunteers. Mean blood alcohol concentrations in the lab study were 124 mg/100 ml. The expected drunkenness and impairments to speed and accuracy of performance were seen in both settings. Performance was slower in the everyday setting, and the ethanol impairment greater, particularly for errors, although the inferred ethanol levels in the everyday setting were somewhat lower. The mean number of incorrect responses for number pairs (attention) was 6.52 for placebo, 9.28 for ethanol in the lab ($p<0.01$, ANOVA); and 6.45 (no ethanol), 12.2 (ethanol) in the everyday setting ($p<0.05$ Paired t-test). Laboratory and everyday assessments differ in many ways, including: the rate of drinking, distraction, time of day, and social context. It is therefore not surprising that results are not identical. The poorer performance in the everyday setting could be due to greater distraction, which should be further investigated. Two overall conclusions may be drawn (1) Performance impairments are found in both settings, and are at least as great in real life as in the lab, and (2) Lab results suggesting that errors are an important aspect of alcohol impairment are supported by this study of volunteers in their everyday circumstances. No external funding.

MD10

EFFECTS OF ACUTE ALCOHOL CONSUMPTION ON THE PROCESSING OF PERCEPTUAL CUES OF EMOTIONAL EXPRESSION

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Introduction: The mechanisms underlying the relationship between alcohol and aggression are not particularly well understood. Alcohol may facilitate aggression via alterations in the processing of the emotional content of facial cues. Studies have reported impairments in the processing of emotional facial cues in alcohol dependent participants (Townshend & Duka 2003). Recently, studies have shown modified processing of emotional facial cues after acute doses of alcohol in non-dependent social drinkers (Kano et al. 2003). The studies reported here further explore these effects using adapted psychophysical tasks in order to measure threshold sensitivity and categorization of emotional expressions, and examining the effects of alcohol dose and expectancy. The effect of alcohol dose on the processing of facial cues in male and female social drinkers was also examined. Both studies were funded by the Alcohol Education and Research Council (AERC)

Method: Study 1 (n = 100) was a between-subjects balanced placebo design, in which participants attended one session (0.0 or 0.4 g/kg alcohol) and were randomly allocated to one of four groups; received alcohol/told alcohol, received alcohol/told placebo, received placebo/told alcohol, received placebo/told placebo. A psychophysical task in which two faces were presented for each trial (neutral vs emotional) was employed, and participants were required to identify the emotional face. This task enables identification of perceptual sensitivity to small changes in facial emotional expressions. Sad, happy and angry emotional expressions were tested in male and female target faces. Study 2 (n = 96) employed a similar design to Study 1 however a miscategorisation task was used. A target face was presented consisting of a morph between two emotional exemplars (e.g., happy and angry face) and participants were asked to identify the emotion of the face (i.e., happy or angry). This task was run separately for angry-happy and angry-disgusted facial morphs. Results: : Data were analyzed within 2x2x2x2 mixed model ANOVAs with drink (alcohol, placebo), expectancy (told alcohol, told placebo) and participant sex (male, female) as between subject factors and target sex (male, female) as a within-subjects factor. Emotion was also included as a within-subjects factor compromising there levels for Study 1 (happy, angry, sad) and two levels for Study 2 (angry-happy, angry-disgusted).Study one revealed a near significant emotion by drink interaction ($F [2, 178] = 2.94$, $p = 0.055$), with higher thresholds after alcohol for sad, but not happy or angry, emotional expressions .Study two indicated a significant emotion x target sex x alcohol interaction ($F [1, 72] = 5.52$, $p = 0.02$), with participants showing a bias towards categorisation of disgusted faces as angry after alcohol but not after placebo consumption. There were no effects of alcohol on the angry-happy categorisation condition ($ps > 0.05$)

Conclusions: These data suggest that alcohol may differentially affect processing of different emotional expressions. In study one, after alcohol consumption, participants showed reduced sensitivity to recognising sad emotion in faces compared to placebo, but no effects were found for angry or happy emotions. Study two showed that alcohol may lead to individuals miscategorising negative (disgusted), but not positive (happy), faces as angry, which has implications for real world situations in which a negative facial expression may be erroneously perceived as provocative. However these miscategorisation effects were obtained in male, but not female, targets, possibly due to greater expectancy of alcohol-related aggression in men.

