Introduction
The first reports of naturally occurring systemic hypertension in cats emerged in the late 1980s and early 1990s; since then, hypertension has emerged as a major feline disease, reportedly affecting around 10% or more of cats over the age of 6–9 years presented to veterinary clinics, with a marked increase in prevalence with age. While earlier experimental studies established a link between hypertension and induced renal damage, or the administration of thyroxine, studies of naturally occurring disease soon demonstrated that many cases of hypertension were associated with either chronic kidney disease (CKD), hyperthyroidism or, sometimes, other...
systemic diseases. In contrast to human medicine where primary hypertension is common, it is currently estimated that at least 80% of feline cases are secondary hypertension, with CKD being the most commonly identified comorbidity.

Indirect measurement of systolic blood pressure (SBP), using either Doppler or oscillometric equipment, has become established as the standard way to assess blood pressure (BP) and diagnose hypertension in conscious cats. However, measured BP can be affected by many different variables, including the type of equipment and how it is used (site used, technique employed, position of the cat, size of the cuff, etc), personnel involved, level of arousal of the cat and experience of the operator. These factors, together with the inherent inter- and intra-variability of BP, can make interpretation of individual BP measurements challenging. Despite these difficulties, consensus guidelines have emerged on how to measure and interpret SBP in cats, although SBP values should not be interpreted independently from other clinical information.

There have been few large-scale studies on assessment of feline SBP in clinical practice and the variables that may be associated with its measurement in this setting. The current study, entitled ‘The Mercury Challenge’, was therefore established as a large, international, multicenter European-based convenience sample of feline SBP assessment in primary care practice. The objective was to collect data on more than 10,000 cats aged ≥7 years of age, where SBP was being measured as part of their clinical assessment, to describe the findings and to look at different variables that might have affected SBP measurement and the values obtained.

Materials and methods

A web-based questionnaire was designed and hosted on a dedicated website (www.mercurychallenge.ceva.com) to collect data on cats that were having SBP measured as part of their clinical examination (Figure 1). Clinics were encouraged to follow the American College of Veterinary Internal Medicine (ACVIM) guidelines for evaluation of BP and to collect data on more than 10,000 cats ≥7 years of age, where SBP was being measured as part of their clinical assessment.

Descriptive statistics were used to summarize the collected data and inferential statistics were used to analyze factors affecting the SBP measured and the duration of SBP assessment. As the data were not normally distributed, simple non-parametric univariate analyses were undertaken as appropriate (Mann–Whitney test, Kruskal–Wallis test with Dunn’s post-test pair-wise comparisons, Spearman Rank correlation and χ² test).

It was hypothesized that the following might all independently affect the SBP measured: the clinic; the cat’s age, weight, sex, breed and demeanor; the device used; and the presence of concomitant disease or concomitant therapy. To evaluate these factors further, a linear mixed-model analysis was used to evaluate their effect on mean SBP values (after logarithmic transformation of the SBP to have normally distributed data), using these variables as fixed effects except for the clinic, which was included as a random effect. Variables with a P value <0.20 in the univariable linear mixed-model analysis were used in the backward selection to build the multivariable model.

Goodness of fit was assessed with the normal distribution of the residuals. It was also hypothesized that the cat’s demeanor, the device used and the SBP measured might all independently affect the duration of SBP assessment, and a proportional-odds cumulative logistic mixed model was used to assess the effect of these variables on the duration of SBP assessment. However, only cats known to have had at least five SBP recordings, along with information on the duration of SBP assessment (n = 4250) were included in these analyses.

