Measuring improvement in quality of life of dogs with osteoarthritis (OA) treated with bedinvetmab (Librela®, Zoetis, Inc., Parsippany, NJ) using an app-based, validated, owner-reported, health-related quality of life (HRQL) outcome measure (VetMetrica™).

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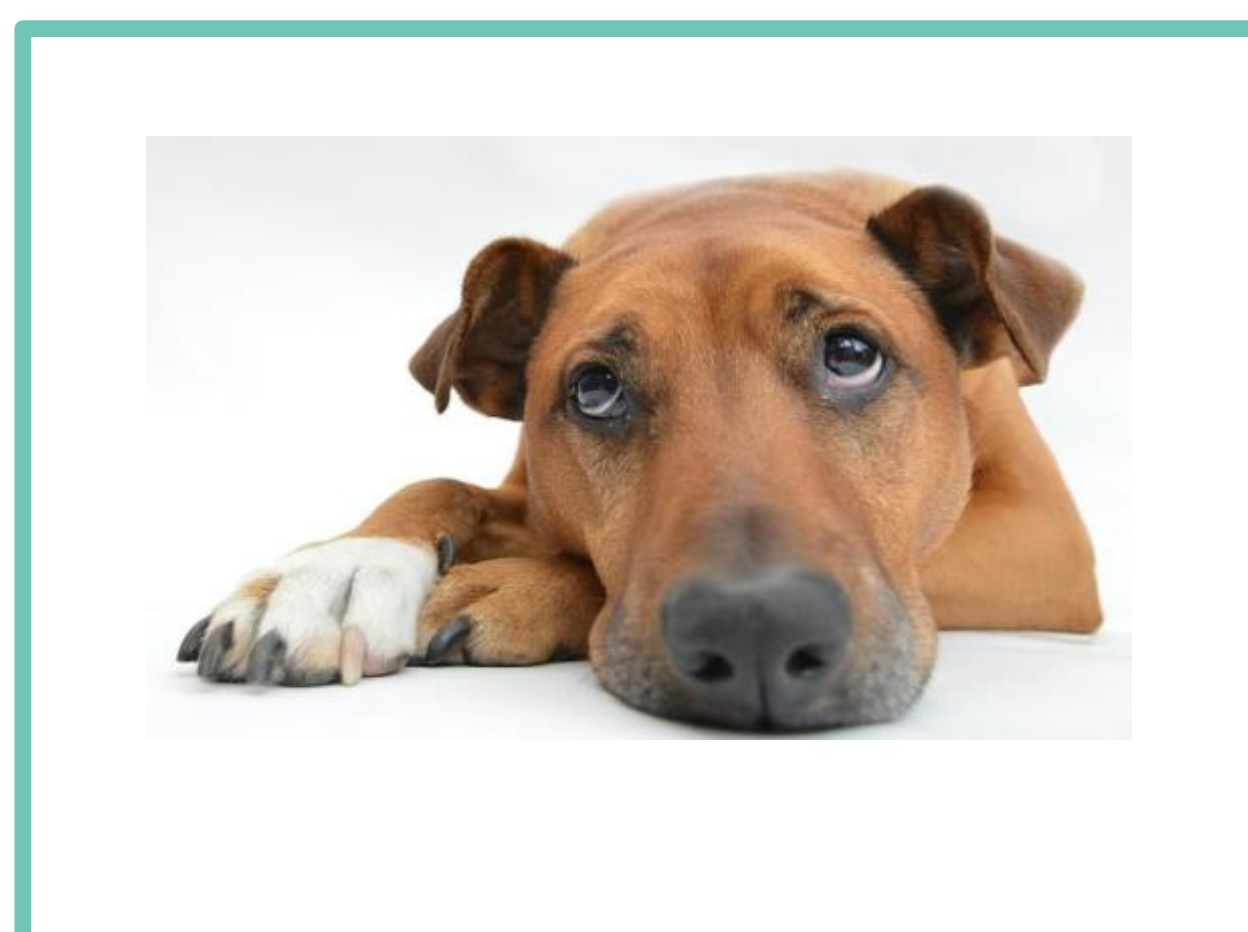
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Introduction: In people quantification of HRQL in osteoarthritis (OA) plays a key role in measuring the severity and outcome of the disease; a practice that has yet to be generally implemented in veterinary science. Effective HRQL measurement should provide the means to measure the affective component of the pain experience (how it makes you feel) which is recognised as the contemporary approach to its measurement.

