

1 Title

2 A scoping review of end of life decision-making models used in dogs, cats, and equids

3

4 Short Running Title

5 Veterinary end of life decision-making

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7 Author Names and Affiliations

8 Amelia Cameron <sup>a</sup>, Kristian Pollock <sup>b</sup>, Eleanor Wilson <sup>b</sup>, John Burford <sup>a</sup>, Gary England <sup>a</sup>, Sarah Freeman <sup>a</sup>

9 <sup>a</sup> School of Veterinary Science and Medicine, University of Nottingham, Loughborough, UK

10 <sup>b</sup> Nottingham Centre for the Advancement of Research into Supportive, Palliative and End of Life  
11 Care, School of Health Sciences, University of Nottingham, Nottingham, UK

12 Corresponding author: Amelia Cameron ([amelia.cameron@nottingham.ac.uk](mailto:amelia.cameron@nottingham.ac.uk))

13

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16 feedback on the scoping review search strategy used.

17

## 18 Abstract

### 19 Background

20 End of life decisions for companion animals can be stressful for veterinarians and owners, and when  
21 delayed result in poor animal welfare. Delayed euthanasia has been identified as a particularly  
22 prominent issue for horses. This scoping review aimed to identify the available literature on  
23 veterinary decision-making models, which can support end of life planning.

### 24 Methods

25 A protocol was preregistered, and a structured literature search performed on six electronic  
26 databases. Publications were reviewed against specifically developed eligibility criteria. Data from  
27 original studies and narrative type reviews were extracted separately, and the components of each  
28 model were charted.

### 29 Results

30 There were 2211 publications identified, and 23 included in the final review. Eight were original  
31 research studies and 15 were narrative reviews or similar. Publications were not indexed uniformly,  
32 increasing the difficulty of discovering relevant sources. The end of life decision-making process  
33 comprised of three stages; (1) making the decision, (2) enacting the decision, and (3) aftercare.  
34 Twenty key components of decision-making models were identified, though no publication reflected  
35 all of these.

### 36 Conclusions

37 A lack of original research studies and equine specific publications was identified. Shared decision-  
38 making models for euthanasia in veterinary practice should include all three stages, and consider  
39 species-specific issues.

40

41

## 42 Introduction

43 Shared decision-making (SDM) promotes a collaborative approach,<sup>1,2</sup> and has been associated with  
44 improved patient satisfaction,<sup>3,4</sup> treatment adherence,<sup>3</sup> and potentially surgical outcomes.<sup>4</sup> This  
45 approach has been gaining prominence in human medicine, and several models have been proposed  
46 on how SDM should be carried out.<sup>5</sup> Some models have been adapted for use in a veterinary  
47 context.<sup>2,6</sup> However, less veterinary-specific research is available, and models have not been  
48 systematically mapped in this context as they have in human medicine.

49 Most veterinary research in this area focuses on dogs and cats, with research into equids particularly  
50 lacking. Delayed euthanasia in horses has been recognised by experts as a prevalent welfare issue  
51 that has the potential to cause great suffering.<sup>7,8</sup> A horse owner's recognition of pain or  
52 deteriorating quality of life may be poor,<sup>7,9</sup> potentially contributing to euthanasia decisions being  
53 delayed. Additionally, owners find having their horse euthanased very distressing.<sup>10</sup> Horses have a  
54 long lifespan, and years of ownership contribute to a strong bond which can make the decision even  
55 more difficult.<sup>10</sup> Companion animal owners may feel they do not have enough knowledge to make  
56 the decision or are unable to bear the burden of the full responsibility alone.<sup>1</sup> Advice from a  
57 veterinarian can increase their confidence in the decision.<sup>1</sup> Veterinarians also experience moral  
58 distress when euthanasia is delayed and the animal is suffering,<sup>11</sup> but may be unsure of how, or  
59 whether, they should aim to influence the owner's decision.<sup>1</sup> The aim of this scoping review is to

60 identify the literature available on veterinary end of life (EOL) decision-making models and use this  
61 to inform the future development of a SDM model for companion animal euthanasia.

62

63 Objectives:

- 64 • To identify published literature on decision-making models used in the context of serious  
65 veterinary illness, EOL planning, and euthanasia in canine, feline, and equine medicine, through  
66 a systematic search of the databases
- 67 • To extract and chart relevant information from the included publications, and identify the  
68 components of the different decision-making models
- 69 • To suggest key terms that could be included in future publications on companion animal EOL  
70 decision-making to increase their discoverability

71

## 72 Methods

### 73 Protocol and Registration

74 The protocol for this scoping review was drafted using the Preferred Reporting Items for Systematic  
75 Reviews and Meta-Analyses Extension for Scoping Reviews (PRISMA-ScR).<sup>12</sup> The review followed the  
76 Joanna Briggs Institute methodology,<sup>13</sup> for which reviewer SF has completed the accredited training  
77 programme. The final protocol was registered prospectively with Open Science Framework  
78 ([https://osf.io/txqw9/?view\\_only=b4d2e3ee5e834b02b82d9f426bff91c7](https://osf.io/txqw9/?view_only=b4d2e3ee5e834b02b82d9f426bff91c7)) on 11.02.21. This project  
79 was reviewed and approved by the Ethics Committee, [masked for review].

80

### 81 Eligibility Criteria

82 The eligibility criteria are described in Table 1. A decision-making model was defined as a set of  
83 criteria, a process, steps, or information that can be used to support the making of a decision about  
84 the most appropriate course of action available in specific circumstances.

85 A publication was included if the full text could be obtained from any of the [masked for review]  
86 libraries or e-libraries, as well as from free online Open Access and legal deposit libraries. A  
87 publication was considered an opinion review where the information provided was not supported by  
88 references or sources of evidence, and instead credibility was based on the authors' expertise or  
89 experiences; these were excluded.

90

### 91 Information Sources

92 To identify potentially relevant publications the following electronic databases were searched on  
93 15.02.21:

- 94 • CAB Abstracts (Ovid): 1910-present
- 95 • Ovid MEDLINE: 1946-present
- 96 • Embase (Ovid): 1974-present
- 97 • WEB of Science (Core Collection: Citation Indexes): 1946-present
- 98 • Scopus: 1946-present

- 99       • PubMed: 2020-present (to identify preprints or recent publications that may not yet be on  
100       Ovid)

101

102       The search strategy was drafted by the research team and feedback was provided by an experienced  
103       [maskred for review] librarian. Publications identified by other means such as conference attendance  
104       and models referenced by included publications were also included.

105

#### 106       Search strategy

107       Search combinations were constructed from the following components, including synonyms, related  
108       terms, and alternative spellings:

- 109       •    Veterinary OR Veterinarian

110       AND

- 111       •    Decision-making OR Communication OR Goals of Care OR Relationship-centred OR  
112       Conversation OR Breaking Bad News

113       AND

- 114       •    Models OR Guidelines OR Framework OR Checklists OR Plan OR Approach

115       AND

- 116       •    Euthanasia OR End of Life OR Advanced Care Plan OR Palliation OR Critical Illness

117

118       The full search strategy used for each database can be found in Appendix 1.

119

#### 120       Study Selection

121       To increase consistency, the same 51 titles and abstracts from a pilot search were reviewed by AC  
122       and SF. Results were discussed to determine whether it was necessary to amend the inclusion and  
123       exclusion criteria before beginning screening for this review.