For all analyses, GraphPad Prism (version 9.2.0) or R software (version 4.0.4) was used, and a P value <0.05 was considered to be statistically significant.
Results

Population characteristics
A total of 10,153 SBP assessments were recorded in the database; of these, 1269 were excluded: 1146 as they were from cats aged <7 years (and therefore did not meet the inclusion criteria); and 123 as the recorded SBP was <80 mmHg (range 10–79) and these entries were regarded as unreliable based on previously published data. \textsuperscript{17,18,39}
This resulted in a total of 8884 unique SBP assessments, which were used as the population for subsequent analyses of factors affecting SBP values measured (Figure 2). In 4630/8884 cases, <5 individual SBP recordings (between 1 and 4) were entered into the database, and it was impossible to determine whether at least five recordings had originally been obtained. In a further four cases, although five readings had been entered, the duration of SBP assessment had not been recorded. This resulted in 4250 cases where at least five SBP measurements were known to have been made and the duration of SBP measurement was recorded, and this population was used for analysis of factors affecting the duration of SBP measurement (Figure 2).

The demographics of the 8884 cats in the final dataset are shown in Table 1 and Figure 3. Database entries were received from a total of 811 clinics from 16 countries. The median number of entries per clinic was 6.0 (range 1–162, interquartile range [IQR] 2.0–16.0).

The age of the cats (n = 8884) ranged from 7 to 26 years old (median 13.0; IQR 10.0–16.0). Data on body weight were available from 8517 cats, but the weights of seven cats were excluded as outliers and potentially unreliable based on published data,45–52 three weighing >15kg (range 16–59kg) and four <1.5kg (range 1.0–1.3). Of the remaining 8510 cats, median body weight was 4.0kg (range 1.5–14.0; IQR 3.3–5.0).

**Individual cat SBP and associated factors**

In the final population (n = 8884), the overall median recorded SBP was 150 mmHg (range 80–310; IQR 133–174). An overview of the recorded SBP values broken down by the different categories is given in Tables 2 and 3, along with the results of simple, non-parametric statistical analyses.

The type of device used to measure SBP was specified for 8512 cats (Table 2), but of the 4305 cases where oscillometry was used, the specific type of equipment was only provided in 165 cases, which comprised petMAP (n = 107; Ramsey Medical), Vet HDO Monitor (n = 35; S+B medVET), SunTech or SunTech Vet20 (n = 21; SunTech...
Figure 3  Overview of the geographic distribution of the population investigated

Table 2  Analysis of the systolic blood pressure (SBP) reported in the 8884 cats according to different criteria

| Category                    | Number of cats (% category) | Median SBP | IQR   | Range    | Analysis                  |
|-----------------------------|-----------------------------|------------|-------|----------|---------------------------|
| Sex                         |                             |            |       |          |                           |
| Male                        | 71 (0.8)                    | 144        | 129–163 | 90–250   | Kruskal–Wallis            |
| Male neutered               | 4256 (47.9)                 | 151        | 134–174 | 80–300   |                           |
| Female                      | 63 (0.8)                    | 148        | 130–179 | 92–300   |                           |
| Female neutered             | 4335 (48.8)                 | 150        | 132–174 | 80–310   |                           |
| Unknown                     | 159 (1.8)                   |            |        |          |                           |
| Breed                       |                             |            |       |          |                           |
| Pedigree                    | 2174 (24.5)                 | 150        | 132–172 | 80–300   | Mann–Whitney              |
| Non-pedigree                | 6466 (72.8)                 | 151        | 133–175 | 80–310   |                           |
| Unknown                     | 244 (2.7)                   |            |        |          |                           |
| Device used                 |                             |            |       |          |                           |
| Doppler                     | 4207 (47.4)                 | 148        | 130–172 | 80–310   | Mann–Whitney              |
| Oscillometric               | 4305 (48.5)                 | 154        | 136–175 | 80–280   |                           |
| Unknown                     | 372 (4.2)                   |            |        |          |                           |
| Demeanor                    |                             |            |       |          |                           |
| Calm                        | 4074 (45.7)                 | 144        | 128–166 | 80–310   | Kruskal–Wallis            |
| Anxious                     | 3720 (41.9)                 | 155        | 138–179 | 80–300   |                           |
| Nervous                     | 790 (8.9)                   | 165        | 145–190 | 81–300   |                           |
| Unknown                     | 300 (3.4)                   |            |        |          |                           |
| Duration of assessment (mins) |                             |            |       |          |                           |
| <5                          | 4475 (50.4)                 | 148        | 130–170 | 80–310   | Kruskal–Wallis            |
| 5–10                        | 3696 (41.7)                 | 155        | 136–178 | 80–300   |                           |
| >10                         | 706 (7.9)                   | 154        | 136–180 | 80–300   |                           |
| Unknown                     | 7 (0.1)                     |            |        |          |                           |
| Concomitant diseases reported |                             |            |       |          |                           |
| Total cats with concomitant disease | 4629 (52.1) |          |        |          |                           |
| CKD alone (n = 1692) or with other disease (n = 244) | 1936 (21.8) | 155 | 136–179 | 80–310 | Kruskal–Wallis: P < 0.0001 |
| Hyperthyroidism alone (n = 957) or with other disease (n = 111) | 1068 (12.0) | 160 | 140–181 | 85–300 | Kruskal–Wallis: P < 0.0001 |

