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1 **An online survey of owners' experiences of medicating their cats at home**

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8 Key words: Medicating, compliance, tablets, liquids, cats, owners, communication

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12

13 **Abstract**

14 *Objective* To use an online survey to obtain information from cat owners about their
15 experiences of medicating cats.

16 *Methods* An online survey containing 35 questions on experiences of medicating cats was
17 circulated to cat owners globally.

18 *Results* 2507 surveys from 57 countries were analysed; 1724 from 'cat owners' and 783
19 from 'cat owners+' (respondents with significant cat experience, including veterinary
20 professionals). Around half (50.75%) of cat owners were 'sometimes' or 'never' provided
21 with information or advice on how to administer medication; however, 91.78% of those
22 given information found it 'somewhat' or 'very' useful. Around half (53.61%) of owners
23 sought information from the internet about how to administer medication. Total cat owners
24 (cat owners and cat owners+) administered liquids (61.30%), pastes (45.30%) or tablets
25 (39.51%) directly into their cat's mouth; fewer (22.59-24.08%) hid these medications in
26 food. Total cat owners rated tablets significantly harder to administer than liquids; 52.96%
27 chose liquids as a first choice formulation, followed by tablets (29.27%). Insulin injections
28 and 'spot-ons' were significantly easier to administer than any oral medications.

29 Over half (51.57%) of owners reported that medicating their cat(s) had changed their
30 relationship with them; 77.03% reported that their cat(s) had tried to bite or scratch them
31 when medicating. Other challenges included the cat(s) spitting out tablets (78.68%),
32 refusing medication in food (71.71%) and running away (52.70%). Of owners who failed to
33 complete a course of medication (35.36%), 27.85% stopped near the end of the course,
34 while 19.28% stopped after a few doses, in both cases as medicating was too difficult.

35 *Conclusions and relevance* Owners appreciate being provided information about the
36 administration of medication. Frequent challenges when medicating cats including potential

Commented [SC1]: Pedantic comment here but possibly relevant: my understanding was that 29% of owners said tablets were their first choice and this is different to the suggestion of this sentence that tablets were the second choice (it's the words 'followed by' which is maybe putting me off this sentence)? Maybe re-word as 52.96% chose liquids as their first choice formulation while 29.27% chose tablets.

37 human injury and damage to the owner-cat relationship. Pharmaceutical companies should
38 provide a range of formulations to ease compliance. Veterinary clinics should provide
39 information/demonstrations, and web-links when prescribing medications.

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51 **Introduction**

52 Medications, in the form of tablets, liquids, capsules, powders, pastes, transdermal
53 preparations, 'spot-ons' and injections, are prescribed to cats by veterinarians for owners to
54 administer at home, both for the treatment of illnesses, and the prevention and treatment
55 of parasitic infection. Owners may find giving the prescribed medications to their cat
56 challenging and 'compliance' (also termed 'adherence') to medication courses is a poorly
57 studied area of feline practice.¹ A previous smaller study,² showed that a quarter of cat
58 owners were unable to give some doses of medication prescribed, with owners reporting
59 challenges including cats refusing medication in food, spitting out the medication or hyper-
60 salivating. Medication formulation may affect adherence in cats.³ For example, formulations
61 designed for cats (as opposed to human medications) are usually easier to administer,² yet
62 still only 35% of cats in that study took the drug willingly. Liquids (solutions and
63 suspensions) may be easier to administer,² with fewer missed doses than tablets,⁴ but
64 tablets were preferred by owners for long-term administration.^{2,4} There is a need to create
65 palatable medications for companion animals,^{2,3} but this may be easier in dogs than cats
66 who are, by their nature, more fastidious.⁵

67 In human medicine, medication adherence is identified as a target outcome to reduce
68 healthcare costs and use of health services⁶ and parallels in challenges to adherence are
69 seen in paediatric medical practice.⁷ Multicomponent and behavioural interventions can
70 produce marked effects on human adherence⁸ and the American Animal Hospital
71 Association (AHAA) review⁹ suggested the same may be true in animals, showing that good
72 communication and provision of written information was strongly correlated with
73 adherence. In that survey, pet owners shown one or more ways to administer medication
74 had a significantly higher rate of 'never missing a dose' than those not shown.⁹

75 Attempts to medicate unwilling cats can result in human injury,² but failure to complete a
76 course of medication has wider-human health implications if antibiotic courses are not
77 completed, potentially promoting antibiotic resistance, which is a major concern in
78 veterinary and human medicine.¹⁰ Additionally, perceptions that cats are challenging to
79 medicate may promote the use of highest priority, critically important antimicrobial drugs,
80 such as cefovecin¹¹ in a long-acting subcutaneous injection formulation, which may not
81 comply with the International Society for Companion Animal Infectious Diseases (ISCAID)
82 guidelines,¹² and raises antibiotic stewardship concerns. Improved compliance is likely to
83 result in improved treatment success, optimised preventative healthcare, reduced antibiotic
84 resistance and an improved cat and owner bond. Understanding barriers to medicating cats
85 will assist the pharmaceutical manufacturers and veterinary profession when creating and
86 prescribing medicines for cats.

87 The aim of this study was to conduct a worldwide survey of cat owners, to obtain
88 information on how they give medications to their cats, what information is provided by the
89 veterinary clinic, challenges of administering medication, the cat's behavioural responses to
90 being medicated, as well as owner preferences for formulation and barriers to completion
91 of a medication course.

92 **Methods**

93 An online survey was created to collect data from cat owners on their experiences of
94 medicating their cats. The survey included 35 questions on a range of topics from
95 experiences of administering different forms of medications, use of online pharmacies,
96 preferences for medication formulation, support from the veterinary clinic, negative feline
97 behavioural responses to being medicated, and the impact on the owner's relationship with
98 their pet. Drop down menus allowed respondents to select answers to several questions,
99 including selecting from a list of categories to distinguish cat owners without veterinary or
100 professional pet experience (termed 'cat owners') from veterinary professionals and those
101 working with cats in other capacities (termed cat owners+); this latter group included
102 veterinary professionals, cat behaviourists, breeders, fosterers, those working with
103 unowned cats, and anyone who spent considerable time with cats. The full survey is
104 included in the supplementary materials.