124       References were downloaded into EndNote X9 (Thomson Reuters), and duplicates removed. Titles  
125       were screened on EndNote and retained publications were then imported into Rayyan (Rayyan  
126       Systems Inc.), a collaborative systematic review tool. Abstract and full text screening took place  
127       through Rayyan. Both AC and SF independently reviewed titles and then abstracts for agreement  
128       with the eligibility criteria, with any ambiguous publications being retained for review of the full text.  
129       Disagreements during screening were discussed until a consensus was reached. If a consensus had  
130       not been reached, the opinion of a third reviewer would have been enlisted.

131       In cases where a publication could be excluded for multiple reasons, it was listed as excluded by the  
132       first reason that became apparent. During abstract screening, decisions were based purely on the  
133       abstract, and not on any additional information in the record such as where the language or type of  
134       source was stated. This information was only considered during full text screening.

135

## 136 Charting Process

137 The included publications were read in full and assessed so relevant information could be extracted  
138 and charted. This was done independently by AC. Two separate forms were used, one for scientific  
139 studies (Table 2) and one for narrative review type publications (Table 3). This was due to the  
140 differing nature of the information extracted from these two publication types, and the differences  
141 in the value of evidence they provide. The EOL decision-making models identified did not all focus on  
142 the same aspect of EOL decisions. Three stages of guidance were identified, with models either  
143 focusing on one, two, or all of these. The first, making the decision, comprised the steps required for  
144 the veterinarian and owner to come to a decision about euthanasia or EOL care for the animal  
145 patient. The second was enacting the decision, including steps such as educating the owner about  
146 and planning for the euthanasia procedure, or potentially carrying out an agreed hospice care plan  
147 and monitoring any changes in the animal. The final stage was aftercare, with steps such as  
148 explaining body disposal and memorialisation options and deciding on these, or signposting the  
149 owner to emotional support resources. Distinctions were made between these stages when charting  
150 to identify which aspects of end of life decision-making have received most research attention, and  
151 so readers interested in just one stage can identify which publications are relevant. A third form  
152 (Table 4) charted the components of the decision-making models from each publication, so the  
153 recommended steps of each could easily be identified. Broad labels were given as components were  
154 described slightly differently between publications. This meant some interpretation was required  
155 from AC as to what constituted minimising owner guilt or following up after euthanasia, for example.

156

## 157 Results

### 158 Selection of Evidence Sources

159 A total of 2209 publications were identified through the six database searches. After duplicates were  
160 removed 1197 publications remained. Once title screening had taken place 264 publications were  
161 retained for abstract screening. During this stage, 111 publications were excluded because they did  
162 not cover the areas of interest identified in the inclusion and exclusion criteria (Table 1).  
163 Additionally, 12 were excluded for not being about the correct population, six for being the wrong  
164 publication type (e.g., grey literature), five for not focusing on the desired context, and two for being  
165 the wrong study design (e.g., opinion reviews). After abstract screening, 128 publications were  
166 initially included for review of the full text. However, two additional publications were identified  
167 outside of the main screening process and their full text assessed. The first<sup>14</sup> was identified because  
168 the model presented in Van Eps *et al.*<sup>15</sup> (included through the main screening process) was based on  
169 the model in this additional paper. The second<sup>16, 17</sup> was identified through a workshop attended by  
170 AC, the report and guidelines developed are presented as two separate documents. Of the 130 full  
171 texts screened, 11 were excluded as it was not possible to obtain the full texts, while 10 were  
172 excluded as the full text was only available in a language other than English. The full list of exclusion  
173 reasons can be found in Figure 1, along with the full publication screening and selection process.  
174 There were 23 publications found to meet the final inclusion criteria, including the two publications  
175 identified outside of the main screening process. Of the publications included in the scoping review,  
176 eight were original research studies, while 15 were narrative reviews or similar.

177

### 178 Characteristics of Evidence Sources

179 Models most commonly focused on the first stage of the EOL decision-making process, making the  
180 decision (n=22 publications), with far fewer advising on enacting the decision (n=7), and aftercare

181 (n=9). Six of the original research studies presented an original model or gave advice based on their  
182 findings, although one of these incorporated an established breaking bad news model within their  
183 full model. The findings of the other two studies reflected the structure of previously established  
184 models or frameworks. In contrast to this, most of the models (n=10) presented in the narrative  
185 review type publications had been adapted from previously published models or frameworks, mainly  
186 from human medical literature. Five were original models or advice developed based on the  
187 available literature. Of all the publications, three contained models or EOL advice intended for dogs,  
188 two for dogs and cats, two for equids, and 16 for companion animals in general. However, often the  
189 recommendations in the models intended for companion animals in general appeared to relate most  
190 to dogs and cats, and would less likely be suitable for horses. Examples include advice on assisted  
191 nutrition provided by Smith,<sup>18</sup> and on supporting animals requiring hospice care by Bishop *et al.*<sup>19</sup> All  
192 included sources were published between 2005 and 2021. Seventeen were published from 2014  
193 onwards, including all eight original research studies and nine narrative reviews or similar. The other  
194 six review type sources were published between 2005 and 2011. The full data extracted about the  
195 characteristics and key findings of the eight original research studies included can be found in Table  
196 2. The characteristics and recommendations of the 15 review publications can be found in Table 3.

197

#### 198 Aspects of Decision-Making Models

199 In some cases, publications presented decision-making steps laid out as a clear model, checklist,  
200 framework, or tool. In others, authors presented recommendations from their study findings or from  
201 the literature within the publication text. Table 4 summarises the 20 key components and/or stages  
202 of the decision-making model or recommendations presented in each publication. The order the  
203 components are listed does not necessarily reflect the order in which the publications advise these  
204 are completed. Not all models contained all components, and different publications recommend  
205 these are carried out in slightly different orders. It was only possible to include the main components  
206 within the table, but some publications broke down a component into several smaller steps, and in a  
207 few publications additional components were recommended.

208 No publication reflected every component identified within their model or recommendations. Some  
209 publications intended their model to cover the entire decision-making process from the initial  
210 discussion up to body aftercare and emotional support, whereas others focused on a specific aspect  
211 of the EOL decision. The model presented by Arora *et al.*<sup>17</sup> covered the greatest number of identified  
212 components (n=18), followed by Bishop *et al.*<sup>19</sup> (n=16). In comparison, Grimm *et al.*<sup>20</sup> (n=3) and  
213 Bley<sup>21</sup> (n=3) covered the fewest components. The most frequently identified component was  
214 “presentation of treatment and/or EOL options” (n=20), followed by “knowledge exchange between  
215 veterinary team and owner” (n=18), “consider impact of options on animal patient's QOL” (n=17),  
216 and “make a treatment and/or EOL care plan” (n=17). Five publications recommended having the  
217 owner sign consent forms prior to enacting a decision (e.g., euthanasia, treatment, a method of  
218 body care). In contrast, Arora *et al.*<sup>17</sup> advised verbal consent over signing a form when the vet-client  
219 relationship is good, although stated consent via email or similar is not adequate. Seven publications  
220 recommended that veterinary staff begin having EOL conversations with clients early, before these  
221 decisions need to be made, and six specifically included or were made up of a breaking bad news  
222 protocol. Eight publications advocated setting treatment goals including end points, which signify  
223 the point at which euthanasia should occur. For example, when QOL declines past a predetermined  
224 point, or the animal can no longer perform certain behaviours which have been pre-agreed between  
225 the veterinarian and owner. Marked on Table 4 are the components that are most likely to  
226 contribute to SDM, as these involve direct collaboration between the owner and veterinarian.