Reported alcohol consumption, depressive and anxiety symptoms, and mental well-being among UK veterinary surgeons: cross-sectional questionnaire survey

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ABSTRACT

Veterinary surgeons are at high risk of suicide, with a proportional mortality ratio around four times that of the general population and approximately twice that of other healthcare professions. Although there has been much speculation regarding mechanisms of increased suicide risk in the profession, there is scant empirical research, and the contribution of alcohol misuse, anxiety and depression is uncertain. We wished to examine relationships between alcohol consumption, depressive and anxiety symptoms, and overall mental well-being through a questionnaire survey of a large stratified sample of veterinary surgeons practising within the UK.

The questionnaire was mailed to 3,200 veterinary surgeons (approximately 20% of the membership of the Royal College of Veterinary Surgeons). Reported alcohol consumption was graded through completion of the Alcohol Use Disorders Identification Test alcohol consumption Questions (AUDIT-C), individuals being classified into non-drinkers, low-risk drinkers (score 1-3 for women and 1-4 for men) and at-risk drinkers (score ≥4 for women and ≥5 for men). Depressive and anxiety symptoms were assessed through completion of the Hospital Anxiety and Depression Scale (HADS) and mental well-being through the Warwick Edinburgh Mental Well-being Scale (WEMWBS).

1796 participants returned the completed questionnaire, a response rate of 56.1%: after imputation of minor omissions, valid data was available for 1757 individuals (881 men, 876 women). There were 95 non-drinkers (5.4%), 563 low-risk (32.0%) and 1099 (62.5%) at-risk drinkers. Mean scores on the HADS anxiety (HADS-A) and depression (HADS-D) sub-scales in the overall sample were 7.92 and 4.65, respectively. Mean HADS sub-scale scores and WEMWBS did not differ significantly (one-way ANOVA and Kruskal-Wallis tests) between non-drinkers, low-risk and at-risk drinkers: HADS-A, 7.96 vs. 7.69 vs. 8.04; HADS-D, 5.02 vs. 4.67 vs. 4.61; WEMWBS, 47.27 vs. 49.42 vs. 48.79.

In this population, self-reported depressive and anxiety symptom severity did not differ significantly across three levels of reported alcohol consumption. The high prevalence of at-risk alcohol consumption and the HADS-A score indicating anxiety symptoms of possible clinical significance require further exploration and, if substantiated, would cause some concern if this sample is representative of the UK veterinary profession.

BACKGROUND

Mortality due to suicide is higher in the veterinary profession than in the general population, the proportional mortality ratio for suicide being around four times that of the general population and twice that of other healthcare professions. The relative risk of suicide across occupational groups is often explained by differences in demographic factors but veterinary surgeons have higher rates of suicide even when these are taken into account[1].

Little is known regarding the mechanisms of increased suicide risk in the profession. It is uncertain whether the increased risk derives from the characteristics of individuals entering the profession, the work environment, or other factors known to influence suicide. In common with other high risk occupational groups, veterinary surgeons have ready access to effective means of suicide which may play an important aetiological role.

Suicide rate is sometimes used as an imperfect proxy indicator of population mental health status[2] so it follows that psychological morbidity among veterinary surgeons may also be increased. Initiatives to provide mental health support to members of the profession have been established but there has been no attempt to measure the nature and extent of psychological morbidity among veterinary surgeons in the UK.

METHOD

A questionnaire was mailed twice to 3,200 veterinary surgeons (approximately 20% of the membership of the Royal College of Veterinary Surgeons, excluding those practising overseas or retired). Depressive and anxiety symptoms were assessed through completion of the Hospital Anxiety and Depression Scale (HADS). Reported alcohol consumption was graded through completion of the Alcohol Use Disorders Identification Test alcohol consumption questions (AUDIT-C) and mental well-being through the Warwick Edinburgh Mental Well-Being Scale (WEMWBS). The questionnaire also included measures of suicidal ideation, psychosocial work characteristics and work-home interaction.

To investigate the effect of each predictor variable on continuous response (outcome) variables, simple and multiple linear regression was applied. Simple and multiple logistic regression was applied for binary outcome variables. Odds ratios (ORs) and regression coefficients were accompanied by 95% confidence interval. Statistical significance was defined as $p<0.05$.

