

## 1 Title

2 Motivators and barriers for dog and cat owners and veterinary surgeons in the United  
3 Kingdom to use preventative medicines

## 4 Author names and affiliations

5 Zoe Belshaw<sup>1</sup>, Natalie. J. Robinson<sup>1</sup>, Rachel S. Dean<sup>1</sup> and Marnie L. Brennan<sup>1</sup>

6 <sup>1</sup> Centre for Evidence-based Veterinary Medicine, School of Veterinary Medicine and Science,  
7 The University of Nottingham, LE12 5RD, UK.

## 8 Corresponding author:

9 Marnie Brennan: [marnie.brennan@nottingham.ac.uk](mailto:marnie.brennan@nottingham.ac.uk)

10

## 11 Abstract

12

13 Routine use of preventative medicines is advocated as part of responsible dog and cat ownership.

14 However, it has been suggested that the number of owners in the United Kingdom (UK) using

15 preventative medicines to protect their pets is in decline. The aim of this novel study was to use a

16 qualitative methodology to explore the attitudes of pet owners and veterinary surgeons in the UK to

17 using preventative medicine products in dogs and cats. Preventative medicine was defined as “a

18 drug or any other preparation used to prevent disease, illness or injury.” Semi-structured interviews

19 were conducted by telephone with owners and veterinary surgeons who had recently participated in

20 a preventative healthcare consultation. Thematic analysis of transcribed recordings of these

21 interviews identified four themes. This paper reports the theme related to motivators and barriers

22 to using preventative medicines. Owners' understanding varied widely about the importance of  
23 preventative medicines for pets, as did their confidence in the safety of prescription products. A  
24 good relationship with their veterinary surgeon or practice, seeing adverts on the television about  
25 specific diseases, advice from a breeder and having personally seen infected animals appeared to be  
26 motivators for owners to use preventative medicines. Concern about adverse events and uncertainty  
27 about the necessity of using preventative medicines were barriers. Owners who trusted their  
28 veterinary surgeons to advise them on preventative medicine products described little use of  
29 alternative information sources when making preventative medicine choices. However, owners who  
30 preferred to do their own research described reading online opinions, particular in relation to the  
31 safety of preventative medicines, which they found confusing. In contrast, veterinary surgeons  
32 described broad confidence in the safety and efficacy of prescription preventative medicines, and  
33 described protection of pet health as a strong motivator for their use. Several expressed some  
34 concern about being seen to "sell" products, which may present a barrier to their advocacy.  
35 Veterinary surgeons were unsure about owners' level of understanding of the necessity of  
36 preventative medicines, particularly in relation to vaccinations, and few recalled instigating  
37 conversations with owners about product safety. Owner uncertainties about preventative medicine  
38 products may not be adequately addressed in the consulting room. This first qualitative study to  
39 investigate dog and cat preventative medicines globally suggests strategies are needed to increase  
40 discussion between pet owners and veterinary surgeons in the UK about the necessity, safety,  
41 efficacy and cost of preventative medicines.

42

43 Keywords: preventative healthcare; dog; cat; veterinary; consultation; vaccination.

44

45 **Introduction**

46 Use of vaccines, ecto- and endoparasiticides are widely advocated as part of responsible pet  
47 ownership. However, a recent survey conducted on behalf of The People's Dispensary for Sick  
48 Animals (PDSA; 2017) reported use of preventative medicines in the United Kingdom (UK) pet  
49 population to be in decline. Concerns about owner adherence to veterinary surgeons'  
50 recommendations on preventative healthcare are not new (Abood, 2007) and criticism has been  
51 levelled at veterinary surgeons for not doing enough to promote small animal preventative  
52 healthcare (DeHaven, 2014). Strategies proposed to increase awareness and uptake of preventative  
53 medicines include educational interventions (Aitken, 2014; DeHaven, 2014) and enhanced reminders  
54 for owners and veterinary surgeons (Lefebvre, 2012). More recently pet healthcare plans, which  
55 financially package vaccines, parasiticides, free consultations and free reminder alerts for owners,  
56 have been proposed as a solution to boost adherence (Ravetz, 2017). The magnitude of the problem  
57 suggests the existence of a complex range of motivators and barriers to the use of preventative  
58 medicines which have yet to be fully explored.

