

ORIGINAL RESEARCH

Comparing veterinarians' attitudes to and the potential influence of pet health insurance in Austria, Denmark and the UK

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Abstract

Background: Health insurance offers many benefits to clients and veterinarians, such as the ability to perform necessary and possibly cost-intensive medical interventions without financial constraints, or to potentially prevent euthanasia based on financial challenges. However, concerns about negative consequences, such as the overuse of diagnostic tests or overtreatment, have also been raised.

Methods: Using an online questionnaire distributed via e-mail, which included a section on health insurance, we investigated the relative number of insured dogs and cats treated by Austrian, Danish and UK veterinarians (N = 636) and the attitudes of those veterinarians toward health insurance. Further, using a case vignette, we examined whether coverage by health insurance may influence treatment suggestions.

Results: Even though veterinarians in all three countries believe that health insurance reduces stress since clients' financial resources will be less important, we found that Austrian veterinarians are more likely to agree that health insurance is unnecessary compared to Danish and UK veterinarians. Further, many raised the concern that insurance policies influence clinical decisions; and less than half supported the idea of making insurance mandatory. A majority of veterinarians in Austria and the UK thought that insurance can lead to the overuse of diagnostic tests, and in the UK a majority also thought that it can lead to overtreatment. Using case vignettes, we found that veterinarians were significantly more likely to suggest a CT scan to a client with an insured animal, in contrast to a client with stated financial limitations. Further, UK veterinarians were more likely to suggest a CT scan to a client with an insured animal, in contrast to a client without insurance.

Conclusion: In conclusion, we found that veterinarians, in general, were in favour of health insurance, and that greater coverage may increase more cost-intensive veterinary care. Our findings also raise a potential ethical challenge of health insurance causing differential access to clinical care for patients.

KEYWORDS

overtreatment, pet health insurance, small animal practice, transnational questionnaire study, veterinary ethics

INTRODUCTION

Developments in small animal practice have vastly increased the diagnostic and treatment options that

are available for companion animals. However, advanced health care is often associated with significant costs and veterinarians may not be able to provide the best possible medical care due to clients

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limited financial resources. Studies show that veterinarians not only regularly face ethical challenges due to clients' financial limitations, but that facing these challenges also increases veterinarians' stress levels during patient care.¹⁻⁴ The introduction of health insurance may lessen these challenges by increasing the ability to undertake necessary diagnostic and treatment interventions, or to potentially prevent euthanasia based on financial limitations.^{3,5-7}

Although positive aspects in relation to coverage by health insurance are recognised and many owners are interested in pet health insurance,⁸ some veterinarians are concerned about the risks of the overuse of diagnostic tests and overtreatment arising as a consequence.^{9,10} There is good reason to be concerned when we look at the many studies that have assessed whether and to what extent the presence of insurance in human patients impacts healthcare provision.¹¹⁻²⁴ The research indicates, on the one hand, that health insurance coverage may influence patient demand for healthcare service, which in turn, can lead to a patient-driven increase in the use of preventive healthcare services (e.g., dental visits or cancer screenings) as described by Simon and others.²⁰ On the other hand, the presence of health insurance also impacts the decisions of healthcare providers.^{11-19,21-24} For instance, Lundin showed that Swedish physicians differentiate between patient's costs and the insurance provider's costs for the prescription of medications and those physicians' are more inclined to prescribe less costly generic versions when patients have to pay out-of-pocket up to a certain amount.¹² In a study of treatment decisions involving diabetes patients in multiple US community healthcare centres, patients with insurance received better quality-of-care measures.¹⁶ Other studies show similar provider-driven increases in the use of healthcare services in the presence of a health insurance regarding, for example, generic drug prescription,²¹ general preventive services²² and advanced diagnostics such as gene expression assays.²³ These studies of clinical decision making are supported and supplemented by findings in questionnaire studies where a large majority of physicians report that they are aware that the insurance status of their patients may alter their clinical management.¹⁴

The above-mentioned findings on the impact of insurance on human healthcare services are based on economics theory in which one proposed mechanism on the demand side is that the lower marginal cost of care to the individual may increase healthcare use.²⁴ Also, on the supply side healthcare providers may tend to diagnose and treat more if patients are insured and the perceived costs of healthcare services, therefore, go down.¹² The described economic mechanisms concerning effects of health insurance are likely to be similar across domains and also affect veterinary clinical decision making. For instance, insurance could lead to the overuse of diagnostic tests and overtreatment as already suggested by Loeb⁹ and Stowe.¹⁰ Overtreatment is here defined as a treatment that either has no positive impact on the patient's medical condi-

tions or quality of life, or potentially worsens the situation for the animal, compared to palliative treatment, no treatment or euthanasia.²⁵ It could be speculated that owners and/or veterinarians may pursue investigations and treatment until the insurance limit has been reached, even when the prognosis for the patient is questionable.⁹ Beyond that, concerns have been raised that health insurance policies may influence veterinarians in their recommendation of diagnostic tests and the type of treatment based on what is covered by the insurance.^{8,10} Health insurance might, therefore, give rise to potential ethical challenges since veterinarians might feel compelled to offer not only differential clinical service for uninsured patients compared to insured patients, but also to insured patients, depending on what is covered by the insurance policies.