RESULTS

1796 participants returned the completed questionnaire, a response rate of 56.1%. After imputation of minor omissions, valid data was available for 1757 individuals (881 men, 876 women). There were 95 non-drinkers (5.4%), 563 low-risk (32.0%) and 1099 (62.5%) at-risk drinkers. Mean scores on the HADS and WEMWBS are compared across alcohol consumption categories in Table 1.

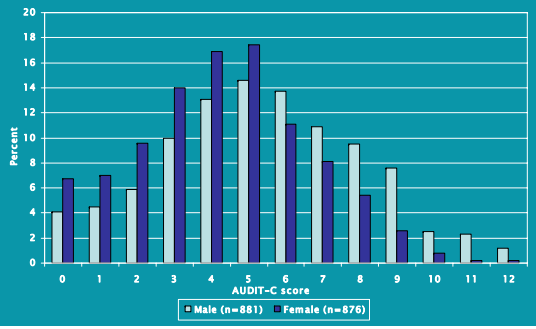
Table 1

	HADS-A		HADS-D		HADS-T		WEMWBS	
	mean	SD	mean	SD	mean	SD	mean	SD
Non-drinkers (n=95)	7.96	4.57	5.02	3.64	12.98	7.47	47.27	10.40
Low risk drinkers (n=563)	7.69	4.03	4.67	3.42	12.36	6.75	49.24	8.99
At-risk drinkers (n=1757)	8.04	4.07	4.61	3.41	12.64	6.75	48.79	8.96
Total (n=1757)	7.92	4.09	4.65	3.42	12.57	6.79	48.85	9.06
p-value†								
One-way ANOVA	0.264		0.518		0.605		0.137	
Kruskal-Wallis	0.284		0.527		0.720		0.301	

† HADS-A, HADS-T and WEMWBS scores are nearly normally distributed and HADS-D is positively skewed. Levene test of homogeneity of variances indicated one-way ANOVA is acceptable for testing relationship between AUDIT-C and outcome variables.

Figure 1. summarises the distribution of AUDIT-C scores among male and female veterinary surgeons. AUDIT-C scores are nearly normally distributed but slightly positively skewed. The gender difference across AUDIT-C scores is significant (Pearson $\chi 2=96.34$, df=12, $p<0.001$).

Figure 1



CONCLUSIONS

HADS-A subscale scores for non-drinkers are higher than for low-risk drinkers and lower than for at-risk drinkers; HADS-D subscale scores are higher for non-drinkers than for low-risk drinkers and lowest for at-risk drinkers; WEMWBS scores are lowest for non-drinkers, higher for at-risk drinkers and highest for low-risk drinkers. However, self-reported depressive and anxiety symptom severity and positive mental well-being did not differ significantly across three levels of reported alcohol consumption. The high prevalence of at-risk alcohol consumption and the HADS-A score indicating anxiety symptoms of possible clinical significance require further exploration and, if substantiated, would cause some concern if this sample is representative of the UK veterinary profession.

REFERENCES AND ACKNOWLEDGEMENTS

1. BARTRAM, D.J. & BALDWIN, D.S. *Veterinary Record* 2008; 162: 36-40

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BARTRAM, D.J. & BALDWIN, D.S. (2008) Veterinary surgeons and suicide: a hypothetical model to explain risk. [Oral presentation] Proceedings of 12th European Symposium on Suicide and Suicidal Behaviour, 27-30 August, 2008. Glasgow, Scotland. pp 57-58

then to past suicidality. Further, there are validity issues with the PPAS, there is opportunity of a multi-item measures and probably a multi-factor measure.
Although the concept of psychache is used in discussions of suicidal behaviour, there have not been many attempts to devise quantitative measures of the variable for research. Also, for suicidal psychiatric patients, amelioration of symptoms is not sufficient to reduce pain associated with certain events, probably because of the lack of proper management. In addition, efforts should be made to reduce the psychache currently experienced and to restructure the cognitions of the patients about the traumata that they have experienced in the past. Asking of the suicidal person about psychache and suicidality may be useful in establishing rapport with the patient and in assessment, beyond psychometric scores. In summary, we address a large epistemolgical question, that is negative emotions between individuals and how to bridge the gap in communication of human suffering.