59 Research in human healthcare demonstrates that making decisions about medications on behalf of  
60 another family member can be challenging and is prone to a wide range of unconscious biases  
61 (Greenhalgh, 2017). For example, risk aversion is heightened as individuals may have an increased  
62 awareness of the need to justify the acceptability of their decision to others, and emotive stories  
63 about adverse events are particularly easy to recall (Greenhalgh et al., 2004). The potential for harm  
64 associated with vaccines has been widely discussed in both print and online media in recent years  
65 (Betsch et al., 2010), and public concern about vaccination safety remains high in relation to human  
66 vaccines (Ames et al., 2017). Similarly, Day (2017) refers to "vaccinophobia" amongst pet owners,  
67 which he suggests has also been driven by vocal anti-vaccine groups, particularly on the internet.  
68 Primary research to confirm this has yet to be published (Townsend, 2013). However, a growing  
69 body of evidence describing the motivators and barriers to use of veterinary preventative medicine  
70 products for disease control in farm animal species suggests how risks are perceived can influence

71 decisions about their use (Garforth et al., 2013; Alarcon et al., 2014; Richens et al., 2015; Brennan et  
72 al., 2016; Nijse et al., 2016; Manyweathers et al., 2017).

73 Other factors have been suggested. Research from the PSDA (The People's Dispensary for Sick  
74 Animals, 2017) suggests owners grossly underestimate the lifetime costs of dog and cat ownership,  
75 and socioeconomic factors have been linked with the disease clusters of parvovirus in Australia  
76 (Brady et al., 2012). The effort required to administer treatment of different types may impact how  
77 willing owners are to comply with recommendations (Murphy et al., 2013), as might their bond with  
78 their pet and their understanding of the need for preventative medicines (Esch et al., 2012). Owners'  
79 understanding of population immunity and the impact of this on their decisions is not known.

80 Veterinary surgeons should be well placed both to understand, and to teach owners, the importance  
81 of preventative medicines and population-level disease control. Whilst small animal vaccination  
82 guidelines have recently been updated (Day et al., 2016; Day, 2017), it is not reported how widely  
83 these are adopted in the UK or whether they are used as an evidence-base with which to educate  
84 owners. The impact of factors such as perceived or known local disease prevalence, and personal  
85 experience, on veterinary surgeons' advocacy for preventative medicine use are also unclear.

86 The aim of this hypothesis-generating study was to explore the attitudes of dog and cat owners and  
87 veterinary surgeons in the United Kingdom to using preventative medicine products in pets. The  
88 objective was to perform qualitative interviews with owners and veterinary surgeons to capture a  
89 wide range of opinions about preventative medicine use in dogs and cats in the United Kingdom.

## 90 **Materials and methods**

91 During July and August 2016, telephone interviews were conducted with dog and/or cat owners and  
92 veterinary surgeons as part of a larger study exploring canine and feline preventative healthcare  
93 consultations in the United Kingdom (UK). Ethical approval for this work was granted by the ethics  
94 committee at the School of Veterinary Medicine and Science, University of Nottingham. Reporting

95 follows the Consolidated Criteria for Reporting Qualitative Research (COREQ) checklist (Tong et al.,  
96 2007).

#### 97 **Owner recruitment**

98 Criteria for inclusion of owner interviewees were: a) ownership of one or more cats and/or dogs  
99 that, during the preceding three months, had attended a veterinary consultation in the UK for any  
100 form of preventative healthcare. Eligible consultation types were: routine vaccination; antibody titre  
101 testing; parasite prevention; routine health check; or prevention of season in female dogs; AND b)  
102 willingness to be interviewed by telephone about that consultation during the study period.

103 Recruitment was based on a purposive sampling frame designed by the authors (available on  
104 request) which included practice, client and pet variables with the intent of capturing the maximum  
105 variation of experience. Recruitment was conducted using: convenience sampling of eligible  
106 participants known to the authors; social media posts including on online owner forums asking  
107 eligible owners to contact author NR; recruitment of eligible clients by veterinary surgeons in a  
108 multi-branch veterinary practice in Scotland; and snowball sampling whereby eligible participants  
109 recruit others (Bryman, 2012).

#### 110 **Veterinary surgeon recruitment**

111 Inclusion criteria for veterinary surgeon interviewees were: a) veterinary surgeons currently working  
112 in primary care practice in the UK; AND b) who currently performed canine and/or feline  
113 preventative healthcare consultations; AND c) were available for interview by telephone during the  
114 study period. Recruitment was again based on a purposive sampling frame designed by the authors  
115 which included veterinary surgeon and practice variables to capture the maximum variation of  
116 experience. Recruitment of veterinary surgeons that met inclusion and sampling frame criteria was  
117 conducted using: social media posts asking eligible practitioners to contact author NR; directly  
118 contacting veterinary practices who had expressed an interest in collaborating with the Centre for

119 Evidence-based Veterinary Medicine in practice based research; direct email to practices listed in the  
120 Royal College of Veterinary Surgeons' list of practices; and snowball sampling.