All of the aforementioned concerns relating to the veterinary field are so far based on anecdotal information from veterinarians only^{9,10} and have not been empirically investigated. In addition, investigations on attitudes toward health insurance have mainly been conducted in countries where the uptake of insurance is low such as in the US, or German-speaking countries where it is estimated that only around 5% of animals are insured.^{3,7}

Thus, there were two aims of this comparative study across small animal veterinarians from Austria, Denmark and the UK. The first aim was to investigate attitudes to pet health insurance in countries that differ in two ways. First, the prevalence of pet health insurance varies across the countries studied. Austria has a relatively under-developed pet insurance market, with the estimated number of insured animals far below 10%.²⁶ In contrast, a report on the UK pet insurance market found that 46%, that is, almost half of UK pet owners have health insurance for their animals.²⁷ A slightly older study among 600 Danish dog owners indicated that 39% of dogs are insured.²⁸ These country differences in health coverage could have an impact on attitudes toward pet health insurance. Thus, research shows that physicians are aware that patient's health insurance status impacts their clinical treatment,¹⁴ which in turn, could impact their attitude to health insurance. Second, the prevalence of private and corporate practice models differs greatly across European countries, with corporatisation of veterinary practices having progressed much further in the UK than in Austria and Denmark.²⁹ The varying prevalence of health insurance, different practice types and professionals' work experience could lead to different attitudes toward health insurance among veterinarians practising in the three countries.

The second aim of the present study was to examine how coverage by health insurance may impact veterinarians' clinical decision making using a case study focussing on veterinarians' recommendation of a diagnostic tool. Results of a Danish study among small animal veterinarians showed that factors, such as type and severity of diagnoses as well as different client types, impact veterinarians' willingness to treat the animal of an owner who cannot afford or pay for the

needed care.² However, no empirical investigations have been undertaken to examine to what extent varying financial backgrounds of the owner, including coverage by health insurance, impact treatment recommendations. In light of the above-mentioned research in the field of human health care about patient and healthcare providers' decisions to treat or diagnose, we hypothesize that if veterinarians know that costs are covered by insurance it may influence their clinical decision making. Specifically, it may result in recommendations of potentially more advanced, or potentially expensive diagnostic tests compared to situations in which veterinarians have no information about the clients' financial background or to situations where they have been informed of the clients' financial constraints.

Therefore, the current study addresses the following research questions: (i) What are veterinarians' attitudes toward health insurance for dogs and cats across the three countries, and are they shaped by work experience, practice type or the relative number of insured animals? (ii) Does health insurance coverage influence veterinarians' suggestions for diagnostics, and does this differ between the three countries?

MATERIAL AND METHODS

Study population and recruitment of participants

Aiming to ensure comparable study samples and that no information (e.g., e-mail addresses) can be traced back to respondents, participants were recruited in cooperation with small animal associations in Austria (VÖK), Denmark (DVA) and the UK (BSAVA). The link to the online questionnaire was sent via e-mail from the respective associations to 1195 Austrian, 1287 Danish and 5138 UK veterinarians who worked (mainly) with small animals. For Denmark and Austria, the survey was open from 2nd March until 9th April 2020. For the UK, it was open between 30th March and 7th May 2020. Reminder e-mails were sent two weeks after opening the survey. Ethical approval was obtained from the Research Ethics Committee of SCIENCE and HEALTH at the University of Copenhagen (ReF: 504-0114/19-5000).

Study participants

Completed questionnaires with the relevant questions for this article were received from 636 veterinarians including 101 Austrian veterinarians, 171 Danish veterinarians and 364 veterinarians from the UK. The response rate was 8.5% for Austria, 13.3% for Denmark and 7.1% for the UK. Detailed information about socio-demographic and practice-specific factors for the whole study population, and for each sub-population, is listed in Supporting Information 1. Analyses of the representativity of the study and com-

parison between census of small animal veterinarians and sample populations can be found in Springer and others.²⁹

Survey development

The health insurance questions in the questionnaire were developed based on results of an Austrian focus group study on modern small animal practice⁴ and a literature review of mainly empirical studies related to the issue of pet health insurance^{3,5-7,30} and practice-specific factors prevailing in Danish and UK small animal veterinary practice.^{2,3,8,31-38} In brief, the questionnaire was developed in English, and a two-step back-translation procedure was then used to produce the Austrian and Danish versions.²⁹ Further, the questionnaire underwent two stages of pre-testing. In a first step, cognitive interviews^{39,40} were conducted with four Austrian veterinarians. In a second step, an online pre-test phase was conducted with 25 veterinarians from Austria, Denmark and the UK. All comments that could improve the quality of data were considered and incorporated into the final version of the questionnaire in all three languages.²⁹

Survey design and measurements

The questionnaire consisted of three sections (Supporting Information 2) and was designed so that veterinarians did not have to answer every question.