105 The survey was publicised via several routes to encourage responses, these included social
106 media and veterinary organisations, as well as via the Vet Professionals and International
107 Cat Care databases, and the International Society of Feline Medicine newsletters to
108 members. Press releases were supplied to veterinary publications and publicity was gained
109 via several veterinary corporates and pharmaceutical companies. The survey was open for
110 four months between February to May 2021.

111 Data was collected via the Vet Professionals website and stored using FormSite (Vroman
112 Systems) and downloaded into a Microsoft Excel spreadsheet.

113 For analysis, some questions were more applicable to cat owners rather than cat owners+
114 (*e.g.*, advice given by veterinary surgeon), hence the data was separated. In other questions,

115 data from both groups is included (termed 'total cat owners'), and in appropriate cases
116 statistics have been used look at the differences between cat owners and cat owners+.
117 Descriptive statistics were performed as well as χ^2 test to compare groups when
118 appropriate. P values <0.05 were considered to be significant. Free-text statements were
119 examined individually.
120

121 **Results**

122 A total of 2702 responses were received between February 2021 and May 2021. However,
123 195 respondents were not cat owners and were excluded from the study, leaving 2507
124 surveys for analysis. This included 1724 from cat owners and 783 from cat owners+. Of the
125 cat owners+, 346 were veterinarians, 301 veterinary nurses or technicians, 46 veterinary
126 receptionists, 33 boarding cattery staff, 29 veterinary behaviourists, and 29 cat breeders;
127 the remainder were a combination of shelter staff, fosterers and those working with
128 animals on other capacities (some respondents selected more than one role).

Commented [SC2]: In other capacities?

129 *Respondent demographics*

130 Survey responses were received from cat owners in 57 countries. The majority of
131 respondents were from the UK (69.88%), with 14.76% from the United States and Canada,
132 10.21% from European Union countries and 2.79% from Australia and New Zealand. The
133 remainder were from outside those locations eg South America, Africa.

134 *Source of medication*

135 Almost all respondents had been given medications from their veterinarian to give to their
136 cat at home (98.92%). A total of 642 (25.61%) owners had obtained medication from an
137 online pharmacy with a prescription from their veterinarian.

138 *Experience of medicating*

139 The majority of cat owners and cat owners+ had experience of administering tablets
140 (95.53%), 'spot on' preparations (78.34%) and liquids (77.38%). See table 1 for total cat
141 owners' experience of medication formulations.

142 *Advice and support from their veterinary clinic on medicating their cat*

143 Information or advice on how to administer medication was described as 'always given' by
144 47.51% of cat owner respondents and 'sometimes' or 'never' by 50.75% (40.02 and 10.73%,

145 respectively). How information was provided is illustrated in figure 1. When information was
146 provided, this was mainly a verbal explanation by a veterinarian (77.87%), with a
147 demonstration by a vet or nurse to 55.07% of cat owner respondents. Two-thirds (66.99%)
148 of cat owners were advised if the medication could be given with food, and less than half of
149 cat owners giving a tablet or capsule were told if the tablet could be crushed or the capsule
150 opened (45.91%). Of cat owners given information, 91.78% found the information
151 'somewhat' or 'very' useful.

152 Cat owner respondents who found medicine difficult to administer only contacted their
153 veterinary clinic for help in 41.78% of cases, and of these 67.52% reported that the clinic
154 was able to provide a solution to their difficulties.

155 *Advice from other sources*

156 When cat owners were asked if they had sought advice from the internet on how to give
157 medications to their pets, 53.61% answered that they had.

158 *How owners administer medication*

159 Table 2 shows how cat owners and cat owners+ prefer to administer various types of
160 medication. The majority of people administer liquids (61.30%), pastes (45.30%) or tablets
161 (39.51%) directly into their cat's mouth. Capsules are more often opened and mixed with a
162 small amount of food or a treat (37.32%). Around a quarter of respondents answered that
163 they hide pastes (24.08%), tablets (23.39%), and liquids (22.59%) in a small amount of food
164 or a treat, whereas just over two-thirds (67.62%) added powders/granules to food or a
165 treat. Only 16.79% of owners crushed tablets into food or a treat, and 9.93% and 9.45%,
166 respectively, used a pill-giving device for tablets or capsules.

167 *Challenges of medicating cats and the effect on cat owners*

168 Table 3 and figure 2 illustrate answers to the question 'In general, how easy do you find it to
169 administer each of the following formulations?' with answers ranked from 1 (very easy) to
170 10 (impossible). Cat owners were significantly more likely to rate tablets between 7 and 10
171 than liquids ($p \leq 0.05$), and significantly more likely to rate 'spot ons' between 1 and 3 than
172 any other formulation apart from insulin injections, which 70.94% of respondents ranked
173 between 1 and 3.

174 The most frequently reported challenge was the cat spitting out the tablet (78.68%), with
175 the cat refusing the medication in food reported by nearly three-quarters of respondents
176 (total cat owners) (71.71%). A total of 77.03% of total cat owner respondents answered that
177 their cat tried to bite or scratch them. Further information on reported challenges is
178 illustrated in table 4 and figure 3.

179 Respondents were asked how restraining/holding their cat to give it medication made them
180 feel, and for cat owners+, 62.24% felt confident handling their cat, significantly more than
181 the 38.24% of cat owners ($p \leq 0.05$). Just under half of cat owners (46.72%) worried they
182 would hurt their cat, and 33.96% worried they would get bitten or scratched; in both cases,
183 this was significantly less for cat owners+ ($p \leq 0.05$). Further data is shown in table 4.

184 Of 2166 responses, just over half (51.57%) of total cat owners reported that giving
185 medication to their cat at home had changed their relationship with them.

186 *Completing medication courses*

187 Cat owners were asked if they always finished the course of medicine their veterinary clinic
188 had given them, 62.50% answered yes, always, 24.20% yes, most of the time, 11.16% no,
189 not always. Cat owners were then asked if they have not always finished a course of
190 medication, which of a choice of reasons accounted for their decision. The answer selected
191 most frequently was 'I stopped near the end of the course as the medicine was difficult to

192 give' (27.85%), with 19.28% answering that they 'stopped after a few doses as the medicine
193 was so difficult to give'. Further answers are illustrated in figure 4.