### 121 **Interview procedure**

122 Owners and veterinary surgeons who expressed an interest in participating were emailed  
123 information about the study, and a copy of the consent form. Those willing to be interviewed were  
124 asked to supply information relevant to the sampling frame before a date was arranged for the  
125 telephone interview. No incentives to participate were provided and repeat interviews were not  
126 performed. All interviews were conducted by NR, a veterinary surgeon with qualitative research  
127 methods training and extensive research experience in small animal preventative healthcare  
128 consultations. At the start of each interview, NR confirmed that the consent form had been read in  
129 full and asked whether there were any queries before verbal consent to proceed was granted.  
130 Separate semi-structured interview guides (piloted before use and available in Belshaw et al., 2018)  
131 were used for owner and veterinary surgeon interviews. All eligible pets taken for a preventative  
132 healthcare consultation during the preceding 3 months were discussed with the owners, and  
133 preventative healthcare consultations in general were discussed with veterinary surgeons. Pertinent  
134 to this study, owners were asked about why they booked their most recent preventative healthcare  
135 consultation, what they thought about preventative medicines and what informed those opinions.  
136 Veterinary surgeons were asked why preventative healthcare was important, and why owners might  
137 book a preventative healthcare consultation. The number of interviewees recruited was initially  
138 estimated, but data saturation, as defined below, was used to define the point at which no  
139 additional interviewees were needed.

### 140 **Data analysis**

141 Interviews were recorded using a Dictaphone with a telephone adapter; recordings were  
142 professionally transcribed verbatim. Data analysis was performed by ZB, a veterinary surgeon with  
143 training and experience in qualitative research methods. Transcripts were read and checked for

144 accuracy in tandem with the audio recording. Thematic analysis was performed following the six-  
145 step plan described by Braun and Clarke (2006). In brief, this involves reading the transcripts, and  
146 iteratively coding and analysing the data to identify and report patterns, or themes. Further details  
147 of this process are described in Belshaw et al., (2018c). Transcripts were coded using the  
148 organisational support of nVivo (nVivo v11, QSR). Themes were identified using both inductive and  
149 deductive approaches. Data saturation was defined as the point at which no new themes could be  
150 identified when analysing additional transcripts. Statistical analysis was not performed, as is  
151 standard for qualitative methodologies (Ziebland and McPherson, 2006; Clarke and Braun, 2013).

## 152 **Results**

153 Thirty-one interviews were arranged, but two owners were unable to participate due to unforeseen  
154 circumstances on the day of the interview. Twenty-nine telephone interviews were completed, 14  
155 with veterinary surgeons and 15 with owners, at which point data saturation had been reached so  
156 additional interviewees were not recruited. Full demographic details are described in Belshaw et al.  
157 (2018a). The ten female and four male veterinary surgeons had all graduated within the preceding  
158 20 years, were from 12 practices, and ranged widely in seniority. Practice types included both  
159 corporate and independent, small animal only and mixed, with single and multiple branches, and  
160 were located in multiple geographic areas in England, Scotland and Wales. The 15 female pet owners  
161 between them owned 19 dogs and three cats which were between six months and 11 years old. The  
162 dogs included pets, agility dogs and working gun dogs; the cats lived both indoors and outdoors.  
163 Interviews ranged from 15 to 59 minutes in length (median 28 minutes; interquartile range 21–40.5  
164 minutes). Almost all owners described a vaccination consultation as their most recent preventative  
165 healthcare experience. Thematic analysis deductively identified four key themes, each of which has  
166 been reported separately. These described: expectations of owners and veterinary surgeons about  
167 what would happen during preventative healthcare consultations (Belshaw et al., 2018a); the role of  
168 veterinary nurses and receptionists in preventative healthcare (Belshaw et al., 2018b); and the

169 importance of the length of preventative healthcare consultations (Belshaw et al., 2018c). Here, we  
170 report the theme “motivators and barriers to using preventative medicines”. Exemplary quotations  
171 are included to illustrate this theme.