The first section contained 14 closed-ended questions on socio-demographic and practice-specific factors. The second section included items on pet health insurance for dogs and cats, forming the basis for the present study, and these results have not been reported in the previous publication on the transnational study.²⁹ The specific section on health insurance contained six statements focussing on the topic of health insurance for dogs and cats. Respondents could indicate their level of the agreement through one of eight response options from 1 'strongly disagree' up to 7 'strongly agree' and 8 'I don't know'. For the estimation of insured dogs and cats among the animals treated by the respondents, answer options varied from 'I do not treat dogs' or 'I do not treat cats', 'None', '< 10%', '11-20%' and so on up to '91-100%', with an 'I don't know' option also available. We asked for an estimate of the number of insured dogs and cats treated by veterinarians, as it can be assumed that not every practice has an easily accessible and accurate list of the number of insured patients.

The final section included a case vignette⁴¹ where respondents were randomly allocated to receive different information (henceforth referred to as scenarios) about the client's financial background. The first scenario, in which no information was provided about the client's financial situation, was presented to 33.5% (N = 213) of all veterinarians:

TABLE 1 Summary statistics of dogs and cats estimated to be covered by health insurance among animals treated by Austrian, Danish and UK veterinarians

Percentage of covered patients	Austria (n = 101)		Denmark (n = 169-170)		UK (n = 359-364)	
	Dogs	Cats	Dogs	Cats	Dogs	Cats
None	3 (3.0)	39 (38.6)	0 (0.0)	2 (1.2)	2 (0.5)	2 (0.6)
1–30%	94 (93.1)	60 (59.4)	44 (26.0)	136 (80.0)	108 (29.7)	199 (55.4)
31–60%	2 (2.0)	0 (0.0)	79 (46.7)	22 (12.9)	160 (44.0)	102 (28.4)
>60%	0 (0.0)	0 (0.0)	46 (27.2)	10 (5.9)	65 (17.9)	27 (7.5)
I don't know	2 (2.0)	2 (2.0)	0 (0.0)	0 (0.0)	29 (8.0)	29 (8.1)

Counts (percent).

A client consults you about his 7-month-old Labrador, which has a moderately severe left foreleg lameness. The dog's elbow is painful on manipulation, and you suspect medial coronoid disease. You can take radiographs to exclude some types of elbow disease, but only a CT will enable a definitive diagnosis of coronoid disease to be made, and any fragments identified.

How would you proceed further?

In the second scenario, the sentence 'The client tells you the dog is covered by health insurance' was added, and presented to 31.0% (N = 197) of all respondents. The third scenario was presented to 35.5% (N = 226) of all respondents and included the sentence 'The client tells you that he has limited financial resources'. In each scenario, the respondents could choose between the following options: 'I would suggest a CT scan'; 'I would suggest a CT scan and refer the patient' (in case they have no CT scanner available in their practice/clinic); 'I would suggest conservative management (including analgesia) and re-assess the dog after several weeks' and 'Other'.

Data analysis

The online surveys were set up using the survey software Alchemer, and IBM SPSS Statistics version 26 was used for all analyses. Univariate descriptive statistics were presented in tables, figures or text. For bivariate analysis, Chi-square tests or Kruskal–Wallis *H* tests were conducted to determine whether the frequency distribution differed between Austria, Denmark and the UK (Supporting Information 1, Table 2). Bonferroni correction was applied for all multiple comparisons between the three countries. The significance level was 0.05.

Three ordinal regression analyses were conducted to identify whether socio-demographic and practice-specific factors had an impact on veterinarians' attitudes (a) towards the necessity of health insurance, (b) on whether health insurance can result in the overuse of (i) diagnostic tests, or (ii) overtreatment as financial limitations are less likely (see statement 4–6 listed in Table 2). The three dependent variables (statements 4–6 listed in Table 2) were inserted as ordinal vari-

ables. The four categorical predictor variables inserted in the regression analyses were (i) gender (1 = male, 2 = female) and (ii) practice type (1 = independently-owned, 2 = corporate-owned), and (iii) percentage of insured dogs and (iv) percentage of insured cats (1 = none-30%, 2 = 31–60%, 3 = > 60%). Since most of the Austrian veterinarians indicated that they only treat animals without insurance, the variables indicating relative number of insured dogs and cats were inserted with only two values 1 = none and 2 = 1–60%. Work experience was inserted as a continuous predictor (range: 0.5 to 60 years of experience). The answer options 'I don't know' and 'I do not treat dogs' or 'I do not treat cats' for the relative number of insured animals, and the option 'Other' for practice type, were excluded from these analyses.