194 *Preferred formulations for oral medication*

195 Respondents (total cat owners) chose liquids (52.96%) as the preferred first choice
196 formulation from options of tablets, capsules, pastes, powder/granules and liquids. This was
197 followed by tablets (28.85%), powder/granules (6.19%), paste (5.96%) and lastly capsules
198 (3.60%) (figure 5 shows first and second choices of medication formulation). Of those
199 choosing liquid as first choice, 29.27% chose tablet as second choice. Of those choosing
200 tablets as first choice, 26.07% chose liquids as second choice. In both cases, answers from
201 the remaining respondents were spread between different formulations.

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204 **Discussion**

205 In the veterinary profession it has long been accepted that giving medications to cats is
206 challenging; however, little published literature supports this assumption or examines the
207 reasons for, and potential consequences of, attempts to medicate cats and the risk of poor
208 compliance.^{1,2} In the current study we examined owners' experience of medicating their
209 cats at home, using an online survey. Siven² sampled 46 owners and found 24% were unable
210 to give the prescribed doses, therefore calculating compliance as 76%. The present study
211 showed nearly two thirds (62.5%) of cat owners answered that they 'always' completed a
212 course of medication. Owner reported estimates of compliance are likely to overestimate,¹³
213 and the aim of this study was more to assess the challenges of medicating cats according to
214 owners; however, it did show that for half of respondents, failure to complete a course of
215 medication was due to an inability to medicate the cat.

216 This study showed that half of cat owners 'sometimes' or 'never' received
217 information on how to administer the medication that their cat had been prescribed, a third
218 were not told if the medication could be given in food, and less than half of owners were
219 told if a tablet could be crushed, or a capsule opened. This suggests support for clients could
220 be improved and this may improve compliance. Data from the AAHA report⁹ suggests that
221 demonstrating how to medicate a patient could reduce the number of missed doses. This is
222 supported by the present study, as 91.78% of owners provided with information found it
223 'somewhat' or 'very' useful. Most information was provided verbally, with less than 5% of
224 cat owners being directed to online information or videos. However, around half of owners
225 looked for information online, suggesting there is an opportunity to provide clients with
226 reliable online sources and videos to help them understand how to give medication to their
227 cat. In a review of interventional tools to improve human medication compliance,¹⁴ single

228 components (*e.g.*, information or education) seem ineffective; however, when combined
229 with other interventions, such as skills training and even medication packaging design,
230 clinical outcomes may be improved. Alarming, in the present study, less than half of cat
231 owners contacted the clinic to discuss their challenges, although of those that did, two-
232 thirds found it helpful. Maintaining an open and honest dialogue regarding the difficulties of
233 medicating cats is important, encouraging owners to report challenges so help can be
234 provided or alternative formulations discussed. Without support, there is potential for
235 damage to the relationship between the owner and the clinic, and reluctance to return or
236 even report their cat's illnesses promptly for fear of being dispensed further medications
237 they cannot give.

238 Most cat owners in this study administered medications directly into the cat's
239 mouth, with around a quarter hiding medications (*i.e.*, pastes, liquids and tablets) in
240 food/treats. Ensuring owners are aware of options such as hiding drugs in food when giving
241 medications, and the names of preferred treats, may increase the number of owners trying
242 this method of improving cat compliance. However, 72% of total cat owners reported their
243 cat 'would not eat the medication in food or a treat'. Clearly, there is a need to create
244 palatable oral formulations that are voluntarily accepted by cats using research into
245 palatability in this species.³

246 Respondents were asked about formulation preference and significantly more cat
247 owners selected liquids as a first choice and were significantly less likely to rate liquids
248 between 7 and 10 than tablets (with 1 very easy and 10 being impossible), *i.e.*, they
249 generally found liquids relatively easy to give. However, 29% selected tablets as a preferred
250 first choice, and second choices varied between formulations. Pastes and capsules were
251 least preferred for both first and second choice of formulation. Siven² showed an owner

252 preference for liquid and suspension formulations, and liquid preparations have been
253 associated with fewer missed doses in cats;⁴ however, as the current study showed, there is
254 variation between cat owners and cats with regard to choice of formulation, suggesting that
255 offering clients different formulation options may be optimal to encourage compliance.

256 It is clear that cat owners in the current study found 'spot on' administration
257 significantly easier than other formulations of routine medication; however, unexpectedly,
258 insulin injections were found to be simple to administer in many cases, with approximately
259 40% of cat owners rating them as easy to give. This may be because owners of diabetic cats
260 are given more support, and demonstrations of insulin administration, so they feel more
261 confident about medicating their cat; however, there are still gaps in provision of this
262 training, as 51% of owners in one study¹⁵ were not supervised when drawing up and
263 administering insulin.

264 Cat owners met challenges administering medication. Nearly 80% of total cat owners
265 reported their cat 'spat the tablet out' and concerning 45% and 32%, respectively,
266 reported their cat tried to scratch or bite them. Given the risk of cat bite or scratch wounds
267 requiring medical attention,¹⁶ this is a concern. If we accept that giving medication to cats
268 can be difficult, then we should consider the effect on the owner as well as the potential
269 negative impact on the cat's welfare. 'Caregiver burden' is a term used in human healthcare
270 to describe an individual's response to caring for a family member. In veterinary medicine
271 owners of animals with chronic or terminal illnesses show increased caregiver burden,
272 leading to higher stress and anxiety, and a lower quality of life.¹⁷ In the present study, just
273 over half of total cat owners reported that giving medication to their cat had changed their
274 relationship with them, a similar proportion reported that their cat tried to run away from
275 them, and 47% of cat owners felt worried they would hurt their cat restraining them to give

276 medication. As veterinary professionals we should not underestimate the negative
277 consequences to owners of trying to medicate their cats.

278 Challenges in medicating cats may result in antibiotic courses not being completed,
279 or requests by owners for inappropriate long-acting injections. The use of cefovecin has
280 been studied in several countries, with a recent Australian study showing that it is used
281 more commonly in cats than dogs, and in scenarios where antimicrobials may not be
282 indicated or where an antimicrobial of lower importance to human health is
283 recommended.¹⁸ Compliance with appropriate oral antibiotics may be facilitated by
284 supporting clients to improve their ability to medicate their cat using tablets, liquids or
285 paste (as determined by the particular antibiotic that is recommended), and limiting the use
286 of long-acting injections.