172

### 173 **Owners**

174 Owners described different justifications for using, or not using, preventative medicine products.

175 The focus for most decisions was their individual pet; very few discussed preventative medicines in

176 the context of either human health or at a population level. The majority of owners reported using

177 preventative medicine products as advised by their veterinary surgeon; some directly linked this

178 with being a responsible owner. Several discussed the convenience of the pet healthcare plan on

179 which they were enrolled, particularly in relation to text message reminders they received. A good

180 relationship with their veterinary surgeon or practice, seeing adverts on the television about specific

181 diseases, advice from a breeder and having personally seen infected animals appeared to be

182 motivators to use preventative medicine products.

183 *It is important to us. I want to make sure that he has everything he needs to have. Make*

184 *sure that he doesn't develop anything that will be painful or uncomfortable for him. [Owner*

185 *2]*

186

187 *We've got to take them 'cos we've had another cat in the village with cat flu so obviously I*

188 *make sure they get their injections.... [Owner 9]*

189

190 Most owners who trusted their veterinary surgeon’s advice on preventative medicines described

191 little personal involvement in the decision-making process about their pet’s treatment schedule.

192 Typically, these owners described trusting professional advice as the best way to keep their pet safe

193 and healthy; some acknowledged that they did not personally have the knowledge to make



194 preventative medicine decisions on behalf of their pet. Perhaps as a consequence of this level of  
195 trust, the awareness of many about what preventative medicine products did, why their pet might  
196 need them, or which alternatives were available, was poor. Owners who described having some  
197 medical or pet health training were the exception to this.

198 *I've just taken it that when a vet's advised me to vaccinate my cat, then that's the way*  
199 *forward. They didn't actually detail what the vaccinations were for. And I realised after*  
200 *seeing your email, actually I haven't... I don't even know what my cat's been injected with, or*  
201 *what it's for. Yes, you just take it that they just say, yes, your cat needs vaccination, then you*  
202 *just do it, don't you? [Owner 4]*

203

204 *I've studied dog care I do know all the different treatments. I keep up to date because I know*  
205 *I should keep up to date but I have seen what the diseases can do so I probably am a bit*  
206 *more aware than others why they vaccinate their dogs. [Owner 14]*

207

208 Interestingly, another group of owners perceived that doing their own research into preventative  
209 medicine products was important, with some describing this as responsible ownership. Broadly,  
210 these owners appeared to be somewhat less trusting of the mainstream veterinary profession. Some  
211 conflated veterinary surgeons' promotion of preventative medicine products with a financial  
212 motivation and several expressed concerns that veterinary surgeons were advocating unnecessary  
213 treatments. One reported seeking a veterinary surgeon who they felt identified with their concerns  
214 about the safety of veterinary prescription medications; others continued to visit the same  
215 veterinary surgeon but expressed uncertainty about the validity of the information they had  
216 received.

217 *And I've had an argument with vets, but the vet that we're with now, she's a homeopathic*  
218 *vet as well. And there's a lot of alternatives and stuff, so that's how we got into titre*  
219 *testing... [Owner 3]*

220

221 *It all comes down to... there's two things that I think it comes down to. One is the healthcare*  
222 *of the dog. Are you causing any harm by doing this vaccination when you don't need to?*  
223 *Erm, secondly, how much money are people making from it? You know. Does it actually cost*  
224 *thirty, forty pound or is there a two hundred per cent profit made on vaccinations? [Owner*  
225 *7]*

226 The majority of owners who described using alternative information sources appeared concerned  
227 that the preventative treatment might pose a threat to their pets' health. Several cited Facebook  
228 forums as their main source of information about product necessity, efficacy and safety. However,  
229 almost all found it difficult to obtain online information about preventative medicine products that  
230 they thought to be reliable, and expressed confusion at the contrasting viewpoints they  
231 encountered. Rarely, concerns were expressed in relation to a specific product or to individual pet-  
232 specific factors, but more commonly owners talked broadly about the overuse of "chemicals" or  
233 drug safety in general. Very few discussed any aspect of the likelihood of their pet becoming  
234 infected, or the consequences of infection, when discussing decisions about whether or not to use  
235 preventative medicine products.