(Continued)
Of the 3097 cats reported to be receiving systemic therapy (Table 2), 1000 were receiving antithyroid medication, 528 an angiotensin converting enzyme inhibitor, 380 telmisartan, 311 a non-steroidal anti-inflammatory drug, 106 a beta blocker, 38 pimobendan and 36 spironolactone. A total of 1066 cats were reported to be receiving ‘other’ systemic therapies, and although details of additional drugs were not always declared, 319 cats were reported to be receiving amlodipine, 165 glucocorticoids, 141 antibacterial drugs, 113 insulin and 90 other diuretics (furosemide or torasemide). Multiple (⩾ 2) drug therapy was reported in 682 of the cats. A number of the systemic therapies that were being administered are known to affect SBP, but, as full details of the drugs used, their doses, frequency of administration and duration of use were unavailable, cats were simply classified as receiving concomitant therapy or not.

A breakdown of the cats according to the ACVIM criteria for assessing SBP is shown in Table 3 and Figure 4. As can be seen, there was a statistically significant higher proportion of cats with CKD and/or hyperthyroidism in the hypertensive or severely hypertensive categories (P <0.0001). When only cats that were not receiving any form of systemic therapy were analyzed (n = 5786), there was only a marginal effect on the results, with a slightly higher proportion of cats with CKD (47.6%) and hyperthyroidism (51.1%) falling into the hypertensive range (SBP ⩾ 160 mmHg) and a slightly lower proportion of cats with no disease reported (34.3%) falling into this range.

Simple, non-parametric analysis of median SBP values showed significant differences according to the device used to measure SBP, the demeanor of the cat, the duration of assessment, the presence of concomitant disease and the presence of concomitant therapy (Table 2, Figures 5–9). In addition to the data shown, Spearman’s correlation coefficient showed a statistically significant (P <0.0001) but weak correlation between SBP and age (rs = 0.25) and a statistically significant (P <0.0001) but very weak negative correlation between SBP and body weight (rs = −0.07).
The results of further data analysis with the linear mixed model (including the clinic as a random effect) are shown in Table 4, and revealed a significant independent effect of the cat’s demeanor, duration of assessment, disease status, sex, age and presence of concomitant therapy on the SBP measured in the cats.

**Duration of SBP assessment and associated factors**

For the 4250 cats where factors associated with the duration of SBP were analyzed, results of simple non-parametric analysis of the relationship between duration and the device used to measure SBP, the demeanor of the cat and the SBP measured are shown in Table 5 and Figures 10 and 11.

Results of the further multivariable analysis of the effect of different factors on the duration of SBP assessment (using the proportional odds cumulative logistic model) are shown in Table 6, and showed that only the demeanor of the cats statistically significantly affected the duration of assessment, with the odds of the SBP assessment taking ≥5 mins vs <5 mins being 1.55 for anxious vs calm cats and 2.42 for nervous vs calm cats ($P < 0.001$).
Discussion