227

## 228 Discussion

229 This scoping review has identified the current literature available on critical illness and EOL decision-  
230 making models for companion animals (dogs, cats, equids), finding a varied group of publications, of  
231 which eight are original studies while 15 are narrative reviews or similar. Within these two groups  
232 are a range of study designs and publication types respectively. Twenty key components of the  
233 presented models have been identified, which vary in how frequently they appear across these  
234 models. No model contained all components. These components offer a basis from which EOL  
235 decision-making models specific to companion animals can be proposed. Some components are  
236 likely to promote SDM, while others may not necessitate joint engagement from veterinarians and  
237 owners. Issues, such as the lack of consistency with which these publications have been indexed,  
238 have been identified, and suggestions are made for how these could be addressed. This would allow  
239 publications in this area to be more easily discoverable for researchers interested in this area.

240

## 241 Research Protocol

242 Broad search terms and inclusion criteria were employed to increase the likelihood that all relevant  
243 publications would be discovered and included in this review. Titles and abstracts were often vague,  
244 meaning a greater number of sources had to be retained at each round of screening due to  
245 ambiguity. A further challenge was the lack of uniformity in indexing, requiring a wide variety of  
246 terms to be included in the search to prevent relevant publications being excluded. Parker and  
247 Yeates,<sup>14</sup> one of the publications discovered separately, was not identified through the main  
248 screening process due to the title, abstract and key and indexed terms not including words related to  
249 'euthanasia' or critical illness', despite the main body of the text stating that the model presented  
250 could be used for euthanasia decisions. A more consistent approach to indexing research in this area  
251 may help facilitate the retrieval of relevant material by researchers in the future. Key terms have  
252 been suggested in Table 5 that could be included with all papers on the subject of companion animal  
253 EOL decision-making, in order to make them more easily discoverable in searches.

254 When conducting a scoping review, the aim is to systematically and comprehensively map the  
255 research in an identified area, and not to conduct evidence synthesis and appraisal.<sup>22</sup> In this case,  
256 the aim was to comprehensively map veterinary decision-making models, which meant a diverse  
257 range of publication types was included, a common feature of scoping compared to systematic  
258 reviews.<sup>22</sup> The decision to include narrative reviews was made, as in several cases a human model  
259 had been adapted for veterinary use based on current literature, without a research study being  
260 carried out<sup>2, 6, 23</sup>. This decision also increased the number of publications carried through to the full  
261 text screening stage, as in the vast majority of cases it was not possible to distinguish between  
262 narrative and opinion reviews based on the abstract.

263 The aim of the study was to investigate EOL decision-making models used in companion animals,  
264 including equids. This study did not investigate decision-making around other companion animals,  
265 such as rabbits, rodents, and exotic species, which would require a different scoping review with a  
266 distinct set of search terms to capture the many potential terms and species involved. In addition,  
267 there is little specific research on the human-animal bond for these species, with most focusing on  
268 companion animals generally, dogs, or cats,<sup>24</sup> and several publications also available for horses.<sup>25</sup>  
269 Human-animal bond may impact EOL decision-making,<sup>10</sup> and so EOL decision-making models  
270 developed specifically for species other than dogs, cats or equids may be less comparable. However,  
271 despite human-horse relationships resembling those between owners and dogs or cats,<sup>24</sup> there are

272 several equine specific issues which may limit the applicability of models developed for other  
273 companion species. One example is that horses are often bought for a specific purpose and can be  
274 sold if this is not fulfilled, although they may also come to be thought of as a family member.<sup>26</sup>  
275 Other differences are the high financial commitment of equine ownership, and the fact that horses  
276 live outside the household.<sup>26</sup> For this reason, a variation of the companion animal model may be  
277 required for equids, that can take into account the unique aspects of horse ownership and equine  
278 culture, so that equine veterinary professionals and owners can better communicate about and  
279 consider options for EOL.

280

## 281 Characteristics of Evidence Sources

282 Companion animal EOL decision-making appears to still be an emerging field, only receiving research  
283 attention in recent years, with all original research studies published from 2014 onwards, and five of  
284 the eight since 2018.<sup>16, 17, 20, 27-29</sup> Some of the narrative review type publications were published  
285 earlier, with the earliest identified from 2005.<sup>30</sup> However, nine of the 15 narrative reviews have been  
286 published since 2015. It is positive that research interest has been increasing in this important area,  
287 but the developing nature of the field means there are still many gaps in knowledge to be filled.  
288 These include research directed to all phases of the decision process as these have not received  
289 equal attention, and additional papers with a specific focus on horses and other domestic equids,  
290 which were lacking. There should be further original research into EOL decision-making for  
291 companion animals, as these types of publications made up the minority of those identified. Studies  
292 into the models, methods, and techniques currently being used by owners and veterinarians, and  
293 their impact on both these participants and the animal patients' welfare would be beneficial.  
294 Additionally, studies trialling currently available and any future models would be valuable to identify  
295 potential barriers and facilitators to their use in real life settings, so that they may be improved.  
296 Furthermore, none of the original research studies carried out focused specifically on equids, so it is  
297 important for future research to address this due to the unique challenges that are faced by owners  
298 and veterinarians in equine practice.

299 The full decision-making process extends from initial conversations between veterinarian and owner  
300 about EOL up to where the decision is made, all of which is encompassed within the first stage of  
301 making the decision, and then onto the second stage of enacting this decision, and then the final  
302 stage of aftercare. Included within aftercare are decisions about body care and memorialisation, and  
303 signposting to emotional support. All but one of the included publications addressed the first stage  
304 of the EOL decision-making process, while the other two stages were addressed much less  
305 commonly. In some cases, a decision may have to be made very quickly, such as in a medical  
306 emergency where there is no hope of treatment and the animal is suffering intensely. However, in  
307 many cases this stage of the decision-making process could be the longest, drawn out over an  
308 extended period of weeks, months or even years, for example when there is a slow deterioration in  
309 QOL.<sup>1</sup> Additionally, this stage of deliberation may especially cause considerable stress for both  
310 veterinarian and owner due to uncertainty or conflicting opinions,<sup>1, 31</sup> and so be seen as important to  
311 address. Despite the importance of this first stage, the other two should not be neglected. Explaining  
312 and planning for enacting the euthanasia decision may help to reduce owner anxiety,<sup>19</sup> which in turn  
313 could facilitate the procedure going more smoothly. When veterinarians have successfully facilitated  
314 a 'good death' they feel this supports the wellbeing of both themselves and the client.<sup>32</sup> Likewise,  
315 aftercare is a very important consideration. Cooney *et al.*<sup>29</sup> found pet owners have a number of  
316 concerns regarding after death body care, including cost (61%) and the way their pet's body would  
317 be physically handled (57%). Planning for this could reduce anxiety around the process, and prevent