In 2020 Librela (bedinvetmab), an anti-nerve growth factor (NGF) monoclonal antibody was licensed for the alleviation of pain associated with osteoarthritis in dogs[1]. Librela is administered monthly as a subcutaneous injection with a dose of 0.5-1mg/kg. Chronic osteoarthritic pain is associated with a negative impact on the quality of life (QOL) of dogs suffering from the disease[2]. Assessing how the alleviation of pain associated   with osteoarthritis impacts the QOL of the dog, particularly in relation to how the dog feels about its circumstance, is an important step that broadens the perspective in relation to pain management.

VetMetrica™ is a digital HRQL instrument consisting of 22 questions for the owner, each of which consists of a descriptor (eg 'active') with a 7-point Likert rating scale, 0 – 6 (0 meaning 'not at all' and 6 meaning 'couldn't be more'). Transformation of responses into a quality of life profile with scores in 4 domains of HRQL – energetic/enthusiastic (E/E), happy/content (H/C), active/comfortable (A/C), calm/relaxed (C/R) - is automatic and instantaneous[3]. Scores are normalised such that a score of 50 on a 0-100 scale represents that of an age-related healthy dog and 70% of healthy dogs will score above 44.8[4]. The domains E/E and A/C measure physical wellbeing and emotional wellbeing is represented by H/C and C/R[3,4]. Vetmetrica™ is a generic instrument, the 109 item prototype of which has been validated in canine OA[5] as has the current 22 item iteration of the tool.[2]