This study represents the largest published data of feline SBP measurements to date, and the first to look at measurements conducted in primary care veterinary clinics across numerous countries. The initial aim was to collect data from only European countries, but 26 entries were received from three South American countries (Table 1 and Figure 3) and were also included in the final analyzed dataset, which comprised nearly 9000 unique cat entries. The study was designed to capture data from cats ≥7 years of age where SBP was already being measured as part of their clinical evaluation. An age cutoff of 7 years was applied as hypertension is more common in older cats,\textsuperscript{5,10,17,18} which is also in line with the International Society of Feline Medicine recommendations for routine measurement of SBP in cats.\textsuperscript{18} We did not ask clinics to record the reason(s) for measuring SBP in these cats – while it may have been a screening procedure in an older cat, in others it was probably undertaken owing to the presence of underlying diseases associated with hypertension, because of suspected hypertension based on clinical presentation or as a result of monitoring preexisting hypertension (evident as a number of cats were already receiving antihypertensive therapy).

Overall, we found that 3525 (39.7%) of the cats had a SBP ≥ 160 mmHg and would thus be classified as hypertensive according to current guidelines,\textsuperscript{17,18} with 1872 (21.1%) falling into the severely hypertensive category (SBP ≥ 180 mmHg). This is a higher proportion than the 23.7% of cats aged ≥9 years reported to be hypertensive in a smaller study of SBP measurements in primary care practice in the UK,\textsuperscript{10} but there were differences in the populations studied so direct comparison is not possible. Further, in our study, information was not available on the number of cats already diagnosed with hypertension or the number showing clinical signs of hypertension (eg, hypertensive ocular disease). Although our results suggest a relatively high prevalence of hypertension, not all would necessarily have been classified as hypertensive by the clinicians involved, as other factors would also have been taken into consideration (such as the conditions at the time of measurement and the repeatability of the findings).

In our study, 1564 (44.4%) of the 3525 cats with a SBP ≥ 160 mmHg were reported to have either concomitant CKD (n = 890, 25.2%), hypertthyroidism (n = 538, 15.3%)
Table 4  Linear mixed-model multivariable analysis of factors influencing systolic blood pressure in the study cats, with clinic as a random effect

| Parameter                                                                 | Estimate | 95% CI       | P value |
|---------------------------------------------------------------------------|----------|--------------|---------|
| **Univariate analysis**                                                   |          |              |         |
| Age (for an increase of 1 year)                                          | 0.014    | 0.013–0.015  | <0.001  |
| Sex (male vs female)                                                      | 0.008    | −0.001 to 0.17 | 0.075   |
| Body weight (for an increase of 1 kg)                                     | −0.011   | −0.014 to −0.008 | −0.001 |
| Concomitant treatment (yes vs no)                                         | 0.024    | 0.015–0.033  | <0.001  |
| Demeanor (anxious vs calm)                                               | 0.066    | 0.057–0.075  | <0.001  |
| Demeanor (nervous vs calm)                                               | 0.119    | 0.104–0.134  | <0.001  |
| Device (oscillometry vs Doppler)                                          | 0.008    | −0.007 to 0.023 | 0.333   |
| Duration (5–10 mins vs <5 mins)                                           | 0.036    | 0.025–0.047  | <0.001  |
| Duration (>10 mins vs <5 mins)                                            | 0.044    | 0.025–0.063  | <0.001  |
| CKD + hyperthyroidism vs no disease                                      | 0.058    | 0.033–0.083  | <0.001  |
| CKD vs no disease                                                         | 0.040    | 0.028–0.052  | <0.001  |
| Hyperthyroidism vs no disease                                            | 0.063    | 0.049–0.077  | <0.001  |
| Other disease vs no disease                                               | 0.004    | −0.009 to 0.017 | 0.500   |
| Pedigree vs non-pedigree                                                  | 0.005    | −0.006 to 0.016 | 0.347   |
| **Multivariate analysis (showing only significant results)**              |          |              |         |
| Demeanor (nervous vs calm)                                               | 0.113    | 0.098–0.128  | <0.001  |
| Demeanor (anxious vs calm)                                               | 0.064    | 0.055–0.073  | <0.001  |
| Duration (>10 mins vs <5 mins)                                            | 0.026    | 0.008–0.044  | 0.005   |
| Duration (5–10 mins vs <5 mins)                                           | 0.023    | 0.013–0.033  | <0.001  |
| Hyperthyroidism vs no disease                                            | 0.042    | 0.025–0.059  | <0.001  |
| CKD + hyperthyroidism vs no disease                                      | 0.030    | 0.004–0.056  | 0.026   |
| CKD vs no disease                                                         | 0.028    | 0.015–0.041  | <0.001  |
| Sex (male vs female)                                                      | 0.016    | 0.008–0.024  | <0.001  |
| Age (for an increase of 1 year)                                          | 0.013    | 0.012–0.014  | <0.001  |
| Concomitant treatment (yes vs no)                                         | −0.012   | −0.024 to 0.000 | 0.037   |

