

1 LETTER

2 **CEPEF4: update and plan**

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15 Mortality related to anaesthesia is higher in horses than in other domestic species. Overall
16 mortality rates in dogs, cats and rabbits were 0.17%, 0.24% and 1.34%, respectively, in the
17 multicentre, prospective, cohort study reported by Brodbelt et al. (2008). Several studies have
18 been published establishing mortality rate and factors associated with the risk of death in
19 horses; however, many studies were single-centre and/or retrospective (Senior 2013).

20 It is almost 20 years since Johnston et al. (2002) published the Confidential Enquiry
21 into Perioperative Equine Fatalities 2 (CEPEF2) study. This is still the largest multicentre
22 investigation with a collection of 41,824 cases from 62 clinics worldwide spanning 6 years.
23 The CEPEF2 study reported an overall equine mortality rate of 1.9%. This was reduced to
24 0.9% when only elective procedures in healthy horses were included, and increased to 11.7%
25 in horses with colic. This study included 7 days follow-up after anaesthesia. Subsequently in

26 2004, CEPEF3 was published as a randomised controlled trial investigating the relative
27 outcomes after halothane or isoflurane anaesthesia (Johnston et al. 2004).

28 In retrospect, it is clear that much has changed since 2004. For instance, halothane
29 was then the most commonly used inhalant agent whereas it is now neither manufactured nor
30 used in many countries. Other advancements have been made, including new drugs and
31 anaesthetic protocols, more sophisticated monitoring, improved anaesthesia machines,
32 ventilators and ancillary equipment, such as infusion pumps, all considered likely to improve
33 safety. The ultimate aim is to provide anaesthesia and recovery with minimal complications,
34 thereby reducing mortality and morbidity related to anaesthesia.

35 With these new developments we should expect that the death rate of one healthy
36 horse out of 100 anaesthetized is reduced. However, Dugdale & Taylor (2016) in their
37 narrative review claimed that even with all these improvements, *“we are still a long way
38 from greatly reducing the mortality associated with equine anaesthesia”*. Indeed, their
39 statement *“we still lose horses after anaesthesia to a range of catastrophes that would not
40 occur if the horses were not anaesthetized”* has been taken up in recent years with a move
41 towards avoiding general anaesthesia when possible, using more refined techniques for long
42 term sedation and analgesia and inclusion of the in vogue ultrasound-guided locoregional
43 techniques.

44 In an editorial in this journal, Gent & Bettschart-Wolfensberger (2013) declared the
45 need for an update to identify any change in mortality rates from that reported previously in
46 CEPEF2. That is already 7 years ago, providing incentive for initiating CEPEF4. The main
47 aim is to collect an up-to-date dataset as comprehensive as CEPEF2 to document mortality
48 related to equine anaesthesia, but also to identify current trends in equine anaesthesia and
49 analgesia. Highlighting any associations with successful or unsuccessful outcomes should

50 show which, if any, of the new developments are beneficial and point the way to further
51 improvement.

52 A CEPEF4 team has been created; more information can be found at
53 <https://cepef4.wordpress.com/cepef-4-team/>. Unfortunately, a presentation describing the
54 proposed CEPEF4 scheduled during the 2020 spring meeting of the Association of
55 Veterinary Anaesthetists in Dublin was lost to the COVID-19 pandemic. This presentation
56 proposed a digital questionnaire based on previously presented methodology for small
57 animals, adapted to the particularities of horses requiring anaesthesia. The questionnaire is
58 user-friendly for use on phone, tablet or laptop and is designed for collecting anaesthetic and
59 horse related data to describe the current worldwide equine anaesthetic practice and to detect
60 factors associated with mortality. The questionnaire builds on the experience of CEPEF2. In
61 particular, the end point of ‘alive or dead’ at 7 days may be reduced to 3 days to facilitate
62 reliable data collection. However, this change is still under consideration because it would
63 impair comparison with CEPEF2.

64 Launching this study during the COVID-19 pandemic would have biased the case
65 logs in the first months of the study by exerting unnecessary pressure on potential
66 collaborators already dealing with the uncertainties of veterinary care at that time. Instead, we
67 have used our professional network to involve researchers and clinicians with a special
68 interest in this subject to evaluate and comment on the proposed investigation. We are
69 extremely grateful for the invaluable feedback that has undoubtedly improved the quality of
70 the questionnaire.

71 We hope that this letter will encourage all veterinarians treating horses to participate
72 in CEPEF4 so that the current equine anaesthetic-related mortality rate can be documented.
73 The results may identify areas that can be improved and we hope that CEPEF4 will become a
74 shared resource to stimulate and enable further research for all involved in equine

75 anaesthesia. November 2020 is the scheduled start of CEPEF4. If you are interested in
76 helping, please do not hesitate to contact us via <https://cepef4.wordpress.com>.

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