318 owners from making rushed decisions they may regret or finding only after euthanasia that they  
319 cannot afford their preferred option for disposal. In addition, the death of a companion animal can  
320 be immensely distressing,<sup>10, 17, 33, 34</sup> but societal attitudes towards the status of animals can lead  
321 owners to experience disenfranchised grief.<sup>17</sup> Veterinarians are in a position to validate and  
322 normalise their clients' grief,<sup>33</sup> and following up after euthanasia, such as with a phone call or  
323 condolence card, can increase owner satisfaction.<sup>34</sup> Another consideration is that clients that are less  
324 satisfied overall with euthanasia are more likely to change veterinary practices.<sup>35</sup> Future models  
325 published would benefit from addressing all three stages where possible, rather than just the first.

326 The majority of veterinary decision-making models have focused on decisions being made for dogs  
327 and cats, or general models where the species was not specified. Only two publications expressly  
328 related to horses,<sup>14, 15</sup> neither of which were original research studies, while none focused  
329 specifically on donkeys or donkey-horse hybrids. This is consistent with other areas of companion  
330 animal welfare and veterinary practice, where horses have fallen behind dogs and cats in terms of  
331 both research and what is offered.<sup>19, 24, 36</sup> This in turn is likely to affect interactions between  
332 veterinarians and clients depending on the species owned, with Arora *et al.*<sup>17</sup> finding owners of  
333 companion animals other than dogs and cats reported less compassion from veterinary  
334 professionals. Equine decision-making models may be generally applicable to donkeys, but there are  
335 also some differences that may be important to consider. For instance, donkeys tend to form very  
336 strong bonds with a particular companion.<sup>37</sup> This may mean more consideration needs to be given to  
337 healthy donkeys who have a companion requiring euthanasia. At the loss of a companion some  
338 donkeys will refuse to eat or drink, which can lead to hyperlipaemia and then potentially death.<sup>38</sup>  
339 This could potentially involve introducing a new companion before the first is euthanased, although  
340 research is required to determine whether this would be effective. It may be possible that in some  
341 cases it must be considered whether euthanasia for both donkeys is the best option. This is  
342 something usually considered unnecessary for horses who have lost a companion, and a situation in  
343 which veterinarians may refuse to euthanase.<sup>39</sup>

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#### 345 Limitations

346 It is possible some relevant publications may have been missed if they did not contain the  
347 combination of search terms used in either the title, abstract, key words, or indexed terms.  
348 Furthermore, there is a small chance relevant publications could have been excluded during title and  
349 abstract screening if they did not appear to meet the inclusion criteria, when in fact they would have  
350 if the full text had been read. It was beyond the scope of this review to have publications written in  
351 languages other than English translated, so some potentially relevant publications may have been  
352 excluded as a result.

353

#### 354 Conclusion and Recommendations

355 The components and recommendations of currently available serious illness and EOL decision-  
356 making models for companion animals have been collated and extracted to aid owners and  
357 clinicians. Key terms (Table 5) have been suggested that future researchers can include in their  
358 keywords, to help indexers and make their publications more discoverable to others interested in  
359 this area. Companion animal EOL decision-making appears to be an emerging field gaining increasing  
360 interest, and it is hoped it will continue to receive further research attention. However, there is still a  
361 lack of published original research studies, with a complete absence of original studies specifically on  
362 equids.

363 Key future research recommendations include:

- 364 • Inclusion of the suggested key terms and use of more descriptive titles so work can be  
365 discovered
- 366 • Clear summarisation and presentation of key components and/or recommendations of  
367 models so these can be easily identified by readers
- 368 • Studies that investigate all three stages of EOL decision-making identified in this review
- 369 • Research that trials developed models in a practical setting
- 370 • Research that focuses explicitly on equids, due to equine specific issues that may reduce the  
371 applicability of models developed for small companion animals

372 The further investigation into the development and refinement of EOL decision-making models that  
373 can be applied in a practical setting has the potential to decrease stress and uncertainty felt by  
374 companion animal owners and veterinary staff, and support appropriately timed decisions to  
375 promote animal welfare at the end of life.

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381

382

## 383 Conflict of Interest

384 The authors have no conflicts of interest to declare.

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386

## 387 Author Contributions

388 Idea conceived by S.F., G.E., J.B., E.W., and K.P. Study designed by A.C., S.F., G.E., J.B., E.W., and K.P.  
389 Acquisition and analysis of data by A.C. and S.F. The lead on writing the manuscript was taken by  
390 A.C., with input and feedback from all authors.

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398 Figure Legends

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400 Figure 1. Flow diagram outlining the process used for a scoping review of the current literature on  
401 serious illness and end of life decision-making models in dogs, cats, and equids.

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Criteria	Inclusion	Exclusion
<b>Population</b>	<p>Domesticated equids: horses/ponies (<i>Equus caballus</i>) and donkeys (<i>Equus asinus</i>) and their hybrids (mules, hinnies)</p> <p>Domesticated dogs (<i>Canis lupus familiaris</i>)</p> <p>Domesticated cats (<i>Felis catus</i>)</p> <p>Non-specified companion animals e.g., where a publication discusses companion animals without focusing on a particular species, but discussion could plausibly relate to the above mentioned species</p>	<p>Wild equids and their hybrids (zebras, wild asses, their hybrids, domesticated-wild equid hybrids)</p> <p>Publications about horses, dogs, or cats kept as farmed/production animals</p> <p>Publications about working horses, dogs or cats in developing countries</p>
<b>Population</b>	<p>Owners and carers of dogs, cats, and domesticated equids, including breeders and owners of commercial animal premises and charities</p>	<p>Owners/carers of dogs, cats, and equids in developing countries who use these animals for work purposes</p> <p>People who farm dogs, cats, and equids</p>
<b>Population</b>	<p>Members of veterinary practices/hospitals who are involved in the treatment, care or giving advice for the included animal species</p>	
<b>Interest</b>	<p>Publications that describe or investigate the decision-making process</p> <p>Publications that describe or investigate the use of decision-making or communication models, guides, or advice (including conversation guides) for use between companion animal owners/carers and veterinary staff</p>	<p>Publications only exploring specific factors that influence which way a decision is made and not the process by which a decision is made</p> <p>Publications only exploring people's opinions on or experiences of using decision making models or guides, but where a model or guide is not described</p>
<b>Context</b>	<p>Publications involving decision-making between owners/carers and veterinary staff in any situation where euthanasia is a potential option for the included animal species. Also, in situations where the included animal species are suffering from critical or incurable illness, which may be chronic or acute, and a decision must be made between two or several of the following options: different treatment options, to administer, continue, or stop</p>	<p>Publications involving decision-making for non-critical illness, or routine or elective procedures (e.g., worming, vaccination, castration)</p> <p>Publications only involving the decision-making process between multiple owners/carers or multiple members of veterinary staff</p> <p>Publications about causes and procedures for euthanasia</p>

	treatment, euthanasia, or to take no action.	
<b>Study Design</b>	Qualitative, mixed methods, observational, experimental, and quasi experimental studies, case series, systematic reviews, scoping reviews, narrative reviews	Opinion reviews, single case studies
<b>Publication Type</b>	Peer-reviewed publications, continuing education journals, conference proceedings where a full report is available, textbook chapters, reports, and national guidance	Unable to obtain full text Grey literature
<b>Language</b>	Full text available in English	