To examine the effect of a client's financial background on whether a CT scan would be suggested, logistic regression analysis was conducted separately for each country sample. The dependent variable was inserted on a dichotomous scale (1 = 'I would suggest a CT scan'; 0 = 'I would suggest conservative management (including analgesia) and re-assess the dog after several weeks' and 'Other'). The main variable of interest, namely client's financial situation as measured through the case vignette, was inserted as a categorical variable with the values corresponding to the three scenarios: 1 = no information about client's financial situation provided, 2 = having insurance for the dog and 3 = having financial limitations. If client's financial situation turned out as significant, we conducted post-hoc tests to point out which specific scenarios that were significantly different (at the 0.05 level), and reported differences in odds ratio (OR). The same predictor variables were inserted in the binary regression analyses as in the ordinal regression analyses (except 'percentage of insured cats'). In this analysis, the variables were treated as control variables.

RESULTS

Estimated percentages of dogs and cats covered by health insurance

Table 1 presents veterinarians' estimates of the relative numbers of insured dogs and cats among animals treated by them. In all three countries, more dogs than cats seen by the responding veterinarians were

TABLE 2 Veterinarians' attitudes toward health insurance for dogs and cats by country

	Coverage by health insurance...	Level of agreement*	Austria (n = 94-101)	Denmark (n = 168-170)	UK (n = 353-362)	Test
1	Reduces stress for veterinarians as financial limitations are less important in treatment decisions.	Disagreement	12 (12.0)	16 (9.5)	23 (6.4)	H(2) = 15.417, $p < 0.001$ AT vs. DK: $p = 0.829$ AT vs. UK: $p = 0.025^a$ DK vs. UK: $p = 0.001^a$
		Neutral	9 (9.0)	22 (13.0)	14 (3.9)	
		Agreement	79 (79.0)	131 (77.5)	325 (89.8)	
		Mean ± Std.	5.55 ± 1.54	5.54 ± 1.46	5.92 ± 1.30	
2	Should be mandatory for dog and cat owners to ensure that treatment is never determined by financial limitations.	Disagreement	35 (35.0)	54 (32.0)	156 (43.5)	H(2) = 5.868, $p = 0.053$
		Neutral	25 (25.0)	31 (18.3)	57 (15.9)	
		Agreement	40 (40.0)	84 (49.7)	146 (40.7)	
		Mean ± Std.	4.21 ± 1.96	4.40 ± 1.84	3.92 ± 1.90	
3	Influences the use of diagnostic tests and type of treatment due to specific restrictions in the insurance policy.	Disagreement	27 (28.7)	44 (26.2)	84 (23.8)	H(2) = 4.484, $p = 0.106$
		Neutral	24 (25.5)	29 (17.3)	58 (16.4)	
		Agreement	43 (45.7)	95 (56.5)	211 (59.8)	
		Mean ± Std.	4.33 ± 1.54	4.60 ± 1.54	4.62 ± 1.60	
4	Can lead to the overuse of diagnostic tests as financial limitations are less likely.	Disagreement	13 (13.4)	85 (50.0)	104 (28.7)	H(2) = 41.312, $p < 0.001$ AT vs. DK: $p < 0.001^a$ AT vs. UK: $p = 0.125$ DK vs. UK: $p = 0.001^a$
		Neutral	19 (19.6)	21 (12.4)	28 (7.7)	
		Agreement	65 (67.0)	64 (37.6)	230 (63.5)	
		Mean ± Std.	4.90 ± 1.37	3.72 ± 1.82	4.62 ± 1.73	
5	Can lead to overtreatment as financial limitations are less likely.	Disagreement	43 (44.3)	108 (63.5)	129 (35.7)	H(2) = 39.084, $p < .001$ AT vs. DK: $p = 0.100$ AT vs. UK: $p < 0.001^a$ DK vs. UK: $p = 0.006^a$
		Neutral	22 (22.7)	8 (4.7)	23 (6.4)	
		Agreement	32 (33.0)	54 (31.8)	209 (57.9)	
		Mean ± Std.	3.73 ± 1.65	3.26 ± 1.82	4.39 ± 1.77	
6	Is not necessary.	Disagreement	74 (73.3)	154 (91.7)	314 (87.2)	H(2) = 19.295, $p < 0.001$ AT vs. DK: $p < 0.001^a$ AT vs. UK: $p = 0.001^a$ DK vs. UK: $p = 0.134$
		Neutral	17 (16.8)	13 (7.7)	28 (7.8)	
		Agreement	10 (9.9)	1 (0.6)	18 (5.0)	
		Mean ± Std.	2.54 ± 1.66	1.62 ± 1.00	1.88 ± 1.27	

Counts (percent).

*Disagreement = 1 'strongly disagree', 2 'disagree' and 3 'somewhat disagree'; Neutral = 4 'neutral (neither agree nor disagree)'; Agreement = 5 'somewhat agree', 6 'agree', 7 'strongly agree'.

^aBonferroni correction was applied for multiple comparison between three countries and significant variables.

insured. A comparison between Austria, Denmark and the UK showed significant differences for dogs ($H(2) = 138.674$, $p < 0.001$) and cats ($H(2) = 135.261$, $p < 0.001$). A significantly lower percentage of dogs were reported to be insured in Austria than in Denmark ($p < 0.001$) and the UK ($p < 0.001$). A significantly greater percentage of cats were reported to be insured in the UK than in Austria ($p < 0.001$) and Denmark ($p < 0.001$).

Veterinarians' attitudes toward health insurance for dogs and cats

Six statements were presented that explore veterinarians' attitudes toward health insurance (Table 2). In comparison to Austrian and Danish veterinarians, UK veterinarians were more likely to agree that insurance reduces stress as financial constraints are less likely, but also that it can lead to overtreatment. Furthermore, Danish veterinarians agreed more strongly that health insurance can lead to the overuse of diagnostic tests compared to veterinarians from the UK and Austria. Significantly more Austrian veterinarians agreed

that health insurance is not necessary than did their Danish and UK colleagues.

What explains veterinarians' attitudes toward and beliefs about the consequences of health insurance?

We ran three ordinal regression models for each country to understand attitudes underpinning answers to the final three statements in Table 2 (see Supporting Information 3). We provide an overview below.

Statement: Coverage by health insurance is not necessary: In Denmark, veterinarians who indicated that between 'none' and 30% of dogs they treat in clinic are insured were more likely to agree with the statement, compared to veterinarians who indicated that more than 60% of dogs are insured (Denmark: $\chi^2(1) = 6.646$, $p = 0.010$).

Statement: Coverage by health insurance can lead to overtreatment: This was agreed more strongly by veterinarians with more years of work experience in both the UK ($\chi^2(1) = 36.476$, $p < 0.001$) and in Denmark ($\chi^2(1) = 14.379$, $p < 0.001$). Further, we

found that Danish veterinarians who work in privately owned practices/clinics were more likely to agree with the statement ($\chi^2(1) = 12.017$, $p = 0.001$) compared to their colleagues working in corporate-owned practices. In addition, UK veterinarians who estimated that over 60% of dogs are insured agreed more strongly with the statement compared to their colleagues who estimated that 30% or fewer dogs were insured ($\chi^2(1) = 4.514$, $p = 0.034$).

Statement: Coverage by health insurance can lead to the overuse of diagnostic tests: Danish ($\chi^2(1) = 14.767$, $p < 0.001$) and UK ($\chi^2(1) = 21.600$, $p < 0.001$) veterinarians with more work experience agreed more strongly with this statement. Additionally, Danish veterinarians working in privately owned practices were more likely to agree in the statement compared to their colleagues working in corporate-owned practices/clinics ($\chi^2(1) = 21.387$, $p < 0.001$). Austrian veterinarians indicating that 1 to 60% of cats are insured were more likely to agree compared to veterinarians indicating that no cats are insured (Austria: ($\chi^2(1) = 6.837$, $p = 0.009$).

Impact of client's financial background on suggesting a CT

In all three countries, the likelihood that the veterinarian will suggest a CT scan is significantly higher in the scenario in which no information about the client's financial situation was provided ($p_{AT} = 0.001$, OR 12.699; $p_{DK} = 0.001$, OR 4.219; $p_{UK} < 0.001$, OR 5.105) as well as in the scenario in which the dog is insured ($p_{AT} = 0.004$, OR 9.917; $p_{DK} < 0.001$, OR 6.419, $p_{UK} < 0.001$, OR 17.317) compared to the situation in which the client indicates financial limitations (Figure 1). Further, UK veterinarians significantly more often would suggest a CT scan in the scenario in which the dog is insured in comparison to the scenario in which no information about client's financial background was provided ($p = 0.001$, OR 3.392). This difference is not observed in Denmark ($p = 0.395$) and Austria ($p = 0.789$) (Supporting Information 4).

DISCUSSION

The results of this comparative study show that a significantly higher number of dogs met by the veterinarians in the UK and Denmark were estimated to be insured than among those met by veterinarians in Austria. In contrast, UK respondents estimated that more of the cats they met are covered by health insurance than did their Austrian and Danish colleagues. These findings are in agreement with previous study results. For example, Zenz-Spitzweg and others⁷ recently surveyed veterinarians in German-speaking countries who estimated that only 5.4% of the animals they treat are covered by health insurance. In contrast, in the UK, in 2017, there were about 80 companies providing pet health insurance and the demand seems to

be increasing⁴²: in 2019, around 57% of dogs and 37% of cats were insured.^{43,44} Further, a slightly older study of 600 Danish dog owners reported that 39% had their dogs insured.²⁸

Although the prevalence of health insurance differs between countries, there is no doubt that the general awareness of pet insurance has increased and will continue to increase.^{3,5,30,45} As others have argued,^{2,3,7,30} health insurance can mitigate problems veterinarians face with financially constrained clients, and our findings confirm this. Respondents from all three countries tended to agree that coverage by health insurance reduces their stress, as financial limitations are affecting patient care to a lesser degree.

Interestingly, veterinarians' attitudes diverge in relation to whether health insurance should be mandatory. Although between 40 and 50% of veterinarians from the three countries agreed that health insurance should be mandatory, between 32 and 44% of veterinarians did not. It seems likely that while most veterinarians recognise the positive consequences of health insurance, there is also recognition that making it compulsory may cause problems. For instance, if every dog and cat had to be insured, owners might be discouraged from having companion animals, or from keeping specific breeds, as the cost of insurance can vary greatly between breeds.⁴⁶ However, the different insurance costs and potential exclusions in relation to specific breeds may also have a positive impact, acting as an economic incentive to avoid breeds with significant health problems, such as brachycephalic dogs,⁴⁷ thereby regulating the demand for such breeds.

In relation to possible negative effects of health insurance, concerns also arise that some insurance policies dictate to veterinarians the type of patient care they can offer.⁸ Exclusions in policies depend not only on the animal's breed but also on the type and level of coverage that has been purchased.⁴⁶ We observed significant concerns about this in the present study, as 46% of Austrian veterinarians and up to 60% of UK veterinarians agreed that specific restrictions in insurance policies can influence the use of diagnostic tests and the type of treatment undertaken. Thus, insurance policies influence both the options veterinarians offer to the client, as well as clients' wishes. As a consequence, clients may tend to wish only to pursue diagnostic tests and treatments that are covered by their policy, even if more appropriate interventions are available.

There has been considerable discussion about whether health insurance leads to the overuse of diagnostic tests and/or overtreatment, but so far, the debate has mainly been based on anecdotal evidence. For instance, Loeb⁹ introduced a case report from a veterinarian who experienced the problem of client's wish to pursue questionable treatment since all costs were covered by health insurance. To the best of the authors' knowledge, the present study provides the first systematically collected empirical insights into this issue. We found that most veterinarians from

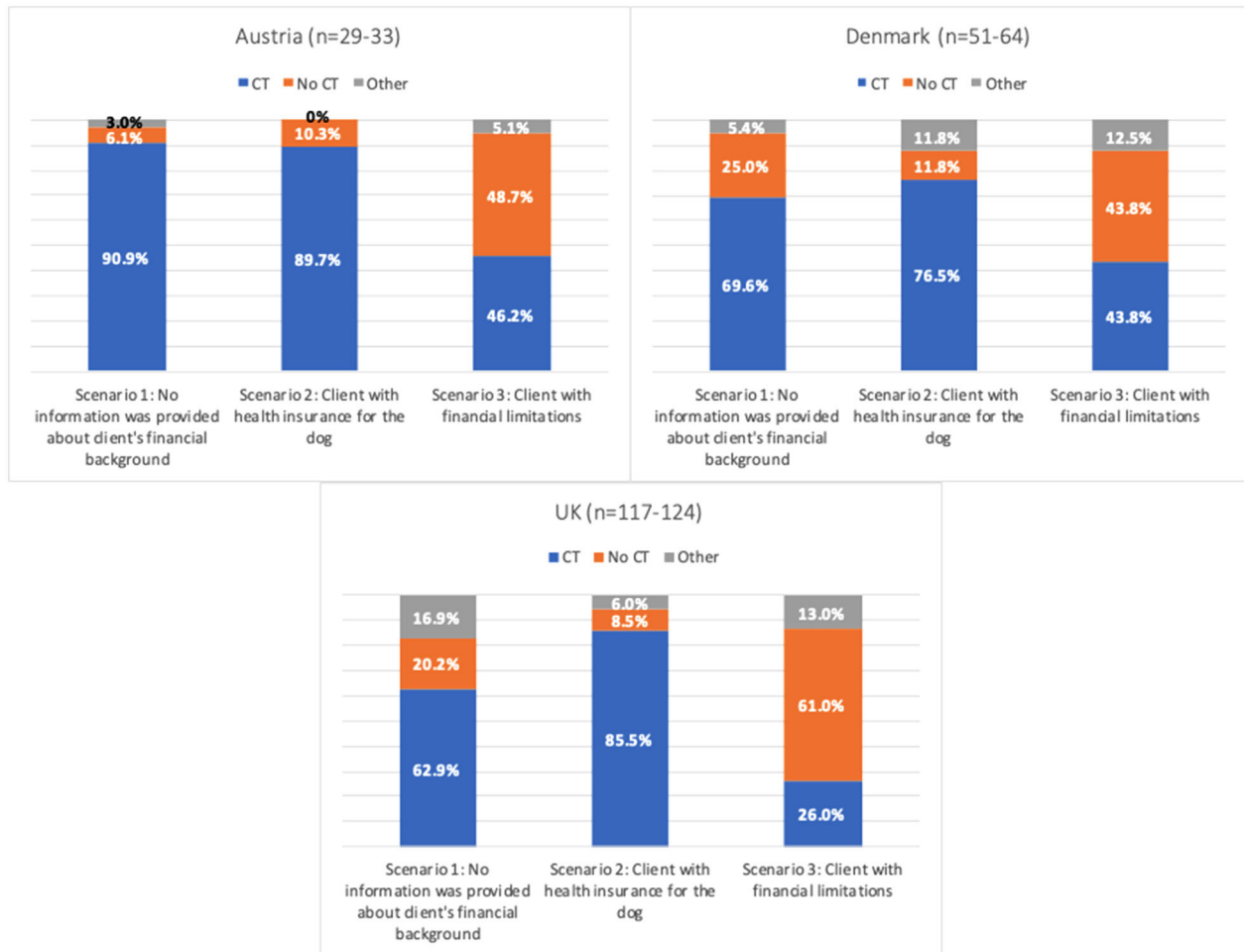


FIGURE 1 Distribution of veterinarians' suggestions for performing a CT scan to obtain a definitive diagnosis depending on the information about a client's financial background and presence of health insurance—reported as 100% stacked columns per country and scenario (Austria [scenario 1: n = 33, 32.7%, scenario 2: n = 29, 28.7%, scenario 3: n = 39, 38.6%], Denmark [scenario 1: n = 56, 32.7%, scenario 2: n = 51, 29.8%, scenario 3: n = 64, 37.4%] and the UK [scenario 1: n = 124, 34.1%, scenario 2: n = 117, 32.1%, scenario 3: n = 123, 33.8%])

Austria and the UK agreed that health insurance can lead to the overuse of diagnostic tests. In addition, over half of UK respondents also agreed that it can lead to overtreatment. Danish veterinarians tended to agree less than their Austrian and UK colleagues that health insurance can lead to the overuse of diagnostic tests. Here, Danish veterinarians who work in corporate-owned practices were even less likely to agree that overuse of diagnostic tests and overtreatment in insured animals is a problem compared to their colleagues working in privately owned practices. A possible explanation for this finding could be that corporate-owned clinics may have standard treatment protocols in place which, in combination with insurance coverage and a general encouragement to generate income,³⁶ might make the use of advanced diagnostics and therapies seem more routine, rather than being considered 'overtreatment' in the eyes of veterinarians who work in corporate-owned clinics. However, even though corporate-owned practices are more frequent in UK than in Denmark, we did not observe a similar association between business type and concern over the overuse of diagnostics tests and treatment of insured animals in the UK. Impacts of

business type on attitudes relating to health insurance deserve attention in future studies.

However, potential overuse of diagnostic tests may not occur solely due to specific protocols being in place in corporate practices. If a pet is covered by insurance, then clients may depend on the insurance to be able to afford the recommended investigations (e.g., advanced imaging), and veterinarians may wish to make use of these options to increase the certainty of their diagnosis.⁴ Younger and more inexperienced veterinarians, in particular, may conduct more tests simply to be more careful, and sure of their diagnosis.⁴ This assumption is partially supported by our results that show that experienced veterinarians in Denmark, but not in other countries, agreed more strongly about the potential for the overuse of diagnostic tests than their less experienced colleagues. In view of this, we suggest that future empirical research should consider a variety of factors related to both the client, such as emotional bonds, and the veterinarian, for example, working background, work experience, level of specialization and economic situation, which in combination may lead to the overuse of diagnostic tests and overtreatment in companion animal practice.

In contrast to previous empirical studies that focus on clients' financial constraints and their effect on veterinarians' decisions,^{1–3,8} we aimed to provide the first insights into how pet health insurance influences veterinarians in their suggestion of advanced diagnostics. Our hypotheses presented in the Introduction—based on related research on the consequences of health insurance in human health care—were only partially confirmed. We expected that the presence of pet health insurance would make it more likely that a veterinarian would suggest CT scan for a lame dog with elbow pain, compared with non-insurance situations. However, this hypothesis was only supported for UK where the veterinarians who received the scenario with an insured dog were more likely to suggest a CT scan compared to those who received other scenarios, in which either no information about the clients' financial background was provided, or the client indicates financial challenges. In Austria and Denmark, there were no differences in propensity to suggest a CT scan when comparing the health insurance scenario with the scenario where veterinarians did not obtain information about the clients' financial background.

We speculate that there are three possible explanations for the observed patterns. One possible explanation is simply that treatment decisions are not affected by the health insurance status of pets (or dogs, at least) in Denmark and Austria, whilst they are in the UK. Another possible explanation is that only some diagnostic and treatment decisions will be affected by the health insurance status, and that our particular case study is an example of this. These explanations can evidently only be examined through future research where multiple clinical decisions are studied. A third explanation is related to differences between the countries in terms of familiarity with health insurance. Specifically, we suggest that the observed differences could be explained by the fact that the pet insurance market in the UK is a mature market, where coverage by health insurance is quite popular.⁴⁸ The UK introduced pet health insurance in the 1970s, second only to Sweden (introduced in 1924), and was, therefore, an early adopter.⁴⁸ To the authors' knowledge, no data exist that provide precise information when pet health insurance was introduced in Denmark and Austria. However, on the basis of available data related to the UK, it can be reconstructed that in contrast, Denmark witnessed a later introduction and implementation of pet health insurance, and Austria is even more behind. In a recent overview of the development of the pet insurance market in the UK, Tooth⁴⁹ describes that it was first introduced in 1976 and that pet owner uptake was slow. A reason for this is that the initial products were of a poor quality, as they lacked transparency and relevant coverage. Tooth further indicates that the possibility of health insurance only received interest in later stages where products with higher coverage were implemented, and that health insurance only became normalized when veterinarians consistently asked animal owners whether the animal is covered.⁴⁹ In the context of a reliable and

high-coverage pet insurance system, UK veterinarians may have adapted their clinical decisions based on an assumption that most pets are insured, while veterinarians in Denmark and Austria have not yet done so because of a less mature health insurance market.

The impact of health insurance on clinical decision making can also be considered from the clients' perspective, with findings from a US study that centred on the other side of the decision-making process.³⁰ In that study, dog owners with health insurance were more willing to spend \$1000 to treat their injured dog than those without health insurance.³⁰ However, without knowing how much is covered by the health insurance, owners with health insurance for their dog did not choose the treatment options costing \$3000 or \$10,000, even if they would have further improved the outcome. Consequently, even though veterinarians might be willing to suggest advanced and more expensive interventions, what the clients accept can be highly dependent on their willingness to pay costs in excess of their insurance limit. Thus, the existence of pet health insurance may give rise to a different standard of health care being offered to insured versus non-insured patients. In a recent study of Austrian veterinarians,⁴ the veterinarians raised the general issue of a multi-tier healthcare system in which veterinarians are ethically challenged by the fact that they can provide all options for those clients who are able to afford them, but need to find alternative options for those who cannot. In this context, it is important to consider whether health insurance will minimize and not widen the gap in the provision of veterinary health care.

We conclude that veterinarians, in general, are in favour of pet health insurance. However, the initial hypothesis that coverage by health insurance increases the likelihood of more advanced and potentially expensive diagnostics or treatments being suggested can only be clearly confirmed when comparing with what is offered to clients with stated financial limitations. Importantly, we have identified that veterinarians believe that coverage by health insurance can potentially lead to the overuse of diagnostic tests and/or overtreatment, raising potential ethical questions. Further research is warranted to explore how insurance influences treatment decision making from both owners' and veterinarians' perspectives.

Although this study involves three different countries to enable a comprehensive investigation of our research questions, the study is subject to limitations. First, to generate an overview of several aspects that are of relevance in relation to health insurance, we formulated and contextualized six statements to identify veterinarians' attitudes toward health insurance based on existing literature including empirical studies and anecdotal information from veterinarians. However, it was not specified whether veterinarians should answer the statements by referring to their own personal experience, or in relation to the profession in general. Thus, future research should explore these two aspects independently. Second, the number of

participants from the three countries' sub-populations varied, and in particular, the small sample size in Austria had an effect on the identification of significant differences in our regression analyses.

We highly recommend that the role veterinarians might play in giving advice or even selling health insurance to their clients is further investigated, and research undertaken to explore how health insurance could positively influence or control challenging aspects of veterinary care such as economic-based euthanasia or the problem of unhealthy breeds.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ETHICS STATEMENT

The research project was approved by the Research Ethics Committee of SCIENCE and HEALTH at the University of Copenhagen (ReF: 504-0114/19-5000).

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DATA AVAILABILITY STATEMENT

All data are fully available without restrictions.

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SUPPORTING INFORMATION

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