287 Owners with experience of handling cats (cat owners+) felt significantly more
288 confident handling their pet and significantly less concerned about getting bitten or
289 scratched, or of hurting their cat. These findings, along with other data from this study
290 showing the cat owner+ group finding medicating their cat easier, suggest that training,
291 experience and familiarity with the species aids compliance. This can be used as further
292 evidence that support and training is beneficial to cat owners when they need to medicate
293 their cat.

294 Given the lack of published information on medication compliance in cats,¹ it is
295 hoped that the present study will contribute to the literature, encourage veterinary clinics
296 to support and educate their clients on how to administer medications to cats, and
297 demonstrate to pharmaceutical companies the importance of considering administration,
298 formulation, palatability and choice when designing medications for this species.

299 *Limitations of the study*

300 Limitations of the study include the nature of an online survey, which selected for cat
301 owners who use the internet and are motivated to complete the survey. They may also have
302 been motivated to complete the survey due to either negative or positive experiences of
303 medicating their cats, and a desire to discuss this experience. It is also possible that in some
304 questions compliance is over-estimated due to reluctance to admit that they found
305 medicating their cat so difficult. For this reason, 'failure' to complete a course of
306 medication, or finding giving medication 'impossible', may have been underestimated. The
307 survey focused on oral medications, and did not specifically discuss the transdermal route,
308 and ease of administration of these medications requires further study. Additionally,
309 specific types of medication were not investigated (*e.g.*, antibiotics, analgesia, *etc.*), nor was
310 how the frequency of administration might affect compliance. The survey was only available
311 in English, which selected for completion in predominantly English-speaking countries.
312 Despite limitations, the survey gained large number of respondents from many countries,
313 and results showing a wide range of experiences giving medications, meaning the results are
314 useful and may help with future conception of medication formulations for cats, and
315 encourage further support from veterinary professionals to owners.

316 **Conclusions**

317 Cat owners' face several challenges when medicating their cats, the most serious being the
318 potential risk of human injury, damage to the cat and owner bond, and uncompleted
319 courses of medication. Veterinary clinics should support clients by demonstrating how to
320 medicate their cats, and directing owners to reliable sources of information. Although liquid
321 formulations are generally preferred and 'spot-on' and insulin injections found the easiest
322 to give to cats, different options should be provided. Pharmaceutical companies should
323 focus on palatability and ease of medicating.

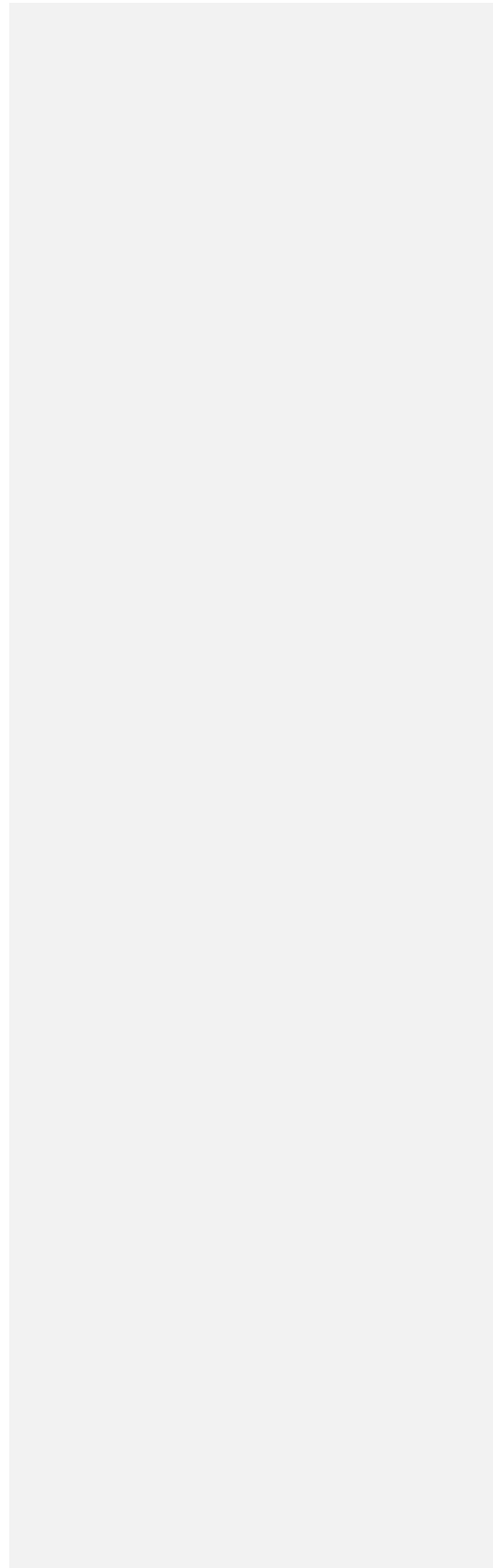
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331 and even promoted this survey. The authors would also like to thank Kim Cockburn at Vet
332 Professionals for uploading and promoting the questionnaire and her assistance in analysing
333 the data.

334 **Authors' note**

335 The results of this study were presented, in part, as an abstract presentation at the 2021
336 ISFM World Feline Congress.

337 **Conflict of interest**

338 The authors declare no conflict of interest with respect to this research, authorship or
339 publication of this article.

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343 **Ethical approval**

344 Ethical approval was provided by The Human Ethical Review Committee (HERC) at the Royal
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346

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398 **Tables and figures**

399 Table 1: Medication formulations that total cat owners (cat owners and cat owners+) had
400 experience of administering to their cats. *Cat owners = owners without significant cat*
401 *experience; Cat owners+ = respondents with significant cat experience, including veterinary*
402 *professionals.*

403

Formulation	Respondents with experience	Percentage
Tablet	2395	95.53
'Spot on'	1964	78.34
Liquid	1940	77.38
Capsule	1132	45.15
Eye drops/ointment	1112	44.36
Powder or granules	1014	40.45
Paste	935	37.30
Ear drops	916	36.54
Cream or ointment on the skin	807	32.19
Insulin injections	409	16.31
Other	267	10.65
None of the above	5	0.20