Clinic effect = 0.089 (0.082–0.098); P <0.001
CI = confidence interval; CKD = chronic kidney disease

Table 5  Relationship between length of time taken to assess systolic blood pressure (SBP; n = 4250) and the cat’s demeanor, the equipment used and the SBP measured

| Category                | Duration of SBP assessment | Analysis   |
|-------------------------|----------------------------|------------|
|                         | <5 mins | 5–10 mins | >10 mins |
| **All cats**            |          |           |          |
| Equipment               |          |           |          |
| Doppler (n = 1735)      | 792 (45.6) | 772 (44.5) | 171 (9.9) | χ² P = 0.0926 |
| Oscillometry (n = 2375) | 1003 (42.2) | 1124 (47.3) | 248 (10.4) |
| Unknown (n = 140)       | 42       | 79        | 19        |
| **Demeanor**            |          |           |          |
| Calm (n = 2051)         | 1015 (49.5) | 866 (42.2) | 170 (8.3) | χ² P <0.0001 |
| Anxious (n = 1746)      | 670 (38.4) | 899 (51.5) | 177 (10.1) |
| Nervous (n = 346)       | 95 (27.5)  | 168 (48.6) | 83 (24.0)  |
| Unknown (n = 107)       | 57       | 42        | 8         |
| **Median (range) SBP**  | 150.0 (86–277) | 155.0 (80–300) | 156.0 (86–300) | Kruskal–Wallis P = 0.0006* |

Data are n (%) unless otherwise stated
*Dunn’s post-test comparison showed significant differences between <5 mins and 5–10 mins (P = 0.0021) and between <5 mins and >10 mins (P = 0.0168)
or both (n = 136, 3.9%). Compared with cats with no concomitant disease, cats with CKD and/or hyperthyroidism had a significantly higher prevalence of hypertension and significantly higher median SBP values (Tables 2–4, Figures 4 and 8). Inevitably, our results underestimated the true prevalence of CKD and hyperthyroidism in the population studied, as some cats may have had diagnoses made after SBP values were obtained, and others may have had undiagnosed disease because of a lack of investigations. These are limitations of the convenience nature of the study; however, consistent with our likely underestimating the prevalence of concomitant disease, previous publications have reported hypertension to be present in around 20–60% of cats with CKD1,6,53–59 and 15–85% of cats with hyperthyroidism.1,56–59

We chose to use a linear mixed-model multivariable approach to analyze the various factors associated with SBP values in this population of cats. We considered this to be appropriate as it allowed us to include the clinic as a random effect, accounting for the significant variability in SBP values that occurred between clinics (probably because of different selection criteria for cases, as well as differences in methodologies and techniques for measuring SBP). In performing this analysis, we not only found that disease status had a significant impact on SBP, but also that the demeanor of the cat had a marked effect on measured SBP. Smaller effects were seen with duration of SBP assessment, age, sex and treatment status (Table 4, Figures 5–9). In a previously published study of Doppler SBP assessment in 780 apparently healthy cats from rehoming centers in the UK, Payne et al.26 assessed the demeanor of the cats during SBP assessment and found significantly higher SBP values in cats showing more signs of arousal (anxious or nervous cats vs calm cats). We used similar descriptors to classify the demeanor of cats in our study and found very similar results. Median SBP values were approximately 10 mmHg different between calm and anxious cats, and between anxious and nervous cats (Table 4, Figure 6). This finding is important, adding weight to previous observations26 and suggesting that a subjective assessment of the cat’s demeanor may be important in helping to interpret SBP values in clinical practice.