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Table 2. The study type, methods, and key findings of original research studies included in the scoping review

Author & Year	Population	Sample Size	Study Design	Publication Type	Country Took Place	Species Model For	Who Will Use Model?	Stage of End of Life Care	Based on Previous Model?	Findings	Limitations
Stoewen <i>et al.</i> (2014) <sup>40</sup>	Owners of dogs with life-limiting cancer	43	30 semi-structured interviews (sometimes multiple owners of 1 dog interviewed together)	Peer reviewed journal article	Canada	Dogs	Veterinary practice staff and owners	Making the decision	No – steps presented from study findings	Owners wanted information in forthright manner, multiple formats, understandable language, unrushed, compassionate staff who had established relationship with, 24hr access to ask questions.	Sample will not be representative of whole population (& other standard interview limitations).
Stoewen <i>et al.</i> (2014) <sup>41</sup>	Owners of dogs with life-limiting cancer	43	30 semi-structured interviews (sometimes multiple owners of 1 dog interviewed together)	Peer reviewed journal article	Canada	Dogs	Veterinary practice staff and owners	Making the decision	No – steps presented from study findings	Owners want information presented to be truth, information from vet generated trust & confidence to engage in treatment, make decisions, prepare for future.	Sample will not be representative of whole population (& other standard interview limitations).
Christiansen <i>et al.</i> (2016) <sup>1</sup>	Owners of chronically ill/aged dogs, considering euthanasia or treatment – dogs alive or died within last 8 months	12	In depth qualitative interviews	Peer reviewed journal article	Denmark	Dogs	Veterinarians and Owners	Making the decision	No – general shared decision-making model steps presented from study findings &	Owners often want support & input from vet in decisions, especially when unsure of best option, although not all do. Can be hard to get truly informed	Sample will not be representative of whole population, some interviewees' dogs already deceased – may have

Author & Year	Population	Sample Size	Study Design	Publication Type	Country Took Place	Species Model For	Who Will Use Model?	Stage of End of Life Care	Based on Previous Model?	Findings	Limitations
									previous research	consent, best way forward could be knowledge exchange between vet & client.	been impact of recall bias.
Grimm <i>et al.</i> (2018) <sup>20</sup>	An expert panel from the European College of Veterinary Anaesthesia and Analgesia, made up of veterinary diplomates and an ethicist	6	Part 1: Literature search  Part 2: Expert panel to agree on framework for ethical decision-making	Peer reviewed journal article	Collaboration between authors from EU countries (Austria, Germany, Switzerland, UK)	General companion animals	Veterinary clinicians and owners	Making the decision	No, new model developed from study: The Veterinary Ethics Tool (VET)	Key stakeholders identified and consensus reached on questions that should be included in VET.	Only views from a small sample of experts included.
Nickels and Feeley (2018) <sup>27</sup>	Companion animal veterinarians	44	Semi-structured interviews	Peer reviewed journal article	USA	General companion animals	Veterinary practice staff and owners	Making the decision, enacting the decision, aftercare (mainly emotional , not decisions about body etc)	COMFORT <sup>42</sup> (findings were considered in relation to SPIKES <sup>43</sup> and COMFORT, & latter was best fit)	Participants were following many of steps from SPIKES, but strategies fit more closely with COMFORT, although did not mention last two steps.	Primarily small animal vets in sample, did not ask other members of vet team, did not get client views.
Lehnus <i>et al.</i> (2019) <sup>28</sup>	Veterinarians , nurses, and technicians specialising	183	Online Survey – many open questions allowing	Peer reviewed journal article	UK (but using an international sample including	General companion animals	Veterinary clinicians and anaesthetists, and owners (and	Making the decision	Findings related to 4 ethical principles of autonomy,	Anaesthetists faced regular ethical dilemmas. Questions	Standard online survey limitations. Importance of ethical

Author & Year	Population	Sample Size	Study Design	Publication Type	Country Took Place	Species Model For	Who Will Use Model?	Stage of End of Life Care	Based on Previous Model?	Findings	Limitations
	in veterinary anaesthesia		detailed narratives		UK, US, EU & other respondents)		potentially other members of veterinary team)		beneficence , non-maleficence & justice <sup>44</sup> (though analysis not performed with this in mind)	suggested to guide discussions with owners. Suggested having anaesthetists involved in discussion with owners.	dilemmas and decision-making thought processes not ranked – some might be more important than others.
Arora <i>et al.</i> (2020) <sup>16, 17</sup>	Companion animal owners (most owned dogs or cats, but a few horses or other animals)	310	Online survey – combination of open and closed questions	Report (non-peer reviewed)	Canada	General companion animals	Veterinary practice staff and owners	Making the decision, enacting the decision, aftercare	Steps presented from study findings. Named developed end of life discussion framework ExplorEEEE R. However, also included SPIKES for breaking bad news <sup>45</sup> .	Owners of cats and dogs reported better communication and compassion than owners of other animals. Nearly 95% respondents had been included in end of life discussions. Most able to discuss decision-making challenges with vet.	Not peer reviewed, standard online survey limitations.
Cooney <i>et al.</i> (2021) <sup>29</sup>	Owners of dogs and/or cats, who had a regular vet, and had made end of life decisions for a pet	2043	Online Survey	Peer reviewed journal article	USA	Dogs & cats	Veterinary practice staff and owners	Aftercare	No – steps presented from study findings	Vet main source of information for pet death and body aftercare, 73% needed 20 mins or less. Participants had several concerns about body aftercare.	Standard online survey limitations.