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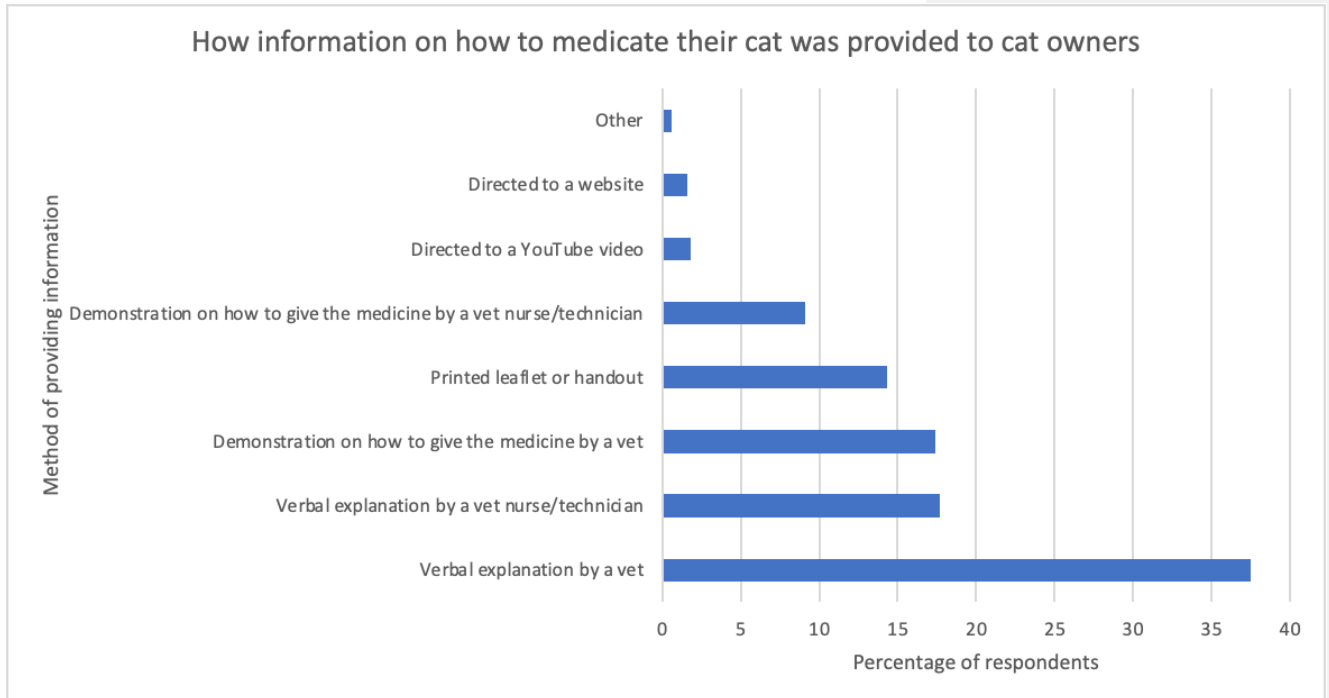
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406 Figure 1: How information on medicating was provided to cat owners. *Cat owners = owners*

407 *without significant cat experience.*

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415 Table 2: How total cat owners (cat owners and cat owners+) prefer to give medications
 416 (excluding answers 'I can't remember' and 'I have never been asked to give that type of
 417 medication'). NA = not applicable. *Cat owners = owners without significant cat experience;*
 418 *Cat owners+ = respondents with significant cat experience, including veterinary*
 419 *professionals.*

420

Preferred method of administering medication	Type of medication: number of respondents (percentage)				
	Tablets	Capsule	Liquid	Paste	Powder/granules
I open the cat's mouth and put it in with my fingers	887 (39.51)	498 (32.89)	NA	NA	NA
I open the cat's mouth and administer directly with a syringe	NA	NA	1229 (61.30)	568 (45.30)	NA
I hide the medication (whole) in a small amount of food or a treat	525 (23.39)	135 (8.92)	453 (22.59)	302 (24.08)	919 (67.62)
I add the liquid/paste to a liquid treat	NA	NA	168 (8.38)	96 (7.66)	209 (15.38)
I add the liquid/powder to a liquid cat treat and syringe directly into the cat's mouth	NA	NA	28 (1.40)	NA	38 (2.80)
I mix the powder/granules with water and syringe directly into the cat's mouth	NA	NA	NA	NA	115 (8.46)
I open the capsule and mix the contents with a small amount of food or a treat	NA	565 (37.32)	NA	NA	NA
I open the capsule and mix the contents with a small amount of liquid and give by syringe directly into the cat's mouth	NA	68 (4.29)	NA	NA	NA
I crush the tablet and mix with a small amount of food or a treat	377 (16.79)	NA	NA	NA	NA
I open the cat's mouth and put it in using a pill 'shooter' or 'popper'	223 (9.93)	143 (9.45)	NA	NA	NA
It varies too much to say	110 (4.90)	53 (3.50)	40 (2.00)	34 (2.71)	31 (2.28)
Other	99 (4.41)	44 (2.91)	66 (3.29)	142	
I offer it on its own (e.g., in an empty food bowl)	24 (1.07)	8 (0.53)	21 (1.05)	97	
Total respondents	2245	1514	2005	125	

Commented [SC3]: Again a pedantic comment but I would tend to have 'other' as the last row in the table (before totals, with 'it varies' the penultimate line). And maybe give some examples – esp thinking of pastes where other accounted for > 10% of responses

421
422

423 Table 3: Cat owners and cat owners+ ease/difficulty of administration rating for
 424 administering different formulations of medication. Rated between 1 (very easy) to 10
 425 (impossible). CO = cat owner, CO+ = cat owner+ (excluding answers of 'not applicable' or
 426 'can't recall'). *Cat owners = owners without significant cat experience; Cat owners+ =*
 427 *respondents with significant cat experience, including veterinary professionals.*