Interestingly, although the difference in median SBP values in cats assessed by Doppler and oscillometry (148 and 154 mmHg, respectively) were significantly different according to the Mann–Whitney test, they did not remain significant in the linear mixed-model analysis. There is no doubt that the type of equipment used to measure

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**Table 6** Proportional odds cumulative logistic mixed model for duration of systolic blood pressure (SBP) assessment (n = 4250)

| Parameter                                      | OR   | 95% CI     | P value |
|------------------------------------------------|------|------------|---------|
| Univariate analysis                            |      |            |         |
| Demeanor (anxious vs calm)                     | 1.50 | 1.34–1.68  | <0.001  |
| Demeanor (nervous vs calm)                     | 2.36 | 1.96–2.84  | <0.001  |
| Device (oscillometry vs Doppler)               | 1.21 | 0.96–1.52  | 0.101   |
| SBP (for an increase of 10 mmHg)              | 1.03 | 1.01–1.05  | <0.001  |
| Multivariate analysis                          |      |            |         |
| Demeanor (anxious vs calm)                     | 1.55 | 1.39–1.74  | <0.001  |
| Demeanor (nervous vs calm)                     | 2.42 | 2.01–2.92  | <0.001  |

OR = odds ratio; CI = confidence interval
indirect SBP can influence the values obtained, and previous studies directly comparing Doppler and oscillometric equipment in conscious cats have often, but not invariably, found oscillometric equipment to significantly underestimate SBP compared with Doppler. However, differences are likely to vary between different models and optimizations of oscillometric equipment, and between different levels of operator training and experience. Had we collected more information on the different types of oscillometric equipment used, it is possible we may have found an effect of device used on SBP measured, but none was evident in the data obtained. Further, we did not collect information on the size of cuff used, site where the cuff was applied or the position of the cat, all of which may have the potential to influence SBP results obtained.

In contrast to the device used, sex was not found to influence median SBP values using the Kruskal–Wallis test, but in the multivariable linear mixed-model analysis the small difference between the higher values in males than females was found to be significant. While some studies have reported no effect of sex on SBP, others have found males to have significantly higher SBP values. Although our results also suggest a potentially higher SBP in male cats, the differences observed were very small and unlikely to be of clinical significance when interpreting SBP results.

The presence of concomitant therapy was associated with a significantly higher SBP in the cats in our study (Table 4, Figure 9), but this finding is difficult to interpret. This study was not designed to provide information on the impact or efficacy of therapies in cats already diagnosed with hypertension, and the higher SBP values in cats receiving concomitant systemic therapy might reflect either the presence of previously diagnosed hypertension and/or other underlying diseases affecting SBP.

We found a small positive relationship between age and SBP values in this study, as has been reported in previous studies. However, whether this is an independent effect of age on SBP (as reported in humans) or whether it may reflect the presence of undiagnosed underlying disease(s) causing secondary increases in SBP remains to be determined. Although simple correlation also suggested a negative association between body weight and SBP, as in some other studies, this was not significant in the linear mixed model, suggesting the apparent association may have been a result of the confounding effect of underlying disease. Although we found no evidence of an effect of pedigree status on SBP values, we did not have enough cats from a range of different breeds to allow a meaningful between-breed comparisons. At least two studies have identified significant differences in SBP between certain breeds among healthy cats, and further work is needed to investigate and quantify potential breed differences and to understand if they might affect clinical interpretation of SBP values.