Table 3. The publication details and recommendations of narrative reviews and similar publication types included in the scoping review

Author & Year	Publication Type	Country Authors From	Species Model For	Who Will Use Model?	Stage of End of Life Care	Based on Previous Model?	Recommendations
Epstein <i>et al.</i> (2005) <sup>30</sup>	Peer reviewed journal article	USA	Senior dogs and cats	Veterinary practice staff and owners	Making the decision, enacting the decision (brief), aftercare (brief)	No – model presented from literature, incorporating currently available resources	Have end of life discussion in anticipatory grief stage rather than in terminal crisis. Consider client’s realistic ability to care for pet.
Brandt and Grabill (2007) <sup>46</sup>	Peer reviewed journal article	USA	General companion animals	Veterinary practice staff and children; veterinary practice staff and older adults	Making the decision, enacting the decision, aftercare (brief)	No – model presented from literature	Age and developmental stage can impact ability to understand health information, so should tailor communication style to suit clients. In all cases honest and compassionate communication important.
Cornell and Kopcha (2007) <sup>2</sup>	Peer reviewed journal article	USA	General companion animals	Veterinarians and owners	Broad general model of communication that could be applied to all 3 stages (making decision, enacting decision, & aftercare)	4E model (adapted from human medicine) <sup>47</sup>	View each client as individual with specific needs, and identify and adapt to these. Relationship based interaction can be facilitated by 4E model.
Shaw and Lagoni (2007) <sup>6</sup>	Peer reviewed journal article	USA	General companion animals	Veterinary practice staff and owners	Making the decision	SPIKES (adapted from human medicine) <sup>45</sup>	Compassionate communication is core clinical skill that can be taught. This skill should be modelled to foster culture of client & pet support, & increased vet team satisfaction.
Gray and Moffett (2010) <sup>48</sup>	Textbook	UK; St Kitts & Nevis	General companion animals (although main focus dogs & cats, specifically mentions most recommendations relevant to horses)	Veterinary practice staff and owners	Making the decision, enacting the decision, aftercare (brief)	7-step communication tool (adapted from human medicine) <sup>49</sup>	Take a relationship-centred approach to communication. Specific advice also given (separately from actual model) on dealing with certain situations e.g., when client does not want to euthanase, expert clients.

Author & Year	Publication Type	Country Authors From	Species Model For	Who Will Use Model?	Stage of End of Life Care	Based on Previous Model?	Recommendations
			& ponies, as well as other species)				
Parker and Yeates (2011) <sup>14</sup>	Peer reviewed journal article	UK	Horses/equines	Veterinary clinicians and owners	Making the decision	No – model presented from literature	Quality of life assessments should be used to inform decisions. In some cases, broad descriptive questions may be more useful than ones that give a numerical score. There is a lack of validated methodologies in equine veterinary practice, & these should be developed.
Hewson (2015) <sup>50</sup>	Peer reviewed journal article	UK	General companion animals	Veterinary nurses and owners	Making the decision, aftercare (brief – just writing a condolence card)	SPIKES (adapted from human medicine) <sup>51</sup> , and separate advice not following model for aftercare	Communicating with grieving clients should not just be one way delivery of information. Should be empathetic & interactive, & is a learnt skill. Condolence cards should be personal rather than generic.
Bishop <i>et al.</i> (2016) <sup>19</sup>	Peer reviewed journal article	USA	General companion animals (although examples given are of dogs and cats)	Veterinary practice staff and owners	Making the decision, enacting the decision, aftercare	No – model presented from literature & experience of taskforce of experts	Primary care practices should have dedicated team implementing end of life palliative & hospice care. Hospice & palliative care options should be discussed with owners, as well as euthanasia vs hospice assisted natural death. Although animal hospice does not accept owner's decision to let pet die without euthanasia unless measures in place to alleviate discomfort & distress.
Knesl <i>et al.</i> (2017) <sup>52</sup>	Peer reviewed journal article	USA	General companion animals	Veterinarians and owners	Making the decision	No – model presented from literature, although other currently available resources cited	To improve end of life discussions & decisions vet staff should have sufficient training in ethical approaches to determine when euthanasia is appropriate, regular training in

Author & Year	Publication Type	Country Authors From	Species Model For	Who Will Use Model?	Stage of End of Life Care	Based on Previous Model?	Recommendations
							client communication, & a standard end of life/euthanasia protocol. Vets can use ethical decision-making frameworks, a communication system where clients see a regular vet, & quality of life assessment tools to improve end of life decision-making.
Pierce and Shanan (2017) <sup>53</sup>	Textbook	USA	General companion animals	Veterinary practice/veterinary hospice staff and owners (and owners' families)	Making the decision	Four-box method (adapted from human medicine) <sup>54</sup>	When 4-box method previously adapted for vet use 4th box (patient preferences) excluded. This box should be retained, & responsibility of caregivers (especially) & vet/hospice team to try to discern the animal's preferences.
Van Eps <i>et al.</i> (2017) <sup>15</sup>	Textbook	Australia; USA	Horses/equines (with laminitis)	Veterinarians, farriers, and owners	Making the decision	Adapted from Parker & Yeates <sup>14</sup> (developed for equines) to be used in specific context of equine chronic laminitis	The owner, vet & farrier will all have valuable contributions when assessing quality of life and making decisions in a chronic laminitis case. The outlined model can be used to help the different team members reach a resolution when there is a disagreement.
Bley (2018) <sup>21</sup>	Peer reviewed journal article	Switzerland	General companion animals (with cancer)	Veterinarians and owners	Making the decision	4 principles of ethical decision making (beneficence, non-maleficence, autonomy, justice) (adapted from human medicine) <sup>44</sup>	Can integrate the 4 ethical principles (especially beneficence/non-maleficence) into empirical facts of what is medically possible. Guidelines from this can reduce burden of decision on owner, & ensure animal patients not enduring severe side effects from futile treatment or euthanased prematurely. Need to consider double effect – where a

Author & Year	Publication Type	Country Authors From	Species Model For	Who Will Use Model?	Stage of End of Life Care	Based on Previous Model?	Recommendations
							treatment has side effect or other impact, the benefit must outweigh this for it to be used.
Goldberg (2019) <sup>23</sup>	Peer reviewed journal article	USA	General companion animals	Veterinary practice staff and owners	Making the decision	Serious Illness Conversation Guide (SICG) (adapted from human medicine to form Serious Veterinary Illness Conversation Guide (SVICG)) <sup>55</sup>	The SVICG is a model for goals of care conversations. Ideally these conversations would take place for all geriatric, chronically or seriously ill patients, and all owners struggling to make decisions. The use of goals of care conversations in veterinary medicine have the potential to increase the quality of medical and palliative care animal patients receive.
Smith (2019) <sup>18</sup>	Peer reviewed journal article	USA	General companion animals in palliative care (although examples given are of dogs and cats) (To decide whether to provide assisted nutrition)	Veterinary practice staff and owners	Making the decision	Adapted from Karlawish <i>et al.</i> <sup>56</sup> (from human medicine)	Decreased food & water consumption commonly seen towards end of life. This can be managed, including using enteral or parenteral nutritional supplementation. Carefully consider the impact assisted nutrition may have on quality as well as quantity of life, when deciding whether to use. Should not use it to prolong life if quality of life will be poor.
Lummis <i>et al.</i> (2020) <sup>57</sup>	Peer reviewed journal article	USA	General companion animals (although examples given are of dogs and cats)	Veterinary practice staff and owners	Making the decision	Common components of SPIKES <sup>51</sup> , ABCDE <sup>58</sup> , BREAKS <sup>59</sup> & SICG <sup>55</sup> (all developed for human medicine) taken and adapted for veterinary use. Additional advice is based on literature.	Good communication sets foundation for providing improved care especially during stressful situations & end of life. The guidelines presented can be implemented in a range of stressful situations. Vet staff should take time to prepare themselves & the physical space before beginning an end of life conversation.