Objective: The purpose of this study was to assess the impact of Librela (bedinvetmab), a monoclonal antibody indicated for alleviation of osteoarthritic pain in dogs, in client-owned dogs with OA. The working hypothesis was that such treatment would produce an improvement in both emotional and physical aspects of the chronic pain experience suffered by dogs with OA, as measured by its impact on QOL, and that this amelioration would be sustained over the period of treatment.
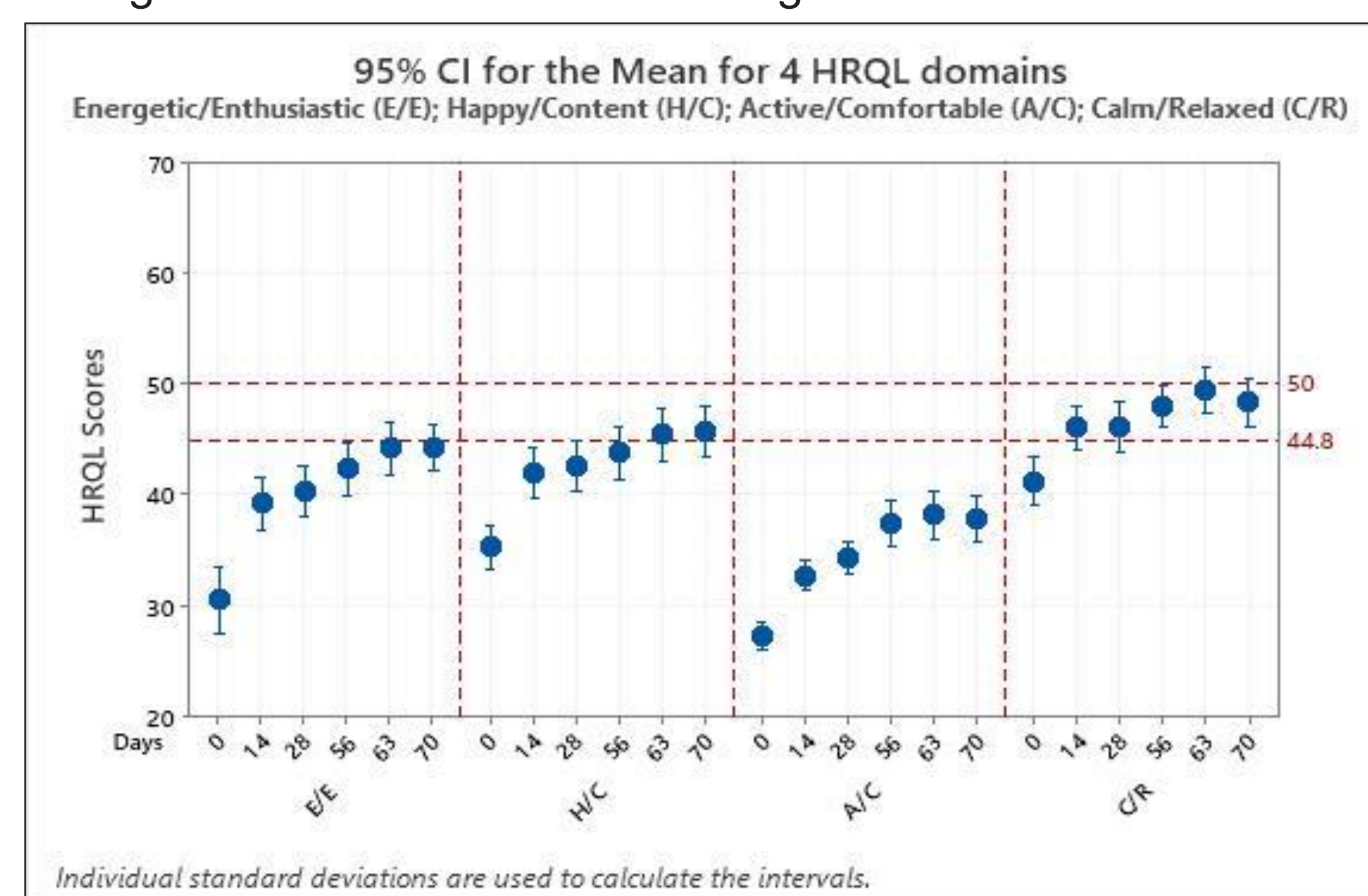
Materials and Methods: Owners of dogs with OA, prescribed Librela by their attending clinician, were requested to complete assessments on an app at the following intervals +/- 48hrs initial injection of Librela (baseline = T0) and at 14 (T1), 28 (T2), 56 (T3), 63 (T4) and 70 (T5) days. Librela was administered monthly as per the licence at T0, T2, and T3. Group means (95% confidence intervals) at all time points and significance between baseline and 14 days using paired T-test was calculated

Results:

Table 1: Demographics of 68 dogs treated with Librela,

Mean age +/- standard deviation	11.2 +/- 3 years
Gender	39 female of which 33 were neutered, 29 male of which 16 were neutered
Breed	Labrador retriever (14); crossbreed (21); Golden retriever, Border collie & Chihuahua (3); Cocker spaniel (4); Flat coat retriever, Shih tzu & JRT (2); Staffordshire bull terrier (6); 1 each of Border terrier, Irish terrier; Greyhound, Labradoodle, Maltese terrier; Rottweiller; English pointer; Shnauzer

The largest change in all domains was seen from T0 to T1 (Table 2 & Figure 1) and this was highly significant (paired T – test in E/E, H/C, A/C, C/R p = < 0.001). The improvement in all domains was continued from T1 to T5 with the greatest change seen in the physical wellbeing domains E/E and A/C compared with the emotional wellbeing domains H/C and C/R.

Figure 1: Mean and 95% Confidence Intervals for HRQL scores in each of the 4 domains E/E, H/C, A/C and C/R for 68 dogs treated with Librela according to the label instructions

Individual standard deviations are used to calculate the intervals.