O3.5.2 - Veterinary surgeons and suicide: a hypothetical model to explain risk

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Veterinary surgeons are at high risk of suicide, with a proportional mortality ratio around four times that of the general population and around twice that of other healthcare professions. Although there has been much speculation regarding mechanisms of increased suicide risk in the profession, there is very little empirical research.
A review of current knowledge about possible influences on the suicide rate among veterinarians and factors elevating the risk in other occupations and in the general population is used to propose a hypothetical model to explain suicide risk in veterinary surgeons. Based on testable constructs, it attempts to clarify a complex interaction of possible mechanisms across the career life course and facilitate a more focused approach to research.
Such mechanisms include the characteristics of individuals entering the profession, negative effects during undergraduate training, work-related stressors (such as long working hours, inadequate support, emotional exhaustion, client expectations and unexpected clinical outcomes), ready access to and knowledge of means (medicines are typically stored in practice premises and deliberate self-poisoning is the most common method of suicide in both male and female veterinarians), stigma associated with mental illness, professional and social isolation, and alcohol or drug misuse (mainly prescription drugs to which the profession has ready access such as ketamine, benzodiazepines and opiates).
Contextual effects such as attitudes to death and euthanasia (formed through the profession's routine involvement with euthanasia of companion animals and slaughter of farm animals) and suicide contagion (due to direct or indirect exposure to suicide of peers within this small profession) are other possible influences.
Research is required to validate the model and to inform the development and timing of appropriate interventions. A cross-sectional study to determine the prevalence of psychological morbidity using standard instruments and to identify psychosocial risk factors in the profession's work environments is under way.

O3.5.3 - Sense of coherence, sleep disturbance and suicidality in suicide attempters

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Objectives: Sense of coherence (SOC) and sleep disturbances have been shown to predict suicide attempt. The present study examines relationships among SOC, sleep disturbance and suicidality in suicide attempters.
Design: Cross-sectional. Repeat attempts within 2 years were determined via hospital record review.
Methods: 165 patients aged 18 to 68 years who were admitted to hospital wards after a suicide attempt were interviewed with SCID-IV and the Suicide Assessment Scale. Two self-report instruments were administered SOC and the Uppsala Sleep Inventory. Associations among SOC subscales (meaningfulness, manageability and comprehensibility), sleep disturbances and suicidality were analyzed with logistic regression.
Results: The mean scores were: SOC total score 112, (SD 10.69), comprehensibility 40, (SD 10,69), manageability 42, (SD 10,80) and meaningfulness 31, (SD 10.59). Patients with low SOC had more problems with difficulties maintaining sleep, early morning awakening and nightmares. In a regression model adjusted for psychiatric diagnoses, low manageability score OR 2.7, (CI 0.99 - 7.47) low comprehensibility score OR 4.1, (CI 1.4 - 11.96) and frequent nightmares OR 3.16, (CI 1.23 - 8.11) were independently associated with high suicidality sub score. SOC subscales did not predict repeat attempt within 2 years but frequent nightmares did OR 3.13, (CI 1.32 - 7.40).
Conclusions: While SOC was associated with suicidality in suicide attempters, frequent nightmares was a better predictor of risk for repeat attempt. Questions concerning sleep problems should be included in the clinical assessment of suicidal patients.

O3.5.4 - Physical illness as a precursor of suicide

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Objectives: The study aims to investigate the relationship between physical illness and completed suicide among adults who have previously attended Accident & Emergency services in Leeds, UK.
Design: A case-control study, determining whether people who have died by suicide have experienced greater

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Veterinary surgeons and suicide: a hypothetical model to explain risk

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12th European Symposium on Suicide and Suicidal Behaviour, 27-30 August 2008, Glasgow

Presentation: O3.5.2

Outline of presentation

- Evidence for elevated suicide risk among vets
- Reasons for developing a conceptual model
- Basis for model
- Overview of the model
- Future research

Elevated PMR for suicide – male vets

Author	Year	Region	Age	PMR	95% CI
Charlton and others (1993)[1]	1979-1990	Eng & Wales	16-64	364	NR
Kelly and Bunting (1998)[2]	1982-1987	Eng & Wales	20-64	349	203-559
Kelly and Bunting (1998)[2]	1991-1996	Eng & Wales	20-64	324	148-615
Mellanby (2005)[3]	1979-1990	Eng & Wales	20-74	361	252-503
Mellanby (2005)[3]	1991-2000	Eng & Wales	20-74	374	244-548
Stark and others (2006)[4]	1981-1999	Scotland	16-45	293	80-749
Stark and others (2006)[4]	1981-1999	Scotland	46-64	301	36-1088