236 *There's a lot of things that I'm hearing at the moment about Frontline. You know that*  
237 *Frontline's no longer working. Some people are, you know, okay with it. And it's more*  
238 *Advocate or it's another one or it's another one... And I don't know what to believe or what*  
239 *not to believe. [Owner 7]*

240

241 *If you read... you can read up scare stories on the internet all the time. So you can hear all*  
242 *the benefits, or you can read about all the benefits of getting them vaccinated, and then*  
243 *there's the other side where they argue about why you shouldn't get him vaccinated. [Owner*  
244 *2]*

245 Rarely, owners' level of concern about the risk of harm was sufficient to prevent them from ever  
246 using either specific products or whole categories of preventative medicines. Only one described  
247 routinely antibody titre testing rather than vaccinating; a few were unsure what this involved. More  
248 commonly, they described adopting strategies that they felt would minimise the risk of treatments  
249 about which they had safety concerns, such as reducing the frequency of worming or flea treatment  
250 or asking their veterinary surgeon to change the injection site of a vaccine. The source  
251 recommending these actions was not clear, but strategies described were similar between owners.  
252 Occasionally, owners' concerns were over-ridden by a necessity to access services such as kennels or  
253 dog sitters which required proof of vaccination.

254 *And I don't actually flea treat them, like they say, every month or so because to me it's just*  
255 *the least amount of chemicals and stuff that you're putting into them the better. [Owner 15]*

256

257 *I don't like adding a lot of chemicals to them. You know, er, they go to kennels now and*  
258 *again so they've got to be vaccinated because of that. So that's why I do it.... I think I*  
259 *would...erm, I mean, I've considered titre testing but kennels don't tend to accept that as*  
260 *reasonable or don't seem to so that's another reason...." [Owner 8]*

261 Few owners discussed concerns about product efficacy. Again the internet appeared to be the main  
262 source of this information, though a few cited personal experience with perceived poorly effective  
263 products. Some described confusion arising from reading conflicting opinions online. Interestingly,  
264 very few owners said they had discussed any of their concerns with a veterinary surgeon, though

265 several thought it might be useful. Barriers to asking the veterinary surgeon for more information  
266 were not specifically explored but those volunteered included time pressures and not wanting to  
267 sound stupid.

268 *I had kennel cough given to my dogs once and two weeks later we were at a show and all the*  
269 *dogs got kennel coughs and my dogs got kennel cough even though they'd just been*  
270 *vaccinated. The vet said 'Oh, you've found a different strain' I said 'Well, there's no point in*  
271 *getting it then. There's no point in me paying money when there's so many strains out there*  
272 *they'll just end up getting it anyway'. So I would never do kennel cough again. [Owner 14]*

273

274 *Because people aren't as confident and a lot of people will go away and think 'Ah, I should*  
275 *have asked that question but it sounds really silly' and just having that kind of anxiety and*  
276 *thinking I'll look stupid if I ask this. [Owner 12]*

## 277 **Veterinary surgeons**

278 Veterinary surgeons who gave specific justifications for promoting preventative medicines described  
279 protecting pets from disease as a strong personal motivator. Like the owners, necessity was typically  
280 discussed at the individual patient rather than a population health level. Very rarely, veterinary  
281 surgeons identified protecting owners from infection to be their main motivation for recommending  
282 vaccination. Fleas, ticks, lungworm, parvovirus and leptospirosis were the preventable diseases  
283 which most veterinary surgeons recalled having treated during their time in practice; this direct  
284 experience appeared to be important in their justification to recommend products to prevent these  
285 diseases. Benefits of preventing diseases such as distemper, which most veterinary surgeons had  
286 never seen, were perhaps less clear and so harder to justify.

287 *Five years ago we had dogs dying left right and centre from lungworm so we're massively*  
288 *pro-Advocate, pro-Milbemax and I always try and mention it. [Veterinary surgeon 3]*

289

290 *Plenty of people know about parvovirus, they know about distemper, you know it's almost*  
291 *been 30 years and I have never seen one. It's on the way back apparently, but it's extremely*  
292 *rare. Leptospirosis is of course the iceberg disease, to a large extent. [Veterinary surgeon 8]*

293 In contrast to the owners, none of the veterinary surgeons expressed any strong personal concern  
294 about the safety of preventative medicine products that they sold, though one alluded to a concern  
295 about over-vaccination. Several identified that the flea, worm and tick treatments they stocked were  
296 safer than products available from other retailers of these types of products. Most also appeared  
297 confident that their products were effective, and that this efficacy was greater than that of  
298 competitor products sold by non-veterinary outlets.