A score of 50 represents that of the average healthy dog and 70% of healthy dogs will score above 44.8

Table 2: Mean (95% Confidence Intervals) at each time point for 4 domains of HRQL in 68 dogs treated with Librela

Group means (CI)	T0 (+/- 48hrs)	T1 (Day14)	T2 (Day28)	T3 (Day56)	T4 (Day63)	T5 (Day 70)	T1 – T0	T5 – T1
Energetic/ Enthusiastic	30.6 (27.54,33.58)	39.2 (36.90,41.57)	40.4 (38.14,42.62)	42.4 (40.04,44.70)	44.3 (41.88,46.63)	44.3 (42.16,46.36)	8.6	5.1
Happy/ Content	35.3 (33.42,37.22)	42.0 (39.74,44.33)	42.6 (40.41,44.87)	43.8 (41.44,46.14)	45.4 (41.44,46.14)	45.7 (43.48,47.91)	6.7	3.7
Active/ Comfortable	27.4 (26.17,28.61)	32.8 (31.52,34.05)	34.4 (32.83,35.90)	37.5 (35.41,39.59)	38.3 (36.08,40.43)	37.9 (35.84,39.89):	5.4	5.1
Calm/ Relaxed	41.2 (39.02,43.44)	46.0 (44.14,47.93)	46.1 (43.78,48.37)	48.1 (46.20,49.93)	49.4 (47.36,51.42)	48.3 (46.16,50.53)	4.8	2.3

Discussion: As people we expect that our doctor will make us feel better, and few would argue that this should not be the same for our companion animals. However, until the advent of VetMetrica™ it has not been possible to quantify that affective component of the pain experience.

This study demonstrated the impact of OA on canine emotional as well as physical wellbeing and provided evidence as to how Librela improves both of these aspects, both from magnitude and temporal viewpoints. The low scores for the domains E/E and A/C at T0 are indicative of the consequential impact of OA on the physical wellbeing of affected dogs. While emotional wellbeing was similarly impacted, it was less so, especially in the domain C/R and this may be because prior to treatment the emotional wellbeing of the dogs was less affected by the disease.

Conclusion: The working hypothesis was upheld; Bedinvetmab (Librela), administered monthly as per its licence produced a significant improvement in QOL within 14 days of initial treatment, which was the first time the QOL impact was measured. Improvement was maintained for the duration of the study.

Additionally the study provides additional evidence to support the use of valid and reliable HRQL measurement in future studies of OA, whereby it increases the evidence base and adds value to existing functional measures.

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Measuring improvement in quality of life of cats with osteoarthritis (OA) treated with frunevetmab (Solensia, Zoetis, Inc., Parsippany, NJ) using an app-based, validated, owner-reported, health-related quality of life (HRQL) outcome measure (VetMetrica™).

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Introduction: In people quantification of HRQL in osteoarthritis (OA) plays a key role in measuring the severity and outcome of the disease; a practice that has yet to be generally implemented in veterinary science. Effective HRQL measurement should provide the means to measure the affective component of the pain experience (how it makes you feel) which is recognised as the contemporary approach to its measurement.