This study was also designed to provide information on variables that may affect the duration of SBP assessment. Few studies have evaluated the time it takes to measure SBP in cats and yet, anecdotally and in market research surveys of veterinarians (‘Feline hypertension research’, FMR Global Health 2021, unpublished data), the length of time taken to measure SBP is a commonly cited reason for clinicians not undertaking assessments. In our study, analysing data for the 4250 cases where five individual SBP values had been entered (Table 5), the time taken to assess SBP was reported to be ≤10 mins in 89.7% (n = 3812) and 5 mins in 43.2% (n = 1837). These findings are comparable to a previous study, which reported that five Doppler SBP readings were obtained in <5 mins from 37.5% of cats. Interestingly, in that study, one specific oscillometric device was also evaluated and it was reported that five oscillometric readings could only be obtained from 5% of cases in <5 mins and that 55% of cases took >10 mins. In our study, although the specifics of the oscillometric devices used were largely unknown, we found no significant difference in the overall time taken between Doppler and oscillometric devices (Tables 5 and 6, Figure 11). However, in both univariate and multivariate analysis, the subjective assessment of the demeanor of the cat did have a significant influence on the duration of SBP assessment, with it taking longer to measure SBP in cats categorized as anxious or nervous than in those categorized as calm (Tables 5 and 6, Figure 10). Although the SBP measured was also significantly associated with the duration of measurement in univariate analysis, this was not significant in multivariate analysis, probably because of the relationship between demeanor and measured SBP. Several factors contribute to the overall amount of time it takes to measure SBP in a clinical setting (eg, allowing the cat time to acclimatize to the environment, repeating the assessment if there is doubt over the validity of readings, etc), but the data from this study show that the measurement of SBP itself can usually be carried out quickly in a clinical setting, although additional time may be anticipated if cats appear overtly anxious or nervous.

Despite the value of this study, several important limitations also need to be recognized. This was a convenience sample survey designed to collect a large amount of data, but it lacked detailed information on several aspects that might affect SBP values such as the environment, the cuff size and site, the position of the cat and details of the equipment used. Further, only basic information on pre-existing diseases and therapies was collected, without knowledge of whether hypertension had already been diagnosed or what conditions might have been diagnosed at the time of SBP assessment.

**Conclusions**

This large study provides a substantial amount of valuable data that will help inform the clinical practice of feline BP assessment. We found evidence that, in most cats, SBP
can be measured successfully in a short period of time, irrespective of the type of equipment used. However, perhaps unsurprisingly, SBP assessment tends to take longer in cats showing higher levels of anxiety or nervousness. In this population of older cats, we found a high prevalence of potential hypertension, and the recent finding of hypertensive ocular abnormalities in 59% of cats with oscillometric SBP >160 mmHg (or diastolic pressure >100 mmHg)9 illustrates the importance of undertaking SBP measurements. Further, even with severe hypertensive chorioretinopathy, significant clinical improvement is seen with adequate control of the hypertension.70 As in other studies, the presence of CKD and/or hyperthyroidism was significantly associated with the presence of raised SBP values; importantly, we confirmed observations in a previous study,26 which suggested that a subjective assessment of the cat’s demeanor may be an important clinical aid to interpreting SBP values. Finally, our results help to confirm the value of SBP assessment in clinical practice and suggest it can be achieved successfully and quickly in most cases. The results add weight to the greater need for routine SBP assessment, especially in cats at higher risk of hypertension, to improve the generally low frequency of assessment, especially in cats at higher risk of hypertension, to improve the generally low frequency of assessment that is currently undertaken in primary care practice.10,71,72

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Conflict of interest This study was conducted by Ceva Santé Animale. CG-P, EG and TB are employees of Ceva Santé Animale, and AHS acts as a consultant for Ceva Santé Animale.

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Ethical approval The work described in this manuscript involved the use of non-experimental (owned or unowned) animals. Established internationally recognised high standards (‘best practice’) of veterinary clinical care for the individual animals. Established internationally recognised high standards (‘best practice’) of veterinary clinical care for the individual patient were always followed and/or this work involved the use of cadavers. Ethical approval from a committee was therefore not specifically required for publication in JFMS. Although not required, where ethical approval was still obtained, it is stated in the manuscript.

Informed consent Informed consent (verbal or written) was obtained from the owner or legal custodian of all animal(s) described in this work (experimental or non-experimental animals, including cadavers) for all procedure(s) undertaken (prospective or retrospective studies). No animals or people are identifiable within this publication, and therefore additional informed consent for publication was not required.

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