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Formulation	Tablet		Capsule		Liquid		Paste		Powder		'Spot on'		Cream/ointment		Ear drops		Eye drops		Insulin injection	
	CO	CO+	CO	CO+	CO	CO+	CO	CO+	CO	CO+	CO	CO+	CO	CO+	CO	CO+	CO	CO+	CO	CO+
1 (very easy)	172 (11.73)	122 (18.40)	99 (11.07)	128 (21.59)	268 (21.49)	212 (33.28)	115 (16.64)	91 (18.92)	155 (20.03)	111 (22.89)	516 (38.42)	276 (42.53)	199 (25.51)	158 (35.91)	91 (13.34)	69	50 (6.78)	58 (21.89)	108 (40.76)	107 (42.97)
2	124 (8.45)	118 (17.80)	82 (9.17)	79 (13.32)	176 (14.11)	123 (19.31)	73 (10.56)	87 (18.09)	97 (12.53)	74 (15.26)	237 (17.65)	126 (19.41)	144 (18.46)	91 (20.68)	72 (10.56)	63	75 (10.18)	61 (12.68)	42 (15.85)	50 (20.08)
3	156 (10.64)	121 (18.25)	94 (10.51)	95 (16.02)	191 (15.32)	98 (15.38)	101 (14.62)	100 (20.79)	123 (15.89)	83 (17.11)	159 (11.84)	63 (9.71)	120 (15.38)	62 (14.09)	125 (18.33)	73	98 (13.30)	75 (15.59)	38 (14.43)	40 (16.06)
4	114 (7.78)	60 (9.05)	86 (9.62)	69 (11.64)	131 (10.51)	62 (9.73)	83 (12.01)	57 (11.85)	83 (10.72)	60 (12.37)	110 (8.19)	43 (6.63)	82 (10.51)	39 (8.86)	86 (12.61)	38	92 (12.48)	74 (15.38)	13 (4.91)	16 (6.43)
5	178 (12.14)	73 (11.01)	122 (13.65)	70 (11.80)	154 (12.35)	53 (8.32)	113 (16.35)	60 (12.47)	107 (13.82)	62 (12.78)	105 (7.82)	52 (8.01)	92 (11.80)	30 (6.82)	92 (13.50)	60	83 (11.26)	62 (12.89)	20 (7.55)	9 (3.61)
6	116 (7.91)	39 (5.88)	69 (7.72)	34 (5.73)	84 (6.73)	21 (3.30)	58 (8.39)	25 (5.20)	65 (8.40)	37 (7.63)	67 (5.00)	26 (4.01)	48 (6.15)	29 (6.59)	58 (8.50)	40	67 (9.09)	35 (7.28)	10 (3.77)	8 (3.21)
7	190 (12.96)	53 (7.99)	97 (10.85)	46 (7.76)	97 (7.78)	29 (4.55)	58 (8.39)	25 (5.20)	54 (6.98)	30 (6.19)	57 (4.24)	22 (3.39)	35 (4.49)	16 (3.64)	70 (10.26)	34	95 (12.89)	45 (9.36)	9 (3.40)	9 (3.61)
8	160 (10.91)	35 (5.28)	92 (10.29)	39 (6.58)	72 (5.77)	25 (3.92)	45 (6.51)	23 (4.78)	31 (4.01)	17 (3.51)	57 (4.24)	18 (2.77)	28 (3.59)	12 (2.73)	43 (6.31)	20	76 (10.31)	34 (7.07)	12 (4.52)	4 (1.61)
9	125 (8.53)	24 (3.62)	75 (8.39)	17 (2.87)	43 (3.45)	12 (1.88)	21 (3.04)	6 (1.25)	22 (2.84)	6 (1.24)	22 (1.64)	13 (2.00)	18 (2.31)	1 (0.23)	19 (2.79)	16	50 (6.78)	22 (4.57)	3 (1.13)	1 (0.40)
10 (impossible)	131 (8.94)	18 (2.71)	78 (8.73)	16 (2.70)	31 (2.49)	2 (0.31)	24 (3.47)	7 (1.46)	37 (4.78)	5 (1.03)	13 (0.97)	10 (1.54)	14 (1.80)	2 (0.46)	26 (3.81)	4	51 (6.92)	15 (3.12)	10 (3.77)	5 (2.01)
Total	1466	663	894	593	1247	637	691	481	774	485	1343	649	780	440	682	417	737	481	265	249

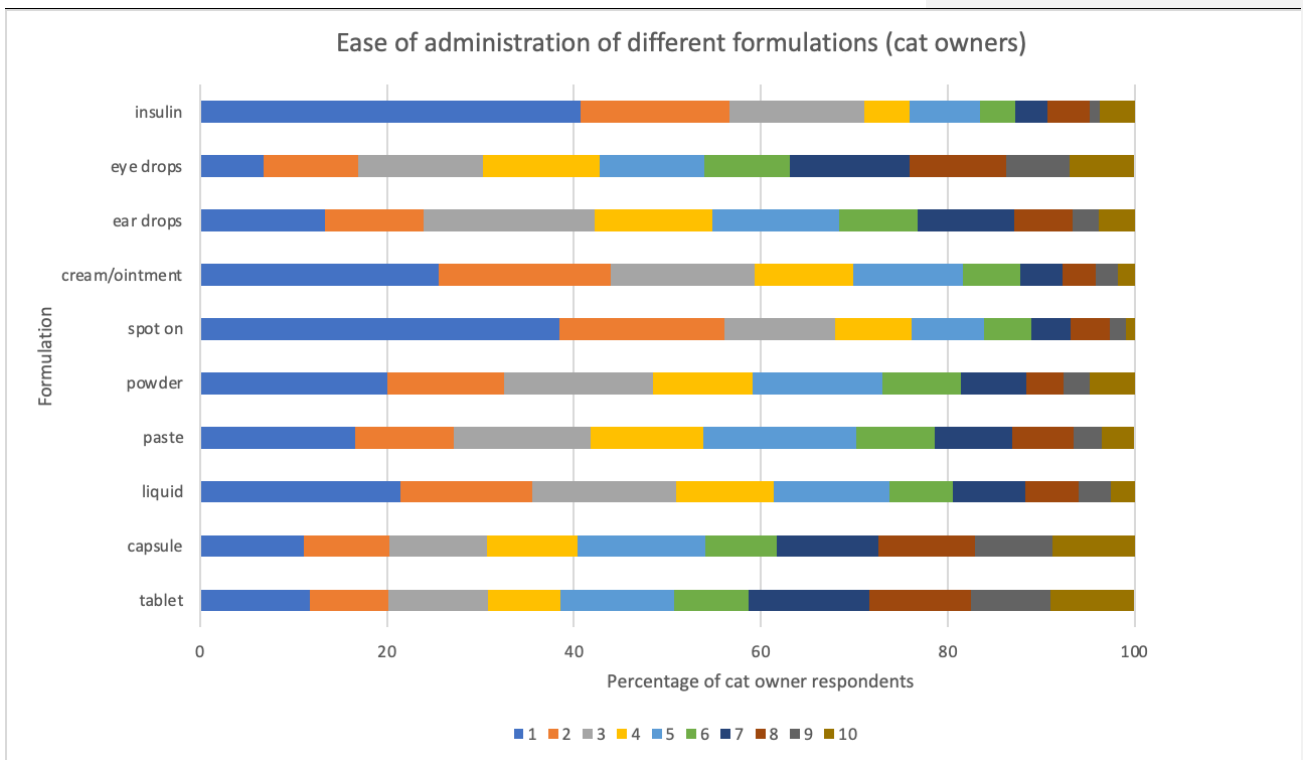
430

431 Figure 2: Rating of ease/difficulty of administering various formulations of medications (cat

432 owners). 1 = very easy, 10 = impossible.