In 2021 Solensia (frunevetmab), an anti-nerve growth factor (NGF) monoclonal antibody was licensed for the alleviation of pain associated with osteoarthritis in cats[1]. Solensia is administered monthly as a subcutaneous injection with a dose of 1-2.8 mg/kg[1]. Chronic osteoarthritic pain is associated with a negative impact on the quality of life (QOL) of cats suffering from the disease[2]. Assessing how the alleviation of pain associated with osteoarthritis impacts the quality of life of the cat, particularly in relation to how the cat feels about its circumstance, is an important step that broadens the perspective in relation to pain management.
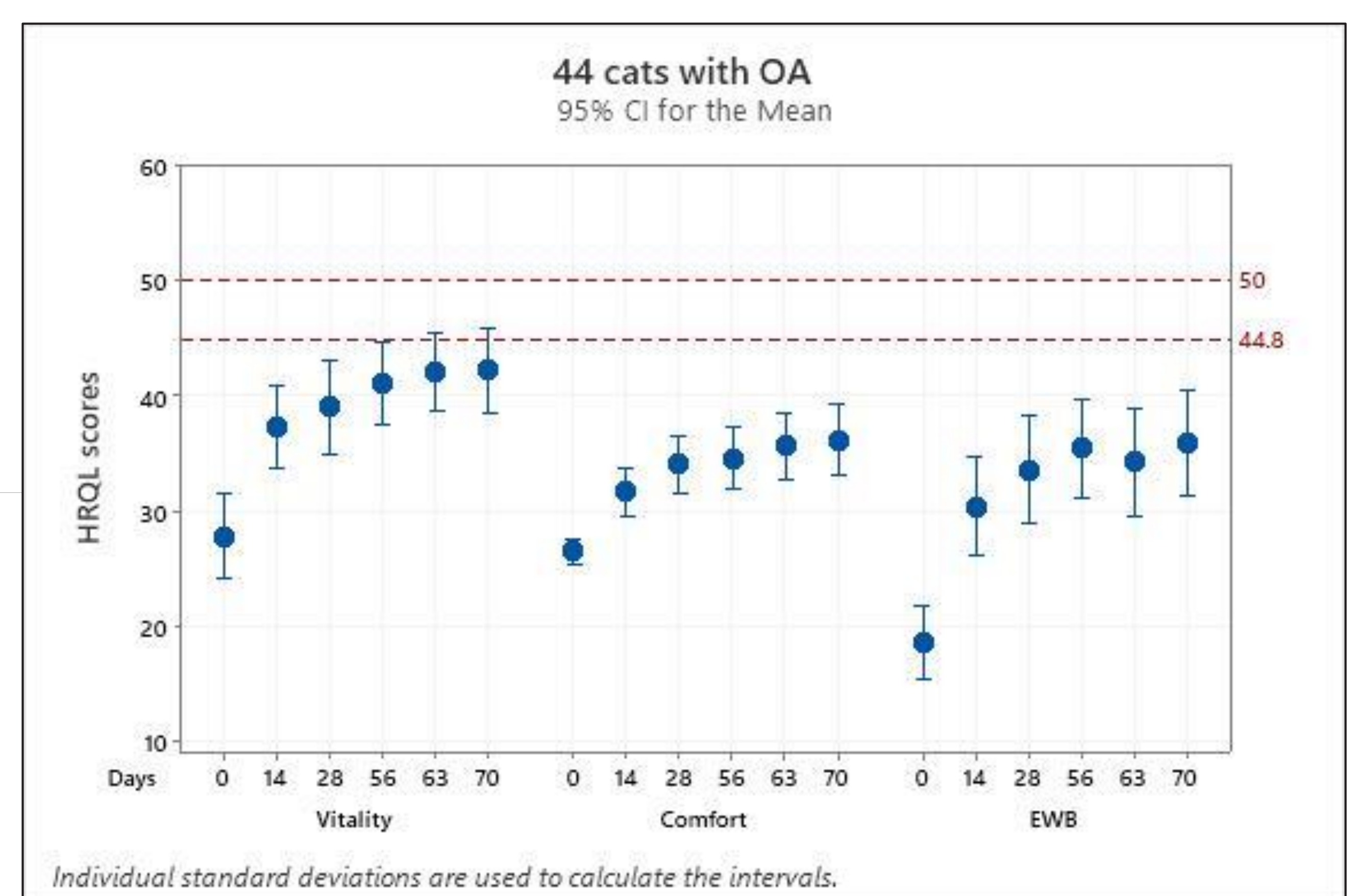
VetMetrica™ for cats is a digital HRQL instrument consisting of 20 questions for the owner, each of which consists of a descriptor (eg 'active') with a 7-point Likert rating scale, 0 – 6 (0 meaning 'not at all' and 6 meaning 'couldn't be more'). Transformation of responses into a quality of life profile with scores in 3 domains of HRQL – vitality (V), comfort (C), emotional wellbeing (EWB) - is automatic and instantaneous[3]. Scores are normalised such that a score of 50 on a 0-100 scale represents that of the healthy cat and 70% of healthy cats will score above 44.8[4] The domains V and C measure physical wellbeing and emotional wellbeing is represented by the EWB domain. Vetmetrica™ is a generic instrument that has been validated previously in cats with OA[2]

Objective: The purpose of this study was to assess the impact of Solensia (frunevetmab) on the QOL of client-owned cats with OA pain. The working hypothesis was that such treatment would produce an improvement in both emotional and physical aspects of the chronic pain experience suffered by cats with OA, as measured by its impact on QOL, and that this amelioration would be sustained over the period of treatment.