299 *They know there are arguments about whether they need boosting and I am glad that we've*  
300 *changed to the WSAVA guidelines where you do less, you know the smaller vaccinations*  
301 *yearly, not smaller but different ones. I love that new protocol because you know that you*  
302 *are not overdoing it. [Veterinary surgeon 14]*

303

304 *We see so many flea infestations and worm problems from animals that have had all their*  
305 *wormers from a pet shop and we try and encourage them to get something that is actually*  
306 *maybe a wee bit more expensive but actually will work and that we seem to have better*  
307 *success with. [Veterinary surgeon 12]*

308 Veterinary surgeons were unsure about owners' level of understanding of the necessity of  
309 preventative medicines, particularly in relation to vaccinations. Several considered that the switch to  
310 less frequent core vaccination was positive for some owners. Reminders, habit, trust in veterinary  
311 surgeons, drug company adverts, a sense of responsibility and the need to put pets into boarding

312 facilities were thought by the veterinary surgeons to be more powerful motivators for owners to use  
313 preventative medicine products than any clear understanding of their necessity to the pet's health.

314 *It's really difficult to say isn't it? I think a lot of them do it because they know it's what they*  
315 *should do but they don't necessarily understand why because we also do a rotational vaccine*  
316 *system with adults. They don't get everything every year but nobody really asks specifically*  
317 *about it, what are they getting this year? I think they just bring them in because that's what*  
318 *they do. [Veterinary surgeon 1]*

319

320 *I usually know when Bayer has done some sort of scare campaign about whatever parasite*  
321 *because they are coming in in a panic whether they knew.... They're like 'I saw about this, do*  
322 *I have to care?'* [Veterinary surgeon 9]

323 Interestingly, most veterinary surgeons reflected that they did not instigate discussion with owners  
324 about the necessity of preventative medicines after the initial puppy or kitten vaccinations or once  
325 they were on a pet healthcare plan. Time pressure, and a tacit assumption that owners would recall  
326 explanations about necessity provided many years previously, were reasons given not to go into  
327 more detail. None described proactively discussing safety other than the risk of immediate short-  
328 term adverse events such as sleepiness or a cutaneous swelling after vaccination. However, there  
329 was a general consensus that questions from owners about the safety and necessity of vaccination  
330 were increasing, particularly amongst owners of older dogs, and that the source of these questions  
331 was usually information read on the internet.

332 *I give them their vaccination and say they might be a bit quiet for 24 to 48 hours afterwards,*  
333 *you may feel probably a lump but that's all perfectly normal but if you have got any*  
334 *concerns, contact the clinic. [Veterinary surgeon 10]*

335

336 *I've had a few people recently kind of bringing up... obviously there has been a lot of stuff on*  
337 *Facebook, and other sort of social media sites and in the news about vaccinations and the*  
338 *whole kind of leptospirosis, you know, leptospirosis things. People do bring up that.* [Veterinary surgeon 6]

339 The relationship between preventative healthcare and profit was a barrier to some veterinary  
340 surgeons actively promoting preventative medicines. Whilst a few identified preventative medicines  
341 as a legitimate and important source of practice revenue, not all were comfortable with this,  
342 particularly if they were not completely sure themselves of their benefits to that owner's pet.  
343 Several expressed concern that owners associated "selling" preventative medicines with a profit-  
344 making agenda, and felt that these owners might trust them less in general if they spent a long time  
345 on a sales pitch. Pet healthcare plans appeared to be a major advantage to these veterinary  
346 surgeons as they needed to "sell" the plan, not the products, and to do that only once.

347 *We really don't push, we are not a selling practice, and we don't do the hard sell, do you*  
348 *know what I mean, in any of these consults. I don't think any of our clients are that sceptical*  
349 *in that way. I think some of my friends who are encouraged to hard sell worm and flea*  
350 *treatments, then I think they find their clients can be a wee bit more sceptical about the*  
351 *whole thing if you know what I mean....* [Veterinary surgeon 12]

352

353 *So we don't have any "You must sell so much wormer", but it's making a recommendation*  
354 *really and the client can choose to take it or leave it but most of our clients, I think something*  
355 *like 85 or 90 per cent of our active clients are members of the scheme so most of the time it's*  
356 *just checking they've got enough.* [Veterinary surgeon 5]

## 357 **Discussion**

358 This study suggests that owners' knowledge about the safety and necessity of using preventative  
359 medicine products may be poor, and that their trust in, and reliance on, veterinary surgeons to

360 advise them may vary widely. Veterinary surgeons may be unaware of some owners' degree of  
361 concern about product safety, and appear not to routinely discuss the importance of preventative  
362 medicine products during consultations, perhaps due to concerns about being seen to be profiting  
363 from sales. This mismatch between owners and veterinary surgeons may have a detrimental impact  
364 on delivery of preventative medicines, and the importance of good two-way communication is  
365 evident. Poor communication may mean that the internet becomes a significant, yet perhaps  
366 unhelpful, information source about preventative medicine products for some owners. Whilst pet  
367 healthcare plans may be promoting preventative medicine product uptake, strategies to increase  
368 discussion between owners and veterinary surgeons about the necessity, safety, efficacy and cost of  
369 preventative medicines may be needed to assuage the fears of some owners about their use.