NR, not reported

1. CHARLTON, J. *et al* (1993) *Population Trends* **71**, 34-42
2. KELLY, S. & BUNTING, J. (1998) *Population Trends* **92**, 29-41
3. MELLANBY, R. (2005) *Veterinary Record* **157**, 415-417
4. STARK, C. *et al* (2006) *Health Statistics Quarterly* **29**, 26-29

Elevated PMR for suicide – female vets

Author	Year	Region	Age	PMR	95% CI
Kelly and Bunting (1998)[1]	1991-1996	Eng & Wales	20-59	500	136-1279
Mellanby (2005)[2]	1979-1990	Eng & Wales	20-74	414	166-853
Mellanby (2005)[2]	1991-2000	Eng & Wales	20-74	1240	446-2710
Meltzer and others (2008)[3]	2001-2005	Eng & Wales	20-64	609	198-1422

1. KELLY, S. & BUNTING, J. (1998) *Population Trends* **92**, 29-41
2. MELLANBY, R. (2005) *Veterinary Record* **157**, 415-417
3. MELTZER, H. *et al* (2008) *British Journal of Psychiatry* **193**, 73-76

Percentage distribution of suicides by method

	Suicide method					
	Poisoning by solid or liquid substances	Poisoning by gases and vapours	Hanging and suffocation	Drowning	Firearms and explosives	Other
Male						
Veterinarians	76	3	5	0	16	0
All men	20	27	27	6	5	16
Female						
Veterinarians	89	11	0	0	-	0
All women	46	10	17	9	-	18

Percentage distribution of suicides by method for veterinarians and combined suicides for all occupations, for males aged 20 to 64 years and for females aged 20 to 59 years, in England and Wales, 1982 to 1996

KELLY, S. & BUNTING, J. (1998) *Population Trends* **92**, 29-41

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Why develop a model?

- Clarify a complex interaction of possible influences
- Enhance ability to predict suicide among veterinary surgeons
- Facilitate a more focused and systematic approach for
  - Research on suicide within the veterinary profession
  - Development and timing of interventions

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Developing the model (1)

- Based on a review of literature relating to
  - Possible influences on the suicide rate among veterinarians and other healthcare professionals
  - Factors elevating suicide risk in the general population

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Developing the model (2)

- Congruent with other models of suicidal behaviour
  - Stress-diathesis model[1]
    - An interaction between adverse life events and individual predisposition
  - Differential occupational risk model[2]
    - Demographics: demographic composition of people in the occupation
    - Internal occupational stress: stress associated with the nature of the work
    - Pre-existing psychiatric morbidity: psychological profile of workers
    - Opportunity factors: access to lethal means of suicide

1. MANN, J.J. *et al* (1999) *American Journal of Psychiatry* **156**, 181-189
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Principal component hypotheses of model

- The following factors elevate suicide risk
  - Personality characteristics of individuals entering the profession confer vulnerability
  - Psychological morbidity attributable to psychosocial factors during undergraduate training and in the workplace
  - Familiarity with animal euthanasia leads to more permissive attitudes towards suicide
  - Access to and knowledge of means of harm

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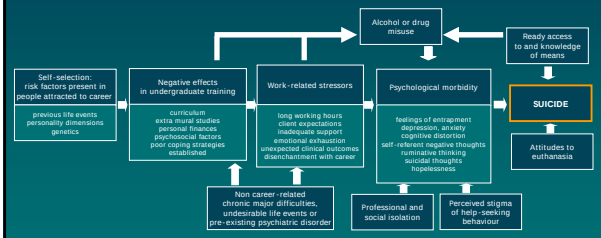
Hypothetical model to explain increased risk of suicide among veterinary surgeons



BARTRAM, D.J. & BALDWIN, D.S. (2008) *Veterinary Record* **162**, 36-40

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Research opportunities

- Validation of the model
  - Empirical testing of constructs and propositions
  - Cross-sectional study of mental health recently completed
- Development and timing of suitable interventions

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