Materials and Methods: Owners of cats with OA pain, prescribed Solensia (frunevetmab) by their attending clinician, were requested to complete assessments on an app at the following intervals +/- 48hrs initial injection of Solensia (baseline = T0) and at 14 (T1), 28 (T2), 56 (T3), 63 (T4) and 70 (T5) days. Solensia was administered monthly as per the licence at T0, T2, and T3. Group means (95% confidence intervals) at all time points and significance between baseline and 14 days using paired T-test was calculated.

Results;

Forty four (44) cats of different breeds, mean age 14.1 years with a standard deviation of 3.4, were recruited to the study. There were 18 females of which 14 were neutered and 26 males of which 20 were neutered. Owners completed all assessments according to the study protocol at all time points

The largest change in scores in all 3 domains was seen from T0 to T1 and this was highly significant (paired T – test in V, C and EWB p = < 0.001). The improvement in all domains was continued from T1 to T5 with the greatest change seen in Vitality and Emotional wellbeing with less change evident in the Comfort domain

Figure 1: Mean and 95% Confidence Intervals for HRQL scores in each of the 3 domains vitality, comfort and emotional wellbeing (EWB) for 44 cats treated with Solensia (frunevetmab) according to the label instructions

A score of 50 represents that of the average healthy cat and 70% of healthy cats will score above 44.8

Table 1 Mean (95% Confidence Intervals) at each time point for 3 domains of HRQL in 44 cats treated with Solensia

Group means (CI)	T0 (+/- 48hrs)	T1 (14days)	T2 (28 days)	T3 (56days)	T4 (63days)	T5 (70days)	T1 – T0	T5 – T1
Vitality	27.8 (24.04, 32.50)	37.2 (33.62, 40.80)	39.0 (34.96, 43.00)	40.0 (37.38, 44.61)	42.1 (38.64, 45.45)	42.1 (58.4, 45.45)	9.4	4.9
Comfort	26.5 (25.36, 27.55)	31.7 (29.55, 33.75)	34.0 (31.56, 36.50)	34.5 (31.85, 37.14)	35.6 (37.76, 38.47)	36.1 (33.02, 39.25)	5.2	4.4
Emotional wellbeing	18.6 (15.39, 21.75)	30.4 (26.12, 34.61)	33.5 (28.80, 38.29)	35.4 (31.09, 39.67)	34.2 (29.56, 38.76)	35.9 (31.26, 40.52)	11.8	5.5

Discussion: As people we expect that our doctor will make us feel better, and few would argue that this should not be the same for our companion animals. However, until the advent of VetMetrica™ it has not been possible to quantify that affective component of the pain experience.

Previously we have reported that in addition to OA, senior cats commonly have several co-morbidities including, but not restricted to, hyperthyroidism and chronic renal disease[2] and this may have contributed to the extremely low domain scores seen at T0, especially in EWB. Nevertheless, this study demonstrated that Solensia (frunevetmab) produced a significant improvement in all 3 domains, with the greatest change overall (T0 – T5) seen in EWB, followed by vitality and then comfort (Fig 1)

Conclusion: The working hypothesis was upheld; Solensia (frunevetmab) administered monthly as per its licence produced a significant improvement in HRQL within 14 days of initial treatment, which was the first time the QOL impact was measured. Improvement was maintained for the duration of the study.

Additionally the study provides additional evidence to support the use of valid and reliable HRQL measurement in future studies of OA, whereby it increases the evidence base and adds value to existing functional measures.

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1. Solensia FPC
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