433 *Cat owners = owners without significant cat experience*

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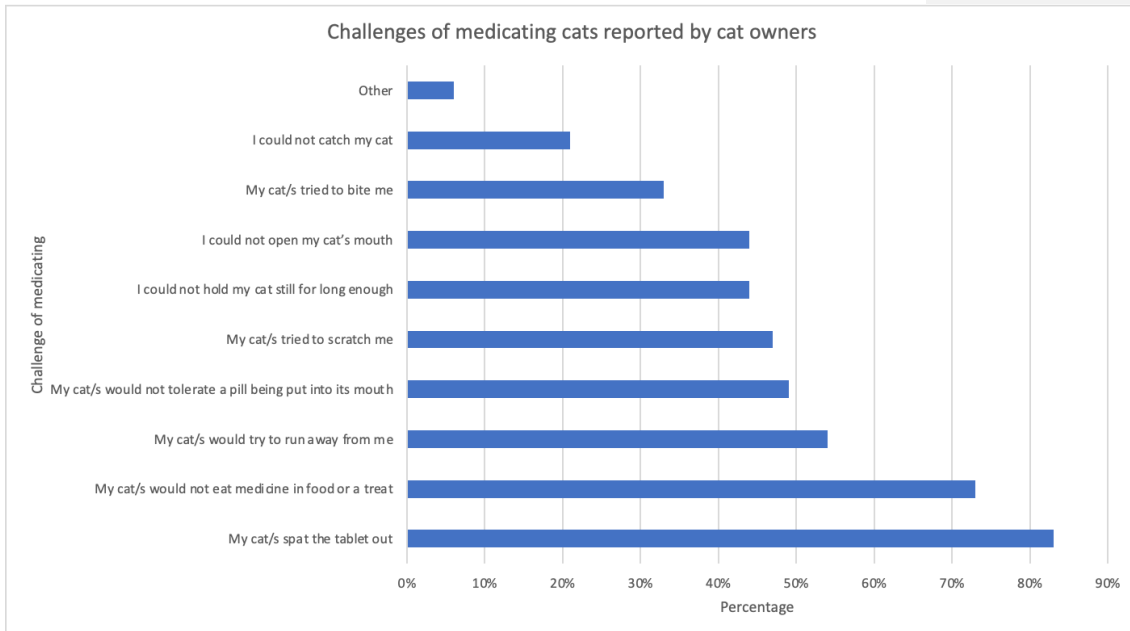
437 Figure 3: Negative behavioural responses to medicating reported by total cat owners (cat
438 owners and cat owners+).

439 *Cat owners = owners without significant cat experience; Cat owners+ = respondents with*
440 *significant cat experience, including veterinary professionals.*

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447

448 Table 4: Negative behavioural responses to medicating reported by total cat owners (cat
449 owners and cat owners+).

450 *Cat owners = owners without significant cat experience; Cat owners+ = respondents with*
451 *significant cat experience, including veterinary professionals.*

452

453

Behavioural response	Total (percentage of respondents to question)		
	Cat owners	Cat owners+	Total respondents
My cat spat the tablet out	1308 (82.73)	500 (70.13)	1808 (78.68)
My cat would not eat the medication in food or a treat	1152 (72.87)	493 (69.14)	1645 (71.71)
My cat would try to run away from me	861 (54.46)	348 (48.81)	1209 (52.70)
My cat tried to scratch me	745 (47.12)	294 (41.23)	1039 (45.29)
My cat tried to bite me	524 (33.14)	204 (28.61)	728 (31.73)
My cat would not tolerate the tablet being put into its mouth	771 (48.77)	270 (37.87)	1041 (45.38)
I could not hold my cat still for long enough	700 (44.28)	221 (31.00)	921 (40.15)
I could not open my cat's mouth	700 (44.28)	162 (22.72)	862 (37.58)
I could not catch my cat	327 (20.68)	110 (15.43)	437 (10.05)
Other	95 (6.01)	62 (8.70)	157 (6.84)

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457 Table 5: How cat owners and cat owners+ felt restraining/holding their cat to give medicine

458 * = significant difference between cat owners and cat owners+ ($p < 0.05$).

459 *Cat owners = owners without significant cat experience; Cat owners+ = respondents with*

460 *significant cat experience, including veterinary professionals.*

461

How owner felt	Total (percentage)	
	Cat owners	Cat owners+
Worried I would hurt my cat*	699 (46.72)	121 (18.06)
Confident to handle my cat*	572 (38.24)	417 (62.24)
Worried I would get bitten or scratched*	508 (33.96)	150 (22.39)
Worried I would do it wrong*	348 (23.26)	52 (7.76)
No problem, I found it easy*	162 (10.83)	155 (23.13)
Not confident – I feel unsure how to hold my cat*	126 (8.42)	15 (2.24)
Other	113 (7.55)	73 (10.90)