Author & Year	Start Having End of Life Conversations Early	Breaking Bad News Protocol	Knowledge Exchange Between Vet Team & Owner *	Elicit Owner Expectations *	Check Owner Understanding *	Present Treatment &/or End of Life Options	Ascertain Level of Involvement in Decision Desired by Owner *	Consider Impact of Options on Animal Patient's Quality of Life *	Consider Impact of Options on Owner (& Other Stakeholders) *	Give Information in Different Formats e.g., written, online etc	Give Information About Costs	Have Owner Sign Consent Form(s)	Make a Treatment &/or End of Life Care Plan *	Set Treatment Goals & End Points *	Minimise Owner Guilt	Explain Euthanasia Procedure & Options	Plan for Euthanasia Procedure	Explain Body Aftercare Options & Make Plan	Signpost Owner to &/or Provide Emotional Support	Follow Up e.g., Appointment, Condolence Card, Fur Clippings etc
Gray and Moffett (2010) <sup>48</sup>																				
Parker and Yeates (2011) <sup>14</sup>																				
Hewson (2015) <sup>50</sup>																				
Bishop <i>et al.</i> (2016) <sup>19</sup>																				
Knesl <i>et al.</i> (2017) <sup>52</sup>																				
Pierce and Shanan (2017) <sup>53</sup>																				
Van Eps <i>et al.</i> (2017) <sup>15</sup>																				
Bley (2018) <sup>21</sup>																				
Goldberg (2019) <sup>23</sup>																				
Smith (2019) <sup>18</sup>																				
Lummis <i>et al.</i> (2020) <sup>57</sup>																				

\* Components most likely to contribute to shared decision-making between client and veterinarian.

† Recommended when veterinarian-client relationship is good should use verbal consent over signing a form, although consent via email or similar is not adequate.

Table 5. Suggested key terms to be included in future publications on companion animal end of life decision-making

<b>Key Terms</b>	<b>Notes</b>
<b>Veterinary</b>	To distinguish from publications in human medicine
<b>[Species/group of animals]</b>	E.g., horse, equids, or companion animals etc, so searches can be narrowed from other animal groups such as farmed, wild, or research animals
<b>Euthanasia OR End of Life OR Serious Illness</b>	Depending on which is most appropriate for the research topic
<b>Decision-making</b>	
<b>Model OR Plan OR Guidance OR Framework</b>	Options to allow flexibility as researchers may wish to market their recommendations slightly differently depending on their specific goals

## References

- 1 Christiansen, S. B., Kristensen, A. T., Lassen, J., et al. Veterinarians' role in clients' decision-making regarding seriously ill companion animal patients. *Acta Vet Scand.* 2016;58:30.
- 2 Cornell, K. K. & Kopcha, M. Client-veterinarian communication: skills for client centered dialogue and shared decision making. *Vet Clin North Am Small Anim Pract.* 2007;37:37-47.
- 3 Bukstein, D. A., Guerra, D. G., Huwe, T., et al. A review of shared decision-making: A call to arms for health care professionals. *Annals of Allergy, Asthma & Immunology.* 2020;125:273-279.
- 4 Chrenka, E. A., Solberg, L. I., Asche, S. E., et al. Is Shared Decision-making Associated with Better Patient-reported Outcomes? A Longitudinal Study of Patients Undergoing Total Joint Arthroplasty. *Clin Orthop Relat Res.* 2022;480:82-91.
- 5 Bomhof-Roordink, H., Gartner, F. R., Stiggelbout, A. M., et al. Key components of shared decision making models: a systematic review. *Bmj Open.* 2019;9:e031763.
- 6 Shaw, J. R. & Lagoni, L. End-of-life communication in veterinary medicine: delivering bad news and euthanasia decision making. *Effective Communication in Veterinary Practice.* 2007;37:95-108.
- 7 Rioja-Lang, F. C., Connor, M., Bacon, H., et al. Determining a welfare prioritization for horses using a delphi method. *Animals.* 2020;10:647.
- 8 Horseman, S., Whay, B., Mullan, S., et al. (2016) Horses in our Hands. [https://storage.googleapis.com/stateless-whwwp-screenbeetle-c/2019/09/14b98a4b-horses-in-our-hands\\_august-2016.pdf](https://storage.googleapis.com/stateless-whwwp-screenbeetle-c/2019/09/14b98a4b-horses-in-our-hands_august-2016.pdf). Accessed 17th February 2021
- 9 Ireland, J. L., Clegg, P. D., McGowan, C. M., et al. A cross-sectional study of geriatric horses in the United Kingdom. Part 2: Health care and disease. *Equine Vet J.* 2011;43:37-44.
- 10 McGowan, T. W., Phillips, C. J. C., Hodgson, D. R., et al. Euthanasia in aged horses: relationship between the owner's personality and their opinions on, and experience of, euthanasia of horses. *Anthrozoos.* 2012;25:261-275.
- 11 Rollin, B. E. Euthanasia, Moral Stress, and Chronic Illness in Veterinary Medicine. *Vet Clin North Am Small Anim Pract.* 2011;41:651-659.
- 12 Tricco, A. C., Lillie, E., Zarin, W., et al. PRISMA Extension for Scoping Reviews (PRISMA-ScR): Checklist and Explanation. *Ann Intern Med.* 2018;169:467-473.
- 13 Peters, M. D. J., Godfrey, C., Mcinerney, P., et al. Chapter 11: Scoping Reviews (2020 version). In JBI Manual for Evidence Synthesis. Eds E. Aromataris & Z. Munn. JBI, 2020
- 14 Parker, R. A. & Yeates, J. W. Assessment of quality of life in equine patients. *Equine Vet J.* 2011;44:244-249.
- 15 Van Eps, A., Hunt, R. J., Belknap, J. K., et al. Management changes in the laminitis case. In Equine laminitis. Eds J. K. Belknap & R. J. Geor. Wiley-Blackwell. pp 411-419, 2017
- 16 Arora, A., Clarida, K., Londono Forero, M., et al. Pet Loss Best Practice Guidelines For Veterinary Teams. Seneca College & VCA Canada, 2020.
- 17 Arora, A., Clarida, K., Steffan, M., et al. Final Report: Pet Loss Best Practice Guidelines For Veterinary Teams. Seneca College & VCA Canada, 2020.
- 18 Smith, A. J. Perspectives on feeding and nutrition. *Vet Clin North Am Small Anim Pract.* 2019;49:501-517.
- 19 Bishop, G., Cooney, K., Cox, S., et al. 2016 AAHA/IAAHPC end-of-life care guidelines. *J Am Anim Hosp Assoc.* 2016;52:341-356.
- 20 Grimm, H., Bergadano, A., Musk, G. C., et al. Drawing the line in clinical treatment of companion animals: recommendations from an ethics working party. *Vet Rec.* 2018;182:664.
- 21 Bley, C. R. Principles for ethical treatment decision-making in veterinary oncology. *Vet Comp Oncol.* 2018;16:171-177.
- 22 Arksey, H. & O'malley, L. Scoping studies: towards a methodological framework. *International Journal of Social Research Methodology.* 2005;8:19-32.
- 23 Goldberg, K. J. Goals of Care: Development and Use of the Serious Veterinary Illness Conversation Guide. *Vet Clin North Am Small Anim Pract.* 2019;49:399-415.