370

371 Both these interviews and those by Christiansen et al. (2016) with owners of ill dogs, identified that  
372 some owners want to be told what to do by a veterinary surgeon, whilst others prefer to take the  
373 lead themselves. Whether the owner trusted the veterinary surgeons' advice about preventative  
374 medicines appeared particularly important, as it is to mothers of young children making vaccination  
375 decisions (Benin et al., 2006). Given that in both situations people are making decisions on behalf of  
376 others, this should not be surprising but suggests much could be learnt from the medical literature  
377 on surrogate decision makers. Few studies have looked into the basis of trust in medical decision  
378 making and little consideration has been given to the nature of trust in owner-veterinary surgeon  
379 relationships. Cohn (2015) drawing on ethnographic studies of diabetic patients suggests that trust  
380 may be dependent on the specific situation, rather than being associated with an individual clinician.  
381 This was not explored in the current study but provides a fascinating hypothesis for future research.

382

383 Risk aversion appeared to be important to these owners, reflecting societal concerns about the  
384 safety of medications (Freer and Godlee, 2017), particularly vaccines (Hobson-West, 2007; Day,



385 2017). This has been described as the “acceptability risk” heuristic (Greenhalgh et al., 2004) whereby  
386 risks associated with vaccines are less societally acceptable than risks arising from other situations or  
387 behaviours such as injury from horse riding or lung cancer from smoking. Our study adds to a  
388 growing body of evidence that parents of young children (Ames et al., 2017) and owners of dogs  
389 (Belshaw et al., 2016), horses (Goyen et al., 2017; Manyweathers et al., 2017), pigs (Alarcon et al.,  
390 2014) and cattle (Richens et al., 2015) desire more information than is currently being provided by  
391 healthcare professionals about the risks associated with prescription medications. Since these  
392 interviews were reliant on recall, it is not possible to know how much information had been  
393 provided during the consultation. However, the veterinary surgeons interviewed suggested any  
394 discussion about risk during preventative healthcare consultations was brief, perhaps because they  
395 were unaware of the importance of this to owners.

396

397 Both owners and veterinary surgeons suggested a link between internet-based information sources  
398 and lack of confidence in the safety of preventative medicines, though a causal relationship cannot  
399 be inferred from these data. Reading the personal experiences of other patients can be helpful to  
400 patients making healthcare decision, but the information shared may not always reflect medical  
401 advice (Entwistle et al., 2011). The impact of peer opinions on the “cultural cognition” of risk  
402 perception in behavioural research (Kahan, 2013) and the strength of emotive stories in human  
403 healthcare (Greenhalgh, 2017) suggest websites, particularly owner forums, could be powerful in  
404 shaping opinions. Interventions appear to be needed to promote discussion in the consulting room  
405 about the risks and benefits of preventative medicines. However, the discrepancy between  
406 veterinary surgeons’ and some owners’ understandings of the risks associated with preventative  
407 medicines was apparently large. Betsch and Sachse (2013) identified that messages saying vaccines  
408 carried “no risk” enhanced rather than reduced fears about their safety, so specifically designed  
409 decision making tools may need to be created (Gorini and Pravettoni, 2011; Stacey et al., 2014).