462

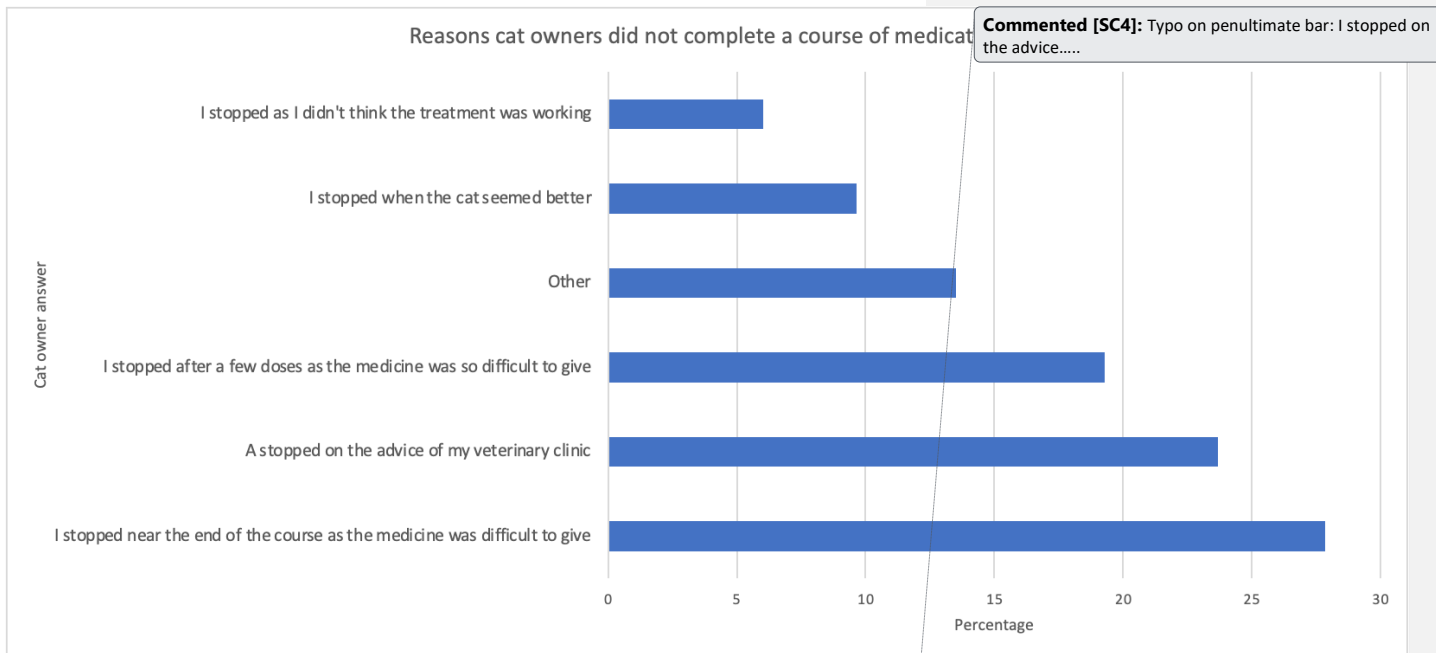
463

464 Figure 4: How cat owners answered the question 'If you have not always finished a course of

465 medicine, which of the following possible reasons accounted for that decision.'

466 *Cat owners = owners without significant cat experience.*

467



468

469 Figure 5: Total cat owners (cat owners + cat owners+) preferred choice of medication

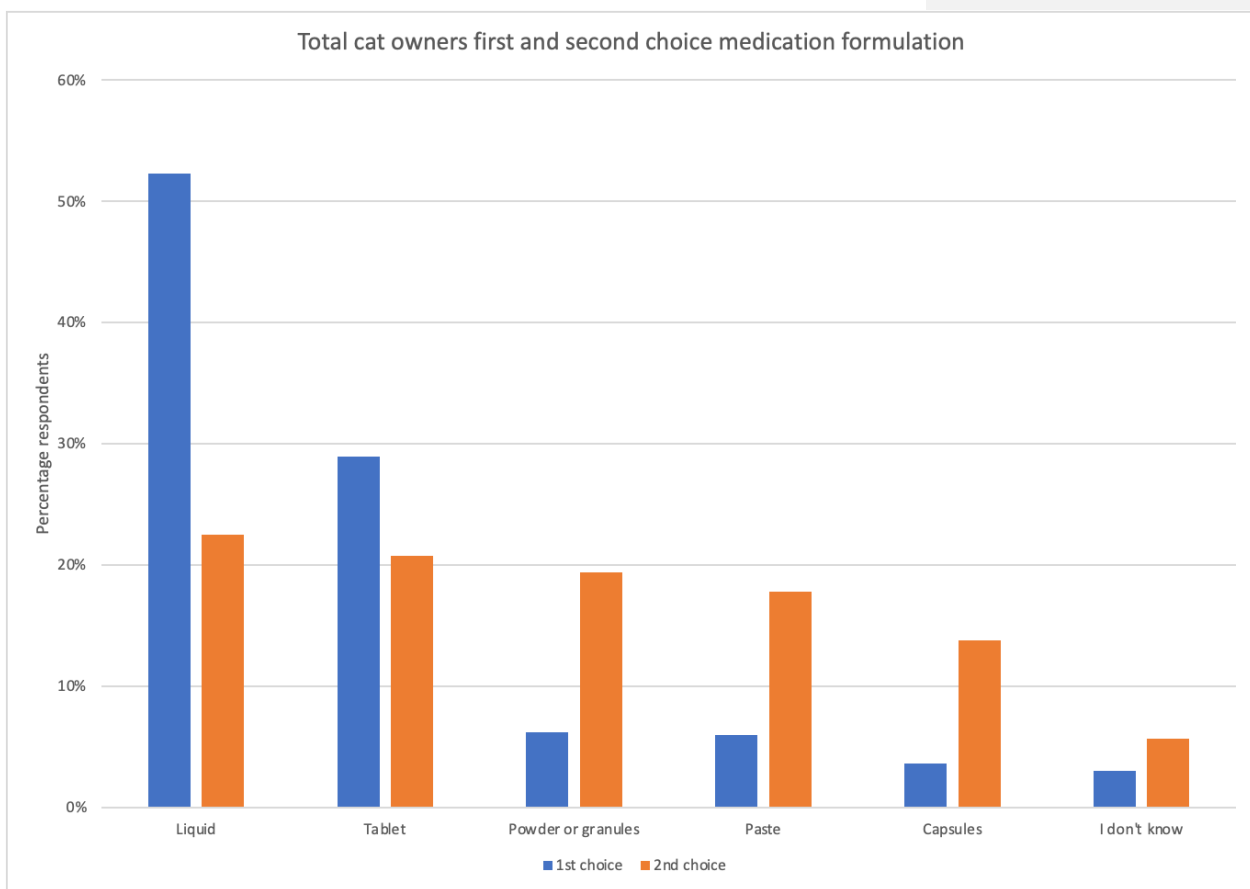
470 formulation.

471 *Cat owners = owners without significant cat experience; Cat owners+ = respondents with*

472 *significant cat experience, including veterinary professionals.*

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