- 24 Hosey, G. & Melfi, V. Human-animal interactions, relationships and bonds: A review and analysis of the literature. *Int J Comp Psychol*. 2014;27:117-142.
- 25 Clough, H. G. R., John, B., Amanda, R., et al. A scoping review of the current literature exploring the nature of the horse-human relationship. *Veterinary Evidence*. 2019;4.
- 26 Clough, H., Roshier, M., England, G., et al. Qualitative study of the influence of horse-owner relationship during some key events within a horse's lifetime. *Vet Rec*. 2021;188:e79.
- 27 Nickels, B. M. & Feeley, T. H. Breaking Bad News in Veterinary Medicine. *Health Communication*. 2018;33:1105-1113.
- 28 Lehnus, K. S., Fordyce, P. S. & Mcmillan, M. W. Ethical dilemmas in clinical practice: a perspective on the results of an electronic survey of veterinary anaesthetists. *Vet Anaesth Analg*. 2019;46:260-275.
- 29 Cooney, K. A., Kogan, L. R., Brooks, S. L., et al. Pet Owners' Expectations for Pet End-of-Life Support and After-Death Body Care: Exploration and Practical Applications. *Top Companion Anim Med*. 2021;43:100503.
- 30 Epstein, M., Kuehn, N. F., Landsberg, G., et al. AAHA senior care guidelines for dogs and cats. *J Am Anim Hosp Assoc*. 2005;41:81-91.
- 31 Batchelor, C. E. M. & Mckeegan, D. E. F. Survey of the frequency and perceived stressfulness of ethical dilemmas encountered in UK veterinary practice. *Vet Rec*. 2012;170:19.
- 32 Matte, A. R., Khosa, D. K., Coe, J. B., et al. Impacts of the process and decision-making around companion animal euthanasia on veterinary wellbeing. *Vet Rec*. 2019;185:480.
- 33 Adams, C. L., Bonnett, B. N. & Meek, A. H. Predictors of owner response to companion animal death in 177 clients from 14 practices in Ontario. *J Am Vet Med Assoc*. 2000;217:1303-1309.
- 34 Matte, A. R., Khosa, D. K., Coe, J. B., et al. Exploring pet owners' experiences and self-reported satisfaction and grief following companion animal euthanasia. *Vet Rec*. 2020;187:e122.
- 35 Fernandez-Mehler, P., Gloor, P., Sager, E., et al. Veterinarians' role for pet owners facing pet loss. *Vet Rec*. 2013;172:555.
- 36 Mason, S. Palliative care in small animal oncology. *In Pract*. 2016;38:203-216.
- 37 Murray, L. M. A., Byrne, K. & D'eath, R. B. Pair-bonding and companion recognition in domestic donkeys, *Equus asinus*. *Appl Anim Behav Sci*. 2013;143:67-74.
- 38 Burden, F. & Thiemann, A. Donkeys Are Different. *J Equine Vet Sci*. 2015;35:376-382.
- 39 Springer, S., Jenner, F., Tichy, A., et al. Austrian Veterinarians' Attitudes to Euthanasia in Equine Practice. *Animals*. 2019;9:44.
- 40 Stoewen, D. L., Coe, J. B., Macmartin, C., et al. Qualitative study of the communication expectations of clients accessing oncology care at a tertiary referral center for dogs with life-limiting cancer. *J Am Vet Med Assoc*. 2014;245:785-795.
- 41 Stoewen, D. L., Coe, J. B., Macmartin, C., et al. Qualitative study of the information expectations of clients accessing oncology care at a tertiary referral center for dogs with life-limiting cancer. *J Am Vet Med Assoc*. 2014;245:773-783.
- 42 Villagran, M., Goldsmith, J., Wittenberg-Lyles, E., et al. Creating COMFORT: A Communication-based model for Breaking Bad News. *Communication Education*. 2010;59:220-234.
- 43 Buckman, R. Breaking bad news: the S-P-I-K-E-S strategy. *Community Oncol*. 2005;2:138-142.
- 44 Beauchamp, T. L. & Childress, J. F. Principles of biomedical ethics. Oxford; New York: Oxford University Press, 2013
- 45 Buckman, R. How to Break Bad News: A Guide for Health Care Professionals. Baltimore: The John Hopkins University Press, 1992
- 46 Brandt, J. C. & Grabill, C. M. Communicating with special populations: children and older adults. *Effective Communication in Veterinary Practice*. 2007;37:181-198.
- 47 Keller, V. F. & Carroll, J. G. A new model for physician-patient communication. *Patient Educ Couns*. 1994;23:131-140.
- 48 Gray, C. & Moffett, J. Dealing with difficult situations. In Handbook of veterinary communication skills. Eds C. Gray & J. Moffett. Wiley-Blackwell. pp 100-126, 2010

- 49 Von Gunten, C. F., Ferris, F. D. & Emanuel, L. L. Ensuring competency in end-of-life care: Communication and relational skills. *JAMA*. 2000;284:3051-3057.
- 50 Hewson, C. Grief for pets. Part 3: Supporting clients. *Veterinary Nursing Journal*. 2015;30:26-30.
- 51 Baile, W. F., Buckman, R., Lenzi, R., et al. SPIKES-A six-step protocol for delivering bad news: application to the patient with cancer. *Oncologist*. 2000;5:302-311.
- 52 Knesl, O., Hart, B. L., Fine, A. H., et al. Veterinarians and Humane Endings: When Is It the Right Time to Euthanize a Companion Animal? *Frontiers in Veterinary Science*. 2017;4:45.
- 53 Pierce, J. & Shanan, A. Ethical Decision Making in Animal Hospice and Palliative Care. In *Hospice and Palliative Care for Companion Animals*. Eds A. Shanan, J. Pierce & T. Shearer. Wiley-Blackwell. pp 57-71, 2017
- 54 Jonsen, A. R., Siegler, M. & Winslade, W. J. *Clinical Ethics: A Practical Approach to Ethical Decisions in Clinical Medicine*. New York: McGraw-Hill, 2010
- 55 Bernacki, R. E. & Block, S. D. Communication About Serious Illness Care Goals: A Review and Synthesis of Best Practices. *JAMA Internal Medicine*. 2014;174:1994-2003.
- 56 Karlawish, J. H. T., Quill, T. & Meier, D. E. A Consensus-Based Approach To Providing Palliative Care to Patients Who Lack Decision-Making Capacity. *Ann Intern Med*. 1999;130:835-840.
- 57 Lummis, M., Marchitelli, B. & Shearer, T. Communication: Difficult Conversation in Veterinary End-of-Life Care. *Vet Clin North Am Small Anim Pract*. 2020;50:607-616.
- 58 Vandekieft, G. K. Breaking bad news. *Am Fam Physician*. 2001;64:1975-1978.
- 59 Narayanan, V., Bista, B. & Koshy, C. 'BREAKS' Protocol for Breaking Bad News. *Indian J Palliat Care*. 2010;16:61-65.