410

411 One in three consultations in UK small animal practice includes preventative healthcare (Robinson et  
412 al., 2015) and preventative medicines are reported to be the main source of revenue in UK small  
413 animal practice (Ravetz, 2017). Importantly, the current study suggests that aversion to “selling”  
414 these products may be an important barrier to these veterinary surgeons promoting their use. The  
415 significant impact of clinicians’ beliefs about the value of preventative healthcare interventions on  
416 their desire to promote them has been described in human healthcare (Rubio-Valera et al., 2014),  
417 and these interviews suggest that veterinary surgeons may struggle to justify the value for money of  
418 small animal preventative medicines. This agrees with the findings of Coe et al. (2009) who found  
419 Canadian veterinary surgeons were also reluctant to discuss money with clients during  
420 appointments. The People’s Dispensary for Sick Animals PAW report (2017) cited cost as a factor in  
421 20% of dog and cat owners not vaccinating their pet, and cost was a significant barrier to Australian  
422 horse owners using the Hendra vaccine (Manyweathers et al., 2017). Few owners directly discussed  
423 the cost of preventative medicines as a barrier in this study. It is possible that owners did not feel  
424 comfortable discussing money during these interviews, or that this is evidence of a positive impact  
425 of pet healthcare plans adding value to the cost of preventative medicines. However, it is equally  
426 possible that the lack of trust in veterinary surgeons’ advice on preventative medicines described by  
427 some owners was directly or indirectly associated with the perception that they derive significant  
428 profit from their sales. This warrants further investigation considering the frequency with which  
429 preventative healthcare is discussed in consultations.

430

431 Both veterinary surgeons and owners suggested a potential relationship between perceived  
432 prevalence of disease in their local region and attitudes to using relevant preventative medicines.  
433 Population-level data about the prevalence and incidence of dog and cat infectious diseases in the  
434 UK are still in short supply, but methods including sentinel practice networks (Radford et al., 2011;

435 Tulloch et al., 2017) and postal surveys (Kirk et al., 2014) are starting to fill the gaps. In the future,  
436 these data could be used to explore the accuracy of peoples' perceptions of disease prevalence, and  
437 whether this correlates with their attitudes to preventative medicines.

438

439 Attitudes to small animal preventative medicine products have not previously been explored using a  
440 qualitative methodology. Whilst these data should not be seen as representative of all opinions, they  
441 provide rich first-step insights into how and why preventative healthcare decisions were made on  
442 which future qualitative and quantitative research can be built. Owners and veterinary surgeons who  
443 elected to be interviewed may have had particularly strong opinions about preventative healthcare,  
444 and owner recruitment through social media may have introduced an element of bias towards the  
445 internet as an information source. However, interviewees from a wide range of backgrounds were  
446 included, and the opinions gathered were diverse. Despite our best efforts, male owners and cat  
447 owners were particularly challenging to recruit. Perhaps as an explanation for this, The Peoples'  
448 Dispensary for Sick Animals PAW report (2017) suggests owners of dogs and cats are more likely to  
449 be female, and that cats are substantially less likely to receive preventative medicine products than  
450 dogs. It would be interesting future work to compare the attitudes to preventative medicines in  
451 owners of dogs, cats and both. In addition, only owners whose pets had recently visited a veterinary  
452 practice for a preventative healthcare consultation were eligible for inclusion; different motivators  
453 and barriers may exist amongst those who do not regularly visit a veterinary surgery for this  
454 purpose. Veterinary surgeons interviewed in this study were from a wide range of UK regions, but  
455 owners were predominantly from the north of England. The diversity of pet owner attitudes in  
456 different regions of the UK towards any veterinary topic have not been reported so the impact on  
457 this study of this geographical clustering is unknown. Whilst we are confident that data saturation  
458 was reached with the interviewees recruited, as with any qualitative research, additional  
459 interviewees may have expressed alternative views (Ziebland and McPherson, 2006). All researchers

460 involved in this study were veterinary surgeons which may have led to a degree of bias in the data  
461 analysis; researchers from other backgrounds may have identified different themes.

462

463 This study highlights the importance of trust in a veterinary surgeons' advice as a motivator for dog  
464 and cat owners to use preventative medicine products, and identifies that risk aversion amongst  
465 owners and fear of being seen to make profit amongst veterinary surgeons may be significant  
466 barriers to their uptake. These findings have implications for all those involved in the promotion of  
467 preventative healthcare. The importance, safety and efficacy of preventative medicines should be  
468 proactively discussed in the consulting room in a way directly relevant to each pet-owner  
469 combination whenever these treatments are advocated. The possible benefits of novel decision  
470 making tools should be investigated. New communication strategies to build trust and to engage  
471 with owners about information they have heard from other sources appear necessary. These novel  
472 qualitative data can be used to inform such strategies. The impact of pet healthcare plans to  
473 promote the value, and value for money, of preventative medicine products should be studied  
474 further, particularly in relation to how they affect trust in the veterinary profession.

475

## 476 **Conflict of interest**

477 None.